:mod:`shelve` --- Python object persistence

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

Unknown directive type "module".

```
.. module:: shelve
   :synopsis: Python object persistence.
```

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

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 7); *backlink*

Unknown interpreted text role "source".

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

Unknown directive type "index".

```
.. index:: module: pickle
```

A "shelf" is a persistent, dictionary-like object. The difference with "dbm" databases is that the values (not the keys!) in a shelf can be essentially arbitrary Python objects --- anything that the :mod:`pickle` module can handle. This includes most class instances, recursive data types, and objects containing lots of shared sub-objects. The keys are ordinary strings.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 13); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 20)

Unknown directive type "function".

```
.. function:: open(filename, flag='c', protocol=None, writeback=False)

   Open a persistent dictionary.  The filename specified is the base filename for
   the underlying database.  As a side-effect, an extension may be added to the
   filename and more than one file may be created.  By default, the underlying
   database file is opened for reading and writing.  The optional *flag* parameter
   has the same interpretation as the *flag* parameter of :func:`dbm.open`.

   By default, pickles created with :data:`pickle.DEFAULT_PROTOCOL` are used
   to serialize values.  The version of the pickle protocol can be specified
   with the *protocol* parameter.

   Because of Python semantics, a shelf cannot know when a mutable
   persistent-dictionary entry is modified.  By default modified objects are
   written *only* when assigned to the shelf (see :ref:`shelve-example`).  If the
   optional *writeback* parameter is set to ``True``, all entries accessed are also
   cached in memory, and written back on :meth:`~Shelf.sync` and
   :meth:`~Shelf.close`; this can make it handier to mutate mutable entries in
   the persistent dictionary, but, if many entries are accessed, it can consume
   vast amounts of memory for the cache, and it can make the close operation
   very slow since all accessed entries are written back (there is no way to
   determine which accessed entries are mutable, nor which ones were actually
   mutated).
```

```
   .. versionchanged:: 3.10
      :data:`pickle.DEFAULT_PROTOCOL` is now used as the default pickle
      protocol.

   .. versionchanged:: 3.11
      Accepts :term:`path-like object` for filename.

   .. note::

      Do not rely on the shelf being closed automatically; always call
      :meth:`~Shelf.close` explicitly when you don't need it any more, or
      use :func:`shelve.open` as a context manager::

          with shelve.open('spam') as db:
              db['eggs'] = 'eggs'
```

Warning

Because the :mod:`shelve` module is backed by :mod:`pickle`, it is insecure to load a shelf from an untrusted source. Like with pickle, loading a shelf can execute arbitrary code.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 64); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 64); *backlink*

Unknown interpreted text role "mod".

Shelf objects support most of methods and operations supported by dictionaries (except copying, constructors and operators `|` and `|=`). This eases the transition from dictionary based scripts to those requiring persistent storage.

Two additional methods are supported:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 74)

Unknown directive type "method".

```
   .. method:: Shelf.sync()

      Write back all entries in the cache if the shelf was opened with *writeback*
      set to :const:`True`.  Also empty the cache and synchronize the persistent
      dictionary on disk, if feasible.  This is called automatically when the shelf
      is closed with :meth:`close`.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 81)

Unknown directive type "method".

```
   .. method:: Shelf.close()

      Synchronize and close the persistent *dict* object.  Operations on a closed
      shelf will fail with a :exc:`ValueError`.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 87)

Unknown directive type "seealso".

```
   .. seealso::

      `Persistent dictionary recipe <https://code.activestate.com/recipes/576642/>`_
```

```
with widely supported storage formats and having the speed of native
dictionaries.
```

Restrictions

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main) (Doc) (library) shelve.rst`, line 97)

Unknown directive type "index".

```
.. index::
   module: dbm.ndbm
   module: dbm.gnu
```

- The choice of which database package will be used (such as :mod:`dbm.ndbm` or :mod:`dbm.gnu`) depends on which interface is available. Therefore it is not safe to open the database directly using :mod:`dbm`. The database is also (unfortunately) subject to the limitations of :mod:`dbm`, if it is used --- this means that (the pickled representation of) the objects stored in the database should be fairly small, and in rare cases key collisions may cause the database to refuse updates.

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main) (Doc) (library) shelve.rst`, line 101); *backlink*

  Unknown interpreted text role "mod".

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main) (Doc) (library) shelve.rst`, line 101); *backlink*

  Unknown interpreted text role "mod".

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main) (Doc) (library) shelve.rst`, line 101); *backlink*

  Unknown interpreted text role "mod".

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main) (Doc) (library) shelve.rst`, line 101); *backlink*

  Unknown interpreted text role "mod".

- The :mod:`shelve` module does not support *concurrent* read/write access to shelved objects. (Multiple simultaneous read accesses are safe.) When a program has a shelf open for writing, no other program should have it open for reading or writing. Unix file locking can be used to solve this, but this differs across Unix versions and requires knowledge about the database implementation used.

