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| **Fall 2022**  **CS-133: Programming Fundamentals** |
| Lab-8 Manual |
| **Iterations** |

GIFT School of Engineering and Applied Sciences

# Task #1: Writing a while loop

In this task, you are being asked to write a loop in Java. Write a while loop that prints:

1. All numbers between the range of 1 to 100 with the increment of 1.
2. All powers of 3 less than n. For example, if n is 100, print 1 3 9 27 81.
3. All positive numbers that are divisible by 7 and less than n. For example, if n is 100, print 7 14 21 28 35 42 49 56 63 70 77 84 91 98.
   1. Create a program called **WhileLoops1Task1Lab8.java.**
   2. Correctly display appropriate messages.

# Task #2: Writing a while loop

In this task, you are being asked to write a loop in Java.

Write a program that reads a set of **15** integers run time and then finds and prints the sum of the even as well as average of even integers and product of odd integers. Also print the count of even numbers and odd numbers.

1. Create a program called **WhileLoops1Task2Lab8.java.**
2. Use a Scanner object for the input.
3. Correctly display appropriate messages.

# Task #3: Drawing a flowchart and writing a while loop

In this task, you are being asked to draw a flowchart and then write a loop in Java.

Draw a flowchart and write a program that prompts the user to input a positive integer. It should then output a message indicating whether the number is a prime number.

**Note**: An even number is prime if it is 2. An odd integer is prime if it is not divisible by any odd integer less than or equal to the square root of the number.

**Note**: Any integer is prime if it is not divisible by any other number, starting from **2,** and less than or equal to half of that number.

**HINTS:** The minimum divisor (factor) you should consider is **2.** The largest factor of any number would be half of that number.

1. Create a program called **PrimeNumberMethod1Lab8.java**
2. Create another program called **PrimeNumberMethod2Lab8.java**
3. Create appropriate variables and assign values using a **Scanner** object.
4. Correctly display appropriate messages.

# Task #4: Writing a while loop

In this task, you are being asked to write a loop in Java.

Write a program that uses **while** loops to perform the following steps:

* 1. Output all uppercase letters.
  2. Output all lowercase letters.
  3. Output all uppercase letters between **E** and **T**
  4. Output all lowercase letters starting from **a** and skipping two letters For example, **a, d, g, …**
  5. All uppercase letters from **Z** to **K**, by decrementing loop

**HINTS:** To print characters, see the below code:

**char c = 'A';**

**System.out.println(c); //prints A**

**++c;**

**System.out.println(c); //prints B**

1. Create a program called **CharactersLab8.java.**
2. All loops will be written in this file.
3. Correctly display appropriate messages.

# Task #5: Determine the output of a loop without execution

In this task, you are being asked to determine the output of a loop **without executing it in Java**. Suppose that the input is **product=11 and 5 16 -1 2**. What is the output of the following code?

## import java.util.Scanner;

**public class LoopExampleLab5 {**

## public static void main(String[] args) {

## Scanner read = new Scanner(System.in);

**int num = 0;**

**int product;**

## int count = 0;

**System.out.print("Enter a value for product:");**

## product = read.nextInt();

**while (count < 4) {**

## System.out.print("Enter a value for num: ");

## num = read.nextInt();

**product = product \* num; count++;**

## }//while

**System.out.print("Product = " + product);**

## }//main

**}//class**

## Try tracing the output of the code using paper and pen without compiling.

1. Next, create a program called **LoopExampleLab8.java.**
2. Copy and paste that above code.
3. Compile and run to see the correct output.

# Task #6: Writing a while loop

In this task, you are being asked to write a loop in Java.

Write a program that asks the user for a positive nonzero integer value. The program should use a loop to get the sum of all the even integers from 1 up to the number entered. For example, if the user enters 50, the loop will find the sum of 2, 4, 6, . . . 50.

1. Create a program called **SumIntegersLab8.java.**
2. Create appropriate variables and assign values using a **Scanner** object.
3. Correctly display appropriate messages.

# Task #7: Writing a while loop

In this task, you are being asked to write a loop in Java.

