Pre-Quiz3-Summer 2007
A. Short Answer

   a.   What is the difference between FlowLayout and BorderLayout?

       FlowLayout is placed starting from the left to the right. BorderLayout requires you to specify a region (i.e. BorderLayout.NORTH) to place the component.
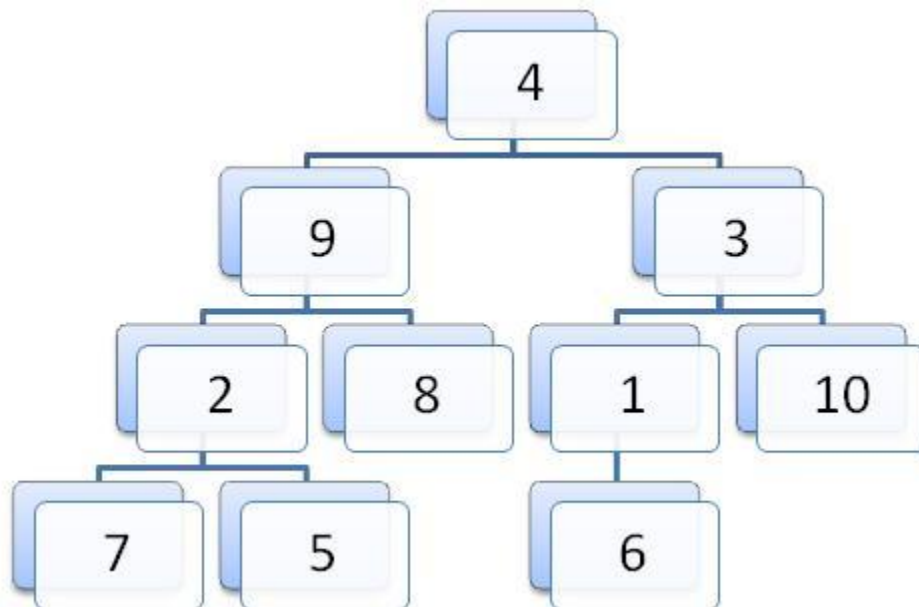
   b.   What does an ActionListener do? What happens in a GUI without one?

       An ActionLister listens for an action and does something (perhaps nothing) when it occurs. Nothing happens in a GUI without an ActionListener.
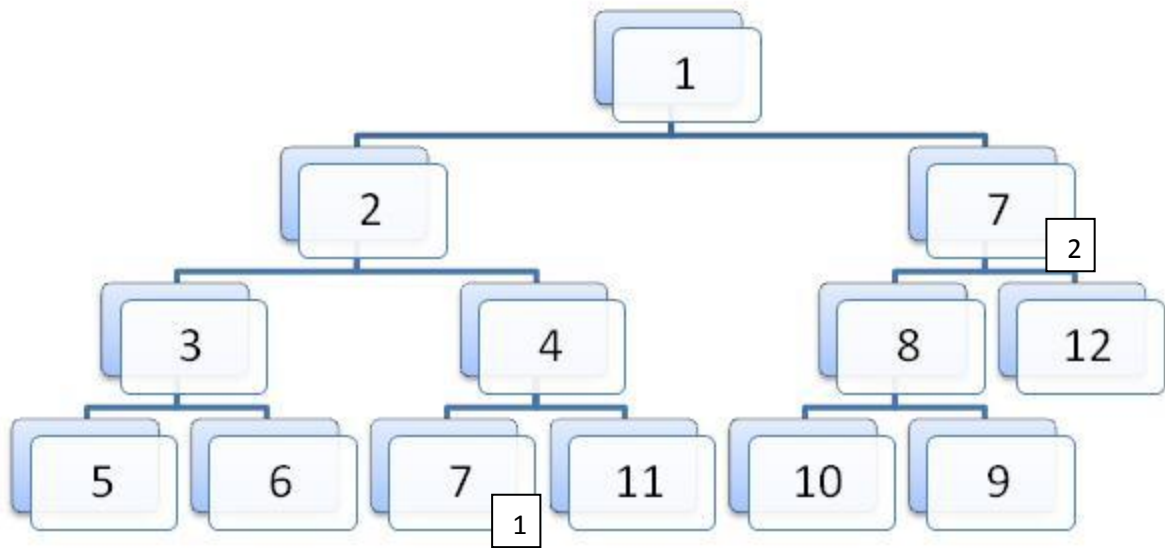
   c.   What is the difference between a JTextArea and JTextField?

       A JTextField can only hold one line of text of a specified length. A JTextArea can hold multiple lines of text of a specified length.

B. Tree Traversals ([Interactive tutorial on tree traversals](#))

   1.   What is the pre-order traversal of this tree?
       A: 4 9 2 7 5 8 3 1 6 10
   2.   What is the in-order traversal of this tree?
       A: 7 2 5 9 8 4 6 1 3 10
   3.   What is the post-order traversal of this tree?
       A: 7 5 2 8 9 6 1 10 3 4

1. What is the pre-order traversal of this tree?
   A: 1 2 3 5 6 4 7.1 11 7.2 8 10 9 12
2. What is the in-order traversal of this tree?
   A: 5 3 6 2 7.1 4 11 1 10 8 9 7.2 12
3. What is the post-order traversal of this tree?
   A: 5 6 3 7.1 11 4 2 10 9 8 12 7.2 1

C. GUI Trees
Consider the following code:

```java
import javax.swing.*;
import java.awt.*;

public class GUITree extends JFrame {
 JButton button1, button2, button3, button4, button5, button6, button7;
 JTextField inputField;

 public GUITree(){
  super("Non-functioning calculator");
  this.getContentPane().setLayout(new BorderLayout());

  button1 = new JButton("+"); button2 = new JButton("-");
  button3 = new JButton("/"); button4 = new JButton("*");
  button5 = new JButton("Clear"); button6 = new JButton("%");
  button7 = new JButton("!"); inputField = new JTextField(10);

  JPanel panel1 = new JPanel();
  panel1.add(button1); panel1.add(button2);
  panel1.add(button6);
  this.getContentPane().add(panel1,BorderLayout.NORTH);

  JPanel panel2 = new JPanel();
  panel2.add(button3); panel2.add(button4);
  panel2.add(button7);
  this.getContentPane().add(panel2,BorderLayout.CENTER);

  JPanel panel3 = new JPanel();
  panel3.add(inputField); panel3.add(button5);
  this.getContentPane().add(panel3,BorderLayout.SOUTH);

  this.pack();
  this.setVisible(true);
 }
}
```
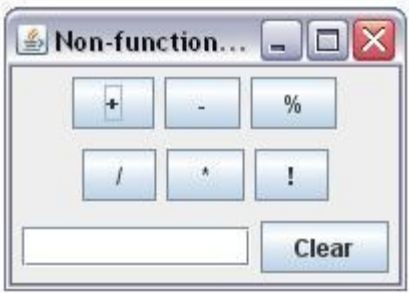
1. What does the GUI look like when we run the line GUITree tree = new GUITree(); in the Interactions Pane?

2. What does the tree representation of the GUI look like?