**Collatz-Sequence-Parallelization**

This project demonstrates parallelization of the Collatz sequence computation using multiple child processes. Given a range of numbers, the program creates multiple child processes and assigns each process a subset of the range. Each child process computes the Collatz sequence for the assigned subset of numbers and writes the results to a file. The parent process waits for all child processes to complete and then reads the results from each file to output the Collatz sequence for each number in the range.

**Usage**

To use the program, run the executable file and pass three arguments:

phpCopy code

./collatz <num\_children> <min\_num> <max\_num>

* **num\_children**: the number of child processes to create (must be a positive integer less than or equal to 10).
* **min\_num**: the minimum number to compute Collatz sequence for.
* **max\_num**: the maximum number to compute Collatz sequence for.

For example, to compute the Collatz sequence for numbers from 1 to 100 using 4 child processes, run:

bashCopy code

./collatz 4 1 100

**Implementation Details**

The program uses the **fork()** system call to create multiple child processes. The parent process assigns a range of numbers to each child process to compute the Collatz sequence for. Each child process writes its results to a file with a name that includes the child process ID and parent process ID. Once all child processes complete, the parent process reads the results from each file and outputs the Collatz sequence for each number in the range.

The program also includes error handling for file I/O and the **fork()** system call.