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main) (Doc) (library) shelve.rst`, line 109); *backlink*

  Unknown interpreted text role "mod".

A subclass of :class:`collections.abc.MutableMapping` which stores pickled values in the *dict* object.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main) (Doc) (library) shelve.rst`, line 119); *backlink*

Unknown interpreted text role "class".

By default, pickles created with :data:`pickle.DEFAULT_PROTOCOL` are used to serialize values. The version of the pickle

protocol can be specified with the *protocol* parameter. See the :mod:`pickle` documentation for a discussion of the pickle protocols.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 122); *backlink*

Unknown interpreted text role "data".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 122); *backlink*

Unknown interpreted text role "mod".

If the *writeback* parameter is `True`, the object will hold a cache of all entries accessed and write them back to the *dict* at sync and close times. This allows natural operations on mutable entries, but can consume much more memory and make sync and close take a long time.

The *keyencoding* parameter is the encoding used to encode keys before they are used with the underlying dict.

A :class:`Shelf` object can also be used as a context manager, in which case it will be automatically closed when the :keyword:`with` block ends.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 135); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 135); *backlink*

Unknown interpreted text role "keyword".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 138)

Unknown directive type "versionchanged".

```
.. versionchanged:: 3.2
   Added the *keyencoding* parameter; previously, keys were always encoded in
   UTF-8.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 142)

Unknown directive type "versionchanged".

```
.. versionchanged:: 3.4
   Added context manager support.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 145)

Unknown directive type "versionchanged".

```
.. versionchanged:: 3.10
   :data:`pickle.DEFAULT_PROTOCOL` is now used as the default pickle
   protocol.
```

A subclass of :class:`Shelf` which exposes :meth:`first`, :meth:`!next`, :meth:`previous`, :meth:`last` and :meth:`set_location` which are available in the third-party :mod:`bsddb` module from pybsddb but not in other database modules. The *dict* object passed to the constructor must support those methods. This is generally accomplished by calling one of :func:`bsddb.hashopen`, :func:`bsddb.btopen` or :func:`bsddb.rnopen`. The optional *protocol*, *writeback*, and *keyencoding* parameters have the same interpretation as for the :class:`Shelf` class.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 152); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 152); *backlink*

Unknown interpreted text role "meth".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 152); *backlink*

Unknown interpreted text role "meth".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 152); *backlink*

Unknown interpreted text role "meth".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 152); *backlink*

Unknown interpreted text role "meth".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 152); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 152); *backlink*

Unknown interpreted text role "func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 152); *backlink*

Unknown interpreted text role "func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 152); *backlink*

Unknown interpreted text role "func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 152); *backlink*

Unknown interpreted text role "class".

A subclass of :class:`Shelf` which accepts a *filename* instead of a dict-like object. The underlying file will be opened using :func:`dbm.open`. By default, the file will be created and opened for both read and write. The optional *flag* parameter has the same interpretation as for the :func:`.open` function. The optional *protocol* and *writeback* parameters have the same interpretation as for the :class:`Shelf` class.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 165); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 165); *backlink*

Unknown interpreted text role "func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 165); *backlink*

Unknown interpreted text role "func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 165); *backlink*

Unknown interpreted text role "class".

Example

To summarize the interface (`key` is a string, `data` is an arbitrary object):

```
import shelve

d = shelve.open(filename)  # open -- file may get suffix added by low-level
                           # library

d[key] = data              # store data at key (overwrites old data if
                           # using an existing key)
data = d[key]              # retrieve a COPY of data at key (raise KeyError
                           # if no such key)
del d[key]                 # delete data stored at key (raises KeyError
                           # if no such key)

flag = key in d            # true if the key exists
klist = list(d.keys())     # a list of all existing keys (slow!)

# as d was opened WITHOUT writeback=True, beware:
d['xx'] = [0, 1, 2]        # this works as expected, but...
d['xx'].append(3)          # *this doesn't!* -- d['xx'] is STILL [0, 1, 2]!

# having opened d without writeback=True, you need to code carefully:
temp = d['xx']             # extracts the copy
temp.append(5)             # mutates the copy
d['xx'] = temp             # stores the copy right back, to persist it

# or, d=shelve.open(filename,writeback=True) would let you just code
# d['xx'].append(5) and have it work as expected, BUT it would also
# consume more memory and make the d.close() operation slower.

d.close()                  # close it
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\(cpython-main)(Doc)(library)shelve.rst, line 212)

Unknown directive type "seealso".

```
.. seealso::

   Module :mod:`dbm`
      Generic interface to ``dbm``-style databases.

   Module :mod:`pickle`
      Object serialization used by :mod:`shelve`.
```