Freetype Python Documentation

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Contents

Freetype python provides bindings for the FreeType library. Only the high-level API is bound.

Freetype-py lives at https://github.com/rougier/freetype-py/, see the installation instructions there.

CHAPTER 1

Usage example

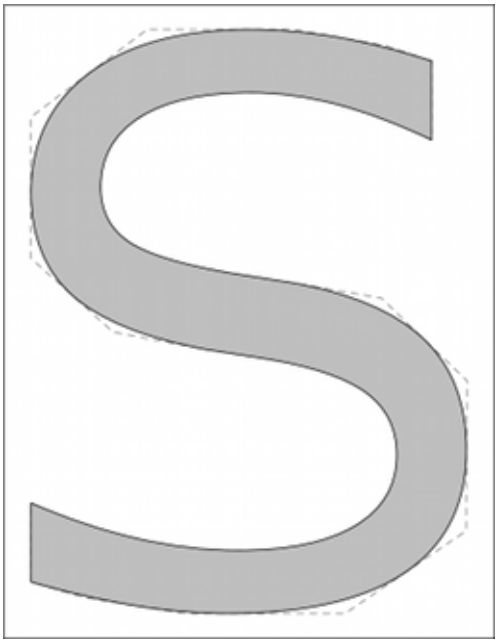
```
import freetype
face = freetype.Face("Vera.ttf")
face.set_char_size( 48*64 )
face.load_char('S')
bitmap = face.glyph.bitmap
print bitmap.buffer
```

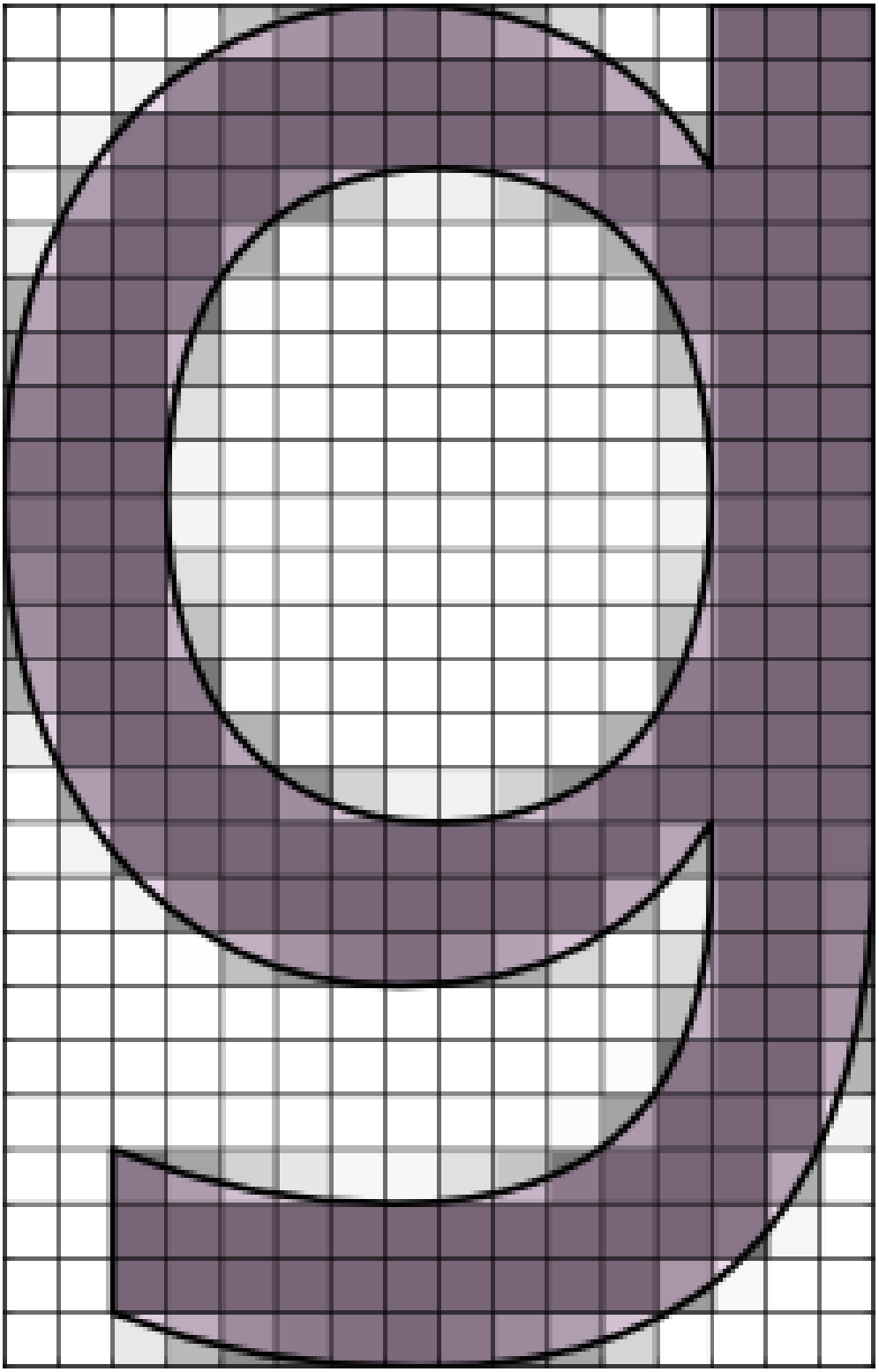
CHAPTER 2

Screenshots

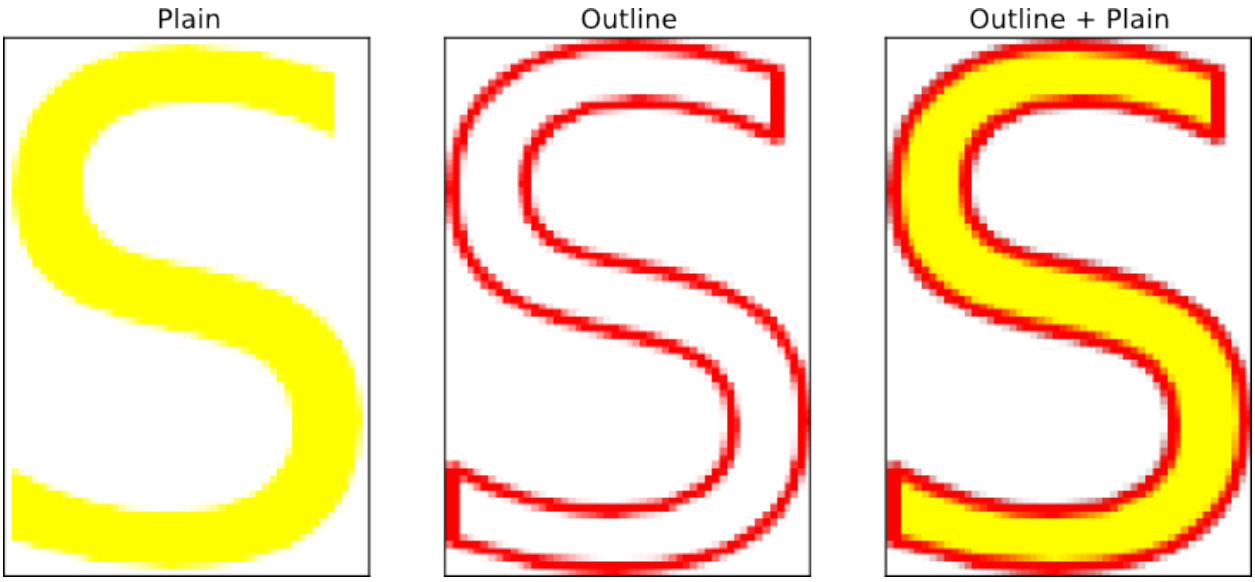
Screenshot below comes from the wordle.py example. No clever tricks here, just brute force.

Screenshots below comes from the glyph-vector.py and glyph-vectopr-2.py examples showing how to access a glyph outline information and use it to draw the glyph. Rendering (with Bézier curves) is done using matplotlib.

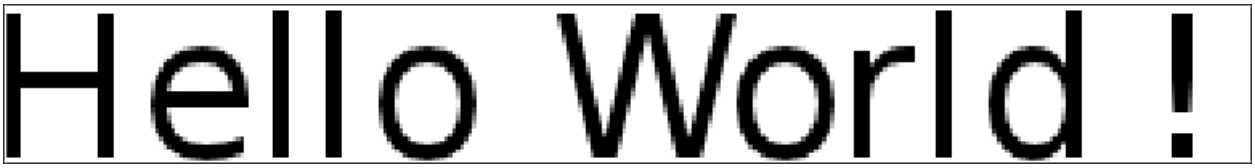




Screenshot below comes from the glyph-color.py showing how to draw and combine a glyph outline with the regular glyph.



The screenshot below comes from the hello-world.py example showing how to draw text in a bitmap (that has been zoomed in to show antialiasing).



The screenshot below comes from the agg-trick.py example showing an implementation of ideas from the Texts Rasterization Exposures by Maxim Shemarev.

CHAPTER 3

API

3.1 Face

class freetype.**Face**(*path_or_stream*, *index=0*)

FT_Face wrapper

FreeType root face class structure. A face object models a typeface in a font file.

ascender

The typographic ascender of the face, expressed in font units. For font formats not having this information, it is set to 'bbox.yMax'. Only relevant for scalable formats.

attach_file(*filename*)

Attach data to a face object. Normally, this is used to read additional information for the face object. For example, you can attach an AFM file that comes with a Type 1 font to get the kerning values and other metrics.

Parameters **filename** – Filename to attach

Note

The meaning of the 'attach' (i.e., what really happens when the new file is read) is not fixed by FreeType itself. It really depends on the font format (and thus the font driver).

Client applications are expected to know what they are doing when invoking this function. Most drivers simply do not implement file attachments.

available_sizes

A list of FT_Bitmap_Size for all bitmap strikes in the face. It is set to NULL if there is no bitmap strike.

bbox

The font bounding box. Coordinates are expressed in font units (see 'units_per_EM'). The box is large enough to contain any glyph from the font. Thus, 'bbox.yMax' can be seen as the 'maximal ascender', and 'bbox.yMin' as the 'minimal descender'. Only relevant for scalable formats.

Note that the bounding box might be off by (at least) one pixel for hinted fonts. See FT_Size_Metrics for further discussion.

charmap
The current active charmap for this face.

charmaps
A list of the charmaps of the face.

descender
The typographic descender of the face, expressed in font units. For font formats not having this information, it is set to 'bbox.yMin'. Note that this field is usually negative. Only relevant for scalable formats.

face_flags
A set of bit flags that give important information about the face; see FT_FACE_FLAG_XXX for the details.

face_index
The index of the face in the font file. It is set to 0 if there is only one face in the font file.

family_name
The face's family name. This is an ASCII string, usually in English, which describes the typeface's family (like 'Times New Roman', 'Bodoni', 'Garamond', etc). This is a least common denominator used to list fonts. Some formats (TrueType & OpenType) provide localized and Unicode versions of this string. Applications should use the format specific interface to access them. Can be NULL (e.g., in fonts embedded in a PDF file).

get_advance(*gindex*, *flags*)
Retrieve the advance value of a given glyph outline in an FT_Face. By default, the unhinted advance is returned in font units.

Parameters

- **gindex** – The glyph index.
- **flags** – A set of bit flags similar to those used when calling FT_Load_Glyph, used to determine what kind of advances you need.

Returns

The advance value, in either font units or 16.16 format.

If FT_LOAD_VERTICAL_LAYOUT is set, this is the vertical advance corresponding to a vertical layout. Otherwise, it is the horizontal advance in a horizontal layout.

get_best_name_string(*nameID*, *default_string=''*, *preferred_order=None*)
Retrieve a name string given nameID. Searches available font names matching nameID and returns the decoded bytes of the best match. "Best" is defined as a preferred list of platform/encoding/languageIDs which can be overridden by supplying a preferred_order matching the scheme of 'sort_order' (see below).

The routine will attempt to decode the string's bytes to a Python str, when the platform/encoding[/langID] are known (Windows, Mac, or Unicode platforms).

If you prefer more control over name string selection and decoding than this routine provides:

- call self._init_name_string_map()
- use (nameID, platformID, encodingID, languageID) as a key into the self._name_strings dict

get_char_index(*charcode*)
Return the glyph index of a given character code. This function uses a charmap object to do the mapping.

Parameters **charcode** – The character code.

