REPORT- CS20BTECH11035

PROGRAM OVERVIEW:

1. Time is measured using tm struct in ctime header. Struct tm returns current date and time.
2. The difference between the times, the time the process requested and the time the process entered critical section is measured through clock_t in time.h header.
3. The exponential distribution with mean lambda1, lambda2 is implemented through exponential_distribution function in random header.
4. Threads are created using thread header in c++. The thread is assigned an id through a for loop.

TEST_AND_SET:

1. C++ has a built-in test_and_set function which sets lock to true, and returns previous value of lock. It is an atomic function.
2. Before entering critical section, process sets lock to true.
3. After process exits critical section, lock is set to false.

COMPARE AND SWAP:

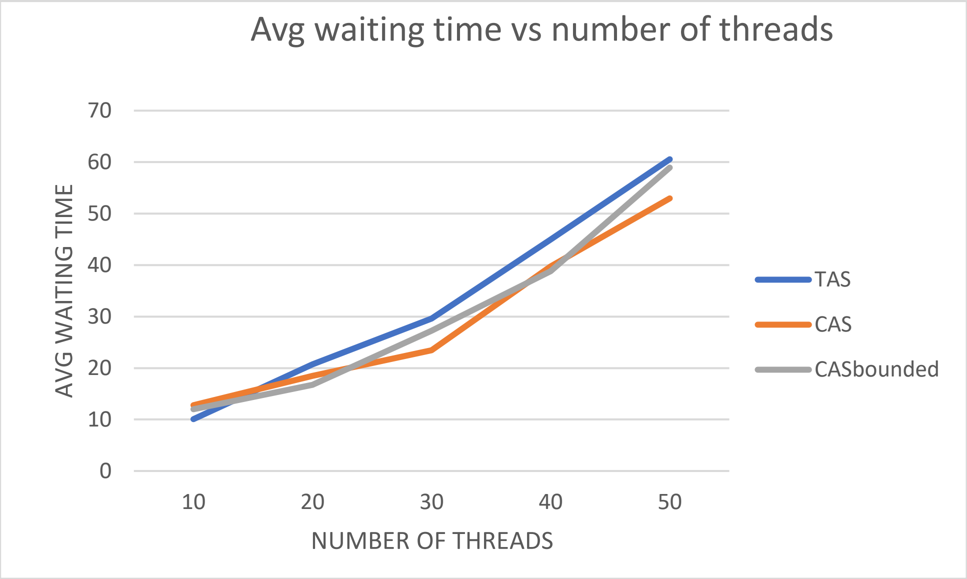
1. Compare and swap sets lock to 1 only if lock value is equal to expected value. It returns previous value of lock.
2. Before entering critical section, process sets lock to 1.
3. After process exits critical section, lock is set to 0.

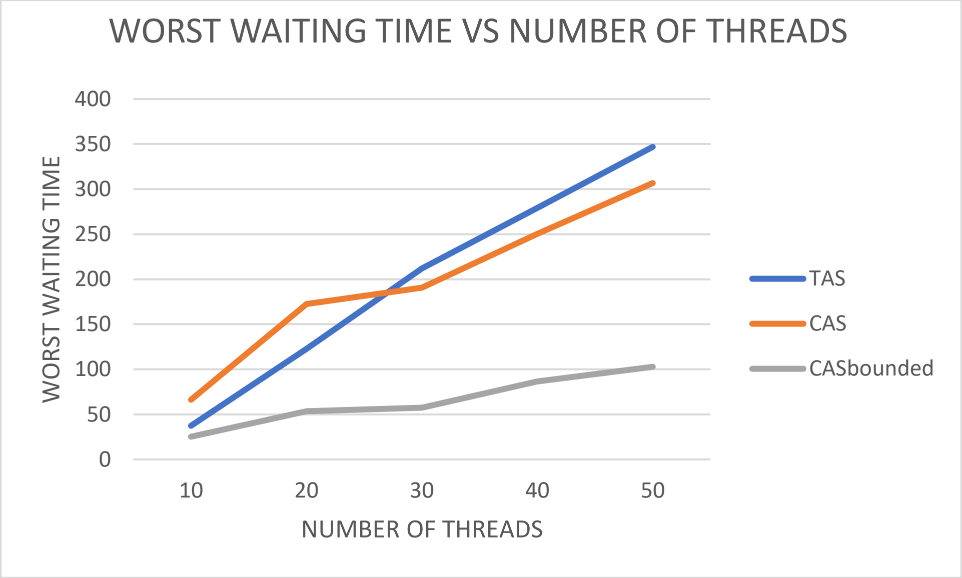
COMPARE AND SWAP WITH BOUNDED WAITING:

1. Bounded waiting is executed in exit section. The process which exits, checks if there is any process waiting. The process waiting enters critical section.
2. If there is no process waiting, lock is set to 0.

OBSERVATIONS:

1. Compare and Swap with bounded waiting has better worst waiting time compared to test and set and compare and swap.
2. compare and swap with bounded waiting ensures bounded waiting. This is the reason why it has better worst waiting time.
3. Average waiting time of all three processes are approximately same. But test and set has little more average waiting time.
4. By this, we can conclude that there is a high probability of starvation in test and set, compare and swap compared to compare and swap with bounded waiting.
5. Here, to record my observations, I took lambda1=2 and lambda=1.


Avg waiting time vs number of threads
AVG WAITING TIME
70
60
50
40
30
20
10
0
10
20
30
40
50
NUMBER OF THREADS
TAS
CAS
CASbounded


WORST WAITING TIME VS NUMBER OF THREADS
WORST WAITING TIME
400
350
300
250
200
150
100
50
0
10
20
30
40
50
NUMBER OF THREADS
TAS
CAS
CASbounded