Ollscoil Mhá Nuad
Ollscoil na hÉireann Má Nuad

CS161FZ Introduction to Computer Science

Lab Assignment 5

There are *five* tasks to be completed.

General Information:

- Use variables instead of using literals in your programs.

Task 1: While Loop 1

Write a Java program that uses a while loop to find the factorial of a number ***num***. ***num*** should be an integer variable.

Factorial (! denotes factorial) is defined as the result of multiplying a sequence of natural numbers by each other down to 1.

Examples of this are:

4! = 4 x 3 x 2 x 1 = 24

7! = 7 x 6 x 5 x 4 x 3 x 2 x 1 = 5040

The program should print in the format of the sample output below. Test your program for the factorial of **17**. Your source file should be named as "***Factorial***".

Sample Output

```
The factorial of 7 is 5040
```

Task 2: While Loop 2

Write a Java program that uses a while-loop to check how many times an integer ***num1*** can be divided by 2 before the number becomes less than 2. The program should then print to the screen the number of times ***num1*** can be successively divided by 2. **Set *num1* to the default 40 when evaluating**. You should name your source file as "DivideBy2".

For example for number 30, the output is 4.

Operation	**Count**
30 / 2 = 15	(1)
15 / 2 = 7	(2)
7 / 2 = 3	(3)
3 / 2 = 1	(4)

1 is less than 2 so we don't divide.

Sample Output (num1 = 30):

4

Task 3: While Loop Song

Write a Java program that uses a while loop to print out the following song:

10 in a bed and the little one said,

'Roll over, roll over'

They all rolled over and one fell out,

9 in a bed and the little one said,

'Roll over, roll over'

They all rolled over and one fell out,

8 in a bed and the little one said,

...

1 in a bed and the little one said,

'Alone at last'

You should use an `if statement` to help you solve this.

The program should print in the format of the sample output below. Your source file should be named as “Song”.

Sample Output

```
10 in a bed and the little one said,
'Roll over, roll over'
They all rolled over and one fell out,
9 in a bed and the little one said,
'Roll over, roll over'
They all rolled over and one fell out,
8 in a bed and the little one said,
...
1 in a bed and the little one said,
'Alone at last'
```

Task 4: For Loop 1

Write a Java program that uses a `for loop` to print all numbers, followed by a space, that can be evenly divided by 7 between 10 and 70 inclusive.

The program should print in the format of the sample output below. Your source file should be named as “DivideBy7”.

Sample Output

`14 21` etc

Task 5: *for* Loop 2

Write a Java program that uses `for loops` to compute:

- The sum of all numbers divisible by 13 between 1 and 100 (inclusive), and
- The sum of all numbers squared between 1 and 100 (inclusive).

You can do this with two loops but as a challenge can you do it with one loop?

The program should print in the format of the sample output below. Your source file should be named as “SquareSum”.

Sample Output

```
The sum of all numbers divisible by 13 is 364
The sum of all squares is 338350
```