

## Lab 3

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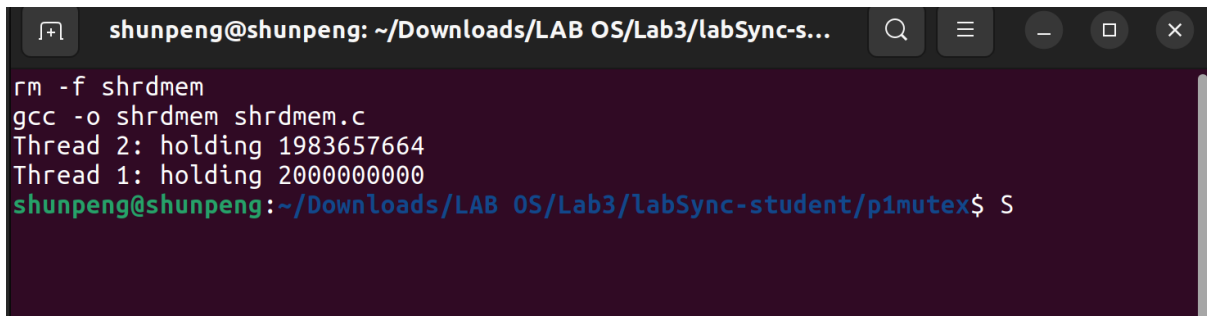
Student ID : 2153011

Class: CC02

### Introduction:

- All the code for each exercise is in their own directory same as the initial code. There is also a run.sh in the directory.
- Use command **./run.sh** to run the exercise.

### Practice 3.1:



```
shunpeng@shunpeng: ~/Downloads/LAB OS/Lab3/labSync-s...  
rm -f shrdmem  
gcc -o shrdmem shrdmem.c  
Thread 2: holding 1983657664  
Thread 1: holding 2000000000  
shunpeng@shunpeng:~/Downloads/LAB OS/Lab3/labSync-student/p1mutex$ S
```

### Practice 3.2:

```
shunpeng@shunpeng: ~/Downloads/LAB OS/Lab3/labSync-s...
75 | pthread_create( & producers[i], NULL, producer, (void * ) tid[i]);
    |
pc.c:78:53: warning: cast to pointer from integer of different size [-Wint-to-po
inter-cast]
78 | pthread_create( & consumers[i], NULL, consumer, (void * ) tid[i]);
    |
Producer 0 put data 0
Producer 0 put data 1
Producer 0 put data 2
Consumer 1 get data 0
Producer 0 put data 3
Consumer 1 get data 1
Consumer 1 get data 2
Producer 0 put data 4
Producer 0 put data 5
Producer 1 put data 0
Consumer 0 get data 3
Consumer 0 get data 4
Consumer 0 get data 5
Consumer 0 get data 0
Producer 0 put data 6
Producer 0 put data 7
Producer 1 put data 1
Producer 1 put data 2
Consumer 1 get data 6
Consumer 1 get data 7
Consumer 1 get data 1
Consumer 1 get data 2
Producer 1 put data 3
Producer 1 put data 4
Producer 1 put data 5
Producer 1 put data 6
Consumer 1 get data 3
Consumer 1 get data 4
Consumer 1 get data 5
Consumer 1 get data 6
Producer 1 put data 7
Consumer 0 get data 7
$
```

### Practice 3.3:

```
shunpeng@shunpeng: ~/Downloads/LAB OS/Lab3/labSync-student/p3dinPhil
Philosopher 1 is eating
Philosopher 2 is hungry
Philosopher 0 is hungry
Philosopher 3 is thinking
Philosopher 4 is eating with forks 3 and 4
Philosopher 3 is thinking
Philosopher 4 is eating
Philosopher 1 is thinking
Philosopher 2 is eating with forks 1 and 2
Philosopher 1 is thinking
Philosopher 2 is eating
Philosopher 3 is hungry
Philosopher 1 is hungry
Philosopher 4 is thinking
Philosopher 0 is eating with forks 4 and 0
Philosopher 4 is thinking
Philosopher 0 is eating
Philosopher 2 is thinking
Philosopher 3 is eating with forks 2 and 3
Philosopher 2 is thinking
Philosopher 3 is eating
Philosopher 4 is hungry
Philosopher 2 is hungry
Philosopher 0 is thinking
Philosopher 1 is eating with forks 0 and 1
Philosopher 0 is thinking
Philosopher 1 is eating
Philosopher 3 is thinking
Philosopher 4 is eating with forks 3 and 4
Philosopher 4 is eating
Philosopher 3 is thinking
Philosopher 0 is hungry
Philosopher 3 is hungry
Philosopher 1 is thinking
Philosopher 2 is eating with forks 1 and 2
Philosopher 2 is eating
Philosopher 1 is thinking
Philosopher 4 is thinking
Philosopher 0 is eating with forks 4 and 0
Philosopher 4 is thinking
Philosopher 0 is eating
```