Note:

If you use FreeType to manipulate the contents of font files directly, be aware that the glyph index returned by this function doesn't always correspond to the internal indices used within the file. This is done to ensure that value 0 always corresponds to the 'missing glyph'.

get_chars()
This generator function is used to return all unicode character codes in the current charmap of a given face. For each character it also returns the corresponding glyph index.

Returns character code, glyph index

Note: Note that 'agindex' is set to 0 if the charmap is empty. The character code itself can be 0 in two cases: if the charmap is empty or if the value 0 is the first valid character code.

get_first_char()
This function is used to return the first character code in the current charmap of a given face. It also returns the corresponding glyph index.

Returns Glyph index of first character code. 0 if charmap is empty.

Note:

You should use this function with get_next_char to be able to parse all character codes available in a given charmap. The code should look like this:

Note that 'agindex' is set to 0 if the charmap is empty. The result itself can be 0 in two cases: if the charmap is empty or if the value 0 is the first valid character code.

get_format()
Return a string describing the format of a given face, using values which can be used as an X11 FONT_PROPERTY. Possible values are 'TrueType', 'Type 1', 'BDF', 'PCF', 'Type 42', 'CID Type 1', 'CFF', 'PFR', and 'Windows FNT'.

get_fstype()
Return the fsType flags for a font (embedding permissions).

The return value is a tuple containing the freetype enum name as a string and the actual flag as an int

get_glyph_name(*agindex*, *buffer_max=64*)
This function is used to return the glyph name for the given charcode.

Parameters

- **agindex** – The glyph index.
- **buffer_max** – The maximum number of bytes to use to store the glyph name.
- **glyph_name** – The glyph name, possibly truncated.

get_kerning(*left*, *right*, *mode=0*)
Return the kerning vector between two glyphs of a same face.

Parameters

- **left** – The index of the left glyph in the kern pair.
- **right** – The index of the right glyph in the kern pair.
- **mode** – See FT_Kerning_Mode for more information. Determines the scale and dimension of the returned kerning vector.

Note:

Only horizontal layouts (left-to-right & right-to-left) are supported by this method. Other layouts, or more sophisticated kernings, are out of the scope of this API function – they can be implemented through format-specific interfaces.

get_name_index(*name*)
Return the glyph index of a given glyph name. This function uses driver specific objects to do the translation.

Parameters **name** – The glyph name.

get_next_char(*charcode*, *agindex*)
This function is used to return the next character code in the current charmap of a given face following the value 'charcode', as well as the corresponding glyph index.

Parameters

- **charcode** – The starting character code.
- **agindex** – Glyph index of next character code. 0 if charmap is empty.

Note:

You should use this function with FT_Get_First_Char to walk over all character codes available in a given charmap. See the note for this function for a simple code example.

Note that 'agindex' is set to 0 when there are no more codes in the charmap.

get_sfnt_name(*index*)
Retrieve a string of the SFNT 'name' table for a given index

Parameters **index** – The index of the 'name' string.

Note:

The 'string' array returned in the 'aname' structure is not null-terminated. The application should deallocate it if it is no longer in use.

Use FT_Get_Sfnt_Name_Count to get the total number of available 'name' table entries, then do a loop until you get the right platform, encoding, and name ID.

get_var_blend_coords()
Get the current blend coordinates (-1.0..+1.0)

get_var_design_coords()
Get the current design coordinates

get_variation_info()
Retrieves variation space information for the current face.

glyph
The face's associated glyph slot(s).

has_fixed_sizes
True whenever a face object contains some embedded bitmaps. See the 'available_sizes' field of the FT_FaceRec structure.

has_glyph_names
True whenever a face object contains some glyph names that can be accessed through FT_Get_Glyph_Name.

has_horizontal
True whenever a face object contains horizontal metrics (this is true for all font formats though).

has_kerning
True whenever a face object contains kerning data that can be accessed with FT_Get_Kerning.

has_multiple_masters
True whenever a face object contains some multiple masters. The functions provided by FT_MULTIPLE_MASTERS_H are then available to choose the exact design you want.

has_vertical
True whenever a face object contains vertical metrics.

height
The height is the vertical distance between two consecutive baselines, expressed in font units. It is always positive. Only relevant for scalable formats.

is_cid_keyed
True whenever a face object contains a CID-keyed font. See the discussion of FT_FACE_FLAG_CID_KEYED for more details.

If this macro is true, all functions defined in FT_CID_H are available.

is_fixed_width
True whenever a face object contains a font face that contains fixed-width (or 'monospace', 'fixed-pitch', etc.) glyphs.

is_scalable
true whenever a face object contains a scalable font face (true for TrueType, Type 1, Type 42, CID, OpenType/CFF, and PFR font formats.

is_sfnt
true whenever a face object contains a font whose format is based on the SFNT storage scheme. This usually means: TrueType fonts, OpenType fonts, as well as SFNT-based embedded bitmap fonts.

If this macro is true, all functions defined in FT_SFNT_NAMES_H and FT_TRUETYPE_TABLES_H are available.

is_tricky
True whenever a face represents a 'tricky' font. See the discussion of FT_FACE_FLAG_TRICKY for more details.

load_char(*char*, *flags=4*)
A function used to load a single glyph into the glyph slot of a face object, according to its character code.

Parameters

- **char** – The glyph's character code, according to the current charmap used in the face.
- **flags** – A flag indicating what to load for this glyph. The FT_LOAD_XXX constants can be used to control the glyph loading process (e.g., whether the outline should be scaled, whether to load bitmaps or not, whether to hint the outline, etc).

Note:

This function simply calls FT_Get_Char_Index and FT_Load_Glyph.

load_glyph(*index*, *flags=4*)
A function used to load a single glyph into the glyph slot of a face object.

Parameters

- **index** – The index of the glyph in the font file. For CID-keyed fonts (either in PS or in CFF format) this argument specifies the CID value.
- **flags** – A flag indicating what to load for this glyph. The FT_LOAD_XXX constants can be used to control the glyph loading process (e.g., whether the outline should be scaled, whether to load bitmaps or not, whether to hint the outline, etc).

Note:

The loaded glyph may be transformed. See FT_Set_Transform for the details.

For subsetted CID-keyed fonts, 'FT_Err_Invalid_Argument' is returned for invalid CID values (this is, for CID values which don't have a corresponding glyph in the font). See the discussion of the FT_FACE_FLAG_CID_KEYED flag for more details.

max_advance_height
The maximal advance height, in font units, for all glyphs in this face. This is only relevant for vertical layouts, and is set to 'height' for fonts that do not provide vertical metrics. Only relevant for scalable formats.

max_advance_width
The maximal advance width, in font units, for all glyphs in this face. This can be used to make word wrapping computations faster. Only relevant for scalable formats.

num_faces
The number of faces in the font file. Some font formats can have multiple faces in a font file.

num_fixed_sizes
The number of bitmap strikes in the face. Even if the face is scalable, there might still be bitmap strikes, which are called 'sbits' in that case.

num_glyphs
The number of glyphs in the face. If the face is scalable and has sbits (see 'num_fixed_sizes'), it is set to the number of outline glyphs.

For CID-keyed fonts, this value gives the highest CID used in the font.

postscript_name
ASCII PostScript name of face, if available. This only works with PostScript and TrueType fonts.

select_charmap(*encoding*)
Select a given charmap by its encoding tag (as listed in 'freetype.h').

Note:

This function returns an error if no charmap in the face corresponds to the encoding queried here.

Because many fonts contain more than a single cmap for Unicode encoding, this function has some special code to select the one which covers Unicode best ('best' in the sense that a UCS-4 cmap is preferred to a UCS-2 cmap). It is thus preferable to FT_Set_Charmap in this case.

select_size(*strike_index*)
Select a bitmap strike.

Parameters **strike_index** – The index of the bitmap strike in the 'available_sizes' field of Face object.

set_char_size(*width=0*, *height=0*, *hres=72*, *vres=72*)
This function calls FT_Request_Size to request the nominal size (in points).

Parameters

- **width** (*float*) – The nominal width, in 26.6 fractional points.
- **height** (*float*) – The nominal height, in 26.6 fractional points.
- **hres** (*float*) – The horizontal resolution in dpi.
- **vres** (*float*) – The vertical resolution in dpi.

Note

If either the character width or height is zero, it is set equal to the other value.

If either the horizontal or vertical resolution is zero, it is set equal to the other value.

A character width or height smaller than 1pt is set to 1pt; if both resolution values are zero, they are set to 72dpi.

Don't use this function if you are using the FreeType cache API.

set_charmap(*charmap*)
Select a given charmap for character code to glyph index mapping.

Parameters **charmap** – A handle to the selected charmap, or an index to face->charmaps[]

set_pixel_sizes(*width*, *height*)
This function calls FT_Request_Size to request the nominal size (in pixels).

Parameters

- **width** – The nominal width, in pixels.
- **height** – The nominal height, in pixels.

set_transform(*matrix*, *delta*)
A function used to set the transformation that is applied to glyph images when they are loaded into a glyph slot through FT_Load_Glyph.

Parameters **matrix** – A pointer to the transformation's 2x2 matrix. Use 0 for the identity matrix.

Parm delta A pointer to the translation vector. Use 0 for the null vector.

Note:

The transformation is only applied to scalable image formats after the glyph has been loaded. It means that hinting is unaltered by the transformation and is performed on the character size given in the last call to FT_Set_Char_Size or FT_Set_Pixel_Sizes.

Note that this also transforms the 'face.glyph.advance' field, but not the values in 'face.glyph.metrics'.

set_var_blend_coords(*coords*, *reset=False*)
Set blend coords. Using reset=True will set all axes to their default coordinates.

set_var_design_coords(*coords*, *reset=False*)
Set design coords. Using reset=True will set all axes to their default coordinates.

set_var_named_instance(*instance_name*)
Set instance by name. This will work with any FreeType with variable support (for our purposes: v2.8.1 or later). If the actual FT_Set_Named_Instance() function is available (v2.9.1 or later), we use it (which, despite what you might expect from its name, sets instances by *index*). Otherwise we just use the coords of the named instance (if found) and call self.set_var_design_coords.

sfnt_name_count
Number of name strings in the SFNT 'name' table.

size
The current active size for this face.

style_flags
A set of bit flags indicating the style of the face; see FT_STYLE_FLAG_XXX for the details.

style_name
The face's style name. This is an ASCII string, usually in English, which describes the typeface's style (like 'Italic', 'Bold', 'Condensed', etc). Not all font formats provide a style name, so this field is optional,

and can be set to NULL. As for 'family_name', some formats provide localized and Unicode versions of this string. Applications should use the format specific interface to access them.

underline_position
The position, in font units, of the underline line for this face. It is the center of the underlining stem. Only relevant for scalable formats.

underline_thickness
The thickness, in font units, of the underline for this face. Only relevant for scalable formats.

units_per_EM
The number of font units per EM square for this face. This is typically 2048 for TrueType fonts, and 1000 for Type 1 fonts. Only relevant for scalable formats.

3.2 BBox

class freetype.**BBox**(*bbox*)
FT_BBox wrapper.

A structure used to hold an outline's bounding box, i.e., the coordinates of its extrema in the horizontal and vertical directions.

Note

The bounding box is specified with the coordinates of the lower left and the upper right corner. In PostScript, those values are often called (llx,lly) and (urx,ury), respectively.

If 'yMin' is negative, this value gives the glyph's descender. Otherwise, the glyph doesn't descend below the baseline. Similarly, if 'ymax' is positive, this value gives the glyph's ascender.

'xMin' gives the horizontal distance from the glyph's origin to the left edge of the glyph's bounding box. If 'xMin' is negative, the glyph extends to the left of the origin.

xMax
The horizontal maximum (right-most).

xMin
The horizontal minimum (left-most).

yMax
The vertical maximum (top-most).

yMin
The vertical minimum (bottom-most).

3.3 Size Metrics

class freetype.**SizeMetrics**(*metrics*)
The size metrics structure gives the metrics of a size object.

Note

The scaling values, if relevant, are determined first during a size changing operation. The remaining fields are then set by the driver. For scalable formats, they are usually set to scaled values of the corresponding fields in Face.

Note that due to glyph hinting, these values might not be exact for certain fonts. Thus they must be treated as unreliable with an error margin of at least one pixel!

Indeed, the only way to get the exact metrics is to render all glyphs. As this would be a definite performance hit, it is up to client applications to perform such computations.

