

Lab #12

Exercise

The purpose of this exercise is to apply your knowledge about repetition/loop statements discussed during the lectures.

The value of the number e can be approximated by the sum:

$$e = \frac{1}{0!} + \frac{1}{1!} + \frac{1}{2!} + \frac{1}{3!} + \cdots + \frac{1}{n!}$$

Write a program called *EulerApproximation* that asks the user for an integer greater than 1 and computes the approximation of the number e using the series specified above. If the user enters an invalid integer, an integer less than or equal to 1, the program will display an error message and request the input again until the user enters an integer greater than 1. Afterwards, the program will compute and display the approximation of the number e by summing the sum of the terms of the above series according to the value of n entered by the user. The expression $n!$ is the factorial of n defined as:

$$n! = \begin{cases} 1 & \text{if } n=0 \\ 1*2*3*\dots*n & \text{if } n > 0 \end{cases}$$

The number e is also called Euler's number to honor the Swiss mathematician Leonard Euler who first studied the number e in the 1720s. For more information, please check [http://en.wikipedia.org/wiki/E_\(mathematical_constant\)](http://en.wikipedia.org/wiki/E_(mathematical_constant)).

Sample Runs

Example 1

```
Please enter an integer >=1: 10
The approximation of the number e for n=10 is 2.7182818011463845
```

Example 2

```
Please enter an integer >=1: -1
You must enter an integer greater than 1.
Please enter an integer >=1: 4
```

```
The approximation of the number e for n=4 is 2.7083333333333333
```

Hint: **The exercise MUST be solved without using any nested loops to receive full credit!**

Compile, run and test your program.

After you have completed this exercise, demonstrate it to your lab instructor.

WebCT Submission

After you have completed both exercises in this lab, upload the java file *EulerApproximation* in WebCT and submit it to receive credit.