Multiple Choice

Select one correct answer for each of the following problems.

1. Which of the following algorithms can be implemented on a linked list?
    a. Linear Search
    b. Insertion Sort
    c. Binary Search
    d. Merge Sort

2. What will be returned if the linked list 1->3->2->4->6->5 is passed into foo?

```
void foo(struct node* head)
{
     if(head == NULL)
     return;

     foo(head->next);
     printf("%d  ", head->data);
}
```

    a. 5 6 4 2 3 1
    b. 6 5 4 3 2 1
    c. 1 2 3 4 5 6
    d. 1 3 2 4 6 5

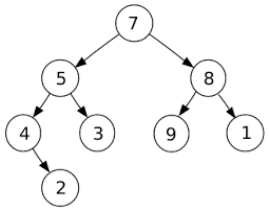
3. Select the following which are true of an ideal hashing algorithm:
    a. Maps a string of arbitrary size to a string of a fixed size
    b. No two inputs should produce the same output
    c. A small change in the input should reflect a small change in the output
    d. The output can be feasibly derived from the input

4. A stack follows which principle:
    a. Last in, last out
    b. First in, first out
    c. First in, last out
    d. None of the above

5. How many pointers are typically used to find the middle of a linked list?
    a. 0
    b. 1
    c. 2
    d. 3

6. Which data structure operates by adding elements to the rear and deleting elements from the front?
    a. Stack
    b. Queue
    c. Hash Map
    d. Binary Search Tree

7. List the nodes of the binary tree in post-order:
    a. 4 2 5 3 7 9 8 1
    b. 2 4 3 5 9 1 8 7
    c. 7 5 8 4 3 9 1 2
    d. 1 8 9 7 3 5 2 4



8. A binary tree is labeled with levels such that the root node is level 1, the root's left and right children are level 2, and so on. Which expression describes the maximum number of nodes in a level if the level is denoted by i.
    a. 2^{i-1}
    b. 2^{i+1}
    c. 2^{i}
    d. $2^{i/2}$

9. Below are the pre-order, post-order, and in-order traversals of a binary tree, but which traversal is which is not known.

    I. D F A G E H B I C
    II. D G F A C I E B H
    III. C G D A F I B E H

    Which of the following is true?
    a. I and II are pre-order and post-order respectively
    b. II and III are in-order and post-order respectively
    c. II and III are pre-order and in-order respectively
    d. I and III are post-order and pre-order respectively

10. The number of different binary trees possible with 5 nodes is:
    a. 25
    b. 42
    c. 120
    d. 125

11. Given the pointer to a node in a linked list, what is the time complexity to delete the node in a singly and doubly linked list respectively?
    a. O(1), O(1)
    b. O(1), O(n)
    c. O(n), O(1)
    d. O(n), O(n)