

COMP-202A, Fall 2007, All Sections

Assignment 1

Due: Monday September 24, 2007 (23:55)

You **MUST** do this assignment individually and, unless otherwise specified, you **MUST** follow all the general instructions and regulations for assignments.

For this assignment, graders will issue warnings to students who deviate from the general instructions and regulations, but will not deduct marks; however, on future assignments, graders will have the discretion to impose penalties for such deviations.

Respect of instructions and regulations:	0 points
Part 1:	0 points
Part 2, Question 1:	4 points
Part 2, Question 2:	3 points
Part 2, Question 3:	3 points
<hr/>	
	10 points total

Part 1 (0 points)

Do not hand in this part. It will not be graded. But doing this exercise might help you to do the second part of the assignment (that will be graded). If you have difficulties with the questions of Part 2, then we suggest you go to one of the office hours. The TA can help you and work with you through the warm-up questions.

Warm-up Question 1 (0 points)

The following is a program that calculates one's weight on different planets. Retype the program in DrJava, compile and execute it.

```
/*  
A program calculating your weight on Mars and Jupiter.  
Assume that the surface gravity on Mars and Jupiter is  
0.379 and 2.529 times that of Earth's, respectively.  
*/
```

```

import java.util.Scanner;

public class Weight
{
    public static void main(String[] args) {
        int earthWeight;
        double marsWeight, jupiterWeight;

        Scanner scan = new Scanner(System.in);

        System.out.println("Enter your mass in kilograms: ");
        earthWeight = scan.nextInt();

        marsWeight = earthWeight * 0.379;
        jupiterWeight = earthWeight * 2.529;

        System.out.println("You'd weigh " + marsWeight + " on Mars");
        System.out.println("You'd weigh " + jupiterWeight + " on Jupiter");
    }
}

```

Part 2 (4 + 3 + 3 = 10 points)

The questions in this part of the assignment will be graded.

Question 1 (4 points)

Suppose you know Merlin, an all-powerful wizard who provides you with the following curious method for multiplying any two numbers between 100 and 109: ¹

1. The most significant digit will always be 1.
2. The next two significant digits will be the summation of the least significant digits of the the inputs.
3. The final two digits will be the product of the least significant digits of the inputs.

Some examples:

- First example: $105 \times 107 = 11235$:

First Step: The most significant digit is 1

Second Step: The next two significant digits will be $12 : 5 + 7 = 12$

¹<http://mikesmath.com/shortcuts.htm>

Third Step: The final two digits will be 3 and 5 since $5 \times 7 = 35$.

- Second example: $102 \times 104 = 10608$:

First Step: The most significant digit is 1

Second Step: The next two significant digits will be 06 as $2 + 4 = 6$

Third Step: The final two digits will be 0 and 8 since $2 \times 4 = 8$.

Write a program that prompts the user to enter two integers between 100 and 109 and then computes their product using Merlin's method and outputs the result. Save the source code of your program in a file called `Merlin.java` and submit it to myCourses.

Question 2 (3 points)

There are 6 (and only 6) syntax errors in the following Java program. Each line is numbered, you should submit a text file called `a1q2-errors.txt` with this assignment, and for each error we ask that you write out the line number on which the error occurred (or if it spans more than one line, write all of the line numbers), and the nature of the error. For example, you could write

`line 3, missing a semicolon,`

If you do not feel that you can come up with a good explanation of what is wrong, you may also just state what the proper syntax would be. So for example, you could write

`line 6 should be 'int x = 4;'`

Famous Cafe α serves only four types of beverages: Cappuccinos, Mochaccinos, London Fogs (tea + steamed milk + caramel), and Green tea for \$3.25, \$4.50, \$3.25, and \$2.75, respectively. The following program calculates the net profit of the coffee shop on a particular day. Assume that hypothetical Cafe α is located in a tax-free city.

Keep in mind that we are ONLY looking for syntax errors, and not any other types of errors. Each error is worth 0.5 marks if both the description and the line number are correct. Note that the line numbers on the left are meant as a convenience for you and should not be thought to be part of the Java program.

```

1: import java.util.Scanner;
2:
3: public class Profit {
4:     public static void main(String[] args) {
5:
6:         // Variable definition:
7:         int cappuccino = 0, mochaccino = 0.0;
8:         int londonFog = 0, greenTea = 0;
9:
10:        int total;
11:        double totalProfit, initialBudget;
12:
13:        //Read in the data values
14:        Scanner scan = new Scanner(System.in);
15:
16:        System.out.println("Please enter today's initial budget");
17:        initialBudget = scan.nextDouble();
18:
19:        System.out.println("Please enter the total number of Cappuccino's sold today:");
20:        int cappuccino = scan.nextInt();
21:
22:        System.out.println("Please enter the total number of Mochaccino's sold today:");
23:        mochaccino = scan.nextInt();
24:
25:        System.out.println("Please enter the total number of London Fog's sold today:");
26:        londonfog = scan.nextInt();
27:
28:        System.out.println("Please enter the total number of Green tea's sold today:");
29:        greenTea = scan.nextInt();
30:
31:        // Calculate the total cups of beverage sold today:
32:        cappuccino + mochaccino + londonFog + greenTea = total;
33:
34:        // Calculate today's profit:
35:        totalProfit = initialBudget - ((cappuccino * 3.25) + (mochaccino * 4.50) +
36:            (londonFog*3.25) + (greenTea*2.75));
37:
38:        // Print the result:
39:        System.out.println("You have sold a total of " + total + " cups of beverage today");
40:        System.out.println("Starting with the budget of " + initialBudget + " you
41:            have earned a profit of " + totalProfit + " dollars.");
42:    }
43: }

```

Question 3 (3 points)

Write a program that calculates the surface area and volume of a box. It should proceed as follows:

- Ask the user to enter the box's width, height, and length
- Calculate the surface area of the box
- Calculate the volume of the box
- Display the surface area and the volume of the box

Save the source code of your program in a file called `Box.java` and submit it to myCourse.