# CSCI 1100 – 2016
# Laboratory Report 2

## Name:

## Student ID:

| Please mark your lab | | | | | | |
|---|---|---|---|---|---|---|
| T 8:30 L143 | T 8:30 L134 | T 8:30 L133 | T 11:30 L143 | T 11:30 L133 | T 11:30 L142 | T 2:30 L143 |
| T 5:30 L143 | T 5:30 L142 | W 11:30 143 | W 4:30 143 | | | |

| Declaration: Please complete this declaration | | |
|---|---|---|
| 1 | This document is entirely my own work. | Yes |
| 2 | I obtained some help to complete this document. | No |
| 3 | This document contains some material from the Internet or another document or file or program. Note, your lab should be the efforts of your own work. However, you may need to look something up to help you – you need to acknowledge this. You should not cut and paste solutions. | The only material obtained from the internet is the exchange ratio for US dollars and Euros |

**Exercise 0.** TAs please provide an explanation of what assignment means and how assignment is different from mathematical equality. (In math the operator "=" means equality and that is completely different from the assignment operator.) **No Marks**.

Let students examine the following class.

```
/*Lab 2 CSCI 1100
  This program assigns values to three integer variables: x, y and x and then uses and prints the values
*/

public class Example_Lab2 {
  public static void main(String args[]) {
      //declare and assign values to int variables
     int x = 1;
     int y = 2;
     int z = x + y;
     //print out the values of the variables before and after changing them
     System.out.println("x =  " + x + " y = " + y + " z = " + z );
     x = 0; y = 0;
     System.out.println("x =  " + x + " y = " + y + " z = " + z );
   }
```

```
}
```

*Ask the students what it prints. Explain why this is wrong. Try it out and show them.*

```
x = 1 y = 2 z = 3
x = 0 y = 0 z = 0
```

Encourage students how to properly use comments in their code (e.g., look at the header comment and comments in the code) and properly format the code.

## **Remember to properly format and comment your code. You can loose up to 2 marks if you do not format and comment your code.

**Exercise 1.** Without writing a program evaluate the expressions shown below and write down the resulting values. **No Marks.**

```
4 * 2 / 9 + 4  * 2            ->   8
5 / 3  + 5 / 4                ->   2
5 / 3.0 + 5 / 4               ->   2.6666666666667
15 / (2 + 3 ) / 2             ->   1
6  / 4.0  * 3  + 2            ->   6.5
3 * 3 / 4.0 * 2 / 2.0 + 3.5   ->   5.75
4.0 / 2 + 5 / 6 + 0.5 - 5     ->   -2.5
```

**Exercise 2.** Write a program to verify your answers to Exercise 1. Your program must output both the expression and the value. Output the results using the format below: **[2 marks]**

```
4 * 2 / 9 + 4 * 2 -> 8
```

Hint. As an example, the statement

```
System.out.println("4 * 2 / 9 + 4 * 2" + " -> " + (4*2/9+4*2));
```

prints the line

```
4 * 2 / 9 + 4 * 2 -> 8
```

**Solution (program):**

```
/* CSCI 1100-Lab1-Exercise 2
 This program is to verify results of the first question of Lab2
 <Mihyar Al-Masalma> <B00759975> <9/27/2016>*/
public class verifyAnswers {
        public static void main(String[] args) {
                System.out.println("4 * 2 / 9 + 4 * 2"+" -> "+ (4*2/9+4*2));
                System.out.println("5 / 3 + 5 / 4"+" -> "+ (5/3+5/4));
                System.out.println("5 / 3.0 + 5 / 4"+" -> "+ (5/3.0+5/4));
                System.out.println("15 / ( 2 + 3 ) / 2"+" -> "+ (15/(2+3)/2));
                System.out.println("6 / 4.0 * 3 + 2"+" -> "+ (6/4.0*3+2));
                System.out.println("3 * 3 / 4.0 * 2 / 2.0 + 3.5"+" -> "+ (3*3/4.0*2/2.0+3.5));
```

```
		System.out.println("4.0 / 2 + 5 / 6 + 0.5 - 5"+" -> "+ (4.0/2+5/6+0.5-5));
	}
}
```

