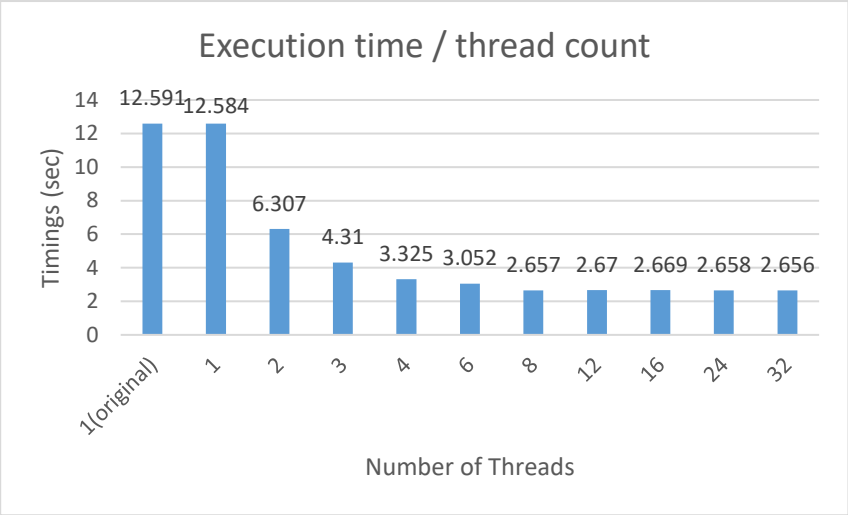
ASSIGNMENT 3 - Report

Question 2:

Threads	timings (sec)	speedup
1(original)	12.591	1
1	12.584	1.000556262
2	6.307	1.996353258
3	4.31	2.921345708
4	3.325	3.786766917
6	3.052	4.125491481
8	2.657	4.738803161
12	2.67	4.715730337
16	2.669	4.71749719
24	2.658	4.737020316
32	2.656	4.740587349



a. No.
b. This is because there are limited number cores and thus an upper limit of threads we can use, thus after a few threads there is almost no significant impact on the timings. Also the more threads we use, the CPU utilization increases, so after some point we might also see time increase as the utilization gets close to 1.

Question 4:

Number of threads	Observed timings	Observed speedup compared to original	Expected speedup
1(original)	18.865	1	1
1	18.88	0.999205508	1
2	10.186	1.852051836	2
3	6.808	2.7710047	3
4	5.235	3.603629417	4
8	3.719	5.072600161	8
16	3.839	4.914040115	16

No, the observed speedup differs from what was expected. It can be observed that for the first 4 threads, the observed speedup was close to the expected, but when there are more threads like 8 or 16, the speedup almost was the same (or even increases) and there was not a significant speed up after a certain number of threads. So trend-wise, we see it was at its max speedup that is around 5 times. This could be because there are only 4 cores with 2 threads each . So we see the speedup coming to a stop. Also after some threads, the CPU utilization shoots up, resulting in no change in speedup or even can increase time.