14.2. configparser — Configuration file parser

Source code: Lib/configparser.py

This module provides the ConfigParser class which implements a basic configuration language which provides a structure similar to what's found in Microsoft Windows INI files. You can use this to write Python programs which can be customized by end users easily.

Note: This library does *not* interpret or write the value-type prefixes used in the Windows Registry extended version of INI syntax.

See also:

Module shlex
Support for creating Unix shell-like mini-languages which can be used as an alternate format for application configuration files.

Module json
The json module implements a subset of JavaScript syntax which can also be used for this purpose.

14.2.1. Quick Start

Let's take a very basic configuration file that looks like this:

```
[DEFAULT]
ServerAliveInterval = 45
Compression = yes
CompressionLevel = 9
ForwardX11 = yes

[bitbucket.org]
User = hg

[topsecret.server.com]
Port = 50022
ForwardX11 = no
```

The structure of INI files is described in the following section. Essentially, the file consists of sections, each of which contains keys with values. configparser classes can read and write such files. Let’s start by creating the above configuration file programmatically.

```
>>> import configparser
>>> config = configparser.ConfigParser()
>>> config['DEFAULT'] = {'ServerAliveInterval': '45',
...                      'Compression': 'yes',
...                      'CompressionLevel': '9'}
>>> config['bitbucket.org'] = {}
>>> config['bitbucket.org']['User'] = 'hg'
>>> config['topsecret.server.com'] = {}
>>> topsecret = config['topsecret.server.com']
>>> topsecret['Port'] = '50022'     # mutates the parser
>>> topsecret['ForwardX11'] = 'no'  # same here
>>> config['DEFAULT']['ForwardX11'] = 'yes'
>>> with open('example.ini', 'w') as configfile:
...   config.write(configfile)
...
```

As you can see, we can treat a config parser much like a dictionary. There are differences, outlined later, but the behavior is very close to what you would expect from a dictionary.

Now that we have created and saved a configuration file, let’s read it back and explore the data it holds.

```
>>> import configparser
>>> config = configparser.ConfigParser()
>>> config.sections()
[]
>>> config.read('example.ini')
['example.ini']
>>> config.sections()
['bitbucket.org', 'topsecret.server.com']
>>> 'bitbucket.org' in config
True
>>> 'bytebong.com' in config
False
>>> config['bitbucket.org']['User']
'hg'
>>> config['DEFAULT']['Compression']
'yes'
>>> topsecret = config['topsecret.server.com']
>>> topsecret['ForwardX11']
'no'
>>> topsecret['Port']
'50022'
>>> for key in config['bitbucket.org']: print(key)
...
user
```

```
compressionlevel
serveraliveinterval
compression
forwardx11
>>> config['bitbucket.org']['ForwardX11']
'yes'
```

As we can see above, the API is pretty straightforward. The only bit of magic involves the `DEFAULT` section which provides default values for all other sections [1]. Note also that keys in sections are case-insensitive and stored in lowercase [1].

14.2.2. Supported Datatypes

Config parsers do not guess datatypes of values in configuration files, always storing them internally as strings. This means that if you need other datatypes, you should convert on your own:

```
>>> int(topsecret['Port'])
50022
>>> float(topsecret['CompressionLevel'])
9.0
```

Since this task is so common, config parsers provide a range of handy getter methods to handle integers, floats and booleans. The last one is the most interesting because simply passing the value to `bool()` would do no good since `bool('False')` is still `True`. This is why config parsers also provide `getboolean()`. This method is case-insensitive and recognizes Boolean values from `'yes'`/`'no'`, `'on'`/`'off'`, `'true'`/`'false'` and `'1'`/`'0'` [1]. For example:

```
>>> topsecret.getboolean('ForwardX11')
False
>>> config['bitbucket.org'].getboolean('ForwardX11')
True
>>> config.getboolean('bitbucket.org', 'Compression')
True
```

Apart from `getboolean()`, config parsers also provide equivalent `getint()` and `getfloat()` methods. You can register your own converters and customize the provided ones. [1]

14.2.3. Fallback Values

As with a dictionary, you can use a section's `get()` method to provide fallback values:

```
>>> topsecret.get('Port')
'50022'
>>> topsecret.get('CompressionLevel')
'9'
>>> topsecret.get('Cipher')
>>> topsecret.get('Cipher', '3des-cbc')
'3des-cbc'
```

Please note that default values have precedence over fallback values. For instance, in our example the `'CompressionLevel'` key was specified only in the `'DEFAULT'` section. If we try to get it from the section `'topsecret.server.com'`, we will always get the default, even if we specify a fallback:

```
>>> topsecret.get('CompressionLevel', '3')
'9'
```

One more thing to be aware of is that the parser-level `get()` method provides a custom, more complex interface, maintained for backwards compatibility. When using this method, a fallback value can be provided via the `fallback` keyword-only argument:

```
>>> config.get('bitbucket.org', 'monster',
...            fallback='No such things as monsters')
'No such things as monsters'
```

