
Cartouche Documentation

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Cartouche is a Sphinx extension for transforming easy-to-read docstrings into the reStructuredText consumed by Sphinx.

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CHAPTER 1

Installing cartouche

cartouche is available on the [Python Package Index \(PyPI\)](#) and can be installed with `easy_install` so long as you have [setuptools](#) installed already:

```
$ easy_install cartouche
```

Alternatively, you can download and unpack the source distribution from the from PyPI and a GZipped tarball. You should then unpack the source distribution into a temporary directory and run the setup script which will install cartouche into the current Python environment, for example:

```
$ tar xzf cartouche-1.1.2.tar.gz
$ cd cartouche-1.1.2
$ python setup.py install
```

Finally, you can get the source direct from the [repository](#) on Github.

CHAPTER 2

Overview

Cartouche was motivated by a desire to support docstrings in a style compatible with that in the [Google Python Style Guide](#). Currently function and method docstrings in the Google style are supported, although it is planned to add support for class docstrings in a future release.

The syntax supported by Cartouche goes some way beyond that described informally in the Google Style Guide, although I have attempted to remain compatible with the Google guide.

The main benefit of this simple and highly readable docstring format over the native reStructuredText Sphinx format is that it retains its readability when used with the `help()` function in the Python REPL, or when presented by IDEs.

Functions and Methods

Function or method docstrings may contain any text, however, text introduced by block headings will be treated specially during processing of the docstring and converted into reStructuredText equivalents before being passed along to Sphinx for rendering.

The special blocks currently recognised by Cartouche are `Args:`, `Returns:`, `Yields:`, `Raises:`, `Note:` and `Warning:`. The order of the blocks is not significant, although most function docstrings will consist of a preamble followed by `Args:`, `Returns:` and `Raises:` in that order.

A typical docstring

Let's start by showing a complete and typical docstring. This one is taken from the open source [asq](#) project which uses Cartouche for its docstrings:

```
def select(self, selector):
    '''Transforms each element of a sequence into a new form.

    Each element of the source is transformed through a selector function
    to produce a corresponding element in the result sequence.

    If the selector is identity the method will return self.

    Note: This method uses deferred execution.

    Args:
        selector: A unary function mapping a value in the source sequence
                  to the corresponding value in the generated sequence.
                  The single positional argument to the selector function is the
                  element value. The return value of the selector function
                  should be the corresponding element of the result sequence.

    Returns:
        A Queryable over generated sequence whose elements are the result
        of invoking the selector function on each element of the source
```

```
sequence.  
  
Raises:  
    ValueError: If this Queryable has been closed.  
    TypeError: If selector is not callable.  
'''
```

This docstring consists of a arbitrarily structured preamble. The first Cartouche feature is the `Note:` block. Here the note content has been included on one line, although the note content may extend over several lines if appropriate indentation is used. Indentation in Cartouche docstrings can be of any size, but must be consistent, since the indentation is used to extract structure - much like Python code itself. The body of a paragraph such as a `Note:` can either start on the same line as the heading after the colo— which is useful for short notes—or can start on the next line if indented.

The second Cartouche heading is `Args:` which introduces an argument list. Each named argument have its own heading followed by a colon followed by one or more lines of description. Again, the description can start on the same line or be indented on the following line. There is no need to use blank lines between arguments - indentation alone is used to extract the structure.

The third Cartouche heading is `Returns:` which may also be spelt `Return:`. In this example, the author has chosen to start the paragraph on the indented next line.

The final Cartouche heading is `Raises:` This is followed by a list of paragraphs each introduced by a heading which is the exception type.

