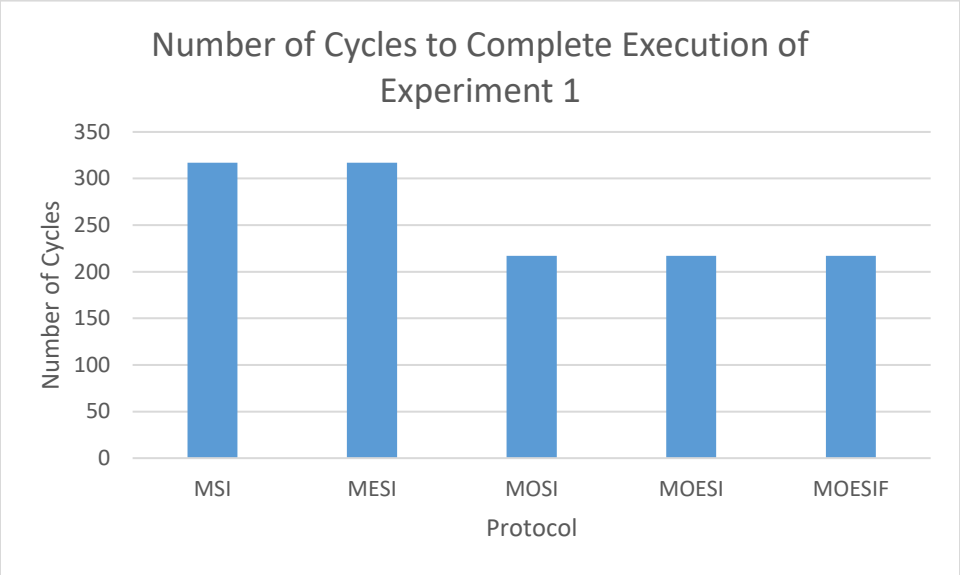
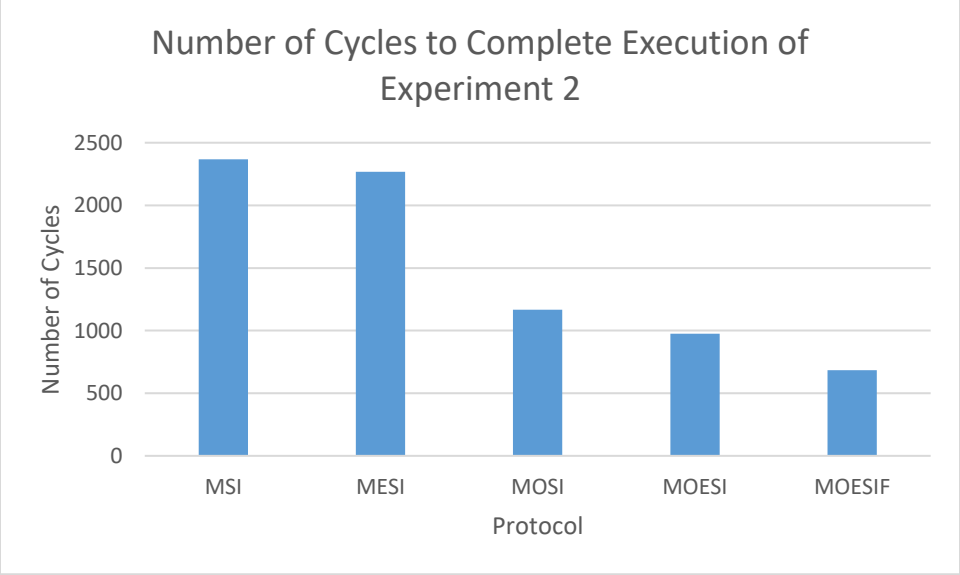
Project 3 Report

