Problem Set 4

Multi-Precision Computing

Problem I

Write a program to test if a number is prime.

Problem II

Find the mean distribution of prime numbers between two bounds.

Problem III

Generate a random number and check for its primality. How many trials are needed before finding a prime number?

Problem IV

How long does it take to find a probable prime number?

Problem V

A Mersenne[1] number is a number that is one less than a power of two

$$M_n = 2^n - 1$$

1. Prove that M_n is prime implies n is prime.

2. Is it true that n is prime implies M_n is prime?

3. Write a program to test if M_n is prime for n in between 2 and 1000.

[1] Marin Mersenne was a 16th century a French monk, philosopher, mathematician and music theorist who is best known for his work in number theory.

Marin Mersenne (1588 - 1648)