PyOEIS Documentation

Release 1.0

Dylan Evans

June 18, 2015

Contents

Contents:

CHAPTER 1

Introduction

The Online Encyclopedia of Integer Sequences (OEIS) is a database of integer sequences. It contains many well-known sequences, such as the primes and Fibonacci numbers as well as many more obscure sequences.

PyOEIS allows for the searching of the OEIS from within Python, as well as allowing you to access sequence information through `Sequence` objects.

1.1 OEIS Search Syntax and Other Useful Links

While PyOEIS provides many porcelain methods which allow you to search by sequence ID, author etc., it is also possible to query the OEIS using its usual search syntax (as you would on the website). It may also be useful to understand how the OEIS operates for debugging purposes. The following links may therefore be of use:

- Hints and search syntax
- Explanation of the OEIS internal format (which PyOEIS is built upon)
- Explanation of the fields in each sequence entry

CHAPTER 2

API

2.1 OEISClient objects

class client.**OEISClient**

Maintains a Session and contains all methods for querying the OEIS.

get_by_id(*id*)

Returns a *Sequence* for the sequence with the ID *id*, or else raises *NoResultsError*.

Note: On the OEIS website, IDs are displayed with an uppercase letter and 6 (for A IDs) or 4 (for M and N IDs) digits. However, this method does not require an uppercase letter or leading zeros to be used.

---

lookup_by_name(*name*, *max_seqs=10*)

Returns a list of at most *max_seqs* *Sequence* objects whose names contain *name*.

Note: Sequences are retrieved in sets of 10 and sequences are then removed if necessary. So, there is no speed improvement between, for example, a *max_seqs* of 10 and one of 15. This applies to all methods with a *max_seqs* argument.

---

lookup_by_author(*author*, *max_seqs=10*)

Returns a list of at most *max_seqs* *Sequence* objects whose authors contain *author*.

lookup_by(*prefix*, *query*, *max_seqs=10*, *list_func=False*)

If *prefix* is *""*, search OEIS with string *query*, otherwise use string '*prefix*:*query*'.

If *list_func* is true, return a list of at most *max_seqs* *Sequence* objects or else an empty list if there are no results. If *list_func* is false, return the first Sequence found, or else raise a *NoResultsError*.

lookup_by_keywords(*keywords*)

Returns a list of at most *max_seqs* *Sequence* objects which are tagged with *keywords*.

lookup_by_terms(*terms*, ***kwargs*)

Returns a list of at most *max_seqs* *Sequence* objects which contain *terms* anywhere within them. If none exist, returns an empty list. If *ordered* is false, terms may be in any order. If *signed* is false, terms may be positive or negative.

2.2 Sequence objects

class sequence.**Sequence**(*sequence_entry*)

Takes internal format sequence entry as constructor argument.

Has attributes to contain information for each field of a sequence entry in the OEIS and methods fot retrieving a certain number of the sequence's signed or unsigned terms.

generate(*n*)
If a parsable formula exists, returns the *nth* term of the sequence, else raises a *NoFunctionError*.

signed(*n*)
Returns the first *n* signed integers in the sequence.

unsigned(*n*)
Returns the first *n* unsigned integers in the sequence.

2.2.1 Attributes

id	The sequence's unique ID in the OEIS, as a string. Begins 'A'.
alt_ids	Other IDs, as a list of strings beginning 'M' and 'N' which the sequence carried in the "The Encyclopedia of Integer Sequences", 1995 or the "Handbook of Integer Sequences", 1973, respectively.
unsigned_list	A list of terms in the sequence without any minus signs.
signed_list	A list of terms in the sequence *including* any minus signs.
name	The name of the sequence, as a string.
references	A list of references to the sequence.
links	A list of links about the sequence.
formulae	Formulae for generating the sequence, as a list of strings.
cross_references	Cross-references to the sequence from elsewhere in the OEIS, as a list of strings.
author	The author of the sequence entry, as a string.
offset	The subscript of the first term and the position of the first term whose modulus exceeds 1, as a tuple of two numbers.
errors	Errors in the sequence entry, as a list of strings.
examples	Examples to illustrate the sequence, as a list of strings.
maple	Maple code to generate the sequence, as a string.
mathematica	Mathematica code to generate the sequence, as a string.
other_programs	Code to generate the sequence in other programs/languages, as a list of strings.
keywords	The sequence's keywords, as a list of strings.
comments	Comments on the sequence entry, as a list of strings.

More information about the fields in a sequence entry can be found here.

2.3 Errors

exception errors.**InvalidQueryError**(*response*)
Raised when a search is invalid according to the OEIS search syntax.

exception errors.**MalformedSequenceError**(*malformed_line*)
Raised when a sequence entry does not contain the required information in a parsable format.

exception errors.**NoFunctionError**(*seq*)
Raised when a sequence has no formula.

exception errors.**NoResultsError**(*query*)
Raised when a search gives no results and it is unacceptable to return an empty list.

exception errors.**OEISException**
Base class for PyOEIS exceptions.

exception errors.**TooManyResultsError**(*query*)
Raised when too many results are found for a search for them to be properly parsed.

CHAPTER 3

Usage

The first thing you must do when using pyoeis is to initialise an *OEISClient*:

```
>>> import pyoeis
>>> c = pyoeis.OEISClient()
```

This handles all queries to the OEIS and all methods for querying are accessed from it. For example, say we want to access the entry for sequence A000040, the primes:

```
>>> primes = c.get_by_id('a40')
>>> primes.name
u'The prime numbers'
```

CHAPTER 4

Indices and tables

- genindex
- modindex
- search

e

E

G

I

L

M

N

O

S

T

U