ALIGARH MUSLIM UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE

FACULTY OF SCIENCE

Computer Lab work

CAMS-3P01: Laboratory Course III

M.C.A 3Rd SEMESTER

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WEEK 1

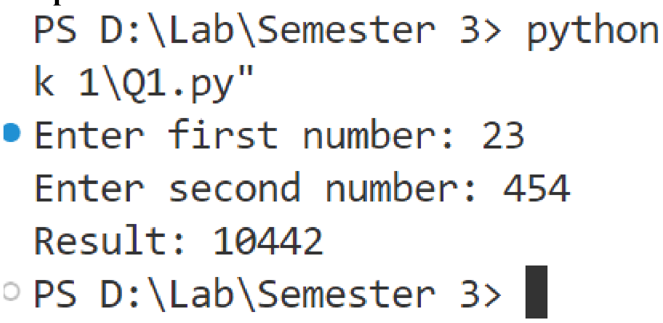
1. Write a program to find the product of two user-supplied integers and if the product is equal to or lower than 5000, then return the sum of the two numbers.

   Program:

```
def product_and_sum(a, b):
    product = a * b
    if product <= 5000:
        return a + b
    return product

num1 = int(input("Enter first number: "))
num2 = int(input("Enter second number: "))
result = product_and_sum(num1, num2)
print("Result:", result)
```

   Output:



```
PS D:\Lab\Semester 3> python
k 1\Q1.py"
Enter first number: 23
Enter second number: 454
Result: 10442
PS D:\Lab\Semester 3>
```

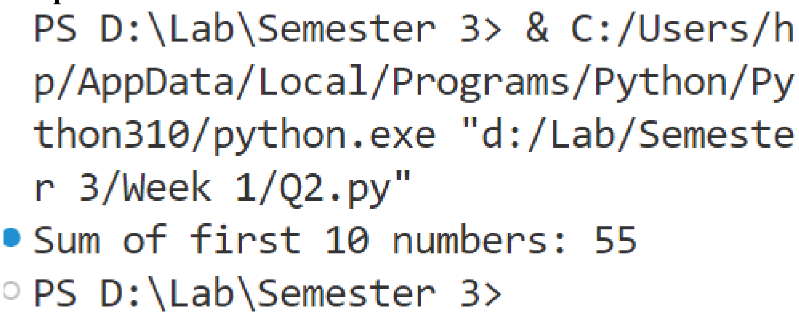
2. Write a program to print the sum of the first 10 numbers.

   Program:

```
def sum_of_first_10_numbers():
    return sum(range(1, 11))

print("Sum of first 10 numbers:", sum_of_first_10_numbers())
```

   Output:



```
PS D:\Lab\Semester 3> & C:/Users/h
p/AppData/Local/Programs/Python/Py
thon310/python.exe "d:/Lab/Semeste
r 3/Week 1/Q2.py"
Sum of first 10 numbers: 55
PS D:\Lab\Semester 3>
```

3. Write a program to iterate through a supplied list of 20 numbers and print only those numbers which are divisible by 5.

Program:

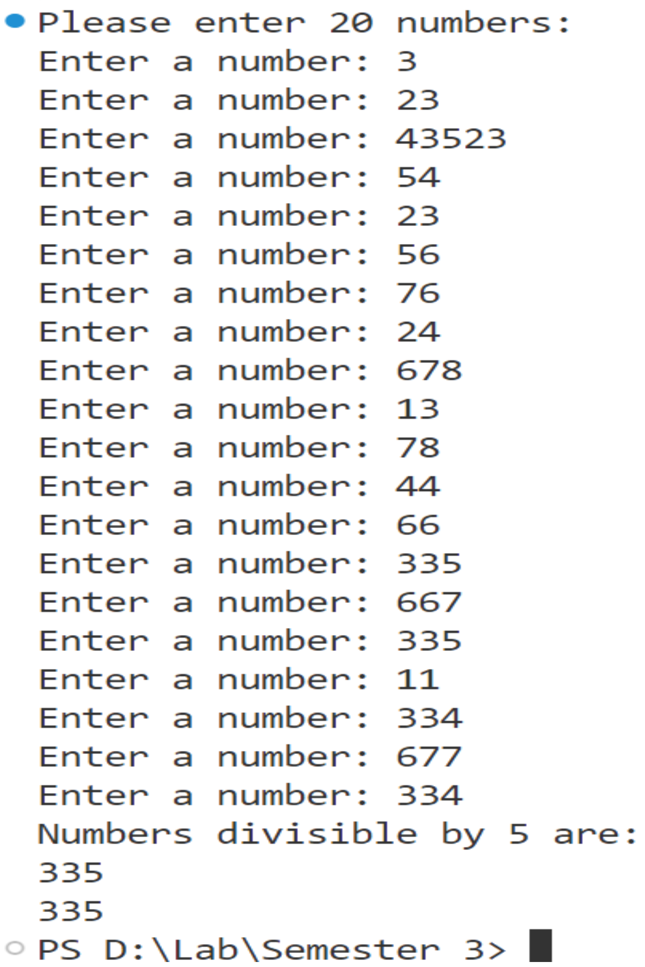
```
def print_divisible_by_5(numbers):
    for num in numbers:
        if num % 5 == 0:
            print(num)

numbers = []

print("Please enter 20 numbers:")
for _ in range(20):
    number = int(input("Enter a number: "))
    numbers.append(number)

print("Numbers divisible by 5 are:")
print_divisible_by_5(numbers)
```