The SizeMetrics structure is valid for bitmap fonts also.

ascender
The ascender in 26.6 fractional pixels. See Face for the details.

descender
The descender in 26.6 fractional pixels. See Face for the details.

height
The height in 26.6 fractional pixels. See Face for the details.

max_advance
The maximal advance width in 26.6 fractional pixels. See Face for the details.

x_ppem
The width of the scaled EM square in pixels, hence the term 'ppem' (pixels per EM). It is also referred to as 'nominal width'.

x_scale
A 16.16 fractional scaling value used to convert horizontal metrics from font units to 26.6 fractional pixels. Only relevant for scalable font formats.

y_ppem
The height of the scaled EM square in pixels, hence the term 'ppem' (pixels per EM). It is also referred to as 'nominal height'.

y_scale
A 16.16 fractional scaling value used to convert vertical metrics from font units to 26.6 fractional pixels. Only relevant for scalable font formats.

3.4 Bitmap size

class freetype.**BitmapSize**(*size*)
FT_Bitmap_Size wrapper

This structure models the metrics of a bitmap strike (i.e., a set of glyphs for a given point size and resolution) in a bitmap font. It is used for the 'available_sizes' field of Face.

Note

Windows FNT: The nominal size given in a FNT font is not reliable. Thus when the driver finds it incorrect, it sets 'size' to some calculated values and sets 'x_ppem' and 'y_ppem' to the pixel width and height given in the font, respectively.

TrueType embedded bitmaps: 'size', 'width', and 'height' values are not contained in the bitmap strike itself. They are computed from the global font parameters.

height
The vertical distance, in pixels, between two consecutive baselines. It is always positive.

size
The nominal size of the strike in 26.6 fractional points. This field is not very useful.

width
The average width, in pixels, of all glyphs in the strike.

x_ppem
The horizontal ppem (nominal width) in 26.6 fractional pixels.

y_ppem
The vertical ppem (nominal width) in 26.6 fractional pixels.

3.5 Bitmap

class freetype.**Bitmap**(*bitmap*)
FT_Bitmap wrapper

A structure used to describe a bitmap or pixmap to the raster. Note that we now manage pixmaps of various depths through the 'pixel_mode' field.

Note:

For now, the only pixel modes supported by FreeType are mono and grays. However, drivers might be added in the future to support more 'colorful' options.

buffer
A typeless pointer to the bitmap buffer. This value should be aligned on 32-bit boundaries in most cases.

num_grays
This field is only used with FT_PIXEL_MODE_GRAY; it gives the number of gray levels used in the bitmap.

palette
A typeless pointer to the bitmap palette; this field is intended for paletted pixel modes. Not used currently.

palette_mode
This field is intended for paletted pixel modes; it indicates how the palette is stored. Not used currently.

pitch
The pitch's absolute value is the number of bytes taken by one bitmap row, including padding. However, the pitch is positive when the bitmap has a 'down' flow, and negative when it has an 'up' flow. In all cases, the pitch is an offset to add to a bitmap pointer in order to go down one row.

Note that 'padding' means the alignment of a bitmap to a byte border, and FreeType functions normally align to the smallest possible integer value.

For the B/W rasterizer, 'pitch' is always an even number.

To change the pitch of a bitmap (say, to make it a multiple of 4), use FT_Bitmap_Convert. Alternatively, you might use callback functions to directly render to the application's surface; see the file 'example2.py' in the tutorial for a demonstration.

pixel_mode
The pixel mode, i.e., how pixel bits are stored. See FT_Pixel_Mode for possible values.

rows
The number of bitmap rows.

width
The number of pixels in bitmap row.

3.6 Charmap

class freetype.**Charmap**(*charmap*)
FT_Charmap wrapper.

A handle to a given character map. A charmap is used to translate character codes in a given encoding into glyph indexes for its parent's face. Some font formats may provide several charmaps per font.

Each face object owns zero or more charmaps, but only one of them can be 'active' and used by FT_Get_Char_Index or FT_Load_Char.

The list of available charmaps in a face is available through the 'face.num_charmaps' and 'face.charmaps' fields of FT_FaceRec.

The currently active charmap is available as 'face.charmap'. You should call FT_Set_Charmap to change it.

Note:

When a new face is created (either through FT_New_Face or FT_Open_Face), the library looks for a Unicode charmap within the list and automatically activates it.

See also:

See FT_CharMapRec for the publicly accessible fields of a given character map.

cmap_format
The format of 'charmap'. If 'charmap' doesn't belong to a TrueType/sfnt face, return -1.

cmap_language_id
The language ID of 'charmap'. If 'charmap' doesn't belong to a TrueType/sfnt face, just return 0 as the default value.

encoding
An FT_Encoding tag identifying the charmap. Use this with FT_Select_Charmap.

encoding_id
A platform specific encoding number. This also comes from the TrueType specification and should be emulated similarly.

encoding_name
A platform specific encoding name. This also comes from the TrueType specification and should be emulated similarly.

index
The index into the array of character maps within the face to which 'charmap' belongs. If an error occurs, -1 is returned.

platform_id
An ID number describing the platform for the following encoding ID. This comes directly from the TrueType specification and should be emulated for other formats.

3.7 Outline

class freetype.**Outline**(*outline*)
FT_Outline wrapper.

This structure is used to describe an outline to the scan-line converter.

contours
The number of contours in the outline.

decompose(*context=None*, *move_to=None*, *line_to=None*, *conic_to=None*, *cubic_to=None*, *shift=0*, *delta=0*)
Decompose the outline into a sequence of move, line, conic, and cubic segments.

Parameters

- **context** – Arbitrary contextual object which will be passed as the last parameter of all callbacks. Typically an object to be drawn to, but can be anything.
- **move_to** – Callback which will be passed an *FT_Vector* control point and the context. Called when outline needs to jump to a new path component.
- **line_to** – Callback which will be passed an *FT_Vector* control point and the context. Called to draw a straight line from the current position to the control point.
- **conic_to** – Callback which will be passed two *FT_Vector* control points and the context. Called to draw a second-order Bézier curve from the current position using the passed control points.
- **curve_to** – Callback which will be passed three *FT_Vector* control points and the context. Called to draw a third-order Bézier curve from the current position using the passed control points.
- **shift** – Passed to FreeType which will transform vectors via *x = (x << shift) - delta* and *y = (y << shift) - delta*
- **delta** – Passed to FreeType which will transform vectors via *x = (x << shift) - delta* and *y = (y << shift) - delta*

Since 1.3

flags
A set of bit flags used to characterize the outline and give hints to the scan-converter and hinter on how to convert/grid-fit it. See FT_OUTLINE_FLAGS.

get_bbox()
Compute the exact bounding box of an outline. This is slower than computing the control box. However, it uses an advanced algorithm which returns very quickly when the two boxes coincide. Otherwise, the outline Bezier arcs are traversed to extract their extrema.

get_cbox()
Return an outline's 'control box'. The control box encloses all the outline's points, including Bezier control points. Though it coincides with the exact bounding box for most glyphs, it can be slightly larger in some situations (like when rotating an outline which contains Bezier outside arcs).

Computing the control box is very fast, while getting the bounding box can take much more time as it needs to walk over all segments and arcs in the outline. To get the latter, you can use the 'ftbbox' component which is dedicated to this single task.

get_inside_border()
Retrieve the FT_StrokerBorder value corresponding to the 'inside' borders of a given outline.

Returns The border index. FT_STROKER_BORDER_RIGHT for empty or invalid outlines.

get_outside_border()
Retrieve the FT_StrokerBorder value corresponding to the 'outside' borders of a given outline.

Returns The border index. FT_STROKER_BORDER_RIGHT for empty or invalid outlines.

points
The number of points in the outline.

tags
A list of 'n_points' chars, giving each outline point's type.

If bit 0 is unset, the point is 'off' the curve, i.e., a Bezier control point, while it is 'on' if set.

Bit 1 is meaningful for 'off' points only. If set, it indicates a third-order Bezier arc control point; and a second-order control point if unset.

If bit 2 is set, bits 5-7 contain the drop-out mode (as defined in the OpenType specification; the value is the same as the argument to the SCANMODE instruction).

Bits 3 and 4 are reserved for internal purposes.

3.8 Glyph

class freetype.**Glyph**(*glyph*)
FT_Glyph wrapper.

The root glyph structure contains a given glyph image plus its advance width in 16.16 fixed float format.

format
The format of the glyph's image.

get_cbox(*bbox_mode*)
Return an outline's 'control box'. The control box encloses all the outline's points, including Bezier control points. Though it coincides with the exact bounding box for most glyphs, it can be slightly larger in some situations (like when rotating an outline which contains Bezier outside arcs).

Computing the control box is very fast, while getting the bounding box can take much more time as it needs to walk over all segments and arcs in the outline. To get the latter, you can use the 'ftbbox' component which is dedicated to this single task.

Parameters **mode** – The mode which indicates how to interpret the returned bounding box values.

Note:

Coordinates are relative to the glyph origin, using the y upwards convention.

If the glyph has been loaded with FT_LOAD_NO_SCALE, 'bbox_mode' must be set to FT_GLYPH_BBOX_UNSCALED to get unscaled font units in 26.6 pixel format. The value FT_GLYPH_BBOX_SUBPIXELS is another name for this constant.

Note that the maximum coordinates are exclusive, which means that one can compute the width and height of the glyph image (be it in integer or 26.6 pixels) as:

width = bbox.xMax - bbox.xMin; height = bbox.yMax - bbox.yMin;

Note also that for 26.6 coordinates, if 'bbox_mode' is set to FT_GLYPH_BBOX_GRIDFIT, the coordinates will also be grid-fitted, which corresponds to:

bbox.xMin = FLOOR(bbox.xMin); bbox.yMin = FLOOR(bbox.yMin); bbox.xMax = CEILING(bbox.xMax); bbox.yMax = CEILING(bbox.yMax);

To get the bbox in pixel coordinates, set 'bbox_mode' to FT_GLYPH_BBOX_TRUNCATE.

To get the bbox in grid-fitted pixel coordinates, set 'bbox_mode' to FT_GLYPH_BBOX_PIXELS.

stroke(*stroker*, *destroy=False*)
Stroke a given outline glyph object with a given stroker.

Parameters

- **stroker** – A stroker handle.
- **destroy** – A Boolean. If 1, the source glyph object is destroyed on success.

Note:

The source glyph is untouched in case of error.

to_bitmap(*mode*, *origin*, *destroy=False*)
Convert a given glyph object to a bitmap glyph object.

Parameters

- **mode** – An enumeration that describes how the data is rendered.
- **origin** – A pointer to a vector used to translate the glyph image before rendering. Can be 0 (if no translation). The origin is expressed in 26.6 pixels.

  We also detect a plain vector and make a pointer out of it, if that's the case.
- **destroy** – A boolean that indicates that the original glyph image should be destroyed by this function. It is never destroyed in case of error.

Note:

This function does nothing if the glyph format isn't scalable.

The glyph image is translated with the 'origin' vector before rendering.

The first parameter is a pointer to an FT_Glyph handle, that will be replaced by this function (with newly allocated data). Typically, you would use (omitting error handling):

3.9 Bitmap glyph

class freetype.**BitmapGlyph**(*glyph*)
FT_BitmapGlyph wrapper.

A structure used for bitmap glyph images. This really is a 'sub-class' of FT_GlyphRec.

bitmap
A descriptor for the bitmap.

format
The format of the glyph's image.

left
The left-side bearing, i.e., the horizontal distance from the current pen position to the left border of the glyph bitmap.

top
The top-side bearing, i.e., the vertical distance from the current pen position to the top border of the glyph bitmap. This distance is positive for upwards y!

3.10 Glyph slot

class freetype.**GlyphSlot**(*slot*)
FT_GlyphSlot wrapper.