The same `fallback` argument can be used with the `getint()`, `getfloat()` and `getboolean()` methods, for example:

```
>>> 'BatchMode' in topsecret
False
>>> topsecret.getboolean('BatchMode', fallback=True)
True
>>> config['DEFAULT']['BatchMode'] = 'no'
>>> topsecret.getboolean('BatchMode', fallback=True)
False
```

14.2.4. Supported INI File Structure

A configuration file consists of sections, each led by a `[section]` header, followed by key/value entries separated by a specific string (`=` or `:` by default [1]). By default, section names are case sensitive but keys are not [1]. Leading and trailing whitespace is removed from keys and values. Values can be omitted, in which case the key/value delimiter may also be left out. Values can also span multiple lines, as long as they are indented deeper than the first line of the value. Depending on the parser's mode, blank lines may be treated as parts of multiline values or ignored.

Configuration files may include comments, prefixed by specific characters (`#` and `;` by default [1]). Comments may appear on their own on an otherwise empty line, possibly indented. [1]

For example:

```
[Simple Values]
key=value
spaces in keys=allowed
spaces in values=allowed as well
spaces around the delimiter = obviously
you can also use : to delimit keys from values

[All Values Are Strings]
values like this: 1000000
or this: 3.14159265359
are they treated as numbers? : no
integers, floats and booleans are held as: strings
can use the API to get converted values directly: true

[Multiline Values]
chorus: I'm a lumberjack, and I'm okay
    I sleep all night and I work all day

[No Values]
key_without_value
empty string value here =

[You can use comments]
# like this
; or this

# By default only in an empty line.
# Inline comments can be harmful because they prevent users
# from using the delimiting characters as parts of values.
# That being said, this can be customized.

    [Sections Can Be Indented]
        can_values_be_as_well = True
        does_that_mean_anything_special = False
        purpose = formatting for readability
        multiline_values = are
            handled just fine as
            long as they are indented
            deeper than the first line
            of a value
        # Did I mention we can indent comments, too?
```

14.2.5. Interpolation of values

On top of the core functionality, `ConfigParser` supports interpolation. This means values can be preprocessed before returning them from `get()` calls.

class `configparser.`**`BasicInterpolation`**

The default implementation used by `ConfigParser`. It enables values to contain format strings which refer to other values in the same section, or values in the special default section [1]. Additional default values can be provided on initialization.

For example:

```
[Paths]
home_dir: /Users
my_dir: %(home_dir)s/lumberjack
my_pictures: %(my_dir)s/Pictures
```

In the example above, `ConfigParser` with *interpolation* set to `BasicInterpolation()` would resolve `%(home_dir)s` to the value of `home_dir` (`/Users` in this case). `%(my_dir)s` in effect would resolve to `/Users/lumberjack`. All interpolations are done on demand so keys used in the chain of references do not have to be specified in any specific order in the configuration file.

With `interpolation` set to `None`, the parser would simply return `%(my_dir)s/Pictures` as the value of `my_pictures` and `%(home_dir)s/lumberjack` as the value of `my_dir`.

class `configparser.`**`ExtendedInterpolation`**

An alternative handler for interpolation which implements a more advanced syntax, used for instance in `zc.buildout`. Extended interpolation is using `${section:option}` to denote a value from a foreign section. Interpolation can span multiple levels. For convenience, if the `section:` part is omitted, interpolation defaults to the current section (and possibly the default values from the special section).

For example, the configuration specified above with basic interpolation, would look like this with extended interpolation:

```
[Paths]
home_dir: /Users
my_dir: ${home_dir}/lumberjack
my_pictures: ${my_dir}/Pictures
```

Values from other sections can be fetched as well:

```
[Common]
home_dir: /Users
library_dir: /Library
system_dir: /System
macports_dir: /opt/local

[Frameworks]
Python: 3.2
path: ${Common:system_dir}/Library/Frameworks/

[Arthur]
nickname: Two Sheds
last_name: Jackson
my_dir: ${Common:home_dir}/twosheds
my_pictures: ${my_dir}/Pictures
python_dir: ${Frameworks:path}/Python/Versions/${Frameworks:Python
```

14.2.6. Mapping Protocol Access

New in version 3.2.

Mapping protocol access is a generic name for functionality that enables using custom objects as if they were dictionaries. In case of `configparser`, the mapping interface implementation is using the `parser['section']['option']` notation.

`parser['section']` in particular returns a proxy for the section's data in the parser. This means that the values are not copied but they are taken from the original parser on demand. What's even more important is that when values are changed on a section proxy, they are actually mutated in the original parser.

