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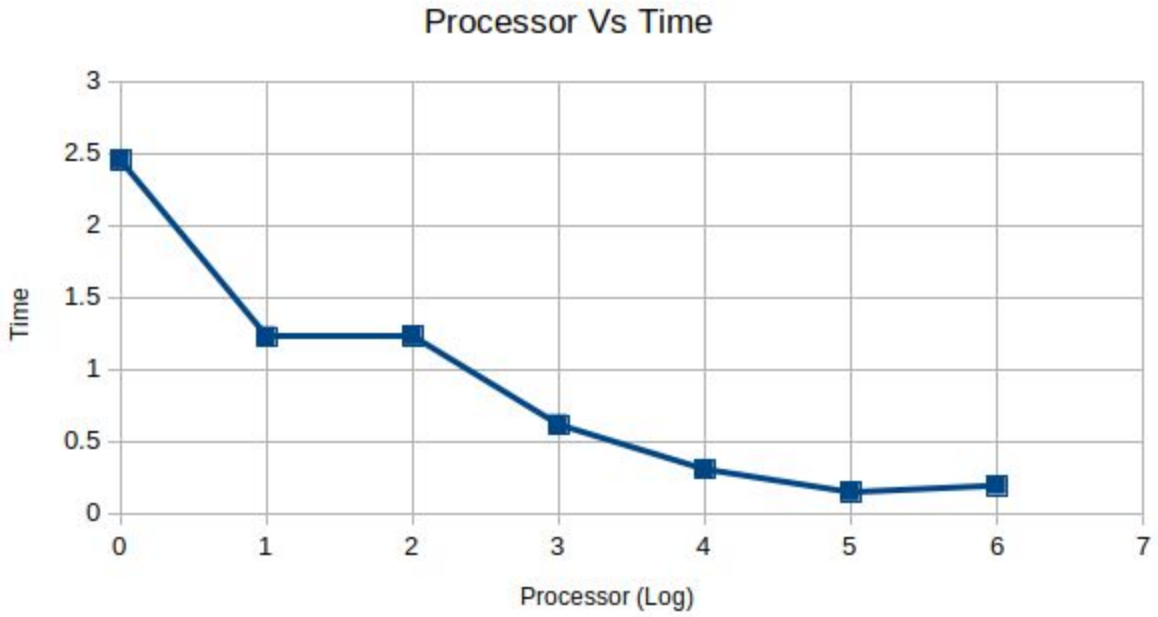
CSCE 689 HW1

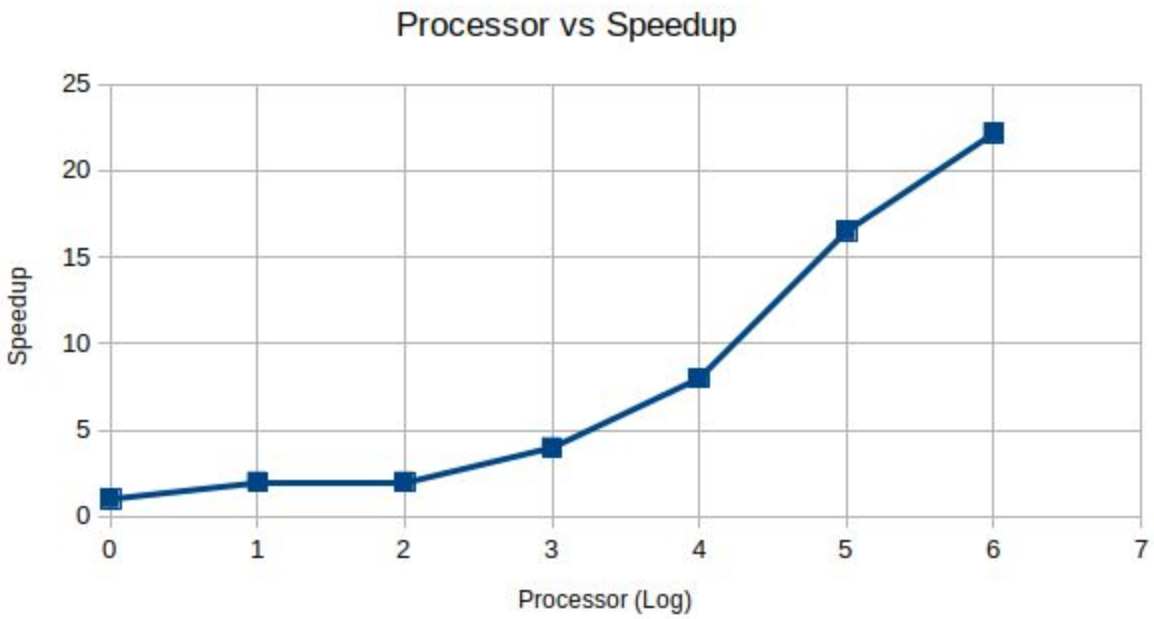
1. Plot execution time versus p to demonstrate how time varies with the number of processes. Use a logarithmic scale for the x-axis.

