

You have to submit a zip file containing the codes and the zip file should be named as Assignment1_Name_RollNo. For eg. Assignment1_Abhay_210022. You also have to submit a pdf file which includes the logic behind your code and it should have the same name as the zip file. The last date for the submission will be 15th December(Friday).

Q1. Given N balls of colour red, white or blue (represented by 1,2 and 3 respectively) arranged in a line in random order. You have to arrange all the balls such that the balls with the same colours are adjacent with the order of the balls, with the order of the colours being red, white and blue (i.e., all red coloured balls come first then the white coloured balls and then the blue coloured balls). Use of sort() function or any sorting algorithm is not allowed.

Q2. Given an array of N numbers. The problem is to find 3 numbers with the most occurrences, i.e., the top 3 numbers having the maximum frequency. If two numbers have the same frequency then the number with a larger value should be given preference. The numbers should be displayed in decreasing order of their frequencies. If the array consists of less than 3 different numbers, print "NOT POSSIBLE".

Input: arr[] = {3, 1, 4, 4, 5, 2, 6, 1}, K = 2

Output: 4 1

Explanation:

Frequency of 4 = 2, Frequency of 1 = 2

These two have the maximum frequency and 4 is larger than 1.

Input: arr[] = {7, 10, 11, 5, 2, 5, 5, 7, 11, 8, 9}, K = 4

Output: 5 11 7 10

Explanation:

Frequency of 5 = 3, Frequency of 11 = 2, Frequency of 7 = 2, Frequency of 10 = 1

These four have the maximum frequency and 5 is largest among the rest.

Q3. Implement a data Structure using Array. The data structures should have following functions:

insert(): Inserts an element at the rear end of the data structure.

delete(): This operation removes and returns an element that is at the front end of the data structure.

front(): This operation returns the element at the front end without removing it.

rear(): This operation returns the element at the rear end without removing it.

isEmpty(): This operation indicates whether the data structure is empty or not.

size(): This operation returns the size of the data structure i.e. the total number of elements it contains.

Q4. Given an array and an integer K, find the maximum for each and every contiguous subarray of size K.

Input: arr[] = {8, 5, 10, 7, 9, 4, 15, 12, 90, 13}, K = 4

Output: 10 10 10 15 15 90 90

Explanation: Maximum of first 4 elements is 10, similarly for next 4 elements (i.e. from index 1 to 4) is 10, So the sequence generated is 10 10 10 15 15 90 90.