Output:



```
● Please enter 20 numbers:
  Enter a number: 3
  Enter a number: 23
  Enter a number: 43523
  Enter a number: 54
  Enter a number: 23
  Enter a number: 56
  Enter a number: 76
  Enter a number: 24
  Enter a number: 678
  Enter a number: 13
  Enter a number: 78
  Enter a number: 44
  Enter a number: 66
  Enter a number: 335
  Enter a number: 667
  Enter a number: 335
  Enter a number: 11
  Enter a number: 334
  Enter a number: 677
  Enter a number: 334
  Numbers divisible by 5 are:
  335
  335
○ PS D:\Lab\Semester 3>
```

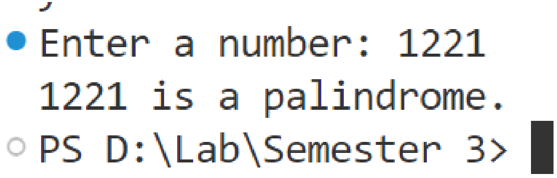
4. Write a program to check if the given number is a palindrome.

Program:

```
def is_palindrome(number):
    return str(number) == str(number)[::-1]

num = int(input("Enter a number: "))
if is_palindrome(num):
    print(f"{num} is a palindrome.")
else:
    print(f"{num} is not a palindrome.")
```

Output:



```
● Enter a number: 1221
  1221 is a palindrome.
○ PS D:\Lab\Semester 3>
```

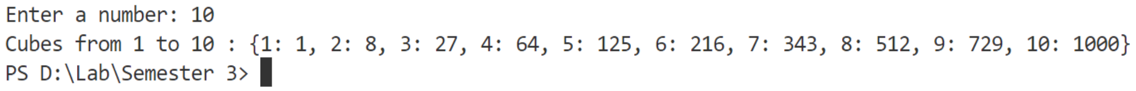
5. Write a program to calculate the cube of all numbers from 1 to a given number.

Program:

```
def cubes_up_to_n(n):
    return {i: i**3 for i in range(1, n+1)}

n = int(input("Enter a number: "))
print("Cubes from 1 to", n, ":", cubes_up_to_n(n))
```

Output:



```
Enter a number: 10
Cubes from 1 to 10 : {1: 1, 2: 8, 3: 27, 4: 64, 5: 125, 6: 216, 7: 343, 8: 512, 9: 729, 10: 1000}
PS D:\Lab\Semester 3>
```

WEEK 2

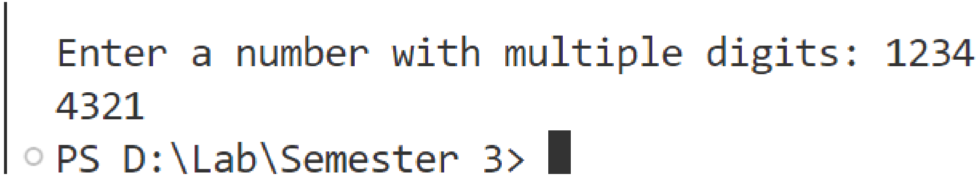
1. Write a program to extract each digit from an integer in reverse order.

Program:

```
def extract_digits_reverse(num):
    while num > 0:
        digit = num % 10
        print(digit, end="")
        num //= 10

num = int(input("Enter a number with multiple digits: "))
extract_digits_reverse(num)
```

Output:



```
Enter a number with multiple digits: 1234
4321
○ PS D:\Lab\Semester 3> █
```

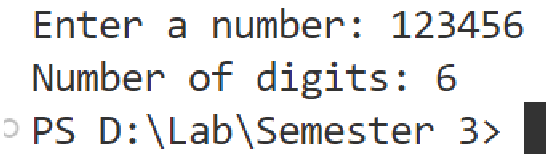
2. Write a program to count the total number of digits in a number using a while loop.