FreeType root glyph slot class structure. A glyph slot is a container where individual glyphs can be loaded, be they in outline or bitmap format.

advance
This shorthand is, depending on FT_LOAD_IGNORE_TRANSFORM, the transformed advance width for the glyph (in 26.6 fractional pixel format). As specified with FT_LOAD_VERTICAL_LAYOUT, it uses either the 'horiAdvance' or the 'vertAdvance' value of 'metrics' field.

bitmap
This field is used as a bitmap descriptor when the slot format is FT_GLYPH_FORMAT_BITMAP. Note that the address and content of the bitmap buffer can change between calls of FT_Load_Glyph and a few other functions.

bitmap_left
This is the bitmap's left bearing expressed in integer pixels. Of course, this is only valid if the format is FT_GLYPH_FORMAT_BITMAP.

bitmap_top
This is the bitmap's top bearing expressed in integer pixels. Remember that this is the distance from the baseline to the top-most glyph scanline, upwards y coordinates being positive.

format
This field indicates the format of the image contained in the glyph slot. Typically FT_GLYPH_FORMAT_BITMAP, FT_GLYPH_FORMAT_OUTLINE, or FT_GLYPH_FORMAT_COMPOSITE, but others are possible.

get_glyph()
A function used to extract a glyph image from a slot. Note that the created FT_Glyph object must be released with FT_Done_Glyph.

linearHoriAdvance
The advance width of the unhinted glyph. Its value is expressed in 16.16 fractional pixels, unless FT_LOAD_LINEAR_DESIGN is set when loading the glyph. This field can be important to perform correct WYSIWYG layout. Only relevant for outline glyphs.

linearVertAdvance
The advance height of the unhinted glyph. Its value is expressed in 16.16 fractional pixels, unless FT_LOAD_LINEAR_DESIGN is set when loading the glyph. This field can be important to perform correct WYSIWYG layout. Only relevant for outline glyphs.

metrics
The metrics of the last loaded glyph in the slot. The returned values depend on the last load flags (see the FT_Load_Glyph API function) and can be expressed either in 26.6 fractional pixels or font units. Note that even when the glyph image is transformed, the metrics are not.

next
In some cases (like some font tools), several glyph slots per face object can be a good thing. As this is rare, the glyph slots are listed through a direct, single-linked list using its 'next' field.

outline
The outline descriptor for the current glyph image if its format is FT_GLYPH_FORMAT_OUTLINE. Once a glyph is loaded, 'outline' can be transformed, distorted, embolded, etc. However, it must not be freed.

render(*render_mode*)
Convert a given glyph image to a bitmap. It does so by inspecting the glyph image format, finding the relevant renderer, and invoking it.

Parameters **render_mode** – The render mode used to render the glyph image into a bitmap. See FT_Render_Mode for a list of possible values.

If FT_RENDER_MODE_NORMAL is used, a previous call of FT_Load_Glyph with flag FT_LOAD_COLOR makes FT_Render_Glyph provide a default blending of colored glyph layers associated with the current glyph slot (provided the font contains such layers) instead of rendering the glyph slot's outline. This is an experimental feature; see FT_LOAD_COLOR for more information.

Note:

To get meaningful results, font scaling values must be set with functions like FT_Set_Char_Size before calling FT_Render_Glyph.

When FreeType outputs a bitmap of a glyph, it really outputs an alpha coverage map. If a pixel is completely covered by a filled-in outline, the bitmap contains 0xFF at that pixel, meaning that 0xFF/0xFF fraction of that pixel is covered, meaning the pixel is 100% black (or 0% bright). If a pixel is only 50% covered (value 0x80), the pixel is made 50% black (50% bright or a middle shade of grey). 0% covered means 0% black (100% bright or white).

On high-DPI screens like on smartphones and tablets, the pixels are so small that their chance of being completely covered and therefore completely black are fairly good. On the low-DPI screens, however, the situation is different. The pixels are too large for most of the details of a glyph and shades of gray are the norm rather than the exception.

This is relevant because all our screens have a second problem: they are not linear. 1 + 1 is not 2. Twice the value does not result in twice the brightness. When a pixel is only 50% covered, the coverage map says 50% black, and this translates to a pixel value of 128 when you use 8 bits per channel (0-255). However, this does not translate to 50% brightness for that pixel on our sRGB and gamma 2.2 screens. Due to their non-linearity, they dwell longer in the darks and only a pixel value of about 186 results in 50% brightness – 128 ends up too dark on both bright and dark backgrounds. The net result is that dark text looks burnt-out, pixely and blotchy on bright background, bright text too frail on dark backgrounds, and colored text on colored background (for example, red on green) seems to have dark halos or 'dirt' around it. The situation is especially ugly for diagonal stems like in 'w' glyph shapes where the quality of FreeType's anti-aliasing depends on the correct display of grays. On high-DPI screens where smaller, fully black pixels reign supreme, this doesn't matter, but on our low-DPI screens with all the gray shades, it does. 0% and 100% brightness are the same things in linear and non-linear space, just all the shades in-between aren't.

The blending function for placing text over a background is

dst = alpha * src + (1 - alpha) * dst

which is known as the OVER operator.

To correctly composite an anti-aliased pixel of a glyph onto a surface, take the foreground and background colors (e.g., in sRGB space) and apply gamma to get them in a linear space, use OVER to blend the two linear colors using the glyph pixel as the alpha value (remember, the glyph bitmap is an alpha coverage bitmap), and apply inverse gamma to the blended pixel and write it back to the image.

Internal testing at Adobe found that a target inverse gamma of 1.8 for step 3 gives good results across a wide range of displays with an sRGB gamma curve or a similar one.

This process can cost performance. There is an approximation that does not need to know about the background color; see https://bel.fi/alankila/lcd/ and https://bel.fi/alankila/lcd/alpcor.html for details.

ATTENTION: Linear blending is even more important when dealing with subpixel-rendered glyphs to prevent color-fringing! A subpixel-rendered glyph must first be filtered with a filter that gives equal weight to the three color primaries and does not exceed a sum of 0x100, see section 'Subpixel Rendering'. Then the only difference to gray linear blending is that subpixel-rendered linear blending is done 3 times per pixel: red foreground subpixel to red background subpixel and so on for green and blue.

3.11 SFNT name

class freetype.**SfntName**(*name*)
SfntName wrapper

A structure used to model an SFNT 'name' table entry.

encoding_id
The encoding ID for 'string'.

language_id
The language ID for 'string'.

name_id
An identifier for 'string'.

platform_id
The platform ID for 'string'.

string
The 'name' string. Note that its format differs depending on the (platform,encoding) pair. It can be a Pascal String, a UTF-16 one, etc.

Generally speaking, the string is not zero-terminated. Please refer to the TrueType specification for details.

string_len
The length of 'string' in bytes.

3.12 Stroker

class freetype.**Stroker**
FT_Stroker wrapper

This component generates stroked outlines of a given vectorial glyph. It also allows you to retrieve the 'outside' and/or the 'inside' borders of the stroke.

This can be useful to generate 'bordered' glyph, i.e., glyphs displayed with a coloured (and anti-aliased) border around their shape.

begin_subpath(*to*, *_open*)
Start a new sub-path in the stroker.

:param to A pointer to the start vector.

Parameters **_open** – A boolean. If 1, the sub-path is treated as an open one.

Note:

This function is useful when you need to stroke a path that is not stored as an 'Outline' object.

conic_to(*control*, *to*)
'Draw' a single quadratic Bezier in the stroker's current sub-path, from the last position.

Parameters

- **control** – A pointer to a Bezier control point.
- **to** – A pointer to the destination point.

Note:

You should call this function between 'begin_subpath' and 'end_subpath'.

cubic_to(*control1*, *control2*, *to*)
'Draw' a single quadratic Bezier in the stroker's current sub-path, from the last position.

Parameters

- **control1** – A pointer to the first Bezier control point.
- **control2** – A pointer to second Bezier control point.
- **to** – A pointer to the destination point.

Note:

You should call this function between 'begin_subpath' and 'end_subpath'.

end_subpath()
Close the current sub-path in the stroker.

Note:

You should call this function after 'begin_subpath'. If the subpath was not 'opened', this function 'draws' a single line segment to the start position when needed.

export(*outline*)
Call this function after get_border_counts to export all borders to your own 'Outline' structure.

Note that this function appends the border points and contours to your outline, but does not try to resize its arrays.

Parameters **outline** – The target outline.

export_border(*border*, *outline*)
Call this function after 'get_border_counts' to export the corresponding border to your own 'Outline' structure.

Note that this function appends the border points and contours to your outline, but does not try to resize its arrays.

Parameters

- **border** – The border index.
- **outline** – The target outline.

Note:

Always call this function after get_border_counts to get sure that there is enough room in your 'Outline' object to receive all new data.

When an outline, or a sub-path, is 'closed', the stroker generates two independent 'border' outlines, named 'left' and 'right'

When the outline, or a sub-path, is 'opened', the stroker merges the 'border' outlines with caps. The 'left' border receives all points, while the 'right' border becomes empty.

Use the function export instead if you want to retrieve all borders at once.

get_border_counts(*border*)
Call this function once you have finished parsing your paths with the stroker. It returns the number of points and contours necessary to export one of the 'border' or 'stroke' outlines generated by the stroker.

Parameters **border** – The border index.

Returns number of points, number of contours

get_counts()
Call this function once you have finished parsing your paths with the stroker. It returns the number of points and contours necessary to export all points/borders from the stroked outline/path.

Returns number of points, number of contours

line_to(*to*)
'Draw' a single line segment in the stroker's current sub-path, from the last position.

Parameters **to** – A pointer to the destination point.

Note:

You should call this function between 'begin_subpath' and 'end_subpath'.

parse_outline(*outline*, *opened*)
A convenience function used to parse a whole outline with the stroker. The resulting outline(s) can be retrieved later by functions like FT_Stroker_GetCounts and FT_Stroker_Export.

Parameters **outline** – The source outline.

Pram opened A boolean. If 1, the outline is treated as an open path instead of a closed one.

Note:

If 'opened' is 0 (the default), the outline is treated as a closed path, and the stroker generates two distinct 'border' outlines.

If 'opened' is 1, the outline is processed as an open path, and the stroker generates a single 'stroke' outline.

This function calls 'rewind' automatically.

rewind()
Reset a stroker object without changing its attributes. You should call this function before beginning a new series of calls to FT_Stroker_BeginSubPath or FT_Stroker_EndSubPath.

set(*radius*, *line_cap*, *line_join*, *miter_limit*)
Reset a stroker object's attributes.

Parameters

- **radius** – The border radius.
- **line_cap** – The line cap style.
- **line_join** – The line join style.
- **miter_limit** – The miter limit for the FT_STROKER_LINEJOIN_MITER style, expressed as 16.16 fixed point value.

Note:

The radius is expressed in the same units as the outline coordinates.

3.13 Constants

3.13.1 FT_ENCODINGS

An enumeration used to specify character sets supported by charmaps. Used in the FT_Select_Charmap API function.

FT_ENCODING_NONE
The encoding value 0 is reserved.

FT_ENCODING_UNICODE
Corresponds to the Unicode character set. This value covers all versions of the Unicode repertoire, including ASCII and Latin-1. Most fonts include a Unicode charmap, but not all of them.

For example, if you want to access Unicode value U+1F028 (and the font contains it), use value 0x1F028 as the input value for FT_Get_Char_Index.

FT_ENCODING_MS_SYMBOL
Corresponds to the Microsoft Symbol encoding, used to encode mathematical symbols in the 32..255 character code range. For more information, see 'http://www.ceviz.net/symbol.htm'.

FT_ENCODING_SJIS
Corresponds to Japanese SJIS encoding. More info at at 'http://langsupport.japanreference.com/encoding.shtml'. See note on multi-byte encodings below.

FT_ENCODING_GB2312
Corresponds to an encoding system for Simplified Chinese as used used in mainland China.

FT_ENCODING_BIG5
Corresponds to an encoding system for Traditional Chinese as used in Taiwan and Hong Kong.

FT_ENCODING_WANSUNG
Corresponds to the Korean encoding system known as Wansung. For more information see 'http://www.microsoft.com/typography/unicode/949.txt'.

FT_ENCODING_JOHAB
The Korean standard character set (KS C 5601-1992), which corresponds to MS Windows code page 1361. This character set includes all possible Hangeul character combinations.

FT_ENCODING_ADOBE_LATIN_1
Corresponds to a Latin-1 encoding as defined in a Type 1 PostScript font. It is limited to 256 character codes.

FT_ENCODING_ADOBE_STANDARD
Corresponds to the Adobe Standard encoding, as found in Type 1, CFF, and OpenType/CFF fonts. It is limited to 256 character codes.

FT_ENCODING_ADOBE_EXPERT
Corresponds to the Adobe Expert encoding, as found in Type 1, CFF, and OpenType/CFF fonts. It is limited to 256 character codes.

FT_ENCODING_ADOBE_CUSTOM
Corresponds to a custom encoding, as found in Type 1, CFF, and OpenType/CFF fonts. It is limited to 256 character codes.

FT_ENCODING_APPLE_ROMAN
Corresponds to the 8-bit Apple roman encoding. Many TrueType and OpenType fonts contain a charmap for this encoding, since older versions of Mac OS are able to use it.

FT_ENCODING_OLD_LATIN_2
This value is deprecated and was never used nor reported by FreeType. Don't use or test for it.

3.13.2 FT_FACE_FLAGS

A list of bit flags used in the 'face_flags' field of the FT_FaceRec structure. They inform client applications of properties of the corresponding face.

FT_FACE_FLAG_SCALABLE
Indicates that the face contains outline glyphs. This doesn't prevent bitmap strikes, i.e., a face can have both this and and FT_FACE_FLAG_FIXED_SIZES set.

