IT251 Assignment-9

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TOPIC: BINARY HEAPS

DESCRIPTION:

- The program can be executed by passing one extra argument to ./a.out , that is, input text file name, for eg. “input.txt”
- The program implements binary heaps , the operations of extract-max, heapify, build-heap, etc. A Class “BinaryHeap” is made whose object is created which is used to perform and create heap using arrays.
- **Time complexity**: (assume ‘n’ as number of elements in heap)
    1. Build Heap: time complexity is O(nlogn) as heapify is called on each non-leaf node in tree which takes O(logn) time and worst case there will be ‘n’ heapify calls
    2. Heapify – time complexity is O(logn) as no. of swaps will be atmost the height of the tree that is logn.
    3. Extract-max – time complexity is O(logn) as after removing root and replacing it with last element in array, heapify is called on the unstable tree which takes logn time.
    4. Maximum – O(1) time as to just print the first element in heap.
    5. Insert – O(logn) worst case time complexity similar reason as heapify.

OUTPUT SCREENSHOT:

NOTE: It has been assumed that first line in the input file has number of commands as an integer (wasn't stated in the problem statement's test case but was informed in class to make necessary changes accordingly).

So, the input for the test case in the problem statement is taken as follows,

11

1 6 2 8 12 3 7

0

2

2

0

1 11

0

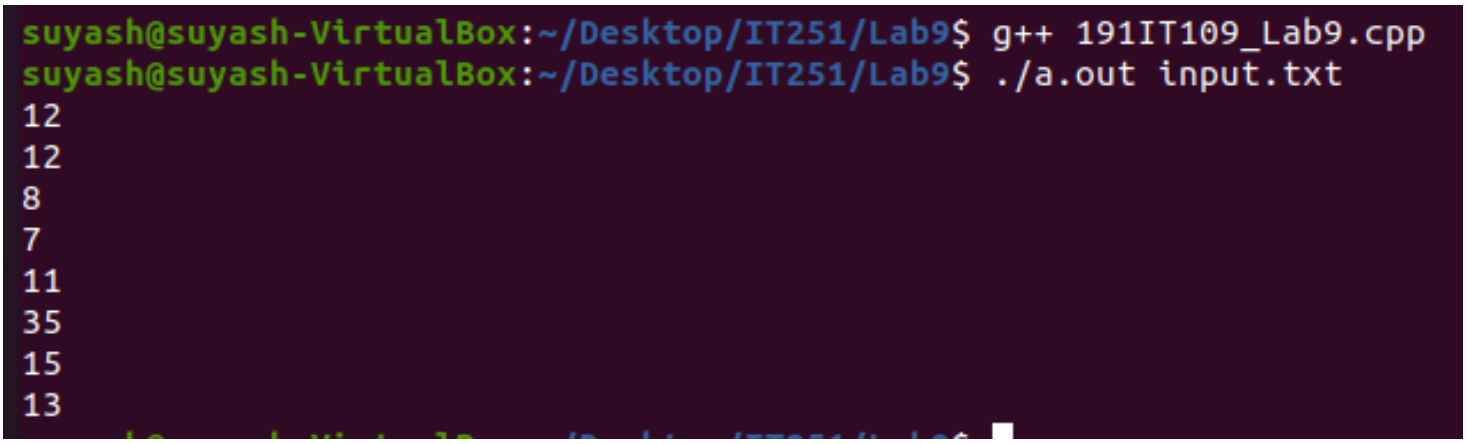
3 5 15 12 7 9 13 35

2

2

2

OUTPUT:



THANK YOU