Exercise-1

Which integer between 1 and 10000 has the largest number of divisors, and how many divisors does it have? Write a program to find the answers and print out the results. It is possible that several integers in this range have the same, maximum number of divisors. Your program only has to print out one of them.

Exercise-2

The above exercise asked you to find the integer in the range 1 to 10000 that has the largest number of divisors. Now write a program that uses multiple threads to solve the same problem, but for the range 1 to 100000. By using threads, your program will take less time to do the computation when it is run on a multiprocessor computer. At the end of the program, output the elapsed time, the integer that has the largest number of divisors, and the number of divisors that it has.

Exercise-3

A museum allows visitors to enter through the east entrance and leave through the west exit. Arrivals and departures are signaled to the museum controller by the turnstiles at the entrance and exit. At opening time, the museum director signals the controller that the museum is open and then the controller permits both arrivals and departures. At closing time, the director signal that the museum is closed, at which point only departures are permitted by the controller. In this exercise there are four processes/monitor: EAST, WEST, CONTROL and DIRECTOR. Identify which of these should be threads and which one a monitor. Provide the implementation of the monitor in Java.

Exercise 4

Implement a monitor called Barrier in Java, which has a sync method that ensure that a number N of threads must call sync before any of them can proceed.

Exercise 5

The savings account problem: A savings account is share by several people, each person might deposit or withdraw funds from the account subject to the constraint that the balance of the account must never become negative. Give a java implementation for the savings account.