Lab – 01 Robot Programming.

Q1. Write a function that gives number of days of given year.

Input : 1990 Input : 2044
Output : 365 Output : 366

Q2. Count the frequency of each character in a string and store it in a dictionary. An example is given below.

Input: 'adcbbdaacd' Output: {'a': 3, 'b': 2, 'c': 2, 'd': 3}

Q3. Write a program to remove duplicates from a list but keep the first

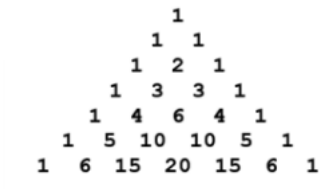
occurrence of each element.

Input: [1, 2, 3, 4, 2, 3, 5, 6, 1, 4]
Output: [1, 2, 3, 4, 5, 6]

Q4. Write a program to sort a stack using only another stack (no other data structures like arrays or linked lists).
Input: stack = [9, 5, 1, 3]
Output: stack = [1, 3, 5, 9]

Q5. Make a module "pascal.py" with function "pascalTriangle(numOfRows)" and import into "main.py".

Input : Enter the num of rows : 7
Output :



Q6. Create a 6x6 matrix with random values and:

Replace all values greater than 0.5 with 1, and all others with 0.
Extract a 3x3 submatrix starting from index (2, 2) and calculate its mean.

Q7. Array Reshaping:

Create a 1D array with 16 elements. Reshape it into a 4x4 matrix.
Flatten a 3x3x3 array into a 1D array.
Reshape a matrix into a new shape without changing its data.

Q8. Write a recursive function Fibonacci_sum(n) to calaculate the sum of first n numbers in Fibonacci series 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89.

Input: 1 Output: 0
Input: 4: Output: 4

Q9. Define a function get_value_from_dict that takes a dictionary and a key as parameters. If the key is not present in the dictionary, the function should raise a KeyError with a custom error message. Write a main function that calls get_value_from_dict with a dictionary and user-provided key. Handle KeyError and display a user-friendly message if the key is not found.

Q10. Using the following dataset, visualize the data with the maximum number of visualization tools available in Python. Create a variety of plots and charts, including but not limited to bar charts, pie charts, line graphs, scatter plots, histograms, and heatmaps. Use libraries such as matplotlib, seaborn, and plotly to explore different ways of presenting the data. Provide clear titles, labels, and legends to enhance the readability of your visualizations.