:mod:`array` --- Efficient arrays of numeric values

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

Unknown directive type "module".

```
.. module:: array
   :synopsis: Space efficient arrays of uniformly typed numeric values.
```

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Unknown directive type "index".

```
.. index:: single: arrays
```

This module defines an object type which can compactly represent an array of basic values: characters, integers, floating point numbers. Arrays are sequence types and behave very much like lists, except that the type of objects stored in them is constrained. The type is specified at object creation time by using a :dfn:`type code`, which is a single character. The following type codes are defined:

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Unknown interpreted text role "dfn".

Type code	C Type	Python Type	Minimum size in bytes	Notes
`'b'`	signed char	int	1	
`'B'`	unsigned char	int	1	
`'u'`	wchar_t	Unicode character	2	(1)
`'h'`	signed short	int	2	
`'H'`	unsigned short	int	2	
`'i'`	signed int	int	2	
`'I'`	unsigned int	int	2	
`'l'`	signed long	int	4	
`'L'`	unsigned long	int	4	
`'q'`	signed long long	int	8	
`'Q'`	unsigned long long	int	8	
`'f'`	float	float	4	
`'d'`	double	float	8	

Notes:

1. It can be 16 bits or 32 bits depending on the platform.

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Unknown directive type "versionchanged".

```
.. versionchanged:: 3.9
   ``array('u')`` now uses ``wchar_t`` as C type instead of deprecated
   ``Py_UNICODE``. This change doesn't affect to its behavior because
   ``Py_UNICODE`` is alias of ``wchar_t`` since Python 3.3.
```

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Unknown directive type "deprecated-removed".

```
.. deprecated-removed:: 3.3 4.0
```

The actual representation of values is determined by the machine architecture (strictly speaking, by the C implementation). The actual size can be accessed through the :attr:`itemsize` attribute.

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Unknown interpreted text role "attr".

The module defines the following type:

A new array whose items are restricted by *typecode*, and initialized from the optional *initializer* value, which must be a list, a :term:`bytes-like object`, or iterable over elements of the appropriate type.

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Unknown interpreted text role "term".

If given a list or string, the initializer is passed to the new array's :meth:`fromlist`, :meth:`frombytes`, or :meth:`fromunicode` method (see below) to add initial items to the array. Otherwise, the iterable initializer is passed to the :meth:`extend` method.

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Unknown interpreted text role "meth".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]array.rst`, line 75); *backlink*

Unknown interpreted text role "meth".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]array.rst`, line 75); *backlink*

Unknown interpreted text role "meth".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]array.rst`, line 75); *backlink*

Unknown interpreted text role "meth".

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Unknown directive type "audit-event".

```
.. audit-event:: array.__new__ typecode,initializer array.array
```

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Unknown directive type "data".

```
.. data:: typecodes

   A string with all available type codes.
```

Array objects support the ordinary sequence operations of indexing, slicing, concatenation, and multiplication. When using slice assignment, the assigned value must be an array object with the same type code; in all other cases, :exc:`TypeError` is raised. Array objects also implement the buffer interface, and may be used wherever :term:`bytes-like objects <bytes-like object>` are supported.

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Unknown interpreted text role "exc".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]array.rst, line 86); *backlink*

Unknown interpreted text role "term".

The following data items and methods are also supported:

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Unknown directive type "attribute".

```
.. attribute:: array.typecode

   The typecode character used to create the array.
```

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Unknown directive type "attribute".

```
.. attribute:: array.itemsize

   The length in bytes of one array item in the internal representation.
```

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Unknown directive type "method".

```
.. method:: array.append(x)

   Append a new item with value *x* to the end of the array.
```

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Unknown directive type "method".

```
.. method:: array.buffer_info()

   Return a tuple ``(address, length)`` giving the current memory address and the
   length in elements of the buffer used to hold array's contents.  The size of the
   memory buffer in bytes can be computed as ``array.buffer_info()[1] *
   array.itemsize``.  This is occasionally useful when working with low-level (and
   inherently unsafe) I/O interfaces that require memory addresses, such as certain
   :c:func:`ioctl` operations.  The returned numbers are valid as long as the array
   exists and no length-changing operations are applied to it.

   .. note::

      When using array objects from code written in C or C++ (the only way to
      effectively make use of this information), it makes more sense to use the buffer
      interface supported by array objects.  This method is maintained for backward
      compatibility and should be avoided in new code.  The buffer interface is
      documented in :ref:`bufferobjects`.
```

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Unknown directive type "method".

```
.. method:: array.byteswap()

   "Byteswap" all items of the array.  This is only supported for values which are
   1, 2, 4, or 8 bytes in size; for other types of values, :exc:`RuntimeError` is
   raised.  It is useful when reading data from a file written on a machine with a
   different byte order.
```

