:mod:`io` --- Core tools for working with streams

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 1); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 4)

Unknown directive type "module".

```
.. module:: io
   :synopsis: Core tools for working with streams.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 7)

Unknown directive type "moduleauthor".

```
.. moduleauthor:: Guido van Rossum <guido@python.org>
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 8)

Unknown directive type "moduleauthor".

```
.. moduleauthor:: Mike Verdone <mike.verdone@gmail.com>
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 9)

Unknown directive type "moduleauthor".

```
.. moduleauthor:: Mark Russell <mark.russell@zen.co.uk>
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 10)

Unknown directive type "moduleauthor".

```
.. moduleauthor:: Antoine Pitrou <solipsis@pitrou.net>
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 11)

Unknown directive type "moduleauthor".

```
.. moduleauthor:: Amaury Forgeot d'Arc <amauryfa@gmail.com>
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 12)

Unknown directive type "moduleauthor".

```
.. moduleauthor:: Benjamin Peterson <benjamin@python.org>
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 13)

Unknown directive type "sectionauthor".

```
.. sectionauthor:: Benjamin Peterson <benjamin@python.org>
```

Source code: :source:`Lib/io.py`

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 15); *backlink*

Unknown interpreted text role "source".

Overview

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 24)

Unknown directive type "index".

```
.. index::
   single: file object; io module
```

The :mod:`io` module provides Python's main facilities for dealing with various types of I/O. There are three main types of I/O: *text I/O*, *binary I/O* and *raw I/O*. These are generic categories, and various backing stores can be used for each of them. A concrete object belonging to any of these categories is called a :term:`file object`. Other common terms are *stream* and *file-like object*.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 27); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 27); *backlink*

Unknown interpreted text role "term".

Independent of its category, each concrete stream object will also have various capabilities: it can be read-only, write-only, or read-write. It can also allow arbitrary random access (seeking forwards or backwards to any location), or only sequential access (for example in the case of a socket or pipe).

All streams are careful about the type of data you give to them. For example giving a :class:`str` object to the `write()` method of a binary stream will raise a :exc:`TypeError`. So will giving a :class:`bytes` object to the `write()` method of a text stream.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 40); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 40); *backlink*

Unknown interpreted text role "exc".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 40); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 45)

Unknown directive type "versionchanged".

```
.. versionchanged:: 3.3
   Operations that used to raise :exc:`IOError` now raise :exc:`OSError`, since
   :exc:`IOError` is now an alias of :exc:`OSError`.
```

Text I/O

Text I/O expects and produces :class:`str` objects. This means that whenever the backing store is natively made of bytes (such as in the case of a file), encoding and decoding of data is made transparently as well as optional translation of platform-specific newline characters.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 53); *backlink*

Unknown interpreted text role "class".

The easiest way to create a text stream is with :meth:`open()`, optionally specifying an encoding:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 58); *backlink*

Unknown interpreted text role "meth".

```
f = open("myfile.txt", "r", encoding="utf-8")
```

In-memory text streams are also available as :class:`StringIO` objects:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 63); *backlink*

Unknown interpreted text role "class".

```
f = io.StringIO("some initial text data")
```

The text stream API is described in detail in the documentation of :class:`TextIOBase`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 67); *backlink*

Unknown interpreted text role "class".

Binary I/O

Binary I/O (also called *buffered I/O*) expects :term:`bytes-like objects <bytes-like object>` and produces :class:`bytes` objects. No encoding, decoding, or newline translation is performed. This category of streams can be used for all kinds of non-text data, and also when manual control over the handling of text data is desired.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 74); *backlink*

Unknown interpreted text role "term".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 74); *backlink*

Unknown interpreted text role "class".

The easiest way to create a binary stream is with :meth:`open()` with `'b'` in the mode string:

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Unknown interpreted text role "meth".

```
f = open("myfile.jpg", "rb")
```

In-memory binary streams are also available as :class:`BytesIO` objects:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 85); *backlink*

Unknown interpreted text role "class".

```
f = io.BytesIO(b"some initial binary data: \x00\x01")
```

The binary stream API is described in detail in the docs of :class:`BufferedIOBase`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 89); *backlink*

Unknown interpreted text role "class".

Other library modules may provide additional ways to create text or binary streams. See :meth:`socket.socket.makefile` for example.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 92); *backlink*

Unknown interpreted text role "meth".

Raw I/O

Raw I/O (also called *unbuffered I/O*) is generally used as a low-level building-block for binary and text streams; it is rarely useful to directly manipulate a raw stream from user code. Nevertheless, you can create a raw stream by opening a file in binary mode with buffering disabled:

```
f = open("myfile.jpg", "rb", buffering=0)
```

The raw stream API is described in detail in the docs of :class:`RawIOBase`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 106); *backlink*

Unknown interpreted text role "class".

Text Encoding

The default encoding of :class:`TextIOWrapper` and :func:`open` is locale-specific (:func:`locale.getpreferredencoding(False) <locale.getpreferredencoding>`).

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System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 114); backlink

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 114); backlink

Unknown interpreted text role "func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 114); backlink

Unknown interpreted text role "func".

However, many developers forget to specify the encoding when opening text files encoded in UTF-8 (e.g. JSON, TOML, Markdown, etc...) since most Unix platforms use UTF-8 locale by default. This causes bugs because the locale encoding is not UTF-8 for most Windows users. For example:

```
# May not work on Windows when non-ASCII characters in the file.
with open("README.md") as f:
    long_description = f.read()
```

Additionally, while there is no concrete plan as of yet, Python may change the default text file encoding to UTF-8 in the future.

Accordingly, it is highly recommended that you specify the encoding explicitly when opening text files. If you want to use UTF-8, pass `encoding="utf-8"`. To use the current locale encoding, `encoding="locale"` is supported in Python 3.10.

When you need to run existing code on Windows that attempts to open UTF-8 files using the default locale encoding, you can enable the UTF-8 mode. See :ref:`UTF-8 mode on Windows <win-utf8-mode>`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 134); backlink

Unknown interpreted text role "ref".

Opt-in EncodingWarning

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 143)

Unknown directive type "versionadded".