This docstring, when processed by Cartouche will result in the following reStructuredText markup:

```
Transforms each element of a sequence into a new form.  
  
Each element of the source is transformed through a selector function  
to produce a corresponding element in teh result sequence.  
  
If the selector is identity the method will return self.  
  
.. note::  
  
    This method uses deferred execution.  
  
:param selector: A unary function mapping a value in the source sequence  
    to the corresponding value in the generated generated sequence.  
    The single positional argument to the selector function is the  
    element value. The return value of the selector function  
    should be the corresponding element of the result sequence.  
  
:returns: A Queryable over generated sequence whose elements are the result  
    of invoking the selector function on each element of the source  
    sequence.  
  
:raises:  
    * ValueError - If this Queryable has been closed.  
  
    * TypeError - If selector is not callable.
```

This in turn will be rendered by Sphinx into HTML like this:

select(selector)

Transforms each element of a sequence into a new form.

Each element is transformed through a selector function to produce a value for each value in the source sequence. The generated sequence is lazily evaluated.

If the selector is identity the method will return self.

Note: This method uses deferred execution.

Parameters: **selector** – A unary function mapping a value in the source sequence to the corresponding value in the generated sequence. The single positional argument to the selector function is the element value. The return value of the selector function should be the corresponding element of the result sequence.

Returns: A Queryable over generated sequence whose elements are the result of invoking the selector function on each element of the source sequence.

Raises :

- ValueError - If this Queryable has been closed.
- TypeError - If selector is not callable.

Now we look at each heading in detail and the syntax it supports:

Args

The **Args :** heading is for specification of function arguments. Each argument must be described by its own indented paragraph introduced by a colon terminated heading which is the name of the argument. The descriptive text for the argument can begin either on the same line as the argument name or indented on subsequent lines. The following are examples are legitimate **Args :** blocks:

```
Args:
    spline: A cubic SplineCurve containing at least three points.
    curvature: A float value between 0.0 and 1.0.
    color: An RGB tuple.
```

or:

```
Args:
    spline:
        A cubic SplineCurve containing at least three points.

    curvature:
        A float value between 0.0 and 1.0.

    color:
        An RGB tuple.
```

or:

```
Args:
    spline: A cubic SplineCurve containing at least three points. Longer
        descriptions which wrap beyond one line can either be started on
        the same line as the parameter name, like this one.
    curvature:
        A float value between 0.0 and 1.0. Or could be started on the next
        line provided a suitable indent is given.

    color: An RGB tuple. Blank lines between arguments are optional.
```

For so-called *varargs* syntax in Python which allow receiving arbitrary positional and keyword arguments as a tuple or dictionary respectively, simply prefix the argument name with `*` or `**` as you would in Python code. For example:

```
Args:
    *args: A tuple of positional arguments.

    **kwargs: A dictionary of named arguments.
```

Optionally, you may provide a type for the argument in parentheses between the argument name and the colon. The type can be any text and does not need to correspond to an actual Python type:

```
Args:
    spline (SplineCurve): A cubic SplineCurve containing at least three
        points.

    curvature (float): A value between 0.0 and 1.0.

    color (tuple of integers): An RGB tuple with values in the range 0-255.
```

It's possible to use almost any reStructuredText or Sphinx formatting in combination with Cartouche in the body text.

Return and Returns

The `Returns:` heading which can also be spelled `Return:` is for the specification of return values. There is no specific syntax for describing the return type, which you should typically mention in the body text. The description can begin on the same line at the heading or indented on subsequent lines. Both of the following are valid:

```
Returns: A short description on the same line as the heading.
```

or:

```
Returns:
    A longer description which starts on the next line indented one level.
    It's a little awkward to make up documentation like this when you have
    nothing to say.
```

or combined:

```
Returns: There's nothing to stop you starting a multi-line description like
    this one the same line as the heading, so long as you indent subsequent
    lines in the paragraph, like this.
```

If the function you are documenting is a generator, prefer to use `Yields:` rather than `Return:` - see below.

