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Distributed System Assignment 2

Output Screenshots

Question 1: Lamport's algorithm

```
58
59  const int numProcess = 5;
60  const int numIterations = 5;
61
62  void processFunction(int pid, LamportMutex& mutex) {
63      for (int i = 0; i < numIterations; ++i) {
64          mutex.lock(pid);
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

- (base) deepwalke@Deeps-MacBook-Air A2 % g++ --std=gnu++17 Q1.cpp
- (base) deepwalke@Deeps-MacBook-Air A2 % ./a.out
Process 0 locked the mutex, entering critical section 1 process
Process 0 unlocking the mutex, exited critical section 1 iterations
- (base) deepwalke@Deeps-MacBook-Air A2 % g++ --std=gnu++17 Q1.cpp
- (base) deepwalke@Deeps-MacBook-Air A2 % ./a.out
Process 0 locked the mutex, entering critical section
Process 0 unlocking the mutex, exited critical section
Process 1 locked the mutex, entering critical section 2 process
Process 1 unlocking the mutex, exited critical section 2 iterations
Process 0 locked the mutex, entering critical section
Process 0 unlocking the mutex, exited critical section
Process 1 locked the mutex, entering critical section
Process 1 unlocking the mutex, exited critical section
- (base) deepwalke@Deeps-MacBook-Air A2 % g++ --std=gnu++17 Q1.cpp
- (base) deepwalke@Deeps-MacBook-Air A2 % ./a.out
Process 0 locked the mutex, entering critical section
Process 0 unlocking the mutex, exited critical section 5 process
Process 1 locked the mutex, entering critical section 5 iterations
Process 1 unlocking the mutex, exited critical section
Process 2 locked the mutex, entering critical section
Process 2 unlocking the mutex, exited critical section
Process 3 locked the mutex, entering critical section
Process 3 unlocking the mutex, exited critical section
Process 4 locked the mutex, entering critical section
Process 4 unlocking the mutex, exited critical section
Process 0 locked the mutex, entering critical section
Process 0 unlocking the mutex, exited critical section
Process 1 locked the mutex, entering critical section
Process 1 unlocking the mutex, exited critical section
Process 2 locked the mutex, entering critical section
Process 2 unlocking the mutex, exited critical section
Process 3 locked the mutex, entering critical section
Process 3 unlocking the mutex, exited critical section
Process 4 locked the mutex, entering critical section

Question 2: Lamports Logical clock.

```
(base) deepwalke@Deeps-MacBook-Air A2 % g++ --std=gnu++17 Q2.cpp
(base) deepwalke@Deeps-MacBook-Air A2 % ./a.out 2
Enter the sender and receiver process id: 0 0
Enter the next event number for this process id:1
The logical clock for each process is:
Process 0: 0 1
Process 1:

Enter the sender and receiver process id: 1 1
Enter the next event number for this process id:1
The logical clock for each process is:
Process 0: 0 1
Process 1: 0 1

Enter the sender and receiver process id: 0 0
Enter the next event number for this process id:2
The logical clock for each process is:
Process 0: 0 1 2
Process 1: 0 1

Enter the sender and receiver process id: 0 1
Enter the event number of sender and reciever: 2 2
The logical clock for each process is:
Process 0: 0 1 2
Process 1: 0 1 3

Enter the sender and receiver process id: 0 0
Enter the next event number for this process id:3
The logical clock for each process is:
Process 0: 0 1 2 3
Process 1: 0 1 3

Enter the sender and receiver process id: 0 1
Enter the event number of sender and reciever: 3 3
The logical clock for each process is:
Process 0: 0 1 2 3
Process 1: 0 1 3 4

Enter the sender and receiver process id: 0 0
Enter the next event number for this process id:4
The logical clock for each process is:
Process 0: 0 1 2 3 4
Process 1: 0 1 3 4

Enter the sender and receiver process id: 1 1
Enter the next event number for this process id:4
The logical clock for each process is:
Process 0: 0 1 2 3 4
Process 1: 0 1 3 4 5
```

Question 3:

“Chandy Misra Haas” (CMH) Edge chasing algorithm.

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
● (base) deepwalke@Deeps-MacBook-Air A2 % g++ --std=gnu++17 Q3.cpp
● (base) deepwalke@Deeps-MacBook-Air A2 % ./a.out
Initiating probe message from process 0 to process 1
Initiating probe message from process 1 to process 2
Initiating probe message from process 3 to process 1
(1, 2, 0)
(1, 2, 3)
No deadlock detected
● (base) deepwalke@Deeps-MacBook-Air A2 % g++ --std=gnu++17 Q3.cpp
● (base) deepwalke@Deeps-MacBook-Air A2 % ./a.out
Initiating probe message from process 0 to process 1
Initiating probe message from process 1 to process 2
Initiating probe message from process 2 to process 0
Initiating probe message from process 3 to process 1
(1, 2, 0)
(2, 0, 1)
(0, 1, 2)
(1, 2, 3)
(2, 0, 0)
(0, 1, 1)
(1, 2, 2)
(2, 0, 3)
Deadlock detected by 0
● (base) deepwalke@Deeps-MacBook-Air A2 % g++ --std=gnu++17 Q3.cpp
● (base) deepwalke@Deeps-MacBook-Air A2 % ./a.out
Initiating probe message from process 0 to process 1
Initiating probe message from process 0 to process 2
Initiating probe message from process 1 to process 0
Initiating probe message from process 1 to process 3
Initiating probe message from process 2 to process 0
Initiating probe message from process 3 to process 0
Initiating probe message from process 3 to process 2
(1, 0, 0)
(1, 3, 0)
(2, 0, 0)
(0, 1, 1)
(0, 2, 1)
(3, 0, 1)
(3, 2, 1)
(0, 1, 2)
(0, 2, 2)
(0, 1, 3)
(0, 2, 3)
(2, 0, 3)
Deadlock detected by 0
○ (base) deepwalke@Deeps-MacBook-Air A2 %
```