```
.. versionadded:: 3.10
   See :pep:`597` for more details.
```

To find where the default locale encoding is used, you can enable the `-X warn_default_encoding` command line option or set the :envvar:`PYTHONWARNDEFAULTENCODING` environment variable, which will emit an :exc:`EncodingWarning` when the default encoding is used.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 146); backlink

Unknown interpreted text role "envvar".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 146); backlink

Unknown interpreted text role "exc".

If you are providing an API that uses :func:`open` or :class:`TextIOWrapper` and passes `encoding=None` as a parameter, you can use :func:`text_encoding` so that callers of the API will emit an :exc:`EncodingWarning` if they don't pass an `encoding`. However, please consider using UTF-8 by default (i.e. `encoding="utf-8"`) for new APIs.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 151); backlink

Unknown interpreted text role "func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 151); backlink

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 151); backlink

Unknown interpreted text role "func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-

main\Doc\library\[cpython-main][Doc][library]io.rst, line 151); *backlink*

Unknown interpreted text role "exc".

High-level Module Interface

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 162)

Unknown directive type "data".

```
.. data:: DEFAULT_BUFFER_SIZE

   An int containing the default buffer size used by the module's buffered I/O
   classes.  :func:`open` uses the file's blksize (as obtained by
   :func:`os.stat`) if possible.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 169)

Unknown directive type "function".

```
.. function:: open(file, mode='r', buffering=-1, encoding=None, errors=None, newline=None, closefd=True, op

   This is an alias for the builtin :func:`open` function.

   .. audit-event:: open path,mode,flags io.open

      This function raises an :ref:`auditing event <auditing>` ``open`` with
      arguments ``path``, ``mode`` and ``flags``. The ``mode`` and ``flags``
      arguments may have been modified or inferred from the original call.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 180)

Unknown directive type "function".

```
.. function:: open_code(path)

   Opens the provided file with mode ``'rb'``. This function should be used
   when the intent is to treat the contents as executable code.

   ``path`` should be a :class:`str` and an absolute path.

   The behavior of this function may be overridden by an earlier call to the
   :c:func:`PyFile_SetOpenCodeHook`. However, assuming that ``path`` is a
   :class:`str` and an absolute path, ``open_code(path)`` should always behave
   the same as ``open(path, 'rb')``. Overriding the behavior is intended for
   additional validation or preprocessing of the file.

   .. versionadded:: 3.8
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 196)

Unknown directive type "function".

```
.. function:: text_encoding(encoding, stacklevel=2)

   This is a helper function for callables that use :func:`open` or
   :class:`TextIOWrapper` and have an ``encoding=None`` parameter.

   This function returns *encoding* if it is not ``None``.
   Otherwise, it returns ``"locale"`` or ``"utf-8"`` depending on
   :ref:`UTF-8 Mode <utf8-mode>`.

   This function emits an :class:`EncodingWarning` if
   :data:`sys.flags.warn_default_encoding <sys.flags>` is true and *encoding*
   is ``None``. *stacklevel* specifies where the warning is emitted.
   For example::

      def read_text(path, encoding=None):
          encoding = io.text_encoding(encoding)  # stacklevel=2
          with open(path, encoding) as f:
              return f.read()

   In this example, an :class:`EncodingWarning` is emitted for the caller of
   ``read_text()``.

   See :ref:`io-text-encoding` for more information.

   .. versionadded:: 3.10

   .. versionchanged:: 3.11
      :func:`text_encoding` returns "utf-8" when UTF-8 mode is enabled and
```

```
*encoding* is ``None``.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 227)

Unknown directive type "exception".

```
.. exception:: BlockingIOError

   This is a compatibility alias for the builtin :exc:`BlockingIOError`
   exception.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 233)

Unknown directive type "exception".

```
.. exception:: UnsupportedOperation

   An exception inheriting :exc:`OSError` and :exc:`ValueError` that is raised
   when an unsupported operation is called on a stream.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 239)

Unknown directive type "seealso".

```
.. seealso::

   :mod:`sys`
       contains the standard IO streams: :data:`sys.stdin`, :data:`sys.stdout`,
       and :data:`sys.stderr`.
```

Class hierarchy

The implementation of I/O streams is organized as a hierarchy of classes. First :term:`abstract base classes <abstract base class>` (ABCs), which are used to specify the various categories of streams, then concrete classes providing the standard stream implementations.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 249); *backlink*

Unknown interpreted text role "term".

Note

The abstract base classes also provide default implementations of some methods in order to help implementation of concrete stream classes. For example, :class:`BufferedIOBase` provides unoptimized implementations of :meth:`~IOBase.readinto` and :meth:`~IOBase.readline`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 256); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 256); *backlink*

Unknown interpreted text role "meth".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 256); *backlink*

Unknown interpreted text role "meth".

At the top of the I/O hierarchy is the abstract base class :class:`IOBase`. It defines the basic interface to a stream. Note, however, that there is no separation between reading and writing to streams; implementations are allowed to raise :exc:`UnsupportedOperation` if they do not support a given operation.

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-

main\Doc\library\[cpython-main] [Doc] [library]io.rst, line 261); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]io.rst, line 261); *backlink*

Unknown interpreted text role "exc".

The :class:`RawIOBase` ABC extends :class:`IOBase`. It deals with the reading and writing of bytes to a stream. :class:`FileIO` subclasses :class:`RawIOBase` to provide an interface to files in the machine's file system.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]io.rst, line 266); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]io.rst, line 266); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]io.rst, line 266); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]io.rst, line 266); *backlink*

Unknown interpreted text role "class".

The :class:`BufferedIOBase` ABC extends :class:`IOBase`. It deals with buffering on a raw binary stream (:class:`RawIOBase`). Its subclasses, :class:`BufferedWriter`, :class:`BufferedReader`, and :class:`BufferedRWPair` buffer raw binary streams that are readable, writable, and both readable and writable, respectively. :class:`BufferedRandom` provides a buffered interface to seekable streams. Another :class:`BufferedIOBase` subclass, :class:`BytesIO`, is a stream of in-memory bytes.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]io.rst, line 270); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]io.rst, line 270); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]io.rst, line 270); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]io.rst, line 270); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]io.rst, line 270); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]io.rst, line 270); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]io.rst, line 270); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]io.rst, line 270); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 270); *backlink*

Unknown interpreted text role "class".

The :class:`TextIOBase` ABC extends :class:`IOBase`. It deals with streams whose bytes represent text, and handles encoding and decoding to and from strings. :class:`TextIOWrapper`, which extends :class:`TextIOBase`, is a buffered text interface to a buffered raw stream (:class:`BufferedIOBase`). Finally, :class:`StringIO` is an in-memory stream for text.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 278); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 278); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 278); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 278); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 278); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 278); *backlink*

Unknown interpreted text role "class".

Argument names are not part of the specification, and only the arguments of :func:`open` are intended to be used as keyword arguments.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 284); *backlink*

Unknown interpreted text role "func".

The following table summarizes the ABCs provided by the :mod:`io` module:

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 287); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 289)

Unknown directive type "tabularcolumns".

