CS 135
Exercise #10
Point value: 40
Date due: email source file (using mail utility) to your lab instructor by 11:59pm by Mon, Oct 30

New Skills Practiced (Learning Goals)

- Problem solving and debugging.
- Value-returning functions

There are many infinite series that can be used to estimate π. Here are 2 of them.

Gregory-Leibniz series: $\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \cdots$

Euler series: $\frac{\pi^2}{6} = \frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \cdots$

Use the cp command to copy the file ~lee/cs135labs/exercise10.cpp to your account.

Read through the file. It contains a program that is designed to read several integer values from a file (via Linux redirection). Each integer represents the number of terms to be used in computing an estimated value of π. The main function reads each integer and then calls 2 functions (gregory_leibniz and euler) to estimate and return a value of π. The 2 estimated values are then printed.

REQUIREMENTS

- Add a comment to the start of the program with your name, lecture and lab section #s, and exercise #.
- Add a print statement to the main function that displays your name, lecture and lab section #s, and exercise # before the data file is processed.
- Add the statements to implement the gregory_leibniz and euler functions as described in the program. These statements MUST be placed in the body of each function. **Do not make any changes to the main function other than adding the print statement mentioned above.**

When the program compiles and runs correctly on bobby.cs.unlv.edu, use the mail utility to email a copy of the program file to your lab instructor. Make sure the subject line of your email includes your name, lecture and lab section #s, and the exercise # if you wish to receive full credit.

NOTES:

- Do not declare any variables at the global level.
- Assume that all input values in the data file will be integers greater than zero.
- Make sure you choose enough test data to ensure your program meets the requirements.
- When constructing data files, separate each integer with whitespace. Each line in the data file should be terminated with a linefeed.
- It is a good idea to send a carbon copy to yourself (-c option) of all emails sent to your lab or course instructor when using the mail utility.
- A comment with your name, lecture section#, lab section#, and exercise# should be at the start of your program file.

Sample terminal session:

```
[lee@bobby keys]$ more data4ten
1
3
```

```
10000
[lee@bobby keys]$ g++ ex10.cpp
[lee@bobby keys]$ ./a.out < data4ten
Using 1 term(s)
Gregory-Leibniz:    4.000000000000000
Euler:              2.449489742783178
Using 3 term(s)
Gregory-Leibniz:    3.466666666666667
Euler:              2.857738033247041
Using 10000 term(s)
Gregory-Leibniz:    3.141492653590034
Euler:              3.141497163947215
```

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