Student Name: ______________________________ Student ID # ______________________________

UOSA Statement of Academic Integrity

On my honor I affirm that I have neither given nor received inappropriate aid in the completion of this exercise.

Signature: ____________________________________ Date: ____________________________________

Notes Regarding this Examination

Open Book(s) You may consult any printed textbooks in your immediate possession during the course of this examination.

Open Notes You may consult any printed notes in your immediate possession during the course of this examination.

No Electronic Devices Permitted You may not use any electronic devices during the course of this examination, including but not limited to calculators, computers, and cellular phones. All electronic devices in the student's possession must be turned off and placed out of sight (for example, in the student's own pocket or backpack) for the duration of the examination.

Violations Copying another's work, or possession of electronic computing or communication devices in the testing area, is cheating and grounds for penalties in accordance with school policies.

Question 1: Graphical User Interfaces and Software Development (20 points)

A. **Explain** why is it suggested that you have a system for component construction (either starting at the lowest level and working up, or starting at the highest level and working down).

B. To do component construction starting at the highest level and working down, in what order would you place the following constructor calls? **Explain** why the order you give is the correct order for highest to lowest.

```
JMenuItem jmiNew = new JMenuItem("New");
JMenu jmFile = new JMenu("File");
JMenuBar jmbTop = new JMenuBar();
```

Question 2: Graphics (20 points)

A. **Explain** why a call to `super.paintComponent()` is generally the first call in a class's own `paintComponent()` method.

B. **Explain** why we almost never see calls to `paintComponent()` in our application code (except for calls to `super.paintComponent()` as described in Part A of this question).

Question 3: Event-Driven Programming (5 points)

Explain what will happen when the user clicks on a `JFrame`'s close button if you have not set a default close operation or created a `WindowListener`.

Question 4: Graphical User Interfaces and Software Development Redux (20 points)

A. List and **explain** one advantage, from an application programmer's perspective, of each component having its own coordinate system with the origin (0, 0) at the upper left corner of that component.

B. List and **explain** one advantage, from a *Java language developer's* perspective, of each component having its own coordinate system with the origin (0, 0) at the upper left corner of that component.

Question 5: Model, View, Controller (35 points)

For each of the following items, **explain** whether it belongs in a model, a view, or a controller. Note that some items may belong in more than one of these object types while others may not belong in any of these object types. Give all that are appropriate in a standard MVC implementation.

A. A call to an accessor method for an application object. (E.g., `employee.getName()`.)

B. A call to an mutator method for an application object. (E.g., `employee.setName()`.)

C. A call to the `setVisible()` method of a JFrame. (E.g., `frame.setVisible(true)`.)

D. A `setModel()` method.

E. A call to a `setModel()` method.

F. An `addActionListener()` method.

G. A call to an `addActionListener()` method.