CSCI 1100 – September 2016
Laboratory Report 7

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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
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Exercise 0. TAs please revise simple for loop code. Show the students a program containing 2 for loops that prints the following lines using while loops then change to for loops:

1 2 3 4 5 6 7 8 9 10
8 10 12 14 16 18 20 22 24 26

Exercise 1. Write a program containing 5 while loops that prints the following lines and show the output for each:

```
3 6 9 12 15 18 21 24 27 30
9 8 7 6 5 4 3 2 1 0
1 3 5 7 9 11 13 15 17 19
0 2 4 6 8 10 12 14 16 18
18 16 14 12 10 8 6 4 2 0
```

```
/*CSCI 1100 – Lab 7 – Exercise 1
    This program will print the output of 5 while loops
<Mihyar Al-Masalma> <B00759975>  <Nov-1-2016> */
public class E1 {
	public static void main(String[] args) {
		// Initilize a few variables to be used later
		int i =3, j=9, k=1, m=0, l=18;
		// Start while loop till it reaches 30
		while (i<=30) {
			// add the number to the string and print when done
			System.out.print(i+" ");
			// add 3 each iteration
			i+=3;
		}
		// new line
		System.out.println();
		// Start while loop till it reaches 0
		while (j>=0) {
			// add the number to the string and print when done
			System.out.print(j+" ");
			// decrease by 1 each iteration
			j-;
		}
		// new line
		System.out.println();
		// Start while loop till it reaches 19
		while (k<=19) {
			// add the number to the string and print when done
			System.out.print(k+" ");
			// add 2 for each iteration
			k+=2;
		}
		// new line
		System.out.println();
		// Start while loop till it reaches 18
		while (m<=18) {
			// add the number to the string and print when done
			System.out.print(m+" ");
			// increase by 2 each iteration
			m+=2;
		}
		// new line
		System.out.println();
		// Start while loop till it reaches 0
		while (l>=0) {
			// add the number to the string and print when done
			System.out.print(l+" ");
			// decrease by 2
			l-=2;
		}
		System.out.println();
	}
}
```

Exercise 2. Write a program containing 5 for loops that does the same as exercise 1. Show the output from each loop.

```
/*CSCI 1100 – Lab 7 – Exercise 2
  This program will print the output of 5 for loops
<Mihyar Al-Masalma> <B00759975>  <Nov-1-2016> */
public class E2 {
	public static void main(String[] args) {
		// Start a for loop from 3 to 30 and increase by 3
		for (int i = 3;i<=30 ;i+=3 ) {
			// add the number to the string and print when done
			System.out.print(i+" ");
		}
		// new line
		System.out.println();
		// Start a for loop from 9 to 0 and decrease by 1
		for (int j = 9;j>=0 ;j-- ) {
			// add the number to the string and print when done
			System.out.print(j+" ");
		}
		//new line
		System.out.println();
		// Start a for loop for 1 to 19 and increase by 2
		for (int k = 1;k<=19 ;k+=2) {
			// add the number to the string and print when done
			System.out.print(k+" ");
		}
		// new line
		System.out.println();
		// Start a for loop from 0 to 18 and increase by 2
		for (int l = 0;l<=18 ;l+=2 ) {
			// add the number to the string and print when done
			System.out.print(l+" ");
		}
		// new line
		System.out.println();
		// Start a for loop from 18 to 0 and decrease by 2
		for (int m = 18;m>=0 ;m-=2 ) {
			// add the number to the string and print when done
			System.out.print(m+" ");
		}
		// new line
		System.out.println();
	}
}
```

Exercise 3. Write a program that could be used by a grocery store to calculate the total of a grocery order and the tax on this order. For some foods (e.g., fresh vegetables and fruits) no tax is added, but for many processed foods and junk food tax is added (e.g., frozen pizza and chips). First, ask the user for how many grocery items there are, then the tax rate. Then using a for loop ask the user to enter in the price for all the items and for each item ask if tax should be added. Keep track of all the prices and tax. Test the program with two sets of grocery orders that have at least 4 items. The program works as follows:

Welcome to your ABC Grocery Store

Enter the number of items you have: 4
Enter the tax rate: .1

Enter the price of your item: 3.4

```
Is the item taxable (1 for yes, 2 for no): 2
Enter the price of your item: 1.0
Is the item taxable (1 for yes, 2 for no): 1
Enter the price of your item: 2.50
Is the item taxable (1 for yes, 2 for no): 1
Enter the price of your item: 4.56
Is the item taxable (1 for yes, 2 for no): 2

Total before tax: $ 11.46
Total tax: $ 0.35
Total after tax: $ 11.81
```

```
/*CSCI 1100 – Lab 7 – Exercise 3
  This program will caculate how your grocery invoice
  and tax you for certain things and give you back the
  total and the tax and how much you should pay
<Mihyar Al-Masalma> <B00759975>  <Nov-1-2016> */
import java.util.Scanner; // import Scanner Class
public class E3 {
	public static void main(String[] args) {
		double total =0, taxed = 0;
		// Create an instance of the Scanner class
		Scanner input = new Scanner(System.in);
		// Greet the costumer
		System.out.println("Welcome to your ABC Grocery Store\n");
		// Ask how many item does the client have
		System.out.print("Enter the number of items you have: ");
		// Store the value in a variable;
		int items = input.nextInt();
		// Ask for the tax rate
		System.out.print("Enter the tax rate: ");
		// Store the value in a variable
		double tax = input.nextDouble();
		// Enter a new line
		System.out.println();
		// Start a for loope from 0 to the number of items
		for (int i =0; i<items ; i++) {
			// tax per item will reset with ever iteration
			double itemTax = 0;
			// ask the user to enter the price of an item
			System.out.print("Enter the price of your item: ");
			// Store the value in a variable
			double price = input.nextDouble();
			// Ask the user if the item is taxable
			System.out.print("Is the item taxable (1 for yes, 2 for no): ");
			// the choice will reset with each iteration
			int taxable = input.nextInt();
			// if it is taxable
			if (taxable == 1) {
				// Calculate the item tax
				itemTax = price*tax;
			}
			// add the price to the total
			total += price;
			// add the tax to the total tax
			taxed += itemTax;
		}
		// print out the results
		System.out.println();
		System.out.println("Total before tax: $ "+total);
		System.out.println("Total tax: $ "+taxed);
		System.out.println("Total after tax: $"+(total+taxed));
```

```
        }
}
```

```
Welcome to your ABC Grocery Store

Enter the number of items you have: 5
Enter the tax rate: .1

Enter the price of your item: 2.5
Is the item taxable (1 for yes, 2 for no): 1
Enter the price of your item: 3.5
Is the item taxable (1 for yes, 2 for no): 2
Enter the price of your item: 4.5
Is the item taxable (1 for yes, 2 for no): 1
Enter the price of your item: 5.5
Is the item taxable (1 for yes, 2 for no): 1
Enter the price of your item: 2.6
Is the item taxable (1 for yes, 2 for no): 1

Total before tax: $ 18.6
Total tax: $ 1.51
Total after tax: $20.110000000000003

Welcome to your ABC Grocery Store

Enter the number of items you have: 6
Enter the tax rate: .15

Enter the price of your item: 10
Is the item taxable (1 for yes, 2 for no): 1
Enter the price of your item: 5.3
Is the item taxable (1 for yes, 2 for no): 2
Enter the price of your item: 2.0
Is the item taxable (1 for yes, 2 for no): 2
Enter the price of your item: 1.0
Is the item taxable (1 for yes, 2 for no): 1
Enter the price of your item: 3.0
Is the item taxable (1 for yes, 2 for no): 1
Enter the price of your item: 4.0
Is the item taxable (1 for yes, 2 for no): 2

Total before tax: $ 25.3
Total tax: $ 2.0999999999999996
Total after tax: $27.4
```

Exercise 4. Write a program that uses a Scanner to read a word. Test the program 2 times (with different examples than below and with words that include upper and lower letters). The program will write as follows:

```
Please type a word: abcdeABCDEabcde
Length of word: 15
Upper Case: ABCDEABCDEABCDE
Lower Case: abcdeabcdeabcde
First Character: a
Middle Character: c
Last Character: e
```

```
/*CSCI 1100 – Lab 7 – Exercise 4
  This program will take a string and give back the length
  of the string, the string with uppercase, lowercase,
  first, middle and last character of the word
<Mihyar Al-Masalma> <B00759975>  <Nov-1-2016> */
import java.util.Scanner; // import Scanner Class
public class E4 {
	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 word
		System.out.print("Please type a word: ");
		// Store the word in a variable
		String word = input.nextLine();
		// Calculate the length of the word
		int length = word.length();
		// print out the length
		System.out.println("Length of word: "+length);
		// Print out the word in uppercase
		System.out.println("Upper Case: "+word.toUpperCase());
		// Print out the word in lowercase
		System.out.println("Lower Case: "+word.toLowerCase());
		// Print out hte first Character
		System.out.println("First Character: "+word.charAt(0));
		// Calculate the middle of the word
		int mid = length/2;
		// Print out the Char at the middle
		System.out.println("Middle Character:"+word.charAt(mid));
		// print out the chart at the end
		System.out.println("Last Character: "+word.charAt(length-1));
	}
}
```

```
Please type a word: HeLLo WorLD!
Length of word: 12
Upper Case: HELLO WORLD!
Lower Case: hello world!
First Character: H
Middle Character:W
Last Character: !

Please type a word: Study
Length of word: 5
Upper Case: STUDY
Lower Case: study
First Character: S
Middle Character:u
Last Character: y
```

