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# **aniso8601 Documentation**

***Release 0.85***

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December 22, 2014



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## Another ISO 8601 parser for Python

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### 1.1 Features

- Pure Python implementation
- Python 3 support
- No extra dependencies
- Logical behavior
- Parse a time, get a `datetime.time`
- Parse a date, get a `datetime.date`
- Parse a datetime, get a `datetime.datetime`
- Parse a duration, get a `datetime.timedelta`
- Parse an interval, get a tuple of dates or datetimes
- Parse a repeating interval, get a date or datetime `generator`
- UTC offset represented as fixed-offset tzinfo
- No regular expressions

### 1.2 Installation

The recommended installation method is to use pip:

```
$ pip install aniso8601
```

Alternatively, you can download the source (git repository hosted at [Bitbucket](#)) and install directly:

```
$ python setup.py install
```

### 1.3 Use

#### 1.3.1 Parsing datetimes

To parse a typical ISO 8601 datetime string:

```
>>> import aniso8601
>>> aniso8601.parse_datetime('1977-06-10T12:00:00Z')
datetime.datetime(1977, 6, 10, 12, 0, tzinfo=<aniso8601.UTCOffset object at 0x7f44fadbbd90>)
```

Alternative delimiters can be specified, for example, a space:

```
>>> aniso8601.parse_datetime('1977-06-10 12:00:00Z', delimiter=' ')
datetime.datetime(1977, 6, 10, 12, 0, tzinfo=<aniso8601.UTCOffset object at 0x7f44fadbbf50>)
```

UTC offsets are supported:

```
>>> aniso8601.parse_datetime('1979-06-05T08:00:00-08:00')
datetime.datetime(1979, 6, 5, 8, 0, tzinfo=<aniso8601.UTCOffset object at 0x7f44fadbbf50>)
```

If a UTC offset is not specified, the returned datetime will be naive:

```
>>> aniso8601.parse_datetime('1983-01-22T08:00:00')
datetime.datetime(1983, 1, 22, 8, 0)
```

## 1.3.2 Parsing dates

To parse a date represented in an ISO 8601 string:

```
>>> import aniso8601
>>> aniso8601.parse_date('1984-04-23')
datetime.date(1984, 4, 23)
```

Basic format is supported as well:

```
>>> aniso8601.parse_date('19840423')
datetime.date(1984, 4, 23)
```

To parse a date using the ISO 8601 week date format:

```
>>> aniso8601.parse_date('1986-W38-1')
datetime.date(1986, 9, 15)
```

To parse an ISO 8601 ordinal date:

```
>>> aniso8601.parse_date('1988-132')
datetime.date(1988, 5, 11)
```

## 1.3.3 Parsing times

To parse a time formatted as an ISO 8601 string:

```
>>> import aniso8601
>>> aniso8601.parse_time('11:31:14')
datetime.time(11, 31, 14)
```

As with all of the above, basic format is supported:

```
>>> aniso8601.parse_time('113114')
datetime.time(11, 31, 14)
```

A UTC offset can be specified for times:

```
>>> aniso8601.parse_time('17:18:19-02:30')
datetime.time(17, 18, 19, tzinfo=<aniso8601.UTCOffset object at 0x7f44fad82c50>)
>>> aniso8601.parse_time('171819Z')
datetime.time(17, 18, 19, tzinfo=<aniso8601.UTCOffset object at 0x7f44fadbbd90>)
```

Reduced accuracy is supported:

```
>>> aniso8601.parse_time('21:42')
datetime.time(21, 42)
>>> aniso8601.parse_time('22')
datetime.time(22, 0)
```

A decimal fraction is always allowed on the lowest order element of an ISO 8601 formatted time:

```
>>> aniso8601.parse_time('22:33.5')
datetime.time(22, 33, 30)
>>> aniso8601.parse_time('23.75')
datetime.time(23, 45)
```

### 1.3.4 Parsing durations

To parse a duration formatted as an ISO 8601 string:

```
>>> import aniso8601
>>> aniso8601.parse_duration('P1Y2M3DT4H54M6S')
datetime.timedelta(428, 17646)
```

Reduced accuracy is supported:

```
>>> aniso8601.parse_duration('P1Y')
datetime.timedelta(365)
```

A decimal fraction is allowed on the lowest order element:

```
>>> aniso8601.parse_duration('P1YT3.5M')
datetime.timedelta(365, 210)
```

The decimal fraction can be specified with a comma instead of a full-stop:

```
>>> aniso8601.parse_duration('P1YT3,5M')
datetime.timedelta(365, 210)
```

