

Stephen Plautz
11570636
CS 491
Project 3 Report

Part 1:

For part 1, all that was changed was the data type of the values from integers to longs, in order to handle higher valued numbers.

Part 2:

In part 2, to optimize the search for prime multiples, all multiples of two were eliminated. This was done by halving the size of the marked array, and adjusting the indices accordingly throughout the algorithm. This results in significant speedup as the iteration over the marked array is essentially halved.

Part 3:

In part 3, each process sieves it's own primes. This is done by each process taking into account the input n value, and knowing that the values of possible primes p will only be such that $p^2 \leq n$. This results in each process having a primes array, cutting down on communication time as broadcasts are no longer necessary. Part 3 experienced the best speedup when more processes were introduced.

Below are given the respective process counts, execution times, and primes found for $n = 10^{10}$.

Sieve 0			sieve 1		
32	64	128	32	64	128
14.80729	16.16778	12.609552	7.404863	3.946238	4.29027
455052511	455052511	455052511	455052511	455052511	455052511

sieve 2		
32	64	128
7.401368	3.641335	1.79966
455052511	4.55E+08	455052511

Part 4: not completed