**Output**

```
4 * 2 / 9 + 4 * 2 -> 8
5 / 3 + 5 / 4 -> 2
5 / 3.0 + 5 / 4 -> 2.666666666666667
15 / ( 2 + 3 ) / 2 -> 1
6 / 4.0 * 3 + 2 -> 6.5
3 * 3 / 4.0 * 2 / 2.0 + 3.5 -> 5.75
4.0 / 2 + 5 / 6 + 0.5 - 5 -> -2.5
```

**Exercise 3.** Write a main method that creates three double variables called x, y and z. The program assigns the values the values 3 to x, 6 to y and 2 to z. The program then computes the average of x, y, z and assigns the value to a variable called average. The program then prints the values of x, y, z and average. Change the values assigned to x, y and z and run the program again (and include this in your output of the program as well). The program must print the new values. **[2 marks]**

**Sample output:**

```
x = 3
y = 6
z = 2
average = ….
```

**Solution (program):**

```
/* CSCI 1100-Lab1-Exercise 3
This program is to compute the average of three given numbers
 <Mihyar Al-Masalma> <B00759975> <9/27/2016>*/
public class average {
	public static void main(String[] args) {
		// define three variables and initialize it
		double x=3, y=6, z=2;
		// define a variable that will hold the result and assign the equation to it
		double average = (x+y+z)/3;
		System.out.println(" x= "+x+"\n y= "+y+"\n z= "+z+"\n average= "+average);
		// assign new values for the variables
		x=1; y=2; z=3;
		// recalculate the average for the new values
		average = (x+y+z)/3;
		// print out the new values
		System.out.println(" x= "+x+"\n y= "+y+"\n z= "+z+"\n average= "+average);
	}
}
```

**Output (there will be two outputs – one with the original values (3, 6 and 2) and one with new values you give)**

```
x= 3.0
y= 6.0
z= 2.0
average= 3.6666666666666665
x= 1.0
y= 2.0
z= 3.0
average= 2.0
```

**Exercise 4.** Write a program that creates two double variables called Fahrenheit and Celsius and that assigns the value 56 to the variable Fahrenheit. The program then computes the equivalent temperature in degrees Celcius and assigns this value to a variable called Celsius. (Find the formula on the Web.) The program then writes the correct result in the form **[3 marks]**

```
56.0 F = .. C.
```

Change the program two more times successively using values of 22 and 87 assigned to the variable Fahrenheit and include all the outputs in this report. Do not concern yourself with controlling the display of the decimal point.

**Solution (program):**

```
/* CSCI 1100-Lab1-Exercise 4
 This program will convert temperature from Fahrenheit to Celsius
 <Mihyar Al-Masalma> <B00759975> <9/27/2016>*/
public class tempretureCalculator {
	public static void main(String[] args) {
		// define two double variables and initialize Fahrenheit
		double Fahrenheit=56, Celsius;
		// compute and assign the result to Celsius
		Celsius = (Fahrenheit-32)/1.8;
		// print out the result
		System.out.println(Fahrenheit+" F = "+Celsius+" C.");
		// reassign new value to Fahrenheit
		Fahrenheit = 22;
		// recalculate the value of Celsius
		Celsius = (Fahrenheit-32)/1.8;
		// print out the new result
		System.out.println(Fahrenheit+" F = "+Celsius+" C.");
		// reassign a new value to Fahrenheit
		Fahrenheit = 87;
		// recalculate the value of Celsius
		Celsius = (Fahrenheit-32)/1.8;
		// print out the new result
		System.out.println(Fahrenheit+" F = "+Celsius+" C.");
	}
}
```

**Output (3 output)**

```
56.0 F = 13.333333333333332 C.
22.0 F = -5.555555555555555 C.
```

87.0 F = 30.555555555555554 C.

**Exercise 5.** Write a program that assigns the value 17 to a variable called cdn (Canadian Dollars). The program computes the equivalent amount in US dollars and assigns this amount to the variable called us and then computes the equivalent in Euros and assigns this amount to the variable called euro. Find the current exchange rates on the Web. Make sure you indicate the exchange rates in comments in your code. The program then writes the result in the following form: **[3 marks]**

```
17 Canadian dollars = .. US dollars = .. Euros
```

Look up the latest exchange rates on the web. You need to decide whether the variables should be of type int or double. Do not concern yourself with controlling the display of the decimal point.

