
python-ly Documentation

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1	The <code>ly</code> command	3
1.1	Options	3
1.2	Arguments	3
1.3	Commands	4
1.4	Variables	4
1.5	Examples	5
2	The <code>ly-server</code> command	7
2.1	Server Options	7
2.2	Command Options	7
2.3	HTTP Requests	8
2.3.1	GET Requests	8
2.3.2	POST Requests	8
2.3.3	Response Object	8
2.3.4	Commands	9
2.3.5	Variables	9
2.4	Examples	10
2.4.1	Sample Requests	10
3	The <code>ly</code> package	13
3.1	Module contents	13
3.2	Subpackages	14
3.2.1	<code>ly.lex</code> package	14
3.2.1.1	Module contents	14
3.2.1.2	Submodules	17
3.2.1.3	<code>ly.lex.docbook</code> module	17
3.2.1.4	<code>ly.lex.html</code> module	17
3.2.1.5	<code>ly.lex.latex</code> module	20
3.2.1.6	<code>ly.lex.lilypond</code> module	21
3.2.1.7	<code>ly.lex.scheme</code> module	42
3.2.1.8	<code>ly.lex.texinfo</code> module	45
3.2.2	<code>ly.music</code> package	48
3.2.2.1	Module contents	48
3.2.2.2	Submodules	50
3.2.2.3	<code>ly.music.event</code> module	50
3.2.2.4	<code>ly.music.items</code> module	50
3.2.2.5	<code>ly.music.read</code> module	62

3.2.3	ly.musicxml package	67
3.2.3.1	Module contents	67
3.2.3.2	Submodules	67
3.2.3.3	ly.musicxml.create_musicxml module	67
3.2.3.4	ly.musicxml.ly2xml_mediator module	71
3.2.3.5	ly.musicxml.lymus2musxml module	75
3.2.3.6	ly.musicxml.xml_objs module	78
3.2.4	ly.pitch package	82
3.2.4.1	Module contents	82
3.2.4.2	Submodules	84
3.2.4.3	ly.pitch.abs2rel module	84
3.2.4.4	ly.pitch.rel2abs module	84
3.2.4.5	ly.pitch.translate module	84
3.2.4.6	ly.pitch.transpose module	85
3.2.5	ly.xml package	86
3.2.5.1	Introduction	86
3.2.5.2	Module contents	86
3.2.5.3	The xml-export.ily file	86
3.2.5.4	Example	87
3.2.6	ly.data package	89
3.2.6.1	Module contents	89
3.2.6.2	Submodules	89
3.2.6.3	ly.data.makeschemedata module	89
3.2.7	ly.cli package	90
3.2.7.1	Module contents	90
3.2.7.2	Submodules	90
3.2.7.3	ly.cli.command module	90
3.2.7.4	ly.cli.main module	91
3.2.8	ly.server package	92
3.2.8.1	Module contents	92
3.2.8.2	Submodules	93
3.2.8.3	ly.server.command module	93
3.2.8.4	ly.server.handler module	94
3.2.8.5	ly.server.main module	94
3.2.8.6	ly.server.options module	95
3.3	Submodules	95
3.4	ly.slexer module	95
3.4.1	slexer – Stateful Lexer	95
3.5	ly.document module	100
3.5.1	DocumentBase and Document	100
3.5.2	Cursor	100
3.5.3	Runner	100
3.5.4	Source	100
3.6	ly.docinfo module	106
3.7	ly.barcheck module	107
3.8	ly.colorize module	107
3.9	ly.cursortools module	112
3.10	ly.dom module	112
3.11	ly.duration module	123
3.12	ly.etreeutil module	124
3.13	ly.indent module	124
3.14	ly.node module	125
3.15	ly.pkginfo module	127
3.16	ly.reformat module	127

3.17	ly.rhythm module	128
3.18	ly.util module	129
3.19	ly.words module	130
4	Indices and tables	131
	Python Module Index	133

This package provides a Python library *ly* containing various Python modules to parse, manipulate or create documents in LilyPond format. A command line program *ly* is also provided that can be used to do various manipulations with LilyPond files.

The LilyPond format is a plain text input format that is used by the GNU music typesetter LilyPond (www.lilypond.org).

The python-ly package is Free Software, licensed under the GPL. This package is written by the Frescobaldi developers and is used extensively by the Frescobaldi project. The main author is Wilbert Berendsen.

Download from: <https://pypi.python.org/pypi/python-ly>

Development homepage: <https://github.com/wbsoft/python-ly>

This documentation describes python-ly 0.9.5.

Contents:

CHAPTER 1

The `ly` command

Usage:

```
ly [options] commands file, ...
```

A tool for manipulating LilyPond source files

1.1 Options

- v, --version** show version number and exit
- h, --help** show this help text and exit
- i, --in-place** overwrite input files
- o, --output NAME** output file name
- e, --encoding ENC** (input) encoding (default UTF-8)
- output-encoding ENC** output encoding (default to input encoding)
- l, --language NAME** default pitch name language (default to “nederlands”)
- d <variable=value>** set a variable

The special option `--` considers the remaining arguments to be file names.

1.2 Arguments

The command is one argument with semicolon-separated commands. In most cases you’ll quote the command so that it is seen as one argument.

You can specify more than one LilyPond file. If you want to process many files and write the results of the operations on each file to a separate output file, you can use two special characters in the output filename: a ‘*’ will be replaced with the full path name of the current input file (without extension), and a ‘?’ will be replaced with the input filename

(without path and extension). If you don't want to have '*' or '?' replaced in the output filename, you can set `-d replace-pattern=false`.

If you don't specify input or output filenames, standard input is read and standard output is written to.

1.3 Commands

Informative commands that write information to standard output and do not change the file:

mode print the mode (guessing if not given) of the document

version print the LilyPond version, if set in the document

language print the pitch name language, if set in the document

Commands that change the file:

indent re-indent the file

reformat reformat the file

translate <language> translate the pitch names to the language

transpose <from> <to> transpose the file like LilyPond would do, pitches are given in the 'nederlands' language

abs2rel convert absolute music to relative

rel2abs convert relative music to absolute

simplify-accidentals replace notes with accidentals as much as possible with their natural neighbors

write [filename] write the file to the given filename or the output variable. If the last command was an editing command, write is automatically called.

Commands that export the file to another format:

musicxml [filename] export to MusicXML (in development, far from complete)

highlight [filename] export the document as syntax colored HTML

hl [filename] alias for highlight

Between commands, you can set or unset a variable using:

variable=value set a variable to value. Special values are true, false, which are interpreted as boolean values, or digits, which will be interpreted as integer values.

variable= unset a variable

1.4 Variables

The following variables can be set to influence the behaviour of commands. If there is a default value, it is written between brackets:

mode mode of the file to read (default automatic) can be one of: lilypond, scheme, latex, html, docbook, texinfo.

output [-] the output filename (also set by -o argument)

encoding [UTF-8] encoding to read (also set by -e argument)

default-language [**nederlands**] the pitch names language to use by default, when not specified otherwise in the document

output-encoding encoding to write (defaults to encoding, also set by the `--output-encoding` argument)

in-place [**false**] whether to overwrite input files (same as `-i`)

backup-suffix [**~**] suffix to use when editing files in-place, if set, backs up the original file before overwriting it

replace-pattern [**true**] whether to replace ‘*’ and ‘?’ in the output filename.

rel-startpitch [**true**] whether to write relative music with a startpitch

rel-absolute whether to assume that the first pitch in a relative expression without specified startpitch is absolute. If `false`, it is assumed to be relative to `c`. If `true`, it is assumed to be absolute (in fact relative to `f`. If not set, this variable defaults to `true` only when the LilyPond version in the document `>= 2.18`.

indent-tabs [**false**] whether to use tabs for indent

indent-width [**2**] how many spaces for each indent level (if not using tabs)

full-html [**True**] if set to `True` a full document with syntax-highlighted HTML will be exported, otherwise only the bare content wrapped in an element configured by the `wrapper-` variables.

stylesheet filename to reference as an external stylesheet for syntax-highlighted HTML. This filename is literally used in the `<link rel="stylesheet">` tag.

inline-style [**false**] whether to use inline style attributes for syntax-highlighted HTML. By default a css stylesheet is embedded.

number-lines [**false**] whether to add line numbers when creating syntax-highlighted HTML.

wrapper-tag [**pre**] which tag syntax highlighted HTML will be wrapped in. Possible values: `div`, `pre`, `id` and `code`

wrapper-attribute [**class**] attribute used for the wrapper tag. Possible values: `id` and `class`.

document-id [**lilypond**] name applied to the wrapper-attribute. If the three last options use their default settings the highlighted HTML elements are wrapped in an element `<pre class="lilypond"></pre>`

linenumbers-id [**linenumbers**] if linenumbers are exported this is the name used for the `<td>` elements

These variables influence the output of information commands:

with-filename prints the filename next to information like version, etc. This is `true` by default if there is more than one file specified.

1.5 Examples

Here is an example to re-indent and transpose a LilyPond file:

```
ly "indent; transpose c d" -o output.ly file.ly
```

Examples using the ‘*’ in the output file name:

```
ly "transpose c d" *.ly -o '*-transposed.ly'  
ly highlight *.ly -o 'html/?.html'
```

The `ly-server` command

Usage:

```
ly-server [options]
```

An HTTP server for manipulating LilyPond input code

2.1 Server Options

- | | |
|---------------------------|--|
| -v, --version | show version number and exit |
| -h, --help | show this help text and exit |
| -p, --port PORT | port server listens to (default 5432) |
| -t, --timeout TIME | If set, server shuts down automatically after -t seconds of inactivity
NOT IMPLEMENTED YET! |

2.2 Command Options

- e, --encoding ENC** (input) encoding (default UTF-8)
- output-encoding ENC** output encoding (default to input encoding)
- l, --language NAME** default pitch name language (default to “nederlands”)
- d <variable=value>** set a variable (see below)

Command options define defaults for the execution of commands triggered by HTTP requests. These options can be overridden by the individual HTTP request.

2.3 HTTP Requests

2.3.1 GET Requests

Some GET requests will be implemented later to retrieve values or change some server settings based on the URL path.

2.3.2 POST Requests

The server accepts POST requests without (currently) making use of the URL path. As the request body it expects a single JSON string with the following elements:

commands (mandatory) An array with one or more commands to be executed subsequently. Each entry contains:

command (mandatory): A name for the command. It has to be one out of the list of available commands below.

args (optional): If a command requires arguments (e.g. the `transpose` command) they are given as a single string value.

variables (optional): A dictionary of variable assignments. Keys have to be from the list below, and proper value types are checked. If one or more variables are given they will be set *before* the command is executed. A variable may be modified again before the execution of the next command but it is not reset automatically. Giving a variable with a value of `''` unsets the variable.

options (optional) A dictionary of option assignments. Keys have to be from the above list of Command Options, taking the long name without the leading hyphens, e.g. `{ "encoding": "UTF-16" }`. If an option is given here it overrides the default option given on the command line, but only for the current command.

data (mandatory) A single string containing the LilyPond input document.

The server will try to construct a series of commands from the request, and if anything is wrong with it send a “Bad Request” message with HTTP response code 400.

2.3.3 Response Object

If the commands execute successfully the response body will contain a serialized JSON object with the following elements:

info An array of entries with the result of “info” commands (see below). Each entry has a `command` and an `info` field.

doc An object with two fields:

content A string with the content of the document with all “edit” commands applied consecutively. (If no edit commands have been specified this contains the original input.

commands An array with the names of the commands that have been applied.

exports An array with entries for each applied “export” command. Each entry has the following fields:

doc A string with the content of the converted/exported document

command The name of the applied command

2.3.4 Commands

There are three types of commands whose results are handled independently:

- “info” commands retrieve metadata from the input document
- “edit” commands modify the document, subsequent edit commands cascade the modifications
- “export” commands that convert the input to another format. Subsequent commands are not affected by the result of export commands.

Informative commands that return information and do not change the file:

mode print the mode (guessing if not given) of the document

version print the LilyPond version, if set in the document

language print the pitch name language, if set in the document

Commands that modify the input:

indent re-indent the file

reformat reformat the file

translate <language> translate the pitch names to the language

transpose <from> <to> transpose the file like LilyPond would do, pitches are given in the ‘nederlands’ language

abs2rel convert absolute music to relative

rel2abs convert relative music to absolute

Commands that convert the input to another format:

musicxml convert to MusicXML (in development, far from complete)

highlight export the document as syntax colored HTML

2.3.5 Variables

The following variables can be set to influence the behaviour of commands. If there is a default value, it is written between brackets:

mode mode of the input to read (default automatic) can be one of: lilypond, scheme, latex, html, docbook, texinfo.

encoding [UTF-8] encoding to read (also set by -e argument)

default-language [nederlands] the pitch names language to use by default, when not specified otherwise in the document

output-encoding encoding to write (defaults to encoding, also set by the --output-encoding argument)

indent-tabs [false] whether to use tabs for indent

indent-width [2] how many spaces for each indent level (if not using tabs)

full-html [True] if set to True a full document with syntax-highlighted HTML will be exported, otherwise only the bare content wrapped in an element configured by the `wrapper-` variables.

stylesheet filename to reference as an external stylesheet for syntax-highlighted HTML. This filename is literally used in the `<link rel="stylesheet">` tag.

inline-style [**false**] whether to use inline style attributes for syntax-highlighted HTML. By default a css stylesheet is embedded.

number-lines [**false**] whether to add line numbers when creating syntax-highlighted HTML.

wrapper-tag [**pre**] which tag syntax highlighted HTML will be wrapped in. Possible values: `div`, `pre`, `id` and `code`

wrapper-attribute [**class**] attribute used for the wrapper tag. Possible values: `id` and `class`.

document-id [**lilypond**] name applied to the wrapper-attribute. If the three last options use their default settings the highlighted HTML elements are wrapped in an element `<pre class="lilypond"></pre>`

linenumbers-id [**linenumbers**] if linenumbers are exported this is the name used for the `<td>` elements

2.4 Examples

Here is the basic invocation, listening on port 5432:

```
ly-server
```

Specifying port and a timeout:

```
ly-server -p 4000 -t 5000
```

2.4.1 Sample Requests

The simplest request, just applying one edit command. In this case the result will be in `result['doc']['content']`:

```
{
  'commands': [
    {
      'command': 'indent'
    }
  ],
  'data' : "\relative c' { c ( d e f ) }"
}
```

Another simple request, this time applying an “info” command. The result will be in `result['info']`, containing `lilypond` in the `info` field and `mode` in the `command` field:

```
{
  'commands': [
    {
      'command': 'mode'
    }
  ],
  'data' : "\relative c' { c ( d e f ) }"
}
```

And a more complex example. This will first transpose the document and then convert the transposed version independently to highlighted HTML and MusicXML. Additionally it will retrieve the mode. This time the result will be in

all three places: the transposed document in `doc.content`, the mode in `info.info`, and HTML and MusicXML in `exports[0].doc` and `exports[1].doc`:

```
{
  'commands': [
    {
      'command': 'transpose',
      'args': 'c d'
    },
    {
      'command': 'highlight',
      'variables': { 'full-html': 'false' }
    },
    { 'command': 'musicxml' },
    { 'command': 'mode' },
  ],
  'options': {
    'language': "deutsch"
  },
  'data': "\relative c' { c4 ( d e ) }"
}
```


3.1 Module contents

A package of modules dealing with LilyPond and the LilyPond format.

The `ly` module supports both Python2 and Python3. This is a short description of some modules:

- `ly.slexer`: generic tools to build parsers using regular expressions
- `ly.node`: a generic list-like node object to build tree structures with
- `ly.document`: a tokenized text document (LilyPond file)
- `ly.docinfo`: harvests and caches various information from a LilyPond document
- `ly.lex`: a parser for LilyPond, Scheme, and other formats, using `slexer`
- `ly.music`: a tree structure of the contents of a document
- `ly.pitch`: functions for translating, transposing etc
- `ly.rhythm`: functions dealing with rhythm
- `ly.indent`: indent LilyPond text
- `ly.reformat`: format LilyPond text
- `ly.dom`: (deprecated) tree structure to build LilyPond text from
- `ly.words`: words for highlighting and autocompletion
- `ly.data`: layout objects, properties, interfaces, font glyphs etc extracted from LilyPond
- `ly.cli`: the implementation of the command-line ‘`ly`’ script

A LilyPond document (source file) is held by a `ly.document.Document`. The `Document` class automatically parses and tokenizes the text, also when its contents are changed.

A music tree can be built from a document using the `ly.music` module. In the near future, music trees can be built from scratch and also generate LilyPond output from scratch. At that moment, `ly.dom` is deprecated.

The functions in `ly.pitch`, such as `transpose` and `translate` currently access the tokens in the document, but in the future they will work on the music tree.

3.2 Subpackages

3.2.1 `ly.lex` package

3.2.1.1 Module contents

This module is built on top of `slexer` and can parse LilyPond input and other formats.

The base functionality is delegated to modules with an underscore in this package. The modules describing parsing modes (filetypes) are the files without underscore.

Currently available are modes for `lilypond`, `latex`, `html`, `texinfo`, `scheme`, and `docbook`.

The ‘underscored’ modules should not be imported in application code. What is needed from them is available here, in the `ly.lex` namespace.

If you add new files for parsing other file types, you should add them in `_mode.py`. The `_token.py` module contains base Token types and Token mixin classes.

The `State`, `Parser`, `FallthroughParser` and `Fridge` classes from `slexer` are all slightly extended here,

Usage:

```
>>> import ly.lex
>>> txt = r"\relative c' { c d e f-^ g }"
>>> s = ly.lex.state("lilypond")
>>> for t in s.tokens(txt):
...     print(t, t.__class__.__name__)
\relative Command
  Space
c Name
' Unparsed
  Space
{ SequentialStart
  Space
c Note
  Space
d Note
  Space
e Note
  Space
f Note
- Direction
^ ScriptAbbreviation
  Space
g Note
  Space
} SequentialEnd
```

A `State()` is used to parse text. The text is given to the `tokens()` method, that returns an iterator iterating over Token instances as they are found. Each token has a ‘pos’ and an ‘end’ attribute describing its position in the original string.

While iterating over the `tokens()`, the `State` maintains information about what kind of text is parsed. (So don’t iterate over more than one call to `tokens()` of the same `State` object at the same time.)

Use `ly.lex.state("name")` to get a state for a specific mode to start parsing with. If you don't know the type of text, you can use `ly.lex.guessState(text)`, where `text` is the text you want to parse. A quick heuristic is then used to determine the type of the text.

See for more information the documentation of the `slexer` module.

```
class ly.lex.State (initialParserClass)
    Bases: ly.slexer.State

    endArgument ()
        Decrease argcount and leave the parser if it would reach 0.

    mode ()
        Returns the mode attribute of the first parser (from current parser) that has it.

class ly.lex.Parser (argcount=None)
    Bases: ly.slexer.Parser

    argcount = 0

    default
        alias of ly.lex._token.Unparsed

    freeze ()

    mode = None

    re_flags = 40

class ly.lex.FallthroughParser (argcount=None)
    Bases: ly.lex.Parser, ly.slexer.FallthroughParser

class ly.lex.Fridge (stateClass=<class 'ly.lex.State'>)
    Bases: ly.slexer.Fridge

ly.lex.guessMode (text)
    Tries to guess the type of the input text, using a quite fast heuristic.

    Returns one of the strings also present as key in the modes dictionary.

ly.lex.state (mode)
    Returns a State instance for the given mode.

ly.lex.guessState (text)
    Returns a State instance, guessing the type of text.

class ly.lex.Token
    Bases: ly.slexer.Token

class ly.lex.Unparsed
    Bases: ly.lex._token.Token

    Represents an unparsed piece of input text.

class ly.lex.Space
    Bases: ly.lex._token.Token

    A token containing whitespace.

    rx = u'\\s+'

class ly.lex.Newline
    Bases: ly.lex._token.Space

    A token that is a single newline.
```

```
rx = u'\\n'
```

class `ly.lex.Comment`
Bases: `ly.lex._token.Token`
Base class for tokens that belong to a comment.

class `ly.lex.LineComment`
Bases: `ly.lex._token.Comment`
Base class for items that are a whole line comment.

class `ly.lex.BlockComment`
Bases: `ly.lex._token.Comment`
Base class for tokens that belong to a block/multiline comment.

class `ly.lex.BlockCommentStart`
Bases: `ly.lex._token.BlockComment`
Base class for tokens that start a block/multiline comment.

class `ly.lex.BlockCommentEnd`
Bases: `ly.lex._token.BlockComment`
Base class for tokens that end a block/multiline comment.

class `ly.lex.String`
Bases: `ly.lex._token.Token`
Base class for tokens that belong to a quote-delimited string.

class `ly.lex.StringStart`
Bases: `ly.lex._token.String`
Base class for tokens that start a quote-delimited string.

class `ly.lex.StringEnd`
Bases: `ly.lex._token.String`
Base class for tokens that end a quote-delimited string.

class `ly.lex.Character`
Bases: `ly.lex._token.Token`
Base class for tokens that are an (escaped) character.

class `ly.lex.Numeric`
Bases: `ly.lex._token.Token`
Base class for tokens that are a numerical value.

class `ly.lex.Error`
Bases: `ly.lex._token.Token`
Base class for tokens that represent erroneous input.

class `ly.lex.MatchStart`
Bases: `object`
Mixin class for tokens that have a matching token forward in the text.
The matchname attribute should give a unique name.

```
matchname = u''
```

```
class ly.lex.MatchEnd
    Bases: object

    Mixin class for tokens that have a matching token backward in the text.

    The matchname attribute should give a unique name.

    matchname = u''
```

```
class ly.lex.Indent
    Bases: object

    Mixin class for tokens that have the text on the next line indent more.
```

```
class ly.lex.Dedent
    Bases: object

    Mixin class for tokens that have the text on the next line indent less.
```

3.2.1.2 Submodules

3.2.1.3 ly.lex.docbook module

Parses and tokenizes DocBook input, recognizing LilyPond in DocBook.

```
class ly.lex.docbook.ParseDocBook (argcount=None)
    Bases: ly.lex.Parser

    items = (<class 'ly.lex._token.Space'>,)

    mode = u'docbook'

    pattern = <_sre.SRE_Pattern object>
```

3.2.1.4 ly.lex.html module

Parses and tokenizes HTML input, recognizing LilyPond in HTML.

```
class ly.lex.html.AttrName
    Bases: ly.lex._token.Token

    rx = u'\\w+([-_:]\\w+)?'
```

```
class ly.lex.html.Comment
    Bases: ly.lex._token.Comment
```

```
class ly.lex.html.CommentEnd
    Bases: ly.lex.html.Comment, ly.lex._token.Leaver, ly.lex._token.
    BlockCommentEnd

    rx = u'-->'
```

```
class ly.lex.html.CommentStart
    Bases: ly.lex.html.Comment, ly.lex._token.BlockCommentStart

    rx = u'<!--'

    update_state (state)
```

```
class ly.lex.html.EntityRef
    Bases: ly.lex._token.Character

    rx = u'\\&(#\\d+|[xX][0-9A-Fa-f]+|[A-Za-z_:]([\\w.:-]*))';'
```

```
class ly.lex.html.EqualSign
    Bases: ly.lex._token.Token

    rx = u'='

    update_state (state)

class ly.lex.html.LilyPondCloseTag
    Bases: ly.lex.html.LilyPondTag, ly.lex._token.Leaver

    rx = u'</lilypond>'

class ly.lex.html.LilyPondFileTag
    Bases: ly.lex.html.LilyPondTag

    rx = u'</?lilypondfile\\b'

    update_state (state)

class ly.lex.html.LilyPondFileTagEnd
    Bases: ly.lex.html.LilyPondTag, ly.lex._token.Leaver

    rx = u'/?>'

class ly.lex.html.LilyPondInlineTag
    Bases: ly.lex.html.LilyPondTag

    rx = u'<lilypond\\b'

    update_state (state)

class ly.lex.html.LilyPondInlineTagEnd
    Bases: ly.lex.html.LilyPondTag, ly.lex._token.Leaver

    rx = u'/?>'

class ly.lex.html.LilyPondTag
    Bases: ly.lex.html.Tag

class ly.lex.html.LilyPondTagEnd
    Bases: ly.lex.html.LilyPondTag

    rx = u'>'

    update_state (state)

class ly.lex.html.LilyPondVersionTag
    Bases: ly.lex.html.LilyPondTag

    rx = u'<lilypondversion/?>'

class ly.lex.html.ParseAttr (argcount=None)
    Bases: ly.lex.Parser

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.html.TagEnd'>, <class 'ly.lex.h

    pattern = <_sre.SRE_Pattern object at 0x229fbd0>

class ly.lex.html.ParseComment (argcount=None)
    Bases: ly.lex.Parser

    default
        alias of Comment

    items = (<class 'ly.lex.html.CommentEnd'>,)

    pattern = <_sre.SRE_Pattern object>
```



```

class ly.lex.html.ParseHTML(argcount=None)
    Bases: ly.lex.Parser

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.html.LilyPondVersionTag'>, <class 'ly.lex.html.LilyPondCloseTag'>)
    mode = u'html'
    pattern = <_sre.SRE_Pattern object at 0x15f9bb0>

class ly.lex.html.ParseLilyPond(argcount=None)
    Bases: ly.lex.lilypond.ParseGlobal

    items = (<class 'ly.lex.html.LilyPondCloseTag'>, <class 'ly.lex.lilypond.Book'>, <class 'ly.lex.lilypond.LilyPondVersionTag'>)
    pattern = <_sre.SRE_Pattern object at 0x241b410>

class ly.lex.html.ParseLilyPondAttr(argcount=None)
    Bases: ly.lex.Parser

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.html.AttrName'>, <class 'ly.lex.html.LilyPondCloseTag'>)
    pattern = <_sre.SRE_Pattern object at 0x1e8a630>

class ly.lex.html.ParseLilyPondFileOptions(argcount=None)
    Bases: ly.lex.Parser

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.html.AttrName'>, <class 'ly.lex.html.LilyPondCloseTag'>)
    pattern = <_sre.SRE_Pattern object at 0x219fc20>

class ly.lex.html.ParseLilyPondInline(argcount=None)
    Bases: ly.lex.lilypond.ParseMusic

    items = (<class 'ly.lex.html.LilyPondInlineTagEnd'>, <class 'ly.lex._token.Space'>, <class 'ly.lex.html.LilyPondCloseTag'>)
    pattern = <_sre.SRE_Pattern object at 0x242d210>

class ly.lex.html.ParseStringDQ(argcount=None)
    Bases: ly.lex.Parser

    default
        alias of String

    items = (<class 'ly.lex.html.StringDQEnd'>, <class 'ly.lex.html.EntityRef'>)
    pattern = <_sre.SRE_Pattern object at 0x1953c50>

class ly.lex.html.ParseStringSQ(argcount=None)
    Bases: ly.lex.Parser

    default
        alias of String

    items = (<class 'ly.lex.html.StringSQEnd'>, <class 'ly.lex.html.EntityRef'>)
    pattern = <_sre.SRE_Pattern object at 0x17dcad0>

class ly.lex.html.ParseValue(argcount=None)
    Bases: ly.lex.FallthroughParser

    Finds a value or drops back.

    fallthrough (state)

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.html.Value'>)
    pattern = <_sre.SRE_Pattern object>

```

```
class ly.lex.html.SemiColon
    Bases: ly.lex._token.Token

    rx = u': '

    update_state (state)

class ly.lex.html.String
    Bases: ly.lex._token.String

class ly.lex.html.StringDQEnd
    Bases: ly.lex.html.String, ly.lex._token.StringEnd, ly.lex._token.Leaver

    rx = u'" '

class ly.lex.html.StringDQStart
    Bases: ly.lex.html.String, ly.lex._token.StringStart

    rx = u'" '

    update_state (state)

class ly.lex.html.StringSQEnd
    Bases: ly.lex.html.String, ly.lex._token.StringEnd, ly.lex._token.Leaver

    rx = u"' "

class ly.lex.html.StringSQStart
    Bases: ly.lex.html.String, ly.lex._token.StringStart

    rx = u"' "

    update_state (state)

class ly.lex.html.Tag
    Bases: ly.lex._token.Token

class ly.lex.html.TagEnd
    Bases: ly.lex.html.Tag, ly.lex._token.Leaver

    rx = u'/?>'

class ly.lex.html.TagStart
    Bases: ly.lex.html.Tag

    rx = u'</?\w[-_\w]*\b'

    update_state (state)

class ly.lex.html.Value
    Bases: ly.lex._token.Leaver

    rx = u'\w+'
```

3.2.1.5 ly.lex.latex module

Parses and tokenizes LaTeX input, recognizing LilyPond in LaTeX.

```
class ly.lex.latex.ParseLaTeX (argcount=None)
    Bases: ly.lex.Parser

    items = (<class 'ly.lex._token.Space'>,)

    mode = u'latex'

    pattern = <_sre.SRE_Pattern object>
```

3.2.1.6 ly.lex.lilypond module

Parses and tokenizes LilyPond input.

```

class ly.lex.lilypond.Accidental
    Bases: ly.lex._token.Token

class ly.lex.lilypond.AccidentalCautionary
    Bases: ly.lex.lilypond.Accidental

    rx = u'\\?'

class ly.lex.lilypond.AccidentalReminder
    Bases: ly.lex.lilypond.Accidental

    rx = u'!'

class ly.lex.lilypond.AccidentalStyle
    Bases: ly.lex.lilypond.Command

    rx = u'\\\\\\accidentalStyle\\b'

    update_state(state)

class ly.lex.lilypond.AccidentalStyleSpecifier
    Bases: ly.lex.lilypond.Specifier

    rx = u'\\b(default|voice|modern|modern-cautionary|modern-voice|modern-voice-cautionary|

class ly.lex.lilypond.AlterBroken
    Bases: ly.lex.lilypond.Command

    rx = u'\\\\\\alterBroken\\b'

    update_state(state)

class ly.lex.lilypond.Articulation
    Bases: ly.lex._token.Token

    Base class for articulation things.

class ly.lex.lilypond.ArticulationCommand
    Bases: ly.lex.lilypond.Articulation, ly.lex.lilypond.IdentifierRef

    classmethod test_match(match)

class ly.lex.lilypond.BackSlashedContextName
    Bases: ly.lex.lilypond.ContextName

    rx = u'\\\\\\(ChoirStaff|ChordNames|CueVoice|Devnull|DrumStaff|DrumVoice|Dynamics|Figure

class ly.lex.lilypond.Beam
    Bases: ly.lex._token.Token

class ly.lex.lilypond.BeamEnd
    Bases: ly.lex.lilypond.Beam, ly.lex._token.MatchEnd

    matchname = u'beam'

    rx = u'\\]'

class ly.lex.lilypond.BeamStart
    Bases: ly.lex.lilypond.Beam, ly.lex._token.MatchStart

    matchname = u'beam'

    rx = u'\\['

```

```
class ly.lex.lilypond.BlockComment
    Bases: ly.lex.lilypond.Comment, ly.lex._token.BlockComment

class ly.lex.lilypond.BlockCommentEnd
    Bases: ly.lex.lilypond.Comment, ly.lex._token.BlockCommentEnd, ly.lex._token.
    Leaver

    rx = u'%}'

class ly.lex.lilypond.BlockCommentStart
    Bases: ly.lex.lilypond.Comment, ly.lex._token.BlockCommentStart

    rx = u'%{'

    update_state (state)

class ly.lex.lilypond.Book
    Bases: ly.lex.lilypond.Keyword

    rx = u'\\\\\\book\\\\b'

    update_state (state)

class ly.lex.lilypond.BookPart
    Bases: ly.lex.lilypond.Keyword

    rx = u'\\\\\\bookpart\\\\b'

    update_state (state)

class ly.lex.lilypond.Change
    Bases: ly.lex.lilypond.Translator

    rx = u'\\\\\\change\\\\b'

class ly.lex.lilypond.Chord
    Bases: ly.lex._token.Token

    Base class for Chord delimiters.

class ly.lex.lilypond.ChordEnd
    Bases: ly.lex.lilypond.Chord, ly.lex._token.Leaver

    rx = u'>'

class ly.lex.lilypond.ChordItem
    Bases: ly.lex._token.Token

    Base class for chordmode items.

class ly.lex.lilypond.ChordMode
    Bases: ly.lex.lilypond.InputMode

    rx = u'\\\\\\(chords|chordmode)\\\\b'

    update_state (state)

class ly.lex.lilypond.ChordModifier
    Bases: ly.lex.lilypond.ChordItem

    rx = u'((?<![a-z])|^)(aug|dim|sus|min|maj|m)(?![a-z])'

class ly.lex.lilypond.ChordSeparator
    Bases: ly.lex.lilypond.ChordItem

    rx = u':|\\\\^|/\\\\+?'
```

```

class ly.lex.lilypond.ChordStart
    Bases: ly.lex.lilypond.Chord

    rx = u'<'

    update_state (state)

class ly.lex.lilypond.ChordStepNumber
    Bases: ly.lex.lilypond.ChordItem

    rx = u'\\d+[-+]?'

class ly.lex.lilypond.Clef
    Bases: ly.lex.lilypond.Command

    rx = u'\\\\\\clef\\b'

    update_state (state)

class ly.lex.lilypond.ClefSpecifier
    Bases: ly.lex.lilypond.Specifier

    rx = u'\\b(alto|baritone|bass|C|F|french|G|GG|mezzosoprano|percussion|soprano|subbass|'

    update_state (state)

class ly.lex.lilypond.CloseBracket
    Bases: ly.lex.lilypond.Delimiter, ly.lex._token.MatchEnd, ly.lex._token.Dedent

    matchname = u'bracket'

    rx = u'\\}'

    update_state (state)

class ly.lex.lilypond.CloseBracketMarkup
    Bases: ly.lex.lilypond.CloseBracket

    update_state (state)

class ly.lex.lilypond.CloseSimultaneous
    Bases: ly.lex.lilypond.Delimiter, ly.lex._token.MatchEnd, ly.lex._token.Dedent

    matchname = u'simultaneous'

    rx = u'>>'

    update_state (state)

class ly.lex.lilypond.Command
    Bases: ly.lex._token.Item, ly.lex.lilypond.IdentifierRef

    classmethod test_match (match)

class ly.lex.lilypond.Comment
    Bases: ly.lex._token.Comment

class ly.lex.lilypond.Context
    Bases: ly.lex.lilypond.Translator

    rx = u'\\\\\\context\\b'

class ly.lex.lilypond.ContextName
    Bases: ly.lex._token.Token

    rx = u'\\b(ChoirStaff|ChordNames|CueVoice|Devnull|DrumStaff|DrumVoice|Dynamics|Figured

```

```
class ly.lex.lilypond.ContextProperty
    Bases: ly.lex.lilypond.Variable

    rx = u'\\b(aDueText|accidentalGrouping|additionalPitchPrefix|alignAboveContext|alignBa

class ly.lex.lilypond.DecimalValue
    Bases: ly.lex.lilypond.Value

    rx = u'-'?\\d+(\\.\\d+)?'

class ly.lex.lilypond.Delimiter
    Bases: ly.lex._token.Token

class ly.lex.lilypond.Direction
    Bases: ly.lex._token.Token

    rx = u'[_^]'

    update_state(state)

class ly.lex.lilypond.Dot
    Bases: ly.lex.lilypond.Duration

    rx = u'\\. '

class ly.lex.lilypond.DotChord
    Bases: ly.lex.lilypond.ChordItem

    rx = u'\\. '

class ly.lex.lilypond.DotPath
    Bases: ly.lex.lilypond.Delimiter

    A dot in dotted path notation.

    rx = u'\\. '

class ly.lex.lilypond.DrumChordEnd
    Bases: ly.lex.lilypond.ChordEnd

class ly.lex.lilypond.DrumChordStart
    Bases: ly.lex.lilypond.ChordStart

    update_state(state)

class ly.lex.lilypond.DrumMode
    Bases: ly.lex.lilypond.InputMode

    rx = u'\\\\\\(drums|drummode)\\b'

    update_state(state)

class ly.lex.lilypond.DrumNote
    Bases: ly.lex.lilypond.MusicItem

    rx = u'[a-z]+(?![A-Za-z])'

class ly.lex.lilypond.Duration
    Bases: ly.lex._token.Token

class ly.lex.lilypond.Dynamic
    Bases: ly.lex._token.Token

    rx = u'\\\\\\[<!>]|\\\\\\(f{1,5}|p{1,5}|mf|mp|fp|spp?|sff?|sfz|rfz|cresc|decresc|dim|cr|de

class ly.lex.lilypond.EqualSign
    Bases: ly.lex._token.Token
```



```
class ly.lex.lilypond.ExpectHeader (argcount=None)
    Bases: ly.lex.lilypond.ExpectOpenBracket

    pattern = <_sre.SRE_Pattern object>

    replace
        alias of ParseHeader

class ly.lex.lilypond.ExpectLayout (argcount=None)
    Bases: ly.lex.lilypond.ExpectOpenBracket

    pattern = <_sre.SRE_Pattern object>

    replace
        alias of ParseLayout

class ly.lex.lilypond.ExpectLyricMode (argcount=None)
    Bases: ly.lex.lilypond.ExpectMusicList

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
    pattern = <_sre.SRE_Pattern object at 0x25f4180>

    replace
        alias of ParseLyricMode

class ly.lex.lilypond.ExpectMidi (argcount=None)
    Bases: ly.lex.lilypond.ExpectOpenBracket

    pattern = <_sre.SRE_Pattern object>

    replace
        alias of ParseMidi

class ly.lex.lilypond.ExpectMusicList (argcount=None)
    Bases: ly.lex.FallthroughParser, ly.lex.lilypond.ParseLilyPond

    Waits for an OpenBracket or << and then replaces the parser with the class set in the replace attribute.

    Subclass this to set the destination for the OpenBracket.

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
    pattern = <_sre.SRE_Pattern object at 0x16abc70>

    update_state (state, token)

class ly.lex.lilypond.ExpectNoteMode (argcount=None)
    Bases: ly.lex.lilypond.ExpectMusicList

    replace
        alias of ParseNoteMode

class ly.lex.lilypond.ExpectOpenBracket (argcount=None)
    Bases: ly.lex.FallthroughParser, ly.lex.lilypond.ParseLilyPond

    Waits for an OpenBracket and then replaces the parser with the class set in the replace attribute.

    Subclass this to set the destination for the OpenBracket.

    default
        alias of Error

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
    pattern = <_sre.SRE_Pattern object>
```



```

    update_state (state, token)

class ly.lex.lilypond.ExpectPaper (argcount=None)
    Bases: ly.lex.lilypond.ExpectOpenBracket

    replace
        alias of ParsePaper

class ly.lex.lilypond.ExpectScore (argcount=None)
    Bases: ly.lex.lilypond.ExpectOpenBracket

    replace
        alias of ParseScore

class ly.lex.lilypond.ExpectTranslatorId (argcount=None)
    Bases: ly.lex.FallthroughParser

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
    pattern = <_sre.SRE_Pattern object>

    update_state (state, token)

class ly.lex.lilypond.ExpectWith (argcount=None)
    Bases: ly.lex.lilypond.ExpectOpenBracket

    replace
        alias of ParseWith

class ly.lex.lilypond.Figure
    Bases: ly.lex._token.Token

    Base class for Figure items.

class ly.lex.lilypond.FigureAccidental
    Bases: ly.lex.lilypond.Figure

    A figure accidental.

    rx = u'[-+!]+ '

class ly.lex.lilypond.FigureBracket
    Bases: ly.lex.lilypond.Figure

    rx = u'[][] '

class ly.lex.lilypond.FigureEnd
    Bases: ly.lex.lilypond.Figure, ly.lex._token.Leaver

    rx = u'>'

class ly.lex.lilypond.FigureMode
    Bases: ly.lex.lilypond.InputMode

    rx = u'\\\\\\(figures|figuremode)\\\\b'

    update_state (state)

class ly.lex.lilypond.FigureModifier
    Bases: ly.lex.lilypond.Figure

    A figure modifier.

    rx = u'\\\\\\[\\\\\\!+]|/'

class ly.lex.lilypond.FigureStart
    Bases: ly.lex.lilypond.Figure

```

```
rx = u'<'
update_state (state)
class ly.lex.lilypond.FigureStep
    Bases: ly.lex.lilypond.Figure
    A step figure number or the underscore.
    rx = u'_|\\d+'
class ly.lex.lilypond.Fingering
    Bases: ly.lex.lilypond.Articulation, ly.lex._token.Leaver
    rx = u'\\d+'
class ly.lex.lilypond.Fraction
    Bases: ly.lex.lilypond.Value
    rx = u'\\d+\\/\\d+'
class ly.lex.lilypond.GrobName
    Bases: ly.lex._token.Token
    rx = u'\\b(Accidental|AccidentalCautionary|AccidentalPlacement|AccidentalSuggestion|Am
class ly.lex.lilypond.GrobProperty
    Bases: ly.lex.lilypond.Variable
    rx = u'\\b([a-z]+|[XY]) (-([a-z]+|[XY]))*(?![\\w]) '
class ly.lex.lilypond.Header
    Bases: ly.lex.lilypond.Keyword
    rx = u'\\\\\\header\\b'
    update_state (state)
class ly.lex.lilypond.HeaderVariable
    Bases: ly.lex.lilypond.Variable
    A variable inside Header. Always follow this one by UserVariable.
    classmethod test_match (match)
class ly.lex.lilypond.Hide
    Bases: ly.lex.lilypond.Keyword
    rx = u'\\\\\\hide\\b'
    update_state (state)
class ly.lex.lilypond.Identifier
    Bases: ly.lex._token.Token
    A variable name, like some-variable.
    rx = u'(?![^\\W\\d_]) [^\\W\\d_]+ ([_ -] [^\\W\\d_]+)* (?![_ -]? [^\\W\\d_]) '
class ly.lex.lilypond.IdentifierRef
    Bases: ly.lex._token.Token
    A reference to an identifier, e.g. \\some-variable.
    rx = u'\\\\\\[^\\W\\d_]+ ([_ -] [^\\W\\d_]+)* (?![_ -]? [^\\W\\d_]) '
class ly.lex.lilypond.InputMode
    Bases: ly.lex.lilypond.Command
```

```

class ly.lex.lilypond.IntegerValue
    Bases: ly.lex.lilypond.DecimalValue

    rx = u'\\d+'

class ly.lex.lilypond.KeySignatureMode
    Bases: ly.lex.lilypond.Command

    rx = u'\\\\\\(major|minor|ionian|dorian|phrygian|lydian|mixolydian|aeolian|locrian) (?![A

class ly.lex.lilypond.Keyword
    Bases: ly.lex._token.Item, ly.lex.lilypond.IdentifierRef

    classmethod test_match(match)

class ly.lex.lilypond.Layout
    Bases: ly.lex.lilypond.Keyword

    rx = u'\\\\\\layout\\b'

    update_state(state)

class ly.lex.lilypond.LayoutContext
    Bases: ly.lex.lilypond.Keyword

    rx = u'\\\\\\context\\b'

    update_state(state)

class ly.lex.lilypond.LayoutVariable
    Bases: ly.lex.lilypond.Variable

    A variable inside Header. Always follow this one by UserVariable.

    classmethod test_match(match)

class ly.lex.lilypond.Length
    Bases: ly.lex.lilypond.Duration

    rx = u'\\\\\\(maxima|longa|breve)\\b| (1|2|4|8|16|32|64|128|256|512|1024|2048) (?!\\d) ) '

    update_state(state)

class ly.lex.lilypond.Ligature
    Bases: ly.lex._token.Token

class ly.lex.lilypond.LigatureEnd
    Bases: ly.lex.lilypond.Ligature, ly.lex._token.MatchEnd

    matchname = u'ligature'

    rx = u'\\\\\\\\\\\\]'

class ly.lex.lilypond.LigatureStart
    Bases: ly.lex.lilypond.Ligature, ly.lex._token.MatchStart

    matchname = u'ligature'

    rx = u'\\\\\\\\\\\\['

class ly.lex.lilypond.LineComment
    Bases: ly.lex.lilypond.Comment, ly.lex._token.LineComment

    rx = u'%.*$'

