Assignment 2

Total Marks=20

1. Write a Java program that takes an integer array from the user and then allows the user to perform the following operations using a menu with the following options **[Marks=2+2+1=5]**

    A. Find the sum of all elements
    B. Find the maximum element
    C. Search for a given element

2. Write a Java program to read an array of integers and, for each element, find the nearest greater element on its right. If no such element exists, print -1. Use only arrays. ***The time complexity for the program should not be more than O(n).*** **[Marks=1+4=5]**
Hint: Use an additional array as a stack**.**

Input:
Array = {4, 5, 2, 25, 7, 8}
Output:
5 25 25 -1 8 -1

3. Write a Java program to implement a priority queue data structure. A priority queue holds a set of data items (take integer values). Each data item has a priority, which is inversely proportional to the value of the item. It means, Lower the value of an item, the higher is its priority. A priority queue has two operations. [Hint: Use Array]. **[Marks =3+4+3=10]**

    1*) insert() :* inserts a new data item in the priority queue.
    2) *extract():* Extracts the data item that has the highest priority. That item will be removed from the queue

Test case:
Priority queue: {10, 7, 2, 5, 3, 18, 4, 12, 9}
The *extract()* should reveal 2 and the priority queue should contain the elements {10, 7, 5, 3, 18, 4,12, 9}.

Note: The goal is to minimize the time for *insert()* and *extract().* You are expected to implement *extract()* using *O(1)* and *insert()* using maximum *O(n)* complexity.