



Expt. No: 1 Expt. Name: Assignment No-5

Roll No 59 Class: S.E.B Branch: Comp Sub. PDSL

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| Experiment Conducted on :     | 1st Attempt   | 2nd Attempt |
|-------------------------------|---|-------------|
| Expected Date of Submission : |   |             |
| Actual Date of Submission :   | 1. Regularity (2) :<br>2. Oral / Quiz (3) :<br>3. Performance (5) :<br><small>(Hand writing, Drawing, Graph, Neatness, Practical Skills etc.)</small> |             |
| Delay D (Days) / W (Weeks) :  | 4. Total (10) :   |             |

Name of Teacher ..... Sign. / Date: .....

| W(2) | C(4) | D(2) | V(2) | Total (20) | Dated |
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|      |      |      |      |            | Sign  |
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\* Title :- set operations.

Objectives :

- To understand implementation of list data structure.
- Understand the implementation of set with various operations like, union, intersection and difference etc.

\* Problem Statement :

In second year computer Engineering class, group A students play cricket, group B students play badminton and group C students play Football. Write a Python program using functions to compute following:-

- List of students who play both cricket list of stut and badminton.
- List of students who play either cricket or badminton but not both.



- c) Number of students who play neither cricket nor badminton.
- d) Number of students who play cricket and football but not badminton.

Outcomes :-

- Implement the list data structure.
- Solve real world problems of sets operations logically using list data structure.

\* Algorithm :-

A) List of students who play both cricket list of stat and badminton.

- 1) Start
- 2) Take three group A, B, C as list.
- 3) Find the length of group A & group B.
- 4) Take resultlist variable for storing result.
- 5) Take for loop for group B in range (say i)
- 6) Take for loop for group A in range (say j)
- 7) Compare group A and group B element.
  - a) if group A & B elements are same then append it on resultlist [ ].
  - b) if group A & B. elements are not same then break inner for loop.
- 8) Print resultlist
- 9) End.

B) List of students who play either cricket or badminton but not both.

- 1) Start
- 2) Take three group A, group B as list.
- 3) Find the length of group A (say I1) & group B (I2)



- 4) Take resultlist variable for storing result
- 5) compare if is greater than 15 them
- 6) Take for loop for group A in range (say i)
- 7) Take for loop for group B in range (say j)
- 8) a. if group A & group B elements are same  
then append it on resultlist [ ].  
b. if group A & group B elements are not  
same then  
break inner for loop.  
c. Point resultlist
- 9) End.

c) Numbers of student's who play neither cricket nor badminton.

- 1) Start
- 2) Take three group A, group B as list
- 3) Find the length of group A & group B.
- 4) Take resultlist variable for storing result.
- 5) compare group A & B elements
- 6) Take a for loop for both groups
- 7) a) If group A & B elements are same then  
append it on resultlist [ ].  
b) If group A & B are not same then break  
inner for loop.
- 8) Point resultlist
- 9) End.

d) No of students who play cricket and football but not badminton.

- 1) Start
- 2) Take three group A, group B, group C as a list



- 3) find the length of group A (say l1) and group B (say l2) and group C (say l3)
- 4) Take resultlist variable for starting result.
- 5) compare l3, l2, l3 greater than or not
- 6) Take for loop for group A in range (say i)
- 7) Take for loop for group B in range (say j)
- 8) Take for loop for group C in range (say k)
- 9)
  - a) if group A & B are same append it on resultlist []
  - b) if group B & C are same append it on resultlist []
  - c) if group A & C are same append it on resultlist []
- 10) Print resultlist.
- 11) End



\* Flow chart of

i} List of students who play both cricket and badminton.

(start)

Declare variables of list group A,  
group B & group c resultlist.

| Read group A , group B & group c |

For i in Group A

For j in Group B

is j last

is group  
B

is  $i=j^2$

Append i in resultlist.

is j last

is group B

is i last

in group A

Display resultlist

End



- 2) List of students who play either cricket or badminton but not Both.

(start)



Declare variable of list  
group A, B, C & resultlist



Read group A, B and C



For i in  
group A

False

is i not  
in  
groups

True

Append i in  
resultlist

is i last  
in group  
A?

True

For i in  
group B

false

is i not  
in group  
A?

True

Append i in  
resultlist

is j  
last in  
group B?