FT_FACE_FLAG_FIXED_SIZES
Indicates that the face contains bitmap strikes. See also the 'num_fixed_sizes' and 'available_sizes' fields of FT_FaceRec.

FT_FACE_FLAG_FIXED_WIDTH
Indicates that the face contains fixed-width characters (like Courier, Lucido, MonoType, etc.).

FT_FACE_FLAG_SFNT
Indicates that the face uses the 'sfnt' storage scheme. For now, this means TrueType and OpenType.

FT_FACE_FLAG_HORIZONTAL
Indicates that the face contains horizontal glyph metrics. This should be set for all common formats.

FT_FACE_FLAG_VERTICAL
Indicates that the face contains vertical glyph metrics. This is only available in some formats, not all of them.

FT_FACE_FLAG_KERNING
Indicates that the face contains kerning information. If set, the kerning distance can be retrieved through the function FT_Get_Kerning. Otherwise the function always return the vector (0,0). Note that FreeType doesn't handle kerning data from the 'GPOS' table (as present in some OpenType fonts).

FT_FACE_FLAG_MULTIPLE_MASTERS
Indicates that the font contains multiple masters and is capable of interpolating between them. See the multiple-masters specific API for details.

FT_FACE_FLAG_GLYPH_NAMES
Indicates that the font contains glyph names that can be retrieved through FT_Get_Glyph_Name. Note that some TrueType fonts contain broken glyph name tables. Use the function FT_Has_PS_Glyph_Names when needed.

FT_FACE_FLAG_EXTERNAL_STREAM
Used internally by FreeType to indicate that a face's stream was provided by the client application and should not be destroyed when FT_Done_Face is called. Don't read or test this flag.

FT_FACE_FLAG_HINTER
Set if the font driver has a hinting machine of its own. For example, with TrueType fonts, it makes sense to use data from the SFNT 'gasp' table only if the native TrueType hinting engine (with the bytecode interpreter) is available and active.

FT_FACE_FLAG_CID_KEYED
Set if the font is CID-keyed. In that case, the font is not accessed by glyph indices but by CID values. For subsetted CID-keyed fonts this has the consequence that not all index values are a valid argument to FT_Load_Glyph. Only the CID values for which corresponding glyphs in the subsetted font exist make FT_Load_Glyph return successfully; in all other cases you get an 'FT_Err_Invalid_Argument' error.

Note that CID-keyed fonts which are in an SFNT wrapper don't have this flag set since the glyphs are accessed in the normal way (using contiguous indices); the 'CID-ness' isn't visible to the application.

FT_FACE_FLAG_TRICKY
Set if the font is 'tricky', this is, it always needs the font format's native hinting engine to get a reasonable result. A typical example is the Chinese font 'mingli.ttf' which uses TrueType bytecode instructions to move and scale all of its subglyphs.

It is not possible to autohint such fonts using FT_LOAD_FORCE_AUTOHINT; it will also ignore FT_LOAD_NO_HINTING. You have to set both FT_LOAD_NO_HINTING and FT_LOAD_NO_AUTOHINT to really disable hinting; however, you probably never want this except for demonstration purposes.

Currently, there are six TrueType fonts in the list of tricky fonts; they are hard-coded in file 'ttobjs.c'.

3.13.3 FT_FSTYPES

A list of bit flags that inform client applications of embedding and subsetting restrictions associated with a font.

FT_FSTYPE_INSTALLABLE_EMBEDDING
Fonts with no fsType bit set may be embedded and permanently installed on the remote system by an application.

FT_FSTYPE_RESTRICTED_LICENSE_EMBEDDING
Fonts that have only this bit set must not be modified, embedded or exchanged in any manner without first obtaining permission of the font software copyright owner.

FT_FSTYPE_PREVIEW_AND_PRINT_EMBEDDING
If this bit is set, the font may be embedded and temporarily loaded on the remote system. Documents containing Preview & Print fonts must be opened 'read-only'; no edits can be applied to the document.

FT_FSTYPE_EDITABLE_EMBEDDING
If this bit is set, the font may be embedded but must only be installed temporarily on other systems. In contrast to Preview & Print fonts, documents containing editable fonts may be opened for reading, editing is permitted, and changes may be saved.

FT_FSTYPE_NO_SUBSETTING
If this bit is set, the font may not be subsetted prior to embedding.

FT_FSTYPE_BITMAP_EMBEDDING_ONLY
If this bit is set, only bitmaps contained in the font may be embedded; no outline data may be embedded. If there are no bitmaps available in the font, then the font is unembeddable.

3.13.4 FT_GLYPH_BBOX_MODES

The mode how the values of FT_Glyph_Get_CBox are returned.

FT_GLYPH_BBOX_UNSCALED
Return unscaled font units.

FT_GLYPH_BBOX_SUBPIXELS
Return unfitted 26.6 coordinates.

FT_GLYPH_BBOX_GRIDFIT
Return grid-fitted 26.6 coordinates.

FT_GLYPH_BBOX_TRUNCATE
Return coordinates in integer pixels.

FT_GLYPH_BBOX_PIXELS
Return grid-fitted pixel coordinates.

3.13.5 FT_GLYPH_FORMATS

An enumeration type used to describe the format of a given glyph image. Note that this version of FreeType only supports two image formats, even though future font drivers will be able to register their own format.

FT_GLYPH_FORMAT_NONE
The value 0 is reserved.

FT_GLYPH_FORMAT_COMPOSITE
The glyph image is a composite of several other images. This format is only used with FT_LOAD_NO_RECURSE, and is used to report compound glyphs (like accented characters).

FT_GLYPH_FORMAT_BITMAP
The glyph image is a bitmap, and can be described as an FT_Bitmap. You generally need to access the 'bitmap' field of the FT_GlyphSlotRec structure to read it.

FT_GLYPH_FORMAT_OUTLINE
The glyph image is a vectorial outline made of line segments and Bezier arcs; it can be described as an FT_Outline; you generally want to access the 'outline' field of the FT_GlyphSlotRec structure to read it.

FT_GLYPH_FORMAT_PLOTTER
The glyph image is a vectorial path with no inside and outside contours. Some Type 1 fonts, like those in the Hershey family, contain glyphs in this format. These are described as FT_Outline, but FreeType isn't currently capable of rendering them correctly.

3.13.6 FT_KERNING_MODES

An enumeration used to specify which kerning values to return in .. data:: FT_Get_Kerning.

FT_KERNING_DEFAULT
Return scaled and grid-fitted kerning distances (value is 0).

FT_KERNING_UNFITTED
Return scaled but un-grid-fitted kerning distances.

FT_KERNING_UNSCALED
Return the kerning vector in original font units.

3.13.7 FT_LCD_FILTERS

A list of values to identify various types of LCD filters.

FT_LCD_FILTER_NONE
Do not perform filtering. When used with subpixel rendering, this results in sometimes severe color fringes.

FT_LCD_FILTER_DEFAULT
The default filter reduces color fringes considerably, at the cost of a slight blurriness in the output.

FT_LCD_FILTER_LIGHT
The light filter is a variant that produces less blurriness at the cost of slightly more color fringes than the default one. It might be better, depending on taste, your monitor, or your personal vision.

FT_LCD_FILTER_LEGACY
This filter corresponds to the original libXft color filter. It provides high contrast output but can exhibit really bad color fringes if glyphs are not extremely well hinted to the pixel grid. In other words, it only works well if the TrueType bytecode interpreter is enabled and high-quality hinted fonts are used.

This filter is only provided for comparison purposes, and might be disabled or stay unsupported in the future.

3.13.8 FT_LOAD_FLAGS

A list of bit-field constants used with FT_Load_Glyph to indicate what kind of operations to perform during glyph loading.

FT_LOAD_DEFAULT
Corresponding to 0, this value is used as the default glyph load operation. In this case, the following happens:

1. FreeType looks for a bitmap for the glyph corresponding to the face's current size. If one is found, the function returns. The bitmap data can be accessed from the glyph slot (see note below).
2. If no embedded bitmap is searched or found, FreeType looks for a scalable outline. If one is found, it is loaded from the font file, scaled to device pixels, then 'hinted' to the pixel grid in order to optimize it. The outline data can be accessed from the glyph slot (see note below).

Note that by default, the glyph loader doesn't render outlines into bitmaps. The following flags are used to modify this default behaviour to more specific and useful cases.

FT_LOAD_NO_SCALE
Don't scale the outline glyph loaded, but keep it in font units.

This flag implies FT_LOAD_NO_HINTING and FT_LOAD_NO_BITMAP, and unsets FT_LOAD_RENDER.

FT_LOAD_NO_HINTING
Disable hinting. This generally generates 'blurrier' bitmap glyph when the glyph is rendered in any of the anti-aliased modes. See also the note below.

This flag is implied by FT_LOAD_NO_SCALE.

FT_LOAD_RENDER
Call FT_Render_Glyph after the glyph is loaded. By default, the glyph is rendered in FT_RENDER_MODE_NORMAL mode. This can be overridden by FT_LOAD_TARGET_XXX or FT_LOAD_MONOCHROME.

This flag is unset by FT_LOAD_NO_SCALE.

FT_LOAD_NO_BITMAP
Ignore bitmap strikes when loading. Bitmap-only fonts ignore this flag.

FT_LOAD_NO_SCALE always sets this flag.

FT_LOAD_VERTICAL_LAYOUT
Load the glyph for vertical text layout. Don't use it as it is problematic currently.

FT_LOAD_FORCE_AUTOHINT
Indicates that the auto-hinter is preferred over the font's native hinter. See also the note below.

FT_LOAD_CROP_BITMAP
Indicates that the font driver should crop the loaded bitmap glyph (i.e., remove all space around its black bits). Not all drivers implement this.

FT_LOAD_PEDANTIC
Indicates that the font driver should perform pedantic verifications during glyph loading. This is mostly used to detect broken glyphs in fonts. By default, FreeType tries to handle broken fonts also.

FT_LOAD_IGNORE_GLOBAL_ADVANCE_WIDTH
Indicates that the font driver should ignore the global advance width defined in the font. By default, that value is used as the advance width for all glyphs when the face has FT_FACE_FLAG_FIXED_WIDTH set.

This flag exists for historical reasons (to support buggy CJK fonts).

FT_LOAD_NO_RECURSE
This flag is only used internally. It merely indicates that the font driver should not load composite glyphs recursively. Instead, it should set the 'num_subglyph' and 'subglyphs' values of the glyph slot accordingly, and set 'glyph->format' to FT_GLYPH_FORMAT_COMPOSITE.

The description of sub-glyphs is not available to client applications for now.

This flag implies FT_LOAD_NO_SCALE and FT_LOAD_IGNORE_TRANSFORM.

FT_LOAD_IGNORE_TRANSFORM
Indicates that the transform matrix set by FT_Set_Transform should be ignored.

FT_LOAD_MONOCHROME
This flag is used with FT_LOAD_RENDER to indicate that you want to render an outline glyph to a 1-bit monochrome bitmap glyph, with 8 pixels packed into each byte of the bitmap data.

Note that this has no effect on the hinting algorithm used. You should rather use FT_LOAD_TARGET_MONO so that the monochrome-optimized hinting algorithm is used.

FT_LOAD_LINEAR_DESIGN
Indicates that the 'linearHoriAdvance' and 'linearVertAdvance' fields of FT_GlyphSlotRec should be kept in font units. See FT_GlyphSlotRec for details.

FT_LOAD_NO_AUTOHINT
Disable auto-hinter. See also the note below.

3.13.9 FT_LOAD_TARGETS

A list of values that are used to select a specific hinting algorithm to use by the hinter. You should OR one of these values to your 'load_flags' when calling FT_Load_Glyph.

Note that font's native hinters may ignore the hinting algorithm you have specified (e.g., the TrueType bytecode interpreter). You can set .. data:: FT_LOAD_FORCE_AUTOHINT to ensure that the auto-hinter is used.

Also note that FT_LOAD_TARGET_LIGHT is an exception, in that it always implies FT_LOAD_FORCE_AUTOHINT.

FT_LOAD_TARGET_NORMAL
This corresponds to the default hinting algorithm, optimized for standard gray-level rendering. For monochrome output, use FT_LOAD_TARGET_MONO instead.

FT_LOAD_TARGET_LIGHT
A lighter hinting algorithm for non-monochrome modes. Many generated glyphs are more fuzzy but better resemble its original shape. A bit like rendering on Mac OS X.

As a special exception, this target implies FT_LOAD_FORCE_AUTOHINT.