`configparser` objects behave as close to actual dictionaries as possible. The mapping interface is complete and adheres to the `MutableMapping` ABC. However, there are a few differences that should be taken into account:

- By default, all keys in sections are accessible in a case-insensitive manner [1]. E.g. `for option in parser["section"]` yields only `optionxform`'ed option key names. This means lowercased keys by default. At the same time, for a section that holds the key `'a'`, both expressions return `True`:

  ```
  "a" in parser["section"]
  "A" in parser["section"]
  ```

- All sections include `DEFAULTSECT` values as well which means that `.clear()` on a section may not leave the section visibly empty. This is because default values cannot be deleted from the section (because technically they are not there). If they are overridden in the section, deleting causes the default value to be visible again. Trying to delete a default value causes a `KeyError`.

- `DEFAULTSECT` cannot be removed from the parser:
  - trying to delete it raises `ValueError`,
  - `parser.clear()` leaves it intact,
  - `parser.popitem()` never returns it.
- `parser.get(section, option, **kwargs)` - the second argument is **not** a fallback value. Note however that the section-level `get()` methods are compatible both with the mapping protocol and the classic configparser API.

- `parser.items()` is compatible with the mapping protocol (returns a list of *section_name*, *section_proxy* pairs including the DEFAULTSECT). However, this method can also be invoked with arguments: `parser.items(section, raw, vars)`. The latter call returns a list of *option*, *value* pairs for a specified `section`, with all interpolations expanded (unless `raw=True` is provided).

The mapping protocol is implemented on top of the existing legacy API so that subclasses overriding the original interface still should have mappings working as expected.

14.2.7. Customizing Parser Behaviour

There are nearly as many INI format variants as there are applications using it. `configparser` goes a long way to provide support for the largest sensible set of INI styles available. The default functionality is mainly dictated by historical background and it's very likely that you will want to customize some of the features.

The most common way to change the way a specific config parser works is to use the `__init__()` options:

- *defaults*, default value: `None`

  This option accepts a dictionary of key-value pairs which will be initially put in the `DEFAULT` section. This makes for an elegant way to support concise configuration files that don't specify values which are the same as the documented default.

  Hint: if you want to specify default values for a specific section, use `read_dict()` before you read the actual file.

- *dict_type*, default value: `collections.OrderedDict`

This option has a major impact on how the mapping protocol will behave and how the written configuration files look. With the default ordered dictionary, every section is stored in the order they were added to the parser. Same goes for options within sections.

An alternative dictionary type can be used for example to sort sections and options on write-back. You can also use a regular dictionary for performance reasons.

Please note: there are ways to add a set of key-value pairs in a single operation. When you use a regular dictionary in those operations, the order of the keys may be random. For example:

```
>>> parser = configparser.ConfigParser()
>>> parser.read_dict({'section1': {'key1': 'value1',
...                                'key2': 'value2',
...                                'key3': 'value3'},
...                   'section2': {'keyA': 'valueA',
...                                'keyB': 'valueB',
...                                'keyC': 'valueC'},
...                   'section3': {'foo': 'x',
...                                'bar': 'y',
...                                'baz': 'z'}
... })
>>> parser.sections()
['section3', 'section2', 'section1']
>>> [option for option in parser['section3']]
['baz', 'foo', 'bar']
```

In these operations you need to use an ordered dictionary as well:

```
>>> from collections import OrderedDict
>>> parser = configparser.ConfigParser()
>>> parser.read_dict(
...   OrderedDict((
...     ('s1',
...      OrderedDict((
...        ('1', '2'),
...        ('3', '4'),
...        ('5', '6'),
...      ))
...     ),
...     ('s2',
...      OrderedDict((
...        ('a', 'b'),
...        ('c', 'd'),
...        ('e', 'f'),
...      ))
...     ),
...     ))
... )
>>> parser.sections()
['s1', 's2']
>>> [option for option in parser['s1']]
['1', '3', '5']
>>> [option for option in parser['s2'].values()]
['b', 'd', 'f']
```

- *allow_no_value*, default value: `False`

  Some configuration files are known to include settings without values, but which otherwise conform to the syntax supported by `configparser`. The *allow_no_value* parameter to the constructor can be used to indicate that such values should be accepted:

```
>>> import configparser

>>> sample_config = """
... [mysqld]
...   user = mysql
...   pid-file = /var/run/mysqld/mysqld.pid
...   skip-external-locking
...   old_passwords = 1
...   skip-bdb
...   # we don't need ACID today
...   skip-innodb
... """
>>> config = configparser.ConfigParser(allow_no_value=True)
>>> config.read_string(sample_config)

>>> # Settings with values are treated as before:
>>> config["mysqld"]["user"]
'mysql'

>>> # Settings without values provide None:
>>> config["mysqld"]["skip-bdb"]

>>> # Settings which aren't specified still raise an error:
>>> config["mysqld"]["does-not-exist"]
Traceback (most recent call last):
  ...
KeyError: 'does-not-exist'
```

- *delimiters*, default value: `('=', ':')`

  Delimiters are substrings that delimit keys from values within a section. The first occurrence of a delimiting substring on a line is considered a delimiter. This means values (but not keys) can contain the delimiters.

