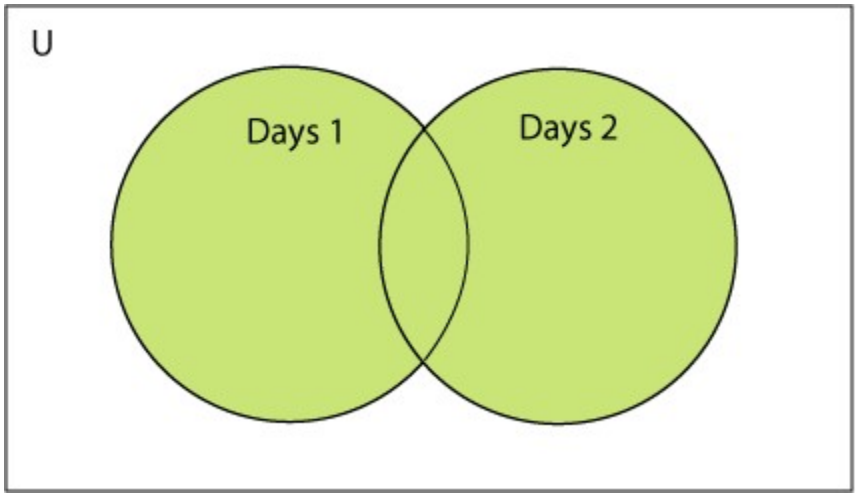
Python Set Operation

Set Operations:-

Set can be performed mathematical operation such as union, intersection, difference, and symmetric difference. Python provides the facility to carry out these operations with operators or methods. We describe these operations as follows.

Union of two Sets:-

The union of two sets is calculated by using the pipe (|) operator. The union of the two sets contains all the items that are present in both the sets.



Consider the following example to calculate the union of two sets.

Example 1: using union | operator

```
Days1 = {"Monday","Tuesday","Wednesday","Thursday", "Sunday"}
Days2 = {"Friday","Saturday","Sunday"}
print(Days1|Days2) #printing the union of the sets
```

Output:

```
{'Friday', 'Sunday', 'Saturday', 'Tuesday', 'Wednesday', 'Monday', 'Thursday'}
```

Python also provides the **union()** method which can also be used to calculate the union of two sets. Consider the following example.

Example 2: using union() method

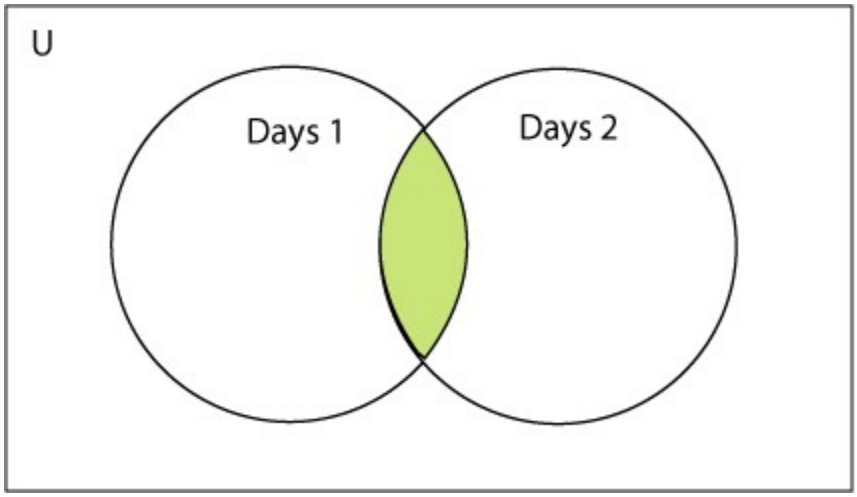
```
Days1 = {"Monday","Tuesday","Wednesday","Thursday"}
Days2 = {"Friday","Saturday","Sunday"}
print(Days1.union(Days2)) #printing the union of the sets
```

Output:

```
{'Friday', 'Monday', 'Tuesday', 'Thursday', 'Wednesday', 'Sunday', 'Saturday'}
```

Intersection of two sets:-

The intersection of two sets can be performed by the **and &** operator or the **intersection() function**. The intersection of the two sets is given as the set of the elements that common in both sets.



Consider the following example.

Example 1: Using & operator

```
Days1 = {"Monday","Tuesday", "Wednesday", "Thursday"}
Days2 = {"Monday","Tuesday","Sunday", "Friday"}
print(Days1&Days2) #prints the intersection of the two sets
```

Output:

```
{'Monday', 'Tuesday'}
```

Example 2: Using intersection() method

```
set1 = {"Devansh","John", "David", "Martin"}
set2 = {"Steve", "Milan", "David", "Martin"}
print(set1.intersection(set2)) #prints the intersection of the two sets
```

Output:

{'Martin', 'David'}

Example 3:

