HackerRank For Work

Fall_2017_INFO6205_Quiz_9 22 minutes

Question - 1

SCORE: **5 points**

Question 1

What is the time complexity for finding the largest M items in a stream of N items using Elementary PQ and Heap-based PQ?

- (●) MN, NlogM
- ( ) NlogN, MN
- ( ) NlogN, NlogM
- ( ) NlogM, NlogM

Question - 2

SCORE: **5 points**

Question 2

What's the height of a complete tree with N nodes? (The height of the root node is zero)

- ( ) logN+1
- (●) logN
- ( ) N/2
- ( ) N

Question - 3

SCORE: **5 points**

Question 3

Consider a binary max-heap implemented using an array. Which one of the following array properly represents a binary max-heap?

- ( ) 25,12,16,13,10,8,14
- (●) 25,14,16,13,10,8,12
- ( ) 25,14,12,13,10,8,16

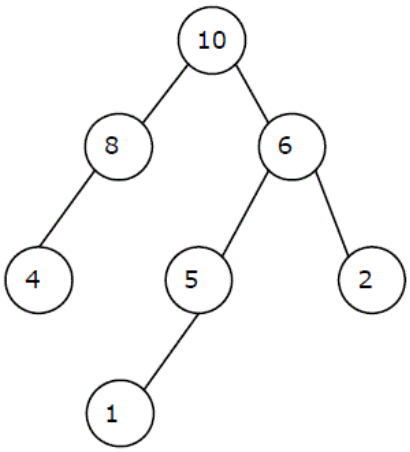
Question - 4

SCORE: **5 points**

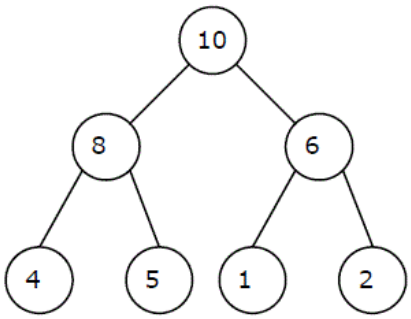
Question 4

A max-heap is a heap where the value of each parent is greater than or equal to the values of its children. Which of the following is a max-heap?

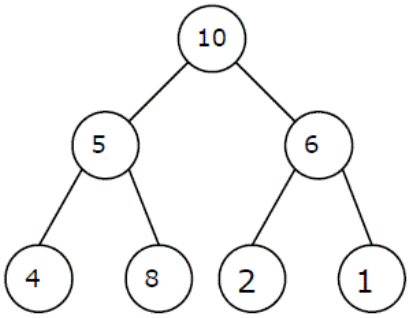
(A)



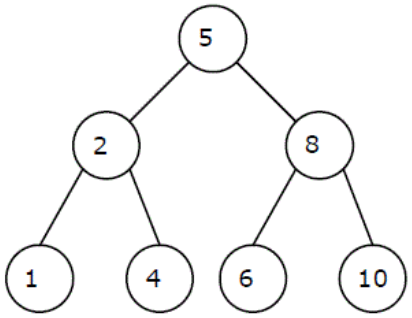
(B)



(C)



(D)



- A
- B
- C
- D

Question - 5

SCORE: **5 points**

Question 5

Suppose that the sequence P R I O * R * * I * T * Y * * * Q U E * * * U * E (where a letter means insert and an asterisk means remove the maximum) is applied
to an initially empty priority queue. Give the sequence of letters returned by the
remove the maximum operations.

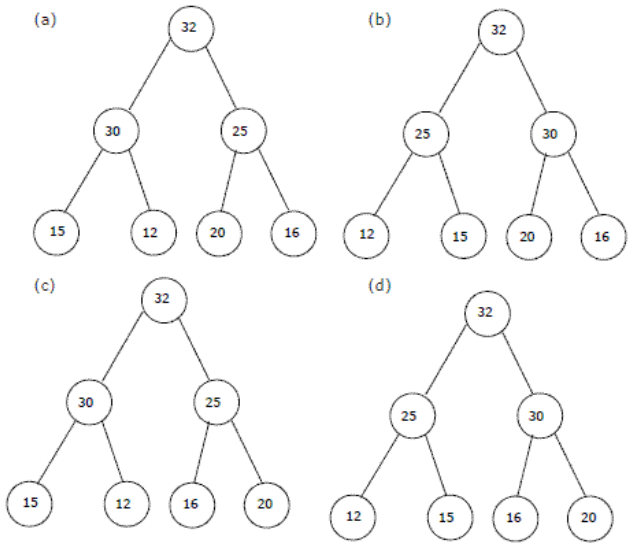
- I O P I R R T Y E Q U U
- I O P I R T R Y Q E U U
- R R P O T Y I I U Q E U
- R R P O Y T I U I Q E U

Question - 6

SCORE: **5 points**

Question 6

The elements 32, 15, 20, 30, 12, 25, 16 are inserted one by one in the given order into a Max Heap. The resultant Max Heap is.



- (●) A
- ( ) B
- ( ) C
- ( ) D

Question - 7

SCORE: **5 points**

Question 7

Here is the sink method for a maxheap:

```
private void sink(int k) {
  while(2*k <= n) {
    int j = 2*k;
    if (j < n && less(j, j+1)) j++;
    if (!less(k, j)) break;
    exch(k, j);
    k = j;
  }
}
```

Why do we have to check *less(j, j+1)*?

- ( ) Because the element at the root might not be the maximum
- ( ) Because a binary heap might not be complete
- (●) Because children of a node in a binary heap are not necessarily in order
- ( ) Because one of the children in a binary heap might not exist.