Program:

```
def count_digits(num):
    count = 0
    while num != 0:
        num //= 10
        count += 1
    return count

num = int(input("Enter a number: "))
print("Number of digits:", count_digits(num))
```

Output:



```
Enter a number: 123456
Number of digits: 6
○ PS D:\Lab\Semester 3> █
```

3. Write a program to display all prime numbers within a range.

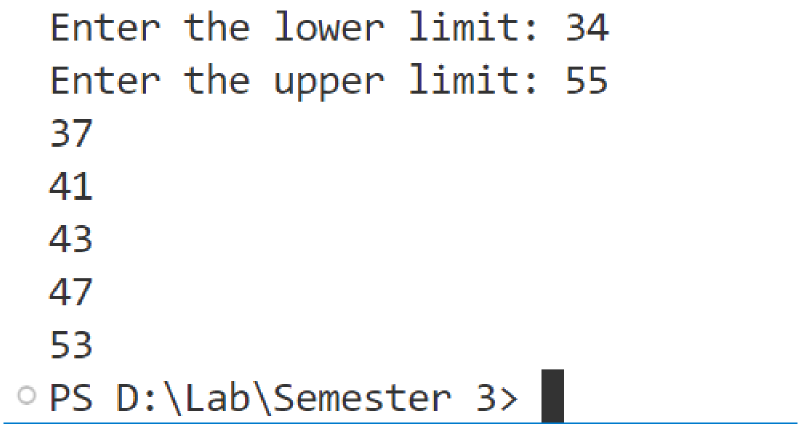
Program:

```
def is_prime(n):
    if n <= 1:
        return False
    for i in range(2, n):
        if n % i == 0:
            return False
    return True
```

```
lower = int(input("Enter the lower limit: "))
upper = int(input("Enter the upper limit: "))

for num in range(lower, upper + 1):
   if is_prime(num):
      print(num)
```

Output:



```
Enter the lower limit: 34
Enter the upper limit: 55
37
41
43
47
53
PS D:\Lab\Semester 3>
```

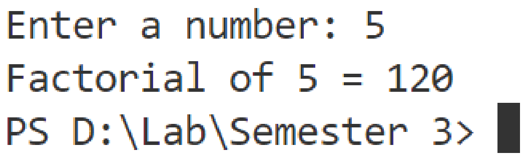
4. Write a program to use a loop to find the factorial of a given number.

Program:

```
def factorial(n):
   if n == 0:
      return 1
   fact = 1
   for i in range(1, n + 1):
      fact *= i
   return fact

num = int(input("Enter a number: "))
print(f"Factorial of {num} = {factorial(num)}")
```

Output:



```
Enter a number: 5
Factorial of 5 = 120
PS D:\Lab\Semester 3>
```

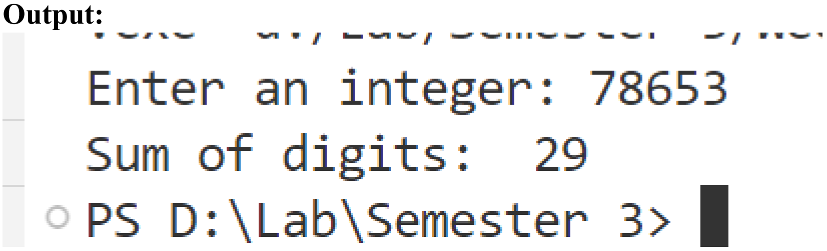
5. Write a program to find the sum of the digits of a supplied integer.

Program:

```
def sum_of_digits(num):
   sum =0
   while num > 0:
      digit = num % 10
      sum = sum +digit
      num  = num// 10
```

```
    return sum
num = int(input("Enter an integer: "))
print("Sum of digits: ", sum_of_digits(num))
```

Output:



```
Enter an integer: 78653
Sum of digits:  29
PS D:\Lab\Semester 3>
```