```

```
class ly.lex.lilypond.Lyric
    Bases: ly.lex._token.Item

    Base class for Lyric items.

class ly.lex.lilypond.LyricExtender
    Bases: ly.lex.lilypond.Lyric

    rx = u'__ (?( $| [\\s\\\\\\]) ) '

class ly.lex.lilypond.LyricHyphen
    Bases: ly.lex.lilypond.Lyric

    rx = u'-- (?( $| [\\s\\\\\\]) ) '

class ly.lex.lilypond.LyricMode
    Bases: ly.lex.lilypond.InputMode

    rx = u'\\\\\\\\(lyricmode| ((old)?add)?lyrics|lyricsto)\\\\b'

    update_state (state)

class ly.lex.lilypond.LyricSkip
    Bases: ly.lex.lilypond.Lyric

    rx = u'_ (?( $| [\\s\\\\\\]) ) '

class ly.lex.lilypond.LyricText
    Bases: ly.lex.lilypond.Lyric

    rx = u'^\\\\\\\\\\\\\\\\s\\\\d\\\\"'+

class ly.lex.lilypond.Markup
    Bases: ly.lex._token.Item

    Base class for all markup commands.

class ly.lex.lilypond.MarkupCommand
    Bases: ly.lex.lilypond.Markup, ly.lex.lilypond.IdentifierRef

    A markup command.

    classmethod test_match (match)

    update_state (state)

class ly.lex.lilypond.MarkupLines
    Bases: ly.lex.lilypond.Markup

    rx = u'\\\\\\\\\\markuplines (?! [_-]? [^\\\\W\\\\d]) '

    update_state (state)

class ly.lex.lilypond.MarkupList
    Bases: ly.lex.lilypond.Markup

    rx = u'\\\\\\\\\\markuplist (?! [_-]? [^\\\\W\\\\d]) '

    update_state (state)

class ly.lex.lilypond.MarkupScore
    Bases: ly.lex.lilypond.Markup

    rx = u'\\\\\\\\\\score\\\\b'

    update_state (state)
```

```

class ly.lex.lilypond.MarkupStart
    Bases: ly.lex.lilypond.Markup, ly.lex.lilypond.Command

    rx = u'\\\\\\markup(?:[_-]?[^\W\d]) '
    update_state(state)

class ly.lex.lilypond.MarkupUserCommand
    Bases: ly.lex.lilypond.Markup, ly.lex.lilypond.IdentifierRef

    A user-defined markup (i.e. not in the words markupcommands list).

    update_state(state)

class ly.lex.lilypond.MarkupWord
    Bases: ly.lex._token.Item

    rx = u'^{\}"\\\\\\\\s#%]+'

class ly.lex.lilypond.Midi
    Bases: ly.lex.lilypond.Keyword

    rx = u'\\\\\\midi\\b'
    update_state(state)

class ly.lex.lilypond.MusicItem
    Bases: ly.lex._token.Token

    A note, rest, spacer, \skip or q.

class ly.lex.lilypond.Name
    Bases: ly.lex.lilypond.UserVariable

    A variable name without prefix.

class ly.lex.lilypond.New
    Bases: ly.lex.lilypond.Translator

    rx = u'\\\\\\new\\b'

class ly.lex.lilypond.Note
    Bases: ly.lex.lilypond.MusicItem

    rx = u'[a-x]+(?:[A-Za-z]) '

class ly.lex.lilypond.NoteMode
    Bases: ly.lex.lilypond.InputMode

    rx = u'\\\\\\(notes|notemode)\\b'
    update_state(state)

class ly.lex.lilypond.Octave
    Bases: ly.lex._token.Token

    rx = u",+|'+"

class ly.lex.lilypond.OctaveCheck
    Bases: ly.lex._token.Token

    rx = u"=(,|'+)?"

class ly.lex.lilypond.Omit
    Bases: ly.lex.lilypond.Keyword

    rx = u'\\\\\\omit\\b'

```

```
    update_state (state)
```

```
class ly.lex.lilypond.OpenBracket
```

```
    Bases: ly.lex.lilypond.Delimiter, ly.lex.\_token.MatchStart, ly.lex.\_token.Indent
```

An open bracket, does not enter different parser, subclass or reimplement `Parser.update_state()`.

```
    matchname = u'bracket'
```

```
    rx = u'\\{'
```

```
class ly.lex.lilypond.OpenBracketMarkup
```

```
    Bases: ly.lex.lilypond.OpenBracket
```

```
    update_state (state)
```

```
class ly.lex.lilypond.OpenSimultaneous
```

```
    Bases: ly.lex.lilypond.Delimiter, ly.lex.\_token.MatchStart, ly.lex.\_token.Indent
```

An open double French quote, does not enter different parser, subclass or reimplement `Parser.update_state()`.

```
    matchname = u'simultaneous'
```

```
    rx = u'<<'
```

```
class ly.lex.lilypond.Override
```

```
    Bases: ly.lex.lilypond.Keyword
```

```
    rx = u'\\\\\\override\\b'
```

```
    update_state (state)
```

```
class ly.lex.lilypond.Paper
```

```
    Bases: ly.lex.lilypond.Keyword
```

```
    rx = u'\\\\\\paper\\b'
```

```
    update_state (state)
```

```
class ly.lex.lilypond.PaperVariable
```

```
    Bases: ly.lex.lilypond.Variable
```

A variable inside Paper. Always follow this one by `UserVariable`.

```
    classmethod test_match (match)
```

```
class ly.lex.lilypond.ParseAccidentalStyle (argcount=None)
```

```
    Bases: ly.lex.FallthroughParser
```

```
    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
```

```
    pattern = <_sre.SRE_Pattern object at 0x2631500>
```

```
    update_state (state, token)
```

```
class ly.lex.lilypond.ParseAlterBroken (argcount=None)
```

```
    Bases: ly.lex.FallthroughParser
```

```
    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
```

```
    pattern = <_sre.SRE_Pattern object at 0x1ed3970>
```

```
    update_state (state, token)
```

```
class ly.lex.lilypond.ParseBlockComment (argcount=None)
```

```
    Bases: ly.lex.Parser
```

```

    default
        alias of BlockComment

    items = (<class 'ly.lex.lilypond.BlockCommentEnd'>,)
    pattern = <_sre.SRE_Pattern object>

class ly.lex.lilypond.ParseBook (argcount=None)
    Bases: ly.lex.lilypond.ParseLilyPond
    Parses the expression after \book {, leaving at }

    items = (<class 'ly.lex.lilypond.CloseBracket'>, <class 'ly.lex.lilypond.MarkupStart'>)
    pattern = <_sre.SRE_Pattern object at 0x264a860>

class ly.lex.lilypond.ParseBookPart (argcount=None)
    Bases: ly.lex.lilypond.ParseLilyPond
    Parses the expression after \bookpart {, leaving at }

    items = (<class 'ly.lex.lilypond.CloseBracket'>, <class 'ly.lex.lilypond.MarkupStart'>)
    pattern = <_sre.SRE_Pattern object at 0x2652d60>

class ly.lex.lilypond.ParseChord (argcount=None)
    Bases: ly.lex.lilypond.ParseMusic
    LilyPond inside chords < >

    items = (<class 'ly.lex.lilypond.ErrorInChord'>, <class 'ly.lex.lilypond.ChordEnd'>, <class 'ly.lex.lilypond.ChordModifier'>)
    pattern = <_sre.SRE_Pattern object at 0x266a2a0>

class ly.lex.lilypond.ParseChordItems (argcount=None)
    Bases: ly.lex.FallthroughParser

    items = (<class 'ly.lex.lilypond.ChordSeparator'>, <class 'ly.lex.lilypond.ChordModifier'>)
    pattern = <_sre.SRE_Pattern object at 0x265bcc0>

class ly.lex.lilypond.ParseChordMode (argcount=None)
    Bases: ly.lex.lilypond.ParseInputMode, ly.lex.lilypond.ParseMusic
    Parser for \chords and \chordmode.

    items = (<class 'ly.lex.lilypond.OpenBracket'>, <class 'ly.lex.lilypond.OpenSimultaneous'>)
    pattern = <_sre.SRE_Pattern object at 0x2680570>
    update_state (state, token)

class ly.lex.lilypond.ParseClef (argcount=None)
    Bases: ly.lex.FallthroughParser
    argcount = 1

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <class 'ly.lex.lilypond.Clef'>)
    pattern = <_sre.SRE_Pattern object at 0x2651380>

class ly.lex.lilypond.ParseContext (argcount=None)
    Bases: ly.lex.lilypond.ParseLilyPond
    Parses the expression after (\layout {})\context {, leaving at }

    items = (<class 'ly.lex.lilypond.CloseBracket'>, <class 'ly.lex.lilypond.BackSlashedCommand'>)
    pattern = <_sre.SRE_Pattern object at 0x21be670>

```

```
class ly.lex.lilypond.ParseDecimalValue (argcount=None)
    Bases: ly.lex.FallthroughParser
    Parses a decimal value without a # before it (if present).
    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
    pattern = <_sre.SRE_Pattern object at 0x1945940>

class ly.lex.lilypond.ParseDrumChord (argcount=None)
    Bases: ly.lex.lilypond.ParseMusic
    LilyPond inside chords in drummode < >
    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
    pattern = <_sre.SRE_Pattern object at 0x263ac60>

class ly.lex.lilypond.ParseDrumMode (argcount=None)
    Bases: ly.lex.lilypond.ParseInputMode, ly.lex.lilypond.ParseMusic
    Parser for \drums and \drummode.
    items = (<class 'ly.lex.lilypond.OpenBracket'>, <class 'ly.lex.lilypond.OpenSimultaneous'>, <
    pattern = <_sre.SRE_Pattern object at 0x21db2d0>

class ly.lex.lilypond.ParseDuration (argcount=None)
    Bases: ly.lex.FallthroughParser
    fallthrough (state)
    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
    pattern = <_sre.SRE_Pattern object>

class ly.lex.lilypond.ParseDurationScaling (argcount=None)
    Bases: ly.lex.lilypond.ParseDuration
    fallthrough (state)
    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
    pattern = <_sre.SRE_Pattern object>

class ly.lex.lilypond.ParseFigure (argcount=None)
    Bases: ly.lex.Parser
    Parse inside < > in figure mode.
    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
    pattern = <_sre.SRE_Pattern object at 0x1ed6760>

class ly.lex.lilypond.ParseFigureMode (argcount=None)
    Bases: ly.lex.lilypond.ParseInputMode, ly.lex.lilypond.ParseMusic
    Parser for \figures and \figuremode.
    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
    pattern = <_sre.SRE_Pattern object at 0x2194200>

class ly.lex.lilypond.ParseGlobal (argcount=None)
    Bases: ly.lex.lilypond.ParseLilyPond
    Parses LilyPond from the toplevel of a file.
    items = (<class 'ly.lex.lilypond.Book'>, <class 'ly.lex.lilypond.BookPart'>, <class 'ly.lex.lilypond.Chapter'>)
```



```

    pattern = <_sre.SRE_Pattern object at 0x20d7b60>
    update_state(state, token)

class ly.lex.lilypond.ParseGlobalAssignment(argcount=None)
    Bases: ly.lex.FallthroughParser, ly.lex.lilypond.ParseLilyPond

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <class 'ly.lex.lilypond.MarkupStart'>)
    pattern = <_sre.SRE_Pattern object at 0x20f35d0>
    update_state(state, token)

class ly.lex.lilypond.ParseGrobPropertyPath(argcount=None)
    Bases: ly.lex.FallthroughParser

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <class 'ly.lex.lilypond.MarkupStart'>)
    pattern = <_sre.SRE_Pattern object>
    update_state(state, token)

class ly.lex.lilypond.ParseHeader(argcount=None)
    Bases: ly.lex.lilypond.ParseLilyPond

    Parses the expression after \header {, leaving at }

    items = (<class 'ly.lex.lilypond.CloseBracket'>, <class 'ly.lex.lilypond.MarkupStart'>)
    pattern = <_sre.SRE_Pattern object at 0x229e0c0>

class ly.lex.lilypond.ParseHideOmit(argcount=None)
    Bases: ly.lex.FallthroughParser

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <class 'ly.lex.lilypond.MarkupStart'>)
    pattern = <_sre.SRE_Pattern object at 0x21aeda0>
    update_state(state, token)

class ly.lex.lilypond.ParseInputMode(argcount=None)
    Bases: ly.lex.lilypond.ParseLilyPond

    Base class for parser for mode-changing music commands.

    classmethod update_state(state, token)

class ly.lex.lilypond.ParseLayout(argcount=None)
    Bases: ly.lex.lilypond.ParseLilyPond

    Parses the expression after \layout {, leaving at }

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <class 'ly.lex.lilypond.MarkupStart'>)
    pattern = <_sre.SRE_Pattern object at 0x228dfe0>

class ly.lex.lilypond.ParseLilyPond(argcount=None)
    Bases: ly.lex.Parser

    mode = u'lilypond'

class ly.lex.lilypond.ParseLyricMode(argcount=None)
    Bases: ly.lex.lilypond.ParseInputMode

    Parser for \lyrics, \lyricmode, \addlyrics, etc.

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <class 'ly.lex.lilypond.MarkupStart'>)
    pattern = <_sre.SRE_Pattern object at 0x200a880>

```

```
class ly.lex.lilypond.ParseMarkup (argcount=None)
    Bases: ly.lex.Parser

    items = (<class 'ly.lex.lilypond.MarkupScore'>, <class 'ly.lex.lilypond.MarkupCommand'>, <class 'ly.lex.lilypond.MarkupText'>)
    pattern = <_sre.SRE_Pattern object at 0x22069a0>

class ly.lex.lilypond.ParseMidi (argcount=None)
    Bases: ly.lex.lilypond.ParseLilyPond

    Parses the expression after \midi {, leaving at }

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <class 'ly.lex.lilypond.MidiCommand'>)
    pattern = <_sre.SRE_Pattern object at 0x228dfe0>

class ly.lex.lilypond.ParseMusic (argcount=None)
    Bases: ly.lex.lilypond.ParseLilyPond

    Parses LilyPond music expressions.

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <class 'ly.lex.lilypond.MusicCommand'>)
    pattern = <_sre.SRE_Pattern object at 0x2687480>

class ly.lex.lilypond.ParseNoteMode (argcount=None)
    Bases: ly.lex.lilypond.ParseMusic

    Parser for \notes and \notemode. Same as Music itself.

class ly.lex.lilypond.ParseOverride (argcount=None)
    Bases: ly.lex.lilypond.ParseLilyPond

    argcount = 0

    items = (<class 'ly.lex.lilypond.ContextName'>, <class 'ly.lex.lilypond.DotPath'>, <class 'ly.lex.lilypond.OverrideCommand'>)
    pattern = <_sre.SRE_Pattern object at 0x21caeb0>

    update_state (state, token)

class ly.lex.lilypond.ParsePaper (argcount=None)
    Bases: ly.lex.lilypond.ParseLilyPond

    Parses the expression after \paper {, leaving at }

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <class 'ly.lex.lilypond.PaperCommand'>)
    pattern = <_sre.SRE_Pattern object at 0x2077500>

class ly.lex.lilypond.ParsePitchCommand (argcount=None)
    Bases: ly.lex.FallthroughParser

    argcount = 1

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <class 'ly.lex.lilypond.PitchCommand'>)
    pattern = <_sre.SRE_Pattern object at 0x1675e30>

    update_state (state, token)

class ly.lex.lilypond.ParseRepeat (argcount=None)
    Bases: ly.lex.FallthroughParser

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <class 'ly.lex.lilypond.RepeatCommand'>)
    pattern = <_sre.SRE_Pattern object at 0x22b70a0>
```

```

class ly.lex.lilypond.ParseRevert (argcount=None)
    Bases: ly.lex.FallthroughParser

    parse the arguments of \revert

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <cl
    pattern = <_sre.SRE_Pattern object at 0x222d980>

    update_state (state, token)

class ly.lex.lilypond.ParseScore (argcount=None)
    Bases: ly.lex.lilypond.ParseLilyPond

    Parses the expression after \score {, leaving at }

    items = (<class 'ly.lex.lilypond.CloseBracket'>, <class 'ly.lex.lilypond.Header'>, <cl
    pattern = <_sre.SRE_Pattern object at 0x2225820>

class ly.lex.lilypond.ParseScriptAbbreviationOrFingering (argcount=None)
    Bases: ly.lex.FallthroughParser

    argcount = 1

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <cl
    pattern = <_sre.SRE_Pattern object>

class ly.lex.lilypond.ParseSet (argcount=None)
    Bases: ly.lex.lilypond.ParseLilyPond

    argcount = 0

    items = (<class 'ly.lex.lilypond.ContextName'>, <class 'ly.lex.lilypond.DotPath'>, <cl
    pattern = <_sre.SRE_Pattern object at 0x2256640>

    update_state (state, token)

class ly.lex.lilypond.ParseString (argcount=None)
    Bases: ly.lex.Parser

    default
        alias of String

    items = (<class 'ly.lex.lilypond.StringQuotedEnd'>, <class 'ly.lex.lilypond.StringQuot
    pattern = <_sre.SRE_Pattern object>

class ly.lex.lilypond.ParseTempo (argcount=None)
    Bases: ly.lex.FallthroughParser

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <cl
    pattern = <_sre.SRE_Pattern object at 0x1ffe4f0>

    update_state (state, token)

class ly.lex.lilypond.ParseTempoAfterEqualSign (argcount=None)
    Bases: ly.lex.FallthroughParser

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <cl
    pattern = <_sre.SRE_Pattern object>

class ly.lex.lilypond.ParseTranslator (argcount=None)
    Bases: ly.lex.FallthroughParser

```

```
    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
    pattern = <_sre.SRE_Pattern object at 0x21f6140>
    update_state(state, token)

class ly.lex.lilypond.ParseTranslatorId(argcount=None)
    Bases: ly.lex.FallthroughParser
    argcount = 1
    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
    pattern = <_sre.SRE_Pattern object at 0x1f45570>
    update_state(state, token)

class ly.lex.lilypond.ParseTremolo(argcount=None)
    Bases: ly.lex.FallthroughParser
    items = (<class 'ly.lex.lilypond.TremoloDuration'>,)
    pattern = <_sre.SRE_Pattern object>

class ly.lex.lilypond.ParseTweak(argcount=None)
    Bases: ly.lex.FallthroughParser
    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
    pattern = <_sre.SRE_Pattern object at 0x226f7e0>
    update_state(state, token)

class ly.lex.lilypond.ParseTweakGrobProperty(argcount=None)
    Bases: ly.lex.FallthroughParser
    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
    pattern = <_sre.SRE_Pattern object at 0x2381180>
    update_state(state, token)

class ly.lex.lilypond.ParseUnset(argcount=None)
    Bases: ly.lex.FallthroughParser
    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.lilypond.BlockCommentStart'>, <
    pattern = <_sre.SRE_Pattern object at 0x269f120>
    update_state(state, token)

class ly.lex.lilypond.ParseWith(argcount=None)
    Bases: ly.lex.lilypond.ParseLilyPond
    Parses the expression after \with {, leaving at }
    items = (<class 'ly.lex.lilypond.CloseBracket'>, <class 'ly.lex.lilypond.ContextName'>
    pattern = <_sre.SRE_Pattern object at 0x26c20d0>

class ly.lex.lilypond.Partial
    Bases: ly.lex.lilypond.Command
    rx = u'\\\\\\partial\\\\b'

class ly.lex.lilypond.PhrasingSlurEnd
    Bases: ly.lex.lilypond.SlurEnd
    matchname = u'phrasingslur'
```

```

    rx = u'\\\\\\\\)'
class ly.lex.lilypond.PhrasingSlurStart
    Bases: ly.lex.lilypond.SlurStart
    matchname = u'phrasingslur'
    rx = u'\\\\\\\\('
class ly.lex.lilypond.PipeSymbol
    Bases: ly.lex.lilypond.Delimiter
    rx = u'\\|'
class ly.lex.lilypond.PitchCommand
    Bases: ly.lex.lilypond.Command
    rx = u'\\\\\\(relative|transpose|transposition|key|octaveCheck)\\\\b'
    update_state(state)
class ly.lex.lilypond.Q
    Bases: ly.lex.lilypond.MusicItem
    rx = u'q(?:[A-Za-z])'
class ly.lex.lilypond.Repeat
    Bases: ly.lex.lilypond.Command
    rx = u'\\\\\\repeat(?:[A-Za-z])'
    update_state(state)
class ly.lex.lilypond.RepeatCount
    Bases: ly.lex.lilypond.IntegerValue, ly.lex._token.Leaver
class ly.lex.lilypond.RepeatSpecifier
    Bases: ly.lex.lilypond.Specifier
    rx = u'\\\\b(unfold|percent|volta|tremolo)(?:[A-Za-z])'
class ly.lex.lilypond.Rest
    Bases: ly.lex.lilypond.MusicItem
    rx = u'[Rr](?:[A-Za-z])'
class ly.lex.lilypond.Revert
    Bases: ly.lex.lilypond.Override
    rx = u'\\\\\\revert\\\\b'
    update_state(state)
class ly.lex.lilypond.Scaling
    Bases: ly.lex.lilypond.Duration
    rx = u'\\\\*\\\\[\\\\t ]*\\\\d+(/\\\\d+)?'
class ly.lex.lilypond.SchemeStart
    Bases: ly.lex._token.Item
    rx = u'[#$](?:[{}])'
    update_state(state)
class ly.lex.lilypond.Score
    Bases: ly.lex.lilypond.Keyword

```

```
rx = u'\\\\score\\b'
update_state(state)

class ly.lex.lilypond.ScriptAbbreviation
    Bases: ly.lex.lilypond.Articulation, ly.lex._token.Leaver

    rx = u'[+|!>._^-]'

class ly.lex.lilypond.SequentialEnd
    Bases: ly.lex.lilypond.CloseBracket

class ly.lex.lilypond.SequentialStart
    Bases: ly.lex.lilypond.OpenBracket

    update_state(state)

class ly.lex.lilypond.Set
    Bases: ly.lex.lilypond.Override

    rx = u'\\\\set\\b'
    update_state(state)

class ly.lex.lilypond.SimultaneousEnd
    Bases: ly.lex.lilypond.CloseSimultaneous

class ly.lex.lilypond.SimultaneousOrSequentialCommand
    Bases: ly.lex.lilypond.Keyword

    rx = u'\\\\(simultaneous|sequential)\\b'

class ly.lex.lilypond.SimultaneousStart
    Bases: ly.lex.lilypond.OpenSimultaneous

    update_state(state)

class ly.lex.lilypond.Skip
    Bases: ly.lex.lilypond.MusicItem

    rx = u'\\\\skip(?:[_-]?[^\W\d])'

class ly.lex.lilypond.Slur
    Bases: ly.lex._token.Token

class ly.lex.lilypond.SlurEnd
    Bases: ly.lex.lilypond.Slur, ly.lex._token.MatchEnd

    matchname = u'slur'
    rx = u'\\)'

class ly.lex.lilypond.SlurStart
    Bases: ly.lex.lilypond.Slur, ly.lex._token.MatchStart

    matchname = u'slur'
    rx = u'\\('

class ly.lex.lilypond.Spacer
    Bases: ly.lex.lilypond.MusicItem

    rx = u's(?:[A-Za-z])'

class ly.lex.lilypond.Specifier
    Bases: ly.lex._token.Token
```

```

class ly.lex.lilypond.String
    Bases: ly.lex._token.String

class ly.lex.lilypond.StringNumber
    Bases: ly.lex.lilypond.Articulation

    rx = u'\\\\\\\\d+'

class ly.lex.lilypond.StringQuoteEscape
    Bases: ly.lex._token.Character

    rx = u'\\\\\\\\[\\\\\\\\"]'

class ly.lex.lilypond.StringQuotedEnd
    Bases: ly.lex.lilypond.String, ly.lex._token.StringEnd

    rx = u'"""'

    update_state(state)

class ly.lex.lilypond.StringQuotedStart
    Bases: ly.lex.lilypond.String, ly.lex._token.StringStart

    rx = u'"""'

    update_state(state)

class ly.lex.lilypond.Tempo
    Bases: ly.lex.lilypond.Command

    rx = u'\\\\\\\\tempo\\\\b'

    update_state(state)

class ly.lex.lilypond.TempoSeparator
    Bases: ly.lex.lilypond.Delimiter

    rx = u'[-~] (?!\\\\s*\\\\d) '

class ly.lex.lilypond.Tie
    Bases: ly.lex.lilypond.Slur

    rx = u'~'

class ly.lex.lilypond.Translator
    Bases: ly.lex.lilypond.Command

    update_state(state)

class ly.lex.lilypond.Tremolo
    Bases: ly.lex._token.Token

class ly.lex.lilypond.TremoloColon
    Bases: ly.lex.lilypond.Tremolo

    rx = u':'

    update_state(state)

class ly.lex.lilypond.TremoloDuration
    Bases: ly.lex.lilypond.Tremolo, ly.lex._token.Leaver

    rx = u'\\\\b(8|16|32|64|128|256|512|1024|2048) (?!\\\\d) '

class ly.lex.lilypond.Tweak
    Bases: ly.lex.lilypond.Keyword

```

```
rx = u'\\\\\\tweak\\\\b'
update_state(state)

class ly.lex.lilypond.Unit
    Bases: ly.lex.lilypond.Command

    rx = u'\\\\\\(mm|cm|in|pt)\\\\b'

class ly.lex.lilypond.Unset
    Bases: ly.lex.lilypond.Keyword

    rx = u'\\\\\\unset\\\\b'

    update_state(state)

class ly.lex.lilypond.UserCommand
    Bases: ly.lex.lilypond.IdentifierRef

class ly.lex.lilypond.UserVariable
    Bases: ly.lex.lilypond.Identifier

class ly.lex.lilypond.Value
    Bases: ly.lex._token.Item, ly.lex._token.Numeric

class ly.lex.lilypond.Variable
    Bases: ly.lex.lilypond.Identifier

class ly.lex.lilypond.VoiceSeparator
    Bases: ly.lex.lilypond.Delimiter

    rx = u'\\\\\\\\\\\\\\\\\\\\'

class ly.lex.lilypond.With
    Bases: ly.lex.lilypond.Keyword

    rx = u'\\\\\\with\\\\b'

    update_state(state)
```

3.2.1.7 ly.lex.scheme module

Parses and tokenizes Scheme input.

```
class ly.lex.scheme.BlockComment
    Bases: ly.lex.scheme.Comment, ly.lex._token.BlockComment

class ly.lex.scheme.BlockCommentEnd
    Bases: ly.lex.scheme.Comment, ly.lex._token.BlockCommentEnd, ly.lex._token.Leaver

    rx = u'!#'

class ly.lex.scheme.BlockCommentStart
    Bases: ly.lex.scheme.Comment, ly.lex._token.BlockCommentStart

    rx = u'#!'

    update_state(state)

class ly.lex.scheme.Bool
    Bases: ly.lex.scheme.Scheme, ly.lex._token.Item

    rx = u'#[tf]\\\\b'
```



```

class ly.lex.scheme.Char
    Bases: ly.lex.scheme.Scheme, ly.lex._token.Item

    rx = u'#\\\\\\\\([a-z]+|.)'

class ly.lex.scheme.CloseParen
    Bases: ly.lex.scheme.Scheme, ly.lex._token.MatchEnd, ly.lex._token.Dedent

    matchname = u'schemeparen'

    rx = u'\\\\)'

    update_state(state)

class ly.lex.scheme.Comment
    Bases: ly.lex._token.Comment

class ly.lex.scheme.Constant
    Bases: ly.lex.scheme.Word

    classmethod test_match(match)

class ly.lex.scheme.Dot
    Bases: ly.lex.scheme.Scheme

    rx = u'\\\\.(?!\\\\S)'

class ly.lex.scheme.Float
    Bases: ly.lex.scheme.Number

    rx = u'-?(\\\\\\\\d+(\\\\\\\\.\\\\\\\\d*)|\\\\\\\\.\\\\\\\\d+)(E\\\\\\\\d+)?(?:$|[]\\\\s])'

class ly.lex.scheme.Fraction
    Bases: ly.lex.scheme.Number

    rx = u'-?\\\\\\\\d+ / \\\\.d+(?=$|[]\\\\s])'

class ly.lex.scheme.Function
    Bases: ly.lex.scheme.Word

    classmethod test_match(match)

class ly.lex.scheme.Keyword
    Bases: ly.lex.scheme.Word

    classmethod test_match(match)

class ly.lex.scheme.LilyPond
    Bases: ly.lex._token.Token

class ly.lex.scheme.LilyPondEnd
    Bases: ly.lex.scheme.LilyPond, ly.lex._token.Leaver, ly.lex._token.MatchEnd,
ly.lex._token.Dedent

    matchname = u'schemelily'

    rx = u'#}'

class ly.lex.scheme.LilyPondStart
    Bases: ly.lex.scheme.LilyPond, ly.lex._token.MatchStart, ly.lex._token.Indent

    matchname = u'schemelily'

    rx = u'#{'

    update_state(state)

```

```
class ly.lex.scheme.LineComment
    Bases: ly.lex.scheme.Comment, ly.lex._token.LineComment

    rx = u';.*$'

class ly.lex.scheme.Number
    Bases: ly.lex._token.Item, ly.lex._token.Numeric

    rx = u'(-?\d+|#[b[0-1]+|o[0-7]+|x[0-9a-fA-F]+)|[-+]?inf.0|[-+]?nan.0)(?=$|[]\s))'

class ly.lex.scheme.OpenParen
    Bases: ly.lex.scheme.Scheme, ly.lex._token.MatchStart, ly.lex._token.Indent

    matchname = u'schemeparen'

    rx = u'\('

    update_state(state)

class ly.lex.scheme.ParseBlockComment(argcount=None)
    Bases: ly.lex.Parser

    default
        alias of BlockComment

    items = (<class 'ly.lex.scheme.BlockCommentEnd'>,)

    pattern = <_sre.SRE_Pattern object>

class ly.lex.scheme.ParseLilyPond(argcount=None)
    Bases: ly.lex.lilypond.ParseMusic

    items = (<class 'ly.lex.scheme.LilyPondEnd'>, <class 'ly.lex._token.Space'>, <class 'ly.lex._token.LilyPondEnd'>,)

    pattern = <_sre.SRE_Pattern object at 0x2c79740>

class ly.lex.scheme.ParseScheme(argcount=None)
    Bases: ly.lex.Parser

    items = (<class 'ly.lex._token.Space'>, <class 'ly.lex.scheme.OpenParen'>, <class 'ly.lex._token.LilyPondEnd'>,)

    mode = u'scheme'

    pattern = <_sre.SRE_Pattern object at 0x26a9da0>

class ly.lex.scheme.ParseString(argcount=None)
    Bases: ly.lex.Parser

    default
        alias of String

    items = (<class 'ly.lex.scheme.StringQuotedEnd'>, <class 'ly.lex.scheme.StringQuoteEsc'>,)

    pattern = <_sre.SRE_Pattern object>

class ly.lex.scheme.Quote
    Bases: ly.lex.scheme.Scheme

    rx = u"['` ,]"

class ly.lex.scheme.Scheme
    Bases: ly.lex._token.Token

    Baseclass for Scheme tokens.

class ly.lex.scheme.String
    Bases: ly.lex._token.String
```

```

class ly.lex.scheme.StringQuoteEscape
    Bases: ly.lex._token.Character

    rx = u'\\\\\\\\[\\\\\\\\"]'

class ly.lex.scheme.StringQuotedEnd
    Bases: ly.lex.scheme.String, ly.lex._token.StringEnd

    rx = u'"""'

    update_state(state)

class ly.lex.scheme.StringQuotedStart
    Bases: ly.lex.scheme.String, ly.lex._token.StringStart

    rx = u'"""'

    update_state(state)

class ly.lex.scheme.Variable
    Bases: ly.lex.scheme.Word

    classmethod test_match(match)

class ly.lex.scheme.VectorStart
    Bases: ly.lex.scheme.OpenParen

    rx = u'#\\('

class ly.lex.scheme.Word
    Bases: ly.lex.scheme.Scheme, ly.lex._token.Item

    rx = u'[^(){}\\s]+'

```

3.2.1.8 ly.lex.texinfo module

Parses and tokenizes Texinfo input, recognizing LilyPond in Texinfo.

```

class ly.lex.texinfo.Accent
    Bases: ly.lex.texinfo.EscapeChar

    rx = u'@[\\'"\',=^`~] (\\{[a-zA-Z]\\}|[a-zA-Z]\\b)'

class ly.lex.texinfo.Attribute
    Bases: ly.lex._token.Token

class ly.lex.texinfo.Block
    Bases: ly.lex._token.Token

class ly.lex.texinfo.BlockCommentEnd
    Bases: ly.lex.texinfo.Comment, ly.lex._token.Leaver, ly.lex._token.
    BlockCommentEnd

    rx = u'@end\\s+ignore\\b'

class ly.lex.texinfo.BlockCommentStart
    Bases: ly.lex.texinfo.Comment, ly.lex._token.BlockCommentStart

    rx = u'@ignore\\b'

    update_state(state)

class ly.lex.texinfo.BlockEnd
    Bases: ly.lex.texinfo.Block, ly.lex._token.Leaver

```

```
    rx = u'\\}'

class ly.lex.texinfo.BlockStart
    Bases: ly.lex.texinfo.Block

    rx = u'@[a-zA-Z]+\\{'

    update_state(state)

class ly.lex.texinfo.Comment
    Bases: ly.lex._token.Comment

class ly.lex.texinfo.EscapeChar
    Bases: ly.lex._token.Character

    rx = u'@[@{}]'

class ly.lex.texinfo.Keyword
    Bases: ly.lex._token.Token

    rx = u'@[a-zA-Z]+'

class ly.lex.texinfo.LilyPondAttrEnd
    Bases: ly.lex.texinfo.Attribute, ly.lex._token.Leaver

    rx = u'\\}'

class ly.lex.texinfo.LilyPondAttrStart
    Bases: ly.lex.texinfo.Attribute

    rx = u'\\['

    update_state(state)

class ly.lex.texinfo.LilyPondBlockEnd
    Bases: ly.lex.texinfo.Block, ly.lex._token.Leaver

    rx = u'\\}'

class ly.lex.texinfo.LilyPondBlockStart
    Bases: ly.lex.texinfo.Block

    rx = u'@lilypond(?:\\[[a-zA-Z,=0-9\\\\\\\\\\\\s]+\\\\\\])?\\{\\}'

    update_state(state)

class ly.lex.texinfo.LilyPondBlockStartBrace
    Bases: ly.lex.texinfo.Block

    rx = u'\\{'

    update_state(state)

class ly.lex.texinfo.LilyPondEnvEnd
    Bases: ly.lex.texinfo.Keyword, ly.lex._token.Leaver

    rx = u'@end\\s+lilypond\\b'

class ly.lex.texinfo.LilyPondEnvStart
    Bases: ly.lex.texinfo.Keyword

    rx = u'@lilypond\\b'

    update_state(state)

class ly.lex.texinfo.LilyPondFileStart
    Bases: ly.lex.texinfo.Block
```

```

    rx = u'@lilypondfile\\b'
    update_state(state)

class ly.lex.texinfo.LilyPondFileStartBrace
    Bases: ly.lex.texinfo.Block

    rx = u'\\{'
    update_state(state)

class ly.lex.texinfo.LineComment
    Bases: ly.lex.texinfo.Comment, ly.lex._token.LineComment

    rx = u'@c\\b.*$'

class ly.lex.texinfo.ParseBlock(argcount=None)
    Bases: ly.lex.Parser

    items = (<class 'ly.lex.texinfo.BlockEnd'>, <class 'ly.lex.texinfo.Accent'>, <class 'ly.lex.texinfo.LilyPondBlockEnd'>, <class 'ly.lex.texinfo.LilyPondBlockAttr'>, <class 'ly.lex.texinfo.LilyPondBlockEnv'>, <class 'ly.lex.texinfo.LilyPondBlockEnvAttr'>)
    pattern = <_sre.SRE_Pattern object at 0x1e9eb90>

class ly.lex.texinfo.ParseComment(argcount=None)
    Bases: ly.lex.Parser

    default
        alias of Comment

    items = (<class 'ly.lex.texinfo.BlockCommentEnd'>,)
    pattern = <_sre.SRE_Pattern object>

class ly.lex.texinfo.ParseLilyPondAttr(argcount=None)
    Bases: ly.lex.Parser

    default
        alias of Attribute

    items = (<class 'ly.lex.texinfo.LilyPondAttrEnd'>,)
    pattern = <_sre.SRE_Pattern object>

class ly.lex.texinfo.ParseLilyPondBlock(argcount=None)
    Bases: ly.lex.lilypond.ParseGlobal

    items = (<class 'ly.lex.texinfo.LilyPondBlockEnd'>, <class 'ly.lex.lilypond.Book'>, <class 'ly.lex.lilypond.LilyPondBlockAttr'>, <class 'ly.lex.lilypond.LilyPondBlockEnv'>, <class 'ly.lex.lilypond.LilyPondBlockEnvAttr'>)
    pattern = <_sre.SRE_Pattern object at 0x2d68690>

class ly.lex.texinfo.ParseLilyPondBlockAttr(argcount=None)
    Bases: ly.lex.Parser

    items = (<class 'ly.lex.texinfo.LilyPondAttrStart'>, <class 'ly.lex.texinfo.LilyPondBlockEnd'>, <class 'ly.lex.lilypond.LilyPondBlockAttr'>, <class 'ly.lex.lilypond.LilyPondBlockEnv'>, <class 'ly.lex.lilypond.LilyPondBlockEnvAttr'>)
    pattern = <_sre.SRE_Pattern object>

class ly.lex.texinfo.ParseLilyPondEnv(argcount=None)
    Bases: ly.lex.lilypond.ParseGlobal

    items = (<class 'ly.lex.texinfo.LilyPondEnvEnd'>, <class 'ly.lex.lilypond.Book'>, <class 'ly.lex.lilypond.LilyPondBlockEnd'>, <class 'ly.lex.lilypond.LilyPondBlockAttr'>, <class 'ly.lex.lilypond.LilyPondBlockEnv'>, <class 'ly.lex.lilypond.LilyPondBlockEnvAttr'>)
    pattern = <_sre.SRE_Pattern object at 0x2ce4720>

class ly.lex.texinfo.ParseLilyPondEnvAttr(argcount=None)
    Bases: ly.lex.FallthroughParser

    fallthrough(state)

```

```
    items = (<class 'ly.lex.texinfo.LilyPondAttrStart'>,)
    pattern = <_sre.SRE_Pattern object>
class ly.lex.texinfo.ParseLilyPondFile (argcount=None)
    Bases: ly.lex.Parser
    items = (<class 'ly.lex.texinfo.LilyPondAttrStart'>, <class 'ly.lex.texinfo.LilyPondFi
    pattern = <_sre.SRE_Pattern object>
class ly.lex.texinfo.ParseTexinfo (argcount=None)
    Bases: ly.lex.Parser
    items = (<class 'ly.lex.texinfo.LineComment'>, <class 'ly.lex.texinfo.BlockCommentStar
    mode = u'texinfo'
    pattern = <_sre.SRE_Pattern object at 0x2cb0350>
class ly.lex.texinfo.ParseVerbatim (argcount=None)
    Bases: ly.lex.Parser
    default
        alias of Verbatim
    items = (<class 'ly.lex.texinfo.VerbatimEnd'>,)
    pattern = <_sre.SRE_Pattern object>
class ly.lex.texinfo.Verbatim
    Bases: ly.lex._token.Token
class ly.lex.texinfo.VerbatimEnd
    Bases: ly.lex.texinfo.Keyword, ly.lex._token.Leaver
    rx = u'@end\\s+verbatim\\b'
class ly.lex.texinfo.VerbatimStart
    Bases: ly.lex.texinfo.Keyword
    rx = u'@verbatim\\b'
    update_state (state)
```

3.2.2 ly.music package

3.2.2.1 Module contents

An api to read music from the tokens of a `ly.document.Document` into a tree structure.

This is meant to quickly read music from a document, to perform modifications on the document, and to interpret music and markup and to convert or export it to other formats.

All nodes are a subclass of `items.Item`, (which inherits from `node.WeakNode`).

Tree structures are created from nested LilyPond structures, markup and scheme code. Some Item types have special methods to query information. The Music type, for example, has a `length()` method that returns the duration of the music fragment.

Using the `Music.events()` method and the `events` module, it is possible to iterate in musical time over the music tree, e.g. to convert music to another format.

This package is not yet capable to construct documents entirely from scratch. This needs to be developed. Until that time, the `ly.dom` module can be used instead.

Some Item types can have a list of child items, but the tree structure is as linear as possible.

A convenience function is available to create a `ly.music.items.Document` instance for the specified `ly.document.Document`.

Here is an example:

```
>>> import ly.document
>>> import ly.music
>>> d=ly.document.Document(r'''
\version "2.18.0"

music = \relative {
  \time 4/4
  \key d \minor
  d4 e f g
  a g f e
  d2
}

\score {
  \new Staff <<
    \music
  >>
}
''')
>>> m=ly.music.document(d)
>>> print m.dump()
<Document>
  <Version u'\\version'>
    <String u''''>
  <Assignment u'music'>
    <Relative u'\\relative'>
      <MusicList u'{'>
        <TimeSignature u'\\time'>
        <KeySignature u'\\key'>
          <Note u'd'>
          <Command u'\\minor'>
          <Note u'd'>
          <Note u'e'>
          <Note u'f'>
          <Note u'g'>
          <Note u'a'>
          <Note u'g'>
          <Note u'f'>
          <Note u'e'>
          <Note u'd'>
        <Score u'\\score'>
          <Context u'\\new'>
            <MusicList u'<<'>
              <UserCommand u'\\music'>
>>> m[2][0][0]
<MusicList u'<<'>
>>> m[2][0][0].length()
Fraction(5, 2)
>>>
```

`ly.music.document` (*doc*)

Return a `music.items.Document` instance for the `ly.document.Document`.

3.2.2.2 Submodules

3.2.2.3 `ly.music.event` module

Translates a `music.items.Document` tree into lists of events.

class `ly.music.event.Events`

Bases: `object`

Traverses a music tree and records music events from it.

read (*node*, *time=0*, *scaling=1*)

Read events from the node and all its child nodes; return time.

traverse (*node*, *time*, *scaling*)

Traverse node and call event handlers; record and return the time.

unfold_repeats = **False**

3.2.2.4 `ly.music.items` module

The items a music expression is constructed with in a tree structure.

Whitespace and comments are left out.

All nodes (instances of `Item`) have a ‘position’ attribute that indicates where the item starts in the source text. Almost all items have the token that starts the expression in the ‘token’ attribute and possibly other tokens in the ‘tokens’ attribute, as a tuple.

The ‘end_position()’ method returns the position where the node (including its child nodes) ends.

You can get the whole tree structure of a LilyPond document by instantiating a `Document` with the `ly.document.Document` instance. (It will read all the tokens from the document using the `Reader` from the `read` module.) As a convenience, the `ly.music.document(doc)` function does this.

If you want to add new `Item` types, you should also add a method to `read.Reader` to construct those items.

class `ly.music.items.Absolute` (*parent=None*)

Bases: `ly.music.items.Music`

An absolute music expression. Has one child (normally `Music`).

class `ly.music.items.AfterGrace` (*parent=None*)

Bases: `ly.music.items.Music`

The `afterGrace` function with its two arguments.

