Name 1: _____

Name 2: _____

TCSS 422: Operating Systems
Spring 2017

Institute of Technology
University of Washington – Tacoma

Quiz 3

Synchronized Array
Tuesday April 25th, 2017

For Quiz 3, use of a CentOS 7 VM with 2 or more virtual CPU cores is required

Pair programming is permitted. Teams of 2, or individual is OK

For Quiz 3, the objective is to take an existing array based data structure and add synchronization primitives to make it thread safe. You are given a working C program "syncarray.c" which uses two threads to populate items in a shared array. Each thread tries to add 1,000 values to the array from 1 to 1,000. The data structure provides two methods which calculate the sum and average.

The problem is, if the data structure is not thread safe, when two threads attempt to access it simultaneously they race, resulting in data loss. When running the program repeatedly non-deterministic is produced as below:

```
$ ./syncarray
The initial sum is 0
The sum is 624554214
The avg is 12491
$ ./syncarray
The initial sum is 0
The sum is 604787877
The avg is 12095
$ ./syncarray
The initial sum is 0
The sum is 622860387
The avg is 12457
$ ./syncarray
The initial sum is 0
The sum is 621149179
The avg is 12422
```

Quiz 3 code can be downloaded here:
http://faculty.washington.edu/wlloyd/courses/tcss422/quiz/quiz3.tar.gz

You can enable debug output by changing the value of "DEBUG" to 1.

To receive 100% add synchronization and demonstrate correct output by 12:20pm.
If not completed by 12:20pm, seek verification during the next class meeting on Thursday April 27th.