See also the *space_around_delimiters* argument to `ConfigParser.write()`.

- *comment_prefixes*, default value: `('#', ';')`
- *inline_comment_prefixes*, default value: `None`

  Comment prefixes are strings that indicate the start of a valid comment within a config file. *comment_prefixes* are used only on otherwise empty lines (optionally indented) whereas *inline_comment_prefixes* can be used after every valid value (e.g. section names, options and empty lines as well). By default inline comments are disabled and `'#'` and `';'` are used as prefixes for whole line comments.

  Changed in version 3.2: In previous versions of `configparser` behaviour matched `comment_prefixes=('#',';')` and `inline_comment_prefixes=(';',)`.

  Please note that config parsers don't support escaping of comment prefixes so using *inline_comment_prefixes* may prevent users from specifying option values with characters used as comment prefixes. When in doubt, avoid setting *inline_comment_prefixes*. In any circumstances, the only way of storing comment prefix characters at the beginning of a line in multiline values is to interpolate the prefix, for example:

```
>>> from configparser import ConfigParser, ExtendedInterpolation
>>> parser = ConfigParser(interpolation=ExtendedInterpolation())
>>> # the default BasicInterpolation could be used as well
>>> parser.read_string("""
... [DEFAULT]
... hash = #
...
... [hashes]
... shebang =
...   ${hash}!/usr/bin/env python
...   ${hash} -*- coding: utf-8 -*-
...
... extensions =
...   enabled_extension
...   another_extension
...   #disabled_by_comment
...   yet_another_extension
...
... interpolation not necessary = if # is not at line start
... even in multiline values = line #1
...   line #2
...   line #3
... """)
>>> print(parser['hashes']['shebang'])
```

```
#!/usr/bin/env python
# -*- coding: utf-8 -*-
>>> print(parser['hashes']['extensions'])

enabled_extension
another_extension
yet_another_extension
>>> print(parser['hashes']['interpolation not necessary'])
if # is not at line start
>>> print(parser['hashes']['even in multiline values'])
line #1
line #2
line #3
```

- *strict*, default value: `True`

  When set to `True`, the parser will not allow for any section or option duplicates while reading from a single source (using `read_file()`, `read_string()` or `read_dict()`). It is recommended to use strict parsers in new applications.

  Changed in version 3.2: In previous versions of `configparser` behaviour matched `strict=False`.

- *empty_lines_in_values*, default value: `True`

  In config parsers, values can span multiple lines as long as they are indented more than the key that holds them. By default parsers also let empty lines to be parts of values. At the same time, keys can be arbitrarily indented themselves to improve readability. In consequence, when configuration files get big and complex, it is easy for the user to lose track of the file structure. Take for instance:

```
[Section]
key = multiline
  value with a gotcha

 this = is still a part of the multiline value of 'key'
```

  This can be especially problematic for the user to see if she's using a proportional font to edit the file. That is why when your application does not need values with empty lines, you should consider disallowing them. This will make empty lines split keys every time. In the example above, it would produce two keys, `key` and `this`.

- *default_section*, default value: `configparser.DEFAULTSECT` (that is: `"DEFAULT"`)

The convention of allowing a special section of default values for other sections or interpolation purposes is a powerful concept of this library, letting users create complex declarative configurations. This section is normally called `"DEFAULT"` but this can be customized to point to any other valid section name. Some typical values include: `"general"` or `"common"`. The name provided is used for recognizing default sections when reading from any source and is used when writing configuration back to a file. Its current value can be retrieved using the `parser_instance.default_section` attribute and may be modified at runtime (i.e. to convert files from one format to another).

- *interpolation*, default value: `configparser.BasicInterpolation`

  Interpolation behaviour may be customized by providing a custom handler through the *interpolation* argument. `None` can be used to turn off interpolation completely, `ExtendedInterpolation()` provides a more advanced variant inspired by `zc.buildout`. More on the subject in the dedicated documentation section. `RawConfigParser` has a default value of `None`.

- *converters*, default value: not set

  Config parsers provide option value getters that perform type conversion. By default `getint()`, `getfloat()`, and `getboolean()` are implemented. Should other getters be desirable, users may define them in a subclass or pass a dictionary where each key is a name of the converter and each value is a callable implementing said conversion. For instance, passing `{'decimal': decimal.Decimal}` would add `getdecimal()` on both the parser object and all section proxies. In other words, it will be possible to write both `parser_instance.getdecimal('section', 'key', fallback=0)` and `parser_instance['section'].getdecimal('key', 0)`.