Only the duration of the first is counted.

class `ly.music.items.Alternative` (*parent=None*)

Bases: `ly.music.items.Music`

An alternative expression.

class `ly.music.items.Articulation` (*parent=None*)

Bases: `ly.music.items.Item`

An articulation, fingering, string number, or other symbol.


```

class ly.music.items.Assignment (parent=None)
    Bases: ly.music.items.Item

    A variable = value construct.

    name ()
        The variable name.

    value ()
        The assigned value.

class ly.music.items.Beam (parent=None)
    Bases: ly.music.items.Item

    A [ or ].

    event = None

class ly.music.items.Book (parent=None)
    Bases: ly.music.items.Container

    A book { ... } construct.

class ly.music.items.BookPart (parent=None)
    Bases: ly.music.items.Container

    A bookpart { ... } construct.

class ly.music.items.Change (parent=None)
    Bases: ly.music.items.Translator

    A change music expression.

class ly.music.items.Chord (parent=None)
    Bases: ly.music.items.Durable, ly.music.items.Container

class ly.music.items.ChordItem (parent=None)
    Bases: ly.music.items.Item

    An item inside a ChordSpecifier, e.g. a number or modifier.

class ly.music.items.ChordMode (parent=None)
    Bases: ly.music.items.InputMode

    A chordmode or chords expression.

class ly.music.items.ChordSpecifier (parent=None)
    Bases: ly.music.items.Item

    Chord specifications after a note in chord mode.

    Has children of Note or ChordItem class.

class ly.music.items.Clef (parent=None)
    Bases: ly.music.items.Item

    A clef item.

    specifier ()

class ly.music.items.Command (parent=None)
    Bases: ly.music.items.Item

    A LilyPond command.

```

```
class ly.music.items.Container (parent=None)
    Bases: ly.music.items.Item

    An item having a list of child items.

class ly.music.items.Context (parent=None)
    Bases: ly.music.items.Translator, ly.music.items.Music

    A new or context music expression.

class ly.music.items.Document (doc)
    Bases: ly.music.items.Item

    A toplevel item representing a ly.document.Document.

get_included_document_node (node)
    Return a Document for the Include node. May return None.

get_music (filename)
    Return the music Document for the specified filename.

    This implementation loads a ly.document.Document using utf-8 encoding. Inherit from this class to implement other loading mechanisms or caching.

iter_music (node=None)
    Iter over the music, following references to other assignments.

music_events_til_position (position)
    Return a list of tuples.

    Every tuple is a (parent, nodes, scaling). If an empty list is returned, there is no music expression at this position.

node (position, depth=-1)
    Return the node at or just before the specified position.

resolve_filename (filename)
    Resolve filename against our document and include_path.

substitute_for_node (node)
    Returns a node that replaces the specified node (e.g. in music).

    For example: a variable reference returns its value. Returns nothing if the node is not substitutable. Returns the node itself if it was substitutable, but the substitution failed.

time_length (start, end)
    Return the length of the music between start and end positions.

    Returns None if start and end are not in the same expression.

time_position (position)
    Return the time position in the music at the specified cursor position.

    The value is a fraction. If None is returned, we are not in a music expression.

class ly.music.items.DrumMode (parent=None)
    Bases: ly.music.items.InputMode

    A drummode or drums expression.

class ly.music.items.DrumNote (parent=None)
    Bases: ly.music.items.Durable

class ly.music.items.Durable (parent=None)
    Bases: ly.music.items.Item
```

An Item that has a musical duration, in the duration attribute.

duration = (0, 1)

events (*e, time, scaling*)

Let the event.Events instance handle the events. Return the time.

length ()

Return the musical duration (our base * our scaling).

class `ly.music.items.Duration` (*parent=None*)

Bases: `ly.music.items.Item`

A written duration

class `ly.music.items.Dynamic` (*parent=None*)

Bases: `ly.music.items.Item`

Any dynamic symbol.

class `ly.music.items.FigureMode` (*parent=None*)

Bases: `ly.music.items.InputMode`

A figuremode or figures expression.

class `ly.music.items.Grace` (*parent=None*)

Bases: `ly.music.items.Music`

Music that has grace timing, i.e. 0 as far as computation is concerned.

events (*e, time, scaling*)

Let the event.Events instance handle the events. Return the time.

preceding (*node=None*)

Return a two-tuple (nodes, scaling).

The nodes are the nodes in time before the node (which must be a child), and the scaling is 0 for (because we have grace notes).

If node is None, all nodes that would precede a fictive node at the end are returned.

class `ly.music.items.Header` (*parent=None*)

Bases: `ly.music.items.Container`

A header { ... } construct.

class `ly.music.items.Include` (*parent=None*)

Bases: `ly.music.items.Item`

An include command (not changing the language).

filename ()

Returns the filename.

class `ly.music.items.InputMode` (*parent=None*)

Bases: `ly.music.items.Music`

Base class for inputmode-changing commands.

class `ly.music.items.Item` (*parent=None*)

Bases: `ly.node.WeakNode`

Represents any item in the music of a document.

This can be just a token, or an interpreted construct such as a note, rest or sequential or simultaneous construct , etc.

Some Item instances just have one responsible token, but others have a list or tuple to tokens.

An Item also has a pointer to the Document it originates from.

document = None

end_position ()

Return the end position of this node.

events (*e, time, scaling*)

Let the event.Events instance handle the events. Return the time.

has_output (*_seen_docs=None*)

Return True if this node has toplevel music, markup, book etc.

I.e. returns True when LilyPond would likely generate output. Usually you'll call this method on a Document, Score, BookPart or Book node.

You should not supply the *_seen_docs* argument; it is used internally to avoid traversing recursively nested include files.

iter_toplevel_items ()

Yield the toplevel items of our Document node in backward direction.

Iteration starts with the node just before the node "self" is a descendant of.

iter_toplevel_items_include ()

Same as *iter_toplevel_items()*, but follows include commands.

length ()

Return the musical duration.

music_children (*depth=-1*)

Yield all the children that are new music expressions

(i.e. that are inside other constructions).

music_parent ()

Walk up the parent tree until Music is found; return the outermost Music node.

Returns None if the node does not belong to any music expression (e.g. a toplevel Markup or Scheme object).

plaintext ()

Return a plaintext value for this node.

This only makes sense for items like Markup or String. For other types, an empty string is returned

position = -1

token = None

tokens = ()

class *ly.music.items.KeySignature* (*parent=None*)

Bases: *ly.music.items.Item*

A key pitch mode command.

mode ()

The mode, e.g. "major", "minor", etc.

pitch ()

The *ly.pitch.Pitch* that denotes the pitch.

```

class ly.music.items.Keyword (parent=None)
    Bases: ly.music.items.Item

    A LilyPond keyword.

class ly.music.items.Language (parent=None)
    Bases: ly.music.items.Item

    A command (language or certain include commands) that changes the pitch language.

    language = None

class ly.music.items.Layout (parent=None)
    Bases: ly.music.items.Container

    A layout { ... } construct.

class ly.music.items.LayoutContext (parent=None)
    Bases: ly.music.items.Container

    A context { ... } construct within Layout or Midi.

class ly.music.items.LyricItem (parent=None)
    Bases: ly.music.items.Item

    Another lyric item (skip, extender, hyphen or tie).

class ly.music.items.LyricMode (parent=None)
    Bases: ly.music.items.InputMode

    A lyricmode, lyrics or addlyrics expression.

class ly.music.items.LyricText (parent=None)
    Bases: ly.music.items.Durable

    A lyric text (word, markup or string), with a Duration.

class ly.music.items.LyricsTo (parent=None)
    Bases: ly.music.items.InputMode

    A lyricsto expression.

    context_id()

class ly.music.items.Markup (parent=None)
    Bases: ly.music.items.Item

    A command starting markup (markup, -lines and -list).

    plaintext()
        Return the plain text value of this node.

class ly.music.items.MarkupCommand (parent=None)
    Bases: ly.music.items.Item

    A markup command, such as italic etc.

    plaintext()
        Return the plain text value of this node.

class ly.music.items.MarkupList (parent=None)
    Bases: ly.music.items.Item

    The group of markup items inside { and }. NOTE: not a markuplist.

    plaintext()
        Return the plain text value of this node.

```

```
class ly.music.items.MarkupScore (parent=None)
    Bases: ly.music.items.Item

    A score inside Markup.

class ly.music.items.MarkupUserCommand (parent=None)
    Bases: ly.music.items.Item

    A user-defined markup command

    name ()
        Return the name of this user command (without the leading backslash).

    value ()
        Find the value assigned to this variable.

class ly.music.items.MarkupWord (parent=None)
    Bases: ly.music.items.Item

    A MarkupWord token.

    plaintext ()

class ly.music.items.Midi (parent=None)
    Bases: ly.music.items.Container

    A midi { ... } construct.

class ly.music.items.Music (parent=None)
    Bases: ly.music.items.Container

    Any music expression, to be inherited of.

    events (e, time, scaling)
        Let the event.Events instance handle the events. Return the time.

    length ()
        Return the musical duration.

    preceding (node=None)
        Return a two-tuple (nodes, scaling).

        The nodes are the nodes in time before the node (which must be a child), and the scaling is the scaling this
        node applies (normally 1).

        If node is None, all nodes that would precede a fictive node at the end are returned.

class ly.music.items.MusicList (parent=None)
    Bases: ly.music.items.Music

    A music expression, either << >> or { }.

    events (e, time, scaling)
        Let the event.Events instance handle the events. Return the time.

    preceding (node=None)
        Return a two-tuple (nodes, scaling).

        The nodes are the nodes in time before the node (which must be a child), and the scaling is the scaling this
        node applies (normally 1).

        If node is None, all nodes that would precede a fictive node at the end are returned.

    simultaneous = False
```

```

class ly.music.items.Note (parent=None)
    Bases: ly.music.items.Durable

    A Note that has a ly.pitch.Pitch

    accidental_token = None

    octave_token = None

    octavecheck_token = None

    pitch = None

class ly.music.items.NoteMode (parent=None)
    Bases: ly.music.items.InputMode

    A notemode or notes expression.

class ly.music.items.Number (parent=None)
    Bases: ly.music.items.Item

    A numerical value, directly entered.

    value ()

class ly.music.items.Override (parent=None)
    Bases: ly.music.items.Item

    An override command.

    context ()

    grob ()

class ly.music.items.Paper (parent=None)
    Bases: ly.music.items.Container

    A paper { ... } construct.

class ly.music.items.PartCombine (parent=None)
    Bases: ly.music.items.Music

    The partcombine command with 2 music arguments.

    events (e, time, scaling)
        Let the event.Events instance handle the events. Return the time.

    preceding (node=None)
        Return a two-tuple (nodes, scaling).

        The nodes are the nodes in time before the node (which must be a child), and the scaling is the scaling this
        node applies (normally 1).

        If node is None, all nodes that would precede a fictive node at the end are returned.

class ly.music.items.Partial (parent=None)
    Bases: ly.music.items.Item

    A partial command.

    duration = (0, 1)

    partial_length ()
        Return the duration given as argument as a Fraction.

```

```
class ly.music.items.PathItem (parent=None)
    Bases: ly.music.items.Item
```

An item in the path of an override or revert command.

```
class ly.music.items.PhrasingSlur (parent=None)
    Bases: ly.music.items.Item
```

A (or).

event = None

```
class ly.music.items.PipeSymbol (parent=None)
    Bases: ly.music.items.Item
```

A pipe symbol: |

```
class ly.music.items.Postfix (parent=None)
    Bases: ly.music.items.Item
```

Any item that is prefixed with a `_`, `-` or `^` direction token.

```
class ly.music.items.Q (parent=None)
    Bases: ly.music.items.Durable
```

```
class ly.music.items.Relative (parent=None)
    Bases: ly.music.items.Music
```

A relative music expression. Has one or two children (Note, Music).

```
class ly.music.items.Repeat (parent=None)
    Bases: ly.music.items.Music
```

A repeat expression.

events (*e, time, scaling*)

Let the event.Events instance handle the events. Return the time.

repeat_count ()

specifier ()

```
class ly.music.items.Rest (parent=None)
    Bases: ly.music.items.Durable
```

```
class ly.music.items.Revert (parent=None)
    Bases: ly.music.items.Item
```

A revert command.

context ()

grob ()

```
class ly.music.items.Scaler (parent=None)
    Bases: ly.music.items.Music
```

A music construct that scales the duration of its contents.

In the numerator and denominator attributes the values specified for LilyPond are stored, e.g. with times $\frac{3}{2}$ { c d e }, the numerator is integer 3 and the denominator is integer 2. Note that for tuplet and times the meaning of these numbers is reversed.

The algebraic scaling is stored in the scaling attribute.

denominator = 0

events (*e, time, scaling*)

Let the event.Events instance handle the events. Return the time.

numerator = 0

preceding (*node=None*)

Return a two-tuple (nodes, scaling).

The nodes are the nodes in time before the node (which must be a child), and the scaling is the scaling this node applies.

If node is None, all nodes that would precede a fictive node at the end are returned.

scaling = 1

class `ly.music.items.Scheme` (*parent=None*)

Bases: `ly.music.items.Item`

A Scheme expression inside LilyPond.

get_fraction ()

A basic way to get one (may be fractional) numerical value.

get_int ()

A basic way to get one integer value.

get_list_ints ()

A basic way to get a list of integer values.

get_ly_make_moment ()

A basic way to get a ly:make-moment fraction.

get_pair_ints ()

Very basic way to get two integers specified as a pair.

get_string ()

A basic way to get a quoted string value (without the quotes).

plaintext ()

A crude way to get the plain text in this node.

class `ly.music.items.SchemeItem` (*parent=None*)

Bases: `ly.music.items.Item`

Any scheme token.

class `ly.music.items.SchemeLily` (*parent=None*)

Bases: `ly.music.items.Container`

A music expression inside #{ and #}.

class `ly.music.items.SchemeList` (*parent=None*)

Bases: `ly.music.items.Container`

A (...) expression.

class `ly.music.items.SchemeQuote` (*parent=None*)

Bases: `ly.music.items.Item`

A ' in scheme.

class `ly.music.items.Score` (*parent=None*)

Bases: `ly.music.items.Container`

A score { ... } construct.

```
class ly.music.items.Set (parent=None)
    Bases: ly.music.items.Item

    A set command.

    context ()
        The context, if specified.

    property ()
        The property.

    value ()
        The value, given as argument. This is simply the child element.

class ly.music.items.Skip (parent=None)
    Bases: ly.music.items.Durable

class ly.music.items.Slur (parent=None)
    Bases: ly.music.items.Item

    A ( or ).

    event = None

class ly.music.items.String (parent=None)
    Bases: ly.music.items.Item

    A double-quoted string.

    plaintext ()
        Return the plaintext value of this string, without escapes and quotes.

    value ()

class ly.music.items.StringTuning (parent=None)
    Bases: ly.music.items.Item

    A stringTuning command (with a chord as argument).

class ly.music.items.Tag (parent=None)
    Bases: ly.music.items.Music

    A tag, keepWithTag or removeWithTag command.

    events (e, time, scaling)
        Let the event.Events instance handle the events. Return the time.

    preceding (node=None)
        Return a two-tuple (nodes, scaling).

        The nodes are the nodes in time before the node (which must be a child), and the scaling is the scaling this
        node applies (normally 1).

        If node is None, all nodes that would precede a fictive node at the end are returned.

class ly.music.items.Tempo (parent=None)
    Bases: ly.music.items.Item

    duration = (0, 1)

    fraction ()
        Return the note value as a fraction given before the equal sign.

    tempo ()
        Return a list of integer values describing the tempo or range.
```

text()
Return the text, if set. Can be Markup, Scheme, or String.

class `ly.music.items.Tie` (*parent=None*)
Bases: `ly.music.items.Item`
A tie.

class `ly.music.items.TimeSignature` (*parent=None*)
Bases: `ly.music.items.Item`
A time command.

beatstructure()
The scheme expressions denoting the beat structure, if specified.

fraction()
The lower number as a Fraction (e.g. for 3/2 it returns 1/2).

measure_length()
The length of one measure in this time signature as a Fraction.

numerator()
The upper number (e.g. for 3/2 it returns 3).

class `ly.music.items.Token` (*parent=None*)
Bases: `ly.music.items.Item`
Any token that is not otherwise recognized

class `ly.music.items.Translator` (*parent=None*)
Bases: `ly.music.items.Item`
Base class for a change, new, or context music expression.

context()

context_id()
The context id, if specified after an equal sign.

class `ly.music.items.Transpose` (*parent=None*)
Bases: `ly.music.items.Music`
A transpose music expression. Has normally three children (Note, Note, Music).

class `ly.music.items.Tremolo` (*parent=None*)
Bases: `ly.music.items.Item`
A tremolo item “:”. The duration attribute is a tuple (base, scaling).

duration = (0, 1)

class `ly.music.items.Tweak` (*parent=None*)
Bases: `ly.music.items.Item`
A tweak command.

class `ly.music.items.Unpitched` (*parent=None*)
Bases: `ly.music.items.Durable`
A “note” without pitch, just a standalone duration.

pitch = None

class `ly.music.items.Unset` (*parent=None*)
Bases: `ly.music.items.Item`

An unset command.

context ()

The context, if specified.

property ()

The property.

class `ly.music.items.UserCommand` (*parent=None*)

Bases: `ly.music.items.Music`

A user command, most probably referring to music.

events (*e, time, scaling*)

Let the event.Events instance handle the events. Return the time.

name ()

Return the name of this user command (without the leading backslash).

value ()

Find the value assigned to this variable.

class `ly.music.items.Version` (*parent=None*)

Bases: `ly.music.items.Item`

A version command.

version ()

The version as a tuple of ints.

version_string ()

The version as a string.

class `ly.music.items.VoiceSeparator` (*parent=None*)

Bases: `ly.music.items.Item`

A voice separator: \

class `ly.music.items.With` (*parent=None*)

Bases: `ly.music.items.Container`

A with ... construct.

3.2.2.5 ly.music.read module

The Reader is used to construct a tree structure of (musical and other) items in a LilyPond document. The item types that are used are in the items module.

You instantiate a Reader with a `ly.document.Source` that reads tokens from any (part of a) `ly.document.Document`.

Whitespace and comments are left out.

All nodes (instances of `Item`) have a 'position' attribute that indicates where the item starts in the source text. Almost all items have the token that starts the expression in the 'token' attribute and possibly other tokens in the 'tokens' attribute, as a tuple.

The 'end_position()' method returns the position where the node (including its child nodes) ends.

class `ly.music.read.Reader` (*source*)

Bases: `object`

Reads tokens from a `Source` and builds a meaningful tree structure.

add_bracketed (*item*, *source*)

Append the arguments between brackets to the item.

Returns True if that succeeded, else False.

add_duration (*item*, *token=None*, *source=None*)

Add a duration attribute to the item.

When there are tokens, a Duration item is also appended to the item.

add_markup_arguments (*item*)

Add markup arguments to the item.

consume (*last_token=None*)

Yield the tokens from our source until a parser is exit.

If last_token is given, it is called with the last token that is read.

factory (*cls*, *token=None*, *consume=False*, *position=None*)

Create Item instance for token.

If consume is True, consume()s the source into item.tokens. If you don't specify a token, you must specify the position (≥ 0).

handle_absolute (*t*, *source*)

handle absolute

handle_after_grace (*t*, *source*)

handle afterGrace

handle_alternative (*t*, *source*)

handle alternative

handle_articulation (*t*, *source=None*)

handle Articulation

handle_beam (*t*, *source=None*)

handle Beam

handle_bracketed (*t*, *source*)

handle with, layout, paper, context, book, bookpart, score, midi, header

handle_chord_start (*t*, *source*)

handle ChordStart

handle_clef (*t*, *source*)

handle clef

handle_direct_items (*t*, *source*)

Tokens that directly translate to an Item.

handle Dynamic, Tie, VoiceSeparator, PipeSymbol

handle_direction (*t*, *source*)

handle Direction

handle_grace (*t*, *source*)

handle grace, acciaccatura, appoggiatura, slashedGrace

handle_include (*t*, *source*)

handle include

handle_inputmode (*t*, *source*)

handle notes, figuremode, notemode, drums, chords, drummode, chordmode, figures

handle_key (*t, source*)
handle key

handle_language (*t, source*)
handle language

handle_length (*t, source*)
handle Length

handle_lyricmode (*t, source*)
handle addlyrics, lyricmode, lyrics, oldaddlyrics, lyricsto

handle_markup (*t, source=None*)
handle markup, markuplist, markuplines

handle_markup_command (*t*)
handle MarkupCommand

handle_markup_open_bracket (*t*)
handle OpenBracketMarkup

handle_markup_score (*t*)
handle MarkupScore

handle_markup_user_command (*t*)
handle MarkupUserCommand

handle_markup_word (*t*)
handle MarkupWord

handle_music_item (*t, source*)
handle MusicItem

handle_music_list (*t, source*)
handle OpenBracket, OpenSimultaneous, SimultaneousOrSequentialCommand

handle_name (*t, source*)
handle Name, ContextProperty

handle_number_class (*t, source=None*)
handle DecimalValue, IntegerValue, Fraction

handle_override (*t, source*)
handle override

handle_partcombine (*t, source=None*)
handle partcombine

handle_partial (*t, source*)
handle partial

handle_relative (*t, source*)
handle relative

handle_repeat (*t, source*)
handle repeat

handle_revert (*t, source*)
handle revert

handle_scaler (*t, source*)
handle times, tuplet, scaleDurations

handle_scheme_lilypond_start (*t*)
handle LilyPondStart

handle_scheme_open_parenthesis (*t*)
handle OpenParen

handle_scheme_quote (*t*)
handle Quote

handle_scheme_start (*t*, *source=None*)
handle SchemeStart
handle SchemeStart

handle_scheme_token (*t*)
handle Dot, Bool, Char, Word, Number, Fraction, Float

handle_set (*t*, *source*)
handle set

handle_slurs (*t*, *source=None*)
handle Slur

handle_string_start (*t*, *source=None*)
handle StringStart
handle StringStart
handle StringStart

handle_string_tuning (*t*, *source*)
handle stringTuning

handle_tag (*t*, *source*)
handle tag, keepWithTag, removeWithTag, appendToTag, pushToTag

handle_tempo (*t*, *source*)
handle tempo

handle_time (*t*, *source*)
handle time

handle_translator (*t*, *source*)
handle new, context, change

handle_transpose (*t*, *source*)
handle transpose

handle_tweak (*t*, *source*)
handle tweak

handle_unset (*t*, *source*)
handle unset

handle_variable_assignment (*t*, *source*)
handle PaperVariable, LayoutVariable, HeaderVariable, UserVariable

handle_version (*t*, *source*)
handle version

read (*source=None*)
Yield Item instances reading from source.

read_assignment (*t*)
Read an assignment from the variable name. May return None.

read_chord_specifier (*t*, *source=None*)

Read stuff behind notes in chordmode.

handle ChordSeparator

read_command (*t*, *source*)

Read the rest of a command given in *t* from the source.

handle Command

read_item (*t*, *source=None*)

Return one Item that starts with token *t*. May return None.

read_keyword (*t*, *source*)

Read the rest of a keyword given in *t* from the source.

handle Keyword

read_lyric_item (*t*)

Read one lyric item. Returns None for tokens it does not handle.

read_markup (*t*)

Read LilyPond markup (recursively).

read_music_item (*t*, *source*)

Read one music item (note, rest, s, skip, or q) from *t* and *source*.

read_scheme (*t*)

Return a Scheme item from the token *t*.

read_scheme_item (*t*)

Reads a Scheme expression (just after the # in LilyPond mode).

read_tremolo (*t*, *source=None*)

Read a tremolo.

handle TremoloColon

read_user_command (*t*, *source*)

Read a user command, this can be a variable reference.

handle UserCommand

set_language (*lang*)

Changes the pitch name language to use.

Called internally when language or include tokens are encountered with a valid language name/file.

Sets the language attribute to the language name.

test_music_list (*t*)

Test whether a music list (*{ ... }*, *<< ... >>*), starts here.

Also handles simultaneous *{ ... }* and sequential *{ ... }* correctly. These obscure commands are not even highlighted by lex, but they exist in LilyPond... simultaneous *{ ... }* is like *<< ... >>* but sequential *<< ... >>* just behaves like *<< ... >>*

Returns a two-tuple(item; iterable), both may be None. If item is not None, it can be either a UserCommand or a MusicList. If iterable is None, the item is a UserCommand (namely simultaneous or sequential, but not followed by a *{* or *<<*); else the item is a MusicList, and the iterable should be read fully to get all the tokens inside the MusicList. If item is None, there is no MusicList and no token is read.

This way you can handle the *{ ... }* and *<< ... >>* transparently in every input mode.

class `ly.music.read.dispatcher`

Bases: `object`

Decorator creator to dispatch commands, keywords, etc. to a method.

method (*token*)

The registered method to call for the token. May return None.

read_arg (*a*)

class `ly.music.read.dispatcher_class`

Bases: `ly.music.read.dispatcher`

Decorator creator to dispatch the class of a token to a method.

method (*token*)

The registered method to call for the token's class. May return None.

read_arg (*a*)

`ly.music.read.skip` (*source*, *what*=(<class 'ly.lex_token.Space'>, <class 'ly.lex_token.Comment'>))

Yield tokens from source, skipping items of classes specified in what.

By default, comments and whitespace are skipped.

3.2.3 ly.musicxml package

3.2.3.1 Module contents

MusicXML functionality.

This subpackage is created to convert LilyPond text to MusicXML with the help of the tree structure created by `ly.music`. But it is constructed in such a way that you can use some of the submodules for generic MusicXML creation and manipulation.

`ly.musicxml.writer()`

Convert LilyPond text to MusicXML

Example:

```
import ly.musicxml
e = ly.musicxml.writer()
e.parse_text(lilypond_text)
xml = e.musicxml()
xml.write(filename)          # or: xml.tostring()
# xml.tree is the ElementTree xml tree.
```

3.2.3.2 Submodules

3.2.3.3 ly.musicxml.create_musicxml module

Uses `xml.etree` to create a Music XML document.

Example:

```
musxml = create_musicxml.CreateMusicXML()
musxml.create_part()
musxml.create_measure(divs=1)
musxml.new_note('C', 4, 'whole', 4)
```

(continues on next page)

(continued from previous page)

```
xml = musxml.musicxml()  
xml.write(filename)
```

class `ly.musicxml.create_musicxml.CreateMusicXML`

Creates the XML nodes according to the Music XML standard.

add_accidental (*alter*, *caut=False*, *parenth=False*)

Create accidental.

add_articulations ()

Common function for creating all types of articulations.

add_backup (*duration*)

add_barline (*bl_type*, *repeat=None*)

add_beam (*nr*, *beam_type*)

Add beam.

add_chord ()

add_clef (*sign*, *line*, *nr=0*, *oct_ch=0*)

add_creator (*creator*, *name*)

Add creator to score info.

add_direction (*pos=u'above'*)

add_dirwords (*words*)

Add words in direction, e. g. a tempo mark.

add_div_duration (*divdur*)

Create new duration

add_divisions (*div*)

add_dot ()

Create a dot

add_duration_type (*durtype*)

Create new type

add_dynamic_dashes (*text*)

Add dynamics dashes.

add_dynamic_mark (*dyn*)

Add specified dynamic mark.

add_dynamic_text (*text*)

Add dynamic text.

add_dynamic_wedge (*wedge_type*)

Add dynamic wedge/hairpin.

add_fingering (*finger_nr*)

add_gliss (*linetype*, *endtype*, *nr*)

add_grace (*slash*)

Create grace node

add_key (*key*, *mode*)

add_lyric (*txt, syll, nr, ext=False*)
Add lyric element.

add_metron_dir (*unit, beats, dots*)

add_mordent ()

add_named_artic (*artic*)
Add articulation with specified name.

add_named_notation (*notate*)
Fermata, etc.

add_notations ()

add_octave_shift (*plac, octdir, size*)
Add octave shift.

add_ornaments ()

add_pitch (*step, alter, octave*)
Create new pitch.

add_prall ()

add_rest ()
Create rest.

add_rest_w_pos (*step, octave*)
Create rest with display position.

add_rights (*rights*)
Add rights to score info.

add_skip (*duration, forward=True*)

add_slur (*nr, sl_type*)
Add slur.

add_sound_dir (*midi_tempo*)

add_staff (*staff*)

add_staves (*staves*)

add_technical ()

add_tie (*tie_type*)
Create node tie (used for sound of tie)

add_tied (*tie_type*)
Create node tied (used for notation of tie)

add_time (*timesign*)

add_time_modify (*fraction*)
Create time modification

add_tremolo (*trem_type, lines*)

add_trill ()

add_tuplet_type (*nr, ttype, actnr=0, acttype=u", normnr=0, normtype=u"*)
Create tuplet with type attribute

add_turn ()

add_unpitched (*step, octave*)
Create unpitched.

add_voice (*voice*)

add_wavyline (*end_type*)

adjust_time_modify (*timemod_node, fraction*)
Adjust existing time-modification node.

change_div_duration (*newdura*)
Set new duration when tuplet

create_bar_attr ()
Create node attributes

create_measure (***bar_attrs*)
Create new measure

create_new_node (*parentnode, nodename, txt*)
The Music XML language is extensive. This function can be used to create a non basic node not covered elsewhere in this script.

TODO: add attributes

create_note ()
Create new note.

create_part (*name=u'unnamed', abbr=False, midi=False*)
Create a new part

create_partgroup (*gr_type, num, name=None, abbr=None, symbol=None*)
Create a new part group.

create_score_info (*tag, info, attr={}*)
Create score info.

create_tempo (*words, metronome, sound, dots*)

create_title (*title*)
Create score title.

get_time_modify ()
Check if time-modification node already exists.

musicxml (*prettyprint=True*)

new_adv_ornament (*ornament, args*)
Add more complex ornament.

new_articulation (*artic*)
Add specified articulation.

new_bar_attr (*clef=0, mustime=0, key=None, mode=0, divs=0*)
Create all bar attributes set.

new_note (*step, octave, durtype, divdur, alter=0, acc_token=0, voice=1, dot=0, chord=0, grace=(0, 0)*)
Create all nodes needed for a normal note.

new_rest (*duration, durtype, pos, dot, voice*)
Create all nodes needed for a rest.

new_simple_ornament (*ornament*)
Add specified ornament.

new_unpitched_note (*step, octave, durtype, divdur, voice=1, dot=0, chord=0, grace=(0, 0)*)
 Create all nodes needed for an unpitched note.

tie_note (*tie_type*)

tuplet_note (*fraction, bs, ttype, nr, divs, atyp=u", ntyp=u"*)
 Convert current note to tuplet

class `ly.musicxml.create_musicxml.MusicXML` (*tree*)
 Bases: `object`
 Represent a generated MusicXML tree.

indent (*indent=u' '*)
 Add indent and linebreaks to the created XML tree.

tostring (*encoding=u'UTF-8'*)
 Output etree as a XML document.

write (*file, encoding=u'UTF-8', doctype=True*)
 Write XML to a file (file obj or filename).

`ly.musicxml.create_musicxml.get_tag_index` (*node, tag*)
 Return the (first) index of tag in node.
 If tag is not found, -1 is returned.

3.2.3.4 ly.musicxml.ly2xml_mediator module

The information of the parsed source is organised into an object structure with help of the classes in `ly.musicxml.xml_objs`.

class `ly.musicxml.ly2xml_mediator.Mediator`
 Help class that acts as mediator between the ly source parser and the XML creating modules.

add_snippet (*snippet_name*)
 Adds snippet to previous barlist. A snippet can be shorter than a full bar, so this can also mean continuing a previous bar.

add_staff_id (*staff_id*)

add_to_bar (*obj*)

calc_tupl_den (*tfraction, length*)
 Calculate the tuplet denominator from fraction and duration of tuplet.

change_group_bracket (*system_start*)

change_to_tuplet (*tfraction, ttype, nr, length=None*)
 Change the current note into a tuplet note.

change_tuplet_type (*index, newtype*)

check_current_note (*rel=False, rest=False, is_unpitched=False*)
 Perform checks common for all new notes and rests.

check_divs ()
 The new duration is checked against current divisions

check_duration (*rest*)
 Check the duration for the current note.

check_lyrics (*voice_id*)
 Check the finished lyrics section and merge it into the referenced voice.

check_name (*name*, *nr=1*)

check_part ()
Adds the latest active section to the part.

check_score ()
Check score

If no part were created, place first variable (fallback) as part.

Apply the latest global section.

check_simultan ()
Check done after simultanous (<< >>) section.

check_voices ()
Checks active sections. The two latest created are merged. Also checks for empty sections.

check_voices_by_nr ()
Used for snippets. Merges all active snippets created after the stored voice number.

chord_end ()
Actions when chord is parsed.

clear_chord ()

close_group ()

copy_barnote_basics (*bar_note*)
Create a copy of a xml_objs.BarNote.

copy_prev_chord (*duration*)

create_barline (*bl*)

create_barnote_from_note (*note*)
Create a xml_objs.BarNote from ly.music.items.Note.

create_unpitched (*unpitched*)
Create a xml_objs.Unpitched from ly.music.items.Unpitched.

do_action_onnext (*note*)
Perform the stored action on the next note.

duration_from_tokens (*tokens*)
Calculate dots and multibar rests from tokens.

end_gliss (*note*, *line*)

get_first_var ()

get_part_by_id (*pid*, *partholder=None*)

get_var_byname (*name*)

new_articulation (*art_token*)
An articulation, fingering, string number, or other symbol.

Grouped as articulations, ornaments, technical and others.

new_bar (*fill_prev=True*)

new_chord (*note*, *duration=None*, *rel=False*, *chord_base=True*)

new_chord_grace (*slash=0*)

new_chordbase (*note*, *duration*, *rel=False*)

new_chordnote (*note, rel*)

new_clef (*clefname*)

new_duration_token (*token, tokens*)

new_dynamics (*dynamics*)

new_gliss (*line=None*)

new_grace (*slash=0*)

new_group ()

new_header_assignment (*name, value*)
Distributing header information.

new_iso_dura (*note, rel=False, is_unpitched=False*)
Isolated durations in music sequences.

An isolated duration in LilyPond is rendered as a normal note but the pitch information is missing and has to be filled in by some other means, usually by the previous pitch. (RhythmicStaff is an exception since it ignores specified pitches anyway).

new_key (*key_name, mode*)

new_lyric_nr (*num*)

new_lyric_section (*name, voice_id*)

new_lyrics_item (*item*)

new_lyrics_text (*txt*)

new_note (*note, rel=False, is_unpitched=False*)

new_ottava (*octdiff*)

new_part (*pid=None, to_part=None, piano=False*)

new_repeat (*rep*)

new_rest (*rest*)

new_section (*name, glob=False*)

new_snippet (*name*)

new_tempo (*unit, dur_tokens, tempo, string*)

new_time (*num, den, numeric=False*)

new_trill_spanner (*end=None*)

note2rest ()
Note used as rest position transformed to rest.

part_not_empty ()

revert_voicenr ()

scale_rest (*multp*)
create multiple whole bar rests

sections = None
default and initial values

set_by_property (*prprty, value, group=False*)
Generic setter for different properties.

set_groupabbr (*abbr*)

set_groupname (*name*)

set_octave (*relative*)

Set octave by getting the octave of an absolute note + 3.

set_ottava (*note, plac, octdir, size*)

set_partabbr (*abbr*)

set_partmidi (*midi*)

set_partname (*name*)

set_relative (*note*)

set_slur (*nr, slur_type*)

Set the slur start or stop for the current note.

set_staffnr (*staffnr, staff_id=None*)

set_tremolo (*trem_type=u'single', duration=0, repeats=0*)

set_tuplspan_dur (*token=None, tokens=None, fraction=None*)

Catch duration set by the `tupletSpannerDuration` property.

Set the fraction directly or calculate it from tokens.

set_voicenr (*command=None, add=False, nr=0, piano=0*)

tie_to_next ()

unset_tuplspan_dur ()

Reset tuplet duration sum and tuplet spanner duration.

`ly.musicxml.ly2xml_mediator.artic_token2xml_name` (*art_token*)

From Articulations in `ly.music.items`. Grouped as articulations, ornaments and others.

To add an articulation look up the name or abbreviation in LilyPond and the corresponding node name in musicXML. Add it to the python dictionary below.

`ly.musicxml.ly2xml_mediator.calc_trem_dur` (*repeats, base_scaling, duration*)

Calculate tremolo duration from number of repeats and initial duration.

`ly.musicxml.ly2xml_mediator.clefname2clef` (*clefname*)

To add a clef look up the clef name in LilyPond and the corresponding definition in musicXML. Add it to the python dictionary below.

`ly.musicxml.ly2xml_mediator.durval2type` (*durval*)

Convert LilyPond duration to MusicXML duration type.

`ly.musicxml.ly2xml_mediator.getNoteName` (*index*)

`ly.musicxml.ly2xml_mediator.get_fifths` (*key, mode*)

`ly.musicxml.ly2xml_mediator.get_group_symbol` (*lily_sys_start*)

`ly.musicxml.ly2xml_mediator.get_line_style` (*style*)

`ly.musicxml.ly2xml_mediator.get_mult` (*num, den*)

`ly.musicxml.ly2xml_mediator.get_voice` (*c*)

`ly.musicxml.ly2xml_mediator.get_xml_alter` (*alter*)

Convert alter to the specified format, i.e. int if it's int and float otherwise. Also multiply with 2.

3.2.3.5 ly.musicxml.lymus2musxml module

Using the tree structure from ly.music to initiate the conversion to MusicXML.

Uses functions similar to ly.music.items.Document.iter_music() to iter through the node tree. But information about where a node branch ends is also added. During the iteration the information needed for the conversion is captured.

class ly.musicxml.lymus2musxml.**End**(*node*)

Extra class that gives information about the end of Container elements in the node list.

class ly.musicxml.lymus2musxml.**ParseSource**

creates the XML-file from the source code according to the Music XML standard

Articulation (*art*)

An articulation, fingering, string number, or other symbol.

Assignment (*a*)

Variables should already have been substituted so this need only cover other types of assignments.

Beam (*beam*)

Change (*change*)

A change music expression. Changes the staff number.

Chord (*chord*)

ChordMode (*chordmode*)

A chordmode or chords expression.

Clef (*clef*)

Clef clef

Command (*command*)

bar, rest etc

Context (*context*)

context

DrumMode (*drummode*)

A drummode or drums expression.

If the shorthand form drums is found, DrumStaff is implicit.

DrumNote (*drumnote*)

A note in DrumMode.

Duration (*duration*)

A written duration

Dynamic (*dynamic*)

Any dynamic symbol.

End (*end*)

FigureMode (*figmode*)

A figuremode or figures expression.

Grace (*grace*)

KeySignature (*key*)

LyricItem (*lyrics_item*)

Another lyric item (skip, extender, hyphen or tie).

LyricMode (*lyricmode*)
A lyricmode, lyrics or addlyrics expression.

LyricText (*lyrics_text*)
A lyric text (word, markup or string), with a Duration.

LyricsTo (*lyrics_to*)
A lyricsto expression.

MusicList (*musicList*)

Note (*note*)
notename, e.g. c, cis, a bes ...

NoteMode (*notemode*)
A notemode or notes expression.

Number (*number*)

Override (*override*)
An override command.

PathItem (*item*)
An item in the path of an override or revert command.

PhrasingSlur (*phrslur*)
A (or).

PipeSymbol (*barcheck*)
PipeSymbol = l

Postfix (*postfix*)

Q (*q*)

Relative (*relative*)
A relative music expression.

Repeat (*repeat*)

Rest (*rest*)
rest, r or R. Note: NOT by command, i.e. rest

Scaler (*scaler*)
times tuplet scaleDurations

Scheme (*scheme*)
A Scheme expression inside LilyPond.

SchemeItem (*item*)
Any scheme token.

SchemeQuote (*quote*)
A ‘ in scheme.

Set (*cont_set*)
A set command.

Skip (*skip*)
invisible rest/spacer rest (s or command skip)

Slur (*slur*)
Slur, ‘(‘ = start, ‘)’ = stop.

String (*string*)

Tempo (*tempo*)
Tempo direction, e.g. '4 = 80'

Tie (*tie*)
tie ~

TimeSignature (*timeSign*)

Tremolo (*tremolo*)
A tremolo item ":".

Unpitched (*unpitched*)
A note without pitch, just a standalone duration.

UserCommand (*usercommand*)
Music variables are substituted so this must be something else.

VoiceSeparator (*voice_sep*)

With (*cont_with*)
A with ... construct.

check_context (*context, context_id=None, token=u"*)
Check context and do appropriate action (e.g. create new part).

check_note (*note*)
Generic check for all notes, both pitched and unpitched.

check_tuplet ()
Generic tuplet check.

find_score_sub (*doc*)
Find substitute for scorenode. Takes first music node that isn't an assignment.

gen_med_caller (*func_name, *args*)
Call any function in the mediator object.

get_previous_node (*node*)
Returns the nodes previous node or false if the node is first in its branch.

get_score (*node*)
Returns (first) Score node or false if no Score is found.

iter_header (*tree*)
Iter only over header nodes.

iter_score (*scorenode, doc*)
Iter over score.

Similarly to `items.Document.iter_music` user commands are substituted.
Furthermore repeat unfold expressions are unfolded.

look_ahead (*node, find_node*)
Looks ahead in a container node and returns True if the search is successful.

look_behind (*node, find_node*)
Looks behind on the parent node(s) and returns True if the search is successful.

musicxml (*prettyprint=True*)

parse_document (*ly_doc, relative_first_pitch_absolute=False*)
Parse the LilyPond source specified as a `ly.document` document.

If `relative_first_pitch_absolute` is set to True, the first pitch in a

relative expression without startpitch is considered to be absolute (LilyPond 2.18+ behaviour).

parse_nodes (*nodes*)

Work through all nodes by calling the function with the same name as the nodes class.

parse_text (*ly_text*, *filename=None*)

Parse the LilyPond source specified as text.

If you specify a filename, it can be used to resolve include commands correctly.

parse_tree (*mustree*)

Parse the LilyPond source as a ly.music node tree.

simple_node_gen (*node*)

Unlike iter_score are the subnodes yielded without substitution.

unfold_repeat (*repeat_node*, *repeat_count*, *doc*)

Iter over node which represent a repeat unfold expression and do the unfolding directly.

3.2.3.6 ly.musicxml.xml_objs module

Classes that holds information about a musical score, suitable for converting to musicXML.

When the score structure is built, it can easily be used to create a musicXML.

