

Name - Dilip Puri

ID - 201351014

Collaborator - Hemant Kumar(201352026)

Lab 02

Submission Date - October 3, 2016

Deadline - Aug 26, 4:00 PM

1. Familiarize yourself with rw_lock and barrier code in the sample code folder. Run the code and attach the screen-shots with your observations.

```
hemant@hemant:~/Desktop/sen7/pp/lab/lab2/barriers$ ./new_barrier
00: (10) 0000045001 0000045002 0000045003 0000045004 0000045005 0000045006
01: (11) 0000055001 0000055002 0000055003 0000055004 0000055005 0000055006
02: (12) 0000065001 0000065002 0000065003 0000065004 0000065005 0000065006
03: (13) 0000075001 0000075002 0000075003 0000075004 0000075005 0000075006
04: (14) 0000085001 0000085002 0000085003 0000085004 0000085005 0000085006

hemant@hemant:~/Desktop/sen7/pp/lab/lab2/rw_lock$ ./new_rwlock
Thread 2 found unchanged elements 148 times
Thread 3 found unchanged elements 1496 times
Thread 0 found unchanged elements 1041 times
00: interval 10, updates 1000, reads 9000
Thread 4 found unchanged elements 6615 times
Thread 1 found unchanged elements 2150 times
01: interval 44, updates 228, reads 9772
02: interval 65, updates 154, reads 9846
03: interval 53, updates 189, reads 9811
04: interval 11, updates 910, reads 9090
data 00: value 1, 476 updates
data 01: value 1, 88 updates
data 02: value 1, 89 updates
data 03: value 1, 89 updates
data 04: value 1, 88 updates
data 05: value 1, 471 updates
data 06: value 1, 88 updates
data 07: value 1, 88 updates
data 08: value 1, 88 updates
data 09: value 1, 89 updates
data 10: value 1, 473 updates
data 11: value 1, 89 updates
data 12: value 1, 87 updates
data 13: value 1, 89 updates
data 14: value 1, 89 updates
2481 thread updates, 2481 data updates
```

2. For the given serial code (dotprod.c in the sample code folder), write the equivalent parallel code. Using the time command, measure the execution time and corresponding speed-ups for:

- vector length = 100,000 and 200,000
- number of processors = 2, 4 and 8

	p=1	p=2	p=4	p=8
Vector Length = 100,000	0.0095	0.0124	0.0121	0.0102
Vector Length = 200,000	0.014	0.0166	0.0121	0.0163

$$Speedup = \frac{ExecutionTime(p)}{ExecutionTime(serialcode)}$$

	p=2	p=4	p=8
Vector Length = 100,000	1.31	1.27	1.07
Vector Length = 200,000	1.19	1.26	1.16

3 Multi-access threaded queue

1. Implement a multi-access threaded queue with multiple threads inserting and multiple threads extracting from the queue. Use mutex-locks to synchronize access to this queue. Document the time for 1000 insertion and 1000 extractions each with 4 insertion threads (producers) and 4 extraction threads (consumers).
2. Repeat above problem with condition variables (in addition to mutex locks). Document the time for the same test case as above. Comment on the difference in the times.