Interview questions

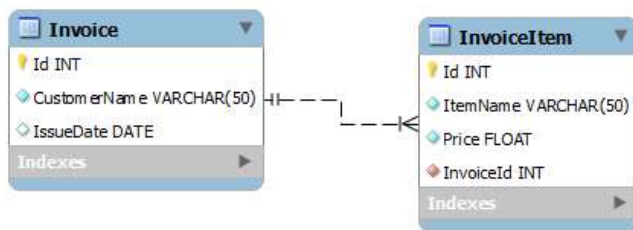1. **Given a binary tree, find its maximum depth.**

   The maximum depth is the number of nodes along the longest path from the root node down to the farthest leaf node.

   ```java
   /** Definition for a binary tree node.
   •    public class TreeNode {
   •    public int val;
   •    public TreeNode left;
   •    public TreeNode right;
   •    public TreeNode(int x) { val = x; }
   •    }
   */
   public class Solution {
       public int MaxDepth(TreeNode root) {

       }
   }
   ```

2. **Let's have this diagram:**

   Create a SQL statement that will select the invoices that have more than three items and will also give us total price of every of such invoices.

3. **Let's have this table:**

   ```sql
   CREATE TABLE Orders(order_id INT PRIMARY KEY, order_date DATE, customer_id INT);
   ```

   Create an SQL statement that will return for every customer his last order (all the columns).

4. **Consider following fragment of a class:**

   ```java
   public class Person {
       private int id;
       private int age;
       private String name;
       private Logger log, log2;

       public void setAge(int newAge) {
           synchronized(this) {
               log.debug("setAge id=" + id + " old=" + age + " new=" + newAge);
               age = newAge;
           }
       }

       public void setName(String newName) {
           synchronized(this) {
               log2.debug("setName id=" + id + " old=" + name + " new=" + newName);
               name = newName;
           }
       }
       // ...
   }
   ```

   What is synchronized keyword used for? Can you describe potential problem in this code? Rewrite class to avoid the problem.

5. **Implement observer pattern:**

   Observable which will be notifiyng stock identifier (String) and price (double). Just one identifier and price in publish.
   Observer that will subscribe to observable and print out the stock infromation to the console.
   Implement the logic from scratch - avoid using java.util.Observable.