FT_LOAD_TARGET_MONO
Strong hinting algorithm that should only be used for monochrome output. The result is probably unpleasant if the glyph is rendered in non-monochrome modes.

FT_LOAD_TARGET_LCD
A variant of FT_LOAD_TARGET_NORMAL optimized for horizontally decimated LCD displays.

FT_LOAD_TARGET_LCD_V
A variant of FT_LOAD_TARGET_NORMAL optimized for vertically decimated LCD displays.

3.13.10 FT_OPEN_MODES

A list of bit-field constants used within the 'flags' field of the .. data:: FT_Open_Args structure.

FT_OPEN_MEMORY
This is a memory-based stream.

FT_OPEN_STREAM
Copy the stream from the 'stream' field.

FT_OPEN_PATHNAME
Create a new input stream from a C path name.

FT_OPEN_DRIVER
Use the 'driver' field.

FT_OPEN_PARAMS
Use the 'num_params' and 'params' fields.

3.13.11 FT_OUTLINE_FLAGS

A list of bit-field constants use for the flags in an outline's 'flags' field.

FT_OUTLINE_NONE
Value 0 is reserved.

FT_OUTLINE_OWNER
If set, this flag indicates that the outline's field arrays (i.e., 'points', 'flags', and 'contours') are 'owned' by the outline object, and should thus be freed when it is destroyed.

FT_OUTLINE_EVEN_ODD_FILL
By default, outlines are filled using the non-zero winding rule. If set to 1, the outline will be filled using the even-odd fill rule (only works with the smooth rasterizer).

FT_OUTLINE_REVERSE_FILL
By default, outside contours of an outline are oriented in clock-wise direction, as defined in the TrueType specification. This flag is set if the outline uses the opposite direction (typically for Type 1 fonts). This flag is ignored by the scan converter.

FT_OUTLINE_IGNORE_DROPOUTS
By default, the scan converter will try to detect drop-outs in an outline and correct the glyph bitmap to ensure consistent shape continuity. If set, this flag hints the scan-line converter to ignore such cases. See below for more information.

FT_OUTLINE_SMART_DROPOUTS
Select smart dropout control. If unset, use simple dropout control. Ignored if FT_OUTLINE_IGNORE_DROPOUTS is set. See below for more information.

FT_OUTLINE_INCLUDE_STUBS
If set, turn pixels on for 'stubs', otherwise exclude them. Ignored if FT_OUTLINE_IGNORE_DROPOUTS is set. See below for more information.

FT_OUTLINE_HIGH_PRECISION
This flag indicates that the scan-line converter should try to convert this outline to bitmaps with the highest possible quality. It is typically set for small character sizes. Note that this is only a hint that might be completely ignored by a given scan-converter.

FT_OUTLINE_SINGLE_PASS
This flag is set to force a given scan-converter to only use a single pass over the outline to render a bitmap glyph image. Normally, it is set for very large character sizes. It is only a hint that might be completely ignored by a given scan-converter.

3.13.12 FT_PIXEL_MODES

An enumeration type that lists the render modes supported by FreeType 2. Each mode corresponds to a specific type of scanline conversion performed on the outline.

FT_PIXEL_MODE_NONE
Value 0 is reserved.

FT_PIXEL_MODE_MONO
A monochrome bitmap, using 1 bit per pixel. Note that pixels are stored in most-significant order (MSB), which means that the left-most pixel in a byte has value 128.

FT_PIXEL_MODE_GRAY
An 8-bit bitmap, generally used to represent anti-aliased glyph images. Each pixel is stored in one byte. Note that the number of 'gray' levels is stored in the 'num_grays' field of the FT_Bitmap structure (it generally is 256).

FT_PIXEL_MODE_GRAY2
A 2-bit per pixel bitmap, used to represent embedded anti-aliased bitmaps in font files according to the OpenType specification. We haven't found a single font using this format, however.

FT_PIXEL_MODE_GRAY4
A 4-bit per pixel bitmap, representing embedded anti-aliased bitmaps in font files according to the OpenType specification. We haven't found a single font using this format, however.

FT_PIXEL_MODE_LCD
An 8-bit bitmap, representing RGB or BGR decimated glyph images used for display on LCD displays; the bitmap is three times wider than the original glyph image. See also FT_RENDER_MODE_LCD.

FT_PIXEL_MODE_LCD_V
An 8-bit bitmap, representing RGB or BGR decimated glyph images used for display on rotated LCD displays; the bitmap is three times taller than the original glyph image. See also FT_RENDER_MODE_LCD_V.

3.13.13 FT_RENDER_MODES

An enumeration type that lists the render modes supported by FreeType 2. Each mode corresponds to a specific type of scanline conversion performed on the outline.

For bitmap fonts and embedded bitmaps the 'bitmap->pixel_mode' field in the .. data:: FT_GlyphSlotRec structure gives the format of the returned bitmap.

All modes except FT_RENDER_MODE_MONO use 256 levels of opacity.

FT_RENDER_MODE_NORMAL
This is the default render mode; it corresponds to 8-bit anti-aliased bitmaps.

FT_RENDER_MODE_LIGHT
This is equivalent to FT_RENDER_MODE_NORMAL. It is only defined as a separate value because render modes are also used indirectly to define hinting algorithm selectors. See FT_LOAD_TARGET_XXX for details.

FT_RENDER_MODE_MONO
This mode corresponds to 1-bit bitmaps (with 2 levels of opacity).

FT_RENDER_MODE_LCD
This mode corresponds to horizontal RGB and BGR sub-pixel displays like LCD screens. It produces 8-bit bitmaps that are 3 times the width of the original glyph outline in pixels, and which use the FT_PIXEL_MODE_LCD mode.

FT_RENDER_MODE_LCD_V
This mode corresponds to vertical RGB and BGR sub-pixel displays (like PDA screens, rotated LCD displays, etc.). It produces 8-bit bitmaps that are 3 times the height of the original glyph outline in pixels and use the FT_PIXEL_MODE_LCD_V mode.

3.13.14 FT_STROKER_BORDERS

These values are used to select a given stroke border in .. data:: FT_Stroker_GetBorderCounts and FT_Stroker_ExportBorder.

FT_STROKER_BORDER_LEFT
Select the left border, relative to the drawing direction.

FT_STROKER_BORDER_RIGHT
Select the right border, relative to the drawing direction.

Note

Applications are generally interested in the 'inside' and 'outside' borders. However, there is no direct mapping between these and the 'left' and 'right' ones, since this really depends on the glyph's drawing orientation, which varies between font formats.

You can however use FT_Outline_GetInsideBorder and FT_Outline_GetOutsideBorder to get these.

3.13.15 FT_STROKER_LINECAPS

These values determine how the end of opened sub-paths are rendered in a stroke.

FT_STROKER_LINECAP_BUTT
The end of lines is rendered as a full stop on the last point itself.

FT_STROKER_LINECAP_ROUND
The end of lines is rendered as a half-circle around the last point.

FT_STROKER_LINECAP_SQUARE
The end of lines is rendered as a square around the last point.

3.13.16 FT_STROKER_LINEJOINS

These values determine how two joining lines are rendered in a stroker.

FT_STROKER_LINEJOIN_ROUND
Used to render rounded line joins. Circular arcs are used to join two lines smoothly.

FT_STROKER_LINEJOIN_BEVEL
Used to render beveled line joins; i.e., the two joining lines are extended until they intersect.

FT_STROKER_LINEJOIN_MITER
Same as beveled rendering, except that an additional line break is added if the angle between the two joining lines is too closed (this is useful to avoid unpleasant spikes in beveled rendering).

3.13.17 FT_STYLE_FLAGS

A list of bit-flags used to indicate the style of a given face. These are used in the 'style_flags' field of FT_FaceRec.

FT_STYLE_FLAG_ITALIC
Indicates that a given face style is italic or oblique.

FT_STYLE_FLAG_BOLD
Indicates that a given face is bold.

3.13.18 TT_ADOBE_IDS

A list of valid values for the 'encoding_id' for TT_PLATFORM_ADOBE charmaps. This is a FreeType-specific extension!

TT_ADOBE_ID_STANDARD
Adobe standard encoding.

TT_ADOBE_ID_EXPERT
Adobe expert encoding.

TT_ADOBE_ID_CUSTOM
Adobe custom encoding.

TT_ADOBE_ID_LATIN_1
Adobe Latin 1 encoding.

3.13.19 TT_APPLE_IDS

A list of valid values for the 'encoding_id' for TT_PLATFORM_APPLE_UNICODE charmaps and name entries.

TT_APPLE_ID_DEFAULT
Unicode version 1.0.

TT_APPLE_ID_UNICODE_1_1
Unicode 1.1; specifies Hangul characters starting at U+34xx.

TT_APPLE_ID_ISO_10646
Deprecated (identical to preceding).

TT_APPLE_ID_UNICODE_2_0
Unicode 2.0 and beyond (UTF-16 BMP only).

TT_APPLE_ID_UNICODE_32
Unicode 3.1 and beyond, using UTF-32.

TT_APPLE_ID_VARIANT_SELECTOR
From Adobe, not Apple. Not a normal cmap. Specifies variations on a real cmap.

3.13.20 TT_MAC_IDS

A list of valid values for the 'encoding_id' for TT_PLATFORM_MACINTOSH charmaps and name entries.

TT_MAC_ID_ROMAN

TT_MAC_ID_TELUGU

TT_MAC_ID_GURMUKHI

TT_MAC_ID_TIBETAN

TT_MAC_ID_SIMPLIFIED_CHINESE

TT_MAC_ID_SINDHI

TT_MAC_ID_SINHALESE

TT_MAC_ID_RUSSIAN

TT_MAC_ID_KANNADA

TT_MAC_ID_VIETNAMESE

TT_MAC_ID_MONGOLIAN

TT_MAC_ID_DEVANAGARI

TT_MAC_ID_HEBREW

TT_MAC_ID_TAMIL

TT_MAC_ID_THAI

TT_MAC_ID_BURMESE

TT_MAC_ID_MALDIVIAN

TT_MAC_ID_TRADITIONAL_CHINESE

TT_MAC_ID_JAPANESE

TT_MAC_ID_GREEK

TT_MAC_ID_LAOTIAN

TT_MAC_ID_KHMER

TT_MAC_ID_UNINTERP

TT_MAC_ID_ORIYA

TT_MAC_ID_RSYMBOL

TT_MAC_ID_MALAYALAM

TT_MAC_ID_GEEZ

TT_MAC_ID_KOREAN

TT_MAC_ID_GUJARATI

TT_MAC_ID_BENGALI

TT_MAC_ID_ARABIC

TT_MAC_ID_GEORGIAN

TT_MAC_ID_ARMENIAN

TT_MAC_ID_SLAVIC

3.13.21 TT_MAC_LANGIDS

Possible values of the language identifier field in the name records of the TTF 'name' table if the 'platform' identifier code is TT_PLATFORM_MACINTOSH.

