ARRAY

Module 2

Module Outline:

- Array Overview
- Array Representation in Python
- Basic Operations
  - Traverse
  - Accessing
  - Insertion
  - Deletion
  - Search
  - Update

  Basic Operations
- Python Array Methods

What is an Array?

Overview

- Array is a container which can hold a fix number of items and these items should be of the same type. Most of the data structures make use of arrays to implement their algorithms. Following are the important terms to understand the concept of Array.
  - **Element**– Each item stored in an array is called an element.
  - **Index** – Each location of an element in an array has a numerical index, which is used to identify the element.

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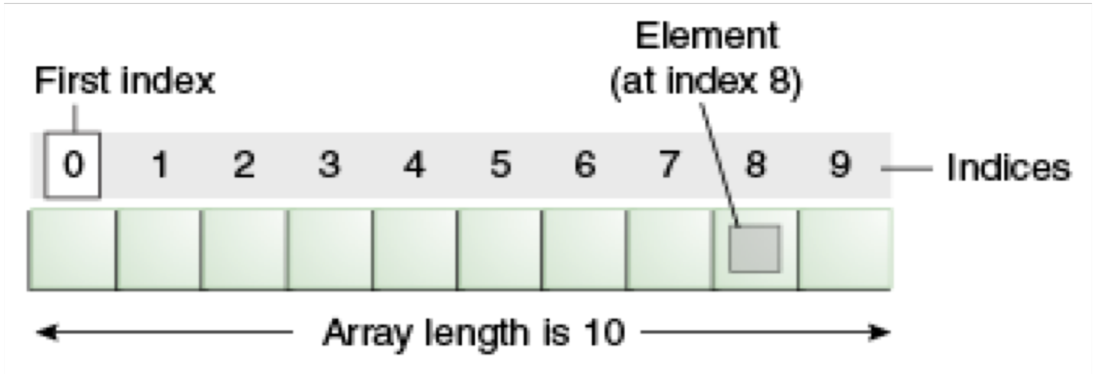
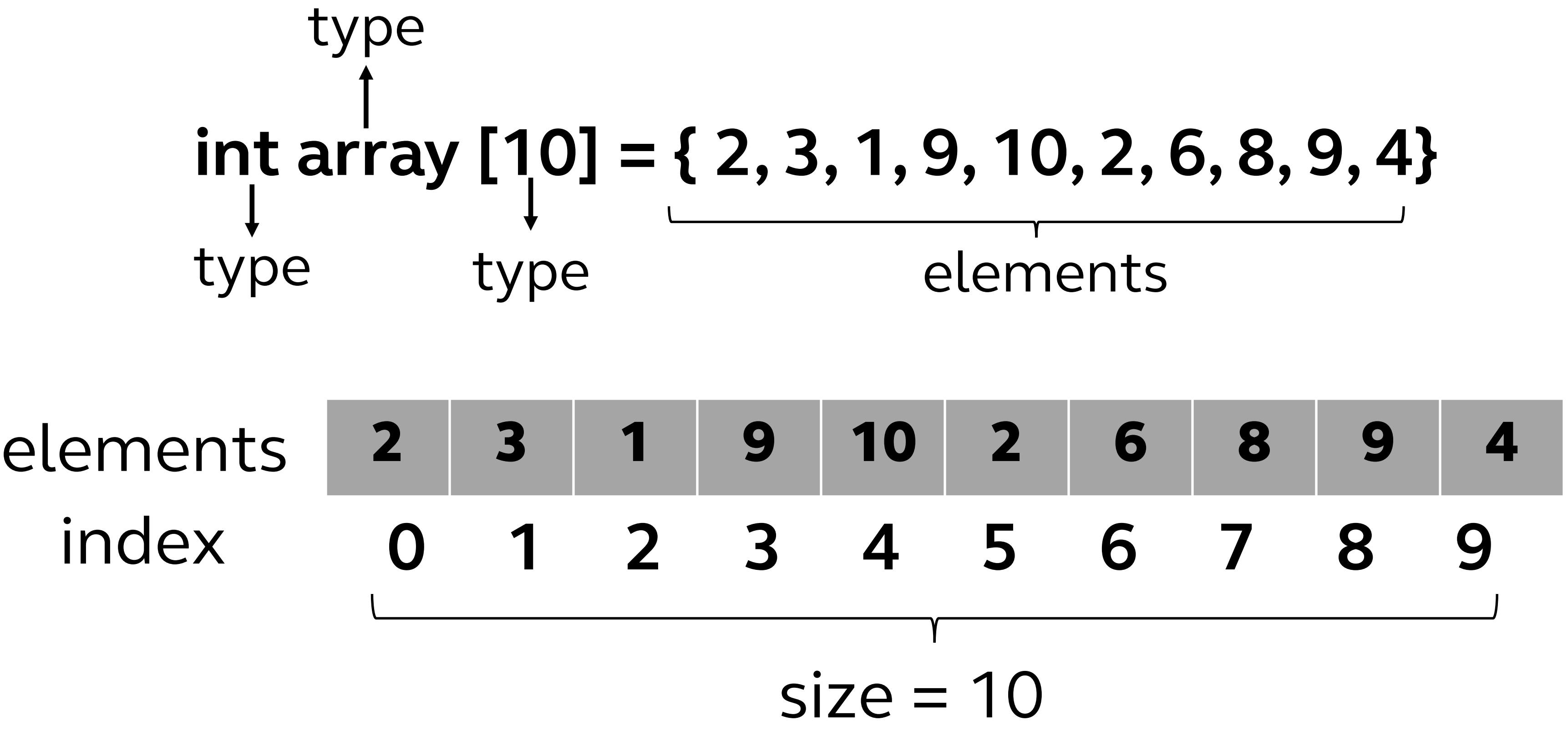


