`argparse` — Parser for command-line options, arguments and sub-commands

New in version 3.2.

Source code: Lib/argparse.py

The `argparse` module makes it easy to write user-friendly command-line interfaces. The program defines what arguments it requires, and `argparse` will figure out how to parse those out of `sys.argv`. The `argparse` module also automatically generates help and usage messages and issues errors when users give the program invalid arguments.

Tutorial

This page contains the API reference information. For a more gentle introduction to Python command-line parsing, have a look at the argparse tutorial.

Example

The following code is a Python program that takes a list of integers and produces either the sum or the max:

```python
import argparse

parser = argparse.ArgumentParser(description='Process some integers.')
parser.add_argument('integers', metavar='N', type=int, nargs='+',
                    help='an integer for the accumulator')
parser.add_argument('--sum', dest='accumulate', action='store_const',
                    const=sum, default=max,
                    help='sum the integers (default: find the max)')

args = parser.parse_args()
print(args.accumulate(args.integers))
```

Assuming the Python code above is saved into a file called `prog.py`, it can be run at the command line and provides useful help messages:

```
$ python prog.py -h
usage: prog.py [-h] [--sum] N [N ...]

Process some integers.

positional arguments:
 N             an integer for the accumulator

optional arguments:
```

```
  -h, --help  show this help message and exit
  --sum       sum the integers (default: find the max)
```

When run with the appropriate arguments, it prints either the sum or the max of the command-line integers:

```
$ python prog.py 1 2 3 4
4

$ python prog.py 1 2 3 4 --sum
10
```

If invalid arguments are passed in, it will issue an error:

```
$ python prog.py a b c
usage: prog.py [-h] [--sum] N [N ...]
prog.py: error: argument N: invalid int value: 'a'
```

The following sections walk you through this example.

Creating a parser

The first step in using the `argparse` is creating an `ArgumentParser` object:

```
>>> parser = argparse.ArgumentParser(description='Process some integers.')
```

The `ArgumentParser` object will hold all the information necessary to parse the command line into Python data types.

Adding arguments

Filling an `ArgumentParser` with information about program arguments is done by making calls to the `add_argument()` method. Generally, these calls tell the `ArgumentParser` how to take the strings on the command line and turn them into objects. This information is stored and used when `parse_args()` is called. For example:

```
>>> parser.add_argument('integers', metavar='N', type=int, nargs='+',
...                     help='an integer for the accumulator')
>>> parser.add_argument('--sum', dest='accumulate', action='store_const',
...                     const=sum, default=max,
...                     help='sum the integers (default: find the max)')
```

Later, calling `parse_args()` will return an object with two attributes, `integers` and `accumulate`. The `integers` attribute will be a list of one or more ints, and the `accumulate` attribute will be either the `sum()` function, if `--sum` was specified at the command line, or the `max()` function if it was not.

Parsing arguments

`ArgumentParser` parses arguments through the `parse_args()` method. This will inspect the command line, convert each argument to the appropriate type and then invoke the appropriate action. In most cases, this means a simple `Namespace` object will be built up from attributes parsed out of the command line:

```
>>> parser.parse_args(['--sum', '7', '-1', '42'])
Namespace(accumulate=<built-in function sum>, integers=[7, -1, 42])
```

In a script, `parse_args()` will typically be called with no arguments, and the `ArgumentParser` will automatically determine the command-line arguments from `sys.argv`.

ArgumentParser objects

class `argparse.`**ArgumentParser**(*prog=None*, *usage=None*, *description=None*, *epilog=None*, *parents=[]*, *formatter_class=argparse.HelpFormatter*, *prefix_chars='-'*, *fromfile_prefix_chars=None*, *argument_default=None*, *conflict_handler='error'*, *add_help=True*, *allow_abbrev=True*)

Create a new `ArgumentParser` object. All parameters should be passed as keyword arguments. Each parameter has its own more detailed description below, but in short they are:

- prog - The name of the program (default: `sys.argv[0]`)
- usage - The string describing the program usage (default: generated from arguments added to parser)
- description - Text to display before the argument help (default: none)
- epilog - Text to display after the argument help (default: none)
- parents - A list of `ArgumentParser` objects whose arguments should also be included
- formatter_class - A class for customizing the help output
- prefix_chars - The set of characters that prefix optional arguments (default: '-')
- fromfile_prefix_chars - The set of characters that prefix files from which additional arguments should be read (default: `None`)
- argument_default - The global default value for arguments (default: `None`)
- conflict_handler - The strategy for resolving conflicting optionals (usually unnecessary)
- add_help - Add a `-h/--help` option to the parser (default: `True`)
- allow_abbrev - Allows long options to be abbreviated if the abbreviation is unambiguous. (default: `True`)

Changed in version 3.5: allow_abbrev parameter was added.

Changed in version 3.8: In previous versions, *allow_abbrev* also disabled grouping of short flags such as `-vv` to mean `-v -v`.

The following sections describe how each of these are used.

prog

By default, `ArgumentParser` objects use `sys.argv[0]` to determine how to display the name of the program in help messages. This default is almost always desirable because it will make the help messages match how the program was invoked on the command line. For example, consider a file named `myprogram.py` with the following code:

```python
import argparse
parser = argparse.ArgumentParser()
parser.add_argument('--foo', help='foo help')
args = parser.parse_args()
```

The help for this program will display `myprogram.py` as the program name (regardless of where the program was invoked from):

```
$ python myprogram.py --help
usage: myprogram.py [-h] [--foo FOO]

optional arguments:
 -h, --help  show this help message and exit
 --foo FOO   foo help
$ cd ..
$ python subdir/myprogram.py --help
usage: myprogram.py [-h] [--foo FOO]

optional arguments:
 -h, --help  show this help message and exit
 --foo FOO   foo help
```

To change this default behavior, another value can be supplied using the `prog=` argument to `ArgumentParser`:

```
>>> parser = argparse.ArgumentParser(prog='myprogram')
>>> parser.print_help()
usage: myprogram [-h]

optional arguments:
 -h, --help  show this help message and exit
```

Note that the program name, whether determined from `sys.argv[0]` or from the `prog=` argument, is available to help messages using the `%(prog)s` format specifier.

```
>>> parser = argparse.ArgumentParser(prog='myprogram')
>>> parser.add_argument('--foo', help='foo of the %(prog)s program')
>>> parser.print_help()
usage: myprogram [-h] [--foo FOO]

optional arguments:
```

```
-h, --help  show this help message and exit
--foo FOO   foo of the myprogram program
```

usage

By default, `ArgumentParser` calculates the usage message from the arguments it contains:

```
>>> parser = argparse.ArgumentParser(prog='PROG')
>>> parser.add_argument('--foo', nargs='?', help='foo help')
>>> parser.add_argument('bar', nargs='+', help='bar help')
>>> parser.print_help()
usage: PROG [-h] [--foo [FOO]] bar [bar ...]

positional arguments:
 bar            bar help

optional arguments:
 -h, --help     show this help message and exit
 --foo [FOO]    foo help
```

The default message can be overridden with the `usage=` keyword argument:

```
>>> parser = argparse.ArgumentParser(prog='PROG', usage='%(prog)s [options]')
>>> parser.add_argument('--foo', nargs='?', help='foo help')
>>> parser.add_argument('bar', nargs='+', help='bar help')
>>> parser.print_help()
usage: PROG [options]

positional arguments:
 bar            bar help

optional arguments:
 -h, --help     show this help message and exit
 --foo [FOO]    foo help
```

The `%(prog)s` format specifier is available to fill in the program name in your usage messages.

description

Most calls to the `ArgumentParser` constructor will use the `description=` keyword argument. This argument gives a brief description of what the program does and how it works. In help messages, the description is displayed between the command-line usage string and the help messages for the various arguments:

```
>>> parser = argparse.ArgumentParser(description='A foo that bars')
>>> parser.print_help()
usage: argparse.py [-h]

A foo that bars
```

```
optional arguments:
  -h, --help  show this help message and exit
```

By default, the description will be line-wrapped so that it fits within the given space. To change this behavior, see the formatter_class argument.