```
.. tabularcolumns:: |l|l|L|L|
```

ABC	Inherits	Stub Methods	Mixin Methods and Properties

ABC	Inherits	Stub Methods	Mixin Methods and Properties
:class:`IOBase` **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 295); *backlink* Unknown interpreted text role "class".		`fileno`, `seek`, and `truncate`	`close`, `closed`, `__enter__`, `__exit__`, `flush`, `isatty`, `__iter__`, `__next__`, `readable`, `readline`, `readlines`, `seekable`, `tell`, `writable`, and `writelines`
:class:`RawIOBase` **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 300); *backlink* Unknown interpreted text role "class".	:class:`IOBase` **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 300); *backlink* Unknown interpreted text role "class".	`readinto` and `write`	Inherited :class:`IOBase` methods, `read`, and `readall` **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 300); *backlink* Unknown interpreted text role "class".
:class:`BufferedIOBase` **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 302); *backlink* Unknown interpreted text role "class".	:class:`IOBase` **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 302); *backlink* Unknown interpreted text role "class".	`detach`, `read`, `read1`, and `write`	Inherited :class:`IOBase` methods, `readinto`, and `readinto1` **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 302); *backlink* Unknown interpreted text role "class".
:class:`TextIOBase` **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 304); *backlink* Unknown interpreted text role "class".	:class:`IOBase` **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 304); *backlink* Unknown interpreted text role "class".	`detach`, `read`, `readline`, and `write`	Inherited :class:`IOBase` methods, `encoding`, `errors`, and `newlines` **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 304); *backlink* Unknown interpreted text role "class".

I/O Base Classes

The abstract base class for all I/O classes.

This class provides empty abstract implementations for many methods that derived classes can override selectively; the default implementations represent a file that cannot be read, written or seeked.

Even though :class:`IOBase` does not declare :meth:`read` or :meth:`write` because their signatures will vary, implementations and clients should consider those methods part of the interface. Also, implementations may raise a :exc:`ValueError` (or :exc:`UnsupportedOperation`) when operations they do not support are called.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, **line 321**); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, **line 321**); *backlink*

Unknown interpreted text role "meth".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, **line 321**); *backlink*

Unknown interpreted text role "meth".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, **line 321**); *backlink*

Unknown interpreted text role "exc".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, **line 321**); *backlink*

Unknown interpreted text role "exc".

The basic type used for binary data read from or written to a file is :class:`bytes`. Other :term:`bytes-like objects <bytes-like object>` are accepted as method arguments too. Text I/O classes work with :class:`str` data.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, **line 327**); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, **line 327**); *backlink*

Unknown interpreted text role "term".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, **line 327**); *backlink*

Unknown interpreted text role "class".

Note that calling any method (even inquiries) on a closed stream is undefined. Implementations may raise :exc:`ValueError` in this case.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, **line 331**); *backlink*

Unknown interpreted text role "exc".

:class:`IOBase` (and its subclasses) supports the iterator protocol, meaning that an :class:`IOBase` object can be iterated over yielding the lines in a stream. Lines are defined slightly differently depending on whether the stream is a binary stream (yielding bytes), or a text stream (yielding character strings). See :meth:`~IOBase.readline` below.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, **line 334**); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, **line 334**); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, **line 334**); *backlink*

Unknown interpreted text role "meth".

:class:`IOBase` is also a context manager and therefore supports the :keyword:`with` statement. In this example, *file* is closed after the :keyword:`!with` statement's suite is finished---even if an exception occurs:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 340); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 340); *backlink*

Unknown interpreted text role "keyword".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 340); *backlink*

Unknown interpreted text role "keyword".

```
with open('spam.txt', 'w') as file:
    file.write('Spam and eggs!')
```

:class:`IOBase` provides these data attributes and methods:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 347); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 349)

Unknown directive type "method".

```
.. method:: close()

   Flush and close this stream. This method has no effect if the file is
   already closed. Once the file is closed, any operation on the file
   (e.g. reading or writing) will raise a :exc:`ValueError`.

   As a convenience, it is allowed to call this method more than once;
   only the first call, however, will have an effect.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 358)

Unknown directive type "attribute".

```
.. attribute:: closed

   ``True`` if the stream is closed.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 362)

Unknown directive type "method".

```
.. method:: fileno()

   Return the underlying file descriptor (an integer) of the stream if it
   exists.  An :exc:`OSError` is raised if the IO object does not use a file
   descriptor.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 368)

Unknown directive type "method".

```
.. method:: flush()

   Flush the write buffers of the stream if applicable.  This does nothing
   for read-only and non-blocking streams.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 373)

Unknown directive type "method".

```
.. method:: isatty()

   Return ``True`` if the stream is interactive (i.e., connected to
   a terminal/tty device).
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 378)

Unknown directive type "method".

```
.. method:: readable()

   Return ``True`` if the stream can be read from.  If ``False``, :meth:`read`
   will raise :exc:`OSError`.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 383)

Unknown directive type "method".

```
.. method:: readline(size=-1)

   Read and return one line from the stream.  If *size* is specified, at
   most *size* bytes will be read.

