Assignment 8

Instructions:-

1. **You need to upload a pdf file for this assignment**
2. **Format:- Q1 code, the screenshot of Q1 output, Q2 code, Q2 screenshot of output, and so on in the sequence.**
3. **File Naming convention:- ID_Lab08.pdf**
    a. **Eg:- 202011002_Lab08.pdf**

1. **Write a program to implement a min heap. You need to write insert function, top function, pop function.**
    a. **Input: insert(50), insert(40), insert(30), top(), pop(), top()**
    b. **Output: 30, 40**
2. **Write a program to implement a max heap.You need to write insert function, top function, pop function.**
    a. **Input: insert(10), insert(20), insert(30), top(), pop(), top()**
    b. **Output: 30, 20**
3. **Given an integer array, find k'th largest element in the array where k is a positive integer less than or equal to the length of array.**
   Note: Use heap
   For example: Input: arr = [7, 4, 6, 3, 9, 1] and k = 2
   Output: The 2nd largest array element is 7

4. **Given an array of pairs, find all symmetric pairs in it**
   Two pairs (a, b) and (c, d) are said to be symmetric if c is equal to b and a is equal to d. For example, (10, 20) and (20, 10) are symmetric. Given an array of pairs, find all symmetric pairs in it.
   Assume that the first elements of all pairs are distinct.
   Note: Use hash table

   Example:
   Input: arr[] = {{11, 20}, {30, 40}, {5, 10}, {40, 30}, {10, 5}}
   Output: Following pairs have symmetric pairs
   (30, 40)
   (5, 10)

5. **Given an array A[] of n numbers and another number x, determines whether or not there exist two elements in A[] whose sum is exactly x.**

   Input: arr[] = {0, -1, 2, -3, 1}
   sum = -2
   Output: -3, 1
   Valid pair exists.
   Explanation: If we calculate the sum of the output,
   1 + (-3) = -2

   Input: arr[] = {1, -2, 1, 0, 5}
   sum = 0
   Output: No valid pair exists.