WEEK 3

1. Write a program to print the following pattern using the for loop:

5 4 3 2 1

4 3 2 1

3 2 1

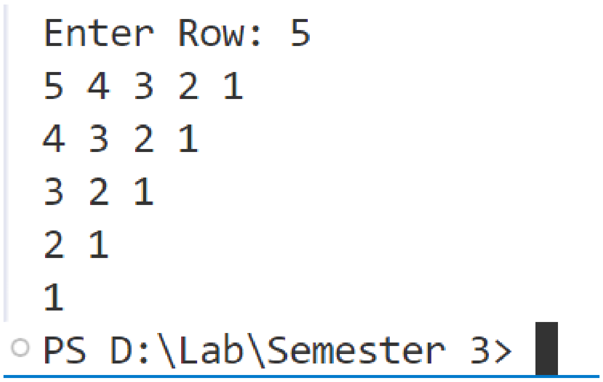
2 1

1

Program:

```
rows = int(input("Enter Row: "))
for i in range(rows, 0,-1):
    for j in range(i, 0,-1):
        print(j, end=" ")
    print()
```

Output:



```
Enter Row: 5
5 4 3 2 1
4 3 2 1
3 2 1
2 1
1
PS D:\Lab\Semester 3>
```

2. Write a program to print the following star pattern using the for loop:

*

* *

* * *

* * * *

* * * * *

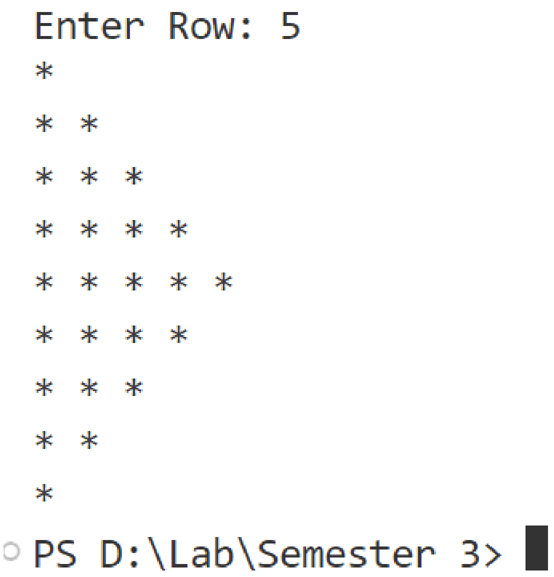
* * * *

```
* * *
* *
*
```

Program:

```
rows = int(input('Enter Row: '))
for i in range(1, rows + 1):
    for j in range(i):
        print("*", end=" ")
    print()
for i in range(rows - 1, 0, -1):
    for j in range(i):
        print("*", end=" ")
    print()
```

Output:



```
Enter Row: 5
*
* *
* * *
* * * *
* * * * *
* * * *
* * *
* *
*
PS D:\Lab\Semester 3>
```

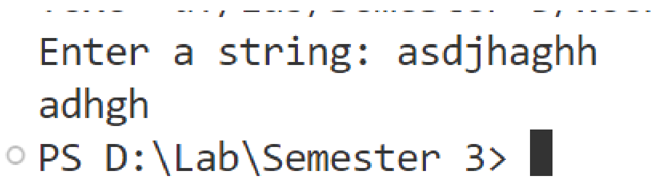
3. Write a program to print characters from a string which are present at even index numbers.

Program:

```
def print_even_index_characters(string):
    result = ""
    for i in range(len(string)):
        if i % 2 == 0:
            result += string[i]
    print(result)


input_string = input("Enter a string: ")
print_even_index_characters(input_string)
```

Output:



```
Enter a string: asdjhaghh
adhgh
PS D:\Lab\Semester 3>
```

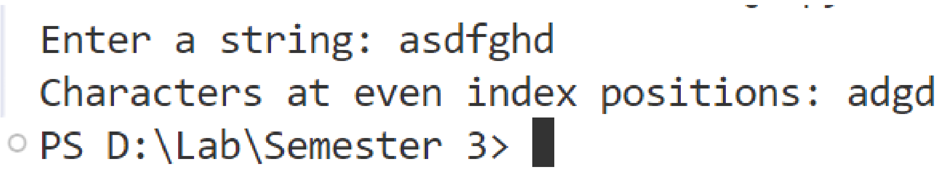
4. Write a program to accept a string from the user and display characters that are present at even index numbers.

Program:

```
def print_even_index_characters_from_user_input():
    string = input("Enter a string: ")
    result = ""
    for i in range(len(string)):
        if i % 2 == 0:
            result += string[i]
    print("Characters at even index positions:", result)


print_even_index_characters_from_user_input()
```

Output:



```
Enter a string: asdfghd
Characters at even index positions: adgd
PS D:\Lab\Semester 3>
```

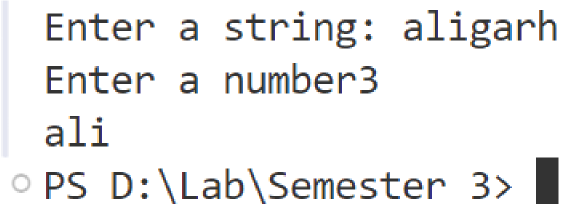
6. Write a program to remove characters from a string starting from the nth position to the last and return a new string. Example: remove_chars("aligarh", 3) should output ali.