### Exercise 4.1:

```
shunpeng@shunpeng: ~/Downloads/LAB OS/Lab3/labSync-s...
make: *** No rule to make target 'clear'. Stop.
gcc -g -pthread -I./ -L. seqlock.c -o seqlock
seqlock.c: In function 'reader':
seqlock.c:30:9: warning: implicit declaration of function 'usleep' [-Wimplicit-f
unction-declaration]
   30 |         usleep(rand() % 1000);
      |         ^~~~~~
val = 1
shunpeng@shunpeng: ~/Downloads/LAB OS/Lab3/labSync-student/ex1seqlock$
```

## Exercise 4.2:

```
shunpeng@shunpeng: ~/Downloads/LAB OS/Lab3/labSync-student/ex2aggsun
make: *** No rule to make target 'clear'. Stop.
gcc -std=c++11 -g -pthread -I./ -L. -lutils main.o libutils.a -o main
number : 1000 valid (and represents all characters read)
number : 100 valid (and represents all characters read)
number : 1 valid (and represents all characters read)
aggsun runs with <arrsz>=1000 <tnum>=100 <seednum>=1

[0,9] [10,19] [20,29] [30,39] [40,49] [50,59] [60,69] [70,79] [80,89] [90,99] [100,109] [110,119] [120,129] [130,139] [140,149] [
150,159] [160,169] [170,179] [180,189] [190,199] [200,209] [210,219] [220,229] [230,239] [240,249] [
250,259] [260,269] [270,279] [280,289] [290,299] [300,309] [310,319] [320,329] [330,339] [340,349] [
350,359] [360,369] [370,379] [380,389] [390,399] [400,409] [410,419] [420,429] [430,439] [440,449] [
450,459] [460,469] [470,479] [480,489] [490,499] [500,509] [510,519] [520,529] [530,539] [540,549] [
550,559] [560,569] [570,579] [580,589] [590,599] [600,609] [610,619] [620,629] [630,639] [640,649] [
650,659] [660,669] [670,679] [680,689] [690,699] [700,709] [710,719] [720,729] [730,739] [740,749] [
750,759] [760,769] [770,779] [780,789] [790,799] [800,809] [810,819] [820,829] [830,839] [840,849] [
850,859] [860,869] [870,879] [880,889] [890,899] [900,909] [910,919] [920,929] [930,939] [940,949] [
950,959] [960,969] [970,979] [980,989] [990,999]

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25, 58, 20, 51, 38, 65, 30, 7, 20, 10, 51, 18, 43, 71, 97, 61, 26, 5, 57, 70,
65, 0, 75, 29, 86, 93, 87, 87, 64, 75, 88, 89, 100, 7, 40, 37, 38, 36, 44, 24,
46, 95, 43, 89, 32, 5, 15, 58, 77, 72, 95, 8, 38, 69, 37, 24, 27, 90, 77, 92,
31, 30, 80, 30, 37, 86, 33, 76, 21, 77, 100, 68, 37, 8, 22, 69, 81, 38, 94, 57,
76, 54, 69, 14, 89, 69, 4, 16, 24, 47, 7, 21, 78, 53, 17, 81, 39, 50, 22, 60,
93, 89, 94, 30, 97, 16, 65, 43, 20, 24, 67, 62, 78, 98, 42, 67, 32, 46, 49, 57,
60, 56, 44, 37, 75, 62, 17, 13, 11, 40, 40, 4, 95, 100, 0, 57, 82, 31, 0, 1,
56, 67, 30, 100, 64, 72, 66, 63, 18, 81, 19, 44, 2, 63, 81, 78, 91, 64, 91, 2,