  If the converter needs to access the state of the parser, it can be implemented as a method on a config parser subclass. If the name of this method starts with `get`, it will be available on all section proxies, in the dict-compatible form (see the `getdecimal()` example above).

More advanced customization may be achieved by overriding default values of these parser attributes. The defaults are defined on the classes, so they may be overridden by subclasses or by attribute assignment.

`configparser.`**`BOOLEAN_STATES`**

By default when using `getboolean()`, config parsers consider the following values `True`: `'1'`, `'yes'`, `'true'`, `'on'` and the following values `False`: `'0'`, `'no'`, `'false'`, `'off'`. You can override this by specifying a custom dictionary of strings and their Boolean outcomes. For example:

```
>>> custom = configparser.ConfigParser()
>>> custom['section1'] = {'funky': 'nope'}
>>> custom['section1'].getboolean('funky')
Traceback (most recent call last):
...
ValueError: Not a boolean: nope
>>> custom.BOOLEAN_STATES = {'sure': True, 'nope': False}
>>> custom['section1'].getboolean('funky')
False
```

Other typical Boolean pairs include `accept`/`reject` or `enabled`/`disabled`.

`configparser.`**`optionxform`**(*option*)

This method transforms option names on every read, get, or set operation. The default converts the name to lowercase. This also means that when a configuration file gets written, all keys will be lowercase. Override this method if that's unsuitable. For example:

```
>>> config = """
... [Section1]
... Key = Value
...
... [Section2]
... AnotherKey = Value
... """
>>> typical = configparser.ConfigParser()
>>> typical.read_string(config)
>>> list(typical['Section1'].keys())
['key']
>>> list(typical['Section2'].keys())
['anotherkey']
>>> custom = configparser.RawConfigParser()
>>> custom.optionxform = lambda option: option
>>> custom.read_string(config)
>>> list(custom['Section1'].keys())
['Key']
>>> list(custom['Section2'].keys())
['AnotherKey']
```

`configparser.`**`SECTCRE`**

A compiled regular expression used to parse section headers. The default matches `[section]` to the name `"section"`. Whitespace is considered part of the section name, thus `[  larch  ]` will be read as a section of name `"  larch  "`. Override this attribute if that's unsuitable. For example:

```
>>> config = """
... [Section 1]
... option = value
```

```
...
... [  Section 2  ]
... another = val
... """
>>> typical = ConfigParser()
>>> typical.read_string(config)
>>> typical.sections()
['Section 1', '  Section 2  ']
>>> custom = ConfigParser()
>>> custom.SECTCRE = re.compile(r"\[ *(?P<header>[^]]+?) *\]")
>>> custom.read_string(config)
>>> custom.sections()
['Section 1', 'Section 2']
```

Note: While ConfigParser objects also use an `OPTCRE` attribute for recognizing option lines, it's not recommended to override it because that would interfere with constructor options *allow_no_value* and *delimiters*.

14.2.8. Legacy API Examples

Mainly because of backwards compatibility concerns, `configparser` provides also a legacy API with explicit `get`/`set` methods. While there are valid use cases for the methods outlined below, mapping protocol access is preferred for new projects. The legacy API is at times more advanced, low-level and downright counterintuitive.

An example of writing to a configuration file:

```
import configparser

config = configparser.RawConfigParser()

# Please note that using RawConfigParser's set functions, you can assi
# non-string values to keys internally, but will receive an error wher
# attempting to write to a file or when you get it in non-raw mode. Se
# values using the mapping protocol or ConfigParser's set() does not c
# such assignments to take place.
config.add_section('Section1')
config.set('Section1', 'an_int', '15')
config.set('Section1', 'a_bool', 'true')
config.set('Section1', 'a_float', '3.1415')
config.set('Section1', 'baz', 'fun')
config.set('Section1', 'bar', 'Python')
config.set('Section1', 'foo', '%(bar)s is %(baz)s!')

# Writing our configuration file to 'example.cfg'
with open('example.cfg', 'w') as configfile:
    config.write(configfile)
```

An example of reading the configuration file again:

```
import configparser

config = configparser.RawConfigParser()
config.read('example.cfg')

# getfloat() raises an exception if the value is not a float
# getint() and getboolean() also do this for their respective types
a_float = config.getfloat('Section1', 'a_float')
an_int = config.getint('Section1', 'an_int')
print(a_float + an_int)

# Notice that the next output does not interpolate '%(bar)s' or '%(baz
# This is because we are using a RawConfigParser().
if config.getboolean('Section1', 'a_bool'):
    print(config.get('Section1', 'foo'))
```