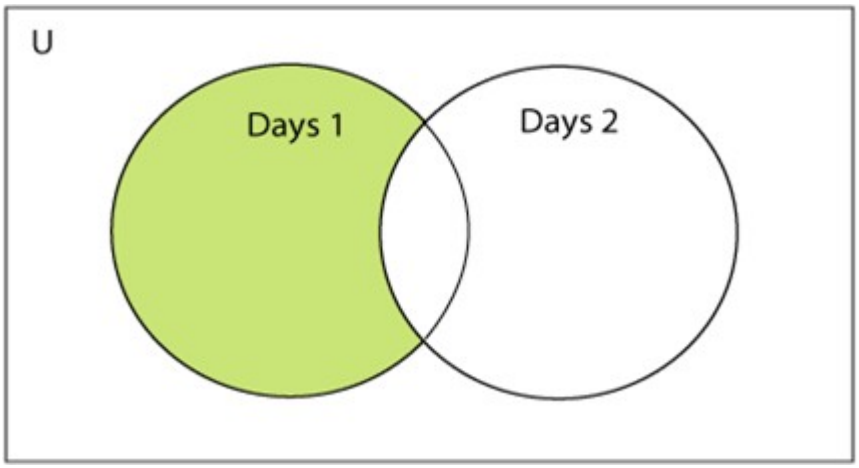
```
set1 = {1,2,3,4,5,6,7}
set2 = {1,2,20,32,5,9}
set3 = set1.intersection(set2)
print(set3)
```

Output:

{1,2,5}

Difference between the two sets:-

The difference of two sets can be calculated by using the subtraction (-) operator or **intersection()** method. Suppose there are two sets A and B, and the difference is A-B that denotes the resulting set will be obtained that element of A, which is not present in the set B.



Consider the following example.

Example 1 : Using subtraction (-) operator

```
Days1 = {"Monday",  "Tuesday", "Wednesday", "Thursday"}
Days2 = {"Monday", "Tuesday", "Sunday"}
print(Days1-Days2) #{"Wednesday", "Thursday" will be printed}
```

Output:

{'Thursday', 'Wednesday'}

Example 2 : Using difference() method

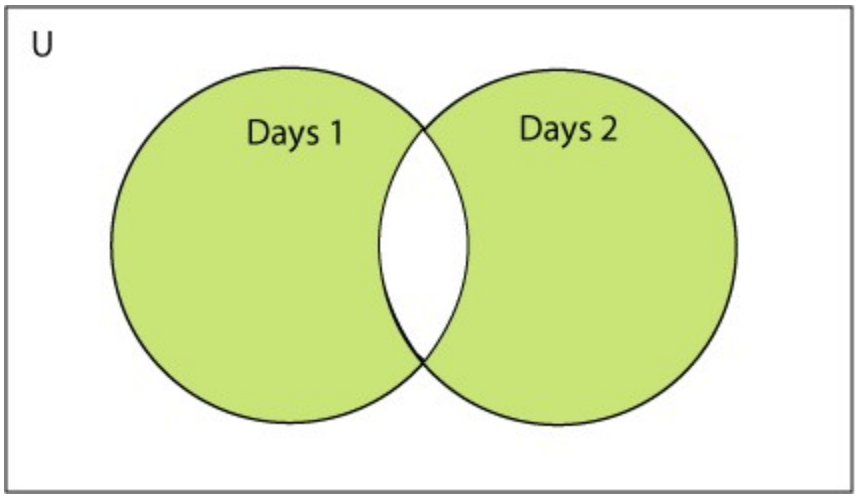
```
Days1 = {"Monday",  "Tuesday", "Wednesday", "Thursday"}
Days2 = {"Monday", "Tuesday", "Sunday"}
print(Days1.difference(Days2)) # prints the difference of the two sets Days1 and Days2
```

Output:

{'Thursday', 'Wednesday'}

Symmetric Difference of two sets:-

The symmetric difference of two sets is calculated by ^ operator or **symmetric_difference()** method. Symmetric difference of sets, it removes that element which is present in both sets. Consider the following example:



Example - 1: Using ^ operator

```
a = {1,2,3,4,5,6}
b = {1,2,9,8,10}
c = a^b
print(c)
```

Output:

{3, 4, 5, 6, 8, 9, 10}

Example - 2: Using symmetric_difference() method

```
a = {1,2,3,4,5,6}
b = {1,2,9,8,10}
c = a.symmetric_difference(b)
print(c)
```

Output:

{3, 4, 5, 6, 8, 9, 10}

Set comparisons:-

Python allows us to use the comparison operators i.e., <, >, <=, >= , == with the sets by using which we can check whether a set is a subset, superset, or equivalent to other set. The boolean true or false is returned depending upon the items present inside the sets.

Consider the following example.

```
Days1 = {"Monday",  "Tuesday", "Wednesday", "Thursday"}
Days2 = {"Monday", "Tuesday"}
Days3 = {"Monday", "Tuesday", "Friday"}
#Days1 is the superset of Days2 hence it will print true.
print (Days1>Days2)
#prints false since Days1 is not the subset of Days2
print (Days1<Days2)
#prints false since Days2 and Days3 are not equivalent
print (Days2 == Days3)
```

Output:

```
True
False
False
```