epilog

Some programs like to display additional description of the program after the description of the arguments. Such text can be specified using the `epilog=` argument to `ArgumentParser`:

```
>>> parser = argparse.ArgumentParser(
...     description='A foo that bars',
...     epilog="And that's how you'd foo a bar")
>>> parser.print_help()
usage: argparse.py [-h]

A foo that bars

optional arguments:
  -h, --help  show this help message and exit

And that's how you'd foo a bar
```

As with the description argument, the `epilog=` text is by default line-wrapped, but this behavior can be adjusted with the formatter_class argument to `ArgumentParser`.

parents

Sometimes, several parsers share a common set of arguments. Rather than repeating the definitions of these arguments, a single parser with all the shared arguments and passed to `parents=` argument to `ArgumentParser` can be used. The `parents=` argument takes a list of `ArgumentParser` objects, collects all the positional and optional actions from them, and adds these actions to the `ArgumentParser` object being constructed:

```
>>> parent_parser = argparse.ArgumentParser(add_help=False)
>>> parent_parser.add_argument('--parent', type=int)

>>> foo_parser = argparse.ArgumentParser(parents=[parent_parser])
>>> foo_parser.add_argument('foo')
>>> foo_parser.parse_args(['--parent', '2', 'XXX'])
Namespace(foo='XXX', parent=2)

>>> bar_parser = argparse.ArgumentParser(parents=[parent_parser])
>>> bar_parser.add_argument('--bar')
>>> bar_parser.parse_args(['--bar', 'YYY'])
Namespace(bar='YYY', parent=None)
```

Note that most parent parsers will specify `add_help=False`. Otherwise, the `ArgumentParser` will see two `-h/--help` options (one in the parent and one in the child) and raise an error.

> **Note:** You must fully initialize the parsers before passing them via `parents=`. If you change the parent parsers after the child parser, those changes will not be reflected in the child.

formatter_class

`ArgumentParser` objects allow the help formatting to be customized by specifying an alternate formatting class. Currently, there are four such classes:

class argparse.**RawDescriptionHelpFormatter**

class argparse.**RawTextHelpFormatter**

class argparse.**ArgumentDefaultsHelpFormatter**

class argparse.**MetavarTypeHelpFormatter**

`RawDescriptionHelpFormatter` and `RawTextHelpFormatter` give more control over how textual descriptions are displayed. By default, `ArgumentParser` objects line-wrap the description and epilog texts in command-line help messages:

```
>>> parser = argparse.ArgumentParser(
...     prog='PROG',
...     description='''this description
...         was indented weird
...             but that is okay''',
...     epilog='''
...             likewise for this epilog whose whitespace will
...         be cleaned up and whose words will be wrapped
...         across a couple lines''')
>>> parser.print_help()
usage: PROG [-h]

this description was indented weird but that is okay

optional arguments:
 -h, --help  show this help message and exit

likewise for this epilog whose whitespace will be cleaned up and whose words
will be wrapped across a couple lines
```

Passing `RawDescriptionHelpFormatter` as `formatter_class=` indicates that description and epilog are already correctly formatted and should not be line-wrapped:

```
>>> parser = argparse.ArgumentParser(
...     prog='PROG',
...     formatter_class=argparse.RawDescriptionHelpFormatter,
...     description=textwrap.dedent('''\
...         Please do not mess up this text!
...         --------------------------------
```

```
...                I have indented it
...                exactly the way
...                I want it
...            '''))
>>> parser.print_help()
usage: PROG [-h]

Please do not mess up this text!
--------------------------------
    I have indented it
    exactly the way
    I want it

optional arguments:
 -h, --help   show this help message and exit
```

`RawTextHelpFormatter` maintains whitespace for all sorts of help text, including argument descriptions. However, multiple new lines are replaced with one. If you wish to preserve multiple blank lines, add spaces between the newlines.

`ArgumentDefaultsHelpFormatter` automatically adds information about default values to each of the argument help messages:

```
>>> parser = argparse.ArgumentParser(
...       prog='PROG',
...       formatter_class=argparse.ArgumentDefaultsHelpFormatter)
>>> parser.add_argument('--foo', type=int, default=42, help='FOO!')
>>> parser.add_argument('bar', nargs='*', default=[1, 2, 3], help='BAR!')
>>> parser.print_help()
usage: PROG [-h] [--foo FOO] [bar [bar ...]]

positional arguments:
 bar          BAR! (default: [1, 2, 3])

optional arguments:
 -h, --help   show this help message and exit
 --foo FOO    FOO! (default: 42)
```

`MetavarTypeHelpFormatter` uses the name of the type argument for each argument as the display name for its values (rather than using the dest as the regular formatter does):

```
>>> parser = argparse.ArgumentParser(
...       prog='PROG',
...       formatter_class=argparse.MetavarTypeHelpFormatter)
>>> parser.add_argument('--foo', type=int)
>>> parser.add_argument('bar', type=float)
>>> parser.print_help()
usage: PROG [-h] [--foo int] float

positional arguments:
  float
```

```
optional arguments:
  -h, --help  show this help message and exit
  --foo int
```

prefix_chars

Most command-line options will use - as the prefix, e.g. `-f/--foo`. Parsers that need to support different or additional prefix characters, e.g. for options like `+f` or `/foo`, may specify them using the `prefix_chars=` argument to the ArgumentParser constructor:

```
>>> parser = argparse.ArgumentParser(prog='PROG', prefix_chars='-+')
>>> parser.add_argument('+f')
>>> parser.add_argument('++bar')
>>> parser.parse_args('+f X ++bar Y'.split())
Namespace(bar='Y', f='X')
```

The `prefix_chars=` argument defaults to `'-'`. Supplying a set of characters that does not include - will cause `-f/--foo` options to be disallowed.

fromfile_prefix_chars

Sometimes, for example when dealing with a particularly long argument lists, it may make sense to keep the list of arguments in a file rather than typing it out at the command line. If the `fromfile_prefix_chars=` argument is given to the ArgumentParser constructor, then arguments that start with any of the specified characters will be treated as files, and will be replaced by the arguments they contain. For example:

```
>>> with open('args.txt', 'w') as fp:
...     fp.write('-f\nbar')
>>> parser = argparse.ArgumentParser(fromfile_prefix_chars='@')
>>> parser.add_argument('-f')
>>> parser.parse_args(['-f', 'foo', '@args.txt'])
Namespace(f='bar')
```

Arguments read from a file must by default be one per line (but see also `convert_arg_line_to_args()`) and are treated as if they were in the same place as the original file referencing argument on the command line. So in the example above, the expression `['-f', 'foo', '@args.txt']` is considered equivalent to the expression `['-f', 'foo', '-f', 'bar']`.

The `fromfile_prefix_chars=` argument defaults to `None`, meaning that arguments will never be treated as file references.

argument_default

Generally, argument defaults are specified either by passing a default to `add_argument()` or by calling the `set_defaults()` methods with a specific set of name-value pairs. Sometimes however, it may be useful to specify a single parser-wide default for arguments. This can be accomplished by passing the `argument_default=` keyword argument to `ArgumentParser`. For example, to globally suppress attribute creation on `parse_args()` calls, we supply `argument_default=SUPPRESS`:

```
>>> parser = argparse.ArgumentParser(argument_default=argparse.SUPPRESS)
>>> parser.add_argument('--foo')
>>> parser.add_argument('bar', nargs='?')
>>> parser.parse_args(['--foo', '1', 'BAR'])
Namespace(bar='BAR', foo='1')
>>> parser.parse_args([])
Namespace()
```

allow_abbrev

Normally, when you pass an argument list to the `parse_args()` method of an `ArgumentParser`, it recognizes abbreviations of long options.