Exercise 5. Write a program that uses a Scanner to read two words. The program will detect words that are the same (case does not matter). If the words are not the same, it will print a message with the length of each word. Test this program with two outputs - one word that is the same and one that is different.

```
Please type a word: abcde
Please type a word: abcdf
The words are: abcde and abcdf. These words are not the same. abcde has 5 letters and abcdf has 5 letters.

Please type a word: abcde
Please type a word: abcde
```

The words are: abcde and abcde. These words are the same.

```
/*CSCI 1100 – Lab 7 – Exercise 5
  This program will take two words and regardless of the case will return if
  these words are teh same or not
<Mihyar Al-Masalma> <B00759975>  <Nov-1-2016> */
import java.util.Scanner; // import Scanner Class
public class E5 {
	public static void main(String[] args) {
		// Create an instance of the Scanner class
		Scanner input = new Scanner(System.in);
		// Ask the user to key-in the first word
		System.out.print("Please type a word: ");
		// Store the word in a variable
		String first_word = input.nextLine();
		// Ask the user to key-in the 2nd word
		System.out.print("Please type a word: ");
		// Store the 2nd word in a variable
		String second_word = input.nextLine();
		// Check to see if both words are the same after convert both to lowercase
		if (first_word.toLowerCase().equals(second_word.toLowerCase())) {
			// If the same then print the following output
			System.out.println("The words are: "+first_word+" and "+second_word+". These words are the
same.");
		}else {
			// if not the same then print the following output
			System.out.print("The words are: "+first_word+" and "+second_word+". These words are ");
			System.out.print("not the same. "+first_word+" has "+first_word.length()+" letters and ");
			System.out.print(second_word+" has "+second_word.length()+" letters.");
		}
	}
}
```

Please type a word: Hello
Please type a word: World
The words are: Hello and World. These words are not the same. Hello has 5 letters and World has 5 letters.

Please type a word: Hello
Please type a word: hElLO
The words are: Hello and hElLO. These words are the same.

Please type a word: Reina
Please type a word: Arenia
The words are: Reina and Arenia. These words are not the same. Reina has 5 letters and Arenia has 6 letters.

Exercise 6. Write a program that uses a Scanner to read a word. The program will capitalize the first, last and middle letter of the word. [Hint: Capture the letter as a string (using the substring method) then use the toUpperCase() method.] Test this with two different inputs than shown below (one word should have an even number of letters and one word should have an odd number of letters).

Please type a word: hello
The new word is: HeLlO

Please type a word: programs
The new word is: ProGramS

```
/*CSCI1100 – Lab 7 – Exercise 6
  This program will take a word and capitalize the first,
  last and middle letter of the word.
<Mihyar Al-Masalma> <B00759975>  <Nov-1-2016> */
import java.util.Scanner; // import Scanner Class
public class E6 {
	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 word
		System.out.print("Please enter a word: ");
		// Store this word in a variable
		String word = input.nextLine();
		// Calculate teh middle and the length of the word
		int mid = 0, length = word.length();
		// Check if the length of the word is even or odd
		if (word.length()%2 == 0) {
			// if even get the middle
			mid = length/2;
		}else{
			// if odd get the middle
			mid = (length/2) + 1;
		}
		// take the first letter capitalize it then add the rest of the word and reassign it to word
		word = word.substring(0,1).toUpperCase() + word.substring(1);
		// take the first half and add capitalized middle letter then add rest then assign it to word
		word = word.substring(0,mid-1) + word.substring(mid-1,mid).toUpperCase() + word.substring(mid, length);
		// take the whole word except the last letter then add capitalized last letter then assign to word
		word = word.substring(0,length-1) + word.substring(length-1,length).toUpperCase();
		// print out the result
		System.out.print('The new word is: "+word);
	}
}
```

```
Please enter a word: ammar
The new word is: AmMaR

Please enter a word: mihyar
The new word is: MiHyaR
```

Exercise 7. Using a for loop write a program that uses a Scanner to read a word (of any length). The program will write word backwards using a <u>for loop</u>. Test this with two outputs.

```
Please type a word: hello
hello backwards is olleh
```

```
/*CSCI 1100 – Lab 7 – Exercise 7
  This program will take a word reverse it
<Mihyar Al-Masalma> <B00759975>  <Nov-1-2016> */
import java.util.Scanner; // import Scanner Class
public class E7 {
        public static void main(String[] args) {
                String result="";
                // Create an instance of Scanner class
                Scanner input = new Scanner(System.in);
                // Ask the user to enter a word
                System.out.print("Please type a word: ");
                // Store the word in a variable
                String word = input.nextLine();
                // Convert the string to array of characters
                char[] array = word.toCharArray();
                // iterate over the array starting from the end
                for (int i = array.length-1; i>=0 ;i-- ) {
                        // concat characters and assign it to result
                        result += array[i];
                }
                // print out the final result
                System.out.print(word+" backward is "+result);
        }
}
```

```
Please type a word: helllo
helllo backward is  ollleh

Please type a word: computer science
computer science backward is  ecneics retupmoc
```