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Unknown directive type "method".

```
.. method:: array.count(x)

   Return the number of occurrences of *x* in the array.
```

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Unknown directive type "method".

```
.. method:: array.extend(iterable)

   Append items from *iterable* to the end of the array.  If *iterable* is another
   array, it must have *exactly* the same type code; if not, :exc:`TypeError` will
   be raised.  If *iterable* is not an array, it must be iterable and its elements
   must be the right type to be appended to the array.
```

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Unknown directive type "method".

```
.. method:: array.frombytes(s)

   Appends items from the string, interpreting the string as an array of machine
   values (as if it had been read from a file using the :meth:`fromfile` method).

   .. versionadded:: 3.2
      :meth:`fromstring` is renamed to :meth:`frombytes` for clarity.
```

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Unknown directive type "method".

```
.. method:: array.fromfile(f, n)

   Read *n* items (as machine values) from the :term:`file object` *f* and append
   them to the end of the array.  If less than *n* items are available,
   :exc:`EOFError` is raised, but the items that were available are still
   inserted into the array.
```

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Unknown directive type "method".

```
.. method:: array.fromlist(list)

   Append items from the list.  This is equivalent to ``for x in list:
   a.append(x)`` except that if there is a type error, the array is unchanged.
```

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Unknown directive type "method".

```
.. method:: array.fromunicode(s)

   Extends this array with data from the given unicode string.  The array must
   be a type ``'u'`` array; otherwise a :exc:`ValueError` is raised.  Use
   ``array.frombytes(unicodestring.encode(enc))`` to append Unicode data to an
   array of some other type.
```

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Unknown directive type "method".

```
.. method:: array.index(x[, start[, stop]])

   Return the smallest *i* such that *i* is the index of the first occurrence of
   *x* in the array.  The optional arguments *start* and *stop* can be
   specified to search for *x* within a subsection of the array.  Raise
   :exc:`ValueError` if *x* is not found.

   .. versionchanged:: 3.10
      Added optional *start* and *stop* parameters.
```

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Unknown directive type "method".

```
.. method:: array.insert(i, x)

   Insert a new item with value *x* in the array before position *i*. Negative
   values are treated as being relative to the end of the array.
```

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Unknown directive type "method".

```
.. method:: array.pop([i])

   Removes the item with the index *i* from the array and returns it. The optional
   argument defaults to ``-1``, so that by default the last item is removed and
   returned.
```

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Unknown directive type "method".

```
.. method:: array.remove(x)

   Remove the first occurrence of *x* from the array.
```

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Unknown directive type "method".

```
.. method:: array.reverse()

   Reverse the order of the items in the array.
```

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Unknown directive type "method".

```
.. method:: array.tobytes()

   Convert the array to an array of machine values and return the bytes
   representation (the same sequence of bytes that would be written to a file by
   the :meth:`tofile` method.)

   .. versionadded:: 3.2
      :meth:`tostring` is renamed to :meth:`tobytes` for clarity.
```

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Unknown directive type "method".

```
.. method:: array.tofile(f)

   Write all items (as machine values) to the :term:`file object` *f*.
```

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Unknown directive type "method".

```
.. method:: array.tolist()

   Convert the array to an ordinary list with the same items.
```

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Unknown directive type "method".

```
.. method:: array.tounicode()

   Convert the array to a unicode string.  The array must be a type ``'u'`` array;
   otherwise a :exc:`ValueError` is raised. Use ``array.tobytes().decode(enc)`` to
   obtain a unicode string from an array of some other type.
```

When an array object is printed or converted to a string, it is represented as `array(typecode, initializer)`. The *initializer* is omitted if the array is empty, otherwise it is a string if the *typecode* is `'u'`, otherwise it is a list of numbers. The string is guaranteed to be able to be converted back to an array with the same type and value using :func:`eval`, so long as the :class:`~array.array` class has been imported using `from array import array`. Examples:

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Unknown interpreted text role "func".

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Unknown interpreted text role "class".

```
array('l')
array('u', 'hello \u2641')
array('l', [1, 2, 3, 4, 5])
array('d', [1.0, 2.0, 3.14])
```

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Unknown directive type "seealso".

```
.. seealso::

   Module :mod:`struct`
      Packing and unpacking of heterogeneous binary data.

   Module :mod:`xdrlib`
      Packing and unpacking of External Data Representation (XDR) data as used in some
      remote procedure call systems.

   `NumPy <https://numpy.org/>`_
      The NumPy package defines another array type.
```