[**Closed book and notes. You may use one side of an** 8.5×11 **inch sheet of paper that you personally prepared.**] Show all of your work clearly in the space provided or on the additional page at the end of the exam. If the additional page is used, clearly identify to which exam question it is related. Be sure to **read each problem carefully**. Note that the exam is double sided. Due to time constraints, you are not required to document your source code.

1. (10 points) Describe the relationship between event source objects and event listener objects. Give one example of each found in your Media Player application developed in lab.

2. (5 points) What is the difference between a **checked** and an **unchecked** exception?

3. In this multi-part problem, you should develop the application in the figure below. When the user clicks on the "More" button, the value should increase by one and when the user clicks on the "Less" button, the value should decrease by one. For example, if the user starts the program and then clicks "More" once, the middle pane should contain: "Value: 1".

In each part of this question, you will add code to complete the following class:

```
import java.awt.*;
import java.awt.event.*;

import javax.swing.*;

public class Midterm {

  private JFrame frame;
  private JLabel label;
  private int labelValue = 0;

  public Midterm() {
    JButton moreButton;
    JButton lessButton;
    MidtermEventHandler eHandler;
```

(a) (10 points) Write the code necessary to create a window with a title of "Midterm" that is 200 pixels wide and 100 pixels tall.

(b) (5 points) Initialize the label field with the correct starting value.

(c) (10 points) Initialize the two buttons giving the "More" button an action command of "increment" and the "Less" button an action command of "decrement".

(d) (15 points) Place the buttons and label in the window using the appropriate layout manager.

(e) (10 points) Write the code necessary to get the event handling code to execute when the buttons are pressed. (MidtermEventHandler is an inner class you will write in part **g**.)

(f) (5 points) Add any additional code you need in the constructor. (This may be nothing if you included the appropriate instructions in your answers to parts **a** – **e**.) Yes, it is possible to get full credit for this part by leaving it blank (provided you aren't missing parts of the answers above).

```
    frame.validate();
    frame.repaint();
  }  // End of Midterm constructor
```

(g) (20 points) Write an inner class called MidtermEventHandler that acts as the event handler for the buttons in the application.

```
} // End Midterm class
```

4. (10 points) Suppose you are interviewing for an intership position and are asked "Why should we use the exception mechanisms provided by the Java language when developing code?" Your grade will depend on how well you convince the interviewer that you should be hired. Your answer should be accurate and complete.