True

Display resultlist



(End)



4) Number of students who play cricket & Football but not Badminton

( start )

Declare variables of List group A  
group B , group c and resultlist

Read group A, groupB & group c

for i in  
group A

is i  
last in  
group A

is i not  
in group  
B & C?

Append i in  
resultlist

Is i last  
in group A

YES

For i in  
group c

is i  
not in  
B

NO  
is last  
group A

Append i in  
resultlist

NO  
is i last  
in group C

Display resultlist

( End )



\* Pseudo code :-

A] List of students who play both cricket and badminton.

- 1) start
- 2) declare group A, group B, group C & resultlist
- 3) Read group A, group B, and group C
- 4) for i in group A
- 5)     for j in group B.
- 6)         if i=j  
           result append (i)  
           break;
- 7) display resultlist
- 8) End

B] List of students who play either cricket or badminton but not both.

- 1) start
- 2) declare group A, group B, group C and resultlist
- 3) as variable
- 4) Read i in group A.
- 5) for if i not in group  
           result : append (i)
- 5) for i in group B.  
           if i not in group A  
               result append (i)
- 6) display result
- 7) End



C) List of student's who play neither cricket nor badminton.

- 1) Start
- 2) Declare variable group A,B,C and resultlist
- 3) Read group A, group B & group C
- 4) For i in group C
- 5) if i not in group A & if i not in group B.  
result.append (i)
- 6) Display result.
- 7) End.

D) List of students who play both cricket and football but not Badminton.

- 1) Start
- 2) Declare variable group A,B,C & resultlist
- 3) Read group A, group B, group C.
- 4) for i not in group A  
if i not in group B & not in group C.  
result.append (i)
- 5) For i in group C  
if i not in group B  
result.append (i)
- 6) Display result
- 7) End.



## \* Conclusion :-

Hence we have learned the list data structure and how to use it to implement set operations.

## \* Assignment questions :-

1) What is Data Structure?

- 1) It is a particular way of storing and organizing data in a computer so that it can be used efficiently.  
2) More precisely, a data structure is a collection of data values and functions.  
3) It is an organizing information in a computer so that it can be retrieved and used most productively.  
4) It can be used in almost every program or software system  
5) It is a key part of many computer algorithms as they allow programmers to do data e.g. we can store a list of items having the same data-type using the array data structure

2) What are different types of Data structure based on organizing method?

- As we know data structure are of two types i.e. Primitive and Non-primitive. It is a way of organizing the data. So we can classify data structure which are primitive and non-primitive data structure which are known as standard and user defined data structure respectively.



### a] Primitive data structure:-

- 1) They are predefined types of data, which are suppose by programming language.
- 2) Programmers can be use these data structure types when creating variables in their programs.
- 3) They can hold text messages numbers and so on, but don't accomodate higher levels of complexity.  
eg:- int , float , pointer, char & double.

### b] Non-Primitive data structure:-

- 1) It not just store a value, but rather a collection of values in formats.
- 2) It is a simply called objects because they are created, rather than pre defined.
- 3) They are sophisticated members of the data structure family.  
eg. linear & non-linear which includes array, list and files.

### Q.3] Explain list is of which type of data structure?

- 1) List is of Non-primitive type of data structure in Python.
- 2) Python lists are used to store collections of heterogeneous items.
- 3) They can be recognized by their square brackets which hold elements and are separated by a comma.
- 4) It is a mutable or changable ordered sequence of elements.
- 5) Each element or value that is inside of a list is called an items.



- Q. 6) It is created by placing [] in python separated by commas.
- 7) A list can also have another list as an item which is called nested list.  
eg. We can have integer, float & string items in a same list.

Q. 4) What are different list methods?

→ There are many list methods in python as follows.

- 1) Append () add a single element to end of the list
- 2) clear () Removes all items from list
- 3) copy () returns a shallow copy of list
- 4) count () returns count of elements in list
- 5) Python list extend () adds iterable elements to end of list.
- 6) Index () returns index of elements in list
- 7) Insert () insert an elements.
- 8) pop () Removes elements at given below.
- 9) Remove () removes items from list
- 10) Reverse () reverses the list.
- 11) Sort () sorts the element of list.