To get interpolation, use `ConfigParser`:

```
import configparser

cfg = configparser.ConfigParser()
cfg.read('example.cfg')

# Set the optional *raw* argument of get() to True if you wish to disa
# interpolation in a single get operation.
print(cfg.get('Section1', 'foo', raw=False))  # -> "Python is fun!"
print(cfg.get('Section1', 'foo', raw=True))   # -> "%(bar)s is %(baz)s

# The optional *vars* argument is a dict with members that will take
# precedence in interpolation.
print(cfg.get('Section1', 'foo', vars={'bar': 'Documentation',
                                       'baz': 'evil'}))

# The optional *fallback* argument can be used to provide a fallback v
print(cfg.get('Section1', 'foo'))
      # -> "Python is fun!"

print(cfg.get('Section1', 'foo', fallback='Monty is not.'))
      # -> "Python is fun!"

print(cfg.get('Section1', 'monster', fallback='No such things as monst
      # -> "No such things as monsters."

# A bare print(cfg.get('Section1', 'monster')) would raise NoOptionErr
# but we can also use:

print(cfg.get('Section1', 'monster', fallback=None))
      # -> None
```

Default values are available in both types of ConfigParsers. They are used in interpolation if an option used is not defined elsewhere.

```
import configparser

# New instance with 'bar' and 'baz' defaulting to 'Life' and 'hard' ea
config = configparser.ConfigParser({'bar': 'Life', 'baz': 'hard'})
config.read('example.cfg')

print(config.get('Section1', 'foo'))     # -> "Python is fun!"
config.remove_option('Section1', 'bar')
config.remove_option('Section1', 'baz')
print(config.get('Section1', 'foo'))     # -> "Life is hard!"
```

14.2.9. ConfigParser Objects

class `configparser.`**`ConfigParser`**(*defaults=None*, *dict_type=collections.OrderedDict*, *allow_no_value=False*, *delimiters=('=', ':')*, *comment_prefixes=('#', ';')*, *inline_comment_prefixes=None*, *strict=True*, *empty_lines_in_values=True*, *default_section=configparser.DEFAULTSECT*, *interpolation=BasicInterpolation()*, *converters={}*)

The main configuration parser. When *defaults* is given, it is initialized into the dictionary of intrinsic defaults. When *dict_type* is given, it will be used to create the dictionary objects for the list of sections, for the options within a section, and for the default values.

When *delimiters* is given, it is used as the set of substrings that divide keys from values. When *comment_prefixes* is given, it will be used as the set of substrings that prefix comments in otherwise empty lines. Comments can be indented. When *inline_comment_prefixes* is given, it will be used as the set of substrings that prefix comments in non-empty lines.

When *strict* is `True` (the default), the parser won't allow for any section or option duplicates while reading from a single source (file, string or dictionary), raising `DuplicateSectionError` or `DuplicateOptionError`. When *empty_lines_in_values* is `False` (default: `True`), each empty line marks the end of an option. Otherwise, internal empty lines of a multiline option are kept as part of the value. When *allow_no_value* is `True` (default: `False`), options without values are accepted; the value held for these is `None` and they are serialized without the trailing delimiter.

When *default_section* is given, it specifies the name for the special section holding default values for other sections and interpolation purposes (normally named `"DEFAULT"`). This value can be retrieved and changed on runtime using the `default_section` instance attribute.

Interpolation behaviour may be customized by providing a custom handler through the *interpolation* argument. `None` can be used to turn off interpolation completely, `ExtendedInterpolation()` provides a more advanced variant inspired by `zc.buildout`. More on the subject in the dedicated documentation section.

All option names used in interpolation will be passed through the `optionxform()` method just like any other option name reference. For example, using the default implementation of `optionxform()` (which converts option names to lower case), the values `foo %(bar)s` and `foo %(BAR)s` are equivalent.

When *converters* is given, it should be a dictionary where each key represents the name of a type converter and each value is a callable implementing the conversion from string to the desired datatype. Every converter gets its own corresponding `get*()` method on the parser object and section proxies.

Changed in version 3.1: The default *dict_type* is `collections.OrderedDict`.

Changed in version 3.2: allow_no_value, *delimiters*, *comment_prefixes*, *strict*, *empty_lines_in_values*, *default_section* and *interpolation* were added.

Changed in version 3.5: The *converters* argument was added.

`defaults`()

Return a dictionary containing the instance-wide defaults.

`sections`()

Return a list of the sections available; the *default section* is not included in the list.

`add_section`(*section*)

Add a section named *section* to the instance. If a section by the given name already exists, `DuplicateSectionError` is raised. If the *default section* name is passed, `ValueError` is raised. The name of the section must be a string; if not, `TypeError` is raised.

Changed in version 3.2: Non-string section names raise `TypeError`.

`has_section`(*section*)

Indicates whether the named *section* is present in the configuration. The *default section* is not acknowledged.

options(*section*)

Return a list of options available in the specified *section*.

has_option(*section*, *option*)

If the given *section* exists, and contains the given *option*, return `True`; otherwise return `False`. If the specified *section* is `None` or an empty string, DEFAULT is assumed.

read(*filenames*, *encoding=None*)

Attempt to read and parse a list of filenames, returning a list of filenames which were successfully parsed.