70, 97, 73, 64, 97, 39, 21, 78, 70, 21, 46, 25, 54, 76, 92, 84, 47, 57, 46, 31,
38, 31, 75, 40, 61, 21, 84, 51, 86, 41, 19, 21, 37, 58, 86, 100, 97, 73, 44, 67,
60, 90, 58, 13, 31, 49, 63, 44, 73, 76, 76, 77, 73, 16, 83, 100, 4, 67, 51, 56,
7, 36, 77, 10, 95, 28, 10, 57, 0, 54, 23, 60, 9, 48, 39, 40, 97, 69, 84, 35,
44, 25, 11, 83, 8, 61, 83, 12, 27, 100, 34, 0, 35, 10, 10, 96, 39, 87, 53, 5,
40, 42, 66, 15, 90, 71, 55, 87, 39, 5, 88, 49, 97, 100, 32, 4, 60, 81, 83, 53,
80, 16, 53, 14, 94, 29, 77, 99, 16, 29, 3, 22, 71, 35, 4, 61, 6, 25, 13, 11,
30, 0, 27, 94, 66, 25, 64, 92, 5, 47, 44, 85, 29, 63, 65, 89, 59, 41, 87, 41,
36, 57, 29, 7, 92, 33, 34, 64, 59, 47, 76, 55, 13, 2, 48, 46, 27, 12, 37, 99,
25, 48, 83, 20, 77, 13, 9, 35, 55, 62, 76, 57, 18, 72, 64, 10, 4, 64, 74, 63,
77, 15, 18, 91, 84, 32, 36, 77, 10, 39, 75, 35, 87, 23, 22, 30, 37, 31, 65, 58,
59, 7, 14, 78, 79, 45, 54, 83, 8, 94, 12, 86, 9, 97, 42, 93, 95, 44, 70, 5,
83, 10, 40, 36, 34, 62, 66, 71, 59, 97, 95, 18, 3, 8, 62, 48, 19, 15, 98, 28,
8, 9, 80, 84, 72, 21, 43, 66, 65, 79, 71, 13, 89, 78, 49, 22, 5, 14, 59, 65,
11, 53, 49, 81, 28, 77, 29, 47, 92, 26, 41, 66, 1, 20, 50, 73, 7, 59, 4, 72,
37, 76, 86, 25, 19, 0, 14, 24, 15, 73, 55, 93, 93, 3, 73, 87, 80, 68, 100, 37,
]

shunpeng@shunpeng: ~/Downloads/LAB OS/Lab3/labSync-student/ex2aggsun
60, 90, 58, 13, 31, 49, 63, 44, 73, 76, 76, 77, 73, 16, 83, 100, 4, 67, 51, 56,
7, 36, 77, 10, 95, 28, 10, 57, 0, 54, 23, 60, 9, 48, 39, 40, 97, 69, 84, 35,
44, 25, 11, 83, 8, 61, 83, 12, 27, 100, 34, 0, 35, 10, 10, 96, 39, 87, 53, 5,
40, 42, 66, 15, 90, 71, 55, 87, 39, 5, 88, 49, 97, 100, 32, 4, 60, 81, 83, 53,
80, 16, 53, 14, 94, 29, 77, 99, 16, 29, 3, 22, 71, 35, 4, 61, 6, 25, 13, 11,
30, 0, 27, 94, 66, 25, 64, 92, 5, 47, 44, 85, 29, 63, 65, 89, 59, 41, 87, 41,
36, 57, 29, 7, 92, 33, 34, 64, 59, 47, 76, 55, 13, 2, 48, 46, 27, 12, 37, 99,
25, 48, 83, 20, 77, 13, 9, 35, 55, 62, 76, 57, 18, 72, 64, 10, 4, 64, 74, 63,
77, 15, 18, 91, 84, 32, 36, 77, 10, 39, 75, 35, 87, 23, 22, 30, 37, 31, 65, 58,
59, 7, 14, 78, 79, 45, 54, 83, 8, 94, 12, 86, 9, 97, 42, 93, 95, 44, 70, 5,
83, 10, 40, 36, 34, 62, 66, 71, 59, 97, 95, 18, 3, 8, 62, 48, 19, 15, 98, 28,
8, 9, 80, 84, 72, 21, 43, 66, 65, 79, 71, 13, 89, 78, 49, 22, 5, 14, 59, 65,
11, 53, 49, 81, 28, 77, 29, 47, 92, 26, 41, 66, 1, 20, 50, 73, 7, 59, 4, 72,
37, 76, 86, 25, 19, 0, 14, 24, 15, 73, 55, 93, 93, 3, 73, 87, 80, 68, 100, 37,
94, 41, 3, 61, 27, 19, 33, 35, 70, 38, 73, 14, 80, 50, 5, 99, 59, 19, 22, 40,
59, 78, 32, 17, 47, 71, 3, 94, 39, 2, 97, 99, 9, 66, 60, 37, 85, 59, 38, 28,
