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C31 - 2003145

DATE: 1 2 22

Experiment-2

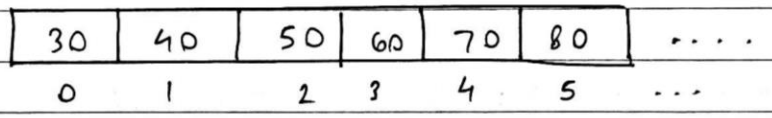
Aim: Implementing array operations in python

Theory:

An array is defined as a collection of items that are stored at contiguous memory locations. It is a container which can hold a fixed number of items, and these items are of the same data type.

Each item stored in array is called an element, whose location has a numerical index which is used to identify the position of the element.

Representation of array:



In python, array can be implemented using 'array' module

eg.

arrayName = array (typecode, [initializer])

o Functions for array available in python:

- append(): an element can be added on the top of array using append (elem) function.

Syntax:

arrayname.append (~~so~~ element)

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- remove() : We can delete any element of the middle of array using remove function.

  Syntax :
  arrayName.remove(element)

- pop() : pop() removes the element whose index was passed in arguments. But by default it removes the last element of the array.

  Syntax :
  arrayName.pop(index)

- insert() : A new element can be added in the beggning, mid or end of the array depending on the requirements using insert() function.

  Syntax :
  arrayName.insert(index, element)

- itemsize() : To get the size of an array element we use itemsize function in python.

  Syntax :
  arrayName.itemsize()

- replace() : This function replaces a specified element with a new element passed to the function

  syntax :
  arrayName.replace(oldValue, NewValue, ~~En~~count)

  count specifies how many occurence of oldValue to be replaced.

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Slicing of an array:

In python array, there are multiple ways to print the whole array with all its elements, but to print a specific range / order we can use slice operator

Syntax

arrayName [start : end : step]

start : starting index where the slicing of array starts

end : Ending index where the slicing of array stops.

steps : It is an optional argument that determines the increment between each index for slicing.

Returns the sliced object containg elements in the given range only.

eg.

by using arrayName [: : -1], we can reverse the array and print on the screen.

Programs :

1. Python program to

- Read an array and display
- Append a new item to the end of the array.
- To reverse the order of the items in the array (slice operator)
- Get the length in bytes of one array item
- To append items from another array
- Remove a specified item using the index from an array
- Insert a specified item at the specified position in the array

Program :

```
import array

arr = array.array('i')
x = int(input("Enter the length of array: "))
for i in range(0, x):
    num = int(input("Enter element %d: "%i))
    arr.append(num)

print("\nInitial array :")
for i in range (0, len(arr)):
    print (arr[i], end =" ")
print()

arr.append(90)

print("\nAfter appending 90 :")
for i in range (0, len(arr)):
    print (arr[i], end =" ")
print()

print("\nAfter reversing :")
rev=arr[::-1]
for i in range (0, len(arr)):
    print (rev[i], end =" ")
print()

print("\nItem size :"+ str(arr.itemsize))

print("\nAfter removing element with index 1 :")
arr.pop(1)
```

```python
for i in range (0, len(arr)):
    print (arr[i], end =" ")
print()

print("\nAfter inserting 69 at index 3 :")
arr.insert(3, 69)

for i in range (0, len(arr)):
    print (arr[i], end =" ")
print()
```

Output :

```
Enter the length of array: 6
Enter element 0: 56
Enter element 1: 23
Enter element 2: 87
Enter element 3: 25
Enter element 4: 79
Enter element 5: 49

Initial array :
56 23 87 25 79 49

After appending 90 :
56 23 87 25 79 49 90

After reversing :
90 49 79 25 87 23 56

Item size :4

After removing element with index 1 :
56 87 25 79 49 90

After inserting 69 at index 3 :
56 87 25 69 79 49 90
PS C:\Users\IsmailRatlamwala\Documents\College prog\Python\Experiment 2>
```

2. Python program to remove prime numbers from an array.

Sample input arr[] = {3,4,6,9,13,14,16,17}

Output arr[] = {4,6,9,13,16}

Program :

```
import array

arr = array.array('i',[3,4,6,9,13,14,16,17])
out = array.array('i',[])
print("\nInitial array :")
for i in range (0, len(arr)):
    print (arr[i], end =" ")
print()

print("Filtered array :")
for i in range(len(arr)) :
    composite = False

    for j in range(2,arr[i]):
        if(arr[i]%j==0) :
            composite =True
            break

    if(composite) :
         out.append(arr[i])

for i in range (0, len(out)):
    print (out[i], end =" ")
print()
```

Output :

```
Initial array :
3 4 6 9 13 14 16 17
Filtered array :
4 6 9 14 16
PS C:\Users\IsmailRatlamwala\Documents\College prog\Python\Experiment 2>
```

3. Python program to change all occurrences of a first character of a string to @ except for first occurrence.

Sample String : 'apple a day'

Expected Result : 'apple @ d@y'

Program :

```
string = str(input("Enter a string : "))

result = string.replace(string[0], '@')
print(string[0]+string[1:])
```

Output :

```
Enter a string : exclusive & early
exclusiv@ & @arly
PS C:\Users\IsmailRatlamwala\Documents\College prog\Python\Experiment 2>
```

4. Python Program

- to sort group of strings into alphabetical order
- to check whether entered string is palindrome or not

Program :

```
n =int(input("Enter the number of strings : "))

a = []
for i in range(n) :
    a.append(str(input()))

a.sort()

print("\nSorted string :")
for i in range (0, len(a)):
    print (a[i], end =" ")
print("\n")

string= str(input("Enter the string to be checked : "))

if(string==string[::-1]):
    print(string+" is a Palindrome")
else :
    print(string+" is not a Palindrome")
```

Output :

```
Enter the number of strings : 4
hello
there
this
is

Sorted string :
hello is  there this

Enter the string to be checked : madam
madam is a Palindrome
PS C:\Users\IsmailRatlamwala\Documents\College prog\Python\Experiment 2>
```