

Arrays

In this lesson, we learn about arrays and how they are used in Python!

We'll cover the following



- Introduction
- Initializing Arrays
- Types of Arrays
- Array slicing
 - Changing or adding array elements
 - How do you remove/delete elements?

Introduction

In Python, an array is just an ordered sequence of *homogeneous* elements. In other words, an array can only hold elements of one datatype. Python arrays are basically just wrappers for C arrays. The type is constrained and specified at the time of creation.

Initializing Arrays

Python arrays are initialized using the array library:

```
import array
new_array = array.array('type', [list])
```

Here `type` defines the data type of array and `list` is a python list containing homogenous elements.

Consider the example below:

```
1 import array
2
3 # type: 'd' (float), initializer list: [1, 2, 3]
4 new_array = array.array('d', [1, 2, 3])
5 print(new_array[0])
```

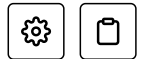


Output

1.0

0.152s

Types of Arrays



There are several types of arrays in Python; refer to the table below for a complete list.

Type code	C Type	Python Type	Minimum Size in Bytes
'c'	character	char	1
'b'	signed char	int	1
'B'	unsigned char	int	1
'u'	Py_UNICODE	Unicode character	2 or 4 depending on Unicode build
'h'	signed short	int	2
'H'	unsigned short	int	2
'i'	signed int	int	2
'I'	unsigned int	long	4
'l'	signed long	int	4
'L'	unsigned long	long	4
'f'	float	float	4
'd'	double	float	8

Array slicing

Array slicing is done in exactly the same way as list slicing is done. Look at the following example:

```
1 import array
2
3 initializer_list = [2, 5, 43, 5, 10, 52, 29, 5]
4 number_array = array.array('i', initializer_list)
5
6 print(number_array[1:5]) # 2nd to 5th
7 print(number_array[:-5]) # beginning to 3rd
8 print(number_array[5:]) # 6th to end
9 print(number_array[:]) # beginning to end
10
```



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0.160s

Output

```

array('i', [5, 43, 5, 10])
array('i', [2, 5, 43])
array('i', [52, 29, 5])
array('i', [2, 5, 43, 5, 10, 52, 29, 5])

```

Changing or adding array elements

Arrays are mutable; their elements can be changed in the same way as list elements. Have a look at the following coding widget.

```

1 import array
2 integers = array.array('i', [1, 2, 3, 5, 7, 10])
3
4 # changing first element
5 integers[0] = 0
6 print(integers) # array('i', [0, 2, 3, 5, 7, 10])
7
8 # changing 3rd to 5th element
9 integers[2:5] = array.array('i', [4, 6, 8])
10 print(integers) # Output: array('i', [0, 2, 4, 6, 8, 10])
11

```

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Output

```

array('i', [0, 2, 3, 5, 7, 10])
array('i', [0, 2, 4, 6, 8, 10])

```

Just as with lists, we can add one item to the end of an array using the `append()` method or add several items using the `extend()` method.

```

1 import array
2
3 numbers = array.array('i', [1, 2, 3])
4
5 numbers.append(4)
6 print(numbers) # array('i', [1, 2, 3, 4])
7
8 # extend() appends iterable to the end of the array
9 numbers.extend([5, 6, 7])
10 print(numbers) # array('i', [1, 2, 3, 4, 5, 6, 7])
11

```

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Output

0.237s



```
array('i', [1, 2, 3, 4])
array('i', [1, 2, 3, 4, 5, 6, 7])
```

You can concatenate two arrays using + operator

```
1 import array
2
3 odd = array.array('i', [1, 3, 5])
4 even = array.array('i', [2, 4, 6])
5
6 integers = array.array('i') # creating empty array of integer
7 integers = odd + even
8
9 print(integers)
10
```



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Output

0.159s

```
array('i', [1, 3, 5, 2, 4, 6])
```

How do you remove/delete elements?

To delete one or more items from an array, use the `del` statement as with lists.

```
1 import array
2
3 integer_array = array.array('i', [1, 2, 3, 3, 4])
4
5 del integer_array[2] # removing third element
6 print(integer_array) # Output: array('i', [1, 2, 3, 4])
7
8 del integer_array # deleting entire array
9 print(integer_array) # Error: array is not defined
10
```



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Output

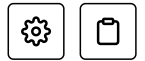
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```
array('i', [1, 2, 3, 4])
```

```
Traceback (most recent call last):
  File "main.py", line 9, in <module>
    print(integer_array) # Error: array is not defined
NameError: name 'integer_array' is not defined
```



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We can use the `remove(val)` method to remove the given item or `pop(index)` to remove an item at the given index. The `remove(val)` method removes the first element that is equal to `val` in the array.

Note: An error is thrown if the index exceeds the size of the array or element is not found in the array.

```
1 import array
2
3 integer_array = array.array('i', [10, 11, 12, 12, 13])
4
5 integer_array.remove(12)
6 print(integer_array)  # array('i', [10, 11, 12, 13])
7
8 print(integer_array.pop(2))  # Output: 12
9 print(integer_array)  # array('i', [10, 11, 13])
10
```



Output

0.700s

```
array('i', [10, 11, 12, 13])
12
array('i', [10, 11, 13])
```

In the next lesson, we'll be looking at the differences between arrays and lists in Python

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Next →

Lists

Lists vs Arrays in Python

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