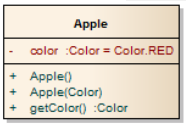
SE1021 Exam 2 Name:

1. (5 points) In your own words, ***describe*** what an instance is.

2. (5 points) Consider the Apple class in the UML diagram on the right. ***Write*** a couple lines of code to call the instance method getColor() from **outside** of the Apple class. Declare all variables that you use.



3. (5 points) ***Write*** two differences between an abstract class and an interface.

4. (5 points) ***Name*** two Java classes/interfaces – one whose instances are "event sources", and one whose instances are "event ~~listeners~~handlers."

5. (5 points) Java~~Swing~~FX provides a framework for responding to user actions. When a button is pressed, some of your code should be run. ***Describe*** how the framework determines what code to run.

(I don't expect you to need the space below this line.)

~~Consider the program below~~

~~try {~~

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~~Scanner in = new Scanner(System.in);~~

6. (5 points) Consider this code-snippet.

```
public class Gui extends JFrame Application {
    private String title;
    …
    @Override
    public void start(Stage primaryStage) {    public JFrame() {
        …
        JButton b = new Button("Press me");
        b.addActionListenersetOnAction(e->System.out.println(title));
        …
    }
}
```

Write whether or not it is legal for the lambda expression above to access the instance variable `title`, and ***explain*** your answer.

7. (10 points) ***Write*** an anonymous inner class implementing the `EventHandler<ActionEvent>ActionListener` interface. This interface contains one method: `public void handle(ActionEvent event)void actionPerformed(ActionEvent e)`;. Your handler ~~action listener~~ should set the text of the variable `textLabel` to `"hi"` when it is called. ***Assign*** the variable `a` to point to an instance of your anonymous inner class.

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8. (5 points) Consider an ActionHanlder~~ActionListener~~ that ~~listens to~~ handles multiple buttons. ***Describe*** one technique the ~~action listener~~ handler could use to determine which button was clicked.

9. (5 points) Suppose you call a method that throws a FileNotFoundException, a checked exception. ***Describe*** the consequences of not catching this exception with a try-catch block.

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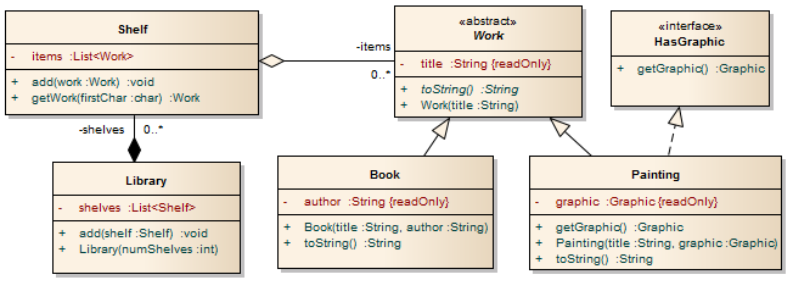
10. (17 points – 2 points for each multiple choice, 1 point for the true/false.)
Consider the UML diagram for the program below. This program is similar to the one on Exam 1, but there are several key differences.



a. ***Select*** one. The relationship between Work and Book is
   i. Composition
   ii. Aggregation
   iii. Inner-class
   iv. Inheritance
   v. Implementation

b. ***Select*** one. The relationship between Library and Shelf is
   i. Composition
   ii. Aggregation
   iii. Inner-class
   iv. Inheritance
   v. Implementation

c. ***Select*** one. The relationship between HasGraphic and Painting is
   i. Composition
   ii. Aggregation
   iii. Inner-class
   iv. Inheritance
   v. Implementation

d. ***Select*** one. As indicated on the diagram, the *toString* method of Work is…
   i. abstract
   ii. volatile
   iii. void
   iv. static
   v. final

e. ***Select*** one. As indicated on the diagram, the *title* variable of Work is…

i. abstract
ii. volatile
iii. void
iv. static
v. final

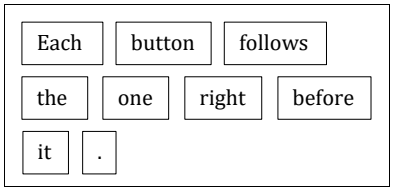
(continued from previous page – see figure there)

f. ***Select*** one. Which of the following statements is valid?
   i. Book b = new Book();
   ii. Work w = new Book("John Hancock","Declaration of Independence");
   iii. Book b = new Work();
   iv. Work w = new Work("My Masterpiece");

g. ***Select*** one. Which of the following statements is valid if `lib` is a Library?
   i. lib.add(new Book());
   ii. lib.add(new Shelf("Top shelf"));
   iii. lib.add(new Book("Dean & Dean","Java"));
   iv. lib.add(new Shelf());

h. ***Circle*** one: true / false: A shelf can contain more than one book.

i. ***Select*** one. (Unrelated to the diagram on the previous page.) Which ~~layout manager~~ pane would be best for designing this layout:



   i. ~~FlowLayout~~FlowPane
   ii. ~~BorderLayout~~VBox
   iii. ~~BoxLayout~~HBox
   iv. ~~GridLayout~~TilePane

11. (8 points) Considering the UML diagram from the previous problem, write the entire add method for the Library. (The Library's constructor takes a numShelves argument. This is the initial number of shelves and does not need to limit the total number of shelves that the Library has.)

Initials:_____