This feature can be disabled by setting `allow_abbrev` to `False`:

```
>>> parser = argparse.ArgumentParser(prog='PROG', allow_abbrev=False)
>>> parser.add_argument('--foobar', action='store_true')
>>> parser.add_argument('--foonley', action='store_false')
>>> parser.parse_args(['--foon'])
usage: PROG [-h] [--foobar] [--foonley]
PROG: error: unrecognized arguments: --foon
```

New in version 3.5.

conflict_handler

`ArgumentParser` objects do not allow two actions with the same option string. By default, `ArgumentParser` objects raise an exception if an attempt is made to create an argument with an option string that is already in use:

```
>>> parser = argparse.ArgumentParser(prog='PROG')
>>> parser.add_argument('-f', '--foo', help='old foo help')
>>> parser.add_argument('--foo', help='new foo help')
Traceback (most recent call last):
 ..
ArgumentError: argument --foo: conflicting option string(s): --foo
```

Sometimes (e.g. when using parents) it may be useful to simply override any older arguments with the same option string. To get this behavior, the value `'resolve'` can be supplied to the `conflict_handler=` argument of `ArgumentParser`:

```
>>> parser = argparse.ArgumentParser(prog='PROG', conflict_handler='resolve')
>>> parser.add_argument('-f', '--foo', help='old foo help')
>>> parser.add_argument('--foo', help='new foo help')
>>> parser.print_help()
usage: PROG [-h] [-f FOO] [--foo FOO]

optional arguments:
 -h, --help  show this help message and exit
 -f FOO      old foo help
 --foo FOO   new foo help
```

Note that `ArgumentParser` objects only remove an action if all of its option strings are overridden. So, in the example above, the old `-f/--foo` action is retained as the `-f` action, because only the `--foo` option string was overridden.

add_help

By default, ArgumentParser objects add an option which simply displays the parser's help message. For example, consider a file named `myprogram.py` containing the following code:

```python
import argparse
parser = argparse.ArgumentParser()
parser.add_argument('--foo', help='foo help')
args = parser.parse_args()
```

If `-h` or `--help` is supplied at the command line, the ArgumentParser help will be printed:

```
$ python myprogram.py --help
usage: myprogram.py [-h] [--foo FOO]

optional arguments:
 -h, --help  show this help message and exit
 --foo FOO   foo help
```

Occasionally, it may be useful to disable the addition of this help option. This can be achieved by passing `False` as the add_help= argument to `ArgumentParser`:

```
>>> parser = argparse.ArgumentParser(prog='PROG', add_help=False)
>>> parser.add_argument('--foo', help='foo help')
>>> parser.print_help()
usage: PROG [--foo FOO]

optional arguments:
 --foo FOO  foo help
```

The help option is typically `-h/--help`. The exception to this is if the `prefix_chars=` is specified and does not include `-`, in which case `-h` and `--help` are not valid options. In this case, the first character in `prefix_chars` is used to prefix the help options:

```
>>> parser = argparse.ArgumentParser(prog='PROG', prefix_chars='+/')
>>> parser.print_help()
usage: PROG [+h]

optional arguments:
  +h, ++help  show this help message and exit
```

The add_argument() method

ArgumentParser.**add_argument**(*name or flags...*[, *action*][, *nargs*][, *const*][, *default*][, *type*][, *choices*][, *required*][, *help*][, *metavar*][, *dest*])

> Define how a single command-line argument should be parsed. Each parameter has its own more detailed description below, but in short they are:
>
> - name or flags - Either a name or a list of option strings, e.g. foo or -f, --foo.
> - action - The basic type of action to be taken when this argument is encountered at the command line.
> - nargs - The number of command-line arguments that should be consumed.
> - const - A constant value required by some action and nargs selections.
> - default - The value produced if the argument is absent from the command line.
> - type - The type to which the command-line argument should be converted.
> - choices - A container of the allowable values for the argument.
> - required - Whether or not the command-line option may be omitted (optionals only).
> - help - A brief description of what the argument does.
> - metavar - A name for the argument in usage messages.
> - dest - The name of the attribute to be added to the object returned by parse_args().

The following sections describe how each of these are used.

name or flags

The add_argument() method must know whether an optional argument, like -f or --foo, or a positional argument, like a list of filenames, is expected. The first arguments passed to add_argument() must therefore be either a series of flags, or a simple argument name. For example, an optional argument could be created like:

```
>>> parser.add_argument('-f', '--foo')
```

while a positional argument could be created like:

```
>>> parser.add_argument('bar')
```

When parse_args() is called, optional arguments will be identified by the - prefix, and the remaining arguments will be assumed to be positional:

```
>>> parser = argparse.ArgumentParser(prog='PROG')
>>> parser.add_argument('-f', '--foo')
>>> parser.add_argument('bar')
>>> parser.parse_args(['BAR'])
Namespace(bar='BAR', foo=None)
>>> parser.parse_args(['BAR', '--foo', 'FOO'])
Namespace(bar='BAR', foo='FOO')
>>> parser.parse_args(['--foo', 'FOO'])
usage: PROG [-h] [-f FOO] bar
PROG: error: the following arguments are required: bar
```

action

ArgumentParser objects associate command-line arguments with actions. These actions can do just about anything with the command-line arguments associated with them, though most actions simply add an attribute to the object returned by parse_args(). The action keyword argument specifies how the command-line arguments should be handled. The supplied actions are:

- 'store' - This just stores the argument's value. This is the default action. For example:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo')
>>> parser.parse_args('--foo 1'.split())
Namespace(foo='1')
```

- 'store_const' - This stores the value specified by the const keyword argument. The 'store_const' action is most commonly used with optional arguments that specify some sort of flag. For example:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo', action='store_const', const=42)
>>> parser.parse_args(['--foo'])
Namespace(foo=42)
```

- 'store_true' and 'store_false' - These are special cases of 'store_const' used for storing the values True and False respectively. In addition, they create default values of False and True respectively. For example:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo', action='store_true')
>>> parser.add_argument('--bar', action='store_false')
>>> parser.add_argument('--baz', action='store_false')
>>> parser.parse_args('--foo --bar'.split())
Namespace(foo=True, bar=False, baz=True)
```

- 'append' - This stores a list, and appends each argument value to the list. This is useful to allow an option to be specified multiple times. Example usage:

```
>>> parser = argparse.ArgumentParser()                                    >>>
>>> parser.add_argument('--foo', action='append')
>>> parser.parse_args('--foo 1 --foo 2'.split())
Namespace(foo=['1', '2'])
```

- 'append_const' - This stores a list, and appends the value specified by the const keyword argument to the list. (Note that the const keyword argument defaults to None.) The 'append_const' action is typically useful when multiple arguments need to store constants to the same list. For example:

```
>>> parser = argparse.ArgumentParser()                                    >>>
>>> parser.add_argument('--str', dest='types', action='append_const', const=
>>> parser.add_argument('--int', dest='types', action='append_const', const=
>>> parser.parse_args('--str --int'.split())
Namespace(types=[<class 'str'>, <class 'int'>])
```

- 'count' - This counts the number of times a keyword argument occurs. For example, this is useful for increasing verbosity levels:

```
>>> parser = argparse.ArgumentParser()                                    >>>
>>> parser.add_argument('--verbose', '-v', action='count')
>>> parser.parse_args(['-vvv'])
Namespace(verbose=3)
```

- 'help' - This prints a complete help message for all the options in the current parser and then exits. By default a help action is automatically added to the parser. See ArgumentParser for details of how the output is created.
- 'version' - This expects a version= keyword argument in the add_argument() call, and prints version information and exits when invoked:

```
>>> import argparse                                                       >>>
>>> parser = argparse.ArgumentParser(prog='PROG')
>>> parser.add_argument('--version', action='version', version='%(prog)s 2.0
>>> parser.parse_args(['--version'])
PROG 2.0
```

- 'extend' - This stores a list, and extends each argument value to the list. Example usage:

```
>>> parser = argparse.ArgumentParser()                                    >>>
>>> parser.add_argument("--foo", action="extend", nargs="+", type=str)
>>> parser.parse_args(["--foo", "f1", "--foo", "f2", "f3", "f4"])
Namespace(foo=['f1', 'f2', 'f3', 'f4'])
```

New in version 3.8.

You may also specify an arbitrary action by passing an Action subclass or other object that implements the same interface. The recommended way to do this is to extend `Action`, overriding the `__call__` method and optionally the `__init__` method.

An example of a custom action:

```python
>>> class FooAction(argparse.Action):
...     def __init__(self, option_strings, dest, nargs=None, **kwargs):
...         if nargs is not None:
...             raise ValueError("nargs not allowed")
...         super(FooAction, self).__init__(option_strings, dest, **kwargs)
...     def __call__(self, parser, namespace, values, option_string=None):
...         print('%r %r %r' % (namespace, values, option_string))
...         setattr(namespace, self.dest, values)
...
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo', action=FooAction)
>>> parser.add_argument('bar', action=FooAction)
>>> args = parser.parse_args('1 --foo 2'.split())
Namespace(bar=None, foo=None) '1' None
Namespace(bar='1', foo=None) '2' '--foo'
>>> args
Namespace(bar='1', foo='2')
```

For more details, see `Action`.

nargs

ArgumentParser objects usually associate a single command-line argument with a single action to be taken. The `nargs` keyword argument associates a different number of command-line arguments with a single action. The supported values are:

- `N` (an integer). `N` arguments from the command line will be gathered together into a list. For example:

```python
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo', nargs=2)
>>> parser.add_argument('bar', nargs=1)
>>> parser.parse_args('c --foo a b'.split())
Namespace(bar=['c'], foo=['a', 'b'])
```

  Note that `nargs=1` produces a list of one item. This is different from the default, in which the item is produced by itself.

- `'?'`. One argument will be consumed from the command line if possible, and produced as a single item. If no command-line argument is present, the value from default will be produced. Note that for optional arguments, there is an additional case - the option string is present but not followed by a command-line argument. In this case the value from const will be produced. Some examples to illustrate this:

```
>>> parser = argparse.ArgumentParser()                                      >>>
>>> parser.add_argument('--foo', nargs='?', const='c', default='d')
>>> parser.add_argument('bar', nargs='?', default='d')
>>> parser.parse_args(['XX', '--foo', 'YY'])
Namespace(bar='XX', foo='YY')
>>> parser.parse_args(['XX', '--foo'])
Namespace(bar='XX', foo='c')
>>> parser.parse_args([])
Namespace(bar='d', foo='d')
```

One of the more common uses of `nargs='?'` is to allow optional input and output files:

```
>>> parser = argparse.ArgumentParser()                                      >>>
>>> parser.add_argument('infile', nargs='?', type=argparse.FileType('r'),
...                     default=sys.stdin)
>>> parser.add_argument('outfile', nargs='?', type=argparse.FileType('w'),
...                     default=sys.stdout)
>>> parser.parse_args(['input.txt', 'output.txt'])
Namespace(infile=<_io.TextIOWrapper name='input.txt' encoding='UTF-8'>,
          outfile=<_io.TextIOWrapper name='output.txt' encoding='UTF-8'>)
>>> parser.parse_args([])
Namespace(infile=<_io.TextIOWrapper name='<stdin>' encoding='UTF-8'>,
          outfile=<_io.TextIOWrapper name='<stdout>' encoding='UTF-8'>)
```

- `'*'`. All command-line arguments present are gathered into a list. Note that it generally doesn't make much sense to have more than one positional argument with `nargs='*'`, but multiple optional arguments with `nargs='*'` is possible. For example:

```
>>> parser = argparse.ArgumentParser()                                      >>>
>>> parser.add_argument('--foo', nargs='*')
>>> parser.add_argument('--bar', nargs='*')
>>> parser.add_argument('baz', nargs='*')
>>> parser.parse_args('a b --foo x y --bar 1 2'.split())
Namespace(bar=['1', '2'], baz=['a', 'b'], foo=['x', 'y'])
```

- `'+'`. Just like `'*'`, all command-line args present are gathered into a list. Additionally, an error message will be generated if there wasn't at least one command-line argument present. For example:

```
>>> parser = argparse.ArgumentParser(prog='PROG')                           >>>
>>> parser.add_argument('foo', nargs='+')
>>> parser.parse_args(['a', 'b'])
Namespace(foo=['a', 'b'])
>>> parser.parse_args([])
usage: PROG [-h] foo [foo ...]
PROG: error: the following arguments are required: foo
```

- `argparse.REMAINDER`. All the remaining command-line arguments are gathered into a list. This is commonly useful for command line utilities that dispatch to other command line utilities:

```
>>>
>>> parser = argparse.ArgumentParser(prog='PROG')
>>> parser.add_argument('--foo')
>>> parser.add_argument('command')
>>> parser.add_argument('args', nargs=argparse.REMAINDER)
>>> print(parser.parse_args('--foo B cmd --arg1 XX ZZ'.split()))
Namespace(args=['--arg1', 'XX', 'ZZ'], command='cmd', foo='B')
```

If the `nargs` keyword argument is not provided, the number of arguments consumed is determined by the action. Generally this means a single command-line argument will be consumed and a single item (not a list) will be produced.

const

The `const` argument of add_argument() is used to hold constant values that are not read from the command line but are required for the various `ArgumentParser` actions. The two most common uses of it are:

- When add_argument() is called with `action='store_const'` or `action='append_const'`. These actions add the `const` value to one of the attributes of the object returned by parse_args(). See the action description for examples.
- When add_argument() is called with option strings (like `-f` or `--foo`) and `nargs='?'`. This creates an optional argument that can be followed by zero or one command-line arguments. When parsing the command line, if the option string is encountered with no command-line argument following it, the value of `const` will be assumed instead. See the nargs description for examples.

With the `'store_const'` and `'append_const'` actions, the `const` keyword argument must be given. For other actions, it defaults to `None`.

default

All optional arguments and some positional arguments may be omitted at the command line. The `default` keyword argument of add_argument(), whose value defaults to `None`, specifies what value should be used if the command-line argument is not present. For optional arguments, the `default` value is used when the option string was not present at the command line:

```
>>>
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo', default=42)
>>> parser.parse_args(['--foo', '2'])
Namespace(foo='2')
>>> parser.parse_args([])
Namespace(foo=42)
```

If the `default` value is a string, the parser parses the value as if it were a command-line argument. In particular, the parser applies any type conversion argument, if provided, before setting the attribute on the `Namespace` return value. Otherwise, the parser uses the value as is:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--length', default='10', type=int)
>>> parser.add_argument('--width', default=10.5, type=int)
>>> parser.parse_args()
Namespace(length=10, width=10.5)
```

For positional arguments with nargs equal to ? or *, the default value is used when no command-line argument was present:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('foo', nargs='?', default=42)
>>> parser.parse_args(['a'])
Namespace(foo='a')
>>> parser.parse_args([])
Namespace(foo=42)
```

Providing default=argparse.SUPPRESS causes no attribute to be added if the command-line argument was not present:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo', default=argparse.SUPPRESS)
>>> parser.parse_args([])
Namespace()
>>> parser.parse_args(['--foo', '1'])
Namespace(foo='1')
```

type

By default, ArgumentParser objects read command-line arguments in as simple strings. However, quite often the command-line string should instead be interpreted as another type, like a float or int. The type keyword argument of add_argument() allows any necessary type-checking and type conversions to be performed. Common built-in types and functions can be used directly as the value of the type argument:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('foo', type=int)
>>> parser.add_argument('bar', type=open)
>>> parser.parse_args('2 temp.txt'.split())
Namespace(bar=<_io.TextIOWrapper name='temp.txt' encoding='UTF-8'>, foo=2)
```

See the section on the default keyword argument for information on when the type argument is applied to default arguments.

To ease the use of various types of files, the argparse module provides the factory FileType which takes the mode=, bufsize=, encoding= and errors= arguments of the open() function. For example, FileType('w') can be used to create a writable file:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('bar', type=argparse.FileType('w'))
>>> parser.parse_args(['out.txt'])
Namespace(bar=<_io.TextIOWrapper name='out.txt' encoding='UTF-8'>)
```

type= can take any callable that takes a single string argument and returns the converted value:

```
>>> def perfect_square(string):
...     value = int(string)
...     sqrt = math.sqrt(value)
...     if sqrt != int(sqrt):
...         msg = "%r is not a perfect square" % string
...         raise argparse.ArgumentTypeError(msg)
...     return value
...
>>> parser = argparse.ArgumentParser(prog='PROG')
>>> parser.add_argument('foo', type=perfect_square)
>>> parser.parse_args(['9'])
Namespace(foo=9)
>>> parser.parse_args(['7'])
usage: PROG [-h] foo
PROG: error: argument foo: '7' is not a perfect square
```

The choices keyword argument may be more convenient for type checkers that simply check against a range of values:

```
>>> parser = argparse.ArgumentParser(prog='PROG')
>>> parser.add_argument('foo', type=int, choices=range(5, 10))
>>> parser.parse_args(['7'])
Namespace(foo=7)
>>> parser.parse_args(['11'])
usage: PROG [-h] {5,6,7,8,9}
PROG: error: argument foo: invalid choice: 11 (choose from 5, 6, 7, 8, 9)
```

