Assignment 2

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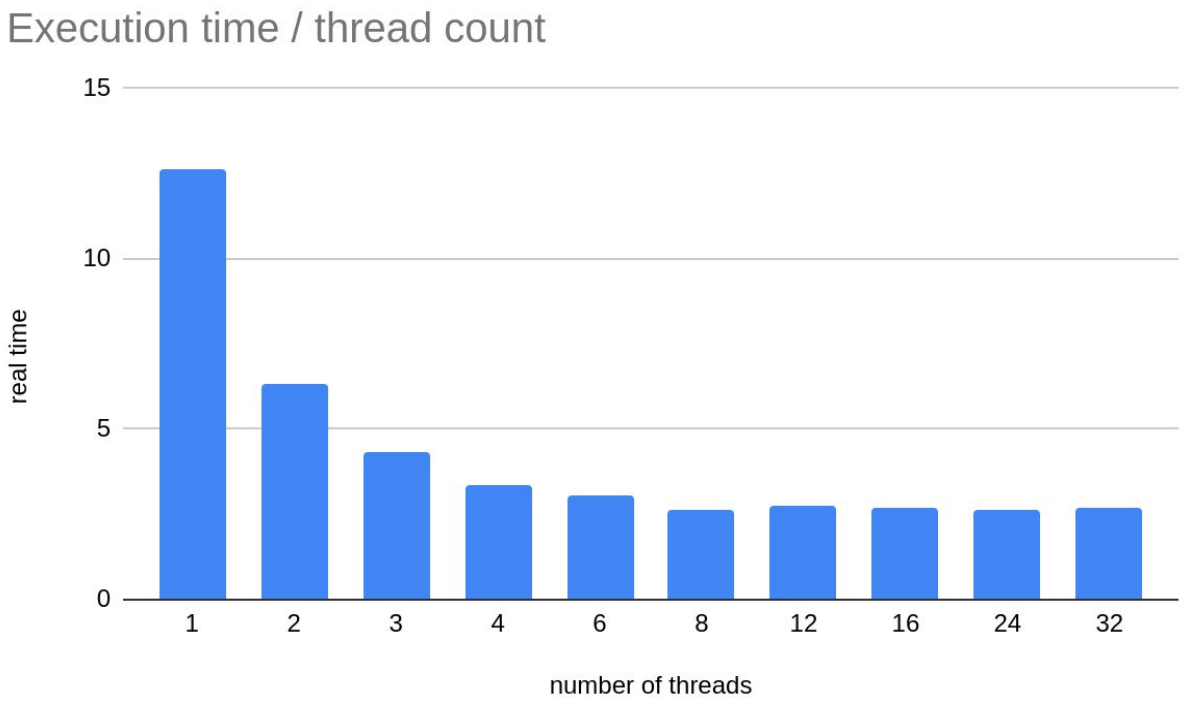
Tutorial: 03

Question 2

Table of timings:

Threads	Timings (in seconds)	Speedup from Original
1 (original)	12.914	
1	12.602	1.02
2	6.312	2.05
3	4.316	2.99
4	3.331	3.88
6	3.060	4.22
8	2.657	4.86
12	2.733	4.73
16	2.700	4.78
24	2.659	4.86
32	2.665	4.85

Bar Graph of Timings:



a) No, we do not observe N-times speedup for all numbers of threads. When using up to 4 threads, we see around N-times speedup, as seen from the table above. But after that, the speedup stays at around 4.8 no matter how many threads the program uses.

b) The linux servers used to time the executions of the programs has 4 physical cores. That means that no matter how many threads we use, only 4 threads can run concurrently, so the maximum speedup will be around 4 times. That is why for threads larger than 4, the speedup is still around 4 times and we are not seeing any increase in the speedup.

Question 4

Test File: Medium.txt			
#Threads:	**Observed Timing (seconds)**	**Observed Speedup Compared to original**	**Expected Speedup**
Original Program	20.1	1.0	1.0
1	21.2	0.95	1.0
2	11	1.83	2.0
3	7.7	2.61	3.0
4	5.75	3.5	4.0
8	4.88	4.11	8.0
16	4.81	4.17	16.0

Test File: Hard.txt			
#Threads:	**Observed Timing (seconds)**	**Observed Speedup Compared to original**	**Expected Speedup**
Original Program	6.89	1.0	1.0
1	7.39	0.93	1.0
2	3.71	1.86	2.0
3	2.54	2.71	3.0
4	1.96	3.52	4.0
8	1.49	4.62	8.0
16	1.51	4.56	16.0

Test File: Hard2.txt			
#Threads:	**Observed Timing (seconds)**	**Observed Speedup Compared to original**	**Expected Speedup**
Original Program	6.9	1.0	1.0
1	7.4	0.93	1.0
2	3.7	1.86	2.0
3	2.54	2.72	3.0
4	1.96	3.52	4.0
8	1.49	4.63	8.0
16	1.5	4.6	16.0

Yes, the results are what I expected them to be. Just like question 2, there is (roughly) an N-times speedup when running the program with number of threads less than or equal to 4. But since the server has 4 physical cores, at most 4 threads can run concurrently. That is why for number of threads larger than 4, we are still seeing a speedup of around 4.