   The line terminator is always ``b'\n'`` for binary files; for text files,
   the *newline* argument to :func:`open` can be used to select the line
   terminator(s) recognized.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 392)

Unknown directive type "method".

```
.. method:: readlines(hint=-1)

   Read and return a list of lines from the stream.  *hint* can be specified
   to control the number of lines read: no more lines will be read if the
   total size (in bytes/characters) of all lines so far exceeds *hint*.

   *hint* values of ``0`` or less, as well as ``None``, are treated as no
   hint.

   Note that it's already possible to iterate on file objects using ``for
   line in file: ...`` without calling ``file.readlines()``.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 404)

Unknown directive type "method".

```
.. method:: seek(offset, whence=SEEK_SET)

   Change the stream position to the given byte *offset*.  *offset* is
   interpreted relative to the position indicated by *whence*.  The default
   value for *whence* is :data:`SEEK_SET`.  Values for *whence* are:

   * :data:`SEEK_SET` or ``0`` -- start of the stream (the default);
     *offset* should be zero or positive
   * :data:`SEEK_CUR` or ``1`` -- current stream position; *offset* may
     be negative
   * :data:`SEEK_END` or ``2`` -- end of the stream; *offset* is usually
     negative

   Return the new absolute position.

   .. versionadded:: 3.1
      The ``SEEK_*`` constants.

   .. versionadded:: 3.3
      Some operating systems could support additional values, like
      :data:`os.SEEK_HOLE` or :data:`os.SEEK_DATA`. The valid values
      for a file could depend on it being open in text or binary mode.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 427)

Unknown directive type "method".

```
.. method:: seekable()

   Return ``True`` if the stream supports random access.  If ``False``,
   :meth:`seek`, :meth:`tell` and :meth:`truncate` will raise :exc:`OSError`.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 432)

Unknown directive type "method".

```
.. method:: tell()

   Return the current stream position.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 436)

Unknown directive type "method".

```
.. method:: truncate(size=None)

   Resize the stream to the given *size* in bytes (or the current position
   if *size* is not specified).  The current stream position isn't changed.
   This resizing can extend or reduce the current file size.  In case of
   extension, the contents of the new file area depend on the platform
   (on most systems, additional bytes are zero-filled).  The new file size
   is returned.

   .. versionchanged:: 3.5
      Windows will now zero-fill files when extending.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 448)

Unknown directive type "method".

```
.. method:: writable()

   Return ``True`` if the stream supports writing.  If ``False``,
   :meth:`write` and :meth:`truncate` will raise :exc:`OSError`.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 453)

Unknown directive type "method".

```
.. method:: writelines(lines)

   Write a list of lines to the stream.  Line separators are not added, so it
   is usual for each of the lines provided to have a line separator at the
   end.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 459)

Unknown directive type "method".

```
.. method:: __del__()

   Prepare for object destruction. :class:`IOBase` provides a default
   implementation of this method that calls the instance's
   :meth:`~IOBase.close` method.
```

Base class for raw binary streams. It inherits :class:`IOBase`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 468); *backlink*

Unknown interpreted text role "class".

Raw binary streams typically provide low-level access to an underlying OS device or API, and do not try to encapsulate it in high-level primitives (this functionality is done at a higher-level in buffered binary streams and text streams, described later in this page).

:class:`RawIOBase` provides these methods in addition to those from :class:`IOBase`:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 475); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 475); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 478)

Unknown directive type "method".

```
.. method:: read(size=-1)
```

```
Read up to *size* bytes from the object and return them.  As a convenience,
if *size* is unspecified or -1, all bytes until EOF are returned.
Otherwise, only one system call is ever made.  Fewer than *size* bytes may
be returned if the operating system call returns fewer than *size* bytes.

If 0 bytes are returned, and *size* was not 0, this indicates end of file.
If the object is in non-blocking mode and no bytes are available,
``None`` is returned.

The default implementation defers to :meth:`readall` and
:meth:`readinto`.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 492)

Unknown directive type "method".

```
.. method:: readall()

   Read and return all the bytes from the stream until EOF, using multiple
   calls to the stream if necessary.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 497)

Unknown directive type "method".

```
.. method:: readinto(b)

   Read bytes into a pre-allocated, writable
   :term:`bytes-like object` *b*, and return the
   number of bytes read.  For example, *b* might be a :class:`bytearray`.
   If the object is in non-blocking mode and no bytes
   are available, ``None`` is returned.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 505)

Unknown directive type "method".

```
.. method:: write(b)

   Write the given :term:`bytes-like object`, *b*, to the
   underlying raw stream, and return the number of
   bytes written.  This can be less than the length of *b* in
   bytes, depending on specifics of the underlying raw
   stream, and especially if it is in non-blocking mode.  ``None`` is
   returned if the raw stream is set not to block and no single byte could
   be readily written to it.  The caller may release or mutate *b* after
   this method returns, so the implementation should only access *b*
   during the method call.
```

Base class for binary streams that support some kind of buffering. It inherits :class:`IOBase`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 520); *backlink*

Unknown interpreted text role "class".

The main difference with :class:`RawIOBase` is that methods :meth:`read`, :meth:`readinto` and :meth:`write` will try (respectively) to read as much input as requested or to consume all given output, at the expense of making perhaps more than one system call.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 523); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 523); *backlink*

Unknown interpreted text role "meth".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 523); *backlink*

Unknown interpreted text role "meth".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 523); *backlink*

Unknown interpreted text role "meth".

In addition, those methods can raise :exc:`BlockingIOError` if the underlying raw stream is in non-blocking mode and cannot take or give enough data; unlike their :class:`RawIOBase` counterparts, they will never return `None`.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 528); *backlink*

Unknown interpreted text role "exc".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 528); *backlink*

Unknown interpreted text role "class".

Besides, the :meth:`read` method does not have a default implementation that defers to :meth:`readinto`.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 533); *backlink*

Unknown interpreted text role "meth".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 533); *backlink*

Unknown interpreted text role "meth".

A typical :class:`BufferedIOBase` implementation should not inherit from a :class:`RawIOBase` implementation, but wrap one, like :class:`BufferedWriter` and :class:`BufferedReader` do.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 536); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 536); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 536); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 536); *backlink*

Unknown interpreted text role "class".

