

Experiment No-01(Group A)

Title:- Set Operations

Objectives:-

1. Understand the implementation of array data structure.
2. Understand the implementation of set with various operations like union, intersection, difference and symmetric difference.

Problem Statement:-

In second year computer engineering class, group A student's play cricket, group B students play badminton and group C students play football.

Write a Python program using functions to compute following: -

- a) List of students who play both cricket and badminton
- b) 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.

(Note- While realizing the group, duplicate entries should be avoided, Do not use SET built-in functions)

Software and Hardware requirements:-

1. **Operating system:** Linux- Ubuntu 16.04 to 17.10, or Windows 7 to 10,
2. **RAM-** 2GB RAM (4GB preferable)
3. You have to install **Python3** or higher version

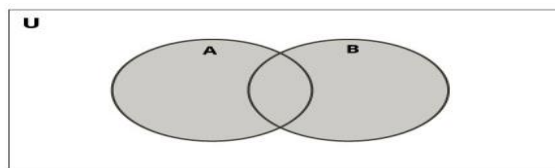
Theory- Basic Set operations:-

Sets can be used to carry out mathematical set operations like union, intersection, difference and symmetric difference. We can do this with operators or methods.

1. Set Union:-

This method performs the union operation on two or more Python sets. What it does is it returns all the items that are in any of those sets.

Union is performed using | operator. Same can be accomplished using the method union().

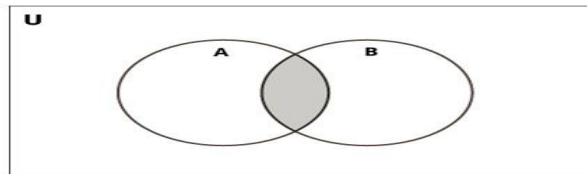


```
>>>A = {1, 2, 3, 4, 5}
>>>B = {4, 5, 6, 7, 8}
>>>print(A | B) # OR by using union()
>>>print(A.union(B)) # output of both will be same {1, 2, 3, 4, 5, 6, 7, 8}
```

2. Set Intersection:-

This method takes as argument sets, and returns the common items in all the sets.

Intersection is performed using & operator. Same can be accomplished using the method intersection().



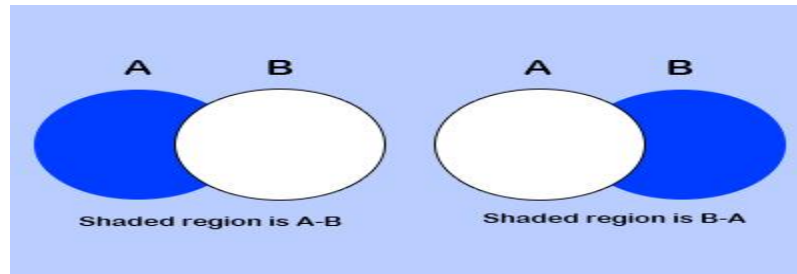
```
>>>A = {1, 2, 3, 4, 5}
>>>B = {4, 5, 6, 7, 8}
>>>print(A & B) # OR by using intersection()
>>>print(A.intersection(B)) # output of both will be same {4, 5}
```

3. Set Difference

The difference() method returns the difference of two or more sets. It returns as a set.

Difference of A and B ($A - B$) is a set of elements that are only in A but not in B. Similarly, $B - A$ is a set of element in B but not in A.

Difference is performed using - operator. Same can be accomplished using the method difference().



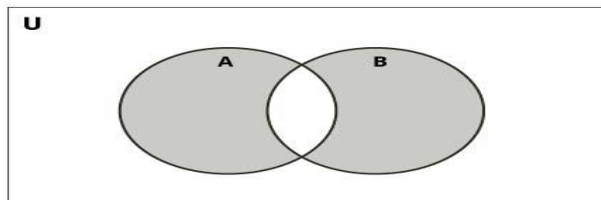
```
>>>A = {1, 2, 3, 4, 5}
>>>B = {4, 5, 6, 7, 8}
>>>print(A - B) # OR by using difference()
>>>print(A.difference(B)) # output of both will be same {1, 2, 3}
```

4. Set Symmetric Difference

This method returns all the items that are unique to each set.

Symmetric Difference of A and B is a set of elements in both A and B except those that are common in both.

Symmetric difference is performed using ^ operator. Same can be accomplished using the method symmetric_difference().



