1. True or False:

(a) T In Alice, there is an event that is processed as long as the world is running.
(b) F In Alice, an event can execute its statements only once.
(c) F An array is the only data structure available in Alice.
(d) F In Alice, it is not possible to have lists of objects.
(e) T A constructor is a method that creates a new object.
(f) F A new class can be derived from an existing one.
(g) F In Java, a variable can be used before it is declared.
(h) F In Java, GUI components cannot contain other components.
(i) T To generate a keyboard event, a component must have the keyboard focus.
(j) T In Java, every event has a related listener interface.

2. (a) What is an event? Give an example.

   An event is something that happens. For example, when the mouse is dragged or a key is clicked are both examples of events.

(b) What is a listener in Java? Give an example.

   A listener responds to events in Java. For example, when a key is pressed, an event is triggered that the KeyListener responds to.

3. Write the Alice code that would make the items in a list, called Ballerinas, turn in place 3 times and jump, in unison:

4. Answer the questions below, based on the following code:
What happens when the world starts?
The method, my first method, is called. The cow swishes his tail back and forth for 10 seconds, and a sign counts up to 10.

What does the other event do? When mooTime is true, cow plays the moo sound.

5. Line up the Alice statements with the corresponding statement in Java:

<table>
<thead>
<tr>
<th>Alice Statement</th>
<th>Java Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>world.drawCircle(x,y);</td>
</tr>
</tbody>
</table>
| IV | if ( count < 10 )
   |   done = false; |
| III | world.drawCircle(); |
| V  | if ( count < 10 )
   |   done = false;
   | else
   |   done = true; |
| E  | name = Integer.toString(count); |
6. To the right of each line of code, indicate the values stored in the variables immediately after those lines have been executed. If a variable is uninitialized, enter ? in the box for that variable.

<table>
<thead>
<tr>
<th></th>
<th>x</th>
<th>y</th>
<th>z</th>
<th>a</th>
<th>b</th>
</tr>
</thead>
</table>
|(a)| int x, y, z;  
    | String a, b;  
    | x = 5;   | 5 | ? | ? | ? |
|   | x   | y   | z   | a   | b   |
|(b)| y = x/5; | 5 | 1 | ? | ? | ? |
|   | x   | y   | z   | a   | b   |
|(c)| a = "Hi"; | 5 | 1 | ? | "Hi" | ? |
|   | x   | y   | z   | a   | b   |
|(d)| b = a+a; | 5 | 1 | ? | "Hi" | "HiHi" |
|   | x   | y   | z   | a   | b   |
|(e)| z = x*x+1; | 5 | 1 | 26 | "Hi" | "HiHi" |
|   | x   | y   | z   | a   | b   |
|(f)| a = "23"; | 5 | 1 | 26 | "23" | "HiHi" |
|   | x   | y   | z   | a   | b   |
|(g)| y = Integer.parseInt(a); | 5 | 23 | 26 | "23" | "HiHi" |
|   | x   | y   | z   | a   | b   |
|(h)| x = y-1; | 22 | 23 | 26 | "23" | "HiHi" |
|   | x   | y   | z   | a   | b   |
|(i)| a = z % x; | 22 | 23 | 26 | "4" | "HiHi" |
|   | x   | y   | z   | a   | b   |
|(j)| x--; | 21 | 23 | 26 | "4" | "HiHi" |
7. Fill in the missing methods below:

```java
//****************************************************************************
// Circle.java    Programming with Alice and Java
//
// Represents a circle with a particular size, color, and location. The circle can be drawn filled or unfilled.
//****************************************************************************
import java.awt.*;
public class Circle {
    private int radius;
    private Color color;
    private int x, y; // the circle's center point
    //--------------------------------------------------------------------------
    // Sets up the circle with the specified location, size, and color.
    //--------------------------------------------------------------------------
    public Circle(int xCenter, int yCenter, int size, Color circleColor) {
        x = xCenter;
        y = yCenter;
        radius = size;
        color = circleColor;
    }
    //--------------------------------------------------------------------------
    // Draws the circle, filled, in the specified graphics context.
    //--------------------------------------------------------------------------
    public void drawFilled(Graphics gc) {
        gc.setColor(color);
        gc.fillOval(x-radius, y-radius, radius*2, radius*2);
    }
}
```

8. Write the constructor for the PushCounterPanel. The count should be initialized to 0, the button should have the title, Push me!, and should have an associated listener from the class, ButtonListener. Also, add the button and label so they appear on the panel and set the background color for the panel.
import java.awt.*;
import javax.swing.*;
import java.awt.event.*;

public class PushCounterPanel extends JPanel {
    private int count;
    private JLabel label;
    private JButton push;

    // Sets up the interface on the panel.
    public PushCounterPanel()
    {
        count = 0;
        push = new JButton("Push me!");
        ButtonListener listener = new ButtonListener(this);
        push.addActionListener(listener);

        label = new JLabel("Pushes: "+ count);

        add(push);
        add(label);

        setBackground (Color.cyan);
        setPreferredSize (new Dimension(350, 60));
    }

    // Increments the counter and updates the label accordingly.
    public void incrementCount()
    {
        count++;
        label.setText("Pushes: "+ count);
    }
}
9. Write a complete Alice program that has 5 bugs moving in random directions. When a bug is clicked with the mouse, it disappears from view.

```
world.my first method:

    world.my first method ()
    bugs =
    For all bugs, every item_from_bugs together
    Do together
        item_from_bugs move left ( random number minimum = -0.25 maximum = 0.25 )
        item_from_bugs move forward ( random number minimum = -0.25 maximum = 0.25 )
```

Events:

While the world is running
  Begin: <None>
  During: world.my first method
  End: <None>

- When is clicked on beetle
  Do: beetle set opacity to 0 (0%)

- When is clicked on beetle2
  Do: beetle2 set opacity to 0 (0%)

- When is clicked on beetle3
  Do: beetle3 set opacity to 0 (0%)

- When is clicked on beetle4
  Do: beetle4 set opacity to 0 (0%)

- When is clicked on beetle5
  Do: beetle5 set opacity to 0 (0%)

10. Write a complete Java program that prints Hello World to the console:

```java
public class Hello {
    public static void main(String args[]) {
        System.out.println("Hello World");
    }
}
```