CMPS 11 - Assignment 1

Submission deadline: January 19th, 2018 at 11:59 pm

Step 1:

Watch the scanner tutorial here. After reading this tutorial you will be able to read text (character, number, string, or boolean) from console.

Step 2:

Read each one of the following problems and examine the sample inputs and outputs carefully. Then, start coding each one of the problems by creating a java file named same as the name of the question. For example, for the first problem the name of the file should be Converter.java.

Problem 1 - Converter (30 points)

Write a program that helps with converting temperature measured in Fahrenheit or Kelvin to Celsius degree. You can find temperature conversion formulas here.
There are two lines of input that you can read from the console using Scanner:

1. The first line contains a character: 'f' for Fahrenheit degree or 'k' for Kelvin degree.
2. The second line contains a floating-point number representing the degree measured in the earlier specified temperature unit.

Output should be a single floating-point number showing the converted degree in Celsius rounded up to two decimal places. Print out the output using **System.out.printf("%.2f", output_variable);** where output_variable is the Celsius degree you calculated.

Example 1:

Input	Output
f 56	13.33

Example 2:

Input	Output
f 77	25.00

Example 3:

Input	Output
f 32	0.00

Example 4:

Input	Output
k 370	96.85

Example 5:

Input	Output
k 475.5	202.35

Example 6:

Input	Output
k 273.576	0.43

Problem 2 - Ordered (35 points)

Write a program that reads in three integers from console, x, y, and z. Then, define a boolean variable whose value is true if the three values are either in strictly ascending order (x < y < z) or in strictly descending order (x > y > z), and false otherwise. Your output is the printed boolean variable.

Example 1:

Input	Output
-1 0 1	true

Example 2:

Input	Output
2 12 -3	false

Example 3:

Input	Output
23 3 -1	true

Example 4:

Input	Output
-10 -9 -23	false

Example 5:

Input	Output
-20 -15 -10	true

Problem 3 - Bits (35 points)

Write a program that takes an integer from console, N, and uses a while loop to compute the number of times you need to divide N by 2 until it is strictly less than 1. Print out the error message "Illegal input" if N is less than or equal to 0.

Remark: This computes the number of bits in the binary representation of N, which also equals to $1 + \lfloor \log_2 N \rfloor$ when N is positive.

Example 1:

Input	Output
-23	Illegal input

Example 2:

Input	Output
0	Illegal input

Example 3:

Input	Output
1000	10

Example 4:

Input	Output
4	3

Example 5:

Input	Output
1	1