Example:

```
from ly.musicxml import create_musicxml, xml_objs

musxml = create_musicxml.CreateMusicXML()

score = xml_objs.Score()
part = xml_objs.ScorePart()
score.partlist.append(part)
bar = xml_objs.Bar()
part.barlist.append(bar)
ba = xml_objs.BarAttr()
ba.set_time([4,4])
bar.obj_list.append(ba)
c = xml_objs.BarNote('c', 0, 0, (1,1))
c.set_octave(4)
c.set_durtype(1)
bar.obj_list.append(c)

xml_objs.IterateXmlObjs(score, musxml, 1)
xml = musxml.musicxml()
xml.write(filename)
```

class ly.musicxml.xml_objs.**Bar**

Representing the bar/measure. Contains also information about how complete it is.

add (*obj*)

create_backup ()

Calculate and create backup object.

has_music ()

Check if bar contains music.

```

inject_voice (new_voice, override=False)
    Adding new voice to bar. Omitting double or conflicting bar attributes as long as override is false. Omitting
    also bars with only skips.

is_skip (obj_list=None)
    Check if bar has nothing but skips.

class ly.musicxml.xml_objs.BarAttr
    object that keep track of bar attributes, e.g. time sign, clef, key etc

    has_attr ()

    merge_attr (barattr, override=False)
        Merge in attributes (from another bar). Existing attributes will only be replaced when override is set to
        true.

    set_barline (bl)

    set_clef (clef)

    set_key (muskey, mode)

    set_tempo (unit=0, unittype=u", beats=0, dots=0, text=u")

    set_time (fractlist, numeric=True)

class ly.musicxml.xml_objs.BarBackup (duration)
    Object that stores duration for backup

class ly.musicxml.xml_objs.BarMus (duration, voice=1)
    Common class for notes and rests.

    add_dot ()

    add_other_notation (other)

    has_attr ()

    set_dynamics_dashes (sign, before=True)

    set_dynamics_mark (sign, before=True)

    set_dynamics_text (sign, before=True)

    set_dynamics_wedge (sign, before=True)

    set_oct_shift (plac, octdir, size)

    set_staff (staff)

    set_tuplet (fraction, ttype, nr, acttype=u", normtype=u")

class ly.musicxml.xml_objs.BarNote (pitch_note, alter, accidental, duration, voice=1)
    Bases: ly.musicxml.xml\_objs.BarMus
    object to keep track of note parameters

    add_adv_ornament (ornament, end_type=u'start')

    add_articulation (art_name)

    add_fingering (finger_nr)

    add_lyric (lyric_list)

    add_ornament (ornament)

    change_lyric_nr (index, nr)

```

```
change_lyric_syll (index, syll)
set_duration (duration, durtype="u")
set_durtype (durtype)
set_gliss (line, endtype=u'start', nr=1)
set_grace (slash)
set_octave (octave)
set_slur (nr, slur_type)
set_tie (tie_type)
set_tremolo (trem_type, duration=False)

class ly.musicxml.xml_objs.BarRest (duration, voice=1, show_type=True, skip=False, pos=0)
    Bases: ly.musicxml.xml_objs.BarMus
    object to keep track of different rests and skips
    set_duration (duration, durtype="u")
    set_durtype (durtype)

class ly.musicxml.xml_objs.Dynamics (sign, before=True)
    Stores information about dynamics.

class ly.musicxml.xml_objs.DynamicsDashes (sign, before=True)
    Bases: ly.musicxml.xml_objs.Dynamics
    Dynamics dashes.

class ly.musicxml.xml_objs.DynamicsMark (sign, before=True)
    Bases: ly.musicxml.xml_objs.Dynamics
    A dynamics mark.

class ly.musicxml.xml_objs.DynamicsText (sign, before=True)
    Bases: ly.musicxml.xml_objs.Dynamics
    A dynamics text.

class ly.musicxml.xml_objs.DynamicsWedge (sign, before=True)
    Bases: ly.musicxml.xml_objs.Dynamics
    A dynamics wedge/hairpin.

class ly.musicxml.xml_objs.IterateXmlObjs (score, musxml, div)
    A ly.musicxml.xml_objs.Score object is iterated and the Music XML node tree is constructed.
    after_note (obj)
        Xml-nodes after note.
    before_note (obj)
        Xml-nodes before note.
    count_duration (base_scaling, divs)
    gener_xml_mus (obj)
        Nodes generic for both notes and rests.
    iterate_bar (bar)
        The objects in the bar are output to the xml-file.
```

```

iterate_part (part)
    The part is iterated.

iterate_partgroup (group)
    Loop through a group, recursively if nested.

new_xml_bar_attr (obj)
    Create bar attribute xml-nodes.

new_xml_note (obj)
    Create note specific xml-nodes.

new_xml_rest (obj)
    Create rest specific xml-nodes.

class ly.musicxml.xml_objs.LyricsSection (name, voice_id)
    Bases: ly.musicxml.xml_objs.ScoreSection

    Holds the lyrics information. Will eventually be merged to the corresponding note in the section set by the voice id.

class ly.musicxml.xml_objs.OctaveShift (plac, octdir, size)
    Class for octave shifts.

class ly.musicxml.xml_objs.Score
    Object that keep track of a whole score.

    debug_score (attr=[])
        Loop through score and print all elements for debugging purposes.

        Additionally print element attributes by adding them to the argument 'attr' list.

    is_empty ()
        Check if score is empty.

    merge_globally (section, override=False)
        Merge section to all parts.

class ly.musicxml.xml_objs.ScorePart (staves=0, part_id=None, to_part=None, name=u'')
    Bases: ly.musicxml.xml_objs.ScoreSection

    object to keep track of part

    extract_global_to_section (name)
        Extract only elements that is relevant for the score globally into a given section.

    merge_part_to_part ()
        Merge the part with the one indicated.

    set_first_bar (divisions)

class ly.musicxml.xml_objs.ScorePartGroup (num, bracket)
    Object to keep track of part group.

    merge_voice (voice, override=False)
        Merge in a ScoreSection into all parts.

    set_bracket (bracket)

class ly.musicxml.xml_objs.ScoreSection (name, glob=False)
    object to keep track of music section

    merge_lyrics (lyrics)
        Merge in lyrics in music section.

```

merge_voice (*voice, override=False*)
Merge in other ScoreSection.

class `ly.musicxml.xml_objs.Slur` (*nr, slurtype*)
Stores information about slur.

class `ly.musicxml.xml_objs.Snippet` (*name, merge_into*)
Bases: `ly.musicxml.xml_objs.ScoreSection`
Short section intended to be merged. Holds reference to the barlist to be merged into.

class `ly.musicxml.xml_objs.TempoDir` (*unit, unittype, beats, dots, text*)
Object that stores tempo direction information
set_midi_tempo (*unit, beats, dots*)

class `ly.musicxml.xml_objs.Tuplet` (*fraction, ttype, nr, acttype, normtype*)
Stores information about tuplet.

class `ly.musicxml.xml_objs.Unpitched` (*duration, step=None, voice=1*)
Bases: `ly.musicxml.xml_objs.BarNote`
Object to keep track of unpitched notes.

`ly.musicxml.xml_objs.convert_barl` (*bl*)

`ly.musicxml.xml_objs.dur2lines` (*dur*)

3.2.4 ly.pitch package

3.2.4.1 Module contents

Pitch manipulation.

class `ly.pitch.LanguageName`
Bases: `ly.lex._token.Token`
A Token that denotes a language name.

class `ly.pitch.Pitch` (*note=0, alter=0, octave=0, accidental=u'', octavecheck=None*)
Bases: `object`
A pitch with note, alter and octave attributes.
Attributes may be manipulated directly.

classmethod `c0` ()
Returns a pitch c.

classmethod `c1` ()
Returns a pitch c'.

copy ()
Returns a new instance with our attributes.

classmethod `f0` ()
Return a pitch f.

makeAbsolute (*lastPitch*)
Makes ourselves absolute, i.e. sets our octave from lastPitch.

makeRelative (*lastPitch*)
Makes ourselves relative, i.e. changes our octave from lastPitch.

output (*language=u'nederlands'*)
Returns our string representation.

class `ly.pitch.PitchIterator` (*source, language=u'nederlands'*)
Bases: `object`

Iterate over notes or pitches in a source.

pitches ()
Yields all tokens, but collects Note and Octave tokens.

When a Note is encountered, also reads octave and octave check and then a Pitch is yielded instead of the tokens.

position (*t*)
Returns the cursor position for the given token or Pitch.

read (*token*)
Reads the token and returns (note, alter) or None.

setLanguage (*lang*)
Changes the pitch name language to use.

Called internally when language or include tokens are encountered with a valid language name/file.

Sets the language attribute to the language name and the read attribute to an instance of `ly.pitch.PitchReader`.

tokens ()
Yield all the tokens from the source, following the language.

write (*pitch, language=None*)
Output a changed Pitch.

The Pitch is written in the Source's document.

To use this method reliably, you must instantiate the `PitchIterator` with a `ly.document.Source` that has `tokens_with_position` set to `True`.

exception `ly.pitch.PitchNameNotAvailable` (*language*)
Bases: `exceptions.Exception`

Exception raised when there is no name for a pitch.

Can occur when translating pitch names, if the target language e.g. does not have quarter-tone names.

class `ly.pitch.PitchReader` (*names, accs, replacements=()*)
Bases: `object`

class `ly.pitch.PitchWriter` (*names, accs, replacements=()*)
Bases: `object`

language = `u'unknown'`

`ly.pitch.octaveToNum` (*octave*)
Converts string octave to an integer:

"" -> 0 ; "," -> -1 ; "''" -> 3 ; etc.

`ly.pitch.octaveToString` (*octave*)
Converts numeric octave to a string with apostrophes or commas.

0 -> "" ; 1 -> "''" ; -1 -> "," ; etc.

`ly.pitch.pitchReader` (*language*)
Returns a `PitchReader` for the specified language.

`ly.pitch.pitchWriter(language)`
Returns a PitchWriter for the specified language.

3.2.4.2 Submodules

3.2.4.3 `ly.pitch.abs2rel` module

Convert absolute music to relative music.

`ly.pitch.abs2rel.abs2rel(cursor, language=u'nederlands', startpitch=True, first_pitch_absolute=False)`
Converts pitches from absolute to relative.

language: language to start reading pitch names in

startpitch: if True, write a starting pitch before the opening bracket of a relative expression.

first_pitch_absolute: this option only makes sense when startpitch is False. If first_pitch_absolute is True, the first pitch of a relative expression is written as absolute. This mimics the behaviour of LilyPond ≥ 2.18 . (In fact, the starting pitch is then assumed to be f.)

If False, the first pitch is written as relative to c' (LilyPond < 2.18 behaviour).

Existing relative expressions are not changed.

3.2.4.4 `ly.pitch.rel2abs` module

Convert relative music to absolute music.

`ly.pitch.rel2abs.rel2abs(cursor, language=u'nederlands', first_pitch_absolute=False)`
Converts pitches from relative to absolute.

language: language to start reading pitch names in

first_pitch_absolute: if True, the first pitch of a relative expression is regarded as absolute, when no starting pitch was given. This mimics the behaviour of LilyPond ≥ 2.18 . (In fact, the starting pitch is then assumed to be f.)

If False, the starting pitch, when not given, is assumed to be c' (LilyPond < 2.18 behaviour).

3.2.4.5 `ly.pitch.translate` module

Translating the language of pitch names

`ly.pitch.translate.insert_language(document, language, version=None)`
Inserts a language command in the document.

The command is inserted at the top or just below the version line.

If the LilyPond version specified $< (2, 13, 38)$, the include command is used, otherwise the newer language command.

`ly.pitch.translate.translate(cursor, language, default_language=u'nederlands')`
Changes the language of the pitch names.

May raise `ly.pitch.PitchNameNotAvailable` if the current pitch language has no quarter tones.

Returns True if there also was a language or include language command that was changed. If not and the cursor specified only a part of the document, you could warn the user that a language or include command should

be added to the document. Or you could call `insert_language` to add a language command to the top of the document.

3.2.4.6 ly.pitch.transpose module

Transposing music.

class `ly.pitch.transpose.ModalTransposer` (*numSteps=1, scaleIndex=0*)

Bases: `object`

Transpose pitches by number of steps within a given scale.

Instantiate with the number of steps (+/-) in the scale to transpose by, and a mode index. The mode index is the index of the major scale in the circle of fifths (C Major = 0).

static `getKeyIndex` (*text*)

Get the index of the key in the circle of fifths.

‘Cb’ returns 0, ‘C’ returns 7, ‘B#’ returns 14.

transpose (*pitch*)

class `ly.pitch.transpose.ModeShifter` (*key, scale*)

Bases: `ly.pitch.transpose.Transposer`

Shift pitches to optional mode/scale.

The scale should be formatted in analogy to the scale in the Transposer parent class.

The key should be an instance of `ly.pitch.Pitch`.

closestPitch (*pitch*)

Get closest pitch from scale.

If only one scale note with the same base step exist that is returned. Otherwise the closest is calculated.

transpose (*pitch*)

Shift to closest scale pitch if not already in scale.

class `ly.pitch.transpose.Simplifier` (*scale=None*)

Bases: `ly.pitch.transpose.Transposer`

Make complicated accidentals simpler by substituting naturals where possible.

transpose (*pitch*)

class `ly.pitch.transpose.Transposer` (*fromPitch, toPitch, scale=None*)

Bases: `object`

Transpose pitches.

Instantiate with a from- and to-Pitch, and optionally a scale. The scale is a list with the pitch height of the unaltered step (0 .. 6). The default scale is the normal scale: C, D, E, F, G, A, B.

scale = (0, 1, 2, `Fraction(5, 2)`, `Fraction(7, 2)`, `Fraction(9, 2)`, `Fraction(11, 2)`)

transpose (*pitch*)

`ly.pitch.transpose.transpose` (*cursor, transposer, language=u'nederlands', relative_first_pitch_absolute=False*)

Transpose pitches using the specified transposer.

If `relative_first_pitch_absolute` is True, the first pitch in a relative expression is considered to be absolute, when a startpitch is not given. This is LilyPond >= 2.18 behaviour.

If `relative_first_pitch_absolute` is `False`, the first pitch in a relative expression is considered to be relative to `c'`, is no startpitch is given. This is LilyPond < 2.18 behaviour.

Currently, `relative_first_pitch_absolute` defaults to `False`.

3.2.5 ly.xml package

3.2.5.1 Introduction

This package is concerned with representing a LilyPond structure (e.g. music) as an XML tree.

The structure of the tree closely follows LilyPond's data structures. The tree can be parsed or analysed, and could be used to convert the music to other formats like Mei or MusicXML.

This package tries to define the exact format (dtd or schema) of the tree.

There will be three ways to build the tree:

- by hand, by creating XML elements (maybe with use of some helper methods).
- from a tokenized document
- by LilyPond, using the `xml-export.ily` script that is included.

The latter case is very interesting as all the music parsing and handling is already done by LilyPond. The exported XML nearly contains all information of a score or music object. Below, some more information about the XML.

Note that this is all in heavy development.

3.2.5.2 Module contents

Routines that manipulate an XML mapping very similar to the Scheme music structure used by LilyPond itself.

The mapping can also be generated from within LilyPond and then parsed by other programs.

While designing the mapping, I decided to use xml elements for almost everything, only values that are very simple in all cases, are attributes.

Code could be written to convert such an XML music tree to other formats.

Also code is added to build such trees from scratch and from tokenized documents.

Code will be added to print LilyPond source. When all is finished, *ly.dom* is deprecated and *ly.music* will probably use these xml tree for storage.

A single LilyPond file *xml-export.ily* is also included with this module; it can be included in a LilyPond document and exports the `\displayLilyXML` music function.

3.2.5.3 The `xml-export.ily` file

Written by Wilbert Berendsen, jan-feb 2015

This LilyPond module defines a function (`xml-export`) that converts LilyPond datastructures to XML. For convenience, a `\displayLilyXML` music function is added that converts a music expression to XML.

Usage e.g.:

```
\include "/path/to/xml-export.ily"  
\displayLilyXML { c d e f }
```

The XML closely follows the LilyPond music structure.

All (make-music 'MusicName ...) objects translate to a `<music type="MusicName">` tag. The music in the 'element and 'elements properties is put in the `<element>` and `<elements>` tags. (LilyPond uses 'element when there is a single music argument, and 'elements for a list of music arguments, but for example \repeat uses both: 'element for the repeated music and 'elements for the \alternatives.)

Thus `<element>`, if there, always has one `<music>` child. `<elements>`, if there, can have more than one `<music>` child.

Besides 'element and 'elements, the following properties of music objects are handled specially:

- 'origin => `<origin>` element with filename, line and char attributes
- 'pitch => `<pitch>` element with octave, notename and alteration attributes
- 'duration => `<duration>` element with log, dots, numer and denom attributes
- 'articulations => `<articulations>` element containing `<music>` elements
- 'tweaks => `<tweaks>` element containing pairs (symbol . value)

All other properties a music object may have, are translated to a `<property>` element with a name attribute. The value is the child element and can be any object (string, list, pair, symbol, number etc.). (Note that the LilyPond command `\displayMusic` does not display all properties.)

Markup objects are also converted to XML, where a toplevel `<markup>` element is used. The individual markup commands are converted to an `<m>` element, with the name in the name attribute (e.g. `<m name="italic"><string value="Hi there!"/></m>`). Arguments to markup commands may be other commands, or other objects (markup \score even has a score argument, which is also supported).

3.2.5.4 Example

This LilyPond music:

```
\relative {
  c d e
}
```

maps to Scheme (using `\displayMusic`):

```
(make-music
 'RelativeOctaveMusic
 'element
 (make-music
  'SequentialMusic
  'elements
  (list (make-music
         'NoteEvent
         'pitch
         (ly:make-pitch -1 0 0)
         'duration
         (ly:make-duration 2 0 1))
        (make-music
         'NoteEvent
         'pitch
         (ly:make-pitch -1 1 0)
         'duration
         (ly:make-duration 2 0 1))
        (make-music
```

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```

'NoteEvent
'pitch
(ly:make-pitch -1 2 0)
'duration
(ly:make-duration 2 0 1))))))

```

and maps to XML (using `\displayLilyXML`):

```

<music name="RelativeOctaveMusic">
  <origin filename="/home/wilbert/dev/python-ly/ly/xml/xml-export.ily" line="244"
↳char="17"/>
  <element>
    <music name="SequentialMusic">
      <origin filename="/home/wilbert/dev/python-ly/ly/xml/xml-export.ily" line="244"
↳char="27"/>
      <elements>
        <music name="NoteEvent">
          <origin filename="/home/wilbert/dev/python-ly/ly/xml/xml-export.ily" line=
↳"245" char="4"/>
          <pitch octave="-1" notename="0" alteration="0"/>
          <duration log="2" dots="0" numer="1" denom="1"/>
        </music>
        <music name="NoteEvent">
          <origin filename="/home/wilbert/dev/python-ly/ly/xml/xml-export.ily" line=
↳"245" char="6"/>
          <pitch octave="-1" notename="1" alteration="0"/>
          <duration log="2" dots="0" numer="1" denom="1"/>
        </music>
        <music name="NoteEvent">
          <origin filename="/home/wilbert/dev/python-ly/ly/xml/xml-export.ily" line=
↳"245" char="8"/>
          <pitch octave="-1" notename="2" alteration="0"/>
          <duration log="2" dots="0" numer="1" denom="1"/>
        </music>
      </elements>
    </music>
  </element>
</music>

```

By default, the XML is written to standard output.

To automatically export a full LilyPond document to an XML representation, use the `xml-export-init.ly` script with the `--init LilyPond` option. That script automatically sets up LilyPond to output one XML document with a `<document>` root element, containing a `<book>` element for every book in the LilyPond file. (LilyPond always creates at least one book, collecting all the music or markup at the toplevel.)

The `xml-export-init.ly` script is intended to be used via the `--init` option. It automatically converts every `\book` in the score to an XML document. In this case the XML is also written to standard output by default, but you can specify another file with `-dxml-export=<filename>`.

So, to convert a LilyPond source file to an XML file containing the LilyPond music structure in XML format, use the following command:

```
lilypond --init /path/to/xml-export-init.ly -dxml-export=song.xml song.ly
```

The XML document has a `<document>` root element, containing a `<book>` element for every book in the LilyPond file.

3.2.6 ly.data package

3.2.6.1 Module contents

Query functions to get data from the LilyPond-generated `_data.py` module.

- `ly.data.all_grob_properties()`
Returns the list of all properties.
- `ly.data.all_scheme_words()`
Returns the list of all scheme words.
- `ly.data.context_properties()`
Returns the list of context properties.
- `ly.data.engravers()`
Returns the list of engravers and performers.
- `ly.data.grob_interface_properties(iface)`
Returns the list of properties an interface supports.
- `ly.data.grob_interfaces(grob, prop=None)`
Returns the list of interfaces a grob supports.

If prop is given, only returns the interfaces that define prop.
- `ly.data.grob_interfaces_for_property(prop)`
Returns the list of interfaces that define the property.

Most times returns one, but several interface names may be returned.
- `ly.data.grob_properties(grob)`
Returns the list of properties the named grob supports.
- `ly.data.grob_properties_with_interface(grob)`
Returns a list of two-tuples (property, interface).
- `ly.data.grobs()`
Returns the sorted list of all grob names.
- `ly.data.music_glyphs()`
Returns the list of glyphs in the emmentaler font.
- `ly.data.scheme_constants()`
Returns the list of scheme constants.
- `ly.data.scheme_functions()`
Returns the list of scheme functions.
- `ly.data.scheme_keywords()`
Returns the list of guile keywords.
- `ly.data.scheme_variables()`
Returns the list of scheme variables.

3.2.6.2 Submodules

3.2.6.3 ly.data.makeschemedata module

generate all scheme words in the `_scheme_data.py` file

- `ly.data.makeschemedata.main()`

```
ly.data.makeschemedata.replace (word)  
ly.data.makeschemedata.writeList (file_, name, lst)
```

3.2.7 ly.cli package

3.2.7.1 Module contents

The commandline interface of the ‘ly’ command.

3.2.7.2 Submodules

3.2.7.3 ly.cli.command module

The commands that are available to the command line.

```
class ly.cli.command.abs2rel  
    Bases: ly.cli.command._edit_command  
    convert absolute music to relative  
    run (opts, cursor, output)  
  
class ly.cli.command.highlight (output=None)  
    Bases: ly.cli.command._export_command  
    write syntax colored HTML.  
    run (opts, cursor, output)  
  
ly.cli.command.hl  
    alias of ly.cli.command.highlight  
  
class ly.cli.command.indent  
    Bases: ly.cli.command._edit_command  
    run the indenter  
    indenter (opts)  
        Get a ly.indent.Indenter initialized with our options.  
    run (opts, cursor, output)  
  
class ly.cli.command.language  
    Bases: ly.cli.command._info_command  
    print language to stdout  
    get_info (info)  
  
class ly.cli.command.mode  
    Bases: ly.cli.command._info_command  
    print mode to stdout  
    get_info (info)  
  
class ly.cli.command.musicxml (output=None)  
    Bases: ly.cli.command._export_command  
    run (opts, cursor, output)
```



```
class ly.cli.command.reformat
    Bases: ly.cli.command.indent
    reformat the document
    run (opts, cursor, output)

class ly.cli.command.rel2abs
    Bases: ly.cli.command._edit_command
    convert relative music to absolute
    run (opts, cursor, output)

class ly.cli.command.set_variable (arg)
    Bases: ly.cli.command._command
    set a variable to a value
    run (opts, cursor, output)

class ly.cli.command.simplify_accidentals
    Bases: ly.cli.command._edit_command
    replace notes with accidentals as much as possible with their natural neighbors
    run (opts, cursor, output)

class ly.cli.command.translate (language)
    Bases: ly.cli.command._edit_command
    translate pitch names
    run (opts, cursor, output)

class ly.cli.command.transpose (arg)
    Bases: ly.cli.command._edit_command
    transpose music
    run (opts, cursor, output)

class ly.cli.command.version
    Bases: ly.cli.command._info_command
    print version to stdout
    get_info (info)

class ly.cli.command.write (output=None)
    Bases: ly.cli.command._command
    write the source file.
    run (opts, cursor, output)
```

3.2.7.4 ly.cli.main module

The entry point for the ‘ly’ command.

```
class ly.cli.main.Options
    Bases: object
    Store all the startup options and their defaults.
    set_variable (name, value)
```

class `ly.cli.main.Output`

Bases: `object`

Object living for a whole file/command operation, handling the output.

When opening a file it has already opened earlier, the file is appended to (like `awk`).

file (***kws*)

Return a context manager for writing to.

If you set encoding to “binary” or `False`, the file is opened in binary mode and you should encode the data you write yourself.

get_filename (*opts, filename*)

Queries the output attribute from the Options and returns it.

If `replace_pattern` is `True` (by default) and the attribute contains a ‘*’, it is replaced with the full path of the specified filename, but without extension. If the attribute contains a ‘?’, it is replaced with the filename without path and extension.

If ‘-’ is returned, it denotes standard output.

`ly.cli.main.die` (*message*)

Exit with message to `STDERR`.

`ly.cli.main.load` (*filename, encoding, mode*)

Load a file, returning a `ly.document.Document`

`ly.cli.main.main` ()

`ly.cli.main.parse_command` (*arg*)

Parse the command string, returning a list of `command.command` instances.

Exits when a command is invalid.

`ly.cli.main.parse_command_line` ()

Return a three-tuple(options, commands, files).

options is an Options instance with all the command-line options commands is a list of `command.command` instances files is the list of filename arguments

Also performs error handling and may exit on certain circumstances.

`ly.cli.main.usage` ()

Print usage info.

`ly.cli.main.usage_short` ()

Print short usage info.

`ly.cli.main.version` ()

Print version info.

3.2.8 ly.server package

3.2.8.1 Module contents

A package implementing an HTTP server to process LilyPond input code.

3.2.8.2 Submodules

3.2.8.3 ly.server.command module

The commands that are available to the command line.

```
class ly.server.command.abs2rel
    Bases: ly.server.command._edit_command
    convert absolute music to relative
    edit (opts, cursor)

class ly.server.command.highlight
    Bases: ly.server.command._export_command
    convert source to syntax colored HTML.
    export (opts, cursor, exports)

class ly.server.command.indent
    Bases: ly.server.command._edit_command
    run the indenter
    edit (opts, cursor)
    indenter (opts)
        Get a ly.indent.Indenter initialized with our options.

class ly.server.command.language
    Bases: ly.server.command._info_command
    retrieve language from document
    get_info (info)

class ly.server.command.mode
    Bases: ly.server.command._info_command
    retrieve mode from document
    get_info (info)

class ly.server.command.musicxml
    Bases: ly.server.command._export_command
    convert source to MusicXML
    export (opts, cursor, exports)

class ly.server.command.reformat
    Bases: ly.server.command.indent
    reformat the document
    edit (opts, cursor)

class ly.server.command.rel2abs
    Bases: ly.server.command._edit_command
    convert relative music to absolute
    edit (opts, cursor)
```

```
class ly.server.command.set_variable(arg)
    Bases: ly.server.command._command

    set a configuration variable to a value

    run (opts, data)

class ly.server.command.translate(language)
    Bases: ly.server.command._edit_command

    translate pitch names

    edit (opts, cursor)

class ly.server.command.transpose(arg)
    Bases: ly.server.command._edit_command

    transpose music

    edit (opts, cursor)

class ly.server.command.version
    Bases: ly.server.command._info_command

    retrieve version from document

    get_info (info)
```

3.2.8.4 ly.server.handler module

HTTP request handler

```
class ly.server.handler.RequestHandler(request, client_address, server)
    Bases: BaseHTTPServer.BaseHTTPRequestHandler

    create_command (cmd)
        Parse one command from the JSON data, plus optionally some commands to set variables. Returns an
        array with command._command instances. Raises exceptions upon faulty data.

    do_POST ()
        A POST request is expected to contain the task to be executed as a JSON object in the request body. The
        POST handler (currently) ignores the URL.

    process_json_request (request)
        Configure the action(s) to be taken, based on the JSON object. Raise errors when the JSON object can't
        be properly understood. Run the commands and return a string (from cursor.text() ).

    process_options (opts)
        Instantiate a copy of the default options and update with the given opts

    read_json_request ()
        Returns the message body parsed to a dictionary from JSON data. Raises - RuntimeError when no
        JSON data is present - ValueError when JSON parsing fails
```

3.2.8.5 ly.server.main module

The entry point for the 'ly-server' command.

```
ly.server.main.die(message)
    Exit with message to STDERR. In ly-server this should only be called upon startup, not while processing
    requests. Then the error should be sent back to the client.
```

```
ly.server.main.main()
```

```
ly.server.main.parse_command_line()
```

Returns a two-tuple(server_opts, cmd_opts)

server_opts is a ServerOptions instance configuring the server behaviour cmd_opts is an Options instance with default options for future command executions triggered by HTTP requests.

Also performs error handling and may exit on certain circumstances.

```
ly.server.main.usage()
```

Print usage info.

```
ly.server.main.usage_short()
```

Print short usage info.

```
ly.server.main.version()
```

Print version info.

3.2.8.6 ly.server.options module

Options configuring the commands' behaviour

```
class ly.server.options.Options
```

Bases: object

Store all the startup options and their defaults.

```
set_variable(name, value)
```

```
class ly.server.options.ServerOptions
```

Bases: object

Options configuring the server itself, not the individual commands

3.3 Submodules

3.4 ly.slexer module

3.4.1 slexer – Stateful Lexer

parses text, searching for tokens represented by a regular expression.

Only depends on the standard Python re module.

You need to create at least one subclass of Parser, and a subclass of Token for every type of text to search for. Then you list the token class names in the 'items' tuple of the Parser subclass definition.

Different contexts can be parsed by creating multiple Parser subclasses. A Parser searches for tokens using the list of Token classes. (Token is simply a subclass of str in Python 3 and of unicode in Python 2). Every Token subclass has the regular expression part to search for in its 'rx' class attribute.

You start parsing text by instantiating a State (you don't need to subclass that) with the Parser subclass you want to parse the text with. Then you iterate over the generated tokens using the tokens(text) method of the State instance. You can use the tokens just as strings (e.g. if token == 'text'...) but you can also test for the type of the token (e.g. if isinstance(token, Number)...). The tokens also carry a 'pos' and an 'end' attribute, specifying their position in the parsed text string.

A token may cause a different Parser to be entered, of the current Parser to be left, etc. This is done by implementing the `update_state()` method of the Token subclass. This method is called automatically when the Token is instantiated.

The State maintains the parsing state (the list of active Parser instances). A State can be frozen to be thawed later to resume parsing text starting in a particular context. A Fridge can be used to store and recover a state under a simple integer number.

How to use `slexer`:

```
from slexer import Token, Parser, State

# create token classes:
class Word(Token):
    rx = r'\w+'

class Number(Token):
    rx = r'\d+'

class String(Token):
    pass

class StringStart(String):
    rx = '"'
    def update_state(self, state):
        state.enter(PString())

class StringEnd(String):
    rx = '"'
    def update_state(self, state):
        state.leave()

# create parsers:
class PTest(Parser):
    '''Looks for numbers, words and the double quote.'''
    items = (
        Number,
        Word,
        StringStart,
    )

class PString(Parser):
    '''Returns String by default, quits at double quote.'''
    default = String
    items = (
        StringEnd,
    )

s = State(PTest)
for t in s.tokens(
    'een tekst met 7 woorden, '
    'een "tekst met 2 aanhalingstekens" '
    'en 2 of 3 nummers'):
    print(t.__class__, t)
```

Running the above code, the result is:

```
<class '__main__.Word'> een
<class '__main__.Word'> tekst
```

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```

<class '__main__.Word'> met
<class '__main__.Number'> 7
<class '__main__.Word'> woorden
<class '__main__.Word'> een
<class '__main__.StringStart'> "
<class '__main__.String'> tekst met 2 aanhalingstekens
<class '__main__.StringEnd'> "
<class '__main__.Word'> en
<class '__main__.Number'> 2
<class '__main__.Word'> of
<class '__main__.Number'> 3
<class '__main__.Word'> nummers

```

class `ly.slexer.Token`

Bases: `unicode`

Represents a parsed piece of text.

The subclass determines the type.

You should put the regular expression string in the `rx` class attribute. In the `rx` string, you may not use named groups starting with “`g_`”.

To add token types to a Parser class, list the token class in the `items` attribute of the Parser class.

end

pos

rx = None

classmethod `test_match` (*match*)

Should return True if the match should indeed instantiate this class.

This class method is only called if multiple Token classes in the Parser’s `items` list have the same `rx` attribute. This method is then called for every matching Token subclass until one returns True. That token is then instantiated. (The method is not called for the last class in the list that have the same `rx` attribute, and also not if there is only one class with that `rx` attribute.)

The default implementation always returns True.

update_state (*state*)

Lets the token update the state, e.g. enter a different parser.

This method is called by the State upon instantiation of the tokens.

Don’t use it later on to have a State follow already instantiated Tokens because the `FallthroughParser` type can also change the state without generating a Token. Use `State.follow()` to have a State follow instantiated Tokens.

The default implementation lets the Parser decide on state change.

class `ly.slexer.Parser`

Bases: `object`

Abstract base class for Parsers.

When creating Parser subclasses, you should set the ‘`items`’ attribute to a tuple of Token subclasses. On class construction, a large regular expression pattern is built by combining the expressions from the ‘`rx`’ attributes of the Token subclasses.

Additionally, you may implement the `update_state()` method which is called by the default implementation of `update_state()` in Token.

default = None

fallthrough (*state*)

Called when no match is returned by `parse()`.

If this function returns `True`, the tokenizer stops parsing, assuming all text has been consumed. If this function returns `False` or `None`, it should alter the state (switch parsers) and parsing continues using the new Parser.

The default implementation simply returns `True`.

freeze ()

Return our instance values as a hashable tuple.

items = ()

parse (*text*, *pos*)

Parse text from position *pos* and returns a Match Object or `None`.

re_flags = 0

classmethod thaw (*attrs*)

token (*match*)

Return a Token instance of the correct class.

The match object is returned by the `parse()` method.

update_state (*state*, *token*)

Called by the default implementation of `Token.update_state()`.

Does nothing by default.

class `ly.slexer.FallthroughParser`

Bases: `ly.slexer.Parser`

Base class for parsers that ‘match’ instead of ‘search’ for a pattern.

You can also implement the `fallthrough()` method to do something with the state if there is no match. The default is to leave the current parser. See `Parser()`.

fallthrough (*state*)

Called when no match is returned by `parse()`.

This implementation leaves the current parser and returns `None` (causing the State to continue parsing).

parse (*text*, *pos*)

Match text at position *pos* and returns a Match Object or `None`.

class `ly.slexer.State` (*initialParserClass*)

Bases: `object`

Maintains state while parsing text.

You instantiate a State object with an initial parser class. Then you use `tokens(text)` to start parsing for tokens.

The state is basically a list of Parser instances; the last one is the active one. The `enter()` and `leave()` methods respectively enter a new parser or leave the current parser.

You can’t `leave()` the initial parser instance.

depth ()

Return the number of parsers currently active (1 or more).

You can use this e.g. to keep parsing until some context ends:


```
tokens = state.tokens(text) # iterator
depth = state.depth()
for token in tokens:
    if state.depth() < depth:
        break
    # do something
```

enter (*parser*)

Enter a new parser.

Note: ‘parser’ is an instantiated Parser subclass. Most times this method will be called from with the `update_state()` method of a Token subclass (or from a Parser subclass, which is also possible: the default implementation of `Token.update_state()` calls `Parser.update_state()`, which does nothing by default).

E.g. in the Token subclass:

```
def update_state(self, state):
    state.enter(SomeDifferentParser())
```

follow (*token*)

Act as if the token has been instantiated with the current state.

You need this when you already have the parsed tokens, (e.g. cached or saved somehow) but want to know which parser created them.

This method changes state according to the token. Basically it calls the `update_state()` method of the token instance, but it does some more work behind the scenes to ensure that the `FallthroughParser` type (see below) also is handled correctly.

freeze ()

Return the current state as a tuple (hashable object).

leave ()

Leave the current parser and pop back to the previous.

The first parser (specified on instantiation) will never be left.

parser ()

Return the currently active Parser instance.

parsers ()

Return all active parsers, the most current one first.

replace (*parser*)

Replace the current parser with a new one.

Somewhat equivalent to:

```
state.leave()
state.enter(SomeDifferentParser())
```

But using this method you can also replace the first parser.

classmethod thaw (*frozen*)

Reproduce a State object from the frozen state argument.

tokens (*text*, *pos=0*)

Parse a text string using our state info.

Yields Token instances. All tokens are a subclass of `str` (or `unicode` in Python 2.x) and have a `pos` and an `end` attribute, describing their position in the original string. If the current parser defines a ‘default’ class attribute, it is the Token subclass to use for pieces of text that would otherwise be skipped.

```
class ly.slexer.Fridge (stateClass=<class 'ly.slexer.State'>)
    Bases: object

    Stores frozen States under an integer number.

    count ()
        Returns the number of stored frozen states.

    freeze (state)
        Stores a state and return an identifying integer.

    thaw (num)
        Returns the state stored under the specified number.
```

3.5 ly.document module

3.5.1 DocumentBase and Document

Represents a LilyPond source document (the text contents).

The Document implementation keeps the document in a (unicode) text string, but you can inherit from the Document-Base class to support other representations of the text content.

Modifying is preferably done inside a context (the with statement), e.g.:

```
d = Document('some string')
with d:
    d[5:5] = 'different '
d.plaintext() --> 'some different string'
```

Changes are applied when the context is exited, also the modified part of the document is re-tokenized. Changes may not overlap.

You may modify the document outside a context, in which case the document is re-tokenized immediately. This is much slower however when performing multiple changes after each other.

The tokens(block) method returns a tuple of tokens for the specified block. Depending on the implementation, a block describes a line in the LilyPond source document. It is not expected to have any methods, except that the '==' operator is supported between two blocks, and returns True if both refer to the same line of text in the source document.

3.5.2 Cursor

Defines a range or position in a Document.

3.5.3 Runner

A Runner allows iterating back and forth over the tokens of a document.

3.5.4 Source

Iterate over tokens in a (part of a) Document, with or without state.

class `ly.document.Cursor` (*doc*, *start=0*, *end=None*)

Bases: `object`

Defines a certain range (selection) in a Document.

You may change the start and end attributes yourself. Both must be an integer, end may also be None, denoting the end of the document.

As long as you keep a reference to the Cursor, its positions are updated when the document changes. When text is inserted at the start position, it remains the same. But when text is inserted at the end of a cursor, the end position moves along with the new text. E.g.:

```
d = Document('hi there, folks!')
c = Cursor(d, 8, 8)
with d:
    d[8:8] = 'new text'
c.start, c.end --> (8, 16)
```

Many tools in the ly module use this object to describe (part of) a document.

blocks ()

Iterate over the selected blocks.

If there are multiple blocks and the cursor ends on the first position of the last selected block, that block is not included.

document

end_block ()

Return the block the end attribute points at.

has_selection ()

Return True when there is some text selected.

lstrip (*chars=None*)

Move start to the right, like Python's `lstrip()` string method.

rstrip (*chars=None*)

Move end to the left, like Python's `lstrip()` string method.

select_all ()

Select all text.

select_end_of_block ()

Move end to the end of the block.

select_start_of_block ()

Move start to the start of the block.

start_block ()

Return the block the start attribute points at.

strip (*chars=None*)

Strip chars from the selection, like Python's `strip()` method.

text ()

Convenience method to return the selected text.

text_after ()

Return text after the cursor in it's end block.

text_before ()

Return text before the cursor in it's start block.

```
class ly.document.Document (text=u'', mode=None)
```

Bases: [ly.document.DocumentBase](#)

A plain text LilyPond source document that auto-updates the tokens.

The modified attribute is set to True as soon as the document is changed, but the `setplaintext()` method sets it to False.

apply_changes ()

block (*position*)

Return the text block at the specified character position.

copy ()

Return a full copy of the document.

index (*block*)

Return the linenumber of the block (starting with 0).

initial_state ()

Return the state at the beginning of the document.

isvalid (*block*)

Return True if the block is a valid block.

classmethod load (*filename*, *encoding*=u'utf-8', *mode*=None)

Load the document from a file, using the specified encoding and mode.

mode ()

Return the mode (lilypond, html, etc). None means automatic mode.

modified = False

position (*block*)

Return the position of the specified block.

setmode (*mode*)

Sets the mode to one of the ly.lex modes.

Use None to auto-determine the mode.

setplaintext (*text*)

Set the text of the document, sets modified to False.

state_end (*block*)

Return the state at the end of the specified block.

text (*block*)

Return the text of the specified block.

tokens (*block*)

Return the tuple of tokens of the specified block.

```
class ly.document.DocumentBase
```

Bases: `object`

Abstract base class for Document instances.

You should inherit the following methods:

`setplaintext` `__len__` `__getitem__` `block` `index` `position` `text` `tokens` `isvalid` `initial_state` `state_end` `apply_changes`

You may inherit (e.g. to get speed improvements):

`plaintext` `next_block` `previous_block` `blocks_forward` `blocks_backward` `state`

You may use the following attributes:

`filename` (`None`) # can represent the filename of the document on disk
`encoding` (`None`) # can represent the encoding of the document when reading/writing to disk

`apply_changes()`

Apply the changes and update the tokens.

`block(position)`

Return the text block at the specified character position.

The text block itself has no methods, but it can be used as an argument to other methods of this class.

(Blocks do have to support the ‘==’ operator.)

`blocks_backward(block)`

Iter backwards starting with the specified block.

`blocks_forward(block)`

Iter forward starting with the specified block.

`check_changes()`

Debugging method that checks for overlapping edits.

`encoding = None`

`filename = None`

`index(block)`

Return the linenumber of the block (starting with 0).

`initial_state()`

Return the state at the beginning of the document.

`isblank(block)`

Return True if the block is empty or blank.

`isvalid(block)`

Return True if the block is a valid block.

`next_block(block)`

Return the next block, which may be invalid.

`plaintext()`

The document contents as a plain text string.

`position(block)`

Return the position of the specified block.

`previous_block(block)`

Return the previous block, which may be invalid.

`setplaintext(text)`

Sets the document contents to the text string.

`size()`

Return the number of characters in the document.

`state(block)`

Return the state at the start of the specified block.

`state_end(block)`

Return the state at the end of the specified block.

text (*block*)

Return the text of the specified block.

tokens (*block*)

Return the tuple of tokens of the specified block.

The pos and end attributes of every token point to the position of the token in the block.

tokens_with_position (*block*)

Return a tuple of tokens of the specified block.

The pos and end attributes of every token point to the position in the Document, instead of to the position in the current block.

This makes it easier to iterate over tokens and change the document.

update_cursors ()

Updates the position of the registered Cursor instances.

class `ly.document.Runner` (*doc, tokens_with_position=False*)

Bases: `object`

Iterates back and forth over tokens.

A Runner can stop anywhere and remembers its current token.

classmethod `at` (*cursor, after_token=False, tokens_with_position=False*)

Create and init from a Cursor.

The Runner is positioned so that yielding forward starts with the first complete token after the cursor's start position.

Set `after_token` to `True` if you want to position the cursor after the token, so that it gets yielded when you go backward.

If `tokens_with_position` is `True`, uses the `tokens_with_position()` method to get the tokens, else (by default), the `tokens()` method is used.

backward ()

Yields tokens in backward direction across blocks.

backward_line ()

Yields tokens in backward direction in the current block.

copy ()

Return a new Runner at the current position.

document

Return our Document.

forward ()

Yields tokens in forward direction across blocks.

forward_line ()

Yields tokens in forward direction in the current block.

move_to_block (*block, at_end=False*)

Positions the Runner at the start of the given text block.

If `at_end == True`, the iterator is positioned past the end of the block.

next_block (*at_end=False*)

Go to the next block, positioning the cursor at the start by default.

Returns `False` if there was no next block, else `True`.

position()

Returns the position of the current token.

previous_block (*at_end=True*)

Go to the previous block, positioning the cursor at the end by default.

Returns False if there was no previous block, else True.

set_position (*position, after_token=False*)

Positions the Runner at the specified position.

Set *after_token* to True if you want to position the cursor after the token, so that it gets yielded when you go backward.

token()

Re-returns the last yielded token.

class `ly.document.Source` (*cursor, state=None, partial=1, tokens_with_position=False*)

Bases: `object`

Helper iterator.

Iterates over the (block, tokens) tuples from a Document (or a part thereof). Stores the current block in the `block` attribute and the tokens (which also is a generator) in the `tokens` attribute.

