OOP – Lab #3

Aim: Getting Familiar with the **range( )** function, **for** loop, and **while** loop

Topics:

1. **range( )** Function
2. **for** loop
3. **break** and **continue** Statements in Loop
4. **Nested for** Loop
5. **while** Loop

Lab Questions –

Q1 – Write the required Python code for the following:

```
############## range( ) Function ################

# Generate this sequence --> [0, 1, 2, 3, ... , 20]
print(list(range(21)))

# Generate this sequence --> [4, 5, 6, 7, ... , 13]
print(list(range(4,14)))

# Generate this sequence --> [10, 9, 8, 7, ... , 3]
print(list(range(10,2,-1)))

# Generate all odd numbers between 5 and 25 (5 and 25 are included)
print(list(range(5, 26, 2)))
```

Q2 – Write a code that uses a for loop to **print even numbers between 1 and 50** in a line, separated by a comma. (Number 50 is also included).

```
2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50
```

```
for num in range(1, 51):
    if (num%2 == 0):
        print(num, end=",")
```

Q3 – Modify the previous question (Q2) also to find the total number of even numbers between 1 and 50.

```
even_count = 0

for num in range(1, 51):
    if (num%2 == 0):
        print(num, end=",")
        even_count += 1

print("\nTotal number of even numbers are:", even_count)
```

Q4 – Write a code that **asks the user to enter an integer number**, then calculates and prints its **factorial**. (Example: Factorial of 4 is calculated as 4! = 4*3*2*1)

```
num = int(input("Enter a number: "))
fact = 1

for i in range(1, num+1):
    fact *= i

print("Factorial of", num, "is", fact)
```

Note – *You can also find the factorial of a number using a recursive function.*

Q5 – Write a program that will print the multiplication table (1 to 10) as follows:

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

```
for i in range(1,11):
    for j in range(1,11):
        print(i*j , end='\t')
    print()
```

Q6 – Write a Python code to have the following output.

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

Note – You can write the code in two different ways:

```
for i in range(1,6):
    for j in range(1,i+1):
        print(j , end=' ')
    print()
```

```
for i in range(1,6):
    for j in range(1,6):
        if j<=i:
            print(j, end=' ')
    print()
```

Q7 – What is the output of this code?

```
for i in range(1,3):
    for j in range(1,5):
        if (j==3) and (i==1):
            break
        print(j , end=' ')
    print()
```

Output →

```
1 2
1 2 3 4
```

Q8 – What is the output of this code?

```
for i in range(1,3):
    for j in range(1,5):
        if (j==3) and (i==1):
            continue
        print(j , end=' ')
    print()
```

Output →

```
1 2 4
1 2 3 4
```

Q9 – Write a code that uses only a **while** loop to print the following sequence of numbers.

5 6 7 8 9 10 11 12 13 14 15 16

```
i = 5

while (i < 17):
    print(i, end=" ")
    i = i + 1
```

Q10 – Modify question (Q9) to print the following sequence of numbers.

20 17 14 11 8 5 2 -1 -4 -7

```
i = 20

while (i > -8):
    print(i, end=" ")
    i = i - 3
```

Q11 – Write a code that asks the user to enter as many integer numbers as they want until the sum of the entered numbers is less than 100. Then prints the sum of all entered numbers.

```
sum = 0

while (True):
    num = int(input("Enter a number: "))
    sum += num

    if (sum>=100):
        print("Sum of entered numbers is:", sum-num)
        break
```

Q12 – Write a code that uses a while loop to print the multiplication table (1 to 10) as follows:

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

```
i = 1
while (i < 11):
    j = 1
    while (j < 11):
        print(i*j, end="\t")
        j+=1
    i+=1
    print()
```

Students' Task (Use for Loop)

Write a Python code for a guessing game. There is a secret number (7), and the user has 5 attempts to guess the secret number (a number between 1 and 10).

In each attempt:

- If the user enters a number that is not the secret number, the program asks the user to try again (for 5 attempts).
- If the user **guesses the secret number**, the program prints "Bravo! You won the game!" and there is no need to try again.
- If the user couldn't guess the secret number in 5 attempts, a message is printed: "You lost the game! The secret number was 7."

```
secret = 7

for attempt in range(1,6):

    guess = int(input("Enter a number between 1 and 10: "))

    if (guess < 1 or guess > 10):
        print("The number is not between 1 nd 10. Try Again!")
        continue

    elif (guess == secret):
        print("Bravo! You won the game!")
        break

    elif (attempt!=5):
        print("Try another number!")

else:
    print("You lost the game! The secret number was", secret)
```