**10.Write a Python function that takes a 2D list (matrix) and returns its transpose.**

def transpose\_matrix(matrix):

num\_rows = len(matrix)

num\_cols = len(matrix[0])

# Create a transposed matrix initialized with zeros

transpose = [[0 for \_ in range(num\_rows)] for \_ in range(num\_cols)]

# Fill the transpose matrix

for i in range(num\_rows):

for j in range(num\_cols):

transpose[j][i] = matrix[i][j]

return transpose

def main():

# Get dimensions of the matrix from user input

num\_rows = int(input("Enter number of rows: "))

num\_cols = int(input("Enter number of columns: "))

# Initialize an empty matrix

matrix = []

# Input the matrix elements row by row

print("Enter the elements of the matrix row by row:")

for i in range(num\_rows):

row = []

for j in range(num\_cols):

element = int(input(f"Enter element [{i}][{j}]: "))

row.append(element)

matrix.append(row)

# Print the original matrix

print("\nOriginal Matrix:")

for row in matrix:

print(row)

# Compute the transpose of the matrix

transposed\_matrix = transpose\_matrix(matrix)

# Print the transposed matrix

print("\nTransposed Matrix:")

for row in transposed\_matrix:

print(row)

if \_\_name\_\_ == "\_\_main\_\_":

main()

**OUTPUT:**

