Summer20 CSE207 Sec 5 Lab Assignment 8

Binary Heap

1. Write a program to find k largest element in an array. You have to **use binary heap to** solve the mentioned problem.

Sample Input	Sample Output
1, 23, 12, 9, 30, 2, 50	K:3 Element: 50, 30, 23

2. Write a program to sort elements of an array in ascending order using Binary Heap.

Sample Input	Sample Output
12, 11, 13, 5, 6, 7	5 6 7 11 12 13

3. Write a program to convert an array to Max Heap.

Sample Input	Sample Output
3 5 9 6 8 20 10 12 18 9	20 18 10 12 9 5 9 3 8 6 or [any Max Heap formed from input elements]

4. Write a program to convert an array to Min Heap.

Sample Input	Sample Output
20 18 10 12 9 5 9 3 8 6	3 5 9 6 8 20 10 12 18 9 or [any Min Heap formed from input elements]

5. Write a program to find smallest and largest element of a binary heap.

Sample Input	Sample Output
3 5 9 6 8 20 10 12 18 9	Min: 3 Max: 20

6. Write a class Priority_Queue that maintains a list or set **S** using max heap and supports the following operations:

   - Insert(x) – Inserts element x into set S, according to its priority
   - Maximum( ) – Returns, but does not remove, the element of S with the largest key
   - Extract-Max( ) – Removes and returns the element of S with the largest key
   - Increase-Key(x, k) – Increases the value of element x's key to the new value k

Sample Input	Sample Output followed by operation
PQ.insert(3) PQ.insert(5) PQ.insert(9) PQ.insert(6) PQ.insert(8) PQ.insert(20) PQ.insert(10) PQ.insert(12) PQ.insert(18)	S: 20 18 10 12 6 5 9 3 8
PQ.Maximum()	20
PQ.Extrcat-Max()	Return 20 S: 18 12 10 8 6 5 9 3
PQ.Increase-Key(3, 11)	S: 18 12 10 11 6 5 9 8