EXPERIMENT NO. - 08

AIM: Edit/compile/run a program to duplicate all the elements of a list.

THEORY:

Python Program to print duplicates from a list of integers:

In this experiment, we will see how we can print duplicates from a list of integers in Python. The List is an ordered set of values enclosed in square brackets [ ]. List stores some values called elements in it, which can be accessed by their particular index.

A duplicate element in a list is the element that has occurred more than once in the list. We can print duplicates by following various approaches.

Given a list of integers, we have to print all those integers which have occurred more than once in the list.

Input: [10, 2, 2, 3, 1, 6, -3, -2, 3, 4, 8, 10]

Output: [10, 2, 3]

For printing duplicate integers from a list in Python, we can follow these approaches:

Brute force approach

using Counter() method

Approach 1: Brute force approach

Also known as exhaustive search, in this, we will use two for loops which will count the occurrence of each integer in the list and display the duplicate elements based on the count of their occurrence.

Algorithm

Follow the algorithm to understand the approach better.

Step 1- Define a function to find duplicates

Step 2- In the function declare a list that will store all the duplicate integers

Step 3- Run a loop for each element in the list

Step 4- For each integer, run another loop that will check if the same integer is repeated

Step 5- If found the repeated integer will be added to another list using append()

Step 6- Return the list which stores repeated integers

Python Program 1

Look at the program to understand the implementation of the above-mentioned approach. In this program, we have defined a function that will check for each integer in the list if it is repeated in the list or not. Integers that are repeated will be stored in another list and returned by the function.

PROGRAM A:

```
# print duplicates from a list of integers

#function
def duplicate(li):
    n=len(li)
    dup=[]
    for i in range(n):
        k = i + 1
        for j in range(k,n):
            if li[i] == li[j] and li[i] not in dup:
                dup.append(li[i])
    return dup

#test
li=[ 10, 20, 30, -10, -20, 10, 80, -10, -20, 30]
print("Duplicate integeres: ",duplicate(li))
```

OUTPUT:

```
Duplicate integeres: [10, 30, -10, -20]
```

Approach 2: Counter() function

Counter() is a built-in function that returns a dictionary of all the elements and their occurrences in a list. A dictionary has keys and values corresponding to it, the elements in the list and their occurrences are returned in a similar way.

After getting occurrences of each integer, we will check which integers occurred more than once and then store them in another list.

Algorithm

Follow the algorithm to understand the approach better.

Step 1- Import Counter function

Step 2- Take input of list with integer values

Step 3- Use Counter() to calculate occurrences of all the numbers in the list

Step 4- Declare another list

Step 5- Use a list comprehension to store integers with occurrence more than 1 in the list

Step 6- Print the list

Python Program 2

To use the Counter() function in your program, import it from the collections module. We will add all the numbers which are repeated in the list into another list with the help of list comprehension.

PROGRAM B:

```
from collections import Counter

li=[1, 3, 2, 6, 2, 3, 5, 6, 4, 5]
d = Counter(li)

repeated_list = list([num for num in d if d[num]>1])
print("Duplicate integers: ",repeated_list)
```

OUTPUT:

Duplicate integers: [3, 2, 6, 5]

PROGRAM C:

Approach 3: Using a single for loop

```
# Python program to print duplicates from
# a list of integers
lis = [1, 2, 1, 2, 3, 4, 5, 1, 1, 2, 5, 6, 7, 8, 9, 9]
```

```
uniqueList = []
duplicateList = []

for i in lis:
    if i not in uniqueList:
        uniqueList.append(i)
    elif i not in duplicateList:
        duplicateList.append(i)

print(duplicateList)
```

OUTPUT:

```
[1, 2, 5, 9]
```

Conclusion: Hence, we have successfully studied about program for duplicating all the elements of a list.