Programming assignment 1
Report
EE17BTECH11041

Number of threads = 8
Number of variables(m) = 10
Number of total transactions = 500, 600, 700, 800, 900, 1000
Lambda = 100

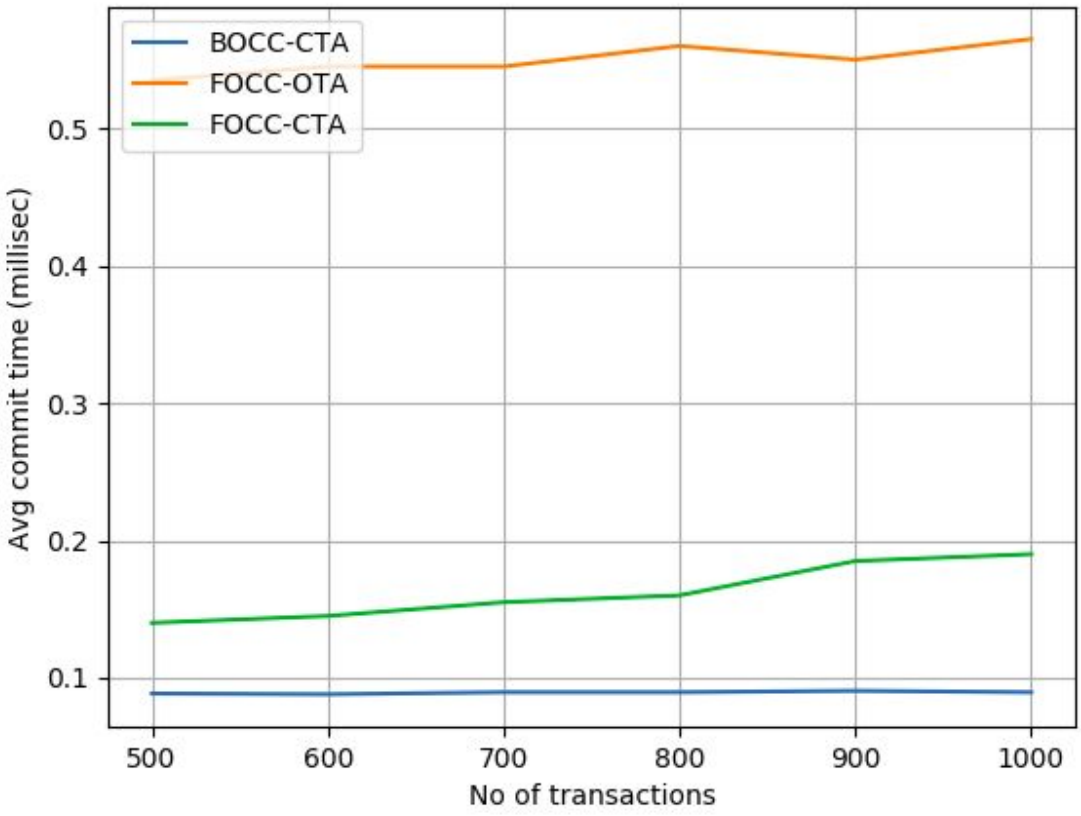
Data Structures used :
map<int,int> status - Used to maintain the status of the other transactions.
map<int,vector<int> > readlist - Used to maintain the read list of all the variables
map<int,vector<int> > writelist - Used to maintain the write list of all the variables.
map<int,vector<int> > readset - Used to maintain readset of each transaction (live transactions in FOCC, committed transactions in BOCC).
map<int,vector<int> > writeset - Used to maintain writeset of each transaction (live transactions in FOCC, committed transactions in BOCC).
varLock - Used for locking the readlist, writelist, readset, writeset, status.
Various locks used for recording measured time, abortcount into shared variables.

