CSE 110 - Lab 4

This lab is for practicing the switch statement, do-while, while and for loops.

Use the following Coding Guidelines:
• When declaring a variable, you usually want to initialize it.
• Use white space to make your program more readable.
• Use comments after the ending brace of classes, methods, and blocks to identify to which block it belongs.

Assignments Documentation:
At the beginning of each programming assignment you must have a comment block with the following information:

```
/*------------------------------------------------------------------------
// AUTHOR:          (Put your name here)
// FILENAME:        Lab4.java
// SPECIFICATION:   This program is for practicing the switch statement, do-while,
while and for loops.
//                              Using a while loop calculate the sum of integers
from 1 to n.
//                              Using a for loop find the factorial of n.
// LAB LETTER:          (Put your Lab Letter here)
//-----------------------------------------------------------------------*/
```

Getting Started
Create a class called **Lab4**. Use the same setup for setting up your class and main method as you did for the previous assignments. Be sure to name your file **Lab4.java**.

Hints
Please replace //--> with the correct program to finish the task according to the corresponding comment.

Please replace ??? with the correct program to enable the program to run as required.

```java
//      Import required java utility Scanner package
import java.util.Scanner;

//      Declare class (Lab4)
public class Lab4
{
//      Write the main method
        public static void main(String[] args)
        {
        //      Declare Constant integers SUM = 1, FACTORIAL = 2, FACTORS = 3, QUIT = 4.
        final int SUM= 1;
        final int FACTORIAL = 2;
        //-->

        //      Create an integer variable named choice.
        //-->

        //      Create a Scanner object (you may need to import the class)
```

```java
        //-->

        //      Create a do-while loop that exits only when the user chooses quit
(choice = QUIT)
        //      Have the do-statement here
        ???{
                //      Print the following options:
                //      "This program does the following:"
                //-->
                //      "1. Sum of numbers from 1 to n"
                //-->
                //      "2. Factorial of n"
                //
                //      "3. Factors of n"
                //-->
                //      "4. Quit"
                //-->
                //      "Please choose an option "
                //-->

                //      Read the value the user enters and store it in an integer
variable <choice>
                //-->

                //      Create a switch statement with <choice> as input for the 3 cases
                switch(???)  {
                        //      case SUM:
                        case SUM:
                                //      Ask the user to enter a number,
                                System.out.print("\nPlease enter a number n: ");
                                // Take user input and put it into the variable <num>
                                //-->
                                // Define 2 integer variables <sum> and <count> and
initialize them to 0
                                //-->

                                //      Use a while loop to calculate the sum of numbers
from 1 to n
                                //      Add the while-statement with the condition that
<count> variable is less than <num>
                                while(count?num){
                                        // increment <count> variable;
                                        count++;
                                        // Calculate the <sum> by adding <count> to <sum>
                                        sum = sum + count;
                                }
                                //      Print the answer saying, 'Sum of numbers from 1 - '
<num> ' is ' <sum>
                                //-->

                                //      exit from the switch with a break statement, what
happens if you don't use one?
                                break;
```

```java
//      case FACTORIAL:
//-->
case ???:
        //      Ask the user to enter a number,
        System.out.print("\nPlease enter a number n: ");
        // Take user input and put it into the variable <num>
        //-->
        //      Compute the factorial of <num>
        // Declare an long (integer) variable <fact> and
initialize it to 1

        //-->
        //      Use a for loop to calculate the factorial of n
        //      Write a for loop with an integer variable <i> and
initialize it to <num>,

        //  condition that <i> greater than 1, increment <i> by 1
        for(int i= num; i > 1 ; i--){
                // write the expression <fact> = <fact> * <i>
                //-->

        }
        //Print the answer saying,'Factorial of' <num> 'is' <fact>
        //-->
        //      exit from the switch with a break statement.
        //-->

case FACTORS:
        //      Ask the user to enter a number,
        System.out.print("\nPlease enter a number n: ");
        // Take user input and put it into the variable <num>
        //-->
        // Write a loop to find which numbers are the factors of
<num>
        // Hint: The loop should terminate after iterating upto
<num>
        // Print the a statement saying,'Factors of' <num> 'are'
        // if(num%i) == 0, then I is a factor (Here we check if
the number <num> is divisible by i)
        // Print the numbers with two spaces

case QUIT:
//-->
        //      Print 'Your choice was <QUIT>, Quitting the program,
Have a good day!'

        //-->
        //      exit from the switch with a break statement
        //-->
//      default:
default:
        //      Print 'Incorrect choice, ' <choice> ' Please choose
again'

        //-->
//      Close the switch statement
//-->
```

```
                //Close the do-while loop with a condition <choice> is not equal to
<QUIT>
                }
        }while(choice!=QUIT);

        }
}
```

SAMPLE INPUT:
1
10
2
20
3
65
8
4

SAMPLE OUTPUT:
This program does the following:
 1. Sum of numbers from 1 to n
 2. Factorial of n
 3. Factors of n
 4. Quit
 Please choose an option

Please enter an integer n:
Sum of numbers from 1 - 10 is 55

This program does the following:
 1. Sum of numbers from 1 to n
 2. Factorial of n
 3. Factors of n
 4. Quit
 Please choose an option

Please enter an integer n:
Factorial of number 20 is 21c3677c82b40000

This program does the following:
 1. Sum of numbers from 1 to n
 2. Factorial of n
 3. Factors of n
 4. Quit
 Please choose an option

```
Please enter an integer n:
Factors of number 65 are
1  5  13  65

This program does the following:
 1. Sum of numbers from 1 to n
 2. Factorial of n
 3. Factors of n
 4. Quit
 Please choose an option

Incorrect choice, 8 Please choose again

This program does the following:
 1. Sum of numbers from 1 to n
 2. Factorial of n
 3. Factors of n
 4. Quit
 Please choose an option

Your choice was <QUIT>, Quitting the program, Have a good day!
```