

DSA IN PYTHON

1.Explain arrays in Python with example

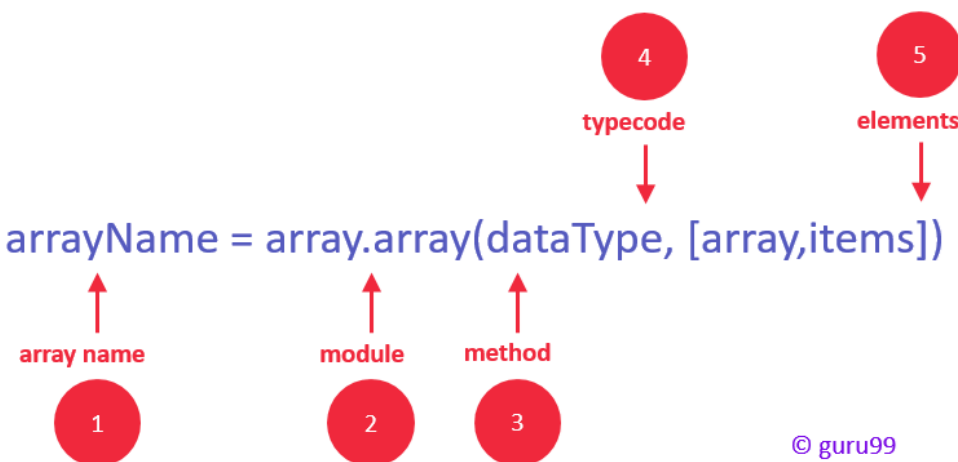
A [Python Array](#) is a collection of a common type of data structures having elements with the same data type. It is used to store collections of data. In Python programming, arrays are handled by the “array” module. If you create arrays using the array module, elements of the array must be of the same numeric type

Syntax to Create an Array in Python

You can declare an array in Python while initializing it using the following syntax.

```
arrayName = array.array(type code for data type,  
[array,items])
```

The following image explains the syntax.



1. **Identifier**: specify a name like usually, you do for variables
2. **Module**: Python has a special module for creating array in Python, called “array” – you must import it before using it
3. **Method**: the array module has a method for initializing the array. It takes two arguments, type code, and elements.
4. **Type Code**: specify the data type using the type codes available (see list below)

5. **Elements:** specify the array elements within the square brackets, for example [130,450,103]

```
import array as myarray  
abc = myarray.array('d', [2.5, 4.9, 6.7])
```

2.How can you access array elements?

You can access any array item by using its index.

The syntax is

```
arrayName[indexNum]
```

Example

```
import array  
balance = array.array('i', [300,200,100])  
print(balance[1])
```

3.How can you insert elements in array?

Python array insert operation enables you to insert one or more items into an array at the beginning, end, or any given index of the array. This method expects two arguments index and value.

The syntax is

```
arrayName.insert(index, value)
```

Example

Let us add a new value right after the second item of the array. Currently, our balance array has three items: 300, 200, and 100. Consider the second array item with a value of 200 and index 1.

In order to insert the new value right “after” index 1, you need to reference index 2 in your insert method, as shown in the below Python array example:

```
import array
balance = array.array('i', [300,200,100])
balance.insert(2, 150)
print(balance)
```

4.How can you insert elements in array?

Python array insert operation enables you to insert one or more items into an array at the beginning, end, or any given index of the array.

This method expects two arguments index and value.

The syntax is

```
arrayName.insert(index, value)
```

Example

Let us add a new value right after the second item of the array.

Currently, our balance array has three items: 300, 200, and 100.

Consider the second array item with a value of 200 and index 1.

In order to insert the new value right “after” index 1, you need to reference index 2 in your insert method, as shown in the below Python array example:

```
import array
balance = array.array('i', [300,200,100])
balance.insert(2, 150)
print(balance)
```

5.How can you delete elements in array?