Yield and Yields

The `Yields:` heading, which can also be spelled `Yield:` is for the specification of the sequence of values returned by a *generator*. When documenting a generator, prefer to use `Yields:` over `Returns:`. Note that Cartouche will *not* verify that the function being documented is actually a generator. The description can begin on the same line at the heading or indented on subsequent lines. Both of the following are valid:

```
Yields: A short description on the same line as the heading.
```

or:

```
Yields:
    A longer description which starts on the next line indented one level.
    It's a little awkward to make up documentation like this when you have
    nothing to say.
```

or combined:

```
Yields: There's nothing to stop you starting a multi-line description like
    this one the same line as the heading, so long as you indent subsequent
    lines in the paragraph, like this.
```

Raises

The `Raises:` heading is used to specify exception types which can be raised by the function. The heading is followed, on subsequent indented paragraphs by further sections each of which details a single exception type. The paragraph for each exception type is introduced by a heading which is the exception type itself. For example, given a function which raises two distinct exception types, the following formats are acceptable:

```
Raises:
    TypeError: A short description for a TypeError.
    ValueError: A short description for a ValueError.
```

or:

```
Raises:
    TypeError: A multi-line description for a TypeError which begins on the
        same line as the heading which introduced the type error. Subsequent
        lines must be indented.
```

Usage

The `Usage:` heading is used to provide a code sample. The entire content of the block, as determined by indentation, is interpreted as Python code and formatting accordingly:

```
Usage:

    for i in range(100):
        print(i)
```

Classes and Attributes

Class docstrings support an `Attributes:` block where instance attributes of objects of that class may be listed.

The attributes block is similar to the `Args:` block. List each attribute by name separated from its description by a colon. You can optionally include the attribute type in parentheses between the name and the colon.

Here's an example class docstring:

```
class Example
    """The example docstring for the Example class.

    Within this class docstring we can both describe the class, but also use
    an attributes heading to list the attributes we expect the instances of
    the class to have. There is no specific provision for distinguishing
    between class attributes and instance attributes at this point, so you
    should make that distinction clear in your descriptions.

    Attributes:
        fred: This attribute description just runs to a single line.
        shiela: This attribute description is somewhat longer and spans
            multiple lines. Subsequent lines are indented one further level.
        jim (int): As with function or method docstrings you can optionally
            provide a type in parentheses after the attribute name and before
            the colon which separates the name from the description.

        harry: With longer attribute descriptions it can help to separate the
            attributes with blank lines. This takes up more room in the
            source code but is much easier to read when using the help()
            function.

    """
    pass
```


CHAPTER 5

cartouche **API**

Forthcoming...

Frequently Asked Questions

Where does the name `cartouche` come from?

A **cartouche** is a symbol used in Egyptian hieroglyphs to indicate that the enclosed text is a royal name⁰. Since `cartouche` is a plugin to the [Sphinx](#) Python documentation generator, a name with a suitably Egyptian theme was selected. The connection to hieroglyphs is significant, because regular Sphinx docstrings can be dense with symbols, making them hard to read in plain text. Ironical, since the motivation behind [reStructuredText](#) was that it should be an “easy-to-read, what-you-see-is-what-you-get plaintext markup syntax”.

Didn't this project used to be called `hieroglyph`?

Yes. Unfortunately, somebody too lazy to do a quick Google search for “Sphinx extension hieroglyph” beat me to an upload to the Python Package Index, thereby securing the name for their own project. C’est la vie. Que sera sera.

⁰ See the [Wikipedia article on cartouches](#) for more details.

CHAPTER 7

Version 1.1.2

- Fixes broken support for Python 2

CHAPTER 8

Version 1.1

- Adds support for instance attributes in the class docstring using an Attributes block.
- Adds support for code samples in docstrings with Usage block.

CHAPTER 9

Version 1.0

- Fix for issue #13: bail out of setup function if called by nose
- Fix for issue #10: chicken/egg issue on importing version number in setup...
- Fix for Issue #8, dots in type specifier
- Moved project to GitHub

CHAPTER 10

Version 0.9

- Changed the project name from Cartouche from Hieroglyph to avoid a naming clash.
- Ensured Python 3 compatibility
- Added support for Yields blocks.

CHAPTER 11

Indices and tables

- `genindex`
- `modindex`
- `search`