Iterating over the source object itself just yields the tokens, while the `block` attribute contains the current block.

You can also iterate over the `tokens` attribute, which will yield the remaining tokens of the current block and then stop.

If you specify a state, the tokens will update the state. If you specify `state = True`, the state will be taken from the document.

consume (*iterable, position*)

Consumes *iterable* (supposed to be reading from us) until *position*.

Returns the last token if that overlaps *position*.

document

Return our Document.

next()

position (*token*)

Returns the position of the token in the current block.

If the iterator was instantiated with `tokens_with_position == True`, this position is the same as the `token.pos` attribute, and the current block does not matter. (In that case you'll probably not use this method.)

pushback (*pushback=True*)

Yields the last yielded token again on the next request.

This can be called multiple times, but only the last token will be yielded again. You can also undo a call to `pushback()` using `pushback(False)`.

token()

Re-returns the last yielded token.

until_parser_end()

Yield the tokens until the current parser is quit.

You can only use this method if you have a State enabled.

3.6 ly.docinfo module

Harvest information from a `ly.document.DocumentBase` instance.

class `ly.docinfo.DocInfo (doc)`

Bases: `object`

Harvest information from a `ly.document.DocumentBase` instance.

All tokens are saved in the `tokens` attribute as a tuple. Newline tokens are added between all lines. All corresponding classes are in the `classes` attribute as a tuple. This makes quick search and access possible.

The tokens are requested from the document using the `tokens_with_position()` method, so you can always locate them back in the original document using their `pos` attribute.

`DocInfo` does not update when the document changes, you should just instantiate a new one.

complete ()

Return whether the document is probably complete and could be compilable.

count_tokens (cls)

Return the number of tokens that are (a subclass) of the specified class.

If you only want the number of instances of the exact class (not a subclass of) you can use `info.classes.count(cls)`, where `info` is a `DocInfo` instance.

counted_tokens ()

Return a dictionary mapping classes to the number of instances of that class.

definitions ()

The list of LilyPond identifiers the document defines.

document

find (token=None, cls=None, pos=0, endpos=-1)

Return the index of the first specified token and/or class after `pos`.

If `token` is `None`, the `cls` should be specified. If `cls` is given, the token should be an instance of the specified class. If `endpos` is given, never searches beyond `endpos`. Returns -1 if the token is not found.

find_all (token=None, cls=None, pos=0, endpos=-1)

Yield all indices of the first specified token and/or class after `pos`.

If `token` is `None`, the `cls` should be specified. If `cls` is given, the token should be an instance of the specified class. If `endpos` is given, never searches beyond `endpos`. Returns -1 if the token is not found.

global_staff_size ()

The global-staff-size, if set, else `None`.

has_output ()

Return `True` when the document probably generates output.

I.e. has notes, rests, markup or other output-generating commands.

include_args ()

The list of include command arguments.

language ()

The pitch language, `None` if not set in the document.

markup_definitions ()

The list of markup command definitions in the document.

mode()

Return the mode, e.g. “lilypond”.

output_args()

The list of arguments of constructs defining the name of output documents.

This looks at the bookOutputName, bookOutputSuffix and define output-suffix commands.

Every argument is a two tuple(type, argument) where type is either “suffix” or “name”.

range(start=0, end=None)

Return a new instance of the DocInfo class for the selected range.

Only the tokens completely contained within the range start..end are added to the new instance. This can be used to perform fast searches on a subset of a document.

scheme_load_args()

The list of scheme (load) command arguments.

token_hash()

Return an integer hash for all non-whitespace and non-comment tokens.

This hash does not change when only comments or whitespace are changed.

version()

Return the version_string() as a tuple of ints, e.g. (2, 16, 2).

version_string()

Return the version as a string, e.g. “2.19.8”.

Looks for the version LilyPond command. The string is returned without quotes. Returns None if there was no version command found.

3.7 ly.barcheck module

Add, check or remove bar checks in selected music.

class ly.barcheck.event

Bases: object

A limited event type at a certain time.

append(node)

ly.barcheck.insert(cursor, music=None)

Insert bar checks within the selected range.

ly.barcheck.remove(cursor)

Remove bar checks from the selected music.

3.8 ly.colorize module

Classes and functions to colorize (syntax-highlight) parsed source.

Highlighting is based on CSS properties and their values, although the Mapping object can map a token’s class to any object or value.

The Mapping object normally maps a token’s class basically to a CSS class and possibly a base CSS class. This way you can define base styles (e.g. string, comment, etc) and have specific classes (e.g. LilyPond string, Scheme

comment) inherit from that base style. This CSS class is described by the `css_class` named tuple, with its three fields: `mode`, `name`, `base`. E.g. ('lilypond', 'articulation', 'keyword'). The `base` field may be `None`.

The `css` classes are mapped to dictionaries of `css` properties, like {'font-weight': 'bold', 'color': '#4800ff'}, etc.

A `scheme` (a collection of styles) is simply a dictionary mapping the `mode` to a dictionary of `CSS` dictionaries. The `base` styles are in the `[None]` item of the `scheme` dictionary.

```
class ly.colorize.HtmlWriter
```

Bases: `object`

A do-it-all object to create syntax highlighted HTML.

You can set the instance attributes to configure the behaviour in all details. Then call the `html(cursor)` method to get the HTML.

```
bgcolor = None
```

```
css_mapper = None
```

```
css_scheme = {None: {'function': {'color': u'#0000c0', 'font-weight': u'bold'},
```

```
document_id = u'document'
```

```
encoding = u'UTF-8'
```

```
fgcolor = None
```

```
full_html = True
```

```
html (cursor)
```

Return the output HTML.

```
inline_style = False
```

```
linenumbers_bgcolor = u'#eeeeee'
```

```
linenumbers_fgcolor = None
```

```
linenumbers_id = u'linenumbers'
```

```
number_lines = False
```

```
set_wrapper_attribute (attr)
```

Choose attribute name for wrapper tag

```
set_wrapper_tag (tag)
```

Define the tag to be used for wrapping the content

```
stylesheet_ref = None
```

```
title = u''
```

```
wrapper_attribute = u'id'
```

```
wrapper_tag = u'pre'
```

```
class ly.colorize.Mapper
```

Bases: `dict`

Maps token classes to arbitrary values, which can be highlighting styles.

`Mapper` behaves like a `dict`, you set items with a token class as key to an arbitrary value.

But getting items can be done using a token. The token class's method resolution order is walked up and the value for the first available class found in the keys is returned. The class is also cached to speed up requests for other tokens.

`ly.colorize.add_line_numbers(cursor, html, linenum_attrs=None, document_attrs=None)`

Combines the html (returned by `html()`) with the line numbers in a HTML table.

The `linenum_attrs` are put in the `<td>` tag for the line numbers. The default value is: `{“style”: “background: #eeeeee;”}`. The `document_attrs` are put in the `<td>` tag for the document. The default is empty.

By default, the id for the line numbers `<td>` is set to “linenumbers”, and the id for the document `<td>` is set to “document”.

`ly.colorize.css_attr(d)`

Return a dictionary with a ‘style’ key.

The value is the style items in `d` formatted with `css_item()` joined with spaces. If `d` is empty, an empty dictionary is returned.

class `ly.colorize.css_class(mode, name, base)`

Bases: tuple

base

Alias for field number 2

mode

Alias for field number 0

name

Alias for field number 1

`ly.colorize.css_dict(css_style, scheme={None: {u'function': {u'color': u'#0000c0', u'font-weight': u'bold'}, u'comment': {u'color': u'#808080', u'font-style': u'italic'}, u'string': {u'color': u'#c00000'}, u'keyword': {u'font-weight': u'bold'}, u'escape': {u'color': u'#008080'}, u'variable': {u'color': u'#0000ff'}, u'error': {u'color': u'ff0000', u'text-decoration-color': u'ff0000', u'text-decoration': u'underline'}, u'value': {u'color': u'#808000'}}, u'html': {}, u'lilypond': {u'lyrictext': {u'color': u'#006000'}, u'articulation': {u'color': u'ff8000', u'font-weight': u'bold'}, u'grob': {u'color': u'#c000c0'}, u'dynamic': {u'color': u'ff8000', u'font-weight': u'bold'}, u'fingering': {u'color': u'ff8000'}, u'duration': {u'color': u'#008080'}, u'lyricmode': {u'color': u'#006000'}, u'stringnumber': {u'color': u'ff8000'}, u'markup': {u'color': u'#008000', u'font-weight': u'normal'}, u'slur': {u'font-weight': u'bold'}, u'context': {u'font-weight': u'bold'}}, u'mup': {}, u'scheme': {}, u'texinfo': {}})`

Return the css properties dict for the style, taken from the scheme.

This can be used for inline style attributes.

`ly.colorize.css_group(selector, d)`

Return a “selector { items... }” part of a CSS stylesheet.

`ly.colorize.css_item(i)`

Return “name: value;” where `i` = (name, value).

`ly.colorize.css_mapper(mapping=None)`

Return a Mapper dict, mapping token classes to two CSS classes.

By default the mapping returned by `default_mapping()` is used.

```
class ly.colorize.css_style_attribute_formatter(scheme={None: {u'function':
    {u'color': u'#0000c0', u'font-weight':
    u'bold'}, u'comment': {u'color':
    u'#808080', u'font-style': u'italic'},
    u'string': {u'color': u'#c00000'},
    u'keyword': {u'font-weight':
    u'bold'}, u'escape': {u'color':
    u'#008080'}, u'variable': {u'color':
    u'#0000ff'}, u'error': {u'color':
    u'ff0000', u'text-decoration-color':
    u'ff0000', u'text-decoration':
    u'underline'}, u'value': {u'color':
    u'#808000'}}, u'html': {}, u'lilypond':
    {u'lyrictext': {u'color': u'#006000'},
    u'articulation': {u'color': u'ff8000',
    u'font-weight': u'bold'}, u'grob':
    {u'color': u'#c000c0'}, u'dynamic':
    {u'color': u'ff8000', u'font-weight':
    u'bold'}, u'fingering': {u'color':
    u'ff8000'}, u'duration': {u'color':
    u'#008080'}, u'lyricmode': {u'color':
    u'#006000'}, u'stringnumber':
    {u'color': u'ff8000'}, u'markup':
    {u'color': u'#008000', u'font-weight':
    u'normal'}, u'slur': {u'font-weight':
    u'bold'}, u'context': {u'font-weight':
    u'bold'}}, u'mup': {}, u'scheme': {},
    u'texinfo': {}})
```

Bases: object

Return the inline style attribute for a specified style.

`ly.colorize.default_mapping()`

Return a good default mapping from token class(es) to style and default style, per group.

`ly.colorize.format_css_span_class(css_style)`

Return a string like 'class="mode-style base"' for the specified style.

`ly.colorize.format_html_document(body, title=u'', stylesheet=None, stylesheet_ref=None, encoding=u'UTF-8')`

Return a complete HTML document.

The body is put inside body tags unchanged. The title is html-escaped. If `stylesheet_ref` is given, it is put as a <link> reference in the HTML; if `stylesheet` is given, it is put verbatim in a <style> section in the HTML. The encoding is set in the meta http-equiv field, but the returned HTML is in normal Python unicode (python2) or str (python3) format, you should encode it yourself in the same encoding (by default utf-8) when writing it to a file.

```
ly.colorize.format_stylesheet (scheme={None: {u'function': {u'color': u'#0000c0', u'font-weight': u'bold'}, u'comment': {u'color': u'#808080', u'font-style': u'italic'}, u'string': {u'color': u'#c00000'}, u'keyword': {u'font-weight': u'bold'}, u'escape': {u'color': u'#008080'}, u'variable': {u'color': u'#0000ff'}, u'error': {u'color': u'ff0000', u'text-decoration-color': u'ff0000', u'text-decoration': u'underline'}, u'value': {u'color': u'#808000'}}, u'html': {}, u'lilypond': {u'lyrictext': {u'color': u'#006000'}, u'articulation': {u'color': u'ff8000', u'font-weight': u'bold'}, u'grob': {u'color': u'#c000c0'}, u'dynamic': {u'color': u'ff8000', u'font-weight': u'bold'}, u'fingering': {u'color': u'ff8000'}, u'duration': {u'color': u'#008080'}, u'lyricmode': {u'color': u'#006000'}, u'stringnumber': {u'color': u'ff8000'}, u'markup': {u'color': u'#008000', u'font-weight': u'normal'}, u'slur': {u'font-weight': u'bold'}, u'context': {u'font-weight': u'bold'}}, u'mup': {}, u'scheme': {}, u'texinfo': {}})
```

Return a formatted stylesheet for the stylesheet scheme dictionary.

```
ly.colorize.get_tokens (cursor)
```

Return the list of tokens for the cursor.

Tokens that are partially inside the cursor's selection are re-created so that they fall exactly within the selection.

This can be used to convert a highlighted part of a document to e.g. HTML.

```
ly.colorize.html (cursor, mapper, span=<function format_css_span_class>)
```

Return a HTML string with the tokens wrapped in elements.

The span argument is a function returning an attribute for the tag for the specified style. By default the format_css_span_class() function is used, that returns a 'class="group style base"' string. You'll want to wrap the HTML inside <pre> tokens and add a CSS stylesheet.

```
ly.colorize.html_escape (text)
```

Escape &, < and >.

```
ly.colorize.html_escape_attr (text)
```

Escape &, ", < and >.

```
ly.colorize.html_format_attrs (d)
```

Format the attributes dict as a string.

The attributes are escaped correctly. A space is prepended for every assignment.

```
ly.colorize.map_tokens (cursor, mapper)
```

Yield a two-tuple(token, style) for every token.

The style is what mapper[token] returns. Style may be None, which also happens with unparsed (not-tokenized) text.

```
ly.colorize.melt_mapped_tokens (mapped_tokens)
```

Melt adjacent tokens with the same mapping together.

```
class ly.colorize.style (name, base, classes)
```

Bases: tuple

base

Alias for field number 1

classes

Alias for field number 2

name

Alias for field number 0

3.9 ly.cursortools module

Routines manipulating `ly.document.Cursor` instances.

`ly.cursortools.find_indent(iterable)`

Yield (token, is_indent, nest) for every occurring indent/dedent token.

The tokens are yielded from the specified iterable.

`ly.cursortools.select_block(cursor)`

Try to select a meaningful block.

Searches backwards for an indenting token, then selects up to the corresponding dedenting token. If needed searches an extra level back to always extend the selection. Returns True if the cursor's selection has changed.

3.10 ly.dom module

This module is deprecated. When *ly.music* is able to generate LilyPond code from scratch, this module will be removed.

LilyPond DOM

(c) 2008-2011 Wilbert Berendsen License: GPL.

A simple Document Object Model for LilyPond documents.

The purpose is to easily build a LilyPond document with good syntax, not to fully understand all features LilyPond supports. (This DOM does not enforce a legal LilyPond file.)

All elements of a LilyPond document inherit `Node`.

Note: elements keep a weak reference to their parent.

class `ly.dom.AddDuration`

Bases: `object`

Mixin to add a duration (as child).

ly (*printer*)

class `ly.dom.AddLyrics` (*parent=None*)

Bases: `ly.dom.InputLyrics`

after = 1

before = 1

may_remove_brackets = False

name = u'addlyrics'

class `ly.dom.Assignment` (*name=None, parent=None, valueObj=None*)

Bases: `ly.dom.Container`

A varname = value construct with it's value as its first child The name can be a string or a Reference object: so that everywhere where this varname is referenced, the name is the same.

after = 1

```

    before = 1
    ly(printer)
    setValue(obj)
    value()

class ly.dom.BlankLine (parent=None)
    Bases: ly.dom.Newline
    A blank line.
    before = 1

class ly.dom.Block (parent=None)
    Bases: ly.dom.Container
    A vertical container type that puts everything on a new line.
    after = 1
    before = 1
    defaultSpace = u'\n'

class ly.dom.BlockComment (text=u'', parent=None)
    Bases: ly.dom.Comment
    A block comment between %{ and %}
    after
    before
    ly(printer)

class ly.dom.Book (parent=None)
    Bases: ly.dom.Section
    name = u'book'

class ly.dom.BookPart (parent=None)
    Bases: ly.dom.Section
    name = u'bookpart'

class ly.dom.ChoirStaff (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType

class ly.dom.Chord (parent=None)
    Bases: ly.dom.Container
    A chord containing one of more Pitches and optionally one Duration. This is a bit of a hack, awaiting real music
    object support.
    ly(printer)

class ly.dom.ChordMode (parent=None)
    Bases: ly.dom.InputMode
    name = u'chordmode'

class ly.dom.ChordNames (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType

```

```
class ly.dom.Clef(clef, parent=None)
```

Bases: [ly.dom.Leaf](#)

A clef.

```
ly(printer)
```

```
class ly.dom.Command(name, parent=None)
```

Bases: [ly.dom.Statement](#)

Use this to create a LilyPond command supplying the name (or a Reference) when instantiating.

```
class ly.dom.CommandEnclosed(name, parent=None)
```

Bases: [ly.dom.StatementEnclosed](#)

Use this to print LilyPond commands that have a single bracket-enclosed list of arguments. The command name is supplied to the constructor.

```
class ly.dom.Comment(text=u'', parent=None)
```

Bases: [ly.dom.Text](#)

A LilyPond comment at the end of a line

```
after = 1
```

```
ly(printer)
```

```
class ly.dom.Container(parent=None)
```

Bases: [ly.dom.LyNode](#)

A node that concatenates its children on output

```
after
```

```
before
```

```
defaultSpace = u' '
```

```
ly(printer)
```

```
class ly.dom.Context(contextName=u'', parent=None)
```

Bases: [ly.dom.HandleVars](#), [ly.dom.Section](#)

A context section for use inside Layout or Midi sections.

```
name = u'context'
```

```
class ly.dom.ContextName(text=u'', parent=None)
```

Bases: [ly.dom.Text](#)

Used to print a context name, like Score.

```
ly(printer)
```

```
class ly.dom.ContextProperty(prop, context=None, parent=None)
```

Bases: [ly.dom.Leaf](#)

A Context.property or Context.layoutObject construct. Call e.g. ContextProperty('aDueText', 'Staff') to get 'Staff.aDueText'.

```
ly(printer)
```

```
class ly.dom.ContextType(cid=None, new=True, parent=None)
```

Bases: [ly.dom.Container](#)

new or context Staff = 'bla' with { } << music >>

A with (With) element is added automatically as the first child as soon as you use our convenience methods that manipulate the variables in with. If the with element is empty, it does not print anything. You should add one other music object to this.

addInstrumentNameEngraverIfNecessary()

Adds the Instrument_name_engraver to the node if it would need it to print instrument names.

after = 1

before = 1

ctype = None

getWith()

Gets the attached with clause. Creates it if not there.

isAtom = True

ly (*printer*)

class `ly.dom.CueVoice` (*cid=None, new=True, parent=None*)

Bases: `ly.dom.ContextType`

class `ly.dom.Devnull` (*cid=None, new=True, parent=None*)

Bases: `ly.dom.ContextType`

class `ly.dom.Document` (*parent=None*)

Bases: `ly.dom.Container`

A container type that puts everything on a new line. To be used as a full LilyPond document.

after = 1

defaultSpace = u'\n'

class `ly.dom.DrumMode` (*parent=None*)

Bases: `ly.dom.InputMode`

name = u'drummode'

class `ly.dom.DrumStaff` (*cid=None, new=True, parent=None*)

Bases: `ly.dom.ContextType`

class `ly.dom.DrumVoice` (*cid=None, new=True, parent=None*)

Bases: `ly.dom.ContextType`

class `ly.dom.Duration` (*dur, dots=0, factor=1, parent=None*)

Bases: `ly.dom.Leaf`

A duration with duration (in logarithmic form): (-2 ... 8), where -2 = longa, -1 = breve, 0 = 1, 1 = 2, 2 = 4, 3 = 8, 4 = 16, etc, dots (number of dots), factor (Fraction giving the scaling of the duration).

ly (*printer*)

class `ly.dom.Dynamics` (*cid=None, new=True, parent=None*)

Bases: `ly.dom.ContextType`

class `ly.dom.Enclosed` (*parent=None*)

Bases: `ly.dom.Container`

Encloses all children between brackets: { ... } If may_remove_brackets is True in subclasses, the brackets are removed if there is only one child and that child is an atom (i.e. a single LilyPond expression).

after = 0

before = 0

```
isAtom = True
ly(printer)
may_remove_brackets = False
post = u'}'
pre = u'{'

class ly.dom.FigureMode (parent=None)
    Bases: ly.dom.InputMode
    name = u'figuremode'

class ly.dom.FiguredBass (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType

class ly.dom.FretBoards (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType

class ly.dom.Global (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType

class ly.dom.GrandStaff (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType

class ly.dom.GregorianTranscriptionStaff (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType

class ly.dom.GregorianTranscriptionVoice (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType

class ly.dom.HandleVars
    Bases: object

    A powerful mixin class to facilitate handling unique variable assignments inside a Container more. E.g.: >>>
    h = Header() >>> h['composer'] = "Johann Sebastian Bach" creates a subnode (by default Assignment) with
    the name 'composer', and that node again gets an autogenerated subnode of type QuotedString (if the argument
    wasn't already a Node).

    childClass
        alias of Assignment

    ifbasestring ()
        Ensure that the method is only called for basestring objects. Otherwise the same method from the super
        class is called.

    importNode (obj)
        Try to interpret the object and transform it into a Node object of the right species.

class ly.dom.Header (parent=None)
    Bases: ly.dom.HandleVars, ly.dom.Section
    name = u'header'

class ly.dom.Identifier (name=None, parent=None)
    Bases: ly.dom.Leaf

    An identifier, prints as name. Name may be a string or a Reference object.

    isAtom = True
    ly(printer)
```

```

class ly.dom.Include (text=u", parent=None)
    Bases: ly.dom.Line
    a LilyPond include statement
    ly (printer)

class ly.dom.InnerChoirStaff (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType

class ly.dom.InnerStaffGroup (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType

class ly.dom.InputChords (parent=None)
    Bases: ly.dom.ChordMode
    name = u'chords'

class ly.dom.InputDrums (parent=None)
    Bases: ly.dom.DrumMode
    name = u'drums'

class ly.dom.InputFigures (parent=None)
    Bases: ly.dom.FigureMode
    name = u'figures'

class ly.dom.InputLyrics (parent=None)
    Bases: ly.dom.LyricMode
    name = u'lyrics'

class ly.dom.InputMode (parent=None)
    Bases: ly.dom.StatementEnclosed
    The abstract base class for input modes such as lyricmode/lyrics, chordmode/chords etc.

class ly.dom.InputNotes (parent=None)
    Bases: ly.dom.NoteMode
    name = u'notes'

class ly.dom.KeySignature (note=0, alter=0, mode=u'major', parent=None)
    Bases: ly.dom.Leaf
    A key signature expression, like:
    key c major The pitch should be given in the arguments note and alter and is written out in the document's
    language.
    ly (printer)

class ly.dom.Layout (parent=None)
    Bases: ly.dom.HandleVars, ly.dom.Section
    name = u'layout'

class ly.dom.Leaf (parent=None)
    Bases: ly.dom.LyNode
    A leaf node without children

class ly.dom.Line (text=u", parent=None)
    Bases: ly.dom.Text
    A text node that claims its own line.

```

```
    after = 1
    before = 1
class ly.dom.LineComment (text=u'', parent=None)
    Bases: ly.dom.Comment
    A LilyPond comment that takes a full line
    before = 1
class ly.dom.LyNode (parent=None)
    Bases: ly.node.WeakNode
    Base class for LilyPond objects, based on Node, which takes care of the tree structure.
    after = 0
    before = 0
    concat (other)
        Returns a string with newlines to concat this node to another one. If zero newlines are requested, an empty
        string is returned.
    isAtom = False
    ly (printer)
        Returns printable output for this object. Can ask printer for certain settings, e.g. pitch language etc.
class ly.dom.LyricMode (parent=None)
    Bases: ly.dom.InputMode
    name = u'lyricmode'
class ly.dom.Lyrics (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType
class ly.dom.LyricsTo (cid, parent=None)
    Bases: ly.dom.LyricMode
    ly (printer)
    name = u'lyricsto'
class ly.dom.Mark (parent=None)
    Bases: ly.dom.Statement
    The mark command.
    name = u'mark'
class ly.dom.Markup (parent=None)
    Bases: ly.dom.StatementEnclosed
    The markup command. You can add many children, in that case Markup automatically prints { and } around
    them.
    name = u'markup'
class ly.dom.MarkupCommand (name, parent=None)
    Bases: ly.dom.Command
    A markup command with more or no arguments, that does not auto-enclose its arguments. Useful for commands
    like note-by-number or hspace.
    You must supply the name. Its arguments are its children. If one argument can be a markup list, use a Enclosed()
    construct for that.
```

```
class ly.dom.MarkupEnclosed (name, parent=None)
```

Bases: *ly.dom.CommandEnclosed*

A markup that auto-encloses all its arguments, like ‘italic’, ‘bold’ etc. You must supply the name.

```
class ly.dom.MensuralStaff (cid=None, new=True, parent=None)
```

Bases: *ly.dom.ContextType*

```
class ly.dom.MensuralVoice (cid=None, new=True, parent=None)
```

Bases: *ly.dom.ContextType*

```
class ly.dom.Midi (parent=None)
```

Bases: *ly.dom.HandleVars*, *ly.dom.Section*

```
    name = u'midi'
```

```
class ly.dom.Named
```

Bases: *object*

Mixin to print a name before the contents of the container. `format()` is called on the `self.name` attribute, so it may also be a Reference.

```
    ly (printer)
```

```
    name = u''
```

```
class ly.dom.Newline (parent=None)
```

Bases: *ly.dom.LyNode*

A newline.

```
    after = 1
```

```
class ly.dom.NoteMode (parent=None)
```

Bases: *ly.dom.InputMode*

```
    name = u'notemode'
```

```
class ly.dom.NoteNames (cid=None, new=True, parent=None)
```

Bases: *ly.dom.ContextType*

```
class ly.dom.Paper (parent=None)
```

Bases: *ly.dom.HandleVars*, *ly.dom.Section*

```
    name = u'paper'
```

```
class ly.dom.Partial (dur, dots=0, factor=1, parent=None)
```

Bases: *ly.dom.Named*, *ly.dom.Duration*

partial <duration> You should add a Duration element

```
    after = 1
```

```
    before = 1
```

```
    name = u'partial'
```

```
class ly.dom.PianoStaff (cid=None, new=True, parent=None)
```

Bases: *ly.dom.ContextType*

```
class ly.dom.Pitch (octave=0, note=0, alter=0, parent=None)
```

Bases: *ly.dom.Leaf*

A pitch with octave, note, alter. octave is specified by an integer, zero for the octave containing middle C. note is a number from 0 to 6, with 0 corresponding to pitch C and 6 corresponding to pitch B. alter is the number of whole tones for alteration (can be int or Fraction)

ly (*printer*)

Print the pitch in the preferred language.

class `ly.dom.Printer`

Bases: `object`

Performs certain operations on behalf of a LyNode tree, like quoting strings or translating pitch names, etc.

indent (*node*)

Return a formatted printout of node (and its children)

indentGen (*node*, *startIndent*=0)

A generator that walks on the output of the given node, and returns properly indented LilyPond code.

primary_quote_left = `u'\u2018'`

primary_quote_right = `u'\u2019'`

quoteString (*text*)

secondary_quote_left = `u'\u201c'`

secondary_quote_right = `u'\u201d'`

class `ly.dom.QuotedString` (*text*=`u''`, *parent*=`None`)

Bases: `ly.dom.Text`

A string that is output inside double quotes.

isAtom = `True`

ly (*printer*)

class `ly.dom.Reference` (*name*=`u''`)

Bases: `object`

A simple object that keeps a name, to use as a (context) identifier. Set the name attribute to the name you want to display, and on all places in the document the name will show up.

class `ly.dom.Relative` (*parent*=`None`)

Bases: `ly.dom.Statement`

relative <pitch> music

You should add a Pitch (optionally) and another music object, e.g. Sim or Seq, etc.

name = `u'relative'`

class `ly.dom.RhythmicStaff` (*cid*=`None`, *new*=`True`, *parent*=`None`)

Bases: `ly.dom.ContextType`

class `ly.dom.Scheme` (*text*=`u''`, *parent*=`None`)

Bases: `ly.dom.Text`

A Scheme expression, without the extra # prepended

isAtom = `True`

ly (*printer*)

class `ly.dom.SchemeLily` (*parent*=`None`)

Bases: `ly.dom.Enclosed`

A LilyPond expression between #{ #} (inside scheme)

post = `u'#{'`

pre = `u'#{'`

```

class ly.dom.SchemeList (parent=None)
    Bases: ly.dom.Enclosed

    A list of items enclosed in parentheses

    ly (printer)

    post = u')'
    pre = u'('

class ly.dom.Score (parent=None)
    Bases: ly.dom.Section

    name = u'score'

class ly.dom.ScoreContext (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType

    Represents the Score context in LilyPond, but the name would collide with the Score class that represents score
    { } constructs.

    Because the latter is used more often, use ScoreContext to get new Score etc.

    ctype = u'Score'

class ly.dom.Section (parent=None)
    Bases: ly.dom.StatementEnclosed

    Very much like a Statement. Use as base class for book { }, score { } etc. By default never removes the brackets
    and always starts on a new line.

    after = 1
    before = 1
    may_remove_brackets = False

class ly.dom.Seq (parent=None)
    Bases: ly.dom.Enclosed

    An SequentialMusic expression between { }

    post = u'}'
    pre = u'{'

class ly.dom.Seqr (parent=None)
    Bases: ly.dom.Seq

    may_remove_brackets = True

class ly.dom.Sim (parent=None)
    Bases: ly.dom.Enclosed

    An SimultaneousMusic expression between << >>

    post = u'>>'
    pre = u'<<'

class ly.dom.Simr (parent=None)
    Bases: ly.dom.Sim

    may_remove_brackets = True

class ly.dom.Staff (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType

```

```
class ly.dom.StaffGroup (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType
```

```
class ly.dom.Statement (parent=None)
    Bases: ly.dom.Named, ly.dom.Container

    Base class for statements with arguments. The statement is read in the name attribute, the arguments are the
    children.

    before = 0

    isAtom = True
```

```
class ly.dom.StatementEnclosed (parent=None)
    Bases: ly.dom.Named, ly.dom.Enclosed

    Base class for LilyPond commands that have a single bracket-enclosed list of arguments.

    may_remove_brackets = True
```

```
class ly.dom.TabStaff (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType
```

```
class ly.dom.TabVoice (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType
```

```
class ly.dom.Tempo (duration, value, parent=None)
    Bases: ly.dom.Container

    A tempo setting, like: tempo 4 = 100 May have a child markup or quoted string.

    after = 1

    before = 1

    ly (printer)
```

```
class ly.dom.Text (text=u'', parent=None)
    Bases: ly.dom.Leaf

    A leaf node with arbitrary text

    ly (printer)
```

```
class ly.dom.TextDur (text=u'', parent=None)
    Bases: ly.dom.AddDuration, ly.dom.Text

    A text note with an optional duration as child.
```

```
class ly.dom.TimeSignature (num, beat, parent=None)
    Bases: ly.dom.Leaf

    A time signature, like: time 4/4

    ly (printer)
```

```
class ly.dom.Transposition (parent=None)
    Bases: ly.dom.Statement

    transposition <pitch> You should add a Pitch.

    name = u'transposition'
```

```
class ly.dom.UserContext (ctype, cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType

    Represents a context the user creates. e.g. new MyStaff = cid << music >>
```



```
class ly.dom.VaticanaStaff (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType
```

```
class ly.dom.VaticanaVoice (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType
```

```
class ly.dom.Version (text=u", parent=None)
    Bases: ly.dom.Line

    a LilyPond version instruction

    ly (printer)
```

```
class ly.dom.Voice (cid=None, new=True, parent=None)
    Bases: ly.dom.ContextType
```

```
class ly.dom.VoiceSeparator (parent=None)
    Bases: ly.dom.Leaf

    A Voice Separator: \

    ly (printer)
```

```
class ly.dom.With (parent=None)
    Bases: ly.dom.HandleVars, ly.dom.Section

    If this item has no children, it prints nothing.

    after = 0
    before = 0

    ly (printer)

    name = u'with'
```

3.11 ly.duration module

LilyPond information and logic concerning durations

```
ly.duration.base_scaling (tokens)
    Return (base, scaling) as two Fractions for the list of tokens.
```

```
ly.duration.base_scaling_string (duration)
    Return (base, scaling) as two Fractions for the specified string.
```

```
ly.duration.format_fraction (value)
    Format the value as "5/1" etc.
```

```
ly.duration.fraction (tokens)
    Return the duration of the Duration tokens as a Fraction.
```

```
ly.duration.fraction_string (duration)
    Return the duration of the specified string as a Fraction.
```

```
ly.duration.tostring (dur, dots=0, factor=1)
    Returns the LilyPond string representation of a given logarithmic duration.

    Supports values from -3 up to and including 11. -2 = 'longa', 0 = '1' (whole note), etc.

    Adds the number of dots (defaults to 0) and the fraction factor if given.
```

3.12 ly.etreeutil module

Utility functions for use with `xml.etree.ElementTree`.

`ly.etreeutil.indent (elem, indent_string=' ', level=0)`
Indent the XML in element.

Text content that is already non-whitespace is not changed.

`ly.etreeutil.isblank (s)`
Return True if `s` is empty or whitespace only.

3.13 ly.indent module

Indent and auto-indent.

class `ly.indent.Indenter`

Bases: `object`

compute_indent (*document*, *block*)

Return the indent the specified block should have.

Returns False if the block is not indentable, e.g. when it is part of a multiline string.

This method is used to determine the indent of one line, and just looks to previous lines, copying the indent of the line where the current indent depth starts, and/or adding a level of indent or alignment space.

Use this method only for one line or the first of a group you're indenting.

decrease_indent (*cursor*)

Manually remove one level of indent from all lines of cursor.

get_indent (*document*, *block*)

Return the indent the block currently has.

Returns False if the block is not indentable, e.g. when it is part of a multiline string.

increase_indent (*cursor*)

Manually add indent to all lines of cursor.

indent (*cursor*, *indent_blank_lines=False*)

Indent all lines in the cursor's range.

If `indent_blank_lines` is True, the indent of blank lines is made larger if necessary. If False (the default), the indent of blank lines is not changed if it is shorter than it should be.

indent_tabs = **False**

indent_width = **2**

class `ly.indent.Line` (*document*, *block*)

Bases: `object`

Brings together all relevant information about a line (block).

is_alignable_scheme_keyword (*token*)

Return True if `token` is an alignable Scheme word like "if", etc.

3.14 ly.node module

The Node class.

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This module contains the Node class that can be used as a simple DOM (Document Object Model) for building a tree structure.

A Node has children with list-like access methods and keeps also a reference to its parent. A Node can have one parent; appending a Node to another Node causes it to be removed from its parent node (if any).

To iterate over the children of a Node:

```
for n in node:
    do_something(n)
```

To get the list of children of a Node:

```
children = list(node)
```

Of course you can get the children directly using:

```
child = node[3]
```

You should inherit from Node to make meaningful tree node types, e.g. to add custom attributes or multiple sub-types.

A WeakNode class is provided as well, which uses a weak reference to the parent, so that no cyclic references are created which might improve garbage collection.

class ly.node.Node (parent=None)

Bases: object

A list-like class to build tree structures with.

ancestors ()

Climb the tree up over the parents.

append (node)

Append a node to the current node.

It will be reparented, that means it will be removed from it's former parent if it had one.

backward ()

Iterate (backwards) over the preceding siblings.

clear ()

Remove all children.

copy ()

Return a deep copy of the node and its children

descendants (depth=-1)

Yield all the descendants, in tree order. Same as iter_depth().

dump ()

Return a string representation of the tree.

extend (iterable)

Append every Node from iterable.

find (*cls*, *depth=-1*)

Yield all descendants if they are an instance of *cls*.

cls may also be a tuple of classes. This method uses `iter_depth()`.

find_child (*cls*, *depth=-1*)

Return the first descendant that's an instance of *cls*.

cls may also be a tuple of classes. This method uses `iter_rings()`.

find_children (*cls*, *depth=-1*)

Yield all descendants if they are an instance of *cls*.

cls may also be a tuple of classes. This method uses `iter_rings()`.

find_parent (*cls*)

Find an ancestor that's an instance of the given class.

cls may also be a tuple of classes.

forward ()

Iterate over the following siblings.

index (*node*)

Return the index of the given child node.

insert (*index*, *node*)

Insert a node at the specified index.

insert_before (*other*, *node*)

Insert a node before the other node.

is_descendant_of (*parent*)

Return True if self is a descendant of *parent*, else False.

iter_depth (*depth=-1*)

Iterate over all the children, and their children, etc.

Set *depth* to restrict the search to a certain depth, -1 is unrestricted.

iter_rings (*depth=-1*)

Iterate over the children in rings, depth last.

This method returns the closest descendants first. Set *depth* to restrict the search to a certain depth, -1 is unrestricted.

next_sibling ()

Return the sibling object just after us in our parents list.

Returns None if this is the last child, or if we have no parent.

parent ()

The parent, or None if the node has no parent.

previous_sibling ()

Return the sibling object just before us in our parents list.

Returns None if this is the first child, or if we have no parent.

remove (*node*)

Remove the given child node.

replace (*old*, *new*)

Replace a child node with another node.

sort (*key=None, reverse=False*)

Sorts the children, optionally using the key function.

Using a key function is recommended, or you must add comparison methods to your Node subclass.

toplevel ()

Return the toplevel parent Node of this node.

unlink ()

Remove all children and unlink() them as well.

class `ly.node.WeakNode` (*parent=None*)

Bases: `ly.node.Node`

A Node type using a weak reference to the parent.

parent ()

The parent, or None if the node has no parent.

3.15 ly.pkginfo module

Meta-information about the LY package.

This information is used by the install script, and also for the command `ly --version`.

`ly.pkginfo.name = u'python-ly'`

name of the package

`ly.pkginfo.version = u'0.9.5'`

the current version

`ly.pkginfo.description = u'Tool and library for manipulating LilyPond files'`

short description

`ly.pkginfo.long_description = u'The python-ly package provides a Python library and a command line tool'`

long description

`ly.pkginfo.maintainer = u'Wilbert Berendsen'`

maintainer name

`ly.pkginfo.maintainer_email = u'info@frescobaldi.org'`

maintainer email

`ly.pkginfo.url = u'https://github.com/wbsoft/python-ly'`

homepage

`ly.pkginfo.license = u'GPL'`

license

3.16 ly.reformat module

Formatting tools to improve the readability of a `ly.document.Document` without changing the semantic meaning of the LilyPond source.

Basically the tools only change whitespace to make the source-code more readable.

See also `ly.indent`.

`ly.reformat.break_indenters` (*cursor*)

Add newlines around indent and dedent tokens where needed.

If there is stuff after a { or << (that's not closed on the same line) it is put on a new line, and if there is stuff before a } or >>, the } or >> is put on a new line.

It is necessary to run the indenter again over the same part of the document, as it will look garbled with the added newlines.

`ly.reformat.move_long_comments` (*cursor*)

Move line comments with more than 2 comment characters to column 0.

`ly.reformat.reformat` (*cursor*, *indenter*)

A do-it-all function improving the LilyPond source formatting.

`ly.reformat.remove_trailing_whitespace` (*cursor*)

Removes whitespace from all lines in the cursor's range.

3.17 ly.rhythm module

Implementation of the tools to edit durations of selected music.

Durations are represented simply by lists of `ly.lex.lilypond.Duration` tokens.

All functions expect a `ly.document.Cursor` with the selected range.

class `ly.rhythm.music_item` (*tokens*, *dur_tokens*, *may_remove*, *insert_pos*, *pos*, *end*)

Bases: tuple

dur_tokens

Alias for field number 1

end

Alias for field number 5

insert_pos

Alias for field number 3

may_remove

Alias for field number 2

pos

Alias for field number 4

tokens

Alias for field number 0

`ly.rhythm.music_items` (*cursor*, *command=False*, *chord=False*, *partial=1*)

Yield `music_item` instances describing rests, skips or pitches.

cursor is a `ly.document.Cursor` instance.

The following keyword arguments can be used:

- *command*: whether to allow pitches in \relative, \transpose, etc.
- *chord*: whether to allow pitches inside chords.
- *partial*: `ly.document.INSIDE` (default), `PARTIAL` or `OUTSIDE`. See the documentation of `ly.document.Source.__init__()`.

`ly.rhythm.music_tokens` (*source*, *command=False*, *chord=False*)
DEPRECATED. Yield lists of tokens describing rests, skips or pitches.

source is a `ly.document.Source` instance following the state.

The following keyword arguments can be used:

- *command*: whether to allow pitches in `\relative`, `\transpose`, etc.
- *chord*: whether to allow pitches inside chords.

This function is deprecated and will be removed. You should use `music_items()` instead.

`ly.rhythm.preceding_duration` (*cursor*)
Return a preceding duration before the cursor, or an empty list.

`ly.rhythm.remove_dups` (*iterable*)
Change reoccurring strings to “ in iterable.

`ly.rhythm.rhythm_dot` (*cursor*)
Add a dot to all durations.

`ly.rhythm.rhythm_double` (*cursor*)
Doubles all duration values.

`ly.rhythm.rhythm_explicit` (*cursor*)
Make all durations explicit.

`ly.rhythm.rhythm_extract` (*cursor*)
Return a list of the durations from the cursor’s range.

`ly.rhythm.rhythm_half` (*cursor*)
Halves all duration values.

`ly.rhythm.rhythm_implicit` (*cursor*)
Remove reoccurring durations.

`ly.rhythm.rhythm_implicit_per_line` (*cursor*)
Remove reoccurring durations, but always write one on a new line.

`ly.rhythm.rhythm_overwrite` (*cursor*, *durations*)
Apply a list of durations to the cursor’s range.
The durations list looks like [“4”, “8”, “”, “16.”,] etc.

`ly.rhythm.rhythm_remove` (*cursor*)
Remove all durations.

`ly.rhythm.rhythm_remove_fraction_scaling` (*cursor*)
Remove the scaling containing fractions (like $\ast 1/3$) from all durations.

`ly.rhythm.rhythm_remove_scaling` (*cursor*)
Remove the scaling (like $\ast 3$, $\ast 1/3$) from all durations.

`ly.rhythm.rhythm_undot` (*cursor*)
Remove one dot from all durations.

3.18 ly.util module

Utility functions.

`ly.util.int2letter` (*number*, *chars*='ABCDEFGHIJKLMNOPQRSTUVWXYZ')

Converts an integer to one or more letters.

E.g. 1 -> A, 2 -> B, ... 26 -> Z, 27 -> AA, etc. Zero returns the empty string.

chars is the string to pick characters from, defaulting to `string.ascii_uppercase`.

`ly.util.int2roman` (*n*)

Convert an integer value to a roman number string.

E.g. 1 -> "I", 12 -> "XII", 2015 -> "MMXV"

n has to be > 1.

`ly.util.int2text` (*number*)

Converts an integer to the English language name of that integer.

E.g. converts 1 to "One". Supports numbers 0 to 999999. This can be used in LilyPond identifiers (that do not support digits).

`ly.util.mkid` (**args*)

Makes a lower-camel-case identifier of the strings in *args*.

All strings are concatenated with the first character of every string uppercased, except for the first character, which is lowercased.

Examples:

```
mkid("Violin") ==> "violin"
mkid("soprano", "verse") ==> "sopranoVerse"
mkid("scoreOne", "choirII") ==> "scoreOneChoirII"
```

3.19 ly.words module

LilyPond reserved words for auto completion and highlighting.