Write a program which will determine whether a number is an Armstrong number or not.

**Enter a number: 371**

**The number is an Armstrong number.**

**HINT:** An **Armstrong** number is a positive m-digit number that is equal to the sum of the mth powers of their digits. For example:

3\*3\*3+7\*7\*7+1\*1\*1 = 371

1\*1\*1\*1+6\*6\*6\*6+3\*3\*3\*3+4\*4\*4\*4 = 1634

1. Create a program called **ArmstrongLab8.java.**
2. Create appropriate variables and assign values using a **Scanner** object.
3. Correctly display appropriate messages.

# : Practice Questions:

# Task#1: Writing a while loop

In this task, you are being asked to write a loop in Java.

Write a program that calculates the amount a person would earn over a period of time if his or her salary is one penny the first day, two pennies the second day, and continues to double each day. The program should display a table showing the salary for each day, and then show the total pay at the end of the period. The output should be displayed in a dollar amount, not the number of pennies.

**NOTE**: Do not accept a number less than 1 for the number of days worked. Also, **100 pennies = 1 dollars.**

1. Create a program called **TotalPay.java.**
2. Create appropriate variables and assign values using a **Scanner** object.
3. Correctly display appropriate messages.

# Task #2: Writing a while loop

In this task, you are being asked to write a loop in Java. Write a while loop that computes:

* + 1. The average of all odd numbers between **a** and **b** (inclusive).
    2. Print sequence of numbers: 3, 7, 11, 15, 19, 23. (**Start from 3 and end on 25).**
       1. Create a program called **WhileLoops2Lab8.java.**
       2. Create appropriate variables and assign values using a **Scanner** object.
       3. Correctly display appropriate messages.

# Task #3: Writing a while loop

In this task, you are being asked to write a loop in Java.

Write a program that prints a Celsius/Kelvin conversion table, starting from **0** to **100,** such as the following.

**Celsius | Kelvin**

**+ 0 | 273.15**

**10 | 283.15**

**20 | 293.15**

**. . . . . . 100 | 373.15**

**HINTS:** Use the following formula to convert the Celsius to Kelvin:

***T*(°K) = (*T*(°C) + 273.15)**

1. Create a program called **CelsiusToKelvinLab8.java.**
2. Correctly display appropriate messages.

# Task #4: Writing a while loop

In this task, you are being asked to write a loop in Java.

Write a loop that asks the user to enter a number, a start value and an end value. The loop should then display the table of that number starting from the start value and end at the end value.

For example:

## Enter a number: 5 Enter a start value: 1 Enter an end value: 6

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **5** | **x** | **1** | **=** | **5** |
| **5** | **x** | **2** | **=** | **10** |
| **.** |  |  |  |  |
| **.** |  |  |  |  |
| **.** |  |  |  |  |
| **5** | **x** | **6** | **=** | **30** |

**NOTE:** Make sure that only positive numbers are allowed for all three values.

1. Create a program called **TablesLab8.java.**
2. Create appropriate variables and assign values using a **Scanner** object.
3. Correctly display appropriate messages.

# Task #5: Writing a while loop

In this task, you are being asked to write a loop in Java.

Write a loop that asks the user to enter a number. The loop should iterate 15 times and keep a running total of the numbers entered. Also print the average.

1. Create a program called **WhileLoops3Lab8.java**
2. Create appropriate variables and assign values using a **Scanner** object.
3. Correctly display appropriate messages.

# Task #6: Writing a while loop

In this task, you are being asked to write a loop in Java.

Write a program that uses while loops to perform the following steps:

1. Prompt the user to input two integers: startingNum and endingNum (startingNum must be less than endingNum).
2. Output all even numbers between startingNum and endingNum.
3. Output the sum of all even numbers between startingNum and endingNum.
4. Output the numbers and their squares between startingNum and endingNum.
5. Output the sum of the square of the odd numbers between startingNum and endingNum.
6. Create a program called **WhileLoopsLab8Task6.java.** All loops will be written in this file.
7. Create appropriate variables and assign values using a **Scanner** object.
8. Correctly display appropriate messages.