:class:`BufferedIOBase` provides or overrides these data attributes and methods in addition to those from :class:`IOBase`:

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 540); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 540); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 543)

Unknown directive type "attribute".

```
.. attribute:: raw

   The underlying raw stream (a :class:`RawIOBase` instance) that
   :class:`BufferedIOBase` deals with.  This is not part of the
   :class:`BufferedIOBase` API and may not exist on some implementations.
```

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 549)

Unknown directive type "method".

```
.. method:: detach()
```

```
Separate the underlying raw stream from the buffer and return it.

After the raw stream has been detached, the buffer is in an unusable
state.

Some buffers, like :class:`BytesIO`, do not have the concept of a single
raw stream to return from this method.  They raise
:exc:`UnsupportedOperation`.

.. versionadded:: 3.1
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 562)

Unknown directive type "method".

```
.. method:: read(size=-1)

   Read and return up to *size* bytes.  If the argument is omitted, ``None``,
   or negative, data is read and returned until EOF is reached.  An empty
   :class:`bytes` object is returned if the stream is already at EOF.

   If the argument is positive, and the underlying raw stream is not
   interactive, multiple raw reads may be issued to satisfy the byte count
   (unless EOF is reached first).  But for interactive raw streams, at most
   one raw read will be issued, and a short result does not imply that EOF is
   imminent.

   A :exc:`BlockingIOError` is raised if the underlying raw stream is in
   non blocking-mode, and has no data available at the moment.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 577)

Unknown directive type "method".

```
.. method:: read1([size])

   Read and return up to *size* bytes, with at most one call to the
   underlying raw stream's :meth:`~RawIOBase.read` (or
   :meth:`~RawIOBase.readinto`) method.  This can be useful if you are
   implementing your own buffering on top of a :class:`BufferedIOBase`
   object.

   If *size* is ``-1`` (the default), an arbitrary number of bytes are
   returned (more than zero unless EOF is reached).
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 588)

Unknown directive type "method".

```
.. method:: readinto(b)

   Read bytes into a pre-allocated, writable
   :term:`bytes-like object` *b* and return the number of bytes read.
   For example, *b* might be a :class:`bytearray`.

   Like :meth:`read`, multiple reads may be issued to the underlying raw
   stream, unless the latter is interactive.

   A :exc:`BlockingIOError` is raised if the underlying raw stream is in non
   blocking-mode, and has no data available at the moment.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 600)

Unknown directive type "method".

```
.. method:: readinto1(b)

   Read bytes into a pre-allocated, writable
   :term:`bytes-like object` *b*, using at most one call to
   the underlying raw stream's :meth:`~RawIOBase.read` (or
   :meth:`~RawIOBase.readinto`) method. Return the number of bytes read.

   A :exc:`BlockingIOError` is raised if the underlying raw stream is in non
   blocking-mode, and has no data available at the moment.

   .. versionadded:: 3.5
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 612)

Unknown directive type "method".

```
.. method:: write(b)

   Write the given :term:`bytes-like object`, *b*, and return the number
   of bytes written (always equal to the length of *b* in bytes, since if
   the write fails an :exc:`OSError` will be raised).  Depending on the
   actual implementation, these bytes may be readily written to the
   underlying stream, or held in a buffer for performance and latency
   reasons.

   When in non-blocking mode, a :exc:`BlockingIOError` is raised if the
   data needed to be written to the raw stream but it couldn't accept
   all the data without blocking.

   The caller may release or mutate *b* after this method returns,
   so the implementation should only access *b* during the method call.
```

Raw File I/O

A raw binary stream representing an OS-level file containing bytes data. It inherits :class:`RawIOBase`.

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 634); *backlink*
>
> Unknown interpreted text role "class".

The *name* can be one of two things:

- a character string or :class:`bytes` object representing the path to the file which will be opened. In this case closefd must be `True` (the default) otherwise an error will be raised.

  > **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 639); *backlink*
  >
  > Unknown interpreted text role "class".

- an integer representing the number of an existing OS-level file descriptor to which the resulting :class:`FileIO` object will give access. When the FileIO object is closed this fd will be closed as well, unless *closefd* is set to `False`.

  > **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 642); *backlink*
  >
  > Unknown interpreted text role "class".

The *mode* can be `'r'`, `'w'`, `'x'` or `'a'` for reading (default), writing, exclusive creation or appending. The file will be created if it doesn't exist when opened for writing or appending; it will be truncated when opened for writing. :exc:`FileExistsError` will be raised if it already exists when opened for creating. Opening a file for creating implies writing, so this mode behaves in a similar way to `'w'`. Add a `'+'` to the mode to allow simultaneous reading and writing.

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 647); *backlink*
>
> Unknown interpreted text role "exc".

The :meth:`read` (when called with a positive argument), :meth:`readinto` and :meth:`write` methods on this class will only make one system call.

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 655); *backlink*
>
> Unknown interpreted text role "meth".

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 655); *backlink*
>
> Unknown interpreted text role "meth".

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 655); *backlink*
>
> Unknown interpreted text role "meth".

A custom opener can be used by passing a callable as *opener*. The underlying file descriptor for the file object is then obtained by calling *opener* with (*name*, *flags*). *opener* must return an open file descriptor (passing :mod:`os.open` as *opener* results in functionality similar to passing `None`).

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 658); *backlink*

Unknown interpreted text role "mod".

The newly created file is :ref:`non-inheritable <fd_inheritance>`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 664); *backlink*

Unknown interpreted text role "ref".

See the :func:`open` built-in function for examples on using the *opener* parameter.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 666); *backlink*

Unknown interpreted text role "func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 669)

Unknown directive type "versionchanged".

```
.. versionchanged:: 3.3
   The *opener* parameter was added.
   The ``'x'`` mode was added.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 673)

Unknown directive type "versionchanged".

```
.. versionchanged:: 3.4
   The file is now non-inheritable.
```

:class:`FileIO` provides these data attributes in addition to those from :class:`RawIOBase` and :class:`IOBase`:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 676); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 676); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 676); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 679)

Unknown directive type "attribute".

```
.. attribute:: mode

   The mode as given in the constructor.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 683)

Unknown directive type "attribute".