TT_MAC_LANGID_LATIN

TT_MAC_LANGID_MALAY_ARABIC_SCRIPT

TT_MAC_LANGID_HINDI

TT_MAC_LANGID_CATALAN

TT_MAC_LANGID_MARATHI

TT_MAC_LANGID_ICELANDIC

TT_MAC_LANGID_ARABIC

TT_MAC_LANGID_SWAHILI

TT_MAC_LANGID_KHMER

TT_MAC_LANGID_UKRAINIAN

TT_MAC_LANGID_FINNISH

TT_MAC_LANGID_POLISH

TT_MAC_LANGID_NEPALI

TT_MAC_LANGID_UZBEK

TT_MAC_LANGID_TELUGU

TT_MAC_LANGID_MALTESE

TT_MAC_LANGID_AFRIKAANS

TT_MAC_LANGID_CHEWA

TT_MAC_LANGID_BASQUE

TT_MAC_LANGID_CZECH

TT_MAC_LANGID_ROMANIAN

TT_MAC_LANGID_QUECHUA

TT_MAC_LANGID_TAGALOG

TT_MAC_LANGID_HUNGARIAN

TT_MAC_LANGID_AZERBAIJANI_CYRILLIC_SCRIPT

TT_MAC_LANGID_TONGAN

TT_MAC_LANGID_SUNDANESE

TT_MAC_LANGID_JAPANESE

TT_MAC_LANGID_MONGOLIAN

TT_MAC_LANGID_ALBANIAN

TT_MAC_LANGID_NORWEGIAN

TT_MAC_LANGID_SLOVAK

TT_MAC_LANGID_MALAGASY

TT_MAC_LANGID_DZONGKHA

TT_MAC_LANGID_DUTCH

TT_MAC_LANGID_MALAY_ROMAN_SCRIPT

TT_MAC_LANGID_SERBIAN

TT_MAC_LANGID_GERMAN

TT_MAC_LANGID_SOMALI

TT_MAC_LANGID_KOREAN

TT_MAC_LANGID_MONGOLIAN_MONGOLIAN_SCRIPT

TT_MAC_LANGID_CROATIAN

TT_MAC_LANGID_TURKISH

TT_MAC_LANGID_MOLDAVIAN

TT_MAC_LANGID_LAO

TT_MAC_LANGID_ORIYA

TT_MAC_LANGID_BRETON

TT_MAC_LANGID_PASHTO

TT_MAC_LANGID_GUARANI

TT_MAC_LANGID_HEBREW

TT_MAC_LANGID_SLOVENIAN

TT_MAC_LANGID_ESTONIAN

TT_MAC_LANGID_RUNDI

TT_MAC_LANGID_URDU

TT_MAC_LANGID_CHINESE_TRADITIONAL

TT_MAC_LANGID_TATAR

TT_MAC_LANGID_CHINESE_SIMPLIFIED

TT_MAC_LANGID_AZERBAIJANI_ARABIC_SCRIPT

TT_MAC_LANGID_SANSKRIT

TT_MAC_LANGID_KURDISH

TT_MAC_LANGID_FAEROESE

TT_MAC_LANGID_MONGOLIAN_CYRILLIC_SCRIPT

TT_MAC_LANGID_TIGRINYA

TT_MAC_LANGID_THAI

TT_MAC_LANGID_DANISH

TT_MAC_LANGID_KAZAKH

TT_MAC_LANGID_YIDDISH

TT_MAC_LANGID_ESPERANTO

TT_MAC_LANGID_LITHUANIAN

TT_MAC_LANGID_FARSI

TT_MAC_LANGID_LETTISH

TT_MAC_LANGID_VIETNAMESE

TT_MAC_LANGID_PORTUGUESE

TT_MAC_LANGID_IRISH

TT_MAC_LANGID_WELSH

TT_MAC_LANGID_PUNJABI

TT_MAC_LANGID_GREEK

TT_MAC_LANGID_INUKTITUT

TT_MAC_LANGID_FRENCH

TT_MAC_LANGID_GREEK_POLYTONIC

TT_MAC_LANGID_AZERBAIJANI

TT_MAC_LANGID_JAVANESE

TT_MAC_LANGID_SWEDISH

TT_MAC_LANGID_UIGHUR

TT_MAC_LANGID_BENGALI

TT_MAC_LANGID_RUANDA

TT_MAC_LANGID_SINDHI

TT_MAC_LANGID_TIBETAN

TT_MAC_LANGID_ENGLISH

TT_MAC_LANGID_SAAMISK

TT_MAC_LANGID_INDONESIAN

TT_MAC_LANGID_MANX_GAELIC

TT_MAC_LANGID_BYELORUSSIAN

TT_MAC_LANGID_BULGARIAN

TT_MAC_LANGID_GEORGIAN

TT_MAC_LANGID_AZERBAIJANI_ROMAN_SCRIPT

TT_MAC_LANGID_ITALIAN

TT_MAC_LANGID_SCOTTISH_GAELIC

TT_MAC_LANGID_ARMENIAN

TT_MAC_LANGID_GALLA

TT_MAC_LANGID_MACEDONIAN

TT_MAC_LANGID_IRISH_GAELIC

TT_MAC_LANGID_KIRGHIZ

TT_MAC_LANGID_TAMIL

TT_MAC_LANGID_SPANISH

TT_MAC_LANGID_BURMESE

TT_MAC_LANGID_KANNADA

TT_MAC_LANGID_GALICIAN

TT_MAC_LANGID_FLEMISH

TT_MAC_LANGID_TAJIKI

TT_MAC_LANGID_ASSAMESE

TT_MAC_LANGID_SINHALESE

TT_MAC_LANGID_GREELANDIC

TT_MAC_LANGID_AMHARIC

TT_MAC_LANGID_KASHMIRI

TT_MAC_LANGID_AYMARA

TT_MAC_LANGID_GUJARATI

TT_MAC_LANGID_RUSSIAN

TT_MAC_LANGID_TURKMEN

TT_MAC_LANGID_MALAYALAM

3.13.22 TT_MS_IDS

A list of valid values for the 'encoding_id' for TT_PLATFORM_MICROSOFT charmaps and name entries.

TT_MS_ID_SYMBOL_CS
Corresponds to Microsoft symbol encoding. See FT_ENCODING_MS_SYMBOL.

TT_MS_ID_UNICODE_CS
Corresponds to a Microsoft WGL4 charmap, matching Unicode. See FT_ENCODING_UNICODE.

TT_MS_ID_SJIS
Corresponds to SJIS Japanese encoding. See FT_ENCODING_SJIS.

TT_MS_ID_GB2312
Corresponds to Simplified Chinese as used in Mainland China. See FT_ENCODING_GB2312.

TT_MS_ID_BIG_5
Corresponds to Traditional Chinese as used in Taiwan and Hong Kong. See FT_ENCODING_BIG5.

TT_MS_ID_WANSUNG
Corresponds to Korean Wansung encoding. See FT_ENCODING_WANSUNG.

TT_MS_ID_JOHAB
Corresponds to Johab encoding. See FT_ENCODING_JOHAB.

TT_MS_ID_UCS_4
Corresponds to UCS-4 or UTF-32 charmaps. This has been added to the OpenType specification version 1.4 (mid-2001.)

3.13.23 TT_MS_LANGIDS

Possible values of the language identifier field in the name records of the TTF 'name' table if the 'platform' identifier code is TT_PLATFORM_MICROSOFT.

