[Total 15 marks]

CSCI 1100 – September 2016
Laboratory Report 6

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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 or your lab may not be graded		
1	This document is entirely my own work. Your lab should be the efforts of your own work. However, you may need to look something up to help you or ask someone for help. If acquired help (online or with someone) you need to acknowledge this below.	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.	No.

Exercise 0. [Very important exercise. No marks.] TAs please go over some of these pieces of code carefully with the students. What is the output of each piece? Let them write down their answer. Help them check it. Then compile and run each piece of the code and verify if they were right.

```
int i = 1;
while(i < 3) {
  System.out.print(i * 12 + " "); //→_____________
  i = i + 1;
}
i = 2;
while(i <= 3) {
  System.out.print(i * 12 + " "); //→_____________
  i =   i + 1;
}
i = 1;
while(i < 3) {
  i = i + 1;
  System.out.print(i * 12 + " "); //→_____________
}
i = 2;
while(i <= 3) {
  i = i + 1;
  System.out.print(i * 12 + " "); //→_____________
}

i = 1;
while(i >= 0) {
  System.out.println(i + "Ooops"); //→_____________
}
```

Exercise 1. **Write a program that uses a Scanner to read a number between 1 and 5 (N) and two different city names. If the number entered is odd it will print the first city N times; if the number is even it will print the second city N times. Test the program two times with two different inputs that show both conditions. (Hint: the Scanner method next() will read a single word entered on a line). For example:**

```
Please type a number between 1 and 5: 5
Please type two cities: Truro Halifax

Truro
Truro
Truro
Truro
Truro
```

Code:

```
/*CSCI 1100 – Lab 6 – Excercise 1
  This program will take an integer between 1 and 5
and the names of two cities, if the number is odd
it will print the name of the first city n times,
if the number is even it will print the name of the
2nd city n times
<Mihyar Al-Masalma> <B00759975>  <25 Oct 2016> */
import java.util.Scanner; // import java Scanner
public class Q1 {
	public static void main(String[] args) {
		// Create an instance of the scanner class
		Scanner input = new Scanner(System.in);
		// Ask the user to enter a number
		System.out.print("Please type a number between 1 and 5: ");
		// Store the number in a variable
		int num = input.nextInt();
		// consume the rest of the line
		input.nextLine();
		// Ask the user to enter the name of the cities
		System.out.print("Please type two cities: ");
		// Store the names in a variable
		String cities = input.nextLine();
		// Split the string based on space and store it in array
		String[] splitedCities = cities.split(" ");
		// Ckeck the number
		if (num%2 == 0) {
			// if number is even; loop as long as num is more than 0
			while (num>0){
				// Print out the name of the city
				System.out.println(splitedCities[1]);
				// Decrease the value of number by one
				num--;
			}
			// if number is odd
		}else{
			// Loop as long as num is more than 0
			while (num>0){
				// Print out the name of the first city
				System.out.println(splitedCities[0]);
				// decrease the value of the number by one
```

```
                        num--;
                    }
                }
            }
}
```

```
Please type a number between 1 and 5: 4
Please type two cities: Tantallon Hubbards
Hubbards
Hubbards
Hubbards
Hubbards

Please type a number between 1 and 5: 3
Please type two cities: Berlin Kosovo
Berlin
Berlin
Berlin
```

Exercise 2. Write a program that uses a Scanner to read a number (say N) and prints the sequence of multiples of N up to exactly N x N. You should test your program twice using two different numbers. It works as follows:

```
Please type a number: 8
8 16 . . . 64

Please type a number: 12
12 24 . . . 144

Please type a number: 16
16 32 . . .  256
```

Code:

```
/*CSCI 1100 – Lab 6 – Excercise 2
  This program will take an integer then
  gives back the the sequence of multiples untill it reaches
  num * num
<Mihyar Al-Masalma> <B00759975>  <25 Oct 2016> */
import java.util.Scanner; // import Scanner class
public class Q2 {
        public static void main(String[] args) {
                int counter = 1;
                String total = "";
                // Create an instance of the Scanner Class
                Scanner input = new Scanner(System.in);
                // Ask the user to enter a number
                System.out.print("Please type a number: ");
                // Store the value in a variabe
                int num = input.nextInt();
                // loop till reach counter = num
                while (num >= counter) {
                        // mutiply the counter by the num and add to the string
                        total += (counter * num);
                        // Add an empty space between each number
                        total += " ";
                        // Increase the counter by one
                        counter++;
                }
```

```
                // Print out the final result
                System.out.println(total);
        }
}
```

