LAB # 05

ITERATION WITH LOOPS

OBJECTIVE

To get familiar with the different types of loops.

THEORY

A loop can be used to tell a program to execute statements repeatedly. In other word, to keep a computer doing useful work we need repetition, looping back over the same block of code again and again.

Type of Loop Statements in Python:

There are 2 types of loop statements in Python language. They are,

1. for
2. while

The for loop:

A Python **for** loop iterates through each value in a sequence.

Syntax:

In general, the syntax of a **for** loop is:

```
for var in sequence:
    # Loop body
```

for loop can be used to simplify the preceding loop:

```
a) for i in range(endValue):
       #Loop body

b) for i in range(initialValue, endValue):
       # Loop body

c) for i in range range(initialValue, endValue,k):   #k=step value
       # Loop body
```

How for loop works:

- A ‘sequence’ holds multiple items of data, stored one after the other. In sequence introduce strings and data storing techniques.They are sequence-type objects in Python.
- The variable ‘**Var’** takes on each successive value in the sequence, and
- The statements in the body of the loop are executed once for each value.

- Generate a sequence of numbers using '**range() function'**, range(10) will generate numbers from 0 to 9 (10 numbers).

Example program for 'for loop':

```
#simple for loop using sequence(string)
for letter in 'Python':
   print ('Current Letter :', letter)
```

Output:

```
>>> %Run task1.py
Current Letter : P
Current Letter : y
Current Letter : t
Current Letter : h
Current Letter : o
Current Letter : n
```

Example program for 'for loop using range( )':

```
#Simple for loop using range()
for i in range(1,6):
   print("Programming is fun")
```

Output:

```
>>> %Run task2.py
Programming is fun
Programming is fun
Programming is fun
Programming is fun
Programming is fun
```

The while loop:

A **while** loop executes statements repeatedly as long as a condition remains true.

Syntax:

The syntax of a **while** loop in Python programming language is:

```
while loop-continuation-condition:
   # Loop body
     Statement(s)
```

How while loop works:

In while loop first the condition (boolean expression) is tested; if it is false the loop is finished without executing the statement(s). If the condition is true, then the statements are executed and the loop executes again and again until the condition is false. Each loop contains a loop-continuation-condition, a Boolean expression that controls the body's execution.

Example program for 'while loop':

```
count = 0
while count < 5:
    print("Programming is fun!")
    count += 1
```

Output:

```
>>> %Run task3.py
Programming is fun!
Programming is fun!
Programming is fun!
Programming is fun!
Programming is fun!
```

EXERCISE

A. Point out the errors, if any, in the following Python programs.

1. Code:

```
for(;;)
{
   printf("SSUET")
}
```

2. Code:

```
count = 4
while n < 8
     count = count + 3:
     print(count)
```

3.Code

```
for v in range(4:8)
print(v)
```

B. What will be the output of the following programs:

1. Code

```
i = 1
while i < 10:
    if i % 2 == 0:
        print(i)
    i += 1
```

Output

2. Code

```
i = 1
while i>0:
    print(i)
    i = i + 1
```

Output

3. Code

```
for v in range(3, 9, 2):
    print(v)
```

Output

C. Write Python programs for the following:

1. Write a program that prints the first 10 natural numbers and their sum using ‘for loop’.
   Sample output:
   The first 10 natural number are :
   1 2 3 4 5 6 7 8 9 10
   The Sum is : 55

2. Write a program to print the multiplication table of the number entered by the user. The table should get displayed in the following form.
   29 x 1 = 29
   29 x 2 = 58
   …
   29 x 10 = 290

3. Write a program that take vowels character in a variable named “vowels” then print each vowels characters in newline using ‘for loop’.