

EXPERIMENT 2

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Experiment 2

AIM - Exploring basic of python like data types (strings, list, array, dictionaries, set, tuples) and control statements.

1. Python program to

- Read an array and display
- Append a new item to the end of the array
- To reverse the order of items in array
- To get length in bytes of one array item
- To append items from another array
- Remove a specific item using the index from an array
- Insert a specific item at the specific position

Theory:-

~~Ans:-~~

~~Array~~ - 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 & these items should be of same type.

The array can be handled in Python by a module named array. It is ~~Array~~ ^{Array module}.
Element:- Each item stored in an array is called an element.

Index:- The location of an element in an array has a numerical value index, which is used to identify the position of the element.

Properties of array are

1. Index starts with 0
2. We can access each element via its index
3. The length of the array defines the capacity to store the elements.

~~Array Operations~~

1. ~~Traversal~~

Syntax: ~~from array import *~~
~~arrayName = array(typecode, [initializers])~~

Array Operations

1. Accessing array elements

Code: ~~import array as arr~~
~~from array import *~~
a = array('i', [1, 2, 3])
~~print a~~
print(a[0])

Output: 1

2. ~~Insertion~~

code:

a.append(4)
print(a)

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

3. Update & change value

Code:- `a[1] = 22`
`print(a[1])`

Output:- 22

4. Delete - It deletes an element at the given index.

Code:- `a = array('i', [1, 2, 3])`
Code:- `del a[2]` // removing third element
`print(a)`

Output:- `array('i', [1, 2])`

5. Length of an array

It is defined as no. of elements present in the array. `len()` this function returns an integer value.

6. Reverse an array

This will reverse the array

Code:- `a = array('i', [1, 2, 3])`
`a = a[::-1]`
`print(a)`

Output:- `array('i', [3, 2, 1])`

7. Length of array element

We use `itemsize` method to get the

length of ^{one} the array element

Code:- `a = array('i', [1, 2, 3])`
`print(a.itemsize)`

Output:- 4

EX_2_1.py

EXPERIMENT 2 > EX_2_1.py > ...

```
1  from array import *
2  arr=array("i",[])
3  arr2=array("i",[])
4  # Driver program
5  if __name__ == "__main__":
6
7
8      while True:
9          print("1:To insert elements into the array")
10         print("2:To print elements in the array")
11         print("3:To reverse the order of elements in the array")
12         print("4:To get in length in bytes of one array item")
13         print("5:To get in length in bytes of array")
14         print("6:To append items form another array")
15         print("7:To remove a specific item from the array")
16         print("8:To insert a specific item at a specific position in the array")
17         print("9:To delete the array")
18         print("10:To exit")
19         n=int(input("Enter your choice: "))
20         if n==1:
21             elements=int(input("Enter the no of elements you want to insert: "))
22             for j in range(0,elements):
23                 element=int(input("Enter the element you want to insert "))
24                 arr.append(element)
25         if n==2:
26             if len(arr)==0:
27                 if len(arr)==0:
28                     print("First insert elements to the array")
29                 else:
30                     a=len(arr)
31                     for j in range(0,a):
32                         print(arr[j])
33         if n==3:
34             if len(arr)==0:
35                 print("First insert elements to the array")
36             else:
37                 a=len(arr)
38                 arr=arr[::-1]
39                 print("After reversing the elements of array:")
40                 for j in range(0,a):
41                     print(arr[j])
42         if n==4:
43             if len(arr)==0:
44                 print("First insert elements to the array")
45             else:
46                 print(arr.itemsize)
47         if n==5:
48             if len(arr)==0:
49                 print("First insert elements to the array")
50             else:
```

```

51         else:
52             u=arr.itemsize
53             l=len(arr)
54
55             print(u*l)
56         if n==6:
57             elements=int(input("Enter the no of elements you want to insert: "))
58             for j in range(0,elements):
59                 element=int(input("Enter the element you want to insert "))
60                 arr2.append(element)
61             for j in range(0,elements):
62                 arr.append(arr2[j])
63             a=len(arr)
64             for j in range(0,a):
65                 print(arr[j])
66         if n==7:
67             if len(arr)==0:
68                 print("First insert elements to the array! ")
69             else:
70                 pos=int(input("Enter the position from which you want to remove the element: "))
71                 arr.pop(pos)
72                 print("After removing the element from position",pos,":")
73                 a=len(arr)
74                 for j in range(0,a):
75                     print(arr[j])
76

```

PS C:\Users\Puru\Desktop\PRIYANSH\College\PYTHON\CODEx> python -u "c:\Users\Puru\Desktop\PRIYANSH\College\PYTHON\CODEx\EXPERIMENT 3\EX_2_1.py"

```

1:To insert elements into the array
2:To print elements in the array
3:To reverse the order of elements in the array
4:To get in length in bytes of one array item
5:To get in length in bytes of array
6:To append items form another array
7:To remove a specific item from the array
8:To insert a specific item at a specific position in the array
9:To delete the array
10:To exit
Enter your choice: 1
Enter the no of elements you want to insert: 3
Enter the element you want to insert 1
Enter the element you want to insert 2
Enter the element you want to insert 3
1:To insert elements into the array
2:To print elements in the array
3:To reverse the order of elements in the array
4:To get in length in bytes of one array item
5:To get in length in bytes of array
6:To append items form another array
7:To remove a specific item from the array
8:To insert a specific item at a specific position in the array
9:To delete the array
10:To exit

```


8:To insert a specific item at a specific position in the array
9:To delete the array
10:To exit

Enter your choice: 2

1

2

3

1:To insert elements into the array
2:To print elements in the array
3:To reverse the order of elements in the array
4:To get in length in bytes of one array item
5:To get in length in bytes of array
6:To append items form another array
7:To remove a specific item from the array
8:To insert a specific item at a specific position in the array
9:To delete the array
10:To exit

Enter your choice: 3

After reversing the elements of array:

3

2

1

1:To insert elements into the array
2:To print elements in the array
3:To reverse the order of elements in the array
4:To get in length in bytes of one array item
5:To get in length in bytes of array

2:To print elements in the array
3:To reverse the order of elements in the array
4:To get in length in bytes of one array item
5:To get in length in bytes of array
6:To append items form another array
7:To remove a specific item from the array
8:To insert a specific item at a specific position in the array
9:To delete the array
10:To exit

Enter your choice: 6

Enter the no of elements you want to insert: 3

Enter the element you want to insert 4

Enter the element you want to insert 5

Enter the element you want to insert 6

3

2

1

4

5

6

1:To insert elements into the array
2:To print elements in the array
3:To reverse the order of elements in the array
4:To get in length in bytes of one array item
5:To get in length in bytes of array
6:To append items form another array
7:To remove a specific item from the array

```
2:To print elements in the array
3:To reverse the order of elements in the array
4:To get in length in bytes of one array item
5:To get in length in bytes of array
6:To append items form another array
7:To remove a specific item from the array
8:To insert a specific item at a specific position in the array
9:To delete the array
10:To exit
Enter your choice: 4
4
1:To insert elements into the array
2:To print elements in the array
3:To reverse the order of elements in the array
4:To get in length in bytes of one array item
5:To get in length in bytes of array
6:To append items form another array
7:To remove a specific item from the array
8:To insert a specific item at a specific position in the array
9:To delete the array
10:To exit
Enter your choice: 5
12
1:To insert elements into the array
2:To print elements in the array
3:To reverse the order of elements in the array
4:To get in length in bytes of one array item
```

```
2:To print elements in the array
3:To reverse the order of elements in the array
4:To get in length in bytes of one array item
5:To get in length in bytes of array
6:To append items form another array
7:To remove a specific item from the array
8:To insert a specific item at a specific position in the array
9:To delete the array
10:To exit
Enter your choice: 6
Enter the no of elements you want to insert: 3
Enter the element you want to insert 4
Enter the element you want to insert 5
Enter the element you want to insert 6
3
2
1
4
5
6
1:To insert elements into the array
2:To print elements in the array
3:To reverse the order of elements in the array
4:To get in length in bytes of one array item
5:To get in length in bytes of array
6:To append items form another array
7:To remove a specific item from the array
```



```
Enter the element you want to insert 5
Enter the element you want to insert 6
3
2
1
4
5
6
1:To insert elements into the array
2:To print elements in the array
3:To reverse the order of elements in the array
4:To get in length in bytes of one array item
5:To get in length in bytes of array
6:To append items form another array
7:To remove a specific item from the array
8:To insert a specific item at a specific position in the array
9:To delete the array
10:To exit
```

```
1:To insert elements into the array
2:To print elements in the array
3:To reverse the order of elements in the array
4:To get in length in bytes of one array item
5:To get in length in bytes of array
6:To append items form another array
7:To remove a specific item from the array
8:To insert a specific item at a specific position in the array
9:To delete the array
10:To exit
Enter your choice: 7
Enter the position from which you want to remove the element: 2
After removing the element from position 2 :
1
2
1:To insert elements into the array
2:To print elements in the array
3:To reverse the order of elements in the array
4:To get in length in bytes of one array item
5:To get in length in bytes of array
6:To append items form another array
7:To remove a specific item from the array
8:To insert a specific item at a specific position in the array
9:To delete the array
10:To exit
Enter your choice: 8
Enter the position at which you want to insert the element: 2
Enter the element which you want to insert 44
After inserting the element in position 2 :
1
2
44
1:To insert elements into the array
```

```

1
2
44
1:To insert elements into the array
2:To print elements in the array
3:To reverse the order of elements in the array
4:To get in length in bytes of one array item
5:To get in length in bytes of array
6:To append items form another array
7:To remove a specific item from the array
8:To insert a specific item at a specific position in the array
9:To delete the array
10:To exit
Enter your choice: 9
Your array has been deleted!
1:To insert elements into the array
2:To print elements in the array
3:To reverse the order of elements in the array
4:To get in length in bytes of one array item
5:To get in length in bytes of array
6:To append items form another array
7:To remove a specific item from the array
8:To insert a specific item at a specific position in the array
9:To delete the array
10:To exit
Enter your choice: 10
PS C:\Users\Puru\Desktop\PRIYANSH\College\PYTHON\CODE>

```

2. Python program to remove prime numbers from an array

Theory -

Prime numbers are those numbers which can be ~~div~~ divisible by ~~the~~ itself and 1 only.

To find prime ~~no~~ numbers the algorithm is as follows:-

1. We will make two array, the first will be the input array ~~where~~ and second will be output array.

2. All the ~~un~~ user inputed numbers will be stored in input array.

3. One by one we will take each no and do the following
 a. Divide that number by each all the numbers which lie in the range from 2 to ^{less than} ~~to~~ number itself
 b. if the numbers get ~~go~~ divided in this range then it is not a prime no else it is a prime number.

```

1  from array import *
2  arr=array("i",[])
3  elements=int(input("Enter the no of elements you want to insert: "))
4  for j in range(0,elements):
5      element=int(input("Enter the element you want to insert "))
6      arr.append(element)
7  out=array("i",[])
8  flag=False
9  # arr = array('i',[2,13,56,34,90])
10 for i in arr:
11     for j in range(2,i-1):
12         if(i%j==0):
13             flag=True
14
15     if(flag==True):
16         out.append(i)
17
18 print("Array after removing all the prime numbers are as follows:")
19 a=len(out)
20 for j in range(0,a):
21     print(out[j])
22
23

```

PS C:\Users\Puru\Desktop\PRIYANSH\College\PYTHON\CODE> python -u "c:\Users\Puru\Desktop\PRIYANSH\College\PYTHON\CODE\EXPERIMENT 3\EX_2_2.py"

```

Enter the no of elements you want to insert: 3
Enter the element you want to insert 23
Enter the element you want to insert 12
Enter the element you want to insert 44
Array after removing all the prime numbers are as follows:
12
44
PS C:\Users\Puru\Desktop\PRIYANSH\College\PYTHON\CODE> 

```

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3. Python program to to change all occurrences of a first character of a string to @ except for the first occurrence
- Theory :- The algorithm to tackle this problem is as follows
1. We will make two ^{variables} arrays the first will be the input array & the second will be the output array.
 2. The user input string will be stored in input array & the
 3. We will store every element of the input string & store the first occurrence of every character in output string
 4. As soon as we get a duplicate character we will put @ in output string
 5. After the traversal is complete print the output string.

EXPERIMENT 2 > EX_2_3.py > ...

```
1 inn=input("Enter the string:")
2 done=[]
3 str=""
4
5 for i in inn:
6     if i==" ":
7         str=str+i
8     elif i not in done:
9         str=str+i
10        done.append(i)
11    else:
12        str=str+"@"
13 print("The customized string is as follows: ")
14 print(str)
```

PS C:\Users\Puru\Desktop\PRIYANSH\College\PYTHON\CODE> python -u "c:\Users\Puru\Desktop\PRIYANSH\College\PYTHON\CODE\EXPERIMENT 3\EX_2_3.py"

Enter the string:apple a day

The customized string is as follows:

ap@le @ day

4. Python Program

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

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Theory:-

Python list `sort()` function is used to sort a list in ascending, descending & user-defined orders.

Syntax:-

List-name.sort()

This ~~not~~ will sort the given list in ascending order. This function can be used to sort a list of integers, floating-point numbers, strings and others.

Ex1:- So sort the list in ascending order

Input:- `num = [1, 3, 4, 2]`
`num.sort()`
`print(num)`

Output:- `[1, 2, 3, 4]`

Ex2:- So sort the list in descending order

Syntax:-
Input:- `list-name.sort(reverse=True)`

Input:- `nums = [1, 3, 4, 2]`
`nums.sort(reverse=True)`
`print(nums)`

Output:- `[4, 3, 2, 1]`

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Ex 3:- To sort in user defined way

Syntax:- list_name.sort(key=..., reverse=...)

Parameters:-

- reverse: When True will sort in descending order. Default: False
- key: A function to specify the sorting criteria

Input:- def sortSecond(val):
 return val[1]

list1 = [(1, 2), (3, 3), (1, 1)]

list1.sort(key=sortSecond)
print(list1)

list1.sort(key=sortSecond, reverse=True)
print(list1)

Output: [(1, 1), (1, 2), (3, 3)]
 [(3, 3), (1, 2), (1, 1)]

EXPERIMENT 2 > EX_2_4.py

```
1  if __name__ == "__main__":
2      arr=[]
3
4
5      while True:
6          print("1:To insert elements into the list")
7          print("2:To print strings in the list")
8          print("3:To sort the string in the list")
9          print("4:To check if the string is palindrome or not")
10
11         print("5:To exit")
12         n=int(input("Enter your choice: "))
13         if n==1:
14             a=int(input("Enter the no of string you want to add: "))
15             for i in range(0,a):
16                 n=input("Enter the string: ")
17                 arr.append(n)
18             print("Entered strings are as follows: ")
19             for i in range(0,a):
20                 print(arr[i])
21         if n==2:
22             print("Entered strings are as follows: ")
23             a=len(arr)
24             for i in range(0,a):
25                 print(arr[i])
26
27             for i in range(0,a):
28                 print(arr[i])
29
30         if n==3:
31             print("After sorting the strings in alphabetical are listed below: ")
32             a=len(arr)
33             arr.sort()
34             for i in range(0,a):
35                 print(arr[i])
36
37         if n==4:
38             tt=input("Enter the string: ")
39             txt=tt
40             flag=True
41             a=len(tt)
42             for i in range(0,a):
43
44                 if(tt[i]!=txt[a-i-1]):
45                     flag=False
46
47             if(flag==True):
48                 print("The entered string is a palindrome!")
49             if(flag==False):
50                 print("The entered string is not a palindrome!")
```

```

26
27     if n==3:
28         print("After sorting the strings in alphabetical are listed below: ")
29         a=len(arr)
30         arr.sort()
31         for i in range(0,a):
32             print(arr[i])
33
34     if n==4:
35         tt=input("Enter the string: ")
36         txt=tt
37         flag=True
38         a=len(tt)
39         for i in range(0,a):
40
41             if(tt[i]!=txt[a-i-1]):
42                 flag=False
43
44         if(flag==True):
45             print("The entered string is a palindrome!")
46         if(flag==False):
47             print("The entered string is not a palindrome!")
48
49     if n ==5:
50         break

```

PS C:\Users\Puru\Desktop\PRIYANSH\College\PYTHON\CODE> python -u "c:\Users\Puru\Desktop\PRIYANSH\College\PYTHON\CODE\EXPERIMENT 3\EX_2_4.py"

```

1:To insert elements into the list
2:To print strings in the list
3:To sort the string in the list
4:To check if the string is palindrome or not
5:To exit
Enter your choice: 1
Enter the no of string you want to add: 3
Enter the string: n
Enter the string: f
Enter the string: a
Entered strings are as follows:
n
f
a
1:To insert elements into the list
2:To print strings in the list
3:To sort the string in the list
4:To check if the string is palindrome or not
5:To exit
Enter your choice: 2
Entered strings are as follows:
n
f
a
1:To insert elements into the list
2:To print strings in the list
3:To sort the string in the list
4:To check if the string is palindrome or not
5:To exit
Enter your choice: 3

```

```
1:To insert elements into the list
2:To print strings in the list
3:To sort the string in the list
4:To check if the string is palindrome or not
5:To exit
Enter your choice: 3
After sorting the strings in alphabetical are listed below:
a
f
n
```

```
PS C:\Users\Puru\Desktop\PRIYANSH\College\PYTHON\CODE> python -u "c:\Users\Puru\Desktop\PRIYANSH\College\PYTHON\CODE\EXPERIMENT 3\EX_2_4.py"
```

```
1:To insert elements into the list
2:To print strings in the list
3:To sort the string in the list
4:To check if the string is palindrome or not
5:To exit
Enter your choice: 4
Enter the string: redivider
The entered string is a palindrome!
1:To insert elements into the list
2:To print strings in the list
3:To sort the string in the list
4:To check if the string is palindrome or not
5:To exit
Enter your choice: 4
Enter the string: priyansh
The entered string is not a palindrome!
1:To insert elements into the list
2:To print strings in the list
3:To sort the string in the list
4:To check if the string is palindrome or not
5:To exit
Enter your choice: █
```