See the choices section for more details.

choices

Some command-line arguments should be selected from a restricted set of values. These can be handled by passing a container object as the *choices* keyword argument to add_argument(). When the command line is parsed, argument values will be checked, and an error message will be displayed if the argument was not one of the acceptable values:

```
>>> parser = argparse.ArgumentParser(prog='game.py')
>>> parser.add_argument('move', choices=['rock', 'paper', 'scissors'])
>>> parser.parse_args(['rock'])
Namespace(move='rock')
>>> parser.parse_args(['fire'])
usage: game.py [-h] {rock,paper,scissors}
```

```
game.py: error: argument move: invalid choice: 'fire' (choose from 'rock',
'paper', 'scissors')
```

Note that inclusion in the *choices* container is checked after any type conversions have been performed, so the type of the objects in the *choices* container should match the type specified:

```
>>> parser = argparse.ArgumentParser(prog='doors.py')
>>> parser.add_argument('door', type=int, choices=range(1, 4))
>>> print(parser.parse_args(['3']))
Namespace(door=3)
>>> parser.parse_args(['4'])
usage: doors.py [-h] {1,2,3}
doors.py: error: argument door: invalid choice: 4 (choose from 1, 2, 3)
```

Any container can be passed as the *choices* value, so list objects, set objects, and custom containers are all supported.

required

In general, the argparse module assumes that flags like -f and --bar indicate *optional* arguments, which can always be omitted at the command line. To make an option *required*, True can be specified for the required= keyword argument to add_argument():

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo', required=True)
>>> parser.parse_args(['--foo', 'BAR'])
Namespace(foo='BAR')
>>> parser.parse_args([])
usage: argparse.py [-h] [--foo FOO]
argparse.py: error: option --foo is required
```

As the example shows, if an option is marked as required, parse_args() will report an error if that option is not present at the command line.

> **Note:** Required options are generally considered bad form because users expect *options* to be *optional*, and thus they should be avoided when possible.

help

The help value is a string containing a brief description of the argument. When a user requests help (usually by using -h or --help at the command line), these help descriptions will be displayed with each argument:

```
>>> parser = argparse.ArgumentParser(prog='frobble')
>>> parser.add_argument('--foo', action='store_true',
...                      help='foo the bars before frobbling')
>>> parser.add_argument('bar', nargs='+',
```

```
...                                 help='one of the bars to be frobbled')
>>> parser.parse_args(['-h'])
usage: frobble [-h] [--foo] bar [bar ...]

positional arguments:
 bar       one of the bars to be frobbled

optional arguments:
 -h, --help  show this help message and exit
 --foo    foo the bars before frobbling
```

The `help` strings can include various format specifiers to avoid repetition of things like the program name or the argument default. The available specifiers include the program name, %(prog)s and most keyword arguments to add_argument(), e.g. %(default)s, %(type)s, etc.:

```
>>> parser = argparse.ArgumentParser(prog='frobble')
>>> parser.add_argument('bar', nargs='?', type=int, default=42,
...                         help='the bar to %(prog)s (default: %(default)s)')
>>> parser.print_help()
usage: frobble [-h] [bar]

positional arguments:
 bar       the bar to frobble (default: 42)

optional arguments:
 -h, --help  show this help message and exit
```

As the help string supports %-formatting, if you want a literal % to appear in the help string, you must escape it as %%.

argparse supports silencing the help entry for certain options, by setting the `help` value to argparse.SUPPRESS:

```
>>> parser = argparse.ArgumentParser(prog='frobble')
>>> parser.add_argument('--foo', help=argparse.SUPPRESS)
>>> parser.print_help()
usage: frobble [-h]

optional arguments:
  -h, --help  show this help message and exit
```

metavar

When `ArgumentParser` generates help messages, it needs some way to refer to each expected argument. By default, ArgumentParser objects use the dest value as the "name" of each object. By default, for positional argument actions, the dest value is used directly, and for optional argument actions, the dest value is uppercased. So, a single positional argument with `dest='bar'` will be referred to as `bar`. A single optional argument `--foo` that should be followed by a single command-line argument will be referred to as `FOO`. An example:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo')
>>> parser.add_argument('bar')
>>> parser.parse_args('X --foo Y'.split())
Namespace(bar='X', foo='Y')
>>> parser.print_help()
usage:  [-h] [--foo FOO] bar

positional arguments:
 bar

optional arguments:
 -h, --help  show this help message and exit
 --foo FOO
```

An alternative name can be specified with `metavar`:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo', metavar='YYY')
>>> parser.add_argument('bar', metavar='XXX')
>>> parser.parse_args('X --foo Y'.split())
Namespace(bar='X', foo='Y')
>>> parser.print_help()
usage:  [-h] [--foo YYY] XXX

positional arguments:
 XXX

optional arguments:
 -h, --help  show this help message and exit
 --foo YYY
```

Note that `metavar` only changes the *displayed* name - the name of the attribute on the parse_args() object is still determined by the dest value.

Different values of `nargs` may cause the metavar to be used multiple times. Providing a tuple to `metavar` specifies a different display for each of the arguments:

```
>>> parser = argparse.ArgumentParser(prog='PROG')
>>> parser.add_argument('-x', nargs=2)
>>> parser.add_argument('--foo', nargs=2, metavar=('bar', 'baz'))
>>> parser.print_help()
usage: PROG [-h] [-x X X] [--foo bar baz]

optional arguments:
 -h, --help     show this help message and exit
 -x X X
 --foo bar baz
```

dest

Most `ArgumentParser` actions add some value as an attribute of the object returned by `parse_args()`. The name of this attribute is determined by the `dest` keyword argument of `add_argument()`. For positional argument actions, `dest` is normally supplied as the first argument to `add_argument()`:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('bar')
>>> parser.parse_args(['XXX'])
Namespace(bar='XXX')
```

For optional argument actions, the value of `dest` is normally inferred from the option strings. `ArgumentParser` generates the value of `dest` by taking the first long option string and stripping away the initial `--` string. If no long option strings were supplied, `dest` will be derived from the first short option string by stripping the initial `-` character. Any internal `-` characters will be converted to `_` characters to make sure the string is a valid attribute name. The examples below illustrate this behavior:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('-f', '--foo-bar', '--foo')
>>> parser.add_argument('-x', '-y')
>>> parser.parse_args('-f 1 -x 2'.split())
Namespace(foo_bar='1', x='2')
>>> parser.parse_args('--foo 1 -y 2'.split())
Namespace(foo_bar='1', x='2')
```

`dest` allows a custom attribute name to be provided:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo', dest='bar')
>>> parser.parse_args('--foo XXX'.split())
Namespace(bar='XXX')
```

Action classes

Action classes implement the Action API, a callable which returns a callable which processes arguments from the command-line. Any object which follows this API may be passed as the `action` parameter to `add_argument()`.

class argparse. **Action**(*option_strings*, *dest*, *nargs=None*, *const=None*, *default=None*, *type=None*, *choices=None*, *required=False*, *help=None*, *metavar=None*)

Action objects are used by an ArgumentParser to represent the information needed to parse a single argument from one or more strings from the command line. The Action class must accept the two positional arguments plus any keyword arguments passed to `ArgumentParser.add_argument()` except for the `action` itself.

Instances of Action (or return value of any callable to the `action` parameter) should have attributes "dest", "option_strings", "default", "type", "required", "help", etc. defined. The easiest way to ensure these attributes are defined is to call `Action.__init__`.

Action instances should be callable, so subclasses must override the `__call__` method, which should accept four parameters:

- `parser` - The ArgumentParser object which contains this action.
- `namespace` - The `Namespace` object that will be returned by `parse_args()`. Most actions add an attribute to this object using `setattr()`.
- `values` - The associated command-line arguments, with any type conversions applied. Type conversions are specified with the `type` keyword argument to `add_argument()`.
- `option_string` - The option string that was used to invoke this action. The `option_string` argument is optional, and will be absent if the action is associated with a positional argument.

The `__call__` method may perform arbitrary actions, but will typically set attributes on the `namespace` based on `dest` and `values`.