Parsing a duration from a combined date and time is supported as well:

```
>>> aniso8601.parse_duration('P0001-01-02T01:30:5')
datetime.timedelta(397, 5405)
```

### 1.3.5 Parsing intervals

To parse an interval specified by a start and end:

```
>>> import aniso8601
>>> aniso8601.parse_interval('2007-03-01T13:00:00/2008-05-11T15:30:00')
(datetime.datetime(2007, 3, 1, 13, 0), datetime.datetime(2008, 5, 11, 15, 30))
```

Intervals specified by a start time and a duration are supported:

```
>>> aniso8601.parse_interval('2007-03-01T13:00:00Z/P1Y2M10DT2H30M')
(datetime.datetime(2007, 3, 1, 13, 0, tzinfo=<aniso8601.UTCOffset object at 0x7f698d44d110>), datetime.datetime(2008, 3, 11, 13, 0, tzinfo=<aniso8601.UTCOffset object at 0x7f698d44d110>))
```

A duration can also be specified by a duration and end time:

```
>>> aniso8601.parse_interval('P1M/1981-04-05')
(datetime.date(1981, 4, 5), datetime.date(1981, 3, 6))
```

Notice that the result of the above parse is not in order from earliest to latest. If sorted intervals are required, simply use the 'sorted' keyword as shown below:

```
>>> sorted(aniso8601.parse_interval('P1M/1981-04-05'))
[datetime.date(1981, 3, 6), datetime.date(1981, 4, 5)]
```

The end of an interval is given as a datetime when required to maintain the resolution specified by a duration, even if the duration start is given as a date:

```
>>> aniso8601.parse_interval('2014-11-12/PT4H54M6.5S')
(datetime.date(2014, 11, 12), datetime.datetime(2014, 11, 12, 4, 54, 6, 500000))
```

Repeating intervals are supported as well, and return a generator:

```
>>> aniso8601.parse_repeating_interval('R3/1981-04-05/P1D')
<generator object date_generator at 0x7f698cdefc80>
>>> list(aniso8601.parse_repeating_interval('R3/1981-04-05/P1D'))
[datetime.date(1981, 4, 5), datetime.date(1981, 4, 6), datetime.date(1981, 4, 7)]
```

Repeating intervals are allowed to go in the reverse direction:

```
>>> list(aniso8601.parse_repeating_interval('R2/PT1H2M/1980-03-05T01:01:00'))
[datetime.datetime(1980, 3, 5, 1, 1), datetime.datetime(1980, 3, 4, 23, 59)]
```

Unbounded intervals are also allowed (Python 2):

```
>>> result = aniso8601.parse_repeating_interval('R/PT1H2M/1980-03-05T01:01:00')
>>> result.next()
datetime.datetime(1980, 3, 5, 1, 1)
>>> result.next()
datetime.datetime(1980, 3, 4, 23, 59)
```

or for Python 3:

```
>>> result = aniso8601.parse_repeating_interval('R/PT1H2M/1980-03-05T01:01:00')
>>> next(result)
datetime.datetime(1980, 3, 5, 1, 1)
>>> next(result)
datetime.datetime(1980, 3, 4, 23, 59)
```

Note that you should never try to convert a generator produced by an unbounded interval to a list:

```
>>> list(aniso8601.parse_repeating_interval('R/PT1H2M/1980-03-05T01:01:00'))
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
  File "aniso8601/__init__.py", line 149, in date_generator_unbounded
    currentdate += timedelta
OverflowError: date value out of range
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
  File "aniso8601/__init__.py", line 149, in date_generator_unbounded
    currentdate += timedelta
OverflowError: date value out of range
```



## 1.4 Tests

To run the unit tests, in your source checkout, navigate to the source directory for the Python version being worked on (python2, python3) and type:

```
$ python -m unittest discover aniso8601/tests/
```

## 1.5 Contributing

aniso8601 is an open source project hosted on [Bitbucket](#).

Any and all bugs are welcome on our [issue tracker](#). Of particular interest are valid ISO 8601 strings that don't parse, or invalid ones that do. At a minimum, bug reports should include an example of the misbehaving string, as well as the expected result. Of course patches containing unit tests (or fixed bugs) are welcome!

## 1.6 References

- [ISO 8601:2004\(E\)](#) (Caution, PDF link)
- [Wikipedia article on ISO 8601](#)
- [Discussion on alternative ISO 8601 parsers for Python](#)