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## SE375 2021-2022 SUMMER

### Laboratory Assignments #3 and #4.

8 August 2022

### Goal: Making Super Store Program Thread Safe

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#### Part 1

Your program is thread un-safe since all the threads are accessing to the same shared data structure. Make your program thread safe by using the `synchronized` java primitive.

#### Part 2

Your task for Part 3 is to use thread-safe collections to make your program thread-safe.

#### Part 3

Instead of using the **`synchronized`** keyword, implement the new versions by using Locks. The application has a shared data structures. It will be updated at the same time by multiple threads, Each thread will lock the shared data structure and once its update is completed, will unlock it.

You are free to use other Java constructs as you like as long as you use `Locks`.

#### Part 4

Instead of creating an array of Thread objects use the Java **`ExecutorService`** to create a pool of size 10.

#### Part 5

Investigate if your program can be written using `java.util.concurrent` package to make it thread safe. Package `java.util.concurrent` contains collections that are optimized to be safe for use by multiple threads: