CSE231 Advanced Computer Programming

Lab 8

1) Write a Java console application that creates a 2D array of integers (10 rows x 1000 columns). The program should then fill each row in the array with the multiples of the row index+1. This means that the row 0, should be filled with multiples of 1 (from 1 to 1000), and row 1 should be filled with multiples of 2 (from 2 to 2000), etc. Finally the program should print the entire array to the screen.

2) Re-write the program you wrote for Exercise 1, but this time use 10 threads to fill the 2D array. Each thread should be responsible for filling one row. Do not use the Runnable interface.

3) Repeat Exercise 2 using the Runnable interface.

4) Create a class IntToInc that encapsulates a single integer (initialized to zero at construction time). The class should have two methods: A method to increment the internal integer and a method to return its value. Write a Java console application that uses 5 threads to increment 5 different IntToInc objects. Each thread should be responsible for one the objects and it should increment it 3000 times. What will be the final value of each of the 5 objects? 3000

5) Repeat Exercise 4 using a single IntToInc object shared by all 5 threads. The object should be incremented 3000 times by each of the five threads. What will be the final value of the object? Why? Not 15000 because of data racing

6) Write a console program that creates a 10 x 1000,000 integer array and randomly initialize every array element with values ranging from 0 to 10 **(Hint: use java.util.Random)**. But use a thread pool managed by ExecutorService to

fill the 2D array. Each task managed by the ExecutorService should be responsible of filling a row of the 2D array and calculating the row sum.