Change the program two times: to compute the amounts for $170 dollars Canadian and $320 dollars Canadian. Include the results in this report.

**Solution (program):**

```
/* CSCI 1100-Lab1-Exercise 5
 This program is to convert Canadian dollars to US dollars and Euros
 <Mihyar Al-Masalma> <B00759975> <9/27/2016>*/
public class moneyExchange{
	public static void main(String[] args) {
		// define three variables and initialize the Canadian dollar
		double cdn = 17, us, euro;
		// calculate the amount in US dollars
		us = cdn * 0.75;
		// calculate the amount in Euros
		euro = cdn * 0.67;
		// print out the results after calculating the values
		System.out.println(cdn+" Canadian dollars = "+us+" US dollars = "+ euro+" Euros");
		// changing the value of Canadian dollars
		cdn = 170;
		// calculate the amount in US dollars
		us = cdn * 0.75;
		// calculate the amount in Euros
		euro = cdn * 0.67;
		// print out the results after calculating the values
		System.out.println(cdn+" Canadian dollars = "+us+" US dollars = "+ euro+" Euros");
		// reassign a new value to the variable
		cdn = 320;
		// calculate the amount in US dollars
		us = cdn * 0.75;
		// calculate the amount in Euros
		euro = cdn * 0.67;
		// print out the results after calculating the values
		System.out.println(cdn+" Canadian dollars = "+us+" US dollars = "+ euro+" Euros");
	}
}
```

**Output (2 outputs)**

17.0 Canadian dollars = 12.75 US dollars = 11.39 Euros
170.0 Canadian dollars = 127.5 US dollars = 113.9 Euros
320.0 Canadian dollars = 240.0 US dollars = 214.4 Euros

**Exercise 6.** Write a program that assigns the value 21.50 representing a cost in $CA to a variable called cost. The program then computes the sales tax on the cost at 12% and assigns the amount to a variable called tax. The program then computes the total amount payable and assigns the value to a variable called total. The program then prints the cost, tax and total amount payable in $CA and US dollars. You can use the exchange rate you found in Question 5. Do not concern yourself with controlling the display of the decimal point. Show two different outputs.

**[3 marks]**

**Sample output:**

```
Cost = $21.50
Tax = $…
Amount payable = .. $CA or .. $US
```

**Solution (program):**

```
/* CSCI 1100-Lab1-Exercise 6
This program is to compute the sales tax and the total amount payable in both
Canadian dollar and US dollars
<Mihyar Al-Masalma> <B00759975> <9/27/2016>*/
public class taxes {
	public static void main(String[] args) {
		// define the variables and initialize the cost with 21.50
		double cost = 21.50, tax, total, us;
		// calculate the tax
		tax = cost * 0.12;
		// calculate the total amount of money you should pay
		total = cost + tax;
		// calculate how much you should pay in us dollars
		us = total * 0.75;
		// print out the result
		System.out.println(" Cost = "+cost+"\n Tax = "+tax+"\n Amount payable = "+total+" $CA or "+us+"
$US");
		// reassign a new value to cost
		cost = 50;
		// calculate the tax
		tax = cost * 0.12;
		// calculate the total amount of money you should pay
		total = cost + tax;
		// calculate how much you should pay in us dollars
		us = total * 0.75;
		// print out the result
		System.out.println(" Cost = "+cost+"\n Tax = "+tax+"\n Amount payable = "+total+" $CA or "+us+"
$US");
		// reassign a new value to cost
		cost = 100;
		// calculate the tax
		tax = cost * 0.12;
```

```
                // calculate the total amount of money you should pay
                total = cost + tax;
                // calculate how much you should pay in us dollars
                us = total * 0.75;
                // print out the result
                System.out.println(" Cost = "+cost+"\n Tax = "+tax+"\n Amount payable = "+total+" $CA or "+us+"
$US");
        }
}
```

**Output (2 outputs)**

```
 Cost = 21.5
 Tax = 2.58
 Amount payable = 24.08 $CA or 18.06 $US
 Cost = 50.0
 Tax = 6.0
 Amount payable = 56.0 $CA or 42.0 $US
 Cost = 100.0
 Tax = 12.0
 Amount payable = 112.0 $CA or 84.0 $US
```