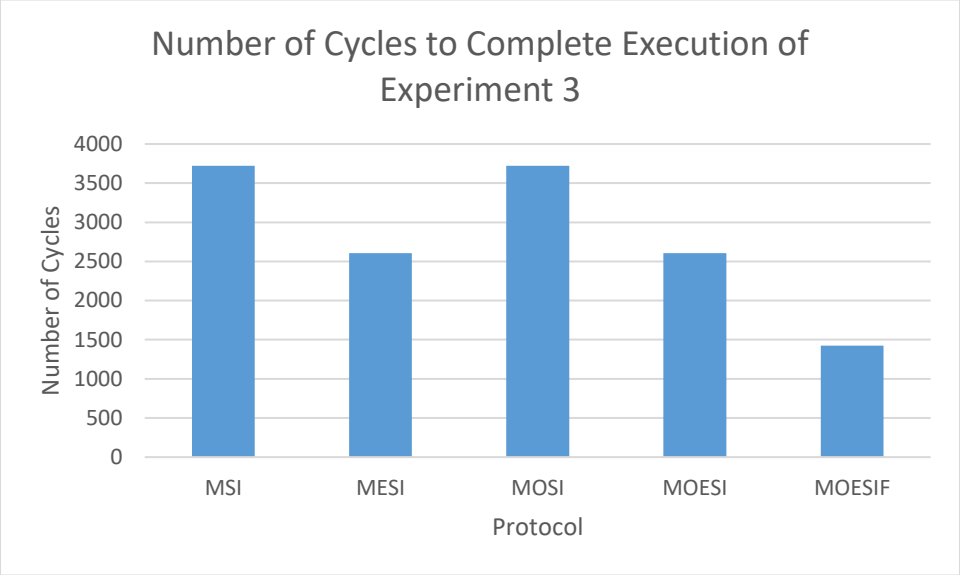


As can be seen in the above plot, MOSI, MOESI, and MOESIF protocols seem to perform better on experiment1 traces, as the owned state in MOSI, MOESI, and MOESIF protocols allows more cache-cache to transfers without having to write to main memory. It seems that the CPU to CPU data transfer latency is lower than that of CPU cache to main memory. Hence, the MOSI, MOESI, and MOESIF end up performing better.

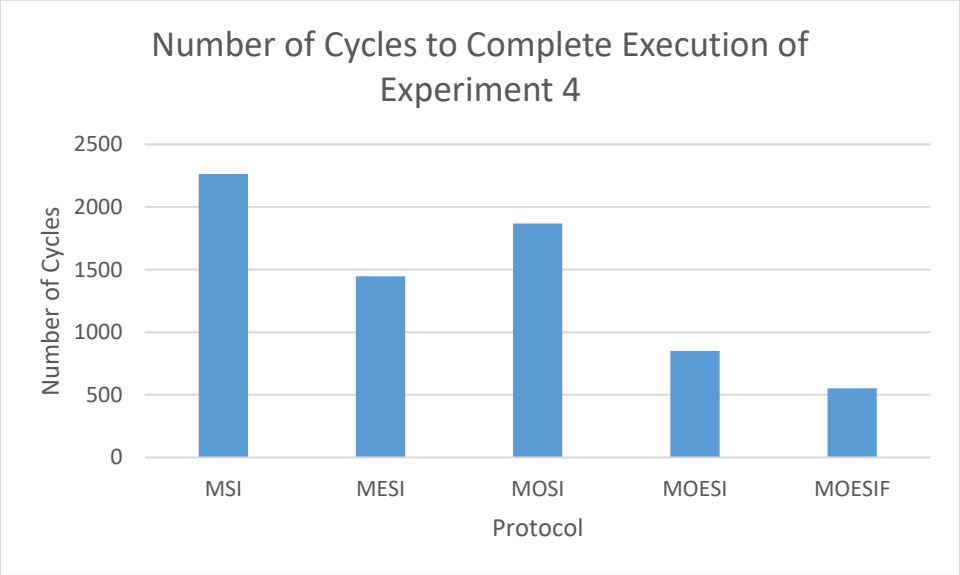


The observation made in experiment 1 applies here and the corresponding explanation provided for it is valid here. In addition, the MOESIF, MOESI, MOSI protocols take lower cycles than one another in that order a significantly large number of cache-to-cache transfers accounts for that, given as 19, 22, 28 (as shown in the tables in the excel file) corresponding to the MOSI, MOESI, and MOESIF protocols

