

Quiz – 3

Time allowed: 10 min

Stacks, Queues and Trees.

Name: _____

ID: _____

A. Select the correct option for the following questions. [5 marks]

1. What is the time complexity of an enqueue operation in a linked-list based queue?
 - a. $O(n) \Rightarrow$ cater to this as well (but in queues we always keep track of front and back in this case that would mean keeping track of head and tail)
 - b. $O(\log n)$
 - c. $O(1)$
 - d. $O(n^2)$
2. What is the advantage of a array based queue compared to linked-list based queue?
 - a. Faster enqueue
 - b. Faster dequeue
 - c. Stack can be grown without any extra overhead
 - d. Array based queues have no real advantage to linked-list based queue
3. Circular queue resolves the following problem of a normal queue
 - a. Slower but more stable dequeue
 - b. Lower memory overhead
 - c. Fast dequeue in $O(\log n)$
 - d. Fast dequeue in $O(1)$
4. In a tree of height 2, the root has 3 children. Only one child of the root has 5 children. How many leaves do we have?
 - a. Cannot determine
 - b. $(3 \times 2) + 5 = 6$
 - c. $(3-1) + 5 = 7$
5. In a tree, number of children at level m is always smaller than the number of children at level n where $m < n$?
 - a. True
 - b. False

B. What is the output when **mystery(q)** is called when q=[3,4,5,6,7]? [2 marks]

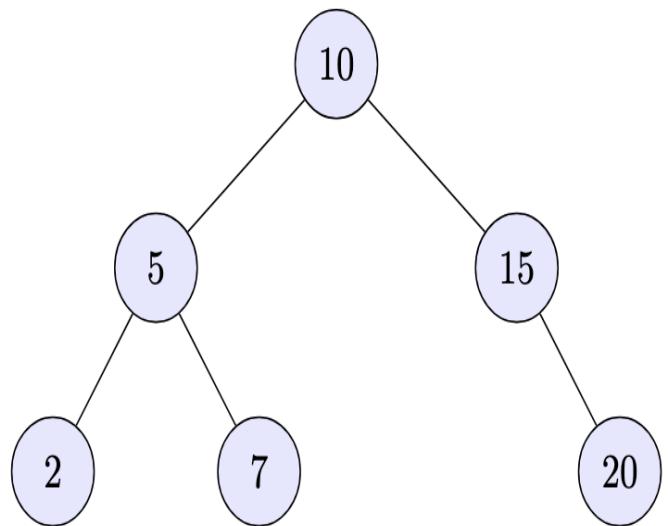
```
void mystery(queue<int> q) {
    while (!q.empty()) {
        int x = q.front();
        q.pop();
        if (!q.empty()) {
            int y = q.front();
            q.pop();
            q.push(x + y);
        }
    }
    while (!q.empty()) {
        cout << q.front() << " ";
        q.pop();
    }
}
```

Output: []

C. What is the output when **magic(root)** is called on the given tree [3 marks]

```
struct Node {
    int data;
    Node* left;
    Node* right;
};

void traverse(Node* root) {
    if (!root) return;
    if (root->right)
        traverse(root->right);
    cout << root->data << " ";
    if (root->left)
        traverse(root->left);
}
```



Output: 20 15 10 7 5 2