CHAPTER 4

Indices and tables

- `genindex`
- `modindex`
- `search`

I

- [ly](#), 13
- [ly.barcheck](#), 107
- [ly.cli](#), 90
- [ly.cli.command](#), 90
- [ly.cli.doc](#), 3
- [ly.cli.main](#), 91
- [ly.colorize](#), 107
- [ly.cursortools](#), 112
- [ly.data](#), 89
- [ly.data.makeschemedata](#), 89
- [ly.docinfo](#), 106
- [ly.document](#), 100
- [ly.dom](#), 112
- [ly.duration](#), 123
- [ly.etreeutil](#), 124
- [ly.indent](#), 124
- [ly.lex](#), 14
- [ly.lex.docbook](#), 17
- [ly.lex.html](#), 17
- [ly.lex.latex](#), 20
- [ly.lex.lilypond](#), 21
- [ly.lex.scheme](#), 42
- [ly.lex.texinfo](#), 45
- [ly.music](#), 48
- [ly.music.event](#), 50
- [ly.music.items](#), 50
- [ly.music.read](#), 62
- [ly.musicxml](#), 67
- [ly.musicxml.create_musicxml](#), 67
- [ly.musicxml.ly2xml_mediator](#), 71
- [ly.musicxml.lymus2musxml](#), 75
- [ly.musicxml.xml_objs](#), 78
- [ly.node](#), 125
- [ly.pitch](#), 82
- [ly.pitch.abs2rel](#), 84
- [ly.pitch.rel2abs](#), 84
- [ly.pitch.translate](#), 84
- [ly.pitch.transpose](#), 85
- [ly.pkginfo](#), 127
- [ly.reformat](#), 127
- [ly.rhythm](#), 128
- [ly.server](#), 92
- [ly.server.command](#), 93
- [ly.server.doc](#), 7
- [ly.server.handler](#), 94
- [ly.server.main](#), 94
- [ly.server.options](#), 95
- [ly.slexer](#), 95
- [ly.util](#), 129
- [ly.words](#), 130
- [ly.xml](#), 86

A

- abs2rel (class in ly.cli.command), 90
- abs2rel (class in ly.server.command), 93
- abs2rel() (in module ly.pitch.abs2rel), 84
- Absolute (class in ly.music.items), 50
- Accent (class in ly.lex.texinfo), 45
- Accidental (class in ly.lex.lilypond), 21
- accidental_token (ly.music.items.Note attribute), 57
- AccidentalCautionary (class in ly.lex.lilypond), 21
- AccidentalReminder (class in ly.lex.lilypond), 21
- AccidentalStyle (class in ly.lex.lilypond), 21
- AccidentalStyleSpecifier (class in ly.lex.lilypond), 21
- add() (ly.musicxml.xml_objs.Bar method), 78
- add_accidental() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_adv_ornament() (ly.musicxml.xml_objs.BarNote method), 79
- add_articulation() (ly.musicxml.xml_objs.BarNote method), 79
- add_articulations() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_backup() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_barline() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_beam() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_bracketed() (ly.music.read.Reader method), 62
- add_chord() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_clef() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_creator() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_direction() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_dirwords() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_div_duration() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_divisions() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_dot() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_dot() (ly.musicxml.xml_objs.BarMus method), 79
- add_duration() (ly.music.read.Reader method), 63
- add_duration_type() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_dynamic_dashes() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_dynamic_mark() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_dynamic_text() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_dynamic_wedge() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_fingering() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_fingering() (ly.musicxml.xml_objs.BarNote method), 79
- add_gliss() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_grace() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_key() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_line_numbers() (in module ly.colorize), 108
- add_lyric() (ly.musicxml.create_musicxml.CreateMusicXML method), 68
- add_lyric() (ly.musicxml.xml_objs.BarNote method), 79
- add_markup_arguments() (ly.music.read.Reader method), 63
- add_metron_dir() (ly.musicxml.create_musicxml.CreateMusicXML method), 69
- add_mordent() (ly.musicxml.create_musicxml.CreateMusicXML method), 69
- add_named_artic() (ly.musicxml.create_musicxml.CreateMusicXML method), 69
- add_named_notation() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

method), 69

add_notations() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_octave_shift() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_ornament() (ly.musicxml.xml_objs.BarNote method), 79

add_ornaments() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_other_notation() (ly.musicxml.xml_objs.BarMus method), 79

add_pitch() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_prall() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_rest() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_rest_w_pos() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_rights() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_skip() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_slur() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_snippet() (ly.musicxml.ly2xml_mediator.Mediator method), 71

add_sound_dir() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_staff() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_staff_id() (ly.musicxml.ly2xml_mediator.Mediator method), 71

add_staves() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_technical() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_tie() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_tied() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_time() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_time_modify() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_to_bar() (ly.musicxml.ly2xml_mediator.Mediator method), 71

add_tremolo() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_trill() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_tuplet_type() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_turn() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_unpitched() (ly.musicxml.create_musicxml.CreateMusicXML method), 69

add_voice() (ly.musicxml.create_musicxml.CreateMusicXML method), 70

add_wavyline() (ly.musicxml.create_musicxml.CreateMusicXML method), 70

AfterGrace (class in ly.music.items), 50

all_grob_properties() (in module ly.data), 89

all_scheme_words() (in module ly.data), 89

AlterBroken (class in ly.lex.lilypond), 21

Alternative (class in ly.music.items), 50

ancestors() (ly.node.Node method), 125

append() (ly.barcheck.event method), 107

append() (ly.node.Node method), 125

apply_changes() (ly.document.Document method), 102

apply_changes() (ly.document.DocumentBase method), 103

argcount (ly.lex.lilypond.ParseClef attribute), 33

argcount (ly.lex.lilypond.ParseOverride attribute), 36

argcount (ly.lex.lilypond.ParsePitchCommand attribute), 36

argcount (ly.lex.lilypond.ParseScriptAbbreviationOrFingering attribute), 37

argcount (ly.lex.lilypond.ParseSet attribute), 37

argcount (ly.lex.lilypond.ParseTranslatorId attribute), 38

argcount (ly.lex.Parser attribute), 15

as_xml_name() (in module ly.musicxml.ly2xml_mediator), 74

Articulation (class in ly.lex.lilypond), 21

Articulation (class in ly.music.items), 50
 Articulation() (ly.musicxml.lymus2musxml.ParseSource method), 75
 ArticulationCommand (class in ly.lex.lilypond), 21
 Assignment (class in ly.dom), 112
 Assignment (class in ly.music.items), 50
 Assignment() (ly.musicxml.lymus2musxml.ParseSource method), 75
 at() (ly.document.Runner class method), 104
 Attribute (class in ly.lex.texinfo), 45
 AttrName (class in ly.lex.html), 17

B

BackSlashedContextName (class in ly.lex.lilypond), 21
 backward() (ly.document.Runner method), 104
 backward() (ly.node.Node method), 125
 backward_line() (ly.document.Runner method), 104
 Bar (class in ly.musicxml.xml_objs), 78
 BarAttr (class in ly.musicxml.xml_objs), 79
 BarBackup (class in ly.musicxml.xml_objs), 79
 BarMus (class in ly.musicxml.xml_objs), 79
 BarNote (class in ly.musicxml.xml_objs), 79
 BarRest (class in ly.musicxml.xml_objs), 80
 base (ly.colorize.css_class attribute), 109
 base (ly.colorize.style attribute), 111
 base_scaling() (in module ly.duration), 123
 base_scaling_string() (in module ly.duration), 123
 Beam (class in ly.lex.lilypond), 21
 Beam (class in ly.music.items), 51
 Beam() (ly.musicxml.lymus2musxml.ParseSource method), 75
 BeamEnd (class in ly.lex.lilypond), 21
 BeamStart (class in ly.lex.lilypond), 21
 beatstructure() (ly.music.items.TimeSignature method), 61
 before (ly.dom.AddLyrics attribute), 112
 before (ly.dom.Assignment attribute), 112
 before (ly.dom.BlankLine attribute), 113
 before (ly.dom.Block attribute), 113
 before (ly.dom.BlockComment attribute), 113
 before (ly.dom.Container attribute), 114
 before (ly.dom.ContextType attribute), 115
 before (ly.dom.Enclosed attribute), 115
 before (ly.dom.Line attribute), 118
 before (ly.dom.LineComment attribute), 118
 before (ly.dom.LyNode attribute), 118
 before (ly.dom.Partial attribute), 119
 before (ly.dom.Section attribute), 121
 before (ly.dom.Statement attribute), 122
 before (ly.dom.Tempo attribute), 122
 before (ly.dom.With attribute), 123
 before_note() (ly.musicxml.xml_objs.IterateXmlObjs method), 80
 bgcolor (ly.colorize.HtmlWriter attribute), 108

BlankLine (class in ly.dom), 113
 Block (class in ly.dom), 113
 Block (class in ly.lex.texinfo), 45
 block() (ly.document.Document method), 102
 block() (ly.document.DocumentBase method), 103
 BlockComment (class in ly.dom), 113
 BlockComment (class in ly.lex), 16
 BlockComment (class in ly.lex.lilypond), 21
 BlockComment (class in ly.lex.scheme), 42
 BlockCommentEnd (class in ly.lex), 16
 BlockCommentEnd (class in ly.lex.lilypond), 22
 BlockCommentEnd (class in ly.lex.scheme), 42
 BlockCommentEnd (class in ly.lex.texinfo), 45
 BlockCommentStart (class in ly.lex), 16
 BlockCommentStart (class in ly.lex.lilypond), 22
 BlockCommentStart (class in ly.lex.scheme), 42
 BlockCommentStart (class in ly.lex.texinfo), 45
 BlockEnd (class in ly.lex.texinfo), 45
 blocks() (ly.document.Cursor method), 101
 blocks_backward() (ly.document.DocumentBase method), 103
 blocks_forward() (ly.document.DocumentBase method), 103
 BlockStart (class in ly.lex.texinfo), 46
 Book (class in ly.dom), 113
 Book (class in ly.lex.lilypond), 22
 Book (class in ly.music.items), 51
 BookPart (class in ly.dom), 113
 BookPart (class in ly.lex.lilypond), 22
 BookPart (class in ly.music.items), 51
 Bool (class in ly.lex.scheme), 42
 break_indenters() (in module ly.reformat), 127

C

c0() (ly.pitch.Pitch class method), 82
 c1() (ly.pitch.Pitch class method), 82
 calc_trem_dur() (in module ly.musicxml.ly2xml_mediator), 74
 calc_tupl_den() (ly.musicxml.ly2xml_mediator.Mediator method), 71
 Change (class in ly.lex.lilypond), 22
 Change (class in ly.music.items), 51
 Change() (ly.musicxml.lymus2musxml.ParseSource method), 75
 change_div_duration() (ly.musicxml.create_musicxml.CreateMusicXML method), 70
 change_group_bracket() (ly.musicxml.ly2xml_mediator.Mediator method), 71
 change_lyric_nr() (ly.musicxml.xml_objs.BarNote method), 79
 change_lyric_syll() (ly.musicxml.xml_objs.BarNote method), 79
 change_to_tuplet() (ly.musicxml.ly2xml_mediator.Mediator method), 71

`change_tuplet_type()` (ly.musicxml.ly2xml_mediator.Mediator method), 71

`Char` (class in ly.lex.scheme), 42

`Character` (class in ly.lex), 16

`check_changes()` (ly.document.DocumentBase method), 103

`check_context()` (ly.musicxml.lymus2musxml.ParseSource method), 77

`check_current_note()` (ly.musicxml.ly2xml_mediator.Mediator method), 71

`check_divs()` (ly.musicxml.ly2xml_mediator.Mediator method), 71

`check_duration()` (ly.musicxml.ly2xml_mediator.Mediator method), 71

`check_lyrics()` (ly.musicxml.ly2xml_mediator.Mediator method), 71

`check_name()` (ly.musicxml.ly2xml_mediator.Mediator method), 72

`check_note()` (ly.musicxml.lymus2musxml.ParseSource method), 77

`check_part()` (ly.musicxml.ly2xml_mediator.Mediator method), 72

`check_score()` (ly.musicxml.ly2xml_mediator.Mediator method), 72

`check_simultan()` (ly.musicxml.ly2xml_mediator.Mediator method), 72

`check_tuplet()` (ly.musicxml.lymus2musxml.ParseSource method), 77

`check_voices()` (ly.musicxml.ly2xml_mediator.Mediator method), 72

`check_voices_by_nr()` (ly.musicxml.ly2xml_mediator.Mediator method), 72

`childClass` (ly.dom.HandleVars attribute), 116

`ChoirStaff` (class in ly.dom), 113

`Chord` (class in ly.dom), 113

`Chord` (class in ly.lex.lilypond), 22

`Chord` (class in ly.music.items), 51

`Chord()` (ly.musicxml.lymus2musxml.ParseSource method), 75

`chord_end()` (ly.musicxml.ly2xml_mediator.Mediator method), 72

`ChordEnd` (class in ly.lex.lilypond), 22

`ChordItem` (class in ly.lex.lilypond), 22

`ChordItem` (class in ly.music.items), 51

`ChordMode` (class in ly.dom), 113

`ChordMode` (class in ly.lex.lilypond), 22

`ChordMode` (class in ly.music.items), 51

`ChordMode()` (ly.musicxml.lymus2musxml.ParseSource method), 75

`ChordModifier` (class in ly.lex.lilypond), 22

`ChordNames` (class in ly.dom), 113

`ChordSeparator` (class in ly.lex.lilypond), 22

`ChordSpecifier` (class in ly.music.items), 51

`ChordStart` (class in ly.lex.lilypond), 22

`ChordStepNumber` (class in ly.lex.lilypond), 23

`classes` (ly.colorize.style attribute), 111

`clear()` (ly.node.Node method), 125

`clear_chord()` (ly.musicxml.ly2xml_mediator.Mediator method), 72

`Clef` (class in ly.dom), 113

`Clef` (class in ly.lex.lilypond), 23

`Clef` (class in ly.music.items), 51

`Clef()` (ly.musicxml.lymus2musxml.ParseSource method), 75

`clefname2clef()` (in ly.musicxml.ly2xml_mediator module), 74

`ClefSpecifier` (class in ly.lex.lilypond), 23

`close_group()` (ly.musicxml.ly2xml_mediator.Mediator method), 72

`CloseBracket` (class in ly.lex.lilypond), 23

`CloseBracketMarkup` (class in ly.lex.lilypond), 23

`CloseParen` (class in ly.lex.scheme), 43

`CloseSimultaneous` (class in ly.lex.lilypond), 23

`closestPitch()` (ly.pitch.transpose.ModeShifter method), 85

`Command` (class in ly.dom), 114

`Command` (class in ly.lex.lilypond), 23

`Command` (class in ly.music.items), 51

`Command()` (ly.musicxml.lymus2musxml.ParseSource method), 75

`CommandEnclosed` (class in ly.dom), 114

`Comment` (class in ly.dom), 114

`Comment` (class in ly.lex), 16

`Comment` (class in ly.lex.html), 17

`Comment` (class in ly.lex.lilypond), 23

`Comment` (class in ly.lex.scheme), 43

`Comment` (class in ly.lex.texinfo), 46

`CommentEnd` (class in ly.lex.html), 17

`CommentStart` (class in ly.lex.html), 17

`complete()` (ly.docinfo.DocInfo method), 106

`compute_indent()` (ly.indent.Indenter method), 124

`concat()` (ly.dom.LyNode method), 118

`Constant` (class in ly.lex.scheme), 43

`consume()` (ly.document.Source method), 105

`consume()` (ly.music.read.Reader method), 63

`Container` (class in ly.dom), 114

`Container` (class in ly.music.items), 51

`Context` (class in ly.dom), 114

`Context` (class in ly.lex.lilypond), 23

`Context` (class in ly.music.items), 52

`context()` (ly.music.items.Override method), 57

`context()` (ly.music.items.Revert method), 58

`context()` (ly.music.items.Set method), 60

`context()` (ly.music.items.Translator method), 61

`context()` (ly.music.items.Unset method), 62

`Context()` (ly.musicxml.lymus2musxml.ParseSource method), 75

`context_id()` (ly.music.items.LyricsTo method), 55

- context_id() (ly.music.items.Translator method), 61
 - context_properties() (in module ly.data), 89
 - ContextName (class in ly.dom), 114
 - ContextName (class in ly.lex.lilypond), 23
 - ContextProperty (class in ly.dom), 114
 - ContextProperty (class in ly.lex.lilypond), 23
 - ContextType (class in ly.dom), 114
 - convert_barl() (in module ly.musicxml.xml_objs), 82
 - copy() (ly.document.Document method), 102
 - copy() (ly.document.Runner method), 104
 - copy() (ly.node.Node method), 125
 - copy() (ly.pitch.Pitch method), 82
 - copy_barnote_basics() (ly.musicxml.ly2xml_mediator.Mediator method), 72
 - copy_prev_chord() (ly.musicxml.ly2xml_mediator.Mediator method), 72
 - count() (ly.slexer.Fridge method), 100
 - count_duration() (ly.musicxml.xml_objs.IterateXmlObjs method), 80
 - count_tokens() (ly.docinfo.DocInfo method), 106
 - counted_tokens() (ly.docinfo.DocInfo method), 106
 - create_backup() (ly.musicxml.xml_objs.Bar method), 78
 - create_bar_attr() (ly.musicxml.create_musicxml.CreateMusicXML method), 70
 - create_barline() (ly.musicxml.ly2xml_mediator.Mediator method), 72
 - create_barnote_from_note() (ly.musicxml.ly2xml_mediator.Mediator method), 72
 - create_command() (ly.server.handler.RequestHandler method), 94
 - create_measure() (ly.musicxml.create_musicxml.CreateMusicXML method), 70
 - create_new_node() (ly.musicxml.create_musicxml.CreateMusicXML method), 70
 - create_note() (ly.musicxml.create_musicxml.CreateMusicXML method), 70
 - create_part() (ly.musicxml.create_musicxml.CreateMusicXML method), 70
 - create_partgroup() (ly.musicxml.create_musicxml.CreateMusicXML method), 70
 - create_score_info() (ly.musicxml.create_musicxml.CreateMusicXML method), 70
 - create_tempo() (ly.musicxml.create_musicxml.CreateMusicXML method), 70
 - create_title() (ly.musicxml.create_musicxml.CreateMusicXML method), 70
 - create_unpitched() (ly.musicxml.ly2xml_mediator.Mediator method), 72
 - CreateMusicXML (class in ly.musicxml.create_musicxml), 68
 - css_attr() (in module ly.colorize), 109
 - css_class (class in ly.colorize), 109
 - css_dict() (in module ly.colorize), 109
 - css_group() (in module ly.colorize), 109
 - css_item() (in module ly.colorize), 109
 - css_mapper (ly.colorize.HtmlWriter attribute), 108
 - css_mapper() (in module ly.colorize), 109
 - css_scheme (ly.colorize.HtmlWriter attribute), 108
 - css_style_attribute_formatter (class in ly.colorize), 109
 - ctype (ly.dom.ContextType attribute), 115
 - ctype (ly.dom.ScoreContext attribute), 121
 - CueVoice (class in ly.dom), 115
 - Cursor (class in ly.document), 100
- ## D
- debug_score() (ly.musicxml.xml_objs.Score method), 81
 - DecimalValue (class in ly.lex.lilypond), 24
 - decrease_indent() (ly.indent.Indenter method), 124
 - Dedent (class in ly.lex), 17
 - default (ly.lex.html.ParseComment attribute), 18
 - default (ly.lex.html.ParseStringDQ attribute), 19
 - default (ly.lex.html.ParseStringSQ attribute), 19
 - default (ly.lex.lilypond.ExpectOpenBracket attribute), 26
 - default (ly.lex.lilypond.ParseBlockComment attribute), 32
 - default (ly.lex.lilypond.ParseString attribute), 37
 - default (ly.lex.Parser attribute), 15
 - default (ly.lex.scheme.ParseBlockComment attribute), 44
 - default (ly.lex.scheme.ParseString attribute), 44
 - default (ly.lex.texinfo.ParseComment attribute), 47
 - default (ly.lex.texinfo.ParseLilyPondAttr attribute), 47
 - default (ly.lex.texinfo.ParseVerbatim attribute), 48
 - default (ly.slexer.Parser attribute), 97
 - default_mapping() (in module ly.colorize), 110
 - defaults (ly.dom.Block attribute), 113
 - defaultSpace (ly.dom.Container attribute), 114
 - defaultSpace (ly.dom.Document attribute), 115
 - definitions() (ly.docinfo.DocInfo method), 106
 - Delimiter (class in ly.lex.lilypond), 24
 - denominator (ly.music.items.Scaler attribute), 58
 - depth() (ly.slexer.State method), 98
 - descendants() (ly.node.Node method), 125
 - description (in module ly.pkginfo), 127
 - Devsnull (class in ly.dom), 115
 - die() (in module ly.cli.main), 92
 - die() (in module ly.server.main), 94
 - Direction (class in ly.lex.lilypond), 24
 - dispatcher (class in ly.music.read), 66
 - dispatcher_class (class in ly.music.read), 67
 - do_action_onnext() (ly.musicxml.ly2xml_mediator.Mediator method), 72
 - do_POST() (ly.server.handler.RequestHandler method), 94
 - DocInfo (class in ly.docinfo), 106
 - Document (class in ly.document), 101
 - Document (class in ly.dom), 115
 - Document (class in ly.music.items), 52

- document (ly.docinfo.DocInfo attribute), 106
 - document (ly.document.Cursor attribute), 101
 - document (ly.document.Runner attribute), 104
 - document (ly.document.Source attribute), 105
 - document (ly.music.items.Item attribute), 54
 - document() (in module ly.music), 49
 - document_id (ly.colorize.HtmlWriter attribute), 108
 - DocumentBase (class in ly.document), 102
 - Dot (class in ly.lex.lilypond), 24
 - Dot (class in ly.lex.scheme), 43
 - DotChord (class in ly.lex.lilypond), 24
 - DotPath (class in ly.lex.lilypond), 24
 - DrumChordEnd (class in ly.lex.lilypond), 24
 - DrumChordStart (class in ly.lex.lilypond), 24
 - DrumMode (class in ly.dom), 115
 - DrumMode (class in ly.lex.lilypond), 24
 - DrumMode (class in ly.music.items), 52
 - DrumMode() (ly.musicxml.lymus2musxml.ParseSource method), 75
 - DrumNote (class in ly.lex.lilypond), 24
 - DrumNote (class in ly.music.items), 52
 - DrumNote() (ly.musicxml.lymus2musxml.ParseSource method), 75
 - DrumStaff (class in ly.dom), 115
 - DrumVoice (class in ly.dom), 115
 - dump() (ly.node.Node method), 125
 - dur2lines() (in module ly.musicxml.xml_objs), 82
 - dur_tokens (ly.rhythm.music_item attribute), 128
 - Durable (class in ly.music.items), 52
 - Duration (class in ly.dom), 115
 - Duration (class in ly.lex.lilypond), 24
 - Duration (class in ly.music.items), 53
 - duration (ly.music.items.Durable attribute), 53
 - duration (ly.music.items.Partial attribute), 57
 - duration (ly.music.items.Tempo attribute), 60
 - duration (ly.music.items.Tremolo attribute), 61
 - Duration() (ly.musicxml.lymus2musxml.ParseSource method), 75
 - duration_from_tokens() (ly.musicxml.ly2xml_mediator.Mediator method), 72
 - durval2type() (in module ly.musicxml.ly2xml_mediator), 74
 - Dynamic (class in ly.lex.lilypond), 24
 - Dynamic (class in ly.music.items), 53
 - Dynamic() (ly.musicxml.lymus2musxml.ParseSource method), 75
 - Dynamics (class in ly.dom), 115
 - Dynamics (class in ly.musicxml.xml_objs), 80
 - DynamicsDashes (class in ly.musicxml.xml_objs), 80
 - DynamicsMark (class in ly.musicxml.xml_objs), 80
 - DynamicsText (class in ly.musicxml.xml_objs), 80
 - DynamicsWedge (class in ly.musicxml.xml_objs), 80
- ## E
- edit() (ly.server.command.abs2rel method), 93
 - edit() (ly.server.command.indent method), 93
 - edit() (ly.server.command.reformat method), 93
 - edit() (ly.server.command.rel2abs method), 93
 - edit() (ly.server.command.translate method), 94
 - edit() (ly.server.command.transpose method), 94
 - Enclosed (class in ly.dom), 115
 - encoding (ly.colorize.HtmlWriter attribute), 108
 - encoding (ly.document.DocumentBase attribute), 103
 - End (class in ly.musicxml.lymus2musxml), 75
 - end (ly.rhythm.music_item attribute), 128
 - end (ly.slexer.Token attribute), 97
 - End() (ly.musicxml.lymus2musxml.ParseSource method), 75
 - end_block() (ly.document.Cursor method), 101
 - end_gliss() (ly.musicxml.ly2xml_mediator.Mediator method), 72
 - end_position() (ly.music.items.Item method), 54
 - endArgument() (ly.lex.State method), 15
 - engravers() (in module ly.data), 89
 - enter() (ly.slexer.State method), 99
 - EntityRef (class in ly.lex.html), 17
 - EqualSign (class in ly.lex.html), 17
 - EqualSign (class in ly.lex.lilypond), 24
 - Error (class in ly.lex), 16
 - Error (class in ly.lex.lilypond), 25
 - ErrorInChord (class in ly.lex.lilypond), 25
 - EscapeChar (class in ly.lex.texinfo), 46
 - event (class in ly.barcheck), 107
 - event (ly.music.items.Beam attribute), 51
 - event (ly.music.items.PhrasingSlur attribute), 58
 - event (ly.music.items.Slur attribute), 60
 - Events (class in ly.music.event), 50
 - events() (ly.music.items.Durable method), 53
 - events() (ly.music.items.Grace method), 53
 - events() (ly.music.items.Item method), 54
 - events() (ly.music.items.Music method), 56
 - events() (ly.music.items.MusicList method), 56
 - events() (ly.music.items.PartCombine method), 57
 - events() (ly.music.items.Repeat method), 58
 - events() (ly.music.items.Scaler method), 58
 - events() (ly.music.items.Tag method), 60
 - events() (ly.music.items.UserCommand method), 62
 - ExpectBook (class in ly.lex.lilypond), 25
 - ExpectBookPart (class in ly.lex.lilypond), 25
 - ExpectChordMode (class in ly.lex.lilypond), 25
 - ExpectContext (class in ly.lex.lilypond), 25
 - ExpectDrumMode (class in ly.lex.lilypond), 25
 - ExpectFigureMode (class in ly.lex.lilypond), 25
 - ExpectGrobProperty (class in ly.lex.lilypond), 25
 - ExpectHeader (class in ly.lex.lilypond), 25
 - ExpectLayout (class in ly.lex.lilypond), 26
 - ExpectLyricMode (class in ly.lex.lilypond), 26

ExpectMidi (class in ly.lex.lilypond), 26
 ExpectMusicList (class in ly.lex.lilypond), 26
 ExpectNoteMode (class in ly.lex.lilypond), 26
 ExpectOpenBracket (class in ly.lex.lilypond), 26
 ExpectPaper (class in ly.lex.lilypond), 27
 ExpectScore (class in ly.lex.lilypond), 27
 ExpectTranslatorId (class in ly.lex.lilypond), 27
 ExpectWith (class in ly.lex.lilypond), 27
 export() (ly.server.command.highlight method), 93
 export() (ly.server.command.musicxml method), 93
 extend() (ly.node.Node method), 125
 extract_global_to_section()
 (ly.musicxml.xml_objs.ScorePart method),
 81

F

f0() (ly.pitch.Pitch class method), 82
 factory() (ly.music.read.Reader method), 63
 fallthrough() (ly.lex.html.ParseValue method), 19
 fallthrough() (ly.lex.lilypond.ParseDuration method), 34
 fallthrough() (ly.lex.lilypond.ParseDurationScaling
 method), 34
 fallthrough() (ly.lex.texinfo.ParseLilyPondEnvAttr
 method), 47
 fallthrough() (ly.slexer.FallthroughParser method), 98
 fallthrough() (ly.slexer.Parser method), 98
 FallthroughParser (class in ly.lex), 15
 FallthroughParser (class in ly.slexer), 98
 fgcolor (ly.colorize.HtmlWriter attribute), 108
 Figure (class in ly.lex.lilypond), 27
 FigureAccidental (class in ly.lex.lilypond), 27
 FigureBracket (class in ly.lex.lilypond), 27
 FiguredBass (class in ly.dom), 116
 FigureEnd (class in ly.lex.lilypond), 27
 FigureMode (class in ly.dom), 116
 FigureMode (class in ly.lex.lilypond), 27
 FigureMode (class in ly.music.items), 53
 FigureMode() (ly.musicxml.lymus2musxml.ParseSource
 method), 75
 FigureModifier (class in ly.lex.lilypond), 27
 FigureStart (class in ly.lex.lilypond), 27
 FigureStep (class in ly.lex.lilypond), 28
 file() (ly.cli.main.Output method), 92
 filename (ly.document.DocumentBase attribute), 103
 filename() (ly.music.items.Include method), 53
 find() (ly.docinfo.DocInfo method), 106
 find() (ly.node.Node method), 125
 find_all() (ly.docinfo.DocInfo method), 106
 find_child() (ly.node.Node method), 126
 find_children() (ly.node.Node method), 126
 find_indent() (in module ly.cursortools), 112
 find_parent() (ly.node.Node method), 126
 find_score_sub() (ly.musicxml.lymus2musxml.ParseSource
 method), 77

Fingering (class in ly.lex.lilypond), 28
 Float (class in ly.lex.scheme), 43
 follow() (ly.slexer.State method), 99
 format_css_span_class() (in module ly.colorize), 110
 format_fraction() (in module ly.duration), 123
 format_html_document() (in module ly.colorize), 110
 format_stylesheet() (in module ly.colorize), 110
 forward() (ly.document.Runner method), 104
 forward() (ly.node.Node method), 126
 forward_line() (ly.document.Runner method), 104
 Fraction (class in ly.lex.lilypond), 28
 Fraction (class in ly.lex.scheme), 43
 fraction() (in module ly.duration), 123
 fraction() (ly.music.items.Tempo method), 60
 fraction() (ly.music.items.TimeSignature method), 61
 fraction_string() (in module ly.duration), 123
 freeze() (ly.lex.Parser method), 15
 freeze() (ly.slexer.Fridge method), 100
 freeze() (ly.slexer.Parser method), 98
 freeze() (ly.slexer.State method), 99
 FretBoards (class in ly.dom), 116
 Fridge (class in ly.lex), 15
 Fridge (class in ly.slexer), 100
 full_html (ly.colorize.HtmlWriter attribute), 108
 Function (class in ly.lex.scheme), 43

G

gen_med_caller() (ly.musicxml.lymus2musxml.ParseSource
 method), 77
 gener_xml_mus() (ly.musicxml.xml_objs.IterateXmlObjs
 method), 80
 get_fifths() (in module ly.musicxml.ly2xml_mediator), 74
 get_filename() (ly.cli.main.Output method), 92
 get_first_var() (ly.musicxml.ly2xml_mediator.Mediator
 method), 72
 get_fraction() (ly.music.items.Scheme method), 59
 get_group_symbol() (in module
 ly.musicxml.ly2xml_mediator), 74
 get_included_document_node()
 (ly.music.items.Document method), 52
 get_indent() (ly.indent.Indenter method), 124
 get_info() (ly.cli.command.language method), 90
 get_info() (ly.cli.command.mode method), 90
 get_info() (ly.cli.command.version method), 91
 get_info() (ly.server.command.language method), 93
 get_info() (ly.server.command.mode method), 93
 get_info() (ly.server.command.version method), 94
 get_int() (ly.music.items.Scheme method), 59
 get_line_style() (in module
 ly.musicxml.ly2xml_mediator), 74
 get_list_ints() (ly.music.items.Scheme method), 59
 get_ly_make_moment() (ly.music.items.Scheme
 method), 59
 get_mult() (in module ly.musicxml.ly2xml_mediator), 74

- `get_music()` (ly.music.items.Document method), 52
 - `get_pair_ints()` (ly.music.items.Scheme method), 59
 - `get_part_by_id()` (ly.musicxml.ly2xml_mediator.Mediator method), 72
 - `get_previous_node()` (ly.musicxml.lymus2musxml.ParseSource method), 77
 - `get_score()` (ly.musicxml.lymus2musxml.ParseSource method), 77
 - `get_string()` (ly.music.items.Scheme method), 59
 - `get_tag_index()` (in module ly.musicxml.create_musicxml), 71
 - `get_time_modify()` (ly.musicxml.create_musicxml.CreateMusicXML method), 70
 - `get_tokens()` (in module ly.colorize), 111
 - `get_var_byname()` (ly.musicxml.ly2xml_mediator.Mediator method), 72
 - `get_voice()` (in module ly.musicxml.ly2xml_mediator), 74
 - `get_xml_alter()` (in module ly.musicxml.ly2xml_mediator), 74
 - `getKeyIndex()` (ly.pitch.transpose.ModalTransposer static method), 85
 - `getNodeName()` (in module ly.musicxml.ly2xml_mediator), 74
 - `getWith()` (ly.dom.ContextType method), 115
 - `Global` (class in ly.dom), 116
 - `global_staff_size()` (ly.docinfo.DocInfo method), 106
 - `Grace` (class in ly.music.items), 53
 - `Grace()` (ly.musicxml.lymus2musxml.ParseSource method), 75
 - `GrandStaff` (class in ly.dom), 116
 - `GregorianTranscriptionStaff` (class in ly.dom), 116
 - `GregorianTranscriptionVoice` (class in ly.dom), 116
 - `grob()` (ly.music.items.Override method), 57
 - `grob()` (ly.music.items.Revert method), 58
 - `grob_interface_properties()` (in module ly.data), 89
 - `grob_interfaces()` (in module ly.data), 89
 - `grob_interfaces_for_property()` (in module ly.data), 89
 - `grob_properties()` (in module ly.data), 89
 - `grob_properties_with_interface()` (in module ly.data), 89
 - `GrobName` (class in ly.lex.lilypond), 28
 - `GrobProperty` (class in ly.lex.lilypond), 28
 - `grobs()` (in module ly.data), 89
 - `guessMode()` (in module ly.lex), 15
 - `guessState()` (in module ly.lex), 15
- ## H
- `handle_absolute()` (ly.music.read.Reader method), 63
 - `handle_after_grace()` (ly.music.read.Reader method), 63
 - `handle_alternative()` (ly.music.read.Reader method), 63
 - `handle_articulation()` (ly.music.read.Reader method), 63
 - `handle_beam()` (ly.music.read.Reader method), 63
 - `handle_bracketed()` (ly.music.read.Reader method), 63
 - `handle_chord_start()` (ly.music.read.Reader method), 63
 - `handle_clef()` (ly.music.read.Reader method), 63
 - `handle_direct_items()` (ly.music.read.Reader method), 63
 - `handle_direction()` (ly.music.read.Reader method), 63
 - `handle_grace()` (ly.music.read.Reader method), 63
 - `handle_include()` (ly.music.read.Reader method), 63
 - `handle_inputmode()` (ly.music.read.Reader method), 63
 - `handle_key()` (ly.music.read.Reader method), 63
 - `handle_language()` (ly.music.read.Reader method), 64
 - `handle_length()` (ly.music.read.Reader method), 64
 - `handle_lyricmode()` (ly.music.read.Reader method), 64
 - `handle_markup()` (ly.music.read.Reader method), 64
 - `handle_markup_command()` (ly.music.read.Reader method), 64
 - `handle_markup_open_bracket()` (ly.music.read.Reader method), 64
 - `handle_markup_score()` (ly.music.read.Reader method), 64
 - `handle_markup_user_command()` (ly.music.read.Reader method), 64
 - `handle_markup_word()` (ly.music.read.Reader method), 64
 - `handle_music_item()` (ly.music.read.Reader method), 64
 - `handle_music_list()` (ly.music.read.Reader method), 64
 - `handle_name()` (ly.music.read.Reader method), 64
 - `handle_number_class()` (ly.music.read.Reader method), 64
 - `handle_override()` (ly.music.read.Reader method), 64
 - `handle_partcombine()` (ly.music.read.Reader method), 64
 - `handle_partial()` (ly.music.read.Reader method), 64
 - `handle_relative()` (ly.music.read.Reader method), 64
 - `handle_repeat()` (ly.music.read.Reader method), 64
 - `handle_revert()` (ly.music.read.Reader method), 64
 - `handle_scaler()` (ly.music.read.Reader method), 64
 - `handle_scheme_lilypond_start()` (ly.music.read.Reader method), 64
 - `handle_scheme_open_parenthesis()` (ly.music.read.Reader method), 65
 - `handle_scheme_quote()` (ly.music.read.Reader method), 65
 - `handle_scheme_start()` (ly.music.read.Reader method), 65
 - `handle_scheme_token()` (ly.music.read.Reader method), 65
 - `handle_set()` (ly.music.read.Reader method), 65
 - `handle_slurs()` (ly.music.read.Reader method), 65
 - `handle_string_start()` (ly.music.read.Reader method), 65
 - `handle_string_tuning()` (ly.music.read.Reader method), 65
 - `handle_tag()` (ly.music.read.Reader method), 65
 - `handle_tempo()` (ly.music.read.Reader method), 65
 - `handle_time()` (ly.music.read.Reader method), 65
 - `handle_translator()` (ly.music.read.Reader method), 65
 - `handle_transpose()` (ly.music.read.Reader method), 65
 - `handle_tweak()` (ly.music.read.Reader method), 65
 - `handle_unset()` (ly.music.read.Reader method), 65

- `handle_variable_assignment()` (`ly.music.read.Reader` method), 65
 - `handle_version()` (`ly.music.read.Reader` method), 65
 - `HandleVars` (class in `ly.dom`), 116
 - `has_attr()` (`ly.musicxml.xml_objs.BarAttr` method), 79
 - `has_attr()` (`ly.musicxml.xml_objs.BarMus` method), 79
 - `has_music()` (`ly.musicxml.xml_objs.Bar` method), 78
 - `has_output()` (`ly.docinfo.DocInfo` method), 106
 - `has_output()` (`ly.music.items.Item` method), 54
 - `has_selection()` (`ly.document.Cursor` method), 101
 - `Header` (class in `ly.dom`), 116
 - `Header` (class in `ly.lex.lilypond`), 28
 - `Header` (class in `ly.music.items`), 53
 - `HeaderVariable` (class in `ly.lex.lilypond`), 28
 - `Hide` (class in `ly.lex.lilypond`), 28
 - `highlight` (class in `ly.cli.command`), 90
 - `highlight` (class in `ly.server.command`), 93
 - `hl` (in module `ly.cli.command`), 90
 - `html()` (in module `ly.colorize`), 111
 - `html()` (`ly.colorize.HtmlWriter` method), 108
 - `html_escape()` (in module `ly.colorize`), 111
 - `html_escape_attr()` (in module `ly.colorize`), 111
 - `html_format_attrs()` (in module `ly.colorize`), 111
 - `HtmlWriter` (class in `ly.colorize`), 108
- I
- `Identifier` (class in `ly.dom`), 116
 - `Identifier` (class in `ly.lex.lilypond`), 28
 - `IdentifierRef` (class in `ly.lex.lilypond`), 28
 - `ifbasestring()` (`ly.dom.HandleVars` method), 116
 - `importNode()` (`ly.dom.HandleVars` method), 116
 - `Include` (class in `ly.dom`), 116
 - `Include` (class in `ly.music.items`), 53
 - `include_args()` (`ly.docinfo.DocInfo` method), 106
 - `increase_indent()` (`ly.indent.Indenter` method), 124
 - `indent` (class in `ly.cli.command`), 90
 - `Indent` (class in `ly.lex`), 17
 - `indent` (class in `ly.server.command`), 93
 - `indent()` (in module `ly.etreeutil`), 124
 - `indent()` (`ly.dom.Printer` method), 120
 - `indent()` (`ly.indent.Indenter` method), 124
 - `indent()` (`ly.musicxml.create_musicxml.MusicXML` method), 71
 - `indent_tabs` (`ly.indent.Indenter` attribute), 124
 - `indent_width` (`ly.indent.Indenter` attribute), 124
 - `Indenter` (class in `ly.indent`), 124
 - `indenter()` (`ly.cli.command.indent` method), 90
 - `indenter()` (`ly.server.command.indent` method), 93
 - `indentGen()` (`ly.dom.Printer` method), 120
 - `index()` (`ly.document.Document` method), 102
 - `index()` (`ly.document.DocumentBase` method), 103
 - `index()` (`ly.node.Node` method), 126
 - `initial_state()` (`ly.document.Document` method), 102
 - `initial_state()` (`ly.document.DocumentBase` method), 103
 - `inject_voice()` (`ly.musicxml.xml_objs.Bar` method), 78
 - `inline_style` (`ly.colorize.HtmlWriter` attribute), 108
 - `InnerChoirStaff` (class in `ly.dom`), 117
 - `InnerStaffGroup` (class in `ly.dom`), 117
 - `InputChords` (class in `ly.dom`), 117
 - `InputDrums` (class in `ly.dom`), 117
 - `InputFigures` (class in `ly.dom`), 117
 - `InputLyrics` (class in `ly.dom`), 117
 - `InputMode` (class in `ly.dom`), 117
 - `InputMode` (class in `ly.lex.lilypond`), 28
 - `InputMode` (class in `ly.music.items`), 53
 - `InputNotes` (class in `ly.dom`), 117
 - `insert()` (in module `ly.barcheck`), 107
 - `insert()` (`ly.node.Node` method), 126
 - `insert_before()` (`ly.node.Node` method), 126
 - `insert_language()` (in module `ly.pitch.translate`), 84
 - `insert_pos` (`ly.rhythm.music_item` attribute), 128
 - `int2letter()` (in module `ly.util`), 129
 - `int2roman()` (in module `ly.util`), 130
 - `int2text()` (in module `ly.util`), 130
 - `IntegerValue` (class in `ly.lex.lilypond`), 28
 - `is_alignable_scheme_keyword()` (`ly.indent.Line` method), 124
 - `is_descendant_of()` (`ly.node.Node` method), 126
 - `is_empty()` (`ly.musicxml.xml_objs.Score` method), 81
 - `is_skip()` (`ly.musicxml.xml_objs.Bar` method), 79
 - `isAtom` (`ly.dom.ContextType` attribute), 115
 - `isAtom` (`ly.dom.Enclosed` attribute), 115
 - `isAtom` (`ly.dom.Identifier` attribute), 116
 - `isAtom` (`ly.dom.LyNode` attribute), 118
 - `isAtom` (`ly.dom.QuotedString` attribute), 120
 - `isAtom` (`ly.dom.Scheme` attribute), 120
 - `isAtom` (`ly.dom.Statement` attribute), 122
 - `isblank()` (in module `ly.etreeutil`), 124
 - `isblank()` (`ly.document.DocumentBase` method), 103
 - `isvalid()` (`ly.document.Document` method), 102
 - `isvalid()` (`ly.document.DocumentBase` method), 103
 - `Item` (class in `ly.music.items`), 53
 - `items` (`ly.lex.docbook.ParseDocBook` attribute), 17
 - `items` (`ly.lex.html.ParseAttr` attribute), 18
 - `items` (`ly.lex.html.ParseComment` attribute), 18
 - `items` (`ly.lex.html.ParseHTML` attribute), 19
 - `items` (`ly.lex.html.ParseLilyPond` attribute), 19
 - `items` (`ly.lex.html.ParseLilyPondAttr` attribute), 19
 - `items` (`ly.lex.html.ParseLilyPondFileOptions` attribute), 19
 - `items` (`ly.lex.html.ParseLilyPondInline` attribute), 19
 - `items` (`ly.lex.html.ParseStringDQ` attribute), 19
 - `items` (`ly.lex.html.ParseStringSQ` attribute), 19
 - `items` (`ly.lex.html.ParseValue` attribute), 19
 - `items` (`ly.lex.latex.ParseLaTeX` attribute), 20
 - `items` (`ly.lex.lilypond.ExpectGrobProperty` attribute), 25
 - `items` (`ly.lex.lilypond.ExpectLyricMode` attribute), 26
 - `items` (`ly.lex.lilypond.ExpectMusicList` attribute), 26

