**Learning Objectives**

• To learn basic thread programming

• To design a program using the master/slave programming model

• To use mutex locks to avoid race conditions in multiple threads

• To write program that accepts three types of command line

• To conduct performance evaluation

Given a large number **num**, you must write a C or C++ program to print out all the prime numbers ranging from 2 up to the specified **num**. Note that a prime number (or a prime) is a natural number greater than 1 that has no positive divisors other than 1 and itself.

For example, if **num** entered by a user is 60, then your program should display the following list: 2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59

* **Specify the number of threads.** Your pthread program allows users to specify the number **nthreads** of threads used in determining primes. If users do not provide the number of threads, your program must use a default value of 2 to set up the number of created theads.
* **Usability.** Your program should have good usability. For example, if the large number num is not specified by users, then your program must print a usage message.
* Please compile your source code using the following command line:

$gcc pprimes.c –pthread –o pprimes