Array Representation

- Arrays can be declared in various ways in different languages. Below is an illustration.



type

int array [10] = { 2, 3, 1, 9, 10, 2, 6, 8, 9, 4}

type type elements

elements	**2**	**3**	**1**	**9**	**10**	**2**	**6**	**8**	**9**	**4**
index	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**

size = 10

Array Representation

- As per the above illustration, following are the important points to be considered.
  - Index starts with 0.
  - Array length is 10 which means it can store 10 elements.
  - Each element can be accessed via its index. For example, we can fetch an element at index 6 as 9.

Array Operations

Basic Operation

Following are the basic operations supported by an array.

- **Traverse** – print all the array elements one by one.
- **Insertion** – Adds an element at the given index.
- **Deletion** – Deletes an element at the given index.
- **Search** – Searches an element using the given index or by the value.
- **Update** – Updates an element at the given index.

Array in Python

Array is created in Python by importing array module to the python program. Then the array is declared as shown below.

```
from array import *
arrayName = array(typecode, [Initializers])
```

Typecodes

Typecode are the codes that are used to define the type of value the array will hold.

Typecode	Value
b	Represents signed integer of size 1 byte/td>
B	Represents unsigned integer of size 1 byte
c	Represents character of size 1 byte
i	Represents signed integer of size 2 bytes
I	Represents unsigned integer of size 2 bytes
f	Represents floating point of size 4 bytes
d	Represents floating point of size 8 bytes

Traverse Operation

```
from array import *
array1 = array('i',[10,20,30,40,50])

for x in array1:
   print(x)
```

What is the output?

Accessing Array Element

```
from array import *
array1 = array('i', [10,20,30,40,50])
print (array1[0])
print (array1[2])
```

What is the output?

Inserting Elements in Array

- Insert operation is to insert one or more data elements into an array. Based on the requirement, a new element can be added at the beginning, end, or any given index of array.

- Here, we add a data element at the middle of the array using the python in-built **insert()** method.

Inserting Elements in Array

```
from array import *
array1 = array('i', [10,20,30,40,50])
array1.insert(1,60)

for x in array1:
  print(x)
```

What is the output?

Deleting Elements in Array

- Deletion refers to removing an existing element from the array and re-organizing all elements of an array.

- Here, we remove a data element at the middle of the array using the python in-built **remove()** method.

Deleting Elements in Array

```
from array import *
array1 = array('i', [10,20,30,40,50])
array1.remove(40)

for x in array1:
   print(x)
```

What is the output?

Deleting Elements in Array

```
from array import *
array1 = array('i', [10,20,30,40,50])
array1.remove(array1[1])

for x in array1:
  print(x)
```

What is the output?

Searching Elements in Array

```
from array import *
array1 = array('i', [10,20,30,40,50])

print (array1.index(40))
```

What is the ouput?

Updating Elements in Array

Update operation refers to updating an existing element from the array at a given index.

```
from array import *
array1 = array('i', [10,20,30,40,50])
array1[2] = 80

for x in array1:
    print(x)
```

What is the output?

Python Array Methods

Array Methods on Python

Method	Description
append()	Adds an element at the end of the list
clear()	Removes all the elements from the list
copy()	Returns a copy of the list
count()	Returns the number of elements with the specified value
extend()	Add the elements of a list (or any iterable), to the end of the current list
index()	Returns the index of the first element with the specified value

Array Methods on Python

Method	Description
insert()	Adds an element at the specified position
pop()	Removes the element at the specified position
remove()	Removes the first item with the specified value
reverse()	Reverses the order of the list
sort()	Sorts the list
insert()	Adds an element at the specified position

Reference:

The instructor does not take the credits on the contents of this presentation.

https://www.tutorialspoint.com/python_data_structure/