Program:

```
def remove_chars(string, n):
    if n > len(string):
        return ""
    return string[:n]

str =  input("Enter a string: ")
num =  int(input("Enter a number"))
new_string = remove_chars(str, num)
print(new_string)
```

Output:



```
Enter a string: aligarh
Enter a number3
ali
PS D:\Lab\Semester 3>
```

Week 4

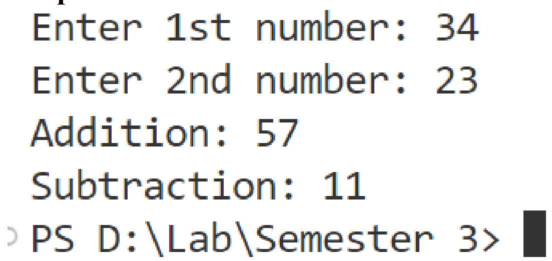
1. Write a program to create a function cal_sum_sub() that accepts two variables and calculates addition and subtraction. Also, it must return both addition and subtraction in a single return call.

   Program:

```
def cal_sum_sub(a, b):
    addition = a + b
    subtraction = a - b
    return addition, subtraction

a =  int(input("Enter 1st number: "))
b =  int(input("Enter 2nd number: "))
result = cal_sum_sub(a, b)
print("Addition:", result[0])
print("Subtraction:", result[1])
```

   Output:



```
Enter 1st number: 34
Enter 2nd number: 23
Addition: 57
Subtraction: 11
PS D:\Lab\Semester 3>
```

2. Write a function to return True if the first and last number of a given list are the same. If the numbers are different, return False.

   Program:

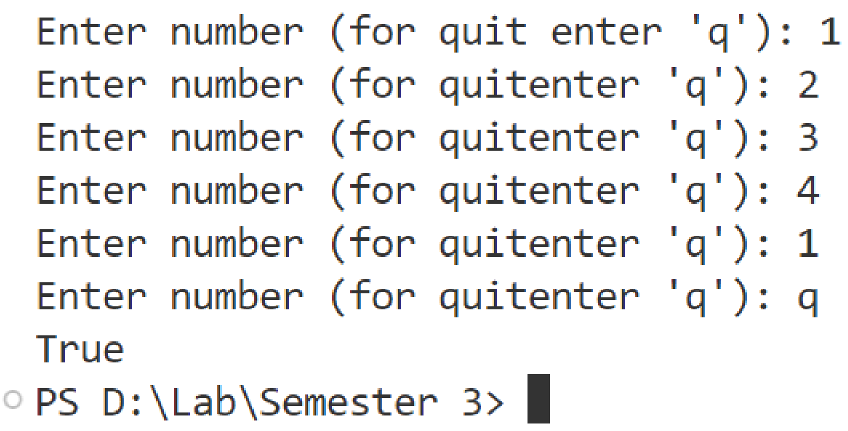
```
def is_first_last_same(numbers):
    return numbers[0] == numbers[-1]

numbers = []
a =  input("Enter number (for quit enter 'q'): ")
while a != 'q':
    try:
        numbers.append(int(a))
    except:
        print("enter valid input")

    a =  input("Enter number (for quitenter 'q'): ")


print(is_first_last_same(numbers))
```

   Output:



```
Enter number (for quit enter 'q'): 1
Enter number (for quitenter 'q'): 2
Enter number (for quitenter 'q'): 3
Enter number (for quitenter 'q'): 4
Enter number (for quitenter 'q'): 1
Enter number (for quitenter 'q'): q
True
○ PS D:\Lab\Semester 3> █
```

