Assignment on List Array

1. Design a Python script to sort numbers specified using lists. You can use functions and list for your program.

2. Write a Python program to implement a stack and queue using a list data-structure. Use function and list for your program.

3. Write a Python program to convert a binary number to equivalent decimal number. Use function and list for your program

4. Write a Python program to convert a decimal number to equivalent binary number. Use function and list for your program.

5. Write a python program using a recursive function to implement a binary search problem.

6. Write a Python program to perform Jump Search for a given key and report success or failure. Prompt the user to enter the key and a list of numbers.

7. Write a Python program to find the index of an array element.

8. Write a Python program to find the duplicate values of an array of integer values

9. Write a Python program to find the second largest element in an array.

10. Write a Python program to count the number of characters (character frequency) in a string.
    Sample String : google.com
    Expected Result : {'g': 2, 'o': 3, 'l': 1, 'e': 1, '.': 1, 'c': 1, 'm': 1}

11. Write a Python program to add 'ing' at the end of a given string (length should be at least 3). If the given string already ends with 'ing' then add 'ly' instead. If the string length of the given string is less than 3, leave it unchanged.

    Sample String : 'abc'
    Expected Result : 'abcing'
    Sample String : 'string'
    Expected Result : 'stringly'

12. Write a Python program that accepts a comma separated sequence of words as input and prints the unique words in sorted form (alphanumerically).
    Sample Words : red, white, black, red, green, black
    Expected Result : black, green, red, white,red

13. Write a Python program to compute matrix multiplication.

14. The celebrity problem is the problem of finding the celebrity among n people. A celebrity is someone who does not know anyone (including themselves) but is known by everyone. Write a Python program to solve the celebrity problem.

```
  A B C D
A 1 1 1 0
B 1 1 1 0
C 0 0 1 0   value=2
D 0 1 1 1
```

Jump Search:

For example, consider a list of `[1, 2, 3, 4, 5, 6, 7, 8, 9]`. The length of the list is `9` and the size of `jump` is `3`. If we have to find the key element `8` then the following steps are performed using the Jump search technique.

`Step 1:` First three elements are checked. Since 3 is smaller than 8, we will have to make a jump ahead.

Elements →	1	2	3	4	5	6	7	8	9
Index →	0	1	2	3	4	5	6	7	8

`Step 2:` Next three elements are checked. Since 6 is smaller than 8, we will have to make a jump ahead.

Elements →	1	2	3	4	5	6	7	8	9
Index →	0	1	2	3	4	5	6	7	8

`Step 3:` Next three elements are checked. Since 9 is greater than 8, the desired value lies within the current boundary.

Elements →	1	2	3	4	5	6	7	8	9
Index →	0	1	2	3	4	5	6	7	8

`Step 4:` A linear search is now done to find the value in the array.

Celebrity Problem: Celebrity Identification Steps

Step 1. The program uses a matrix such that matrix[i][j] is True if and only if i knows j.

Step 2. Create two functions eliminate_non_celebrities() and check_if_celebrity().

Step 3. The function eliminate_non_celebrities() returns a candidate who may be a celebrity. It takes the matrix and n as arguments.

Step 4. The function check_if_celebrity() determines whether a person is a celebrity. It takes the matrix, possible_celebrity and n as arguments.

Step 5. The function eliminate_non_celebrities() works on the principle that if matrix[i][j] = True , that is i knows j , then i cannot be the celebrity and if matrix[i][j] = False , that is i does not know j , then j cannot be the celebrity.

Step 6. The function check_if_celebrity() whether possible_celebrity is known by everyone else and whether possible_celebrity does not know anyone. If so, it returns True.