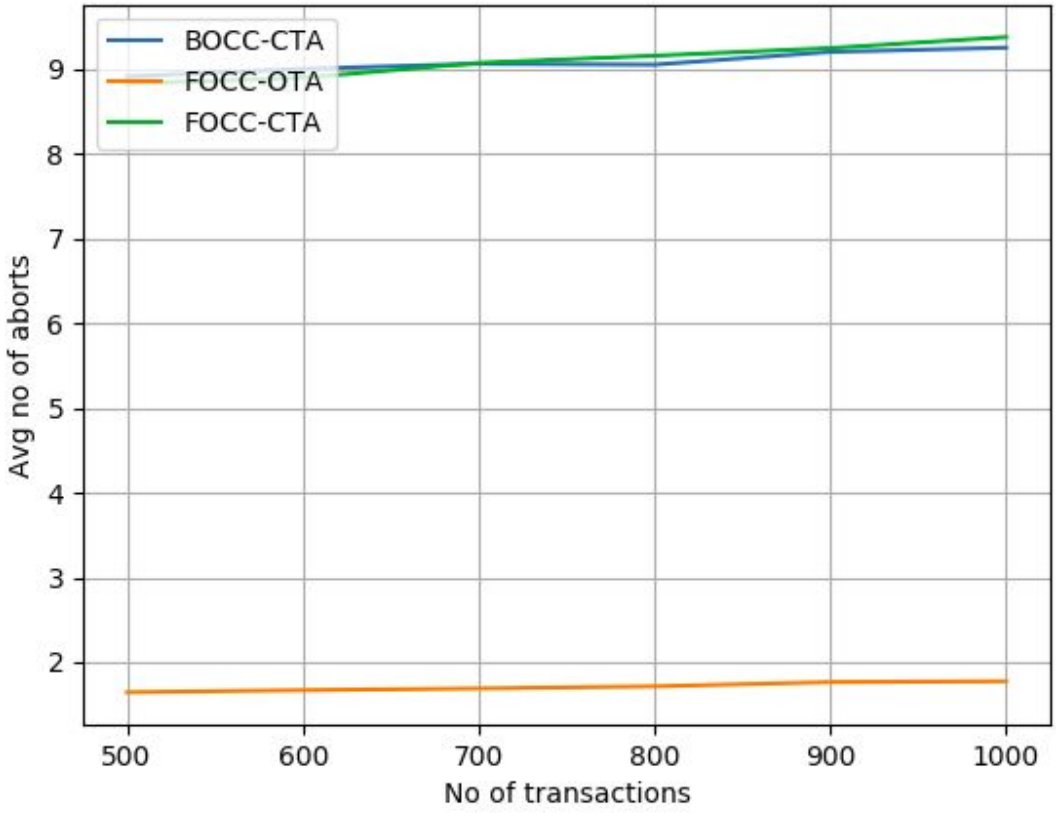
For every operation -
Write - acquire varLock, check status, append to write list and write set, release varLock.
Read - acquire varLock, check status, append to read list and read set, release varLock.
If status check failed - abort - remove itself from readlist, writelist, delete its readset, writeset.
Try_commit -

BOCC-CTA :
Check if the read list of all the variables in its write set is empty, otherwise abort.
FOCC-CTA :
Check if the read list of all the variables in its write set is empty, otherwise abort.
FOCC-OTA :
Check if the read list of each of the variables in its write set is empty, otherwise abort the transactions in the write list of the variables in its read list.

Average commit time - Average time taken by a transaction from begin_trans() to commit successfully.
Average abort count - No of transactions aborted per commited transaction.

As we can see in the graphs the average commit times only increase slightly with total transactions, as we are considering the average per transactions and the number of threads are fixed. So the total number of transactions will not have much effect.


BOCC-CTA
FOCC-OTA
FOCC-CTA
Avg commit time (millisec)
0.1
0.2
0.3
0.4
0.5
500
600
700
800
900
1000
No of transactions


BOCC-CTA
FOCC-OTA
FOCC-CTA
Avg no of aborts
2
3
4
5
6
7
8
9
500
600
700
800
900
1000
No of transactions

The Average commit times for the CTA algorithms are less than that for the ota it has to check for all the intersection of the write set with many other transaction readset's, and abort the other transactions in OTA. But in CTA if we find at least one intersection of its write set with any read set of other transactions we can abort the current transactions.