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Group 4, Letter A

Problem Statement

The purpose of this program is to solve the issue of calculating PI, to the user's desired precision. $\pi/4$ is calculated using the summation formula:

$$\frac{\pi}{4} = \sum_{k=0}^{\infty} \frac{(-1)^k}{2k+1}$$

Then, by multiplying the result by 4, we are left with PI. To get *n* degrees of precision, (10^n)/2 iterations must be calculated.

Interface Description

Input: The input to this program will be either the number of iterations of the summation that the user would like to calculate, or the number of decimal precision that should be calculated. These are long doubles.

Output: The output of the program is PI, calculated using the number of iterations or level of precision desired by the user. This value is a long double.

Code Organization

This program will require a header file, main function, an iteration calculation function, and a precision calculation function. The main function will accept the command line arguments (-i for iterations, or -p for precision), along with the desired value..The corresponding function would then be executed. The number that is passed in will be used to perform the correct number of iterations of the above formula, to calculate PI.