Please type a number: 7
7 14 21 28 35 42 49

Please type a number: 12
12 24 36 48 60 72 84 96 108 120 132 144

Exercise 3. The cost this year (2016) of a car is $25000. Each year the cost increases by 6.5%. Write a Java program that asks you to type a number (say N) representing a time period in years. The program then prints the cost of the car yearly for N years starting in 2016. The program must use a while loop to compute and print the results. You need not concern yourself with the exact display of the decimal point. Test this program with two different numbers of years. The program works as follows:

```
Please type a number of years: 10
Year: 2016 - Cost 25000.0
Year: 2017 - Cost 26625.0
. . .
Year: 2026 - Cost xx
```

Code:

```
/*CSCI 1100 – Lab 6  – Excercise 3
  This program will calculate the increase cost of the car
  over the entered number of years
<Mihyar Al-Masalma> <B00759975>  <25 Oct 2016> */
import java.util.Scanner; // import Scanner class
public class Q3 {
        public static void main(String[] args) {
                int date = 2016;
                double cost = 25000;
                // Create an instance of the Scanner class
                Scanner input = new Scanner(System.in);
                // Ask the user to enter a number
                System.out.print("Please type a number of years: ");
                // Store the value the user entered
                int years = date + input.nextInt();
                // Consume the rest of the line
                input.nextLine();
                // Loop till the end year
                while (date<years){
                        // Print out the price and the year
                        System.out.println("Year: "+date+"- Cost "+cost);
                        // Calculate the cost of the car
                        cost += cost * 0.065;
                        // Increase the date by one
                        date++;
                }
        }
}
```

```
Please type a number of years: 8
Year: 2016- Cost 25000.0
Year: 2017- Cost 26625.0
Year: 2018- Cost 28355.625
Year: 2019- Cost 30198.740625
```

```
Year: 2020- Cost 32161.658765624998
Year: 2021- Cost 34252.16658539062
Year: 2022- Cost 36478.55741344101
Year: 2023- Cost 38849.66364531468


Please type a number of years: 5
Year: 2016- Cost 25000.0
Year: 2017- Cost 26625.0
Year: 2018- Cost 28355.625
Year: 2019- Cost 30198.740625
Year: 2020- Cost 32161.658765624998
```

Exercise 4. **Write a program to read two integer numbers. If the first number is smaller than the second number, then the program will write all numbers starting from the smallest number to the largest number (the numbers between the two numbers in increasing order). If the first number is larger than the second number, then the program will print all the numbers going from largest to the smallest (the numbers between the two numbers in decreasing order). If the two numbers are the same, then use a while loop to keep asking the user to enter two different numbers until the user inputs two different numbers. Test this program three times: once showing inputting a smaller than larger number, a larger followed by a smaller number, and when the numbers are the same where it takes the user at least 3 times to get the numbers correct.**

Sample output.

```
Please type two numbers: 200 190
200 199 198 197 ...  190

Please type two numbers: 4 121
4 5 6 7 . . . . 121

Please type two numbers: 4 4
Error: the numbers must be different. Try Again.

Please type two numbers: 21 21
Error: the numbers must be different. Try Again.

Please type two numbers: 5 5
Error: the numbers must be different. Try Again.

Please type two numbers: 1 4
1 2 3 4
```

