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Assignment 2 - Design Document

Description:

The purpose of this assignment is to approximate many different values such as e and pi using various methods. Different methods of approximations include the madhava series, Euler's solution, and Viete's Formula. We keep adding terms until the current term is less than the value of epsilon (1 * 10^-14). Other approximation methods include Newton's method and Bailey-Borwein-Plouffe series. There will be a test file that can run all the approximation tests.

Pseudocode:

E.c -

```
Counter = 0
While current term >= epsilon:
        Divide Current term by temp
        Add current term to sum
        Add Counter  by 1
        Multiply Temp by counter
Return the sum
```

Madhava.c -

```
Counter = 0
Sum = 0
While current term >= epsilon:
        Divide Top term by -3
        Add Bottom term by 2
        Add Sum by top term
        Add current term to sum
        Add Counter by 1
Return the sum
```

Euler.c -

```
Counter = 0
Sum = 0
While current term >= epsilon:
        Current term /= counter
        Add current term to sum
        Multiply bottom_term by 2
        Add sum by current term
        Add Counter by 1
Return the sum
```

BBP.c -
k = 0
Counter = 0
Sum = 0
While current term >= epsilon:
    Current term = (4/(8k+1) - 2/(8k+4) - 1/(8k+5) - 1/(8k+6)) * 16^-k
    Add current term to sum.
    Add k by 1.
    Add counter by 1.
    Add sum by current term
Return the sum * square root of 6

Viete.c
Counter = 0
Product = 0
Previous_term = 1
Current_term = square root of 2
While current term >= epsilon:
    Multiply previous term by current_term
    Divide Bottom term by 2
    Add counter by 1
    Previous_term = current_term
    Current_term = square root of (2 + previous term)
Return 2 / sum

Mathlib-test.c
Parse through input
While there are inputs to be read:
    Mark which command arguments are inputted.
Run tests that are flagged.
Provide statistics if -s is flagged.
Provide instructions if -h is flagged.