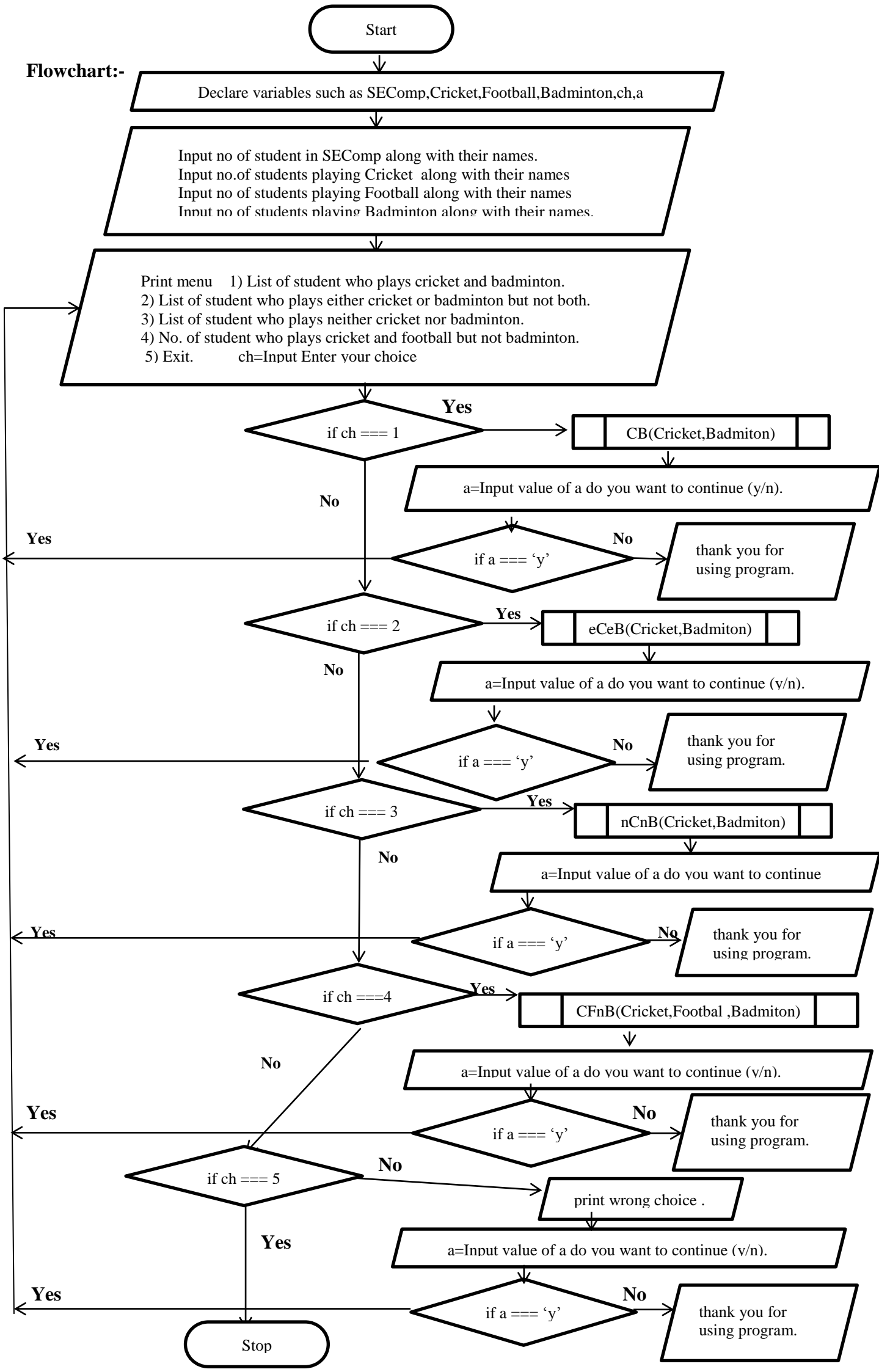
```
>>>A = {1, 2, 3, 4, 5}
>>>B = {4, 5, 6, 7, 8}
>>>print(A ^ B) # OR by using symmetric_difference()
>>>print(A.symmetric_difference(B)) # output of both will be same {1, 2, 3, 6, 7, 8}
```

Algorithm:-

- 1) Start.
- 2) Declare variables such as SEComp,Cricket,Football,Badminton,ch.
- 3) Input no of student in SEComp along with their names.
- 4) Input no.of students playing Cricket along with their names
- 5) Input no of students playing Football along with their names
- 6) Input no of students playing Badminton along with their names.
- 7) Print menu
 - 1) List of student who plays cricket and badminton.
 - 2) List of student who plays either cricket or badminton but not both.
 - 3) List of student who plays neither cricket nor badminton.
 - 4) No. of student who plays cricket and football but not badminton.
 - 5) Exit.

ch=Input Enter your choice
- 8) If ch==1 then call function CB
 - Input value of a do you want to continue (y/n).
 - If a=='y' then go to step 7.
 - else,thank you for using program.
- 9) else if ch==2,then call function eCeB
 - Input value of a do you want to continue (y/n).
 - If a=='y' then go to step 7.
 - else ,thank you for using program.
- 10) else if ch==3 then call function nCnB.
 - Input value of a, do you want to continue (y/n).
 - If a=='y' then go to step 7.
 - else, thank you for using program.
- 11) else if ch==4 then call function CFnB
 - Input value of a , do you want to continue (y/n).
 - If a=='y' ,then go to step 7.
 - else,thank you for using program.
- 12) else if ch==5 then ,go to step 13.
 - else,print wrong choice .
 - Input value of a, do you want to continue (y/n)
 - if a=='y' then go to step 7.
 - else,thank you for using program.
- 13) Stop.

Flowchart:-



Conclusion:

By this way, we can learn how to implement various set operations.