Assignment 3 – Dynamic Scheduling

Compare performance at 16 threads across the different synchronization modes. Why are the speedup this way?

After comparing the performance for 16 threads across different synchronization techniques it is observed that we start getting the speedup as the value of n increases but this increase is speedup is till a certain value of granularity after that value crosses the speedup graph starts descending again as can be seen for the graphs with $n > 100$. This happens due to the effect of granularity. Granularity affects parallelism. It has been observed that using smaller granularity helps achieving more parallelism and hence increases the speedup. However, synchronization overhead, scheduling strategies etc. has negative impacts its performance as some overhead is involved in scheduling the threads again and synchronizing their results. This communication overhead can be reduced by increasing the granularity size. But, which often leads to load balancing issue which further leads to decrease in speedup and thus we can see the speedup graph descends after a certain threshold for granularity is crossed. Thus, the optimal speedup can be gained only somewhere between this range. Source: https://en.m.wikipedia.org/wiki/Granularity_(parallel_computing)

For thread level synchronization, compare the performance at 16 threads of different n and intensity. Why are the plots this way?

As we can see that the speedup graphs for the different values of n increases along with the granularity for a certain limit, when compared with the increase in the intensity this speedup effect of increasing with n starts descending because as the intensity increases it makes the iterations or computations more expensive thus increasing the load or work on the threads and making ineffective load balancing among them. Thus, a perfect balance between the values of intensity and granularity helps achieve an optimal speedup.