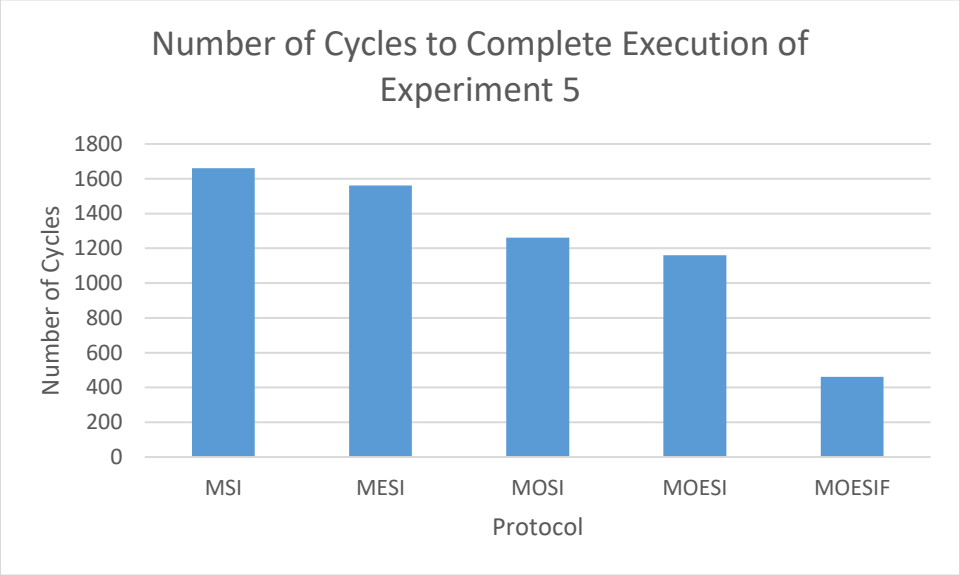
respectively. The extra F state in MOESIF is responsible for those large number of cache to cache transfers. Here, instead of waiting for the data to come from main memory, a direct cache-to-cache transfer is made. Possibly there are more read requests in this experiment, causing the MOESIF protocol to have significantly large number of cache to cache transfers and also the cache to cache transfer latency may be very small.



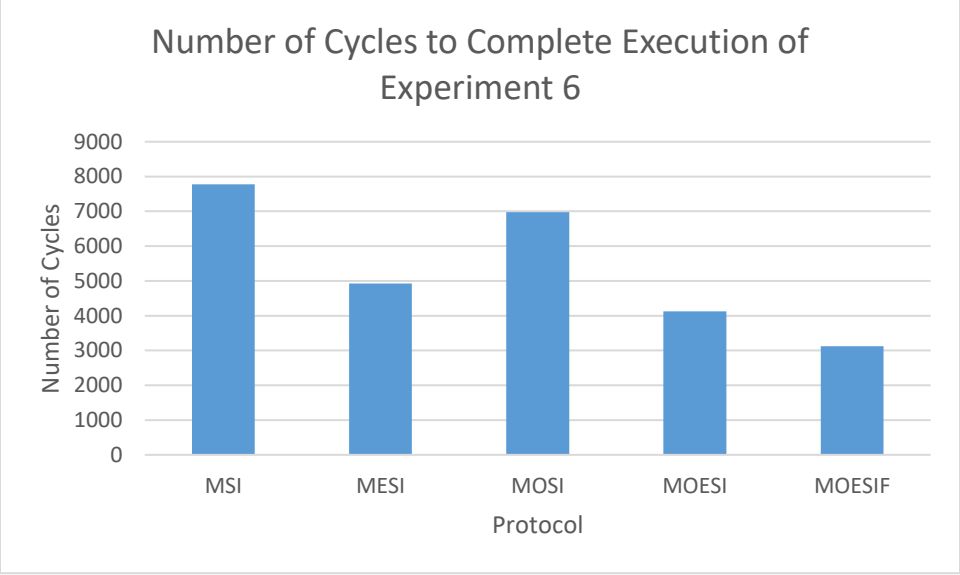
For experiment 3, again the MOESIF protocol performs significantly better than all other protocols. The explanation provided for experiment 2 above regarding state F applies here. Also, MOESI and MESI protocols seem to perform better than the rest except MOESIF. The reason here could be the E state. A possible explanation for this could be that in this case, the program being run is either sequential or not much data is being shared in the parallel program being run. Hence, the E (Exclusive) state is used frequently.