3. Given a list of numbers, write a program to turn every item of the list into its square.
   Program:

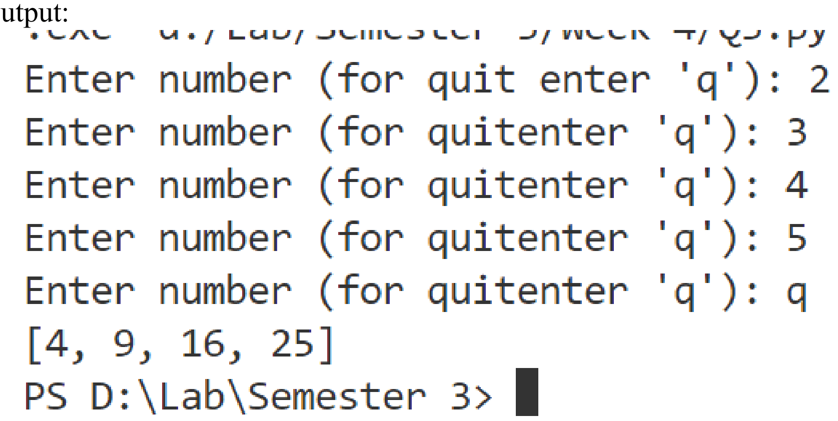
```
def square_list(lst):
    return [x**2 for x in lst]

numbers = []
a =  input("Enter number (for quit enter 'q'): ")
while a != 'q':
    try:
        numbers.append(int(a))
    except:
        print("enter valid input")

    a =  input("Enter number (for quitenter 'q'): ")

squared_numbers = square_list(numbers)
print(squared_numbers)
```

Output:



```
.exe  d:/Lab/Semester 3/Week 4/Q3.py
Enter number (for quit enter 'q'): 2
Enter number (for quitenter 'q'): 3
Enter number (for quitenter 'q'): 4
Enter number (for quitenter 'q'): 5
Enter number (for quitenter 'q'): q
[4, 9, 16, 25]
PS D:\Lab\Semester 3> █
```

4. Given two Python lists, write a program to iterate both lists simultaneously and display items from list 1 in original order and items from list 2 in reverse order.
   Program:

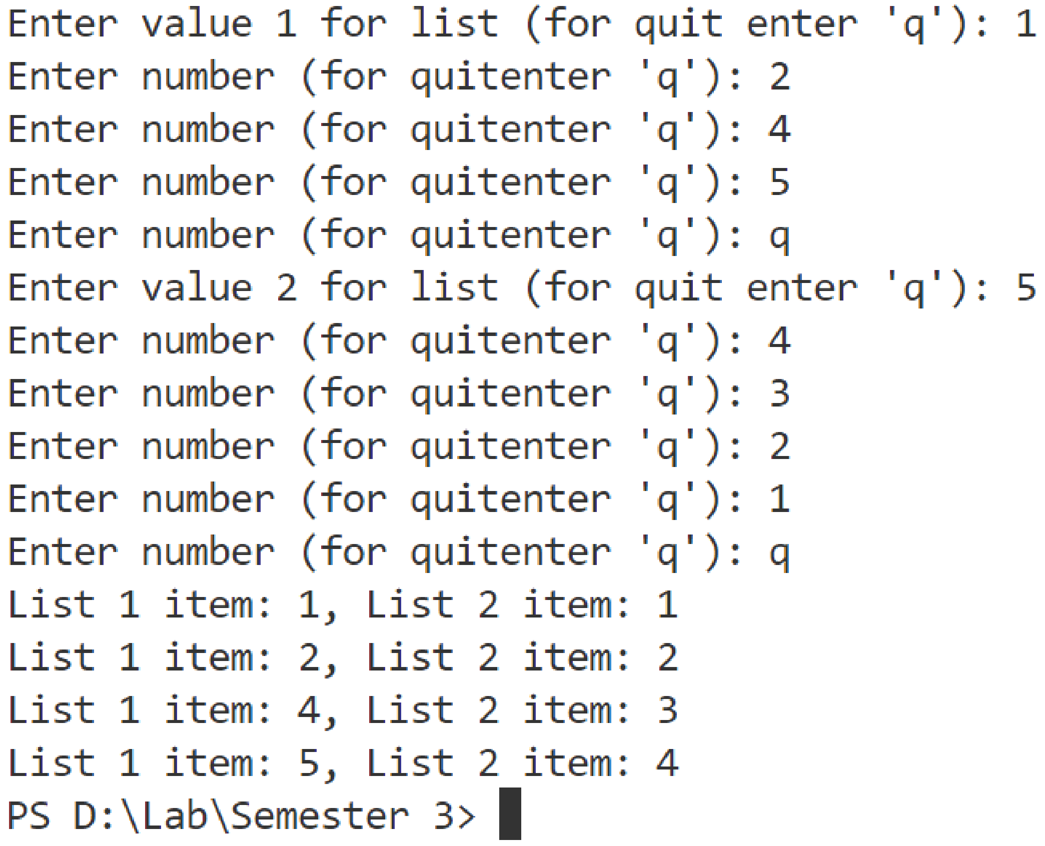
```
def iterate_lists(lst1, lst2):
    for x, y in zip(lst1, lst2[::-1]):
        print(f"List 1 item: {x}, List 2 item: {y}")

def input_fun(a):
    l =[]
    a =  input(f"Enter value {a} for list (for quit enter 'q'): ")
    while a != 'q':
        try:
            l.append(int(a))
        except:
            pass


        a =  input("Enter number (for quitenter 'q'): ")
    return l;


list1 = input_fun(1)
print("Enter value for 2nd list")
list2  =input_fun(2)
iterate_lists(list1, list2)
```