63, 10, 8, 8, 35, 81, 6, 60, 100, 96, 66, 24, 39, 64, 41, 52, 34, 10, 11, 39,
80, 8, 4, 89, 74, 64, 92, 25, 89, 29, 19, 18, 6, 28, 26, 7, 8, 33, 67, 74,
95, 32, 99, 33, 96, 5, 51, 96, 83, 63, 35, 62, 71, 39, 16, 10, 69, 8, 35, 23,
3, 55, 41, 76, 49, 68, 83, 23, 67, 15, 97, 61, 13, 61, 60, 75, 33, 77, 71, 15,
39, 72, 43, 76, 77, 59, 53, 11, 33, 88, 34, 37, 8, 76, 79, 23, 9, 62, 46, 76,
44, 9, 2, 57, 70, 28, 31, 69, 4, 68, 84, 10, 39, 26, 52, 82, 52, 4, 93, 85,
59, 94, 21, 33, 35, 67, 57, 44, 28, 69, 86, 37, 78, 54, 94, 14, 48, 25, 83, 18,
59, 33, 28, 99, 25, 81, 46, 77, 51, 39, 62, 9, 32, 49, 43, 33, 15, 100, 77, 9,
68, 28, 47, 12, 82, 6, 26, 96, 70, 13, 57, 7, 8, 55, 33, 55, 0, 76, 5,
5, 3, 15, 3, 53, 58, 36, 34, 23, 79, 10, 57, 6, 23, 69, 54, 29, 61, 49, 27,
36, 63, 84, 9, 71, 4, 8, 25, 71, 85, 97, 77, 88, 11, 46, 6, 35, 83, 7, 24,
27, 17, 82, 34, 40, 16, 88, 69, 44, 3, 62, 46, 32, 45, 55, 2, 49, 64, 94, 87,
14, 90, 63, 68, 68, 75, 75, 2, 23, 82, 27, 51, 65, 75, 85, 71, 57, 38, 39, 0,
7, 1, 46, 39, 12, 68, 41, 28, 31, 0, 14, 45, 91, 43, 12, 58, 17, 53, 26, 41,
0, 19, 92, 31, 60, 42, 1, 17, 46, 41, 84, 54, 8, 97, 93, 20, 64, 0, 14, 61,
0, 28, 72, 57, 71, 50, 81, 89, 70, 7, 96, 70, 26, 87, 1, 87, 95, 69, 70, 40,
9, 19, 94, 84, 15, 87, 71, 45, 87, 85, 5, 53, 13, 43, 10, 50, 94, 91, 38, 63,
90, 33, 99, 91, 86, 66, 43, 80, 35, 79, 20, 10, 98, 80, 61, 13, 66, 31, 24, 18,
82, 97, 72, 61, 39, 48, 11, 99, 38, 49, 27, 2, 49, 26, 59, 0, 58, 1, 81, 59,
80, 67, 70, 77, 46, 97, 56, 79, 27, 81, 63, 75, 77, 0, 36, 82, 48, 47, 81, 53,
62, 7, 55, 77, 100, 13, 78, 24, 81, 24, 83, 26, 91, 18, 2, 2, 14, 25, 47, 7,
72, 10, 83, 14, 10, 18, 96, 25, 65, 42, 78, 93, 16, 32, 70, 15, 11, 47, 5, 58,
71, 89, 84, 27, 73, 86, 96, 88, 77, 43, 95, 48, 19, 43, 62, 96, 61, 24, 20, 92,
]
sequence sum results 49032
aggsun gives sum result 49032
shunpeng@shunpeng:~/Downloads/LAB OS/Lab3/labSync-student/ex2aggsun$ ./run.sh 1000 100 1
```

## Exercise 4.3:



shunpeng@shunpeng: ~/Downloads/LAB OS/Lab3/labSync-student/ex3logbuf

```
make: *** No rule to make target 'clear'. Stop.
gcc -g -pthread -I./ -L. logbuf.c -o logbuf
flushlog()
flushlog()
Slot 0: 0
Slot 1: 1
Slot 2: 2
Slot 3: 3
Slot 4: 6
Slot 5: 7
flushlog()
Slot 0: 18
Slot 1: 22
Slot 2: 12
Slot 3: 4
Slot 4: 9
Slot 5: 8
flushlog()
Slot 0: 27
Slot 1: 24
Slot 2: 11
Slot 3: 15
Slot 4: 16
Slot 5: 10
flushlog()
Slot 0: 20
Slot 1: 26
Slot 2: 5
Slot 3: 13
Slot 4: 17
Slot 5: 14
flushlog()
Slot 0: 25
Slot 1: 19
Slot 2: 23
Slot 3: 21
Slot 4: 28
Slot 5: 29
flushlog()
flushlog()
flushlog()
flushlog()
flushlog()
```