```
.. attribute:: name

   The file name.  This is the file descriptor of the file when no name is
   given in the constructor.
```

Buffered Streams

Buffered I/O streams provide a higher-level interface to an I/O device than raw I/O does.

A binary stream using an in-memory bytes buffer. It inherits :class:`BufferedIOBase`. The buffer is discarded when the :meth:`~IOBase.close` method is called.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 697); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 697); *backlink*

Unknown interpreted text role "meth".

The optional argument *initial_bytes* is a :term:`bytes-like object` that contains initial data.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 701); *backlink*

Unknown interpreted text role "term".

:class:`BytesIO` provides or overrides these methods in addition to those from :class:`BufferedIOBase` and :class:`IOBase`:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 704); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 704); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 704); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 707)

Unknown directive type "method".

```
.. method:: getbuffer()

   Return a readable and writable view over the contents of the buffer
   without copying them.  Also, mutating the view will transparently
   update the contents of the buffer::

      >>> b = io.BytesIO(b"abcdef")
      >>> view = b.getbuffer()
      >>> view[2:4] = b"56"
      >>> b.getvalue()
      b'ab56ef'

   .. note::
      As long as the view exists, the :class:`BytesIO` object cannot be
      resized or closed.

   .. versionadded:: 3.2
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 725)

Unknown directive type "method".

```
.. method:: getvalue()

   Return :class:`bytes` containing the entire contents of the buffer.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 730)

Unknown directive type "method".

```
.. method:: read1([size])

   In :class:`BytesIO`, this is the same as :meth:`~BufferedIOBase.read`.

   .. versionchanged:: 3.7
      The *size* argument is now optional.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 737)

Unknown directive type "method".

```
.. method:: readinto1(b)

   In :class:`BytesIO`, this is the same as :meth:`~BufferedIOBase.readinto`.

   .. versionadded:: 3.5
```

A buffered binary stream providing higher-level access to a readable, non seekable :class:`RawIOBase` raw binary stream. It inherits :class:`BufferedIOBase`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 745); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 745); *backlink*

Unknown interpreted text role "class".

When reading data from this object, a larger amount of data may be requested from the underlying raw stream, and kept in an internal buffer. The buffered data can then be returned directly on subsequent reads.

The constructor creates a :class:`BufferedReader` for the given readable *raw* stream and *buffer_size*. If *buffer_size* is omitted, :data:`DEFAULT_BUFFER_SIZE` is used.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 753); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 753); *backlink*

Unknown interpreted text role "data".

:class:`BufferedReader` provides or overrides these methods in addition to those from :class:`BufferedIOBase` and :class:`IOBase`:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 757); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 757); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 757); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 760)

Unknown directive type "method".

```
.. method:: peek([size])

   Return bytes from the stream without advancing the position.  At most one
   single read on the raw stream is done to satisfy the call. The number of
   bytes returned may be less or more than requested.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 766)

Unknown directive type "method".

```
.. method:: read([size])

   Read and return *size* bytes, or if *size* is not given or negative, until
   EOF or if the read call would block in non-blocking mode.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 771)

Unknown directive type "method".

```
.. method:: read1([size])
```

```
Read and return up to *size* bytes with only one call on the raw stream.
If at least one byte is buffered, only buffered bytes are returned.
Otherwise, one raw stream read call is made.

.. versionchanged:: 3.7
   The *size* argument is now optional.
```

A buffered binary stream providing higher-level access to a writeable, non seekable :class:`RawIOBase` raw binary stream. It inherits :class:`BufferedIOBase`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 783); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 783); *backlink*

Unknown interpreted text role "class".

When writing to this object, data is normally placed into an internal buffer. The buffer will be written out to the underlying :class:`RawIOBase` object under various conditions, including:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 787); *backlink*

Unknown interpreted text role "class".

- when the buffer gets too small for all pending data;
- when :meth:`flush()` is called;

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 792); *backlink*

  Unknown interpreted text role "meth".

- when a :meth:`seek()` is requested (for :class:`BufferedRandom` objects);

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 793); *backlink*

  Unknown interpreted text role "meth".

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 793); *backlink*

  Unknown interpreted text role "class".

- when the :class:`BufferedWriter` object is closed or destroyed.

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 794); *backlink*

  Unknown interpreted text role "class".

The constructor creates a :class:`BufferedWriter` for the given writeable *raw* stream. If the *buffer_size* is not given, it defaults to :data:`DEFAULT_BUFFER_SIZE`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 796); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 796); *backlink*

Unknown interpreted text role "data".

:class:`BufferedWriter` provides or overrides these methods in addition to those from :class:`BufferedIOBase` and :class:`IOBase`:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 800); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 800); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 800); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 803)

Unknown directive type "method".

```
.. method:: flush()

   Force bytes held in the buffer into the raw stream.  A
   :exc:`BlockingIOError` should be raised if the raw stream blocks.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 808)

Unknown directive type "method".

```
.. method:: write(b)

   Write the :term:`bytes-like object`, *b*, and return the
   number of bytes written.  When in non-blocking mode, a
   :exc:`BlockingIOError` is raised if the buffer needs to be written out but
   the raw stream blocks.
```

A buffered binary stream providing higher-level access to a seekable :class:`RawIOBase` raw binary stream. It inherits :class:`BufferedReader` and :class:`BufferedWriter`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 818); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 818); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 818); *backlink*

Unknown interpreted text role "class".

The constructor creates a reader and writer for a seekable raw stream, given in the first argument. If the *buffer_size* is omitted it defaults to :data:`DEFAULT_BUFFER_SIZE`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 822); *backlink*

Unknown interpreted text role "data".

:class:`BufferedRandom` is capable of anything :class:`BufferedReader` or :class:`BufferedWriter` can do. In addition, :meth:`seek` and :meth:`tell` are guaranteed to be implemented.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 826); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 826); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 826); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 826); *backlink*

Unknown interpreted text role "meth".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 826); *backlink*

Unknown interpreted text role "meth".

A buffered binary stream providing higher-level access to two non seekable :class:`RawIOBase` raw binary streams---one readable, the other writeable. It inherits :class:`BufferedIOBase`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 833); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 833); *backlink*

Unknown interpreted text role "class".

reader and *writer* are :class:`RawIOBase` objects that are readable and writeable respectively. If the *buffer_size* is omitted it defaults to :data:`DEFAULT_BUFFER_SIZE`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 837); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 837); *backlink*

Unknown interpreted text role "data".

:class:`BufferedRWPair` implements all of :class:`BufferedIOBase`'s methods except for :meth:`~BufferedIOBase.detach`, which raises :exc:`UnsupportedOperation`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 841); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 841); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 841); *backlink*

Unknown interpreted text role "meth".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 841); *backlink*

Unknown interpreted text role "exc".

Warning

:class:`BufferedRWPair` does not attempt to synchronize accesses to its underlying raw streams. You should not pass it the same object as reader and writer; use :class:`BufferedRandom` instead.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 847); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 847); *backlink*

Unknown interpreted text role "class".

Text I/O

Base class for text streams. This class provides a character and line based interface to stream I/O. It inherits :class:`IOBase`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 857); *backlink*

Unknown interpreted text role "class".

:class:`TextIOBase` provides or overrides these data attributes and methods in addition to those from :class:`IOBase`:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 860); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 860); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 863)

Unknown directive type "attribute".