Output:



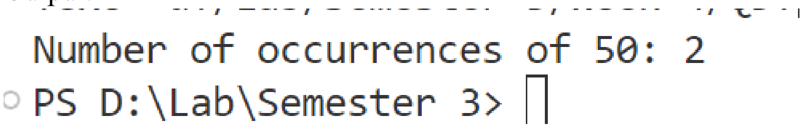
```
Enter value 1 for list (for quit enter 'q'): 1
Enter number (for quitenter 'q'): 2
Enter number (for quitenter 'q'): 4
Enter number (for quitenter 'q'): 5
Enter number (for quitenter 'q'): q
Enter value 2 for list (for quit enter 'q'): 5
Enter number (for quitenter 'q'): 4
Enter number (for quitenter 'q'): 3
Enter number (for quitenter 'q'): 2
Enter number (for quitenter 'q'): 1
Enter number (for quitenter 'q'): q
List 1 item: 1, List 2 item: 1
List 1 item: 2, List 2 item: 2
List 1 item: 4, List 2 item: 3
List 1 item: 5, List 2 item: 4
PS D:\Lab\Semester 3> 
```

5. Write a program to count the number of occurrences of item 50 in the tuple tp1 = (50, 10, 60, 70, 50).

   Program:

```
tp1 = (50, 10, 60, 70, 50)
count_50 = tp1.count(50)
print("Number of occurrences of 50:", count_50)
```

   Output:



```
Number of occurrences of 50: 2
PS D:\Lab\Semester 3> 
```

Week 5

1. Write a program to generate a 6-digit random secure OTP.

Program:

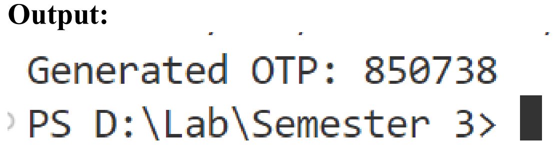
```
import random
import math

def generate_otp():
    digits = "0123456789"
    OTP = ""
    for i in range(6) :
        OTP += digits[math.floor(random.random() * 10)]

    return OTP

print("Generated OTP:", generate_otp())
```

Output:



```
Generated OTP: 850738
PS D:\Lab\Semester 3>
```

2. Write a program to pick a random character from a user-supplied string.

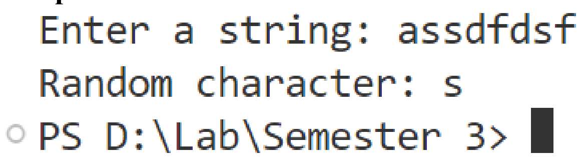
Program:

```
import random

def pick_random_char(user_string):
    return random.choice(user_string)

user_string = input("Enter a string: ")
print("Random character:", pick_random_char(user_string))
```

Output:



```
Enter a string: assdfdsfsds
Random character: s
PS D:\Lab\Semester 3>
```

3. Write a program to generate a random password that meets the following conditions:

a. Password length must be 10 characters long.

b. It must contain at least 2 uppercase letters, 1 digit, and 1 special symbol.

Program:

```
import random
import string
```

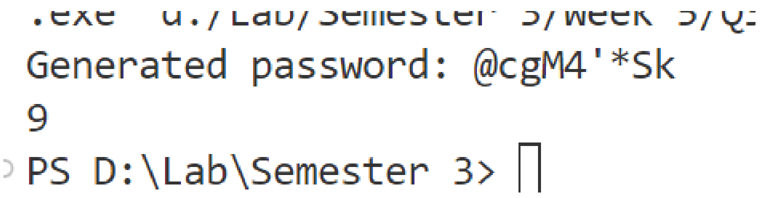
```
def generate_password():
    upper_case = random.choices(string.ascii_uppercase, k=2)
    digit = random.choice(string.digits)
    remaining_chars = random.choices(string.ascii_letters + string.digits + string.punctuation, k=6)

    password_list = upper_case + [digit] + remaining_chars
    random.shuffle(password_list)

    return ''.join(password_list)

print("Generated password:", generate_password())
print(len(generate_password()))
```