- items (ly.lex.lilypond.ExpectOpenBracket attribute), 26
 - items (ly.lex.lilypond.ExpectTranslatorId attribute), 27
 - items (ly.lex.lilypond.ParseAccidentalStyle attribute), 32
 - items (ly.lex.lilypond.ParseAlterBroken attribute), 32
 - items (ly.lex.lilypond.ParseBlockComment attribute), 33
 - items (ly.lex.lilypond.ParseBook attribute), 33
 - items (ly.lex.lilypond.ParseBookPart attribute), 33
 - items (ly.lex.lilypond.ParseChord attribute), 33
 - items (ly.lex.lilypond.ParseChordItems attribute), 33
 - items (ly.lex.lilypond.ParseChordMode attribute), 33
 - items (ly.lex.lilypond.ParseClef attribute), 33
 - items (ly.lex.lilypond.ParseContext attribute), 33
 - items (ly.lex.lilypond.ParseDecimalValue attribute), 34
 - items (ly.lex.lilypond.ParseDrumChord attribute), 34
 - items (ly.lex.lilypond.ParseDrumMode attribute), 34
 - items (ly.lex.lilypond.ParseDuration attribute), 34
 - items (ly.lex.lilypond.ParseDurationScaling attribute), 34
 - items (ly.lex.lilypond.ParseFigure attribute), 34
 - items (ly.lex.lilypond.ParseFigureMode attribute), 34
 - items (ly.lex.lilypond.ParseGlobal attribute), 34
 - items (ly.lex.lilypond.ParseGlobalAssignment attribute), 35
 - items (ly.lex.lilypond.ParseGrobPropertyPath attribute), 35
 - items (ly.lex.lilypond.ParseHeader attribute), 35
 - items (ly.lex.lilypond.ParseHideOmit attribute), 35
 - items (ly.lex.lilypond.ParseLayout attribute), 35
 - items (ly.lex.lilypond.ParseLyricMode attribute), 35
 - items (ly.lex.lilypond.ParseMarkup attribute), 36
 - items (ly.lex.lilypond.ParseMidi attribute), 36
 - items (ly.lex.lilypond.ParseMusic attribute), 36
 - items (ly.lex.lilypond.ParseOverride attribute), 36
 - items (ly.lex.lilypond.ParsePaper attribute), 36
 - items (ly.lex.lilypond.ParsePitchCommand attribute), 36
 - items (ly.lex.lilypond.ParseRepeat attribute), 36
 - items (ly.lex.lilypond.ParseRevert attribute), 37
 - items (ly.lex.lilypond.ParseScore attribute), 37
 - items (ly.lex.lilypond.ParseScriptAbbreviationOrFingering attribute), 37
 - items (ly.lex.lilypond.ParseSet attribute), 37
 - items (ly.lex.lilypond.ParseString attribute), 37
 - items (ly.lex.lilypond.ParseTempo attribute), 37
 - items (ly.lex.lilypond.ParseTempoAfterEqualSign attribute), 37
 - items (ly.lex.lilypond.ParseTranslator attribute), 37
 - items (ly.lex.lilypond.ParseTranslatorId attribute), 38
 - items (ly.lex.lilypond.ParseTremolo attribute), 38
 - items (ly.lex.lilypond.ParseTweak attribute), 38
 - items (ly.lex.lilypond.ParseTweakGrobProperty attribute), 38
 - items (ly.lex.lilypond.ParseUnset attribute), 38
 - items (ly.lex.lilypond.ParseWith attribute), 38
 - items (ly.lex.scheme.ParseBlockComment attribute), 44
 - items (ly.lex.scheme.ParseLilyPond attribute), 44
 - items (ly.lex.scheme.ParseScheme attribute), 44
 - items (ly.lex.scheme.ParseString attribute), 44
 - items (ly.lex.texinfo.ParseBlock attribute), 47
 - items (ly.lex.texinfo.ParseComment attribute), 47
 - items (ly.lex.texinfo.ParseLilyPondAttr attribute), 47
 - items (ly.lex.texinfo.ParseLilyPondBlock attribute), 47
 - items (ly.lex.texinfo.ParseLilyPondBlockAttr attribute), 47
 - items (ly.lex.texinfo.ParseLilyPondEnv attribute), 47
 - items (ly.lex.texinfo.ParseLilyPondEnvAttr attribute), 47
 - items (ly.lex.texinfo.ParseLilyPondFile attribute), 48
 - items (ly.lex.texinfo.ParseTexinfo attribute), 48
 - items (ly.lex.texinfo.ParseVerbatim attribute), 48
 - items (ly.slexer.Parser attribute), 98
 - iter_depth() (ly.node.Node method), 126
 - iter_header() (ly.musicxml.lymus2musxml.ParseSource method), 77
 - iter_music() (ly.music.items.Document method), 52
 - iter_rings() (ly.node.Node method), 126
 - iter_score() (ly.musicxml.lymus2musxml.ParseSource method), 77
 - iter_toplevel_items() (ly.music.items.Item method), 54
 - iter_toplevel_items_include() (ly.music.items.Item method), 54
 - iterate_bar() (ly.musicxml.xml_objs.IterateXmlObjs method), 80
 - iterate_part() (ly.musicxml.xml_objs.IterateXmlObjs method), 80
 - iterate_partgroup() (ly.musicxml.xml_objs.IterateXmlObjs method), 81
 - IterateXmlObjs (class in ly.musicxml.xml_objs), 80
- ## K
- KeySignature (class in ly.dom), 117
 - KeySignature (class in ly.music.items), 54
 - KeySignature() (ly.musicxml.lymus2musxml.ParseSource method), 75
 - KeySignatureMode (class in ly.lex.lilypond), 29
 - Keyword (class in ly.lex.lilypond), 29
 - Keyword (class in ly.lex.scheme), 43
 - Keyword (class in ly.lex.texinfo), 46
 - Keyword (class in ly.music.items), 54
- ## L
- language (class in ly.cli.command), 90
 - Language (class in ly.music.items), 55
 - language (class in ly.server.command), 93
 - language (ly.music.items.Language attribute), 55
 - language (ly.pitch.PitchWriter attribute), 83
 - language() (ly.docinfo.DocInfo method), 106
 - LanguageName (class in ly.pitch), 82
 - Layout (class in ly.dom), 117
 - Layout (class in ly.lex.lilypond), 29
 - Layout (class in ly.music.items), 55

- LayoutContext (class in ly.lex.lilypond), 29
- LayoutContext (class in ly.music.items), 55
- LayoutVariable (class in ly.lex.lilypond), 29
- Leaf (class in ly.dom), 117
- leave() (ly.slexer.State method), 99
- Length (class in ly.lex.lilypond), 29
- length() (ly.music.items.Durable method), 53
- length() (ly.music.items.Item method), 54
- length() (ly.music.items.Music method), 56
- license (in module ly.pkginfo), 127
- Ligature (class in ly.lex.lilypond), 29
- LigatureEnd (class in ly.lex.lilypond), 29
- LigatureStart (class in ly.lex.lilypond), 29
- LilyPond (class in ly.lex.scheme), 43
- LilyPondAttrEnd (class in ly.lex.texinfo), 46
- LilyPondAttrStart (class in ly.lex.texinfo), 46
- LilyPondBlockEnd (class in ly.lex.texinfo), 46
- LilyPondBlockStart (class in ly.lex.texinfo), 46
- LilyPondBlockStartBrace (class in ly.lex.texinfo), 46
- LilyPondCloseTag (class in ly.lex.html), 18
- LilyPondEnd (class in ly.lex.scheme), 43
- LilyPondEnvEnd (class in ly.lex.texinfo), 46
- LilyPondEnvStart (class in ly.lex.texinfo), 46
- LilyPondFileStart (class in ly.lex.texinfo), 46
- LilyPondFileStartBrace (class in ly.lex.texinfo), 47
- LilyPondFileTag (class in ly.lex.html), 18
- LilyPondFileTagEnd (class in ly.lex.html), 18
- LilyPondInlineTag (class in ly.lex.html), 18
- LilyPondInlineTagEnd (class in ly.lex.html), 18
- LilyPondStart (class in ly.lex.scheme), 43
- LilyPondTag (class in ly.lex.html), 18
- LilyPondTagEnd (class in ly.lex.html), 18
- LilyPondVersionTag (class in ly.lex.html), 18
- Line (class in ly.dom), 117
- Line (class in ly.indent), 124
- LineComment (class in ly.dom), 118
- LineComment (class in ly.lex), 16
- LineComment (class in ly.lex.lilypond), 29
- LineComment (class in ly.lex.scheme), 43
- LineComment (class in ly.lex.texinfo), 47
- linenumbers_bgcolor (ly.colorize.HtmlWriter attribute), 108
- linenumbers_fgcolor (ly.colorize.HtmlWriter attribute), 108
- linenumbers_id (ly.colorize.HtmlWriter attribute), 108
- load() (in module ly.cli.main), 92
- load() (ly.document.Document class method), 102
- long_description (in module ly.pkginfo), 127
- look_ahead() (ly.musicxml.lymus2musxml.ParseSource method), 77
- look_behind() (ly.musicxml.lymus2musxml.ParseSource method), 77
- lstrip() (ly.document.Cursor method), 101
- ly (module), 13
- ly() (ly.dom.AddDuration method), 112
- ly() (ly.dom.Assignment method), 113
- ly() (ly.dom.BlockComment method), 113
- ly() (ly.dom.Chord method), 113
- ly() (ly.dom.Clef method), 114
- ly() (ly.dom.Comment method), 114
- ly() (ly.dom.Container method), 114
- ly() (ly.dom.ContextName method), 114
- ly() (ly.dom.ContextProperty method), 114
- ly() (ly.dom.ContextType method), 115
- ly() (ly.dom.Duration method), 115
- ly() (ly.dom.Enclosed method), 116
- ly() (ly.dom.Identifier method), 116
- ly() (ly.dom.Include method), 117
- ly() (ly.dom.KeySignature method), 117
- ly() (ly.dom.LyNode method), 118
- ly() (ly.dom.LyricsTo method), 118
- ly() (ly.dom.Named method), 119
- ly() (ly.dom.Pitch method), 119
- ly() (ly.dom.QuotedString method), 120
- ly() (ly.dom.Scheme method), 120
- ly() (ly.dom.SchemeList method), 121
- ly() (ly.dom.Tempo method), 122
- ly() (ly.dom.Text method), 122
- ly() (ly.dom.TimeSignature method), 122
- ly() (ly.dom.Version method), 123
- ly() (ly.dom.VoiceSeparator method), 123
- ly() (ly.dom.With method), 123
- ly.barcheck (module), 107
- ly.cli (module), 90
- ly.cli.command (module), 90
- ly.cli.doc (module), 3
- ly.cli.main (module), 91
- ly.colorize (module), 107
- ly.cursortools (module), 112
- ly.data (module), 89
- ly.data.makeschemedata (module), 89
- ly.docinfo (module), 106
- ly.document (module), 100
- ly.dom (module), 112
- ly.duration (module), 123
- ly.etreeutil (module), 124
- ly.indent (module), 124
- ly.lex (module), 14
- ly.lex.docbook (module), 17
- ly.lex.html (module), 17
- ly.lex.latex (module), 20
- ly.lex.lilypond (module), 21
- ly.lex.scheme (module), 42
- ly.lex.texinfo (module), 45
- ly.music (module), 48
- ly.music.event (module), 50
- ly.music.items (module), 50
- ly.music.read (module), 62

ly.musicxml (module), 67
ly.musicxml.create_musicxml (module), 67
ly.musicxml.ly2xml_mediator (module), 71
ly.musicxml.lymus2musxml (module), 75
ly.musicxml.xml_objs (module), 78
ly.node (module), 125
ly.pitch (module), 82
ly.pitch.abs2rel (module), 84
ly.pitch.rel2abs (module), 84
ly.pitch.translate (module), 84
ly.pitch.transpose (module), 85
ly.pkginfo (module), 127
ly.reformat (module), 127
ly.rhythm (module), 128
ly.server (module), 92
ly.server.command (module), 93
ly.server.doc (module), 7
ly.server.handler (module), 94
ly.server.main (module), 94
ly.server.options (module), 95
ly.slexer (module), 95
ly.util (module), 129
ly.words (module), 130
ly.xml (module), 86
LyNode (class in ly.dom), 118
Lyric (class in ly.lex.lilypond), 29
LyricExtender (class in ly.lex.lilypond), 30
LyricHyphen (class in ly.lex.lilypond), 30
LyricItem (class in ly.music.items), 55
LyricItem() (ly.musicxml.lymus2musxml.ParseSource method), 75
LyricMode (class in ly.dom), 118
LyricMode (class in ly.lex.lilypond), 30
LyricMode (class in ly.music.items), 55
LyricMode() (ly.musicxml.lymus2musxml.ParseSource method), 75
Lyrics (class in ly.dom), 118
LyricSkip (class in ly.lex.lilypond), 30
LyricsSection (class in ly.musicxml.xml_objs), 81
LyricsTo (class in ly.dom), 118
LyricsTo (class in ly.music.items), 55
LyricsTo() (ly.musicxml.lymus2musxml.ParseSource method), 76
LyricText (class in ly.lex.lilypond), 30
LyricText (class in ly.music.items), 55
LyricText() (ly.musicxml.lymus2musxml.ParseSource method), 76

M

main() (in module ly.cli.main), 92
main() (in module ly.data.makeschemedata), 89
main() (in module ly.server.main), 94
maintainer (in module ly.pkginfo), 127
maintainer_email (in module ly.pkginfo), 127
makeAbsolute() (ly.pitch.Pitch method), 82
makeRelative() (ly.pitch.Pitch method), 82
map_tokens() (in module ly.colorize), 111
Mapper (class in ly.colorize), 108
Mark (class in ly.dom), 118
Markup (class in ly.dom), 118
Markup (class in ly.lex.lilypond), 30
Markup (class in ly.music.items), 55
markup_definitions() (ly.docinfo.DocInfo method), 106
MarkupCommand (class in ly.dom), 118
MarkupCommand (class in ly.lex.lilypond), 30
MarkupCommand (class in ly.music.items), 55
MarkupEnclosed (class in ly.dom), 118
MarkupLines (class in ly.lex.lilypond), 30
MarkupList (class in ly.lex.lilypond), 30
MarkupList (class in ly.music.items), 55
MarkupScore (class in ly.lex.lilypond), 30
MarkupScore (class in ly.music.items), 55
MarkupStart (class in ly.lex.lilypond), 30
MarkupUserCommand (class in ly.lex.lilypond), 31
MarkupUserCommand (class in ly.music.items), 56
MarkupWord (class in ly.lex.lilypond), 31
MarkupWord (class in ly.music.items), 56
MatchEnd (class in ly.lex), 16
matchname (ly.lex.lilypond.BeamEnd attribute), 21
matchname (ly.lex.lilypond.BeamStart attribute), 21
matchname (ly.lex.lilypond.CloseBracket attribute), 23
matchname (ly.lex.lilypond.CloseSimultaneous attribute), 23
matchname (ly.lex.lilypond.LigatureEnd attribute), 29
matchname (ly.lex.lilypond.LigatureStart attribute), 29
matchname (ly.lex.lilypond.OpenBracket attribute), 32
matchname (ly.lex.lilypond.OpenSimultaneous attribute), 32
matchname (ly.lex.lilypond.PhrasingSlurEnd attribute), 38
matchname (ly.lex.lilypond.PhrasingSlurStart attribute), 39
matchname (ly.lex.lilypond.SlurEnd attribute), 40
matchname (ly.lex.lilypond.SlurStart attribute), 40
matchname (ly.lex.MatchEnd attribute), 17
matchname (ly.lex.MatchStart attribute), 16
matchname (ly.lex.scheme.CloseParen attribute), 43
matchname (ly.lex.scheme.LilyPondEnd attribute), 43
matchname (ly.lex.scheme.LilyPondStart attribute), 43
matchname (ly.lex.scheme.OpenParen attribute), 44
MatchStart (class in ly.lex), 16
may_remove (ly.rhythm.music_item attribute), 128
may_remove_brackets (ly.dom.AddLyrics attribute), 112
may_remove_brackets (ly.dom.Enclosed attribute), 116
may_remove_brackets (ly.dom.Section attribute), 121
may_remove_brackets (ly.dom.Seqr attribute), 121
may_remove_brackets (ly.dom.Simr attribute), 121

- `may_remove_brackets` (ly.dom.StatementEnclosed attribute), 122
 - `measure_length()` (ly.music.items.TimeSignature method), 61
 - `Mediator` (class in ly.musicxml.ly2xml_mediator), 71
 - `melt_mapped_tokens()` (in module ly.colorize), 111
 - `MensuralStaff` (class in ly.dom), 119
 - `MensuralVoice` (class in ly.dom), 119
 - `merge_attr()` (ly.musicxml.xml_objs.BarAttr method), 79
 - `merge_globally()` (ly.musicxml.xml_objs.Score method), 81
 - `merge_lyrics()` (ly.musicxml.xml_objs.ScoreSection method), 81
 - `merge_part_to_part()` (ly.musicxml.xml_objs.ScorePart method), 81
 - `merge_voice()` (ly.musicxml.xml_objs.ScorePartGroup method), 81
 - `merge_voice()` (ly.musicxml.xml_objs.ScoreSection method), 81
 - `method()` (ly.music.read.dispatcher method), 67
 - `method()` (ly.music.read.dispatcher_class method), 67
 - `Midi` (class in ly.dom), 119
 - `Midi` (class in ly.lex.lilypond), 31
 - `Midi` (class in ly.music.items), 56
 - `mkid()` (in module ly.util), 130
 - `ModalTransposer` (class in ly.pitch.transpose), 85
 - `mode` (class in ly.cli.command), 90
 - `mode` (class in ly.server.command), 93
 - `mode` (ly.colorize.css_class attribute), 109
 - `mode` (ly.lex.docbook.ParseDocBook attribute), 17
 - `mode` (ly.lex.html.ParseHTML attribute), 19
 - `mode` (ly.lex.latex.ParseLaTeX attribute), 20
 - `mode` (ly.lex.lilypond.ParseLilyPond attribute), 35
 - `mode` (ly.lex.Parser attribute), 15
 - `mode` (ly.lex.scheme.ParseScheme attribute), 44
 - `mode` (ly.lex.texinfo.ParseTexinfo attribute), 48
 - `mode()` (ly.docinfo.DocInfo method), 106
 - `mode()` (ly.document.Document method), 102
 - `mode()` (ly.lex.State method), 15
 - `mode()` (ly.music.items.KeySignature method), 54
 - `ModeShifter` (class in ly.pitch.transpose), 85
 - `modified` (ly.document.Document attribute), 102
 - `move_long_comments()` (in module ly.reformat), 128
 - `move_to_block()` (ly.document.Runner method), 104
 - `Music` (class in ly.music.items), 56
 - `music_children()` (ly.music.items.Item method), 54
 - `music_events_til_position()` (ly.music.items.Document method), 52
 - `music_glyphs()` (in module ly.data), 89
 - `music_item` (class in ly.rhythm), 128
 - `music_items()` (in module ly.rhythm), 128
 - `music_parent()` (ly.music.items.Item method), 54
 - `music_tokens()` (in module ly.rhythm), 128
 - `MusicItem` (class in ly.lex.lilypond), 31
 - `MusicList` (class in ly.music.items), 56
 - `MusicList()` (ly.musicxml.lymus2musxml.ParseSource method), 76
 - `musicxml` (class in ly.cli.command), 90
 - `MusicXML` (class in ly.musicxml.create_musicxml), 71
 - `musicxml` (class in ly.server.command), 93
 - `musicxml()` (ly.musicxml.create_musicxml.CreateMusicXML method), 70
 - `musicxml()` (ly.musicxml.lymus2musxml.ParseSource method), 77
- ## N
- `Name` (class in ly.lex.lilypond), 31
 - `name` (in module ly.pkginfo), 127
 - `name` (ly.colorize.css_class attribute), 109
 - `name` (ly.colorize.style attribute), 111
 - `name` (ly.dom.AddLyrics attribute), 112
 - `name` (ly.dom.Book attribute), 113
 - `name` (ly.dom.BookPart attribute), 113
 - `name` (ly.dom.ChordMode attribute), 113
 - `name` (ly.dom.Context attribute), 114
 - `name` (ly.dom.DrumMode attribute), 115
 - `name` (ly.dom.FigureMode attribute), 116
 - `name` (ly.dom.Header attribute), 116
 - `name` (ly.dom.InputChords attribute), 117
 - `name` (ly.dom.InputDrums attribute), 117
 - `name` (ly.dom.InputFigures attribute), 117
 - `name` (ly.dom.InputLyrics attribute), 117
 - `name` (ly.dom.InputNotes attribute), 117
 - `name` (ly.dom.Layout attribute), 117
 - `name` (ly.dom.LyricMode attribute), 118
 - `name` (ly.dom.LyricsTo attribute), 118
 - `name` (ly.dom.Mark attribute), 118
 - `name` (ly.dom.Markup attribute), 118
 - `name` (ly.dom.Midi attribute), 119
 - `name` (ly.dom.Named attribute), 119
 - `name` (ly.dom.NoteMode attribute), 119
 - `name` (ly.dom.Paper attribute), 119
 - `name` (ly.dom.Partial attribute), 119
 - `name` (ly.dom.Relative attribute), 120
 - `name` (ly.dom.Score attribute), 121
 - `name` (ly.dom.Transposition attribute), 122
 - `name` (ly.dom.With attribute), 123
 - `name()` (ly.music.items.Assignment method), 51
 - `name()` (ly.music.items.MarkupUserCommand method), 56
 - `name()` (ly.music.items.UserCommand method), 62
 - `Named` (class in ly.dom), 119
 - `New` (class in ly.lex.lilypond), 31
 - `new_adv_ornament()` (ly.musicxml.create_musicxml.CreateMusicXML method), 70
 - `new_articulation()` (ly.musicxml.create_musicxml.CreateMusicXML method), 70

`new_articulation()` (ly.musicxml.ly2xml_mediator.Mediator method), 72

`new_bar()` (ly.musicxml.ly2xml_mediator.Mediator method), 72

`new_bar_attr()` (ly.musicxml.create_musicxml.CreateMusicXML method), 70

`new_chord()` (ly.musicxml.ly2xml_mediator.Mediator method), 72

`new_chord_grace()` (ly.musicxml.ly2xml_mediator.Mediator method), 72

`new_chordbase()` (ly.musicxml.ly2xml_mediator.Mediator method), 72

`new_chordnote()` (ly.musicxml.ly2xml_mediator.Mediator method), 72

`new_clef()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_duration_token()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_dynamics()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_gliss()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_grace()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_group()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_header_assignment()`
(ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_iso_dura()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_key()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_lyric_nr()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_lyric_section()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_lyrics_item()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_lyrics_text()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_note()` (ly.musicxml.create_musicxml.CreateMusicXML method), 70

`new_note()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_ottava()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_part()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_repeat()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_rest()` (ly.musicxml.create_musicxml.CreateMusicXML method), 70

`new_rest()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_section()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_simple_ornament()` (ly.musicxml.create_musicxml.CreateMusicXML method), 70

`new_snippet()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_tempo()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_time()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_trill_spanner()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`new_unpitched_note()` (ly.musicxml.create_musicxml.CreateMusicXML method), 70

`new_xml_bar_attr()` (ly.musicxml.xml_objs.IterateXmlObjs method), 81

`new_xml_note()` (ly.musicxml.xml_objs.IterateXmlObjs method), 81

`new_xml_rest()` (ly.musicxml.xml_objs.IterateXmlObjs method), 81

`Newline` (class in ly.dom), 119

`Newline` (class in ly.lex), 15

`next()` (ly.document.Source method), 105

`next_block()` (ly.document.DocumentBase method), 103

`next_block()` (ly.document.Runner method), 104

`next_sibling()` (ly.node.Node method), 126

`Node` (class in ly.node), 125

`node()` (ly.music.items.Document method), 52

`Note` (class in ly.lex.lilypond), 31

`Note` (class in ly.music.items), 56

`Note()` (ly.musicxml.lymus2musxml.ParseSource method), 76

`note2rest()` (ly.musicxml.ly2xml_mediator.Mediator method), 73

`NoteMode` (class in ly.dom), 119

`NoteMode` (class in ly.lex.lilypond), 31

`NoteMode` (class in ly.music.items), 57

`NoteMode()` (ly.musicxml.lymus2musxml.ParseSource method), 76

`NoteNames` (class in ly.dom), 119

`Number` (class in ly.lex.scheme), 44

`Number` (class in ly.music.items), 57

`Number()` (ly.musicxml.lymus2musxml.ParseSource method), 76

`number_lines` (ly.colorize.HtmlWriter attribute), 108

`numerator` (ly.music.items.Scaler attribute), 59

`numerator()` (ly.music.items.TimeSignature method), 61

`Numeric` (class in ly.lex), 16

O

`Octave` (class in ly.lex.lilypond), 31

`octave_token` (ly.music.items.Note attribute), 57

`OctaveCheck` (class in ly.lex.lilypond), 31

octavecheck_token (ly.music.items.Note attribute), 57
 OctaveShift (class in ly.musicxml.xml_objs), 81
 octaveToNum() (in module ly.pitch), 83
 octaveToString() (in module ly.pitch), 83
 Omit (class in ly.lex.lilypond), 31
 OpenBracket (class in ly.lex.lilypond), 32
 OpenBracketMarkup (class in ly.lex.lilypond), 32
 OpenParen (class in ly.lex.scheme), 44
 OpenSimultaneous (class in ly.lex.lilypond), 32
 Options (class in ly.cli.main), 91
 Options (class in ly.server.options), 95
 Output (class in ly.cli.main), 91
 output() (ly.pitch.Pitch method), 82
 output_args() (ly.docinfo.DocInfo method), 107
 Override (class in ly.lex.lilypond), 32
 Override (class in ly.music.items), 57
 Override() (ly.musicxml.lymus2musxml.ParseSource method), 76

P

Paper (class in ly.dom), 119
 Paper (class in ly.lex.lilypond), 32
 Paper (class in ly.music.items), 57
 PaperVariable (class in ly.lex.lilypond), 32
 parent() (ly.node.Node method), 126
 parent() (ly.node.WeakNode method), 127
 parse() (ly.slexer.FallthroughParser method), 98
 parse() (ly.slexer.Parser method), 98
 parse_command() (in module ly.cli.main), 92
 parse_command_line() (in module ly.cli.main), 92
 parse_command_line() (in module ly.server.main), 95
 parse_document() (ly.musicxml.lymus2musxml.ParseSource method), 77
 parse_nodes() (ly.musicxml.lymus2musxml.ParseSource method), 78
 parse_text() (ly.musicxml.lymus2musxml.ParseSource method), 78
 parse_tree() (ly.musicxml.lymus2musxml.ParseSource method), 78
 ParseAccidentalStyle (class in ly.lex.lilypond), 32
 ParseAlterBroken (class in ly.lex.lilypond), 32
 ParseAttr (class in ly.lex.html), 18
 ParseBlock (class in ly.lex.texinfo), 47
 ParseBlockComment (class in ly.lex.lilypond), 32
 ParseBlockComment (class in ly.lex.scheme), 44
 ParseBook (class in ly.lex.lilypond), 33
 ParseBookPart (class in ly.lex.lilypond), 33
 ParseChord (class in ly.lex.lilypond), 33
 ParseChordItems (class in ly.lex.lilypond), 33
 ParseChordMode (class in ly.lex.lilypond), 33
 ParseClef (class in ly.lex.lilypond), 33
 ParseComment (class in ly.lex.html), 18
 ParseComment (class in ly.lex.texinfo), 47
 ParseContext (class in ly.lex.lilypond), 33
 ParseDecimalValue (class in ly.lex.lilypond), 33
 ParseDocBook (class in ly.lex.docbook), 17
 ParseDrumChord (class in ly.lex.lilypond), 34
 ParseDrumMode (class in ly.lex.lilypond), 34
 ParseDuration (class in ly.lex.lilypond), 34
 ParseDurationScaling (class in ly.lex.lilypond), 34
 ParseFigure (class in ly.lex.lilypond), 34
 ParseFigureMode (class in ly.lex.lilypond), 34
 ParseGlobal (class in ly.lex.lilypond), 34
 ParseGlobalAssignment (class in ly.lex.lilypond), 35
 ParseGrobPropertyPath (class in ly.lex.lilypond), 35
 ParseHeader (class in ly.lex.lilypond), 35
 ParseHideOmit (class in ly.lex.lilypond), 35
 ParseHTML (class in ly.lex.html), 18
 ParseInputMode (class in ly.lex.lilypond), 35
 ParseLaTeX (class in ly.lex.latex), 20
 ParseLayout (class in ly.lex.lilypond), 35
 ParseLilyPond (class in ly.lex.html), 19
 ParseLilyPond (class in ly.lex.lilypond), 35
 ParseLilyPond (class in ly.lex.scheme), 44
 ParseLilyPondAttr (class in ly.lex.html), 19
 ParseLilyPondAttr (class in ly.lex.texinfo), 47
 ParseLilyPondBlock (class in ly.lex.texinfo), 47
 ParseLilyPondBlockAttr (class in ly.lex.texinfo), 47
 ParseLilyPondEnv (class in ly.lex.texinfo), 47
 ParseLilyPondEnvAttr (class in ly.lex.texinfo), 47
 ParseLilyPondFile (class in ly.lex.texinfo), 48
 ParseLilyPondFileOptions (class in ly.lex.html), 19
 ParseLilyPondInline (class in ly.lex.html), 19
 ParseLyricMode (class in ly.lex.lilypond), 35
 ParseMarkup (class in ly.lex.lilypond), 35
 ParseMidi (class in ly.lex.lilypond), 36
 ParseMusic (class in ly.lex.lilypond), 36
 ParseNoteMode (class in ly.lex.lilypond), 36
 ParseOverride (class in ly.lex.lilypond), 36
 ParsePaper (class in ly.lex.lilypond), 36
 ParsePitchCommand (class in ly.lex.lilypond), 36
 Parser (class in ly.lex), 15
 Parser (class in ly.slexer), 97
 parser() (ly.slexer.State method), 99
 ParseRepeat (class in ly.lex.lilypond), 36
 ParseRevert (class in ly.lex.lilypond), 36
 parsers() (ly.slexer.State method), 99
 ParseScheme (class in ly.lex.scheme), 44
 ParseScore (class in ly.lex.lilypond), 37
 ParseScriptAbbreviationOrFingering (class in ly.lex.lilypond), 37
 ParseSet (class in ly.lex.lilypond), 37
 ParseSource (class in ly.musicxml.lymus2musxml), 75
 ParseString (class in ly.lex.lilypond), 37
 ParseString (class in ly.lex.scheme), 44
 ParseStringDQ (class in ly.lex.html), 19
 ParseStringSQ (class in ly.lex.html), 19
 ParseTempo (class in ly.lex.lilypond), 37

- ParseTempoAfterEqualSign (class in ly.lex.lilypond), 37
- ParseTexinfo (class in ly.lex.texinfo), 48
- ParseTranslator (class in ly.lex.lilypond), 37
- ParseTranslatorId (class in ly.lex.lilypond), 38
- ParseTremolo (class in ly.lex.lilypond), 38
- ParseTweak (class in ly.lex.lilypond), 38
- ParseTweakGrobProperty (class in ly.lex.lilypond), 38
- ParseUnset (class in ly.lex.lilypond), 38
- ParseValue (class in ly.lex.html), 19
- ParseVerbatim (class in ly.lex.texinfo), 48
- ParseWith (class in ly.lex.lilypond), 38
- part_not_empty() (ly.musicxml.ly2xml_mediator.Mediator method), 73
- PartCombine (class in ly.music.items), 57
- Partial (class in ly.dom), 119
- Partial (class in ly.lex.lilypond), 38
- Partial (class in ly.music.items), 57
- partial_length() (ly.music.items.Partial method), 57
- PathItem (class in ly.music.items), 57
- PathItem() (ly.musicxml.lymus2musxml.ParseSource method), 76
- pattern (ly.lex.docbook.ParseDocBook attribute), 17
- pattern (ly.lex.html.ParseAttr attribute), 18
- pattern (ly.lex.html.ParseComment attribute), 18
- pattern (ly.lex.html.ParseHTML attribute), 19
- pattern (ly.lex.html.ParseLilyPond attribute), 19
- pattern (ly.lex.html.ParseLilyPondAttr attribute), 19
- pattern (ly.lex.html.ParseLilyPondFileOptions attribute), 19
- pattern (ly.lex.html.ParseLilyPondInline attribute), 19
- pattern (ly.lex.html.ParseStringDQ attribute), 19
- pattern (ly.lex.html.ParseStringSQ attribute), 19
- pattern (ly.lex.html.ParseValue attribute), 19
- pattern (ly.lex.latex.ParseLaTeX attribute), 20
- pattern (ly.lex.lilypond.ExpectBook attribute), 25
- pattern (ly.lex.lilypond.ExpectBookPart attribute), 25
- pattern (ly.lex.lilypond.ExpectChordMode attribute), 25
- pattern (ly.lex.lilypond.ExpectContext attribute), 25
- pattern (ly.lex.lilypond.ExpectDrumMode attribute), 25
- pattern (ly.lex.lilypond.ExpectFigureMode attribute), 25
- pattern (ly.lex.lilypond.ExpectGrobProperty attribute), 25
- pattern (ly.lex.lilypond.ExpectHeader attribute), 26
- pattern (ly.lex.lilypond.ExpectLayout attribute), 26
- pattern (ly.lex.lilypond.ExpectLyricMode attribute), 26
- pattern (ly.lex.lilypond.ExpectMidi attribute), 26
- pattern (ly.lex.lilypond.ExpectMusicList attribute), 26
- pattern (ly.lex.lilypond.ExpectOpenBracket attribute), 26
- pattern (ly.lex.lilypond.ExpectTranslatorId attribute), 27
- pattern (ly.lex.lilypond.ParseAccidentalStyle attribute), 32
- pattern (ly.lex.lilypond.ParseAlterBroken attribute), 32
- pattern (ly.lex.lilypond.ParseBlockComment attribute), 33
- pattern (ly.lex.lilypond.ParseBook attribute), 33
- pattern (ly.lex.lilypond.ParseBookPart attribute), 33
- pattern (ly.lex.lilypond.ParseChord attribute), 33
- pattern (ly.lex.lilypond.ParseChordItems attribute), 33
- pattern (ly.lex.lilypond.ParseChordMode attribute), 33
- pattern (ly.lex.lilypond.ParseClef attribute), 33
- pattern (ly.lex.lilypond.ParseContext attribute), 33
- pattern (ly.lex.lilypond.ParseDecimalValue attribute), 34
- pattern (ly.lex.lilypond.ParseDrumChord attribute), 34
- pattern (ly.lex.lilypond.ParseDrumMode attribute), 34
- pattern (ly.lex.lilypond.ParseDuration attribute), 34
- pattern (ly.lex.lilypond.ParseDurationScaling attribute), 34
- pattern (ly.lex.lilypond.ParseFigure attribute), 34
- pattern (ly.lex.lilypond.ParseFigureMode attribute), 34
- pattern (ly.lex.lilypond.ParseGlobal attribute), 34
- pattern (ly.lex.lilypond.ParseGlobalAssignment attribute), 35
- pattern (ly.lex.lilypond.ParseGrobPropertyPath attribute), 35
- pattern (ly.lex.lilypond.ParseHeader attribute), 35
- pattern (ly.lex.lilypond.ParseHideOmit attribute), 35
- pattern (ly.lex.lilypond.ParseLayout attribute), 35
- pattern (ly.lex.lilypond.ParseLyricMode attribute), 35
- pattern (ly.lex.lilypond.ParseMarkup attribute), 36
- pattern (ly.lex.lilypond.ParseMidi attribute), 36
- pattern (ly.lex.lilypond.ParseMusic attribute), 36
- pattern (ly.lex.lilypond.ParseOverride attribute), 36
- pattern (ly.lex.lilypond.ParsePaper attribute), 36
- pattern (ly.lex.lilypond.ParsePitchCommand attribute), 36
- pattern (ly.lex.lilypond.ParseRepeat attribute), 36
- pattern (ly.lex.lilypond.ParseRevert attribute), 37
- pattern (ly.lex.lilypond.ParseScore attribute), 37
- pattern (ly.lex.lilypond.ParseScriptAbbreviationOrFingering attribute), 37
- pattern (ly.lex.lilypond.ParseSet attribute), 37
- pattern (ly.lex.lilypond.ParseString attribute), 37
- pattern (ly.lex.lilypond.ParseTempo attribute), 37
- pattern (ly.lex.lilypond.ParseTempoAfterEqualSign attribute), 37
- pattern (ly.lex.lilypond.ParseTranslator attribute), 38
- pattern (ly.lex.lilypond.ParseTranslatorId attribute), 38
- pattern (ly.lex.lilypond.ParseTremolo attribute), 38
- pattern (ly.lex.lilypond.ParseTweak attribute), 38
- pattern (ly.lex.lilypond.ParseTweakGrobProperty attribute), 38
- pattern (ly.lex.lilypond.ParseUnset attribute), 38
- pattern (ly.lex.lilypond.ParseWith attribute), 38
- pattern (ly.lex.scheme.ParseBlockComment attribute), 44
- pattern (ly.lex.scheme.ParseLilyPond attribute), 44
- pattern (ly.lex.scheme.ParseScheme attribute), 44
- pattern (ly.lex.scheme.ParseString attribute), 44
- pattern (ly.lex.texinfo.ParseBlock attribute), 47
- pattern (ly.lex.texinfo.ParseComment attribute), 47
- pattern (ly.lex.texinfo.ParseLilyPondAttr attribute), 47

- pattern (ly.lex.texinfo.ParseLilyPondBlock attribute), 47
 - pattern (ly.lex.texinfo.ParseLilyPondBlockAttr attribute), 47
 - pattern (ly.lex.texinfo.ParseLilyPondEnv attribute), 47
 - pattern (ly.lex.texinfo.ParseLilyPondEnvAttr attribute), 48
 - pattern (ly.lex.texinfo.ParseLilyPondFile attribute), 48
 - pattern (ly.lex.texinfo.ParseTexinfo attribute), 48
 - pattern (ly.lex.texinfo.ParseVerbatim attribute), 48
 - PhrasingSlur (class in ly.music.items), 58
 - PhrasingSlur() (ly.musicxml.lymus2musxml.ParseSource method), 76
 - PhrasingSlurEnd (class in ly.lex.lilypond), 38
 - PhrasingSlurStart (class in ly.lex.lilypond), 39
 - PianoStaff (class in ly.dom), 119
 - PipeSymbol (class in ly.lex.lilypond), 39
 - PipeSymbol (class in ly.music.items), 58
 - PipeSymbol() (ly.musicxml.lymus2musxml.ParseSource method), 76
 - Pitch (class in ly.dom), 119
 - Pitch (class in ly.pitch), 82
 - pitch (ly.music.items.Note attribute), 57
 - pitch (ly.music.items.Unpitched attribute), 61
 - pitch() (ly.music.items.KeySignature method), 54
 - PitchCommand (class in ly.lex.lilypond), 39
 - pitches() (ly.pitch.PitchIterator method), 83
 - PitchIterator (class in ly.pitch), 83
 - PitchNameNotAvailable, 83
 - PitchReader (class in ly.pitch), 83
 - pitchReader() (in module ly.pitch), 83
 - PitchWriter (class in ly.pitch), 83
 - pitchWriter() (in module ly.pitch), 83
 - plaintext() (ly.document.DocumentBase method), 103
 - plaintext() (ly.music.items.Item method), 54
 - plaintext() (ly.music.items.Markup method), 55
 - plaintext() (ly.music.items.MarkupCommand method), 55
 - plaintext() (ly.music.items.MarkupList method), 55
 - plaintext() (ly.music.items.MarkupWord method), 56
 - plaintext() (ly.music.items.Scheme method), 59
 - plaintext() (ly.music.items.String method), 60
 - pos (ly.rhythm.music_item attribute), 128
 - pos (ly.slexer.Token attribute), 97
 - position (ly.music.items.Item attribute), 54
 - position() (ly.document.Document method), 102
 - position() (ly.document.DocumentBase method), 103
 - position() (ly.document.Runner method), 104
 - position() (ly.document.Source method), 105
 - position() (ly.pitch.PitchIterator method), 83
 - post (ly.dom.Enclosed attribute), 116
 - post (ly.dom.SchemeLily attribute), 120
 - post (ly.dom.SchemeList attribute), 121
 - post (ly.dom.Seq attribute), 121
 - post (ly.dom.Sim attribute), 121
 - Postfix (class in ly.music.items), 58
 - Postfix() (ly.musicxml.lymus2musxml.ParseSource method), 76
 - pre (ly.dom.Enclosed attribute), 116
 - pre (ly.dom.SchemeLily attribute), 120
 - pre (ly.dom.SchemeList attribute), 121
 - pre (ly.dom.Seq attribute), 121
 - pre (ly.dom.Sim attribute), 121
 - preceding() (ly.music.items.Grace method), 53
 - preceding() (ly.music.items.Music method), 56
 - preceding() (ly.music.items.MusicList method), 56
 - preceding() (ly.music.items.PartCombine method), 57
 - preceding() (ly.music.itemsScaler method), 59
 - preceding() (ly.music.items.Tag method), 60
 - preceding_duration() (in module ly.rhythm), 129
 - previous_block() (ly.document.DocumentBase method), 103
 - previous_block() (ly.document.Runner method), 105
 - previous_sibling() (ly.node.Node method), 126
 - primary_quote_left (ly.dom.Printer attribute), 120
 - primary_quote_right (ly.dom.Printer attribute), 120
 - Printer (class in ly.dom), 120
 - process_json_request() (ly.server.handler.RequestHandler method), 94
 - process_options() (ly.server.handler.RequestHandler method), 94
 - property() (ly.music.items.Set method), 60
 - property() (ly.music.items.Unset method), 62
 - pushback() (ly.document.Source method), 105
- ## Q
- Q (class in ly.lex.lilypond), 39
 - Q (class in ly.music.items), 58
 - Q() (ly.musicxml.lymus2musxml.ParseSource method), 76
 - Quote (class in ly.lex.scheme), 44
 - QuotedString (class in ly.dom), 120
 - quoteString() (ly.dom.Printer method), 120
- ## R
- range() (ly.docinfo.DocInfo method), 107
 - re_flags (ly.lex.Parser attribute), 15
 - re_flags (ly.slexer.Parser attribute), 98
 - read() (ly.music.event.Events method), 50
 - read() (ly.music.read.Reader method), 65
 - read() (ly.pitch.PitchIterator method), 83
 - read_arg() (ly.music.read.dispatcher method), 67
 - read_arg() (ly.music.read.dispatcher_class method), 67
 - read_assignment() (ly.music.read.Reader method), 65
 - read_chord_specifier() (ly.music.read.Reader method), 65
 - read_command() (ly.music.read.Reader method), 66
 - read_item() (ly.music.read.Reader method), 66
 - read_json_request() (ly.server.handler.RequestHandler method), 94

