CSE2211: Object Oriented Programming and Design Methods
Quiz 3 (Chapter 4)

1. Why does Java strictly specify the range and behavior of its primitive types?

2. What is Java's character type, and how does it differ from the character type used by some other programming languages?

3. Given this output,

   ```
   One
   Two
   Three
   ```

   using a single string, show the **println( )** statement that produced it.

4. What is wrong with this fragment?

   ```
   for(i = 0; i < 10; i++) {
      int sum;

      sum = sum + i;
   }
   System.out.println("Sum is: " + sum);
   ```

5. In general, when is a cast needed?

6. Is a string consisting of a single character the same as a character literal? For example, is "k" the same as 'k'?

7. What is the difference between the following two statements?

   ```
   final double CM_PER_INCH = 2.54;
   ```
   and
   ```
   public static final double CM_PER_INCH = 2.54;
   ```

8. If n is a positive number, what is (n / 10) % 10?

9. What is wrong with the following statement sequence?

   ```
   System.out.print("Please enter the unit price: ");
   double unitPrice = in.nextDouble();
   int quantity = in.nextInt();
   ```

10. For a car, repair and maintenance costs in year 1 are estimated at $100; in year 10, at $1,500. If the repair cost increases by the same amount every year, develop pseudocode to compute the repair cost in year 3 and then generalize to year n.

11. What does the following statement sequence print?

    ```
    String str = "Harry";
    int n = str.length();
    String mystery=str.substring(0, 1) + str.substring(n - 1, n);
    System.out.println(mystery);
    ```

12. What is wrong with the following sequence of statements?

```
int mystery = 1;
mystery = mystery + 1;
int mystery = 1 - 2 * mystery;
```

13. Suppose direction is an integer angle between 0 and 359 degrees. You turn by a given angle and update the direction as

```
direction = (direction + turn) % 360;
```

In which situation do you get the wrong result? How can you fix that without using the

`Math.floorMod` method.

14. Consider the following code:

```
CashRegister register = new CashRegister();
register.recordPurchase(19.93);
register.receivePayment(20, 0, 0, 0, 0);
System.out.print("Change: ");
System.out.println(register.giveChange());
```

The code segment prints the total as 0.07000000000000028. Explain why. Give a recommendation to improve the code so that users will not be confused.

Programming Question

In this project, you will create a program that computes how far away, in feet, a listener is from a lightning strike. Sound travels approximately 1,100 feet per second through air. Thus, knowing the interval between the time you see a lightning bolt and the time the sound reaches you enables you to compute the distance to the lightning. For this project, assume that the time interval is 7.2 seconds.

i. Create a new file called **Sound.java**.

ii. To compute the distance, you will need to use floating-point values. Why? Because the time interval, 7.2, has a fractional component. Although it would be permissible to use a value of type **float**, we will use **double** in the example.

iii. To compute the distance, you will multiply 7.2 by 1,100. You will then assign this value to a variable.

iv. Finally, Test your program by writing unit test using JUnit.