# Parallel and MultiThreaded Programming

# CSYE 7215

# Homework 6

# Due: February 22, 2020

Put all your java, compiled class files and documentation into zip file named Homework6.zip and submit it via the dropbox on the blackboard before the END of due date. Put your name on all .java files. There will be a short quiz on this assignment.

**1.** Explain:

Parallelism

Concurrency

Parallelism versus Concurrency, provide diagram

CPU core, How do you make cpu core?

Hardware Parallelism, provide diagram

32-bit versus 64-bit architecture, give example

2. You can run tasks in parallel using Java8 Collection.parallelStream. Consider

ParallelExample2, ParallelExample3a, and ParallelExample3b. Compile and run, and

explain how the code works and the Results.

in this article: <https://www.mkyong.com/java8/java-8-parallel-streams-examples/>

3. Write Java parallelism code to sort each array entry in two dimensional

array input data. Note: You need to use Java8 Collection.parallelStream, and run

Six threads in parallel.

int[][] arr = { { 9, 12, 6, 14, 10, 21, 13}, { 3, 5, 41, 16, 14, 10, 21},

{ 3, 15, 41, 17, 11, 10, 51}, { 3, 15, 41, 17, 11, 10, 51}

{ 4, 15, 35, 17, 11, 12, 55}, { 2, 16, 31, 18, 12, 11, 42} };

4**.** The following link provides an example of user defined class loader called CCLoader:

<https://www.journaldev.com/349/java-classloader>

a) Analyze the code and Explain as how it works.

b) Compile and run CCLoader. What are the outputs?

c) Add Student class defined in Homework2. Build CCLoader, Compile

and Run, Explain outputs.

5. In Homework4, you created 50 Student threads and one Grader thread and managed the concurrency using Explicit Locks. In this problem, consider creating threads using ThreadPoolExecutor. How would you design and solve problem-4 in homework4 using ThreadPoolExecutor?

a) Show your design, b)Write code, compile and run.

Note: <https://howtodoinjava.com/java/multi-threading/java-thread-pool-executor-example/>