Midterm 2: Practice multiple-choice questions

Question 1

The following class declaration would be used to create which data structure?

```
class Node {
  int data;
  vector<Node*> adj;
}
```

a. Binary Search Tree
b. Hash Table
c. Heap
d. Graph

Question 2

Which of these data structures would be the most useful when storing a social media used by billions of people, where the main feature is a search bar that lets users look up other users by entering their name?

a. Binary Search Tree
b. Hash Table
c. Heap
d. Graph

Question 3

What will be printed when the following code is run?

```
#include <iostream>
struct Node {
  int key;
  Node* left;
  Node* right;
  Node(int k) {
    this->key = k;
    this->left = this->right = NULL;
  }
};
void print(Node* n) {
  if (n == NULL) return;
  std::cout << n->key << " ";
  print(n->left);
  print(n->right);
}
int main() {
  Node* root = new Node(12);
  root->left = new Node(6);
  root->right = new Node(15);
  root->left->left = new Node(2);
  root->left->right = new Node(8);
  print(root);
}
```

a. 2 8 6 15 12

b. 15 12 8 6 2

c. 12 6 2 8 15

d. 2 6 8 12 15

Question 4

Which of the following algorithms could be used to find the shortest path between two points on a grid?

a. Upward heap repair
b. Breadth-first search
c. Depth-first search
d. Recursive traversal

Question 5

Given a hash table with 4 boxes that uses a suitably random hash function, what is the largest number of elements that you can insert while being *certain* that there is no collision in the table?

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