If *filenames* is a string or path-like object, it is treated as a single filename. If a file named in *filenames* cannot be opened, that file will be ignored. This is designed so that you can specify a list of potential configuration file locations (for example, the current directory, the user's home directory, and some system-wide directory), and all existing configuration files in the list will be read.

If none of the named files exist, the `ConfigParser` instance will contain an empty dataset. An application which requires initial values to be loaded from a file should load the required file or files using `read_file()` before calling `read()` for any optional files:

```
import configparser, os

config = configparser.ConfigParser()
config.read_file(open('defaults.cfg'))
config.read(['site.cfg', os.path.expanduser('~/.myapp.cfg')],
            encoding='cp1250')
```

New in version 3.2: The *encoding* parameter. Previously, all files were read using the default encoding for `open()`.

New in version 3.6.1: The *filenames* parameter accepts a path-like object.

read_file(*f*, *source=None*)

Read and parse configuration data from *f* which must be an iterable yielding Unicode strings (for example files opened in text mode).

Optional argument *source* specifies the name of the file being read. If not given and *f* has a `name` attribute, that is used for *source*; the default is `'<???>'`.

New in version 3.2: Replaces `readfp()`.

`read_string`(*string*, *source='<string>'*)

Parse configuration data from a string.

Optional argument *source* specifies a context-specific name of the string passed. If not given, `'<string>'` is used. This should commonly be a filesystem path or a URL.

New in version 3.2.

`read_dict`(*dictionary*, *source='<dict>'*)

Load configuration from any object that provides a dict-like `items()` method. Keys are section names, values are dictionaries with keys and values that should be present in the section. If the used dictionary type preserves order, sections and their keys will be added in order. Values are automatically converted to strings.

Optional argument *source* specifies a context-specific name of the dictionary passed. If not given, `<dict>` is used.

This method can be used to copy state between parsers.

New in version 3.2.

`get`(*section*, *option*, ***, *raw=False*, *vars=None*[, *fallback*])

Get an *option* value for the named *section*. If *vars* is provided, it must be a dictionary. The *option* is looked up in *vars* (if provided), *section*, and in *DEFAULTSECT* in that order. If the key is not found and *fallback* is provided, it is used as a fallback value. `None` can be provided as a *fallback* value.

All the `'%'` interpolations are expanded in the return values, unless the *raw* argument is true. Values for interpolation keys are looked up in the same manner as the option.

Changed in version 3.2: Arguments *raw*, *vars* and *fallback* are keyword only to protect users from trying to use the third argument as the *fallback* fallback (especially when using the mapping protocol).

`getint`(*section*, *option*, ***, *raw=False*, *vars=None*[, *fallback*])

A convenience method which coerces the *option* in the specified *section* to an integer. See `get()` for explanation of *raw*, *vars* and *fallback*.

`getfloat`(*section*, *option*, ***, *raw=False*, *vars=None*[, *fallback*])

A convenience method which coerces the *option* in the specified *section* to a floating point number. See `get()` for explanation of *raw*, *vars* and *fallback*.

`getboolean`(*section*, *option*, *, *raw=False*, *vars=None*[, *fallback*])

A convenience method which coerces the *option* in the specified *section* to a Boolean value. Note that the accepted values for the option are `'1'`, `'yes'`, `'true'`, and `'on'`, which cause this method to return `True`, and `'0'`, `'no'`, `'false'`, and `'off'`, which cause it to return `False`. These string values are checked in a case-insensitive manner. Any other value will cause it to raise `ValueError`. See `get()` for explanation of *raw*, *vars* and *fallback*.

`items`(*raw=False*, *vars=None*)
`items`(*section*, *raw=False*, *vars=None*)

When *section* is not given, return a list of *section_name*, *section_proxy* pairs, including DEFAULTSECT.

Otherwise, return a list of *name*, *value* pairs for the options in the given *section*. Optional arguments have the same meaning as for the `get()` method.

`set`(*section*, *option*, *value*)

If the given section exists, set the given option to the specified value; otherwise raise `NoSectionError`. *option* and *value* must be strings; if not, `TypeError` is raised.

`write`(*fileobject*, *space_around_delimiters=True*)

Write a representation of the configuration to the specified file object, which must be opened in text mode (accepting strings). This representation can be parsed by a future `read()` call. If *space_around_delimiters* is true, delimiters between keys and values are surrounded by spaces.

`remove_option`(*section*, *option*)

Remove the specified *option* from the specified *section*. If the section does not exist, raise `NoSectionError`. If the option existed to be removed, return `True`; otherwise return `False`.

`remove_section`(*section*)

Remove the specified *section* from the configuration. If the section in fact existed, return `True`. Otherwise return `False`.