Q. 5) What is an Algorithm?

- 1) An algorithm is a finite set of precise instruction for performing a computation.
- 2) It is a step-by-step procedure in python
- 3) It defines a set of instruction to be executed in a certain order.
- 4) Search - Algorithm to search an items a data.
- 5) Sort - Algorithm to sort items in a certain order.
- 6) They are created independent of underlying languages.

```
1 print("a) List of student who play both cricket and badminton")
2 groupA=[ 'Roshan','Pranav','Kartik','Raj']
3 groupB=[ 'Roshan','Rohan','Om','Pranav']
4 groupC=[ 'Pranav','Vedant','Kartik','Raj']
5 l1=len(groupA)
6 l2=len(groupB)
7 resultlist=[]
8 for i in range(l1):
9     for j in range(l2):
10        if (groupA[i]==groupB[j]):
11            resultlist.append(groupA[i])
12            break;
13 print (resultlist)
14
```

Shell > Program tree

Python 3.7.9 (bundled)

>>> %Run a.py

a) List of student who play both cricket and badminton  
['Roshan', 'Pranav']

>>>

```
1 print("a) List of student who play both cricket and badminton")
2 groupA=['Roshan','Pranav','Kartik','Raj'] #cricket
3 groupB=['Roshan','Rohan','Om','Pranav']    #badminton
4 groupC=['Pranav','Vedant','Kartik','Raj'] #football
5 l1=len(groupA)
6 l2=len(groupB)
7 resultlist=[]
8 flag=0
9 for i in range(l1):
10     for j in range(l2):
11         if (groupA[i]==groupB[j]):
12             flag=1
13
14     if(flag==0):
15         resultlist.append(groupA[i])
16     flag=0;
17 flag=0
18
19 for i in range(l2):
20     for j in range(l1):
21         if (groupB[i]==groupA[j]):
22             flag=1
23
24     if(flag==0):
25         resultlist.append(groupB[i])
26     flag=0
27
28 print(resultlist)
```

Shell > Program tree

Python 3.7.9 (bundled)

>>> %Run a.py

a) List of student who play both cricket and badminton

['Roshan', 'Pranav']

>>> %Run b.py

a) List of student who play both cricket and badminton

['Kartik', 'Raj', 'Rohan', 'Om']

>>>

```
1 print("a) List of student who play neither cricket nor badminton")
2 groupA=['Roshan','Pranav','Kartik','Raj'] #cricket
3 groupB=['Roshan','Rohan','Om','Pranav']    #badminton
4 groupC=['Pranav','Vedant','Kartik','Raj'] #football
5 l1=len(groupA)
6 l2=len(groupB)
7 l3=len(groupC)
8 resultlist=[]
9 flag=0
10 for i in range(l3):
11     for j in range(l1):
12         if (groupC[i]==groupA[j]):
13             flag=1
14             break;
15     for k in range(l2):
16         if (groupC[i]==groupB[j]):
17             flag=1
18             break;
19
20     if(flag==0):
21         resultlist.append(groupC[i])
22     flag=0
23 print(resultlist)
```

Shell    Program tree

a) List of student who play both cricket and badminton  
['Roshan', 'Pranav']

>>> %Run b.py

a) List of student who play both cricket and badminton  
['Kartik', 'Raj', 'Rohan', 'Om']

>>> %Run c.py

a) List of student who play neither cricket nor badminton  
['Vedant']

```
1 print("a) List of student who play cricket and football but not badminton")
2 groupA=['Roshan','Pranav','Kartik','Raj'] #cricket
3 groupB=['Roshan','Rohan','Om','Pranav']    #badminton
4 groupC=['Pranav','Vedant','Kartik','Raj'] #football
5 l1=len(groupA)
6 l2=len(groupB)
7 l3=len(groupC)
8 resultlist=[]
9 flag=0
10 for i in range(l3):
11     for j in range(l2):
12         if (groupC[i]==groupB[j]):
13             flag=1
14
15     if(flag==0):
16         resultlist.append(groupC[i])
17     flag=0;
18 flag=0
19
20 for i in range(l1):
21     for j in range(l2):
22         if (groupA[i]==groupB[j]):
23             flag=1
24     if(flag==0):
25         resultlist.append(groupA[i])
26
27 flag=0
28
29 for i in range(l1):
30     for j in range(l2):
31         if (groupA[i]==groupB[j]):
32             flag=1
33
```

Shell < Program tree

```
a) List of student who play neither cricket nor badminton
['Vedant']
```

```
>>> %Run d.py
```

Python 3.7.9 (bundled)

```
>>> %Run d.py
```

```
a) List of student who play cricket and football but not badminton
['Vedant', 'Kartik', 'Raj']
```