CITP 190 – Introduction to Java
Project 4

This project requires you to create a project will calculate the factorial of a number.

To receive full credit for this project you must submit the following:

- A detailed design diagram for the program.
- The source code for the program (the .java file - following the coding standards) and the bytecode for the program (the.class file). The easiest way to capture this is to zip the entire project folder.
- Proof of the correctness of your output using the test data provided. Please note that you must provide proof for all test data. You may provide additional test data.
- A capture of the output of the program. The output must show all data from your proof.

Submit all files as one (1) ZIP file to the Project 4 Drop Box in the course site.

Grading:

Program design	10 points
Following coding standards	4 points
Code	6 points

Important notes:

1. Incorrect calculations will result in a 0 grade for this project.
2. Output that is not presented as shown (including spaces and spelling) will result in a 0 grade for this project.
3. Not using all the test data provided will result in a 0 grade for this project.
4. If the files containing your design diagrams, proofs, and capture of the output do not contain your name, the course code, and the project number at the top of the file, you will receive a 0 grade for this project.

Project 4: Calculate the factorial of a number

Console

```
Welcome to the Factorial Calculator

Enter an integer that's greater than 0 and less than 10: 3
The factorial of 3 is 6.

Continue? (y/n): y

Enter an integer that's greater than 0 and less than 10: 4
The factorial of 4 is 24.

Continue? (y/n): y

Enter an integer that's greater than 0 and less than 10: 9
The factorial of 9 is 362880.

Continue? (y/n): n
```

Operation

- The application prompts the user to enter an integer from 1 to 9.
- The application displays the factorial of the number entered by the user.
- The application prompts the user to continue.

Specifications

- The exclamation point is used to identify a factorial. For example, the factorial of the number n is denoted by n!. Here's how you calculate the factorial of the numbers 1 through 5:

```
1! = 1                  which equals 1
2! = 1 * 2              which equals 2
3! = 1 * 2 * 3          which equals 6
4! = 1 * 2 * 3 * 4      which equals 24
5! = 1 * 2 * 3 * 4 * 5  which equals 120
```

- Place the calculation for finding the factorial in a `static` method. Use a `for` loop to calculate the factorial.
- Assume that the user will enter valid numeric data for the integer.
- Use the `long` data type to store the factorial.
- The application should continue only if the user enters "y" or "Y" to continue.

Test Data

Use the following integers:

8

7

6

1