Output:



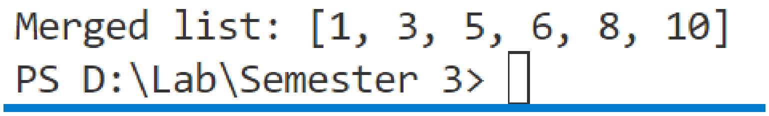
```
.exe  d:/Lab/Semester 3/Week 3/Q:
Generated password: @cgM4'*Sk
9
PS D:\Lab\Semester 3>
```

4. Given two lists of numbers, write a program to create a new list containing odd numbers from the first list and even numbers from the second list.
   Program:

```
def merge_odd_even(lst1, lst2):
    odd_numbers = [x for x in lst1 if x % 2 != 0]
    even_numbers = [x for x in lst2 if x % 2 == 0]
    return odd_numbers + even_numbers

# Example usage
list1 = [1, 2, 3, 4, 5]
list2 = [6, 7, 8, 9, 10]
result = merge_odd_even(list1, list2)
print("Merged list:", result)
```

Output:



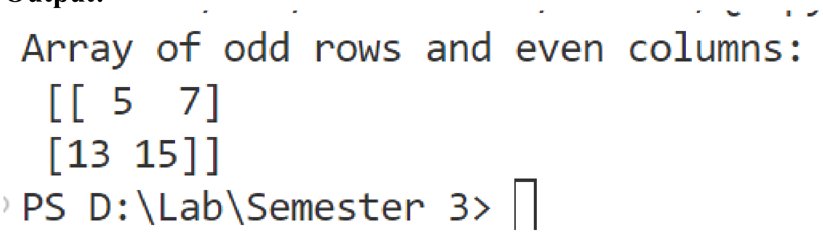
```
Merged list: [1, 3, 5, 6, 8, 10]
PS D:\Lab\Semester 3>
```

5. Write a program to create a numpy array and return an array of odd rows and even columns from the numpy array.
   Program:

```
import numpy as np
```

```
arr = np.array([[1, 2, 3, 4], [5, 6, 7, 8], [9, 10, 11, 12], [13, 14, 15, 16]])
result = arr[1::2, ::2]
print("Array of odd rows and even columns:\n", result)
```

Output:



```
Array of odd rows and even columns:
 [[ 5  7]
 [13 15]]
PS D:\Lab\Semester 3>
```

6. Write a program to create a numpy array and sort it as per the following cases:

a. Case 1: Sort the array by the second row.

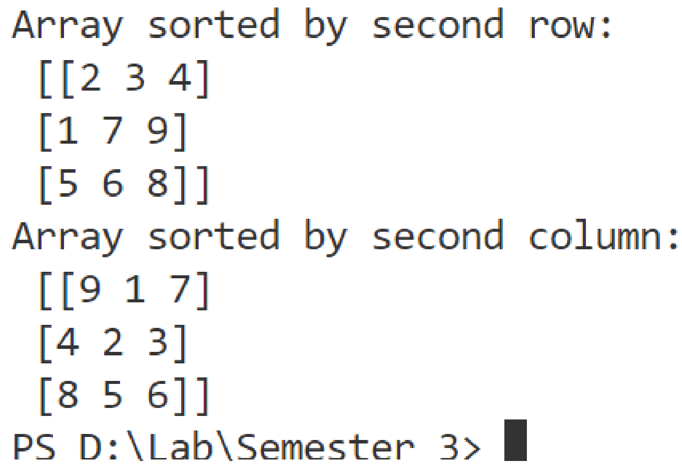
b. Case 2: Sort the array by the second column.

Program:

```
import numpy as np


# a) Sort array by second row
def sort_by_second_row(arr):
   return arr[:, arr[1, :].argsort()]
# b) Sort array by second column
def sort_by_second_column(arr):
   return arr[arr[:, 1].argsort()]
arr = np.array([[4, 2, 3], [9, 1, 7], [8, 5, 6]])
# Case 1
sorted_by_row = sort_by_second_row(arr)
print("Array sorted by second row:\n", sorted_by_row)
# Case 2
sorted_by_column = sort_by_second_column(arr)
print("Array sorted by second column:\n", sorted_by_column)
```

Output:



```
Array sorted by second row:
 [[2 3 4]
 [1 7 9]
 [5 6 8]]
Array sorted by second column:
 [[9 1 7]
 [4 2 3]
 [8 5 6]]
PS D:\Lab\Semester 3>
```