CSCE 145: Test 1, Fall 2011

Questions 1 to 13 are worth 5 points each. Questions 14 to 18 are worth 7 points each.

1. Given the following Java program

```
public class Average {
  public static void main(String[] args) {
    int num1 = 7;
    int num2 = 13;
    int num3 = 5;
    double average = (num1 + num2 + num3)/3;

    System.out.print("The average of " + num1);
    System.out.println(" and " + num2 +" and " +num3 +" is " + average);
 }
}
```

   Modify the program as follows:
   - Create an integer variable named **num3**.
   - Assign the value of 5 to **num3.**
   - Modify the average calculation to include **num3.**
   - Modify the output statements as appropriate.

2. What would be the *exact* result, including all spaces and carriage returns, of executing your modified program above?

   The average of 7 and 13 and 5 is 8.0

3. Suppose the class `Friend` has the `double` instance variable `gpa` and the setter method `setGpa` with one parameter: a `double`. `susan` is an object in the class `Friend`. Write the statement that would cause the `gpa` instance variable for `susan` to be set to `3.85`.

   susan.setGpa(3.85);

4. What would be the result of running the following program?

```
public class WhileLoop {
   public static void main(String[] args) {
      int i = 1; // Modified: int I = 10;
      while(i <= 10) { // Modified: while (i >= 1) {
         System.out.print(i + " ");
         i++; // Modified: i--;
      }
      System.out.print("\n");
   }
}
```

   1 2 3 4 5 6 7 8 9 10

   Modify the code in this class so that it displays the numbers from 10 to 1.

5. What would be the value of variable `energy` after the following two statements are executed?

```
int energy = 9;
energy = energy + 6 / 3;
```

   11

6. Assume that `int x = 4`, `int y = 4`, and `int z = 2`. What would be the value of variable `b` after the following statement is executed?

```
boolean b = (x <= y) && (x * y / z > z) || (x + y <= z);
```

true

7. What would be the value of variable `noise` after the following statement is executed?

```
int noise = 5 * 4 + 4 - 3 * 4;
```

12

8. (Yes or no) Does the random number generator built into Java produce perfectly random numbers?

No

9. Identity (ref. replacing the boards on a boat floating down the Nile):
   Is a person's identity determined by
   a. Their mind
   b. Their body
   c. Both their mind and their body
   d. Their ID card

c.

10. By what year would you expect a team of robots to be able to play soccer at the same level as a team of humans?

2050

11. What would be the value of variable `total` after the following statements are executed?

```
int total = 4;
total++;
total = total * 5;
```

25

12. What would be the value of variable `result` after the following statement is executed?

```
double input = 13.987;
int result = (int)(input + 2.0);
```

15

13. What is the output of the following code segment?

```
double size = 5.7;
double mass = 7.2;
int k = 6;
if ((size > mass) || (k < size)) {
  System.out.println("yes 1");
else
  System.out.println("no 2");
if ((size < mass) && (k > 5))
  System.out.println("yes 3");
else
  System.out.println("no 4");
```

no 2
yes 3

14. Write the two Java expressions that are equivalent to the following two mathematical formulas:

(a x^2 − 3 y) $\sqrt{w^2 + z^2}$ $(r + 7)(r - 8)/(4s + 3z)$

```
(a*x*x - 3*y) * Math.sqrt(w*w + z*z)          (r+7)*(r-8) / (4*s + 3*z)
```

15. Write the statements that would use a `for`-loop to compute the value of this sum $\sum_{k=3}^{18} k\ (k + 3)$

```
int sum = 0;
for (int k = 3; k <=18; k++) {
  sum = sum + k * (k + 3);
}
```

16. Write a method `findAge()` that asks a user for their age and returns the value that the user enters (using the console window and the keyboard).

```
public int findAge() {
  Scanner kb = new Scanner(System.in);
  System.out.println("What is your age?");
  int a = kb.nextInt();
  return a;
}
```

17. Given the following definition for the classes `RailroadCar` and `Train`, write a method in the `Train` class called *getFreight* that returns the total cubic meters of all three railroad cars in an instance of a `Train`.

```
public class RailroadCar {
  private String freight; // a variable for storing the contents of a
                          // RailroadCar, such as "grain," or "lumber"
  private int length; // the length of the RailroadCar in meters
  private int width; // the width of the RailroadCar in meters
  private int height; // the height of the RailroadCar in meters
  //Assume there are getters and setters for all of the instance
  //variables above, such as getWidth()
}
public class Train {
  private RailroadCar car1; // hauling grain
  private RailroadCar car2; // hauling cotton
  private RailroadCar car3; // hauling wood chips
public int getFreight() {
  int v = car1.getLength()*car1.getWidth()*car1.getHeight()
        + car2.getLength()*car2.getWidth()*car2.getHeight()
        + car3.getLength()*car3.getWidth()*car3.getHeight();
  return v;
..}
```

18. Write the constructors for the RailroadCar and Train classes defined above. Each of the constructors should set *all* of the private instance variables (properties) in the class definitions.

```
public RailroadCar(String f, int l, int w, int h) {
  this.freight = f; //   this.setFreight(f);
  this.length = l; //    this.setLength(l);
  this.width = w; //     this.setWidth(w);
  this.height = h; //    this.setHeight(h);
}
public Train(RailroadCar c1, RailroadCar c2, RailroadCar c3) {
  this.car1 = c1; // this.setCar1(c1);
  this.car2 = c2; // this.setCar2(c2);
  this.car3 = c3; // this.setCar3(c3);
}
```