`optionxform`(*option*)

Transforms the option name *option* as found in an input file or as passed in by client code to the form that should be used in the internal structures. The default implementation returns a lower-case version of *option*; subclasses may override this or client code can set an attribute of this name on instances to affect this behavior.

You don't need to subclass the parser to use this method, you can also set it on an instance, to a function that takes a string argument and returns a string. Setting it to `str`, for example, would make option names case sensitive:

```
cfgparser = ConfigParser()
cfgparser.optionxform = str
```

Note that when reading configuration files, whitespace around the option names is stripped before `optionxform()` is called.

`readfp`(*fp*, *filename=None*)

Deprecated since version 3.2: Use `read_file()` instead.

Changed in version 3.2: `readfp()` now iterates on *fp* instead of calling `fp.readline()`.

For existing code calling `readfp()` with arguments which don't support iteration, the following generator may be used as a wrapper around the file-like object:

```
def readline_generator(fp):
    line = fp.readline()
    while line:
        yield line
        line = fp.readline()
```

Instead of `parser.readfp(fp)` use `parser.read_file(readline_generator(fp))`.

`configparser.`**`MAX_INTERPOLATION_DEPTH`**

The maximum depth for recursive interpolation for `get()` when the *raw* parameter is false. This is relevant only when the default *interpolation* is used.

14.2.10. RawConfigParser Objects

class `configparser.`**`RawConfigParser`**(*defaults=None*, *dict_type=collections.OrderedDict*, *allow_no_value=False*, ***, *delimiters=('=', ':')*, *comment_prefixes=('#', ';')*, *inline_comment_prefixes=None*, *strict=True*, *empty_lines_in_values=True*, *default_section=configparser.DEFAULTSECT*[, *interpolation*])

Legacy variant of the `ConfigParser` with interpolation disabled by default and unsafe `add_section` and `set` methods.

Note: Consider using `ConfigParser` instead which checks types of the values to be stored internally. If you don't want interpolation, you can use `ConfigParser(interpolation=None)`.

`add_section`(*section*)

Add a section named *section* to the instance. If a section by the given name already exists, `DuplicateSectionError` is raised. If the *default section* name is passed, `ValueError` is raised.

Type of *section* is not checked which lets users create non-string named sections. This behaviour is unsupported and may cause internal errors.

`set`(*section*, *option*, *value*)

If the given section exists, set the given option to the specified value; otherwise raise `NoSectionError`. While it is possible to use `RawConfigParser` (or `ConfigParser` with *raw* parameters set to true) for *internal* storage of non-string values, full functionality (including interpolation and output to files) can only be achieved using string values.

This method lets users assign non-string values to keys internally. This behaviour is unsupported and will cause errors when attempting to write to a file or get it in non-raw mode. **Use the mapping protocol API** which does not allow such assignments to take place.

14.2.11. Exceptions

exception `configparser.`**`Error`**

Base class for all other `configparser` exceptions.

exception `configparser.`**`NoSectionError`**

Exception raised when a specified section is not found.

exception `configparser.`**`DuplicateSectionError`**

Exception raised if `add_section()` is called with the name of a section that is already present or in strict parsers when a section if found more than once in a single input file, string or dictionary.

New in version 3.2: Optional `source` and `lineno` attributes and arguments to `__init__()` were added.

exception `configparser.`**`DuplicateOptionError`**

Exception raised by strict parsers if a single option appears twice during reading from a single file, string or dictionary. This catches misspellings and case sensitivity-related errors, e.g. a dictionary may have two keys representing the same case-insensitive configuration key.

exception `configparser.`**`NoOptionError`**

Exception raised when a specified option is not found in the specified section.

exception `configparser.`**`InterpolationError`**

Base class for exceptions raised when problems occur performing string interpolation.

exception `configparser.`**`InterpolationDepthError`**

Exception raised when string interpolation cannot be completed because the number of iterations exceeds `MAX_INTERPOLATION_DEPTH`. Subclass of `InterpolationError`.

exception `configparser.`**`InterpolationMissingOptionError`**

Exception raised when an option referenced from a value does not exist. Subclass of `InterpolationError`.

exception `configparser.`**`InterpolationSyntaxError`**

Exception raised when the source text into which substitutions are made does not conform to the required syntax. Subclass of `InterpolationError`.

exception `configparser.`**`MissingSectionHeaderError`**

Exception raised when attempting to parse a file which has no section headers.

exception `configparser.`**`ParsingError`**

Exception raised when errors occur attempting to parse a file.

Changed in version 3.2: The `filename` attribute and `__init__()` argument were renamed to `source` for consistency.

Footnotes

[1] *(1, 2, 3, 4, 5, 6, 7, 8, 9, 10)* Config parsers allow for heavy customization. If you are interested in changing the behaviour outlined by the footnote reference, consult the Customizing Parser Behaviour section.