Lab Report No: - O7

Topic Title: -

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Course Name: - Python Programming Lab

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Q.1 What is an Array in Programming

An array is a data structure that stores a fixed sized sequence of elements, of same data type. Each element in array is accessed using an Index.

<u>Basic properties of array:</u>

i. <u>Fixed size</u> - The size of an array is defined at the time of diclaration

ii. <u>Homogenious Elements</u> - All elements in array must be of same data type.

iii. <u>Index Access</u> - Elements are sorted sequencially and accessed using an Index (Starting from zero).

iv. <u>Efficient Memory Usage</u> - Arrays are sorted in aitigious memory locations.

<u>Types of Arrays:</u>

i. <u>1D Array</u> - It's also known as one dimensional array which defines a simple list of array.

```
e.g - arr = [10, 30, 50, 70, 90]
      Print (arr [48])
      Output: 90
```

ii. <u>2D Array</u> - Known as two dimensional array which is defined as a matrix on table like structure.

```
e.g - matrix = [[1, 2, 3], [4, 5, 6], [7, 8, 9]]
      print (matrix [0] [2])
      Output - 3
```

Dry Run

| 1 | 2 | 3 | | 4 | 5 | 6 | | 7 | 8 | 9 |

Accessing Elements — In Array if we have to access elements of the array we will use indexing. The Index will always starts from zero.

4. Updating Elements:

In case of array to update the index value of that perticular array we just need to update the element of the specific index of the array.

e.g —
```
import array
arr = [3,7,17,9]
arr[3] = 19
Print(arr)
```
Output:
[3,7,17,19]

5. Deleting Elements:

In array to delete a perticular element inside an array we can perform two diff Pro

1. arr.remove() — It removes the first occurences of the value

2. del arr[Index] - By using this we deletes an element without a specific index

e.g —
```
import array
arr = [50,5,53,9,7]
del arr[2]
Print(arr)
arr.remove(9)
Print(arr)
```
output - [50,5,9,7]
[50,5,7]

iii. Multi Dimensional Array - It's used in case of complex array calculations.

e.g - matrix = [[1,2,3],[4,5,6],[7,8,9]], [[1,2], [3,4], [5,6, 7], [8,9]]
Print (@matrix [0][2][1])

Output - 8

Array Operations:

i. Creating an Array - To create an array we use the array module in terms of import array. where as the method will be. array.array (i)[ ] where eg the type codes are.

(i) = Signed Integer

· floating point
'd' double preceission floating point
'b' signed char (Calculating byte)
'char' (byte)

e.g - import array
arr = array.array ("i", [10,30,50,70,90])
print (arr)

Output - array ('i', [10,30,50,70,90])

ii. Inserting Elements : In an array inserting elements will be used using a.

1) .appen [value] - adds an element at the end

2) .insert (@Position, Value) - Inserts an element at a specific position.

e.g - import array
arr = array.array ("i", [10, 20, 30])
arr.append (60)
arr.insert (2, 26)
Print (list(arr))

Output - [10, 20, 26, 30, 60]

Write a python program to calculate the sum of all elements in an array.

Input:
```
import array
arr = array.array ('i', [5,4,3,2,1])
Calculate = sum (arr)
Print ("The Sum of an array :", Calculate)
```

Output: The Sum of an array : 15

Write a python program to find the largest number in the given array.

Input:
```
import array
arr = array.array ('i', [5,4,3,2,1])
max calculate = sum max (arr)
Print ("The maximum number of array :", max)
```

Output : The maximum number of array : 5

Write a python program to reverse a given array.

Input:
```
Import array
arr = array.array ('i', [5,4,3,2,1])
arr.reverse ()
Print (" The reversed array is :", arr.tolist())
```

Output : The reversed array is : [1,2,3,4,5]

Note! Tolist : tolist ()

The tolist method is used to convert an array from the array module to the python list.

Usage : arrayname.tolist ()

Key Points of tolist()
• It doesn't modify the original array;
  It creates returnes the tolist least
• It is useful when we need specific operation
  on an array
• It only works with array.array, not numply arrays