```
.. attribute:: encoding

   The name of the encoding used to decode the stream's bytes into
   strings, and to encode strings into bytes.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 868)

Unknown directive type "attribute".

```
.. attribute:: errors

   The error setting of the decoder or encoder.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 872)

Unknown directive type "attribute".

```
.. attribute:: newlines

   A string, a tuple of strings, or ``None``, indicating the newlines
   translated so far.  Depending on the implementation and the initial
   constructor flags, this may not be available.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 878)

Unknown directive type "attribute".

```
.. attribute:: buffer

   The underlying binary buffer (a :class:`BufferedIOBase` instance) that
   :class:`TextIOBase` deals with.  This is not part of the
   :class:`TextIOBase` API and may not exist in some implementations.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 884)

Unknown directive type "method".

```
.. method:: detach()

   Separate the underlying binary buffer from the :class:`TextIOBase` and
   return it.

   After the underlying buffer has been detached, the :class:`TextIOBase` is
   in an unusable state.

   Some :class:`TextIOBase` implementations, like :class:`StringIO`, may not
   have the concept of an underlying buffer and calling this method will
   raise :exc:`UnsupportedOperation`.

   .. versionadded:: 3.1
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 898)

Unknown directive type "method".

```
.. method:: read(size=-1)

   Read and return at most *size* characters from the stream as a single
   :class:`str`.  If *size* is negative or ``None``, reads until EOF.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 903)

Unknown directive type "method".

```
.. method:: readline(size=-1)

   Read until newline or EOF and return a single ``str``.  If the stream is
   already at EOF, an empty string is returned.

   If *size* is specified, at most *size* characters will be read.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 910)

Unknown directive type "method".

```
.. method:: seek(offset, whence=SEEK_SET)

   Change the stream position to the given *offset*.  Behaviour depends on
   the *whence* parameter.  The default value for *whence* is
   :data:`SEEK_SET`.

   * :data:`SEEK_SET` or ``0``: seek from the start of the stream
     (the default); *offset* must either be a number returned by
     :meth:`TextIOBase.tell`, or zero.  Any other *offset* value
     produces undefined behaviour.
   * :data:`SEEK_CUR` or ``1``: "seek" to the current position;
     *offset* must be zero, which is a no-operation (all other values
     are unsupported).
   * :data:`SEEK_END` or ``2``: seek to the end of the stream;
     *offset* must be zero (all other values are unsupported).

   Return the new absolute position as an opaque number.

   .. versionadded:: 3.1
      The ``SEEK_*`` constants.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 931)

Unknown directive type "method".

```
.. method:: tell()

   Return the current stream position as an opaque number.  The number
   does not usually represent a number of bytes in the underlying
   binary storage.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 937)

Unknown directive type "method".

```
.. method:: write(s)

   Write the string *s* to the stream and return the number of characters
   written.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 943)

Invalid class attribute value for "class" directive: "TextIOWrapper(buffer, encoding=None, errors=None, newline=None, \ line_buffering=False, write_through=False)".

```
.. class:: TextIOWrapper(buffer, encoding=None, errors=None, newline=None, \
                         line_buffering=False, write_through=False)

   A buffered text stream providing higher-level access to a
   :class:`BufferedIOBase` buffered binary stream.  It inherits
   :class:`TextIOBase`.

   *encoding* gives the name of the encoding that the stream will be decoded or
   encoded with.  It defaults to
   :func:`locale.getpreferredencoding(False) <locale.getpreferredencoding>`.
```

```
``encoding="locale"`` can be used to specify the current locale's encoding
explicitly. See :ref:`io-text-encoding` for more information.

*errors* is an optional string that specifies how encoding and decoding
errors are to be handled.  Pass ``'strict'`` to raise a :exc:`ValueError`
exception if there is an encoding error (the default of ``None`` has the same
effect), or pass ``'ignore'`` to ignore errors.  (Note that ignoring encoding
errors can lead to data loss.)  ``'replace'`` causes a replacement marker
(such as ``'?'``) to be inserted where there is malformed data.
``'backslashreplace'`` causes malformed data to be replaced by a
backslashed escape sequence.  When writing, ``'xmlcharrefreplace'``
(replace with the appropriate XML character reference)  or ``'namereplace'``
(replace with ``\N{...}`` escape sequences) can be used.  Any other error
handling name that has been registered with
:func:`codecs.register_error` is also valid.

.. index::
   single: universal newlines; io.TextIOWrapper class

*newline* controls how line endings are handled.  It can be ``None``,
``''``, ``'\n'``, ``'\r'``, and ``'\r\n'``.  It works as follows:

* When reading input from the stream, if *newline* is ``None``,
  :term:`universal newlines` mode is enabled.  Lines in the input can end in
  ``'\n'``, ``'\r'``, or ``'\r\n'``, and these are translated into ``'\n'``
  before being returned to the caller.  If *newline* is ``''``, universal
  newlines mode is enabled, but line endings are returned to the caller
  untranslated.  If *newline* has any of the other legal values, input lines
  are only terminated by the given string, and the line ending is returned to
  the caller untranslated.