The parse_args() method

`ArgumentParser.`**`parse_args`**`(`*args=None*, *namespace=None*`)`

Convert argument strings to objects and assign them as attributes of the namespace. Return the populated namespace.

Previous calls to `add_argument()` determine exactly what objects are created and how they are assigned. See the documentation for `add_argument()` for details.

- args - List of strings to parse. The default is taken from `sys.argv`.
- namespace - An object to take the attributes. The default is a new empty `Namespace` object.

Option value syntax

The `parse_args()` method supports several ways of specifying the value of an option (if it takes one). In the simplest case, the option and its value are passed as two separate arguments:

```
>>> parser = argparse.ArgumentParser(prog='PROG')
>>> parser.add_argument('-x')
>>> parser.add_argument('--foo')
>>> parser.parse_args(['-x', 'X'])
Namespace(foo=None, x='X')
>>> parser.parse_args(['--foo', 'FOO'])
Namespace(foo='FOO', x=None)
```

For long options (options with names longer than a single character), the option and value can also be passed as a single command-line argument, using = to separate them:

```
>>> parser.parse_args(['--foo=FOO'])
Namespace(foo='FOO', x=None)
```

For short options (options only one character long), the option and its value can be concatenated:

```
>>> parser.parse_args(['-xX'])
Namespace(foo=None, x='X')
```

Several short options can be joined together, using only a single - prefix, as long as only the last option (or none of them) requires a value:

```
>>> parser = argparse.ArgumentParser(prog='PROG')
>>> parser.add_argument('-x', action='store_true')
>>> parser.add_argument('-y', action='store_true')
>>> parser.add_argument('-z')
>>> parser.parse_args(['-xyzZ'])
Namespace(x=True, y=True, z='Z')
```

Invalid arguments

While parsing the command line, parse_args() checks for a variety of errors, including ambiguous options, invalid types, invalid options, wrong number of positional arguments, etc. When it encounters such an error, it exits and prints the error along with a usage message:

```
>>> parser = argparse.ArgumentParser(prog='PROG')
>>> parser.add_argument('--foo', type=int)
>>> parser.add_argument('bar', nargs='?')

>>> # invalid type
>>> parser.parse_args(['--foo', 'spam'])
usage: PROG [-h] [--foo FOO] [bar]
PROG: error: argument --foo: invalid int value: 'spam'

>>> # invalid option
>>> parser.parse_args(['--bar'])
usage: PROG [-h] [--foo FOO] [bar]
PROG: error: no such option: --bar

>>> # wrong number of arguments
>>> parser.parse_args(['spam', 'badger'])
usage: PROG [-h] [--foo FOO] [bar]
PROG: error: extra arguments found: badger
```

Arguments containing -

The `parse_args()` method attempts to give errors whenever the user has clearly made a mistake, but some situations are inherently ambiguous. For example, the command-line argument -1 could either be an attempt to specify an option or an attempt to provide a positional argument. The `parse_args()` method is cautious here: positional arguments may only begin with - if they look like negative numbers and there are no options in the parser that look like negative numbers:

```
>>> parser = argparse.ArgumentParser(prog='PROG')
>>> parser.add_argument('-x')
>>> parser.add_argument('foo', nargs='?')

>>> # no negative number options, so -1 is a positional argument
>>> parser.parse_args(['-x', '-1'])
Namespace(foo=None, x='-1')

>>> # no negative number options, so -1 and -5 are positional arguments
>>> parser.parse_args(['-x', '-1', '-5'])
Namespace(foo='-5', x='-1')

>>> parser = argparse.ArgumentParser(prog='PROG')
>>> parser.add_argument('-1', dest='one')
>>> parser.add_argument('foo', nargs='?')

>>> # negative number options present, so -1 is an option
>>> parser.parse_args(['-1', 'X'])
Namespace(foo=None, one='X')

>>> # negative number options present, so -2 is an option
>>> parser.parse_args(['-2'])
usage: PROG [-h] [-1 ONE] [foo]
PROG: error: no such option: -2

>>> # negative number options present, so both -1s are options
>>> parser.parse_args(['-1', '-1'])
usage: PROG [-h] [-1 ONE] [foo]
PROG: error: argument -1: expected one argument
```

If you have positional arguments that must begin with - and don't look like negative numbers, you can insert the pseudo-argument '--' which tells `parse_args()` that everything after that is a positional argument:

```
>>> parser.parse_args(['--', '-f'])
Namespace(foo='-f', one=None)
```

Argument abbreviations (prefix matching)

The `parse_args()` method by default allows long options to be abbreviated to a prefix, if the abbreviation is unambiguous (the prefix matches a unique option):

```
>>> parser = argparse.ArgumentParser(prog='PROG')
>>> parser.add_argument('-bacon')
>>> parser.add_argument('-badger')
>>> parser.parse_args('-bac MMM'.split())
Namespace(bacon='MMM', badger=None)
>>> parser.parse_args('-bad WOOD'.split())
Namespace(bacon=None, badger='WOOD')
>>> parser.parse_args('-ba BA'.split())
usage: PROG [-h] [-bacon BACON] [-badger BADGER]
PROG: error: ambiguous option: -ba could match -badger, -bacon
```

An error is produced for arguments that could produce more than one options. This feature can be disabled by setting allow_abbrev to `False`.

Beyond `sys.argv`

Sometimes it may be useful to have an ArgumentParser parse arguments other than those of `sys.argv`. This can be accomplished by passing a list of strings to `parse_args()`. This is useful for testing at the interactive prompt:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument(
...     'integers', metavar='int', type=int, choices=range(10),
...     nargs='+', help='an integer in the range 0..9')
>>> parser.add_argument(
...     '--sum', dest='accumulate', action='store_const', const=sum,
...     default=max, help='sum the integers (default: find the max)')
>>> parser.parse_args(['1', '2', '3', '4'])
Namespace(accumulate=<built-in function max>, integers=[1, 2, 3, 4])
>>> parser.parse_args(['1', '2', '3', '4', '--sum'])
Namespace(accumulate=<built-in function sum>, integers=[1, 2, 3, 4])
```

The Namespace object

class argparse.**Namespace**

Simple class used by default by `parse_args()` to create an object holding attributes and return it.

This class is deliberately simple, just an `object` subclass with a readable string representation. If you prefer to have dict-like view of the attributes, you can use the standard Python idiom, `vars()`:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo')
>>> args = parser.parse_args(['--foo', 'BAR'])
>>> vars(args)
{'foo': 'BAR'}
```

It may also be useful to have an `ArgumentParser` assign attributes to an already existing object, rather than a new `Namespace` object. This can be achieved by specifying the `namespace=` keyword argument:

```
>>> class C:
...     pass
...
>>> c = C()
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo')
>>> parser.parse_args(args=['--foo', 'BAR'], namespace=c)
>>> c.foo
'BAR'
```

Other utilities

Sub-commands

`ArgumentParser.`**`add_subparsers`**`([`*title*`][, `*description*`][, `*prog*`][, `*parser_class*`][, `*action*`][, `*option_string*`][, `*dest*`][, `*required*`][, `*help*`][, `*metavar*`])`

Many programs split up their functionality into a number of sub-commands, for example, the `svn` program can invoke sub-commands like `svn checkout`, `svn update`, and `svn commit`. Splitting up functionality this way can be a particularly good idea when a program performs several different functions which require different kinds of command-line arguments. `ArgumentParser` supports the creation of such sub-commands with the `add_subparsers()` method. The `add_subparsers()` method is normally called with no arguments and returns a special action object. This object has a single method, `add_parser()`, which takes a command name and any `ArgumentParser` constructor arguments, and returns an `ArgumentParser` object that can be modified as usual.

