# 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)
    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%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]

```cpp
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();
    }
}
```
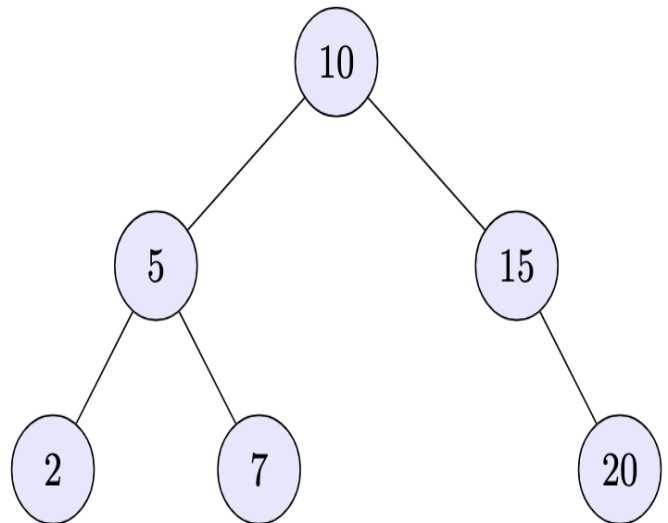
*Output:*

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

```cpp
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