Processors	Processors (Log)	Time (sec)
1	0	2.4515
2	1	1.2262
4	2	1.2301
8	3	0.6161
16	4	0.3069
32	5	0.1478
64	6	0.1931



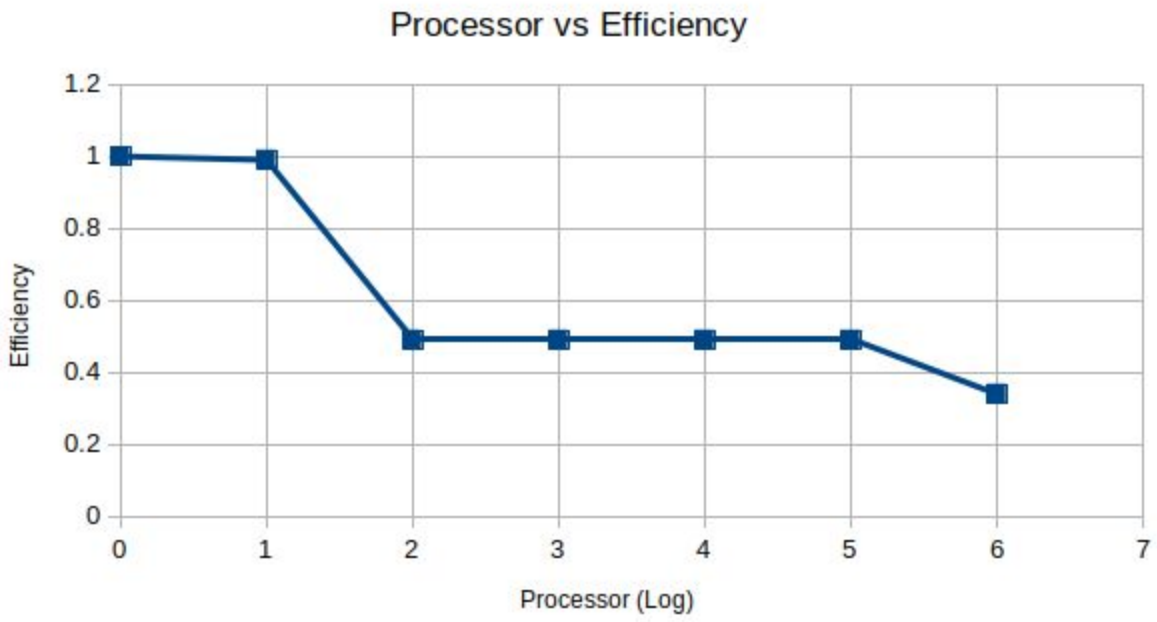
2. Plot speedup versus p to demonstrate the change in speedup with p

Processors	Processors (Log)	Speedup
1	0	1
2	1	1.99
4	2	1.99
8	3	3.97
16	4	7.98
32	5	16.5
64	6	22.16



3. Using the definition: efficiency = speedup/p, plot efficiency versus p to demonstrate how efficiency changes as the number of processes is increased

Processors	Processors (Log)	Efficiency
1	0	1
2	1	0.99
4	2	0.49
8	3	0.49
16	4	0.49
32	5	0.49
64	6	0.34