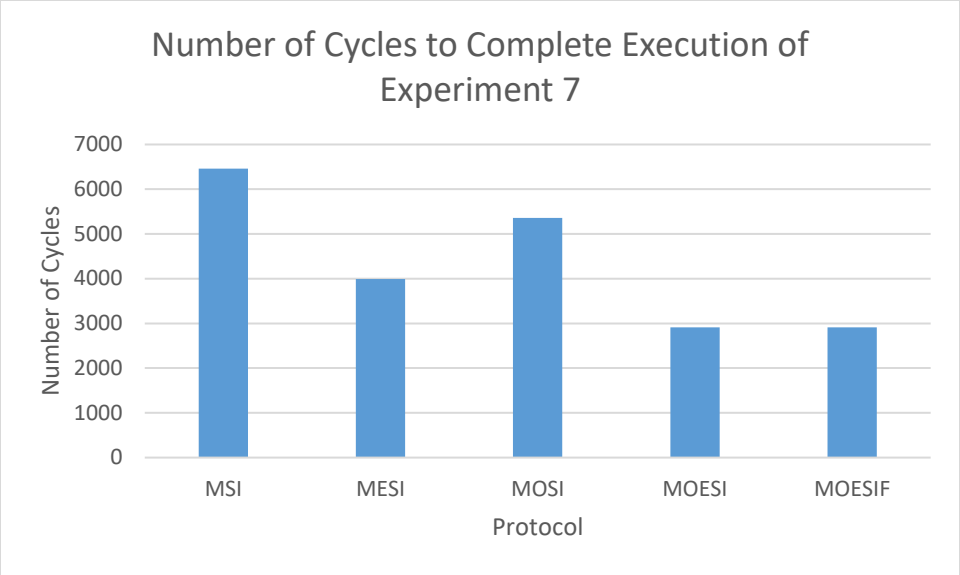
In this experiment the MOESI protocol performs signification better than MSI, MESI, and MOSI. The MOESIF protocol seems performs the best. The reasons provided in previous experiment analysis still apply here for the MOESIF protocol. The reason behind MOESI performing better MESI and MOSI is the combination of O and E states in MOESI. Here, there could be a lot of bus transactions required after a read write request, making the E state useful. Hence, MESI performed better than MOSI. Also, MOESI, performed even better, because of the addition of O state. At the same time, there may be a lot of write backs required. MOESI covers the O and E states, thus the reduction in cycles as compared to MSI by the addition of O state and E state could have caused MOESI to perform better.



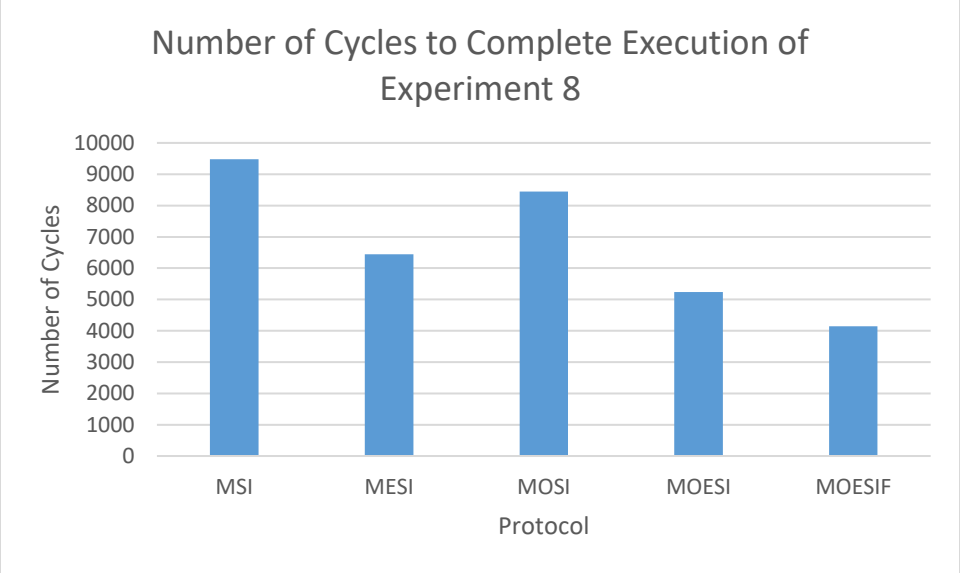
In this experiment the addition of O state and F state seem to make the difference, as the MOESI and MOESIF states perform better than others.



Here the results are very similar to experiment 4. All explanations for the observations provided in analysis for experiment 4 apply here.



This experiment shows results similar to experiments 4 and 6 except the fact that the MOESIF protocol very much matches the performance of MOESI. It could be that there are not many read requests. Consequently, the F state is not made much use of.



Here, the results are very similar to experiments 4 and 6 and the explanations provided in their analysis apply here.

The choice to plot the execution time only versus protocol was made because, the other statistics were seldom needed for the analysis of the results of the different experiments. Still they were extracted out of the trace results file to perform a general analysis of the trend of the remaining statistics for the experiments and use them where needed in this report. They are shown in the file Project3_Results.xlsx file under Doc directory under pdesai75.tar.gz/Project3.