

## Lab – 5 For loop

### Tasks:

1. Consider the program segment below:

```
low = int(input("Input a smaller number: "))
high = int(input("Input a larger number: "))
sum = 0
for i in range(low, high+1):
    sum = sum + i
print ("Sum of number within", low, "and", high, "=", sum)
```

- a) Fill in the blanks below:

- i) If low = 2, high = 4, sum = 9\_\_\_\_\_
- ii) If low = 4, high = 2, sum = 0\_\_\_\_\_
- iii) If low = 2, high = 2, sum = 2\_\_\_\_\_
- iv) If low > high, sum = 0\_\_\_\_\_
- v) If low <= high, sum equals to sum of all integers in between \_\_\_\_\_low and high \_\_\_\_.

- b) Convert the for loop in the above program segment to a while loop

Answer:

```
low = int(input("Input a smaller number: "))
high = int(input("Input a larger number: "))
sum = 0
```

```
print ("Sum of number within", low, "and", high, "=", sum)
```

2. Write a program to compute the product of all even integers in between 50 and 60 using for loop

Output:

Product of all the even integers in between 50 and 60 = 27361152000

Answer:

```
x = range(50,61,+2)
print(list(x))
z = 1
for y in x:
    z = z*y
print(z)
```

3. Write a program to construct the following pattern based on user's input (integer 1 to 9) using for loop with range function.

Output:

Input the value n: 6



1  
22  
333  
4444  
55555  
666666

Hints: "A" \* 3 is a valid statement and will give "AAA"

Answer:

```
n = int(input("Input the value n"))
x = range(1,n+1)
for y in x:
    print(str(y)*y)
```

4. Write a program to sum up all the integers up to user's input n using for loop with range function.  
(i.e.  $1 + 2 + 3 + \dots + n$ )

Output:

Input the value n: 10



Sum of sequence  $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 = 55$

Hints: A string variable, e.g. word, can be used to store the intermediate values or prepare the output string. The print ( ) method can be called after the output string is prepared.

Answer:

```
n = int(input("Input the value n:"))
x = range(1,n+1)
sumx = 0
list = []
for y in x:
    sumx=sumx+y
    list.append(str(y))
    #print(y)
print(' + '.join(list)+" = "+str(sumx))
```

5. Write a program to accumulate all even numbers in between 1 and 1000. Your program should display all even numbers from 1 to 1000, forty numbers per line and the sum of these numbers. A sample output is shown below:

Output:

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, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80

...

922, 924, 926, 928, 930, 932, 934, 936, 938, 940, 942, 944, 946, 948, 950, 952, 954, 956, 958, 960

962, 964, 966, 968, 970, 972, 974, 976, 978, 980, 982, 984, 986, 988, 990, 992, 994, 996, 998, 1000

Sum of all even numbers within 1 and 1000 = 250500

Answer:

```
n = int(input("Input the value n:"))
x = range(2,n+1,+2)
sumx = 0
list = []
for y in x:
    sumx=sumx+y
    list.append(str(y))
    #print(y)
print(",".join(list))
print("Sum of all even numbers within 1 and "+str(n)+" = "+str(sumx))
```

6. Write a program to ask user enter three integers: low, high and divisor. Your program will then display the sum of all numbers divisible by divisor within low and high inclusively. If low > high, you should swap these two values before using a for loop to compute the required sum. Output:

Input lower limit: 15

Input upper limit: 7

Input divisor (n): 3


i = 9 sum = 9

i = 12 sum = 21

i = 15 sum = 36

Sum of all numbers divisible by n: 36

Answer:



```
lower_limit = int(input("Input lower limit:"))
upper_limit = int(input("Input upper limit:"))
n = int(input("Input divisor (n):"))
sumx=0
if lower_limit>upper_limit:
    new_lower_limit = lower_limit
    lower_limit = upper_limit
    upper_limit = new_lower_limit
elif lower_limit==upper_limit:
    print("==")
else:
    pass
x = range(lower_limit,upper_limit+1)
for y in x:
    if (y%n)==0:
        sumx+=y
        print("i =",y,"sum =",sumx)
print("Sum of all numbers divisible by n:",sumx)
```

Input lower limit:7

Input upper limit:15

Input divisor (n):3

i = 9 sum = 9

i = 12 sum = 21

i = 15 sum = 36

Sum of all numbers divisible by n: 36

7. Write a program that uses a nested loop to display the following pattern:

Output:

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

Hints: \t can be used in strings to add tab spaces

Answer:

```
list = []
for i in range(1,4):
    for n in range(1,6):
        list.append((str(i)+"-"+str(n)))
    print("\t".join(list))
    list = []
```

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

8. Write a program that prompts the user to input an integer n. It then displays a multiplication table from 1 to n

Output:

Input table size n: 4



	1	2	3	4
1	1	2	3	4
2	2	4	6	8
3	3	6	9	12
4	4	8	12	16

Answer:

```
list = []
n = int(input("Input table size n:"))
x = range(1,n+1)
for i in x:
    list.append(str(i))
print("\t","\t ".join(list))
print("")
for i in x:
    print(i,"\t",i,"\t",i*2,"\t",i*3,"\t",i*4)
```

Input table size n:4

	1	2	3	4
1	1	2	3	4
2	2	4	6	8
3	3	6	9	12
4	4	8	12	16

9. Write a program to ask user to input an integer. It then displays a message to indicate whether the given integer is a prime number. A prime number is an integer that is not divisible by any number other than itself and 1. By definition, 0 and 1 are not prime number. For example, 2, 3, 5 and 7 are prime numbers.

Output:

Input an integer: 6  
6 is not a prime number!  
Input an integer: 11  
11 is a prime number!



Answer:

```
n = int(input("Input an integer: "))
if n > 1:
    for i in range(2, int(n/2)+1):
        if (n % i) == 0:
            print(n, "is not a prime number")
            break
    else:
        print(n, "is a prime number")
else:
    print(n, "is not a prime number")
```

<https://www.geeksforgeeks.org/python-program-to-check-whether-a-number-is-prime-or-not/>

PS C:\Users\User\Documents> python lab5\_9.py

Input table size n:2

PS C:\Users\User\Documents> python lab5\_9.py

11 is a prime number

PS C:\Users\User\Documents> python lab5\_9.py

Input an integer: 2

2 is a prime number

PS C:\Users\User\Documents> python lab5\_9.py

Input an integer: 3

3 is a prime number



```
PS C:\Users\User\Documents> python lab5_9.py
```

```
Input an integer: 5
```

```
5 is a prime number
```

```
PS C:\Users\User\Documents> python lab5_9.py
```

```
Input an integer: 7
```

```
7 is a prime number
```