Question 1 Basic Introduction to Computers (10 pts)

Multiple Choice. Circle the correct answer.

1. A byte is used to measure the amount of all of the following except:
   (a) CPU speed  (b) hard disk  (c) RAM  (d) cache size

2. A terabyte is about ______________ bytes.
   (a) $10^3$  (b) $10^6$  (c) $10^9$  (d) $10^{12}$

3. Which of the following is NOT computer hardware?
   (a) Monitor  (b) Webcam  (c) Antivirus  (d) Printer

4. All storage on the computer uses the alphabet of:
   (a) 0’s and 1’s  (b) ASCII values  (c) lowercase a,b,c  (d) all printable characters

5. When a program runs, all of the answers to the calculations of expressions will be:
   (a) in memory  (b) displayed on the screen  (c) on disk  (d) none of the above

True/False Circle the Correct Answer

6. RAM is memory on your computer, and it is where your program gets stored when you turn off your computer.
   True       False

7. Each statement in Java corresponds to a single statement in machine language.
   True       False

8. Software is another name for a computer program.
   True       False

9. When you compile your program you get to see what gets printed from all the System.out.print() statements.
   True       False
Question 2 (20 pts)

Something is wrong with each of the following pieces of code. Use A or B to label whether the error is from:

A. Compiler Error B. Logical or Runtime Error

Use minor edits to correct the code.

1.
```java
int x;
System.out.println("value of x is: " + x);
```

2.
```java
if (x%2==0)
   x--;
   System.out.println("Your number was even!");
else
   System.out.println("Your number is odd!");
```

3.
```java
double avg = num1+num2+num3/3.0;
```

4.
```java
if (x > y) {
   double max=x;
} else {
   max = y;
}
```

5.
```java
double answer = Math.sqrt()/25;
```
Question 3 (20 pts) TRACE the following program, showing memory and output on separate parts of the page. Assume that the user types the following at the keyboard:

**Antitoxins 6 10 -20 30 30 50 8**

```java
import java.util.Scanner;

public class Example {
    public static void main(String[] arg) {
        Scanner sc = new Scanner(System.in);
        String s = sc.next();
        System.out.println("s="+s);
        int sum1 = 0, sum2 = 0;
        int header = sc.nextInt();
        for (int i=0; i<header; i++) {
            int x = sc.nextInt();
            System.out.print("x="+x+" ");
            if (x<0 || sum1==x)
                sum1=0;
            else
                sum1+=x;
            if (x>0 && sum2==x)
                sum2=0;
            else
                sum2+=x;
        }
        System.out.println("\nsums: "+sum1+" "+sum2);
    }
}
```
Question 4 (25 points)

Write a complete program in Java called Interest, including javadoc comments, for the following problem:

A bank is offering 2.31% interest on a savings account. Your program will read in:

1. Current principal being invested in the savings account.
2. Number of years the money will remain in the savings account.

Your program will use the following formula to calculate the amount that will be in the account after the number of years passes:

\[ amount = p(1 + r)^t \]

Where \( p \) stands for the initial principal, \( r \) is the rate, and \( t \) is the number of years.

Finally, your program will display the amount calculated to the screen using formatted printing.
Question 5: Write a complete program in Java, including javadoc comments (worth pts) to do the following:

1. Read in the id number of a trip offered by a travel company, the number of miles traveled, and the cost of each mile. Include prompts. Print the original data right after you read it in.

A typical set of values could be: 1234 15 22.67
This means trip 1234 is 15 miles, at a cost per mile of 22.67.

2. Compute the base price for the trip. This is simply the number of miles times the cost of each mile. Print the base price.

3. The travel company gives a discount of 7.5% if the number of miles is 20 or more. For each trip, determine if the trip gets the discount. Print an appropriate message in each case (whether or not the trip gets the discount).

4. Determine the trip's final price. If the trip gets the discount, the final price is the base price for the trip minus the discount. If the trip does not get the discount, the final price is the base price.

Print the final price and the discount. You should print 0 for the discount if there is no discount on this trip.

5. Repeat the entire series of calculations for the next trip, and the next, until all of the trips have been processed. You must decide how to tell when all of the trips have been processed. Make sure that this method is described in a comment.

6. At the end, print the total number of trips. Also, print how many of the trips did not receive the discount.

Hint: You will need two separate counters.
Extra Work Page