Code:

```
/*CSCI 1100 – Lab 6  – Excercise 4
This program will ask the user to enter two numbers
if the 1st number is greater then it will print the
numbers decreasing till it reaches the 2nd number,
if the 1st number is smaller then print the numbers
up till reach 2nd number, if numbers equal try again
<Mihyar Al-Masalma> <B00759975>  <25 Oct 2016> */
import java.util.Scanner; // import Scanner Class
public class Q4 {
	public static void main(String[] args) {
		String total = "";
		int num1 = 0, num2 = 0;
		// Create instance of the Scanner class
		Scanner input = new Scanner(System.in);
		// If the numbers equal start again
		while (num1 == num2){
```

```
                        // Ask the user to enter two integers
                        System.out.print("Please type two numbers: ");
                        // Store the value into integers
                        num1 = input.nextInt();
                        num2 = input.nextInt();
                        // Evaluate the two number
                        if (num1>num2) {
                                // Enter a loop
                                while (num1>=num2){
                                        // Add the result to total
                                        total+= num1;
                                        // Add a space between numbers
                                        total += " ";
                                        // Decrease the first number by one
                                        num1--;
                                }
                        }
                        // If the first number is smaller than the 2nd
                        else if (num1<num2) {
                                while (num1<=num2){
                                        // Add the result to total
                                        total += num1;
                                        // Add a space between numbers
                                        total += " ";
                                        // Increase the first number
                                        num1++;
                                }
                        }
                        // If the numbers are equal
                        else{
                                // Ask the user to try again
                                System.out.println("Error the numbers must be different. Try Again.");
                        }
                }
                // Print out the result
                System.out.println(total);
        }
}
```

```
Please type two numbers: 4 20
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Please type two numbers: 20 4
20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4

Please type two numbers: 1 1
Error the numbers must be different. Try Again.
Please type two numbers: 11 11
Error the numbers must be different. Try Again.
Please type two numbers: 21 21
Error the numbers must be different. Try Again.
Please type two numbers: 200 190
200 199 198 197 196 195 194 193 192 191 190
```

Exercise 5. **Write a program that prints the total of a grocery bill. It will first ask how many items are on the bill (N), and the** tax rate. Then it will ask for cost of item 1, item 2… to item N. Finally, it will print the total before taxes, the total tax **on the bill, and Final Total (total plus tax). Don't worry about controlling for the decimal. Test the program twice using a different number of items to enter (both should be at least 3) that have two different tax rates.**

Sample output.

```
Please enter the number of items in the bill: 4
Please enter the tax rate: %10
Enter the cost of item 1: $2.65
Enter the cost of item 2: $3.15
Enter the cost of item 3: $6.75
Enter the cost of item 4: $2.60

Total (before tax):     $15.13
Total tax (10%):        $1.513
Final Total:            $16.643
```

Code:

```
/*CSCI 1100 – Lab 6 – Excercise 5
  This program will take an integer then
  gives back the the sequence of multiples untill it reaches
  num * num
<Mihyar Al-Masalma> <B00759975>  <25 Oct 2016> */
import java.util.Scanner; // import Scanner Class
public class Q5 {
        public static void main(String[] args) {
                int counter = 1;
                double total = 0, taxed = 0;
                // Create an instance of the Scanner class
                Scanner input = new Scanner(System.in);
                // Ask the user to enter the number of items
                System.out.print("Please enter the number of items in the bill: ");
                // Store the value in a variable]
                int items = input.nextInt();
                // Consume the rest of the line
                input.nextLine();
                // Ask the user for the tax rate
                System.out.print("Please enter the tax rate: %");
                // Store the value in a variable
                int tax = input.nextInt();
                // consume the rest of the line
                input.nextLine();
                // loop to get the prices
                while (counter <= items){
                        // Ask the user to enter the price
                        System.out.print("Enter the cost of item "+counter+": ");
                        // Add the price to the total
                        total += input.nextDouble();
                        // Consume the rest of the line
                        input.nextLine();
                        // Increase the counter by one
                        counter++;
                }
                // Print out the total without taxes
                System.out.println("Total (before tax):\t $"+total);
                // Calculate the tax
                taxed = (total*tax)/100;
                // Print out how much is the tax
                System.out.println("Total tax ("+tax+"%):\t $"+taxed);
                // Print out the total with taxes
                System.out.println("Final Total: \t\t $"+(total+taxed));
        }
}
```

Please enter the number of items in the bill: 3
Please enter the tax rate: %15
Enter the cost of item 1: 4.79
Enter the cost of item 2: 6.82
Enter the cost of item 3: 5.49
Total (before tax): $17.1
Total tax (15%): $2.565
Final Total: $19.665000000000003

Please enter the number of items in the bill: 4
Please enter the tax rate: %10
Enter the cost of item 1: 1.99
Enter the cost of item 2: 8.15
Enter the cost of item 3: 3.49
Enter the cost of item 4: 5.99
Total (before tax): $19.62
Total tax (10%): $1.9620000000000002
Final Total: $21.582