Description of parameters:

- title - title for the sub-parser group in help output; by default "subcommands" if description is provided, otherwise uses title for positional arguments
- description - description for the sub-parser group in help output, by default `None`
- prog - usage information that will be displayed with sub-command help, by default the name of the program and any positional arguments before the subparser argument
- parser_class - class which will be used to create sub-parser instances, by default the class of the current parser (e.g. ArgumentParser)
- action - the basic type of action to be taken when this argument is encountered at the command line
- dest - name of the attribute under which sub-command name will be stored; by default `None` and no value is stored
- required - Whether or not a subcommand must be provided, by default `False` (added in 3.7)

- **help** - help for sub-parser group in help output, by default `None`
- **metavar** - string presenting available sub-commands in help; by default it is `None` and presents sub-commands in form {cmd1, cmd2, ..}

Some example usage:

```
>>> # create the top-level parser
>>> parser = argparse.ArgumentParser(prog='PROG')
>>> parser.add_argument('--foo', action='store_true', help='foo help')
>>> subparsers = parser.add_subparsers(help='sub-command help')
>>>
>>> # create the parser for the "a" command
>>> parser_a = subparsers.add_parser('a', help='a help')
>>> parser_a.add_argument('bar', type=int, help='bar help')
>>>
>>> # create the parser for the "b" command
>>> parser_b = subparsers.add_parser('b', help='b help')
>>> parser_b.add_argument('--baz', choices='XYZ', help='baz help')
>>>
>>> # parse some argument lists
>>> parser.parse_args(['a', '12'])
Namespace(bar=12, foo=False)
>>> parser.parse_args(['--foo', 'b', '--baz', 'Z'])
Namespace(baz='Z', foo=True)
```

Note that the object returned by `parse_args()` will only contain attributes for the main parser and the subparser that was selected by the command line (and not any other subparsers). So in the example above, when the a command is specified, only the `foo` and `bar` attributes are present, and when the b command is specified, only the `foo` and `baz` attributes are present.

Similarly, when a help message is requested from a subparser, only the help for that particular parser will be printed. The help message will not include parent parser or sibling parser messages. (A help message for each subparser command, however, can be given by supplying the `help=` argument to `add_parser()` as above.)

```
>>> parser.parse_args(['--help'])
usage: PROG [-h] [--foo] {a,b} ...

positional arguments:
  {a,b}    sub-command help
    a      a help
    b      b help

optional arguments:
  -h, --help  show this help message and exit
  --foo    foo help

>>> parser.parse_args(['a', '--help'])
usage: PROG a [-h] bar
```

```
positional arguments:
  bar        bar help

optional arguments:
  -h, --help  show this help message and exit

>>> parser.parse_args(['b', '--help'])
usage: PROG b [-h] [--baz {X,Y,Z}]

optional arguments:
  -h, --help       show this help message and exit
  --baz {X,Y,Z}  baz help
```

The add_subparsers() method also supports title and description keyword arguments.
When either is present, the subparser's commands will appear in their own group in the help
output. For example:

```
>>> parser = argparse.ArgumentParser()
>>> subparsers = parser.add_subparsers(title='subcommands',
...                                     description='valid subcommands',
...                                     help='additional help')
>>> subparsers.add_parser('foo')
>>> subparsers.add_parser('bar')
>>> parser.parse_args(['-h'])
usage:  [-h] {foo,bar} ...

optional arguments:
  -h, --help  show this help message and exit

subcommands:
  valid subcommands

  {foo,bar}    additional help
```

Furthermore, add_parser supports an additional aliases argument, which allows multiple
strings to refer to the same subparser. This example, like svn, aliases co as a shorthand for
checkout:

```
>>> parser = argparse.ArgumentParser()
>>> subparsers = parser.add_subparsers()
>>> checkout = subparsers.add_parser('checkout', aliases=['co'])
>>> checkout.add_argument('foo')
>>> parser.parse_args(['co', 'bar'])
Namespace(foo='bar')
```

One particularly effective way of handling sub-commands is to combine the use of the
add_subparsers() method with calls to set_defaults() so that each subparser knows
which Python function it should execute. For example:

```
>>> # sub-command functions
>>> def foo(args):
```

```
...         print(args.x * args.y)
...
>>> def bar(args):
...         print('((%s))' % args.z)
...
>>> # create the top-level parser
>>> parser = argparse.ArgumentParser()
>>> subparsers = parser.add_subparsers()
>>>
>>> # create the parser for the "foo" command
>>> parser_foo = subparsers.add_parser('foo')
>>> parser_foo.add_argument('-x', type=int, default=1)
>>> parser_foo.add_argument('y', type=float)
>>> parser_foo.set_defaults(func=foo)
>>>
>>> # create the parser for the "bar" command
>>> parser_bar = subparsers.add_parser('bar')
>>> parser_bar.add_argument('z')
>>> parser_bar.set_defaults(func=bar)
>>>
>>> # parse the args and call whatever function was selected
>>> args = parser.parse_args('foo 1 -x 2'.split())
>>> args.func(args)
2.0
>>>
>>> # parse the args and call whatever function was selected
>>> args = parser.parse_args('bar XYZYX'.split())
>>> args.func(args)
((XYZYX))
```

This way, you can let parse_args() do the job of calling the appropriate function after argument parsing is complete. Associating functions with actions like this is typically the easiest way to handle the different actions for each of your subparsers. However, if it is necessary to check the name of the subparser that was invoked, the dest keyword argument to the add_subparsers() call will work:

```
>>> parser = argparse.ArgumentParser()
>>> subparsers = parser.add_subparsers(dest='subparser_name')
>>> subparser1 = subparsers.add_parser('1')
>>> subparser1.add_argument('-x')
>>> subparser2 = subparsers.add_parser('2')
>>> subparser2.add_argument('y')
>>> parser.parse_args(['2', 'frobble'])
Namespace(subparser_name='2', y='frobble')
```

Changed in version 3.7: New *required* keyword argument.

FileType objects

class argparse.**FileType**(*mode='r'*, *bufsize=-1*, *encoding=None*, *errors=None*)

The `FileType` factory creates objects that can be passed to the type argument of `ArgumentParser.add_argument()`. Arguments that have `FileType` objects as their type will open command-line arguments as files with the requested modes, buffer sizes, encodings and error handling (see the `open()` function for more details):

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--raw', type=argparse.FileType('wb', 0))
>>> parser.add_argument('out', type=argparse.FileType('w', encoding='UTF-8'))
>>> parser.parse_args(['--raw', 'raw.dat', 'file.txt'])
Namespace(out=<_io.TextIOWrapper name='file.txt' mode='w' encoding='UTF-8'>,
```

FileType objects understand the pseudo-argument `'-'` and automatically convert this into `sys.stdin` for readable `FileType` objects and `sys.stdout` for writable `FileType` objects:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('infile', type=argparse.FileType('r'))
>>> parser.parse_args(['-'])
Namespace(infile=<_io.TextIOWrapper name='<stdin>' encoding='UTF-8'>)
```

New in version 3.4: The *encodings* and *errors* keyword arguments.

Argument groups

ArgumentParser. **add_argument_group**(*title=None*, *description=None*)

By default, `ArgumentParser` groups command-line arguments into "positional arguments" and "optional arguments" when displaying help messages. When there is a better conceptual grouping of arguments than this default one, appropriate groups can be created using the `add_argument_group()` method:

```
>>> parser = argparse.ArgumentParser(prog='PROG', add_help=False)
>>> group = parser.add_argument_group('group')
>>> group.add_argument('--foo', help='foo help')
>>> group.add_argument('bar', help='bar help')
>>> parser.print_help()
usage: PROG [--foo FOO] bar

group:
  bar      bar help
  --foo FOO  foo help
```

The `add_argument_group()` method returns an argument group object which has an `add_argument()` method just like a regular `ArgumentParser`. When an argument is added to the group, the parser treats it just like a normal argument, but displays the argument in a separate group for help messages. The `add_argument_group()` method accepts *title* and *description* arguments which can be used to customize this display:

```
>>> parser = argparse.ArgumentParser(prog='PROG', add_help=False)
>>> group1 = parser.add_argument_group('group1', 'group1 description')
>>> group1.add_argument('foo', help='foo help')
>>> group2 = parser.add_argument_group('group2', 'group2 description')
>>> group2.add_argument('--bar', help='bar help')
>>> parser.print_help()
usage: PROG [--bar BAR] foo

group1:
  group1 description

  foo     foo help

group2:
  group2 description

  --bar BAR  bar help
```

Note that any arguments not in your user-defined groups will end up back in the usual "positional arguments" and "optional arguments" sections.