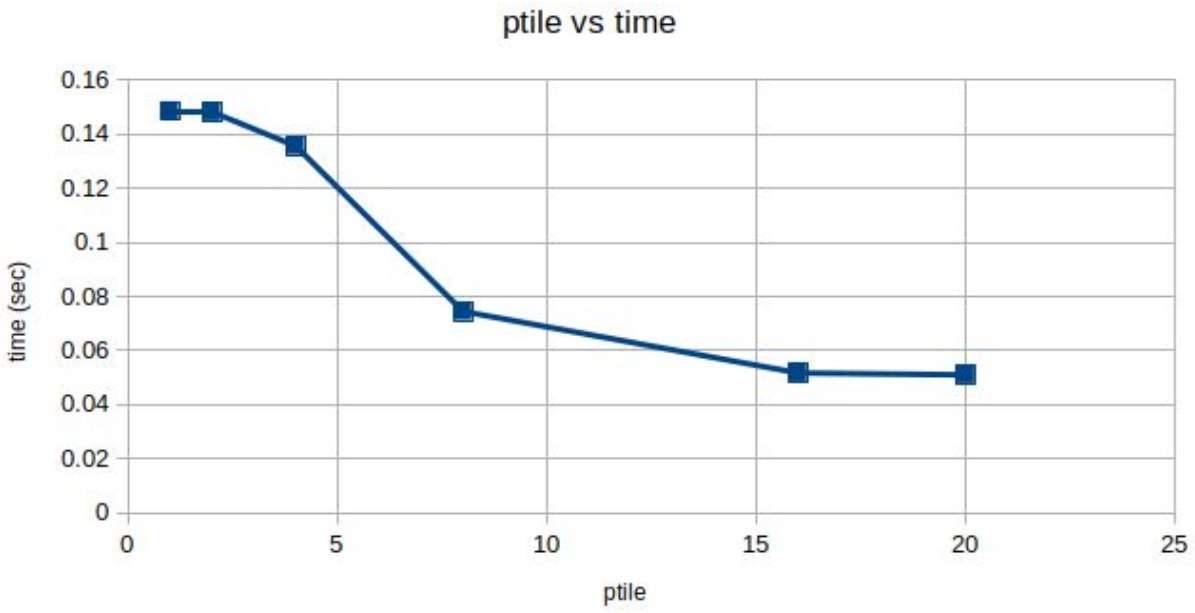


4. What value of p minimizes the parallel runtime?

   P = 32 minimizes the parallel runtime

5. With n=10^9 and p=64, determine the value of ptile that minimizes the total_time. Plot time versus ptile to illustrate your experimental results for this question.

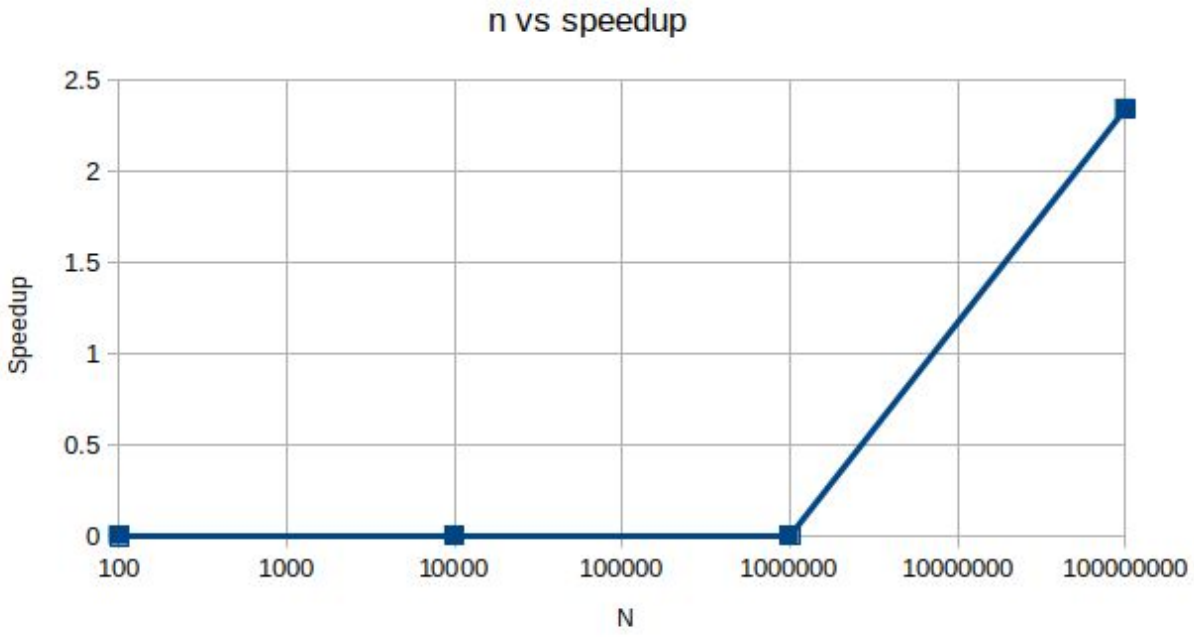
ptile	time
1	0.1484
2	0.1480
4	0.1355
8	0.0744
16	0.0517
20	0.0510



Ptile = 20 minimizes the total_time

6. Repeat the experiments with p=64 for n=10^2 , 10^4 , 10^6 and 10^8.
    a) Plot the speedup observed w.r.t. p=1 versus n.

n	P = 1	P = 64	Speedup
100	0.0001	0.1066	0.00093
10000	0.0002	0.1072	0.0018
1000000	0.0027	0.1150	0.0023
100000000	0.2543	0.1085	2.343



b) Plot the relative error versus n to illustrate the accuracy of the algorithm as a function of n.

n	Relative error
100	2.65e-06
10000	2.65e-10
1000000	2.63e-14
100000000	7.07e-16