TT_MS_LANGID_SANSKRIT_INDIA

TT_MS_LANGID_ENGLISH_UNITED_KINGDOM

TT_MS_LANGID_ENGLISH_BELIZE

TT_MS_LANGID_ARABIC_LEBANON

TT_MS_LANGID_MOLDAVIAN_MOLDAVIA

TT_MS_LANGID_TURKISH_TURKEY

TT_MS_LANGID_WELSH_WALES

TT_MS_LANGID_GERMAN_AUSTRIA

TT_MS_LANGID_DUTCH_BELGIUM

TT_MS_LANGID_YI_CHINA

TT_MS_LANGID_QUECHUA_ECUADOR

TT_MS_LANGID_SPANISH_EL_SALVADOR

TT_MS_LANGID_SWAHILI_KENYA

TT_MS_LANGID_QUECHUA_BOLIVIA

TT_MS_LANGID_SLOVENE_SLOVENIA

TT_MS_LANGID_ORIYA_INDIA

TT_MS_LANGID_FARSI_IRAN

TT_MS_LANGID_ENGLISH_CANADA

TT_MS_LANGID_NEPALI_NEPAL

TT_MS_LANGID_DHIVEHI_MALDIVES

TT_MS_LANGID_GERMAN_LIECHTENSTEI

TT_MS_LANGID_TAMIL_INDIA

TT_MS_LANGID_ARABIC_UAE

TT_MS_LANGID_JAPANESE_JAPAN

TT_MS_LANGID_TAMAZIGHT_MOROCCO

TT_MS_LANGID_FRENCH_FRANCE

TT_MS_LANGID_CHINESE_MACAU

TT_MS_LANGID_VIETNAMESE_VIET_NAM

TT_MS_LANGID_HEBREW_ISRAEL

TT_MS_LANGID_SAMI_NORTHERN_SWEDEN

TT_MS_LANGID_PUNJABI_ARABIC_PAKISTAN

TT_MS_LANGID_SWEDISH_SWEDEN

TT_MS_LANGID_FRENCH_REUNION

TT_MS_LANGID_ARABIC_BAHRAIN

TT_MS_LANGID_ENGLISH_INDIA

TT_MS_LANGID_NEPALI_INDIA

TT_MS_LANGID_THAI_THAILAND

TT_MS_LANGID_ENGLISH_GENERAL

TT_MS_LANGID_SAMI_LULE_NORWAY

TT_MS_LANGID_ARABIC_OMAN

TT_MS_LANGID_SPANISH_HONDURAS

TT_MS_LANGID_ENGLISH_JAMAICA

TT_MS_LANGID_ESTONIAN_ESTONIA

TT_MS_LANGID_FRISIAN_NETHERLANDS

TT_MS_LANGID_LATIN

TT_MS_LANGID_ENGLISH_INDONESIA

TT_MS_LANGID_ENGLISH_IRELAND

TT_MS_LANGID_TIBETAN_CHINA

TT_MS_LANGID_PUNJABI_INDIA

TT_MS_LANGID_FRENCH_MALI

TT_MS_LANGID_GERMAN_LUXEMBOURG

TT_MS_LANGID_SUTU_SOUTH_AFRICA

TT_MS_LANGID_FRENCH_CAMEROON

TT_MS_LANGID_FRENCH_CONGO

TT_MS_LANGID_CLASSIC_LITHUANIAN_LITHUANIA

TT_MS_LANGID_MALAYALAM_INDIA

TT_MS_LANGID_SAMI_SOUTHERN_SWEDEN

TT_MS_LANGID_CHEROKEE_UNITED_STATES

TT_MS_LANGID_SPANISH_GUATEMALA

TT_MS_LANGID_CZECH_CZECH_REPUBLIC

TT_MS_LANGID_MANIPURI_INDIA

TT_MS_LANGID_ENGLISH_AUSTRALIA

TT_MS_LANGID_SPANISH_DOMINICAN_REPUBLIC

TT_MS_LANGID_ARABIC_LIBYA

TT_MS_LANGID_FRENCH_WEST_INDIES

TT_MS_LANGID_ENGLISH_TRINIDAD

TT_MS_LANGID_ARABIC_QATAR

TT_MS_LANGID_SPANISH_COLOMBIA

TT_MS_LANGID_GUARANI_PARAGUAY

TT_MS_LANGID_EDO_NIGERIA

TT_MS_LANGID_SEPEDI_SOUTH_AFRICA

TT_MS_LANGID_ENGLISH_HONG_KONG

TT_MS_LANGID_KOREAN_EXTENDED_WANSUNG_KOREA

TT_MS_LANGID_TATAR_TATARSTAN

TT_MS_LANGID_PASHTO_AFGHANISTAN

TT_MS_LANGID_KASHMIRI_PAKISTAN

TT_MS_LANGID_GALICIAN_SPAIN

TT_MS_LANGID_TAJIK_TAJIKISTAN

TT_MS_LANGID_SAMI_INARI_FINLAND

TT_MS_LANGID_KASHMIRI_SASIA

TT_MS_LANGID_SPANISH_ARGENTINA

TT_MS_LANGID_SAMI_SOUTHERN_NORWAY

TT_MS_LANGID_CROATIAN_CROATIA

TT_MS_LANGID_GUJARATI_INDIA

TT_MS_LANGID_TIBETAN_BHUTAN

TT_MS_LANGID_TIGRIGNA_ETHIOPIA

TT_MS_LANGID_FINNISH_FINLAND

TT_MS_LANGID_ENGLISH_UNITED_STATES

TT_MS_LANGID_ITALIAN_SWITZERLAND

TT_MS_LANGID_ARABIC_EGYPT

TT_MS_LANGID_SPANISH_LATIN_AMERICA

TT_MS_LANGID_LITHUANIAN_LITHUANIA

TT_MS_LANGID_ARABIC_ALGERIA

TT_MS_LANGID_MALAY_MALAYSIA

TT_MS_LANGID_ARABIC_GENERAL

TT_MS_LANGID_CHINESE_PRC

TT_MS_LANGID_BENGALI_BANGLADESH

TT_MS_LANGID_SPANISH_PERU

TT_MS_LANGID_SPANISH_SPAIN_INTERNATIONAL_SORT

TT_MS_LANGID_DIVEHI_MALDIVES

TT_MS_LANGID_LATVIAN_LATVIA

TT_MS_LANGID_TURKMEN_TURKMENISTAN

TT_MS_LANGID_XHOSA_SOUTH_AFRICA

TT_MS_LANGID_KHMER_CAMBODIA

TT_MS_LANGID_NORWEGIAN_NORWAY_NYNORSK

TT_MS_LANGID_ARABIC_MOROCCO

TT_MS_LANGID_FRENCH_SENEGAL

TT_MS_LANGID_YORUBA_NIGERIA

TT_MS_LANGID_CATALAN_SPAIN

TT_MS_LANGID_AFRIKAANS_SOUTH_AFRICA

TT_MS_LANGID_ZULU_SOUTH_AFRICA

TT_MS_LANGID_SPANISH_URUGUAY

TT_MS_LANGID_SPANISH_ECUADOR

TT_MS_LANGID_BOSNIAN_BOSNIA_HERZEGOVINA

TT_MS_LANGID_CHINESE_GENERAL

TT_MS_LANGID_SPANISH_PARAGUAY

TT_MS_LANGID_HINDI_INDIA

TT_MS_LANGID_FRENCH_LUXEMBOURG

TT_MS_LANGID_TSWANA_SOUTH_AFRICA

TT_MS_LANGID_HUNGARIAN_HUNGARY

TT_MS_LANGID_CROATIAN_BOSNIA_HERZEGOVINA

TT_MS_LANGID_ENGLISH_SINGAPORE

TT_MS_LANGID_MALTESE_MALTA

TT_MS_LANGID_SAMI_NORTHERN_FINLAND

TT_MS_LANGID_FRENCH_CANADA

TT_MS_LANGID_SAMI_LULE_SWEDEN

TT_MS_LANGID_KANURI_NIGERIA

TT_MS_LANGID_IRISH_GAELIC_IRELAND

TT_MS_LANGID_ARABIC_SAUDI_ARABIA

TT_MS_LANGID_FRENCH_HAITI

TT_MS_LANGID_SPANISH_PUERTO_RICO

TT_MS_LANGID_BURMESE_MYANMAR

TT_MS_LANGID_POLISH_POLAND

TT_MS_LANGID_PORTUGUESE_PORTUGAL

TT_MS_LANGID_ENGLISH_CARIBBEAN

TT_MS_LANGID_KIRGHIZ_KIRGHIZ_REPUBLIC

TT_MS_LANGID_ICELANDIC_ICELAND

TT_MS_LANGID_BENGALI_INDIA

TT_MS_LANGID_HAUSA_NIGERIA

TT_MS_LANGID_BASQUE_SPAIN

TT_MS_LANGID_UIGHUR_CHINA

TT_MS_LANGID_ENGLISH_MALAYSIA

TT_MS_LANGID_FRENCH_MONACO

TT_MS_LANGID_SPANISH_BOLIVIA

TT_MS_LANGID_SORBIAN_GERMANY

TT_MS_LANGID_SINDHI_INDIA

TT_MS_LANGID_CHINESE_SINGAPORE

TT_MS_LANGID_FRENCH_COTE_D_IVOIRE

TT_MS_LANGID_SPANISH_SPAIN_TRADITIONAL_SORT

TT_MS_LANGID_SERBIAN_SERBIA_CYRILLIC

TT_MS_LANGID_SAMI_SKOLT_FINLAND

TT_MS_LANGID_SERBIAN_BOSNIA_HERZ_CYRILLIC

TT_MS_LANGID_MALAY_BRUNEI_DARUSSALAM

TT_MS_LANGID_ARABIC_JORDAN

TT_MS_LANGID_MONGOLIAN_MONGOLIA_MONGOLIAN

TT_MS_LANGID_SERBIAN_SERBIA_LATIN

TT_MS_LANGID_RUSSIAN_RUSSIA

TT_MS_LANGID_ROMANIAN_ROMANIA

TT_MS_LANGID_FRENCH_NORTH_AFRICA

TT_MS_LANGID_MONGOLIAN_MONGOLIA

TT_MS_LANGID_TSONGA_SOUTH_AFRICA

TT_MS_LANGID_SOMALI_SOMALIA

TT_MS_LANGID_SAAMI_LAPONIA

TT_MS_LANGID_SPANISH_COSTA_RICA

TT_MS_LANGID_ARABIC_SYRIA

TT_MS_LANGID_SPANISH_PANAMA

TT_MS_LANGID_PAPIAMENTU_NETHERLANDS_ANTILLES

TT_MS_LANGID_ASSAMESE_INDIA

TT_MS_LANGID_SCOTTISH_GAELIC_UNITED_KINGDOM

TT_MS_LANGID_DUTCH_NETHERLANDS

TT_MS_LANGID_SINDHI_PAKISTAN

TT_MS_LANGID_MACEDONIAN_MACEDONIA

TT_MS_LANGID_KAZAK_KAZAKSTAN

TT_MS_LANGID_AZERI_AZERBAIJAN_LATIN

TT_MS_LANGID_BELARUSIAN_BELARUS

TT_MS_LANGID_FRENCH_MOROCCO

TT_MS_LANGID_SERBIAN_BOSNIA_HERZ_LATIN

TT_MS_LANGID_ALBANIAN_ALBANIA

TT_MS_LANGID_SINHALESE_SRI_LANKA

TT_MS_LANGID_SPANISH_MEXICO

TT_MS_LANGID_ENGLISH_ZIMBABWE

TT_MS_LANGID_OROMO_ETHIOPIA

TT_MS_LANGID_INDONESIAN_INDONESIA

TT_MS_LANGID_SAMI_NORTHERN_NORWAY

TT_MS_LANGID_UZBEK_UZBEKISTAN_LATIN

TT_MS_LANGID_SLOVAK_SLOVAKIA

TT_MS_LANGID_KASHMIRI_INDIA

TT_MS_LANGID_GERMAN_SWITZERLAND

TT_MS_LANGID_URDU_INDIA

TT_MS_LANGID_FAEROESE_FAEROE_ISLANDS

TT_MS_LANGID_SYRIAC_SYRIA

TT_MS_LANGID_SPANISH_CHILE

TT_MS_LANGID_FILIPINO_PHILIPPINES

TT_MS_LANGID_ARABIC_YEMEN

TT_MS_LANGID_KONKANI_INDIA

TT_MS_LANGID_AMHARIC_ETHIOPIA

TT_MS_LANGID_ENGLISH_NEW_ZEALAND

TT_MS_LANGID_RHAETO_ROMANIC_SWITZERLAND

TT_MS_LANGID_ARABIC_TUNISIA

TT_MS_LANGID_SOTHO_SOUTHERN_SOUTH_AFRICA

TT_MS_LANGID_QUECHUA_PERU

TT_MS_LANGID_DANISH_DENMARK

TT_MS_LANGID_ENGLISH_PHILIPPINES

TT_MS_LANGID_SPANISH_NICARAGUA

TT_MS_LANGID_INUKTITUT_CANADA

TT_MS_LANGID_UKRAINIAN_UKRAINE

TT_MS_LANGID_NORWEGIAN_NORWAY_BOKMAL

TT_MS_LANGID_UZBEK_UZBEKISTAN_CYRILLIC

TT_MS_LANGID_FRENCH_BELGIUM

TT_MS_LANGID_ENGLISH_SOUTH_AFRICA

TT_MS_LANGID_HAWAIIAN_UNITED_STATES

TT_MS_LANGID_ARABIC_IRAQ

TT_MS_LANGID_KANNADA_INDIA

TT_MS_LANGID_DZONGHKA_BHUTAN

TT_MS_LANGID_CHINESE_TAIWAN

TT_MS_LANGID_SPANISH_UNITED_STATES

TT_MS_LANGID_ARMENIAN_ARMENIA

TT_MS_LANGID_LAO_LAOS

TT_MS_LANGID_TIGRIGNA_ERYTREA

TT_MS_LANGID_MARATHI_INDIA

TT_MS_LANGID_ARABIC_KUWAIT

TT_MS_LANGID_TAMAZIGHT_MOROCCO_LATIN

TT_MS_LANGID_PORTUGUESE_BRAZIL

TT_MS_LANGID_TIGRIGNA_ERYTHREA

TT_MS_LANGID_GREEK_GREECE

TT_MS_LANGID_URDU_PAKISTAN

TT_MS_LANGID_KIRGHIZ_KIRGHIZSTAN

TT_MS_LANGID_YIDDISH_GERMANY

TT_MS_LANGID_GERMAN_GERMANY

TT_MS_LANGID_TELUGU_INDIA

TT_MS_LANGID_AZERI_AZERBAIJAN_CYRILLIC

TT_MS_LANGID_KOREAN_JOHAB_KOREA

TT_MS_LANGID_ITALIAN_ITALY

TT_MS_LANGID_MAORI_NEW_ZEALAND

TT_MS_LANGID_SPANISH_VENEZUELA

TT_MS_LANGID_IGBO_NIGERIA

TT_MS_LANGID_IBIBIO_NIGERIA

TT_MS_LANGID_CHINESE_HONG_KONG

TT_MS_LANGID_FRENCH_SWITZERLAND

TT_MS_LANGID_BULGARIAN_BULGARIA

TT_MS_LANGID_FULFULDE_NIGERIA

TT_MS_LANGID_RUSSIAN_MOLDAVIA

TT_MS_LANGID_VENDA_SOUTH_AFRICA

TT_MS_LANGID_GEORGIAN_GEORGIA

TT_MS_LANGID_SWEDISH_FINLAND

3.13.24 TT_NAME_IDS

Possible values of the 'name' identifier field in the name records of the TTF 'name' table. These values are platform independent.

TT_NAME_ID_COPYRIGHT

TT_NAME_ID_FONT_FAMILY

TT_NAME_ID_FONT_SUBFAMILY

TT_NAME_ID_UNIQUE_ID

TT_NAME_ID_FULL_NAME

TT_NAME_ID_VERSION_STRING

TT_NAME_ID_PS_NAME

TT_NAME_ID_TRADEMARK

TT_NAME_ID_MANUFACTURER

TT_NAME_ID_DESIGNER

TT_NAME_ID_DESCRIPTION

TT_NAME_ID_VENDOR_URL

TT_NAME_ID_DESIGNER_URL

TT_NAME_ID_LICENSE

TT_NAME_ID_LICENSE_URL

TT_NAME_ID_PREFERRED_FAMILY

TT_NAME_ID_PREFERRED_SUBFAMILY

TT_NAME_ID_MAC_FULL_NAME

TT_NAME_ID_SAMPLE_TEXT

TT_NAME_ID_CID_FINDFONT_NAME

TT_NAME_ID_WWS_FAMILY

TT_NAME_ID_WWS_SUBFAMILY

3.13.25 TT_PLATFORMS

A list of valid values for the 'platform_id' identifier code in FT_CharMapRec and FT_SfntName structures.

TT_PLATFORM_APPLE_UNICODE
Used by Apple to indicate a Unicode character map and/or name entry. See TT_APPLE_ID_XXX for corresponding 'encoding_id' values. Note that name entries in this format are coded as big-endian UCS-2 character codes only.

TT_PLATFORM_MACINTOSH
Used by Apple to indicate a MacOS-specific charmap and/or name entry. See TT_MAC_ID_XXX for corresponding 'encoding_id' values. Note that most TrueType fonts contain an Apple roman charmap to be usable on MacOS systems (even if they contain a Microsoft charmap as well).

TT_PLATFORM_ISO
This value was used to specify ISO/IEC 10646 charmaps. It is however now deprecated. See TT_ISO_ID_XXX for a list of corresponding 'encoding_id' values.

TT_PLATFORM_MICROSOFT
Used by Microsoft to indicate Windows-specific charmaps. See TT_MS_ID_XXX for a list of corresponding 'encoding_id' values. Note that most fonts contain a Unicode charmap using (TT_PLATFORM_MICROSOFT, TT_MS_ID_UNICODE_CS).

TT_PLATFORM_CUSTOM
Used to indicate application-specific charmaps.

TT_PLATFORM_ADOBE
This value isn't part of any font format specification, but is used by FreeType to report Adobe-specific charmaps in an FT_CharMapRec structure. See TT_ADOBE_ID_XXX.

CHAPTER 4

Release notes

4.1 0.4.1

- Fixed a bug in Face.load_char
- Added get_format and get_fstype in Face (titusz.pan)

4.2 0.3.3

- Fixed a bug in get_kerning
- Added test against freetype version for FT_ReferenceFace and FT_Get_FSType_Flags

4.3 0.3.2

- Added wordle.py example
- Added get_bbox for Outline class
- Added get_cbox for Outline and Glyph classes
- Added __del__ method to Face class
- Set encoding (utf-8) to all source files and examples.
- Added test against freetype version for FT_Library_SetLcdFilterWeights.

4.4 0.3.1

- Added FT_Stroker bindings (enums, structs and methods)

- Added ft-outline and ft-color examples
- Fixed first/next char in Face
- Pythonic interface has been documented

4.5 0.3.0

- Added ftdump.py demo and necessary functions

4.6 0.2.0

- Added sfnt functions
- Added TT_XXX flags in ft_enums
- New examples

4.7 0.1.1

- Initial release
- Working examples

CHAPTER 5

License

CHAPTER 6

Indices and tables

- genindex
- modindex
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