Mutual exclusion

ArgumentParser.**add_mutually_exclusive_group**(*required=False*)

Create a mutually exclusive group. argparse will make sure that only one of the arguments in the mutually exclusive group was present on the command line:

```
>>> parser = argparse.ArgumentParser(prog='PROG')
>>> group = parser.add_mutually_exclusive_group()
>>> group.add_argument('--foo', action='store_true')
>>> group.add_argument('--bar', action='store_false')
>>> parser.parse_args(['--foo'])
Namespace(bar=True, foo=True)
>>> parser.parse_args(['--bar'])
Namespace(bar=False, foo=False)
>>> parser.parse_args(['--foo', '--bar'])
usage: PROG [-h] [--foo | --bar]
PROG: error: argument --bar: not allowed with argument --foo
```

The add_mutually_exclusive_group() method also accepts a *required* argument, to indicate that at least one of the mutually exclusive arguments is required:

```
>>> parser = argparse.ArgumentParser(prog='PROG')
>>> group = parser.add_mutually_exclusive_group(required=True)
>>> group.add_argument('--foo', action='store_true')
>>> group.add_argument('--bar', action='store_false')
>>> parser.parse_args([])
usage: PROG [-h] (--foo | --bar)
PROG: error: one of the arguments --foo --bar is required
```

Note that currently mutually exclusive argument groups do not support the *title* and *description* arguments of `add_argument_group()`.

Parser defaults

`ArgumentParser.`**`set_defaults`**(***kwargs*)

Most of the time, the attributes of the object returned by `parse_args()` will be fully determined by inspecting the command-line arguments and the argument actions. `set_defaults()` allows some additional attributes that are determined without any inspection of the command line to be added:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('foo', type=int)
>>> parser.set_defaults(bar=42, baz='badger')
>>> parser.parse_args(['736'])
Namespace(bar=42, baz='badger', foo=736)
```

Note that parser-level defaults always override argument-level defaults:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo', default='bar')
>>> parser.set_defaults(foo='spam')
>>> parser.parse_args([])
Namespace(foo='spam')
```

Parser-level defaults can be particularly useful when working with multiple parsers. See the `add_subparsers()` method for an example of this type.

`ArgumentParser.`**`get_default`**(*dest*)

Get the default value for a namespace attribute, as set by either `add_argument()` or by `set_defaults()`:

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo', default='badger')
>>> parser.get_default('foo')
'badger'
```

Printing help

In most typical applications, `parse_args()` will take care of formatting and printing any usage or error messages. However, several formatting methods are available:

`ArgumentParser.`**`print_usage`**(*file=None*)

Print a brief description of how the `ArgumentParser` should be invoked on the command line. If *file* is None, `sys.stdout` is assumed.

ArgumentParser.**print_help**(*file=None*)

> Print a help message, including the program usage and information about the arguments registered with the `ArgumentParser`. If *file* is None, `sys.stdout` is assumed.

There are also variants of these methods that simply return a string instead of printing it:

ArgumentParser.**format_usage**()

> Return a string containing a brief description of how the `ArgumentParser` should be invoked on the command line.

ArgumentParser.**format_help**()

> Return a string containing a help message, including the program usage and information about the arguments registered with the `ArgumentParser`.

Partial parsing

ArgumentParser.**parse_known_args**(*args=None*, *namespace=None*)

Sometimes a script may only parse a few of the command-line arguments, passing the remaining arguments on to another script or program. In these cases, the `parse_known_args()` method can be useful. It works much like `parse_args()` except that it does not produce an error when extra arguments are present. Instead, it returns a two item tuple containing the populated namespace and the list of remaining argument strings.

```
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo', action='store_true')
>>> parser.add_argument('bar')
>>> parser.parse_known_args(['--foo', '--badger', 'BAR', 'spam'])
(Namespace(bar='BAR', foo=True), ['--badger', 'spam'])
```

> **Warning:** Prefix matching rules apply to `parse_known_args()`. The parser may consume an option even if it's just a prefix of one of its known options, instead of leaving it in the remaining arguments list.

Customizing file parsing

ArgumentParser.**convert_arg_line_to_args**(*arg_line*)

> Arguments that are read from a file (see the *fromfile_prefix_chars* keyword argument to the `ArgumentParser` constructor) are read one argument per line. `convert_arg_line_to_args()` can be overridden for fancier reading.
>
> This method takes a single argument *arg_line* which is a string read from the argument file. It returns a list of arguments parsed from this string. The method is called once per line read from the argument file, in order.

A useful override of this method is one that treats each space-separated word as an argument. The following example demonstrates how to do this:

```python
class MyArgumentParser(argparse.ArgumentParser):
    def convert_arg_line_to_args(self, arg_line):
        return arg_line.split()
```

Exiting methods

ArgumentParser.**exit**(*status=0*, *message=None*)

This method terminates the program, exiting with the specified *status* and, if given, it prints a *message* before that. The user can override this method to handle these steps differently:

```python
class ErrorCatchingArgumentParser(argparse.ArgumentParser):
    def exit(self, status=0, message=None):
        if status:
            raise Exception(f'Exiting because of an error: {message}')
        exit(status)
```

ArgumentParser.**error**(*message*)

This method prints a usage message including the *message* to the standard error and terminates the program with a status code of 2.

Intermixed parsing

ArgumentParser.**parse_intermixed_args**(*args=None*, *namespace=None*)

ArgumentParser.**parse_known_intermixed_args**(*args=None*, *namespace=None*)

A number of Unix commands allow the user to intermix optional arguments with positional arguments. The parse_intermixed_args() and parse_known_intermixed_args() methods support this parsing style.

These parsers do not support all the argparse features, and will raise exceptions if unsupported features are used. In particular, subparsers, argparse.REMAINDER, and mutually exclusive groups that include both optionals and positionals are not supported.

The following example shows the difference between parse_known_args() and parse_intermixed_args(): the former returns ['2', '3'] as unparsed arguments, while the latter collects all the positionals into rest.

```python
>>> parser = argparse.ArgumentParser()
>>> parser.add_argument('--foo')
>>> parser.add_argument('cmd')
>>> parser.add_argument('rest', nargs='*', type=int)
>>> parser.parse_known_args('doit 1 --foo bar 2 3'.split())
```

```
(Namespace(cmd='doit', foo='bar', rest=[1]), ['2', '3'])
>>> parser.parse_intermixed_args('doit 1 --foo bar 2 3'.split())
Namespace(cmd='doit', foo='bar', rest=[1, 2, 3])
```

parse_known_intermixed_args() returns a two item tuple containing the populated namespace and the list of remaining argument strings. parse_intermixed_args() raises an error if there are any remaining unparsed argument strings.

New in version 3.7.

Upgrading optparse code

Originally, the argparse module had attempted to maintain compatibility with optparse. However, optparse was difficult to extend transparently, particularly with the changes required to support the new nargs= specifiers and better usage messages. When most everything in optparse had either been copy-pasted over or monkey-patched, it no longer seemed practical to try to maintain the backwards compatibility.

The argparse module improves on the standard library optparse module in a number of ways including:

- Handling positional arguments.
- Supporting sub-commands.
- Allowing alternative option prefixes like + and /.
- Handling zero-or-more and one-or-more style arguments.
- Producing more informative usage messages.
- Providing a much simpler interface for custom type and action.

A partial upgrade path from optparse to argparse:

- Replace all optparse.OptionParser.add_option() calls with ArgumentParser.add_argument() calls.
- Replace (options, args) = parser.parse_args() with args = parser.parse_args() and add additional ArgumentParser.add_argument() calls for the positional arguments. Keep in mind that what was previously called options, now in the argparse context is called args.
- Replace optparse.OptionParser.disable_interspersed_args() by using parse_intermixed_args() instead of parse_args().
- Replace callback actions and the callback_* keyword arguments with type or action arguments.
- Replace string names for type keyword arguments with the corresponding type objects (e.g. int, float, complex, etc).
- Replace optparse.Values with Namespace and optparse.OptionError and optparse.OptionValueError with ArgumentError.

- Replace strings with implicit arguments such as `%default` or `%prog` with the standard Python syntax to use dictionaries to format strings, that is, `%(default)s` and `%(prog)s`.
- Replace the OptionParser constructor `version` argument with a call to `parser.add_argument('--version', action='version', version='<the version>')`.