Name:_____

SE1021 Exam 1

You may not use a note-sheet or any other aids. Write your name on the front of all pages and read through the exam before you get started. The exam is printed double-sided.

Have fun!

1. (5 points) Describe how the keyword `protects` differs from `public` and `private`.

2. (20 points) Below, ***draw*** a UML class diagram for the classes shown in the appendix, including the classes, member variables, and methods for each class, and the **relationships** between classes. You do not need to include the `LibraryDriver` in your class diagram. (Every class in the diagram will have some relationship to at least one of the other classes.)

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3. (10 points) Both Painting and Book have some work to do. We'll leave Book for after the exam. ***Complete*** the method below to set the title of the Painting:

```
public Painting(String title) {









    System.out.println("Painting: "+title);
}
```

4. (20 points) Considering the code in the appendix, ***write*** what is printed when `main` runs, from the beginning up to the comment "`// A`".

5. (5 points) Consider the classes in the appendix. Suppose we want to add a `String describe()` method to `Book` and `Painting`. ***Explain*** why we might want to add a method to the `Work` class as well.

6. (5 points) Continuing from the previous problem, suppose the `describe` method for a book will return "This lovely hardbound work by _____ has parchment pages" (filling in the blank with the author), and the `describe()` method for painting will say "This beautiful work _____ by an unknown artist has a solid gold frame, filling in the title of the work. ***Explain*** why we might want to make the describe method in the Work class **abstract**.

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7. (5 points) If I declare `i` as `int i`, its type is "`int`." If I declare l as `Library l`, write its type.

8. (10 points) Consider this code-snippet, making use of classes from the appendix. Strike a line through each assignment that is illegal at **compile** time. You may assume the first four assignments are legal.

```
Library l = new Library();
Book b = new Book("Flying is fun", "Ralph");
Painting p = new Painting("Mona Lisa");
Work w3 = (Work)b;

Library l2 = b;
Library l3 = l;
Book b2 = p;
Book b3 = l;
Painting p3 = b;
Painting p3 = p;
Work w1 = l;
Work w2 = p;
Painting p4 = (Painting)w2;
Painting p4 = (Painting)w3;
```

9. (5 points) Strike through the assignments that will fail at compile time. You may assume the first four are correct.

```
double d = 1;
int i = 1;
long L = 1;
float f = 1;

d = i;
L = i;
i = L;
f = i;
f = L;
```

10. (5 points) ***Describe*** what it means for a class to **implement** an interface.

11. (5 points) ***Describe*** the difference between a class using `extends` and `implements`.

12. (5 points) Write what is printed by the `code` below.

```
int x = 0;
System.out.println(++x);
System.out.println(x++);
System.out.println(x++);
```