With this operation, you can delete one item from an array by value.

This method accepts only one argument, value. After running this method, the array items are re-arranged, and indices are re-assigned.

The syntax is

```
arrayName.remove(value)
```

Example

Let's remove the value of "3" from the array

```
import array as myarray
first = myarray.array('b', [2, 3, 4])
first.remove(3)
print(first)
```

6.How can you search and get the index of a value in an array?

With this operation, you can search for an item in an array based on its value. This method accepts only one argument, value. It is a non-destructive method, which means it does not affect the array values.

The syntax is

```
arrayName.index(value)
```

Example

Let's find the value of "3" in the array. This method returns the index of the searched value.

```
import array as myarray
number = myarray.array('b', [2, 3, 4, 5, 6])
print(number.index(3))
```

7.How can you reverse array in Python?

You can use reverse() to reverse array in Python.

Example:

```
import array as myarray
number = myarray.array('b', [1,2, 3])
number.reverse()
print(number)
```

8.Give example to convert array to Unicode

The Example to convert array to Unicode is:

```
from array import array
p =
array('u', [u'\u0050',u'\u0059',u'\u0054',u'\u0048',u'\
u004F',u'\u004E'])
print(p)
q = p.tounicode()
print(q)
```

Methods For Performing Operations on Arrays in Python

Arrays are mutable, which means they are changeable. You can change the value of the different items, add new ones, or remove any you don't want in your program anymore.

Let's see some of the most commonly used methods which are used for performing operations on arrays.

How to Change the Value of an Item in an Array

You can change the value of a specific element by specifying its position and assigning it a new value:

```
import array as arr
```

```
#original array
```

```
numbers = arr.array('i',[10,20,30])
```

```
#change the first element
```

```
#change it from having a value of 10 to having a value of 40
```

```
numbers[0] = 40
```

```
print(numbers)
```

```
#output
```

```
#array('i', [40, 20, 30])
```

How to Add a New Value to an Array

To add one single value at the end of an array, use the `append()` method:

```
import array as arr
```

```
#original array
```

```
numbers = arr.array('i',[10,20,30])
```

```
#add the integer 40 to the end of numbers
```

```
numbers.append(40)
```

```
print(numbers)
```

```
#output
```

```
#array('i', [10, 20, 30, 40])
```

Be aware that the new item you add needs to be the same data type as the rest of the items in the array. Look what happens when I try to add a float to an array of integers:

```
import array as arr
```

```
#original array
```

```
numbers = arr.array('i',[10,20,30])
```

```
#add the float 40.0 to the end of numbers
```

```
numbers.append(40.0)
```

```
print(numbers)
```

```
#output
```

```
#Traceback (most recent call last):
```

```
# File "/Users/dionysialemonaki/python_articles/demo.py", line 19, in  
<module>
```

```
# numbers.append(40.0)
```

```
#TypeError: 'float' object cannot be interpreted as an integer
```


But what if you want to add more than one value to the end an array?

Use the `extend()` method, which takes an iterable (such as a list of items) as an argument. Again, make sure that the new items are all the same data type.

```
import array as arr
```

```
#original array
```

```
numbers = arr.array('i',[10,20,30])
```

```
#add the integers 40,50,60 to the end of numbers
```

```
#The numbers need to be enclosed in square brackets
```

```
numbers.extend([40,50,60])
```

```
print(numbers)
```

```
#output
```

```
#array('i', [10, 20, 30, 40, 50, 60])
```

And what if you don't want to add an item to the end of an array? Use the `insert()` method, to add an item at a specific position.

The `insert()` function takes two arguments: the index number of the position the new element will be inserted, and the value of the new element.

```
import array as arr
#original array
numbers = arr.array('i',[10,20,30])

#add the integer 40 in the first position
#remember indexing starts at 0

numbers.insert(0,40)

print(numbers)

#output

#array('i', [40, 10, 20, 30])
```