`read_keyword()` (`ly.music.read.Reader` method), 66
`read_lyric_item()` (`ly.music.read.Reader` method), 66
`read_markup()` (`ly.music.read.Reader` method), 66
`read_music_item()` (`ly.music.read.Reader` method), 66
`read_scheme()` (`ly.music.read.Reader` method), 66
`read_scheme_item()` (`ly.music.read.Reader` method), 66
`read_tremolo()` (`ly.music.read.Reader` method), 66
`read_user_command()` (`ly.music.read.Reader` method), 66
`Reader` (class in `ly.music.read`), 62
`Reference` (class in `ly.dom`), 120
`reformat` (class in `ly.cli.command`), 90
`reformat` (class in `ly.server.command`), 93
`reformat()` (in module `ly.reformat`), 128
`rel2abs` (class in `ly.cli.command`), 91
`rel2abs` (class in `ly.server.command`), 93
`rel2abs()` (in module `ly.pitch.rel2abs`), 84
`Relative` (class in `ly.dom`), 120
`Relative` (class in `ly.music.items`), 58
`Relative()` (`ly.musicxml.lymus2musxml.ParseSource` method), 76
`remove()` (in module `ly.barcheck`), 107
`remove()` (`ly.node.Node` method), 126
`remove_dups()` (in module `ly.rhythm`), 129
`remove_trailing_whitespace()` (in module `ly.reformat`), 128
`Repeat` (class in `ly.lex.lilypond`), 39
`Repeat` (class in `ly.music.items`), 58
`Repeat()` (`ly.musicxml.lymus2musxml.ParseSource` method), 76
`repeat_count()` (`ly.music.items.Repeat` method), 58
`RepeatCount` (class in `ly.lex.lilypond`), 39
`RepeatSpecifier` (class in `ly.lex.lilypond`), 39
`replace` (`ly.lex.lilypond.ExpectBook` attribute), 25
`replace` (`ly.lex.lilypond.ExpectBookPart` attribute), 25
`replace` (`ly.lex.lilypond.ExpectChordMode` attribute), 25
`replace` (`ly.lex.lilypond.ExpectContext` attribute), 25
`replace` (`ly.lex.lilypond.ExpectDrumMode` attribute), 25
`replace` (`ly.lex.lilypond.ExpectFigureMode` attribute), 25
`replace` (`ly.lex.lilypond.ExpectHeader` attribute), 26
`replace` (`ly.lex.lilypond.ExpectLayout` attribute), 26
`replace` (`ly.lex.lilypond.ExpectLyricMode` attribute), 26
`replace` (`ly.lex.lilypond.ExpectMidi` attribute), 26
`replace` (`ly.lex.lilypond.ExpectNoteMode` attribute), 26
`replace` (`ly.lex.lilypond.ExpectPaper` attribute), 27
`replace` (`ly.lex.lilypond.ExpectScore` attribute), 27
`replace` (`ly.lex.lilypond.ExpectWith` attribute), 27
`replace()` (in module `ly.data.makeschemedata`), 89
`replace()` (`ly.node.Node` method), 126
`replace()` (`ly.slexer.State` method), 99
`RequestHandler` (class in `ly.server.handler`), 94
`resolve_filename()` (`ly.music.items.Document` method), 52
`Rest` (class in `ly.lex.lilypond`), 39
`Rest` (class in `ly.music.items`), 58
`Rest()` (`ly.musicxml.lymus2musxml.ParseSource` method), 76
`Revert` (class in `ly.lex.lilypond`), 39
`Revert` (class in `ly.music.items`), 58
`revert_voicenr()` (`ly.musicxml.ly2xml_mediator.Mediator` method), 73
`rhythm_dot()` (in module `ly.rhythm`), 129
`rhythm_double()` (in module `ly.rhythm`), 129
`rhythm_explicit()` (in module `ly.rhythm`), 129
`rhythm_extract()` (in module `ly.rhythm`), 129
`rhythm_halve()` (in module `ly.rhythm`), 129
`rhythm_implicit()` (in module `ly.rhythm`), 129
`rhythm_implicit_per_line()` (in module `ly.rhythm`), 129
`rhythm_overwrite()` (in module `ly.rhythm`), 129
`rhythm_remove()` (in module `ly.rhythm`), 129
`rhythm_remove_fraction_scaling()` (in module `ly.rhythm`), 129
`rhythm_remove_scaling()` (in module `ly.rhythm`), 129
`rhythm_undot()` (in module `ly.rhythm`), 129
`RhythmicStaff` (class in `ly.dom`), 120
`rstrip()` (`ly.document.Cursor` method), 101
`run()` (`ly.cli.command.abs2rel` method), 90
`run()` (`ly.cli.command.highlight` method), 90
`run()` (`ly.cli.command.indent` method), 90
`run()` (`ly.cli.command.musicxml` method), 90
`run()` (`ly.cli.command.reformat` method), 91
`run()` (`ly.cli.command.rel2abs` method), 91
`run()` (`ly.cli.command.set_variable` method), 91
`run()` (`ly.cli.command.simplify_accidentals` method), 91
`run()` (`ly.cli.command.translate` method), 91
`run()` (`ly.cli.command.transpose` method), 91
`run()` (`ly.cli.command.write` method), 91
`run()` (`ly.server.command.set_variable` method), 94
`Runner` (class in `ly.document`), 104
`rx` (`ly.lex.html.AttrName` attribute), 17
`rx` (`ly.lex.html.CommentEnd` attribute), 17
`rx` (`ly.lex.html.CommentStart` attribute), 17
`rx` (`ly.lex.html.EntityRef` attribute), 17
`rx` (`ly.lex.html.EqualSign` attribute), 18
`rx` (`ly.lex.html.LilyPondCloseTag` attribute), 18
`rx` (`ly.lex.html.LilyPondFileTag` attribute), 18
`rx` (`ly.lex.html.LilyPondFileTagEnd` attribute), 18
`rx` (`ly.lex.html.LilyPondInlineTag` attribute), 18
`rx` (`ly.lex.html.LilyPondInlineTagEnd` attribute), 18
`rx` (`ly.lex.html.LilyPondTagEnd` attribute), 18
`rx` (`ly.lex.html.LilyPondVersionTag` attribute), 18
`rx` (`ly.lex.html.SemiColon` attribute), 20
`rx` (`ly.lex.html.StringDQEnd` attribute), 20
`rx` (`ly.lex.html.StringDQStart` attribute), 20
`rx` (`ly.lex.html.StringSQEnd` attribute), 20
`rx` (`ly.lex.html.StringSQStart` attribute), 20
`rx` (`ly.lex.html.TagEnd` attribute), 20
`rx` (`ly.lex.html.TagStart` attribute), 20
`rx` (`ly.lex.html.Value` attribute), 20

- rx (ly.lex.lilypond.AccidentalCautionary attribute), 21
- rx (ly.lex.lilypond.AccidentalReminder attribute), 21
- rx (ly.lex.lilypond.AccidentalStyle attribute), 21
- rx (ly.lex.lilypond.AccidentalStyleSpecifier attribute), 21
- rx (ly.lex.lilypond.AlterBroken attribute), 21
- rx (ly.lex.lilypond.BackSlashedContextName attribute), 21
- rx (ly.lex.lilypond.BeamEnd attribute), 21
- rx (ly.lex.lilypond.BeamStart attribute), 21
- rx (ly.lex.lilypond.BlockCommentEnd attribute), 22
- rx (ly.lex.lilypond.BlockCommentStart attribute), 22
- rx (ly.lex.lilypond.Book attribute), 22
- rx (ly.lex.lilypond.BookPart attribute), 22
- rx (ly.lex.lilypond.Change attribute), 22
- rx (ly.lex.lilypond.ChordEnd attribute), 22
- rx (ly.lex.lilypond.ChordMode attribute), 22
- rx (ly.lex.lilypond.ChordModifier attribute), 22
- rx (ly.lex.lilypond.ChordSeparator attribute), 22
- rx (ly.lex.lilypond.ChordStart attribute), 23
- rx (ly.lex.lilypond.ChordStepNumber attribute), 23
- rx (ly.lex.lilypond.Clef attribute), 23
- rx (ly.lex.lilypond.ClefSpecifier attribute), 23
- rx (ly.lex.lilypond.CloseBracket attribute), 23
- rx (ly.lex.lilypond.CloseSimultaneous attribute), 23
- rx (ly.lex.lilypond.Context attribute), 23
- rx (ly.lex.lilypond.ContextName attribute), 23
- rx (ly.lex.lilypond.ContextProperty attribute), 24
- rx (ly.lex.lilypond.DecimalValue attribute), 24
- rx (ly.lex.lilypond.Direction attribute), 24
- rx (ly.lex.lilypond.Dot attribute), 24
- rx (ly.lex.lilypond.DotChord attribute), 24
- rx (ly.lex.lilypond.DotPath attribute), 24
- rx (ly.lex.lilypond.DrumMode attribute), 24
- rx (ly.lex.lilypond.DrumNote attribute), 24
- rx (ly.lex.lilypond.Dynamic attribute), 24
- rx (ly.lex.lilypond.EqualSign attribute), 24
- rx (ly.lex.lilypond.ErrorInChord attribute), 25
- rx (ly.lex.lilypond.FigureAccidental attribute), 27
- rx (ly.lex.lilypond.FigureBracket attribute), 27
- rx (ly.lex.lilypond.FigureEnd attribute), 27
- rx (ly.lex.lilypond.FigureMode attribute), 27
- rx (ly.lex.lilypond.FigureModifier attribute), 27
- rx (ly.lex.lilypond.FigureStart attribute), 27
- rx (ly.lex.lilypond.FigureStep attribute), 28
- rx (ly.lex.lilypond.Fingering attribute), 28
- rx (ly.lex.lilypond.Fraction attribute), 28
- rx (ly.lex.lilypond.GrobName attribute), 28
- rx (ly.lex.lilypond.GrobProperty attribute), 28
- rx (ly.lex.lilypond.Header attribute), 28
- rx (ly.lex.lilypond.Hide attribute), 28
- rx (ly.lex.lilypond.Identifier attribute), 28
- rx (ly.lex.lilypond.IdentifierRef attribute), 28
- rx (ly.lex.lilypond.IntegerValue attribute), 29
- rx (ly.lex.lilypond.KeySignatureMode attribute), 29
- rx (ly.lex.lilypond.Layout attribute), 29
- rx (ly.lex.lilypond.LayoutContext attribute), 29
- rx (ly.lex.lilypond.Length attribute), 29
- rx (ly.lex.lilypond.LigatureEnd attribute), 29
- rx (ly.lex.lilypond.LigatureStart attribute), 29
- rx (ly.lex.lilypond.LineComment attribute), 29
- rx (ly.lex.lilypond.LyricExtender attribute), 30
- rx (ly.lex.lilypond.LyricHyphen attribute), 30
- rx (ly.lex.lilypond.LyricMode attribute), 30
- rx (ly.lex.lilypond.LyricSkip attribute), 30
- rx (ly.lex.lilypond.LyricText attribute), 30
- rx (ly.lex.lilypond.MarkupLines attribute), 30
- rx (ly.lex.lilypond.MarkupList attribute), 30
- rx (ly.lex.lilypond.MarkupScore attribute), 30
- rx (ly.lex.lilypond.MarkupStart attribute), 31
- rx (ly.lex.lilypond.MarkupWord attribute), 31
- rx (ly.lex.lilypond.Midi attribute), 31
- rx (ly.lex.lilypond.New attribute), 31
- rx (ly.lex.lilypond.Note attribute), 31
- rx (ly.lex.lilypond.NoteMode attribute), 31
- rx (ly.lex.lilypond.Octave attribute), 31
- rx (ly.lex.lilypond.OctaveCheck attribute), 31
- rx (ly.lex.lilypond.Omit attribute), 31
- rx (ly.lex.lilypond.OpenBracket attribute), 32
- rx (ly.lex.lilypond.OpenSimultaneous attribute), 32
- rx (ly.lex.lilypond.Override attribute), 32
- rx (ly.lex.lilypond.Paper attribute), 32
- rx (ly.lex.lilypond.Partial attribute), 38
- rx (ly.lex.lilypond.PhrasingSlurEnd attribute), 38
- rx (ly.lex.lilypond.PhrasingSlurStart attribute), 39
- rx (ly.lex.lilypond.PipeSymbol attribute), 39
- rx (ly.lex.lilypond.PitchCommand attribute), 39
- rx (ly.lex.lilypond.Q attribute), 39
- rx (ly.lex.lilypond.Repeat attribute), 39
- rx (ly.lex.lilypond.RepeatSpecifier attribute), 39
- rx (ly.lex.lilypond.Rest attribute), 39
- rx (ly.lex.lilypond.Revert attribute), 39
- rx (ly.lex.lilypond.Scaling attribute), 39
- rx (ly.lex.lilypond.SchemeStart attribute), 39
- rx (ly.lex.lilypond.Score attribute), 39
- rx (ly.lex.lilypond.ScriptAbbreviation attribute), 40
- rx (ly.lex.lilypond.Set attribute), 40
- rx (ly.lex.lilypond.SimultaneousOrSequentialCommand attribute), 40
- rx (ly.lex.lilypond.Skip attribute), 40
- rx (ly.lex.lilypond.SlurEnd attribute), 40
- rx (ly.lex.lilypond.SlurStart attribute), 40
- rx (ly.lex.lilypond.Spacer attribute), 40
- rx (ly.lex.lilypond.StringNumber attribute), 41
- rx (ly.lex.lilypond.StringQuotedEnd attribute), 41
- rx (ly.lex.lilypond.StringQuotedStart attribute), 41
- rx (ly.lex.lilypond.StringQuoteEscape attribute), 41
- rx (ly.lex.lilypond.Tempo attribute), 41
- rx (ly.lex.lilypond.TempoSeparator attribute), 41

`rx (ly.lex.lilypond.Tie attribute)`, 41
`rx (ly.lex.lilypond.TremoloColon attribute)`, 41
`rx (ly.lex.lilypond.TremoloDuration attribute)`, 41
`rx (ly.lex.lilypond.Tweak attribute)`, 41
`rx (ly.lex.lilypond.Unit attribute)`, 42
`rx (ly.lex.lilypond.Unset attribute)`, 42
`rx (ly.lex.lilypond.VoiceSeparator attribute)`, 42
`rx (ly.lex.lilypond.With attribute)`, 42
`rx (ly.lex.Newline attribute)`, 15
`rx (ly.lex.scheme.BlockCommentEnd attribute)`, 42
`rx (ly.lex.scheme.BlockCommentStart attribute)`, 42
`rx (ly.lex.scheme.Bool attribute)`, 42
`rx (ly.lex.scheme.Char attribute)`, 43
`rx (ly.lex.scheme.CloseParen attribute)`, 43
`rx (ly.lex.scheme.Dot attribute)`, 43
`rx (ly.lex.scheme.Float attribute)`, 43
`rx (ly.lex.scheme.Fraction attribute)`, 43
`rx (ly.lex.scheme.LilyPondEnd attribute)`, 43
`rx (ly.lex.scheme.LilyPondStart attribute)`, 43
`rx (ly.lex.scheme.LineComment attribute)`, 44
`rx (ly.lex.scheme.Number attribute)`, 44
`rx (ly.lex.scheme.OpenParen attribute)`, 44
`rx (ly.lex.scheme.Quote attribute)`, 44
`rx (ly.lex.scheme.StringQuotedEnd attribute)`, 45
`rx (ly.lex.scheme.StringQuotedStart attribute)`, 45
`rx (ly.lex.scheme.StringQuoteEscape attribute)`, 45
`rx (ly.lex.scheme.VectorStart attribute)`, 45
`rx (ly.lex.scheme.Word attribute)`, 45
`rx (ly.lex.Space attribute)`, 15
`rx (ly.lex.texinfo.Accent attribute)`, 45
`rx (ly.lex.texinfo.BlockCommentEnd attribute)`, 45
`rx (ly.lex.texinfo.BlockCommentStart attribute)`, 45
`rx (ly.lex.texinfo.BlockEnd attribute)`, 45
`rx (ly.lex.texinfo.BlockStart attribute)`, 46
`rx (ly.lex.texinfo.EscapeChar attribute)`, 46
`rx (ly.lex.texinfo.Keyword attribute)`, 46
`rx (ly.lex.texinfo.LilyPondAttrEnd attribute)`, 46
`rx (ly.lex.texinfo.LilyPondAttrStart attribute)`, 46
`rx (ly.lex.texinfo.LilyPondBlockEnd attribute)`, 46
`rx (ly.lex.texinfo.LilyPondBlockStart attribute)`, 46
`rx (ly.lex.texinfo.LilyPondBlockStartBrace attribute)`, 46
`rx (ly.lex.texinfo.LilyPondEnvEnd attribute)`, 46
`rx (ly.lex.texinfo.LilyPondEnvStart attribute)`, 46
`rx (ly.lex.texinfo.LilyPondFileStart attribute)`, 46
`rx (ly.lex.texinfo.LilyPondFileStartBrace attribute)`, 47
`rx (ly.lex.texinfo.LineComment attribute)`, 47
`rx (ly.lex.texinfo.VerbatimEnd attribute)`, 48
`rx (ly.lex.texinfo.VerbatimStart attribute)`, 48
`rx (ly.slexer.Token attribute)`, 97

S

`scale (ly.pitch.transpose.Transposer attribute)`, 85
`scale_rest() (ly.musicxml.ly2xml_mediator.Mediator method)`, 73

`Scaler (class in ly.music.items)`, 58
`Scaler() (ly.musicxml.lymus2musxml.ParseSource method)`, 76
`Scaling (class in ly.lex.lilypond)`, 39
`scaling (ly.music.items.Scaler attribute)`, 59
`Scheme (class in ly.dom)`, 120
`Scheme (class in ly.lex.scheme)`, 44
`Scheme (class in ly.music.items)`, 59
`Scheme() (ly.musicxml.lymus2musxml.ParseSource method)`, 76
`scheme_constants() (in module ly.data)`, 89
`scheme_functions() (in module ly.data)`, 89
`scheme_keywords() (in module ly.data)`, 89
`scheme_load_args() (ly.docinfo.DocInfo method)`, 107
`scheme_variables() (in module ly.data)`, 89
`SchemeItem (class in ly.music.items)`, 59
`SchemeItem() (ly.musicxml.lymus2musxml.ParseSource method)`, 76
`SchemeLily (class in ly.dom)`, 120
`SchemeLily (class in ly.music.items)`, 59
`SchemeList (class in ly.dom)`, 120
`SchemeList (class in ly.music.items)`, 59
`SchemeQuote (class in ly.music.items)`, 59
`SchemeQuote() (ly.musicxml.lymus2musxml.ParseSource method)`, 76
`SchemeStart (class in ly.lex.lilypond)`, 39
`Score (class in ly.dom)`, 121
`Score (class in ly.lex.lilypond)`, 39
`Score (class in ly.music.items)`, 59
`Score (class in ly.musicxml.xml_objs)`, 81
`ScoreContext (class in ly.dom)`, 121
`ScorePart (class in ly.musicxml.xml_objs)`, 81
`ScorePartGroup (class in ly.musicxml.xml_objs)`, 81
`ScoreSection (class in ly.musicxml.xml_objs)`, 81
`ScriptAbbreviation (class in ly.lex.lilypond)`, 40
`secondary_quote_left (ly.dom.Printer attribute)`, 120
`secondary_quote_right (ly.dom.Printer attribute)`, 120
`Section (class in ly.dom)`, 121
`sections (ly.musicxml.ly2xml_mediator.Mediator attribute)`, 73
`select_all() (ly.document.Cursor method)`, 101
`select_block() (in module ly.cursortools)`, 112
`select_end_of_block() (ly.document.Cursor method)`, 101
`select_start_of_block() (ly.document.Cursor method)`, 101
`SemiColon (class in ly.lex.html)`, 19
`Seq (class in ly.dom)`, 121
`Seqr (class in ly.dom)`, 121
`SequentialEnd (class in ly.lex.lilypond)`, 40
`SequentialStart (class in ly.lex.lilypond)`, 40
`ServerOptions (class in ly.server.options)`, 95
`Set (class in ly.lex.lilypond)`, 40
`Set (class in ly.music.items)`, 59

- Set() (ly.musicxml.lymus2musxml.ParseSource method), 76
- set_barline() (ly.musicxml.xml_objs.BarAttr method), 79
- set_bracket() (ly.musicxml.xml_objs.ScorePartGroup method), 81
- set_by_property() (ly.musicxml.ly2xml_mediator.Mediator method), 73
- set_clef() (ly.musicxml.xml_objs.BarAttr method), 79
- set_duration() (ly.musicxml.xml_objs.BarNote method), 80
- set_duration() (ly.musicxml.xml_objs.BarRest method), 80
- set_durtype() (ly.musicxml.xml_objs.BarNote method), 80
- set_durtype() (ly.musicxml.xml_objs.BarRest method), 80
- set_dynamics_dashes() (ly.musicxml.xml_objs.BarMus method), 79
- set_dynamics_mark() (ly.musicxml.xml_objs.BarMus method), 79
- set_dynamics_text() (ly.musicxml.xml_objs.BarMus method), 79
- set_dynamics_wedge() (ly.musicxml.xml_objs.BarMus method), 79
- set_first_bar() (ly.musicxml.xml_objs.ScorePart method), 81
- set_gliss() (ly.musicxml.xml_objs.BarNote method), 80
- set_grace() (ly.musicxml.xml_objs.BarNote method), 80
- set_groupabbr() (ly.musicxml.ly2xml_mediator.Mediator method), 73
- set_groupname() (ly.musicxml.ly2xml_mediator.Mediator method), 74
- set_key() (ly.musicxml.xml_objs.BarAttr method), 79
- set_language() (ly.music.read.Reader method), 66
- set_midi_tempo() (ly.musicxml.xml_objs.TempoDir method), 82
- set_oct_shift() (ly.musicxml.xml_objs.BarMus method), 79
- set_octave() (ly.musicxml.ly2xml_mediator.Mediator method), 74
- set_octave() (ly.musicxml.xml_objs.BarNote method), 80
- set_ottava() (ly.musicxml.ly2xml_mediator.Mediator method), 74
- set_partabbr() (ly.musicxml.ly2xml_mediator.Mediator method), 74
- set_partmidi() (ly.musicxml.ly2xml_mediator.Mediator method), 74
- set_partname() (ly.musicxml.ly2xml_mediator.Mediator method), 74
- set_position() (ly.document.Runner method), 105
- set_relative() (ly.musicxml.ly2xml_mediator.Mediator method), 74
- set_slur() (ly.musicxml.ly2xml_mediator.Mediator method), 74
- set_slur() (ly.musicxml.xml_objs.BarNote method), 80
- set_staff() (ly.musicxml.xml_objs.BarMus method), 79
- set_staffnr() (ly.musicxml.ly2xml_mediator.Mediator method), 74
- set_tempo() (ly.musicxml.xml_objs.BarAttr method), 79
- set_tie() (ly.musicxml.xml_objs.BarNote method), 80
- set_time() (ly.musicxml.xml_objs.BarAttr method), 79
- set_tremolo() (ly.musicxml.ly2xml_mediator.Mediator method), 74
- set_tremolo() (ly.musicxml.xml_objs.BarNote method), 80
- set_tuplet() (ly.musicxml.xml_objs.BarMus method), 79
- set_tuplspan_dur() (ly.musicxml.ly2xml_mediator.Mediator method), 74
- set_variable (class in ly.cli.command), 91
- set_variable (class in ly.server.command), 93
- set_variable() (ly.cli.main.Options method), 91
- set_variable() (ly.server.options.Options method), 95
- set_voicnr() (ly.musicxml.ly2xml_mediator.Mediator method), 74
- set_wrapper_attribute() (ly.colorize.HtmlWriter method), 108
- set_wrapper_tag() (ly.colorize.HtmlWriter method), 108
- setLanguage() (ly.pitch.PitchIterator method), 83
- setmode() (ly.document.Document method), 102
- setplaintext() (ly.document.Document method), 102
- setplaintext() (ly.document.DocumentBase method), 103
- setValue() (ly.dom.Assignment method), 113
- Sim (class in ly.dom), 121
- simple_node_gen() (ly.musicxml.lymus2musxml.ParseSource method), 78
- Simplifier (class in ly.pitch.transpose), 85
- simplify_accidentals (class in ly.cli.command), 91
- Simr (class in ly.dom), 121
- simultaneous (ly.music.items.MusicList attribute), 56
- SimultaneousEnd (class in ly.lex.lilypond), 40
- SimultaneousOrSequentialCommand (class in ly.lex.lilypond), 40
- SimultaneousStart (class in ly.lex.lilypond), 40
- size() (ly.document.DocumentBase method), 103
- Skip (class in ly.lex.lilypond), 40
- Skip (class in ly.music.items), 60
- skip() (in module ly.music.read), 67
- Skip() (ly.musicxml.lymus2musxml.ParseSource method), 76
- Slur (class in ly.lex.lilypond), 40
- Slur (class in ly.music.items), 60
- Slur (class in ly.musicxml.xml_objs), 82
- Slur() (ly.musicxml.lymus2musxml.ParseSource method), 76
- SlurEnd (class in ly.lex.lilypond), 40
- SlurStart (class in ly.lex.lilypond), 40
- Snippet (class in ly.musicxml.xml_objs), 82
- sort() (ly.node.Node method), 126

Source (class in ly.document), 105
Space (class in ly.lex), 15
Spacer (class in ly.lex.lilypond), 40
Specifier (class in ly.lex.lilypond), 40
specifier() (ly.music.items.Clef method), 51
specifier() (ly.music.items.Repeat method), 58
Staff (class in ly.dom), 121
StaffGroup (class in ly.dom), 121
start_block() (ly.document.Cursor method), 101
State (class in ly.lex), 15
State (class in ly.slexer), 98
state() (in module ly.lex), 15
state() (ly.document.DocumentBase method), 103
state_end() (ly.document.Document method), 102
state_end() (ly.document.DocumentBase method), 103
Statement (class in ly.dom), 122
StatementEnclosed (class in ly.dom), 122
String (class in ly.lex), 16
String (class in ly.lex.html), 20
String (class in ly.lex.lilypond), 40
String (class in ly.lex.scheme), 44
String (class in ly.music.items), 60
String() (ly.musicxml.lymus2musxml.ParseSource method), 76
StringDQEnd (class in ly.lex.html), 20
StringDQStart (class in ly.lex.html), 20
StringEnd (class in ly.lex), 16
StringNumber (class in ly.lex.lilypond), 41
StringQuotedEnd (class in ly.lex.lilypond), 41
StringQuotedEnd (class in ly.lex.scheme), 45
StringQuotedStart (class in ly.lex.lilypond), 41
StringQuotedStart (class in ly.lex.scheme), 45
StringQuoteEscape (class in ly.lex.lilypond), 41
StringQuoteEscape (class in ly.lex.scheme), 44
StringSQEnd (class in ly.lex.html), 20
StringSQStart (class in ly.lex.html), 20
StringStart (class in ly.lex), 16
StringTuning (class in ly.music.items), 60
strip() (ly.document.Cursor method), 101
style (class in ly.colorize), 111
stylesheet_ref (ly.colorize.HtmlWriter attribute), 108
substitute_for_node() (ly.music.items.Document method), 52

T

TabStaff (class in ly.dom), 122
TabVoice (class in ly.dom), 122
Tag (class in ly.lex.html), 20
Tag (class in ly.music.items), 60
TagEnd (class in ly.lex.html), 20
TagStart (class in ly.lex.html), 20
Tempo (class in ly.dom), 122
Tempo (class in ly.lex.lilypond), 41
Tempo (class in ly.music.items), 60

tempo() (ly.music.items.Tempo method), 60
Tempo() (ly.musicxml.lymus2musxml.ParseSource method), 76
TempoDir (class in ly.musicxml.xml_objs), 82
TempoSeparator (class in ly.lex.lilypond), 41
test_match() (ly.lex.lilypond.ArticulationCommand class method), 21
test_match() (ly.lex.lilypond.Command class method), 23
test_match() (ly.lex.lilypond.HeaderVariable class method), 28
test_match() (ly.lex.lilypond.Keyword class method), 29
test_match() (ly.lex.lilypond.LayoutVariable class method), 29
test_match() (ly.lex.lilypond.MarkupCommand class method), 30
test_match() (ly.lex.lilypond.PaperVariable class method), 32
test_match() (ly.lex.scheme.Constant class method), 43
test_match() (ly.lex.scheme.Function class method), 43
test_match() (ly.lex.scheme.Keyword class method), 43
test_match() (ly.lex.scheme.Variable class method), 45
test_match() (ly.slexer.Token class method), 97
test_music_list() (ly.music.read.Reader method), 66
Text (class in ly.dom), 122
text() (ly.document.Cursor method), 101
text() (ly.document.Document method), 102
text() (ly.document.DocumentBase method), 103
text() (ly.music.items.Tempo method), 60
text_after() (ly.document.Cursor method), 101
text_before() (ly.document.Cursor method), 101
TextDur (class in ly.dom), 122
thaw() (ly.slexer.Fridge method), 100
thaw() (ly.slexer.Parser class method), 98
thaw() (ly.slexer.State class method), 99
Tie (class in ly.lex.lilypond), 41
Tie (class in ly.music.items), 61
Tie() (ly.musicxml.lymus2musxml.ParseSource method), 77
tie_note() (ly.musicxml.create_musicxml.CreateMusicXML method), 71
tie_to_next() (ly.musicxml.ly2xml_mediator.Mediator method), 74
time_length() (ly.music.items.Document method), 52
time_position() (ly.music.items.Document method), 52
TimeSignature (class in ly.dom), 122
TimeSignature (class in ly.music.items), 61
TimeSignature() (ly.musicxml.lymus2musxml.ParseSource method), 77
title (ly.colorize.HtmlWriter attribute), 108
Token (class in ly.lex), 15
Token (class in ly.music.items), 61
Token (class in ly.slexer), 97
token (ly.music.items.Item attribute), 54
token() (ly.document.Runner method), 105

- token() (ly.document.Source method), 105
 - token() (ly.slexer.Parser method), 98
 - token_hash() (ly.docinfo.DocInfo method), 107
 - tokens (ly.music.items.Item attribute), 54
 - tokens (ly.rhythm.music_item attribute), 128
 - tokens() (ly.document.Document method), 102
 - tokens() (ly.document.DocumentBase method), 104
 - tokens() (ly.pitch.PitchIterator method), 83
 - tokens() (ly.slexer.State method), 99
 - tokens_with_position() (ly.document.DocumentBase method), 104
 - toplevel() (ly.node.Node method), 127
 - tostring() (in module ly.duration), 123
 - tostring() (ly.musicxml.create_musicxml.MusicXML method), 71
 - translate (class in ly.cli.command), 91
 - translate (class in ly.server.command), 94
 - translate() (in module ly.pitch.translate), 84
 - Translator (class in ly.lex.lilypond), 41
 - Translator (class in ly.music.items), 61
 - transpose (class in ly.cli.command), 91
 - Transpose (class in ly.music.items), 61
 - transpose (class in ly.server.command), 94
 - transpose() (in module ly.pitch.transpose), 85
 - transpose() (ly.pitch.transpose.ModalTransposer method), 85
 - transpose() (ly.pitch.transpose.ModeShifter method), 85
 - transpose() (ly.pitch.transpose.Simplifier method), 85
 - transpose() (ly.pitch.transpose.Transposer method), 85
 - Transposer (class in ly.pitch.transpose), 85
 - Transposition (class in ly.dom), 122
 - traverse() (ly.music.event.Events method), 50
 - Tremolo (class in ly.lex.lilypond), 41
 - Tremolo (class in ly.music.items), 61
 - Tremolo() (ly.musicxml.lymus2musxml.ParseSource method), 77
 - TremoloColon (class in ly.lex.lilypond), 41
 - TremoloDuration (class in ly.lex.lilypond), 41
 - Tuplet (class in ly.musicxml.xml_objs), 82
 - tuplet_note() (ly.musicxml.create_musicxml.CreateMusicXML method), 71
 - Tweak (class in ly.lex.lilypond), 41
 - Tweak (class in ly.music.items), 61
- ## U
- unfold_repeat() (ly.musicxml.lymus2musxml.ParseSource method), 78
 - unfold_repeats (ly.music.event.Events attribute), 50
 - Unit (class in ly.lex.lilypond), 42
 - unlink() (ly.node.Node method), 127
 - Unparsed (class in ly.lex), 15
 - Unpitched (class in ly.music.items), 61
 - Unpitched (class in ly.musicxml.xml_objs), 82
 - Unpitched() (ly.musicxml.lymus2musxml.ParseSource method), 77
 - Unset (class in ly.lex.lilypond), 42
 - Unset (class in ly.music.items), 61
 - unset_tuplspan_dur() (ly.musicxml.ly2xml_mediator.Mediator method), 74
 - until_parser_end() (ly.document.Source method), 105
 - update_cursors() (ly.document.DocumentBase method), 104
 - update_state() (ly.lex.html.CommentStart method), 17
 - update_state() (ly.lex.html.EqualSign method), 18
 - update_state() (ly.lex.html.LilyPondFileTag method), 18
 - update_state() (ly.lex.html.LilyPondInlineTag method), 18
 - update_state() (ly.lex.html.LilyPondTagEnd method), 18
 - update_state() (ly.lex.html.SemiColon method), 20
 - update_state() (ly.lex.html.StringDQStart method), 20
 - update_state() (ly.lex.html.StringSQStart method), 20
 - update_state() (ly.lex.html.TagStart method), 20
 - update_state() (ly.lex.lilypond.AccidentalStyle method), 21
 - update_state() (ly.lex.lilypond.AlterBroken method), 21
 - update_state() (ly.lex.lilypond.BlockCommentStart method), 22
 - update_state() (ly.lex.lilypond.Book method), 22
 - update_state() (ly.lex.lilypond.BookPart method), 22
 - update_state() (ly.lex.lilypond.ChordMode method), 22
 - update_state() (ly.lex.lilypond.ChordStart method), 23
 - update_state() (ly.lex.lilypond.Clef method), 23
 - update_state() (ly.lex.lilypond.ClefSpecifier method), 23
 - update_state() (ly.lex.lilypond.CloseBracket method), 23
 - update_state() (ly.lex.lilypond.CloseBracketMarkup method), 23
 - update_state() (ly.lex.lilypond.CloseSimultaneous method), 23
 - update_state() (ly.lex.lilypond.Direction method), 24
 - update_state() (ly.lex.lilypond.DrumChordStart method), 24
 - update_state() (ly.lex.lilypond.DrumMode method), 24
 - update_state() (ly.lex.lilypond.ExpectGrobProperty method), 25
 - update_state() (ly.lex.lilypond.ExpectMusicList method), 26
 - update_state() (ly.lex.lilypond.ExpectOpenBracket method), 26
 - update_state() (ly.lex.lilypond.ExpectTranslatorId method), 27
 - update_state() (ly.lex.lilypond.FigureMode method), 27
 - update_state() (ly.lex.lilypond.FigureStart method), 28
 - update_state() (ly.lex.lilypond.Header method), 28
 - update_state() (ly.lex.lilypond.Hide method), 28
 - update_state() (ly.lex.lilypond.Layout method), 29
 - update_state() (ly.lex.lilypond.LayoutContext method), 29

- `update_state()` (ly.lex.lilypond.Length method), 29
 - `update_state()` (ly.lex.lilypond.LyricMode method), 30
 - `update_state()` (ly.lex.lilypond.MarkupCommand method), 30
 - `update_state()` (ly.lex.lilypond.MarkupLines method), 30
 - `update_state()` (ly.lex.lilypond.MarkupList method), 30
 - `update_state()` (ly.lex.lilypond.MarkupScore method), 30
 - `update_state()` (ly.lex.lilypond.MarkupStart method), 31
 - `update_state()` (ly.lex.lilypond.MarkupUserCommand method), 31
 - `update_state()` (ly.lex.lilypond.Midi method), 31
 - `update_state()` (ly.lex.lilypond.NoteMode method), 31
 - `update_state()` (ly.lex.lilypond.Omit method), 31
 - `update_state()` (ly.lex.lilypond.OpenBracketMarkup method), 32
 - `update_state()` (ly.lex.lilypond.Override method), 32
 - `update_state()` (ly.lex.lilypond.Paper method), 32
 - `update_state()` (ly.lex.lilypond.ParseAccidentalStyle method), 32
 - `update_state()` (ly.lex.lilypond.ParseAlterBroken method), 32
 - `update_state()` (ly.lex.lilypond.ParseChordMode method), 33
 - `update_state()` (ly.lex.lilypond.ParseGlobal method), 35
 - `update_state()` (ly.lex.lilypond.ParseGrobPropertyPath method), 35
 - `update_state()` (ly.lex.lilypond.ParseHideOmit method), 35
 - `update_state()` (ly.lex.lilypond.ParseInputMode class method), 35
 - `update_state()` (ly.lex.lilypond.ParseOverride method), 36
 - `update_state()` (ly.lex.lilypond.ParsePitchCommand method), 36
 - `update_state()` (ly.lex.lilypond.ParseRevert method), 37
 - `update_state()` (ly.lex.lilypond.ParseSet method), 37
 - `update_state()` (ly.lex.lilypond.ParseTempo method), 37
 - `update_state()` (ly.lex.lilypond.ParseTranslator method), 38
 - `update_state()` (ly.lex.lilypond.ParseTranslatorId method), 38
 - `update_state()` (ly.lex.lilypond.ParseTweak method), 38
 - `update_state()` (ly.lex.lilypond.ParseTweakGrobProperty method), 38
 - `update_state()` (ly.lex.lilypond.ParseUnset method), 38
 - `update_state()` (ly.lex.lilypond.PitchCommand method), 39
 - `update_state()` (ly.lex.lilypond.Repeat method), 39
 - `update_state()` (ly.lex.lilypond.Revert method), 39
 - `update_state()` (ly.lex.lilypond.SchemeStart method), 39
 - `update_state()` (ly.lex.lilypond.Score method), 40
 - `update_state()` (ly.lex.lilypond.SequentialStart method), 40
 - `update_state()` (ly.lex.lilypond.Set method), 40
 - `update_state()` (ly.lex.lilypond.SimultaneousStart method), 40
 - `update_state()` (ly.lex.lilypond.StringQuotedEnd method), 41
 - `update_state()` (ly.lex.lilypond.StringQuotedStart method), 41
 - `update_state()` (ly.lex.lilypond.Tempo method), 41
 - `update_state()` (ly.lex.lilypond.Translator method), 41
 - `update_state()` (ly.lex.lilypond.TremoloColon method), 41
 - `update_state()` (ly.lex.lilypond.Tweak method), 42
 - `update_state()` (ly.lex.lilypond.Unset method), 42
 - `update_state()` (ly.lex.lilypond.With method), 42
 - `update_state()` (ly.lex.scheme.BlockCommentStart method), 42
 - `update_state()` (ly.lex.scheme.CloseParen method), 43
 - `update_state()` (ly.lex.scheme.LilyPondStart method), 43
 - `update_state()` (ly.lex.scheme.OpenParen method), 44
 - `update_state()` (ly.lex.scheme.StringQuotedEnd method), 45
 - `update_state()` (ly.lex.scheme.StringQuotedStart method), 45
 - `update_state()` (ly.lex.texinfo.BlockCommentStart method), 45
 - `update_state()` (ly.lex.texinfo.BlockStart method), 46
 - `update_state()` (ly.lex.texinfo.LilyPondAttrStart method), 46
 - `update_state()` (ly.lex.texinfo.LilyPondBlockStart method), 46
 - `update_state()` (ly.lex.texinfo.LilyPondBlockStartBrace method), 46
 - `update_state()` (ly.lex.texinfo.LilyPondEnvStart method), 46
 - `update_state()` (ly.lex.texinfo.LilyPondFileStart method), 47
 - `update_state()` (ly.lex.texinfo.LilyPondFileStartBrace method), 47
 - `update_state()` (ly.lex.texinfo.VerbatimStart method), 48
 - `update_state()` (ly.slexer.Parser method), 98
 - `update_state()` (ly.slexer.Token method), 97
 - `url` (in module ly.pkginfo), 127
 - `usage()` (in module ly.cli.main), 92
 - `usage()` (in module ly.server.main), 95
 - `usage_short()` (in module ly.cli.main), 92
 - `usage_short()` (in module ly.server.main), 95
 - `UserCommand` (class in ly.lex.lilypond), 42
 - `UserCommand` (class in ly.music.items), 62
 - `UserCommand()` (ly.musicxml.lymus2musxml.ParseSource method), 77
 - `UserContext` (class in ly.dom), 122
 - `UserVariable` (class in ly.lex.lilypond), 42
- ## V
- `Value` (class in ly.lex.html), 20
 - `Value` (class in ly.lex.lilypond), 42

[value\(\) \(ly.dom.Assignment method\), 113](#)
[value\(\) \(ly.music.items.Assignment method\), 51](#)
[value\(\) \(ly.music.items.MarkupUserCommand method\), 56](#)
[value\(\) \(ly.music.items.Number method\), 57](#)
[value\(\) \(ly.music.items.Set method\), 60](#)
[value\(\) \(ly.music.items.String method\), 60](#)
[value\(\) \(ly.music.items.UserCommand method\), 62](#)
[Variable \(class in ly.lex.lilypond\), 42](#)
[Variable \(class in ly.lex.scheme\), 45](#)
[VaticanaStaff \(class in ly.dom\), 122](#)
[VaticanaVoice \(class in ly.dom\), 123](#)
[VectorStart \(class in ly.lex.scheme\), 45](#)
[Verbatim \(class in ly.lex.texinfo\), 48](#)
[VerbatimEnd \(class in ly.lex.texinfo\), 48](#)
[VerbatimStart \(class in ly.lex.texinfo\), 48](#)
[version \(class in ly.cli.command\), 91](#)
[Version \(class in ly.dom\), 123](#)
[Version \(class in ly.music.items\), 62](#)
[version \(class in ly.server.command\), 94](#)
[version \(in module ly.pkginfo\), 127](#)
[version\(\) \(in module ly.cli.main\), 92](#)
[version\(\) \(in module ly.server.main\), 95](#)
[version\(\) \(ly.docinfo.DocInfo method\), 107](#)
[version\(\) \(ly.music.items.Version method\), 62](#)
[version_string\(\) \(ly.docinfo.DocInfo method\), 107](#)
[version_string\(\) \(ly.music.items.Version method\), 62](#)
[Voice \(class in ly.dom\), 123](#)
[VoiceSeparator \(class in ly.dom\), 123](#)
[VoiceSeparator \(class in ly.lex.lilypond\), 42](#)
[VoiceSeparator \(class in ly.music.items\), 62](#)
[VoiceSeparator\(\) \(ly.musicxml.lymus2musxml.ParseSource method\), 77](#)

W

[WeakNode \(class in ly.node\), 127](#)
[With \(class in ly.dom\), 123](#)
[With \(class in ly.lex.lilypond\), 42](#)
[With \(class in ly.music.items\), 62](#)
[With\(\) \(ly.musicxml.lymus2musxml.ParseSource method\), 77](#)
[Word \(class in ly.lex.scheme\), 45](#)
[wrapper_attribute \(ly.colorize.HtmlWriter attribute\), 108](#)
[wrapper_tag \(ly.colorize.HtmlWriter attribute\), 108](#)
[write \(class in ly.cli.command\), 91](#)
[write\(\) \(ly.musicxml.create_musicxml.MusicXML method\), 71](#)
[write\(\) \(ly.pitch.PitchIterator method\), 83](#)
[writeList\(\) \(in module ly.data.makeschemedata\), 90](#)
[writer\(\) \(in module ly.musicxml\), 67](#)