* When writing output to the stream, if *newline* is ``None``, any ``'\n'``
  characters written are translated to the system default line separator,
  :data:`os.linesep`.  If *newline* is ``''`` or ``'\n'``, no translation
  takes place.  If *newline* is any of the other legal values, any ``'\n'``
  characters written are translated to the given string.

If *line_buffering* is ``True``, :meth:`flush` is implied when a call to
write contains a newline character or a carriage return.

If *write_through* is ``True``, calls to :meth:`write` are guaranteed
not to be buffered: any data written on the :class:`TextIOWrapper`
object is immediately handled to its underlying binary *buffer*.

.. versionchanged:: 3.3
   The *write_through* argument has been added.

.. versionchanged:: 3.3
   The default *encoding* is now ``locale.getpreferredencoding(False)``
   instead of ``locale.getpreferredencoding()``. Don't change temporary the
   locale encoding using :func:`locale.setlocale`, use the current locale
   encoding instead of the user preferred encoding.

.. versionchanged:: 3.10
   The *encoding* argument now supports the ``"locale"`` dummy encoding name.

:class:`TextIOWrapper` provides these data attributes and methods in
addition to those from :class:`TextIOBase` and :class:`IOBase`:

.. attribute:: line_buffering

   Whether line buffering is enabled.

.. attribute:: write_through

   Whether writes are passed immediately to the underlying binary
   buffer.

   .. versionadded:: 3.7

.. method:: reconfigure(*[, encoding][, errors][, newline][, \
                        line_buffering][, write_through])

   Reconfigure this text stream using new settings for *encoding*,
   *errors*, *newline*, *line_buffering* and *write_through*.

   Parameters not specified keep current settings, except
   ``errors='strict'`` is used when *encoding* is specified but
   *errors* is not specified.

   It is not possible to change the encoding or newline if some data
   has already been read from the stream. On the other hand, changing
   encoding after write is possible.

   This method does an implicit stream flush before setting the
   new parameters.

   .. versionadded:: 3.7
```

A text stream using an in-memory text buffer. It inherits :class:`TextIOBase`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 1045); *backlink*

Unknown interpreted text role "class".

The text buffer is discarded when the :meth:`~IOBase.close` method is called.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 1048); *backlink*

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The initial value of the buffer can be set by providing *initial_value*. If newline translation is enabled, newlines will be encoded as if by :meth:`~TextIOBase.write`. The stream is positioned at the start of the buffer.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 1051); *backlink*

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The *newline* argument works like that of :class:`TextIOWrapper`, except that when writing output to the stream, if *newline* is `None`, newlines are written as `\n` on all platforms.

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:class:`StringIO` provides this method in addition to those from :class:`TextIOBase` and :class:`IOBase`:

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Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 1060); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 1063)

Unknown directive type "method".

```
.. method:: getvalue()

   Return a ``str`` containing the entire contents of the buffer.
   Newlines are decoded as if by :meth:`~TextIOBase.read`, although
   the stream position is not changed.
```

Example usage:

```
import io

output = io.StringIO()
output.write('First line.\n')
print('Second line.', file=output)

# Retrieve file contents -- this will be
# 'First line.\nSecond line.\n'
contents = output.getvalue()

# Close object and discard memory buffer --
# .getvalue() will now raise an exception.
output.close()
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 1086)

Unknown directive type "index".

```
.. index::
   single: universal newlines; io.IncrementalNewlineDecoder class
```

A helper codec that decodes newlines for :term:`universal newlines` mode. It inherits :class:`codecs.IncrementalDecoder`.

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System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 1091); backlink

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Performance

This section discusses the performance of the provided concrete I/O implementations.

Binary I/O

By reading and writing only large chunks of data even when the user asks for a single byte, buffered I/O hides any inefficiency in calling and executing the operating system's unbuffered I/O routines. The gain depends on the OS and the kind of I/O which is performed. For example, on some modern OSes such as Linux, unbuffered disk I/O can be as fast as buffered I/O. The bottom line, however, is that buffered I/O offers predictable performance regardless of the platform and the backing device. Therefore, it is almost always preferable to use buffered I/O rather than unbuffered I/O for binary data.

Text I/O

Text I/O over a binary storage (such as a file) is significantly slower than binary I/O over the same storage, because it requires conversions between unicode and binary data using a character codec. This can become noticeable handling huge amounts of text data like large log files. Also, :meth:`TextIOWrapper.tell` and :meth:`TextIOWrapper.seek` are both quite slow due to the reconstruction algorithm used.

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System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 1116); backlink

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:class:`StringIO`, however, is a native in-memory unicode container and will exhibit similar speed to :class:`BytesIO`.

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System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 1123); backlink

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Multi-threading

:class:`FileIO` objects are thread-safe to the extent that the operating system calls (such as `read(2)` under Unix) they wrap are thread-safe too.

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Binary buffered objects (instances of :class:`BufferedReader`, :class:`BufferedWriter`, :class:`BufferedRandom` and :class:`BufferedRWPair`) protect their internal structures using a lock; it is therefore safe to call them from multiple threads at once.

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System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst, line 1132); backlink

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:class:`TextIOWrapper` objects are not thread-safe.

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Reentrancy

Binary buffered objects (instances of :class:`BufferedReader`, :class:`BufferedWriter`, :class:`BufferedRandom` and :class:`BufferedRWPair`) are not reentrant. While reentrant calls will not happen in normal situations, they can arise from doing I/O in a :mod:`signal` handler. If a thread tries to re-enter a buffered object which it is already accessing, a :exc:`RuntimeError` is raised. Note this doesn't prohibit a different thread from entering the buffered object.

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System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 1142); *backlink*

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System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 1142); *backlink*

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System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 1142); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 1142); *backlink*

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System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 1142); *backlink*

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The above implicitly extends to text files, since the :func:`open()` function will wrap a buffered object inside a :class:`TextIOWrapper`. This includes standard streams and therefore affects the built-in :func:`print()` function as well.

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System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 1150); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]io.rst`, line 1150); *backlink*

Unknown interpreted text role "func".