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CS 515 Project 1

**Summary**

This program finds all prime number up to a given range. The number of threads used in doing so is specified by the user. The method used to find the prime numbers is the Sieve of Eratosthenes Method.

The prime sieves are found at and below the square root of the range. After each prime sieve is found we cross out multiples of that given number. Once we find all the sieve primes and crossing out all their multiples, the remaining integers will be all primes. Evens are not considered in order to save time.

Before the task is started threads are assigned to their own unique number range to work on. As they’ll crossing out multiples in their own block only.

All threads are launched but don’t start crossing out multiples until the main thread begins the sieve finding. As each sieve is found other threads begin working through their respective blocks. The main thread doesn’t begin crossing multiples until he’s found all the sieves in his block. If it happens that all the prime sieves don’t fall within the main thread’s block he’ll send a signal to the next thread to look through the remaining numbers for more sieves (if there are any).

Once all the sieves are found and all the multiples of the sieves are crossed out the threads are joined back to the main program. The master thread goes through all the numbers and counts all the indicated primes and prints how many were found.

A script was created for N values 100, 1000, 10000, 100000, 1000000 with threads ranging from 1 to 4.

For running the program

**./usage N p test**

If you would like the option of printing all the prime numbers put any number in as the third argument e.g.

**./prime\_number.exe 1000 4 1**