

OPERATING SYSTEM – 2(CS3523)

Programming Assignment – 2 (Implementing TAS, CAS and Bounded Waiting CAS Mutual Exclusion Algorithms)

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- This Assignment compares three different synchronization algorithm which is implemented at the hardware level. Those three Algorithm are test_and_set, compare_and_swap and bounded compare_and_swap.
- By the data given on next page , i draw a following conclusion :
 1. Average time is more for bounded CAS as compare to TAS and CAS.
 2. TAS and CAS has comparable(almost same) Average time.
 3. Worst time is much less for bounded CAS as compared to TAS and CAS.
 4. Worst time is more in case of TAS as compared to CAS.
- From above conclusion i can say that starvation problem is more in TAS as compared to CAS while bounded CAS has minimum starvation of threads.

- Example of collection of Average time and worst time to enter in CS for a given set of input in which $k = 10$, $\lambda_1 = 5$ seconds and $\lambda_2 = 20$ seconds is given below :

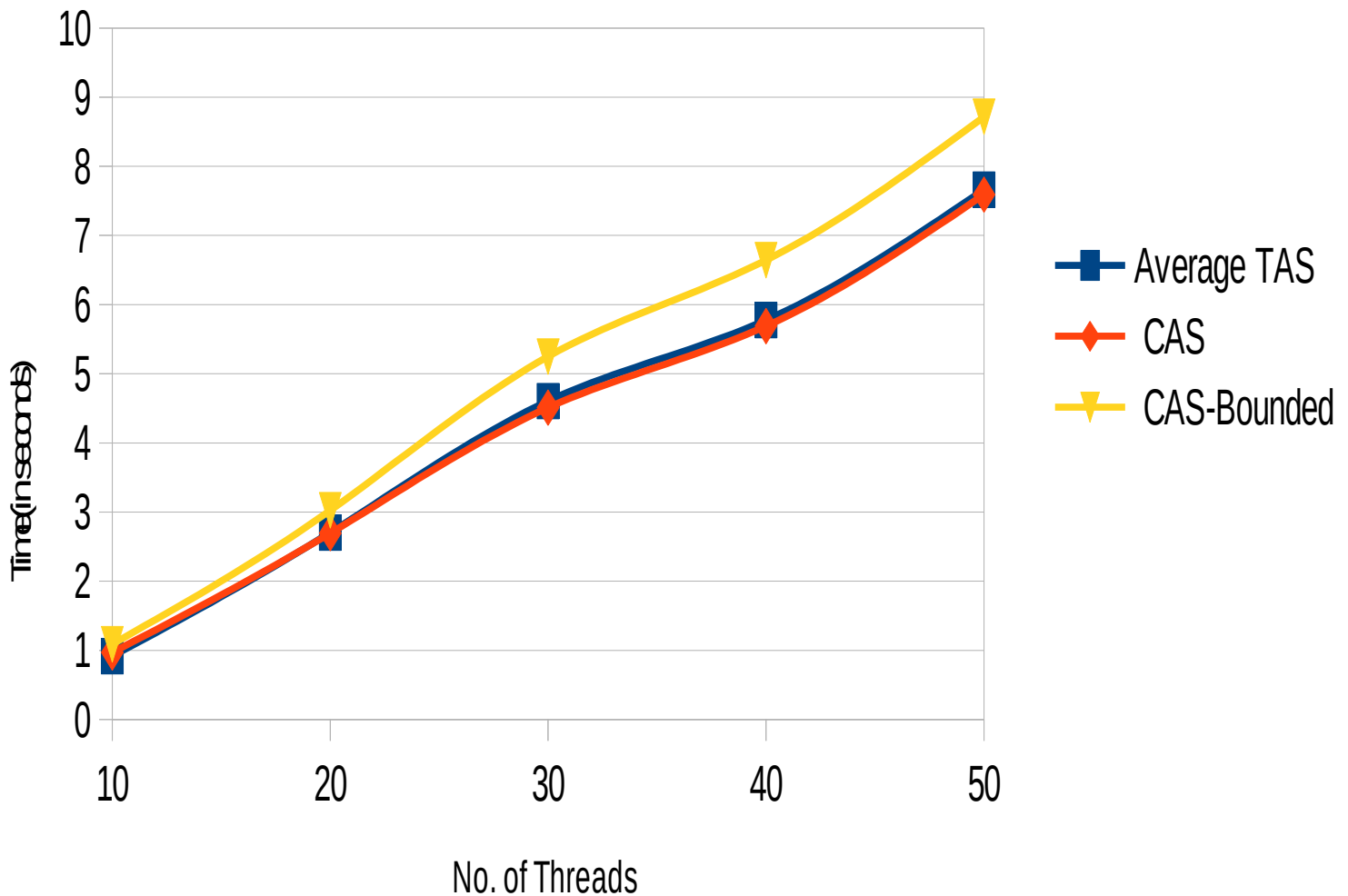
No. of threads	Sample Output	Average			Worst		
		TAS	CAS	CAS-Bounded	TAS	CAS	CAS-Bounded
10	1	0.92	0.82	1.06	3	5	2
	2	0.86	1	1.08	5	6	2
	3	0.87	1	1.1	5	5	2
	4	1.03	1.01	1.09	4	5	2
	5	0.9	1.01	1.11	4	6	2
	Average	0.916	0.968	1.088	4.2	5.4	2
20	1	2.73	2.745	3.06	16	14	4
	2	2.84	2.645	3.015	19	24	4
	3	2.495	2.815	3	15	16	4
	4	2.615	2.555	3.035	16	11	4
	5	2.84	2.715	3.015	22	14	4
	Average	2.704	2.695	3.025	17.6	15.8	4
30	1	4.51	4.53	5.26	22	27	6
	2	4.52333	4.42	5.21	32	26	6
	3	4.39	4.49667	5.23667	24	25	6
	4	4.72667	4.87333	5.26667	27	22	6
	5	4.87667	4.23	5.27667	31	22	6
	Average	4.605334	4.51	5.250002	27.2	24.4	6
40	1	5.9375	5.7525	6.6475	46	36	8
	2	5.62	5.58	6.6625	37	25	8
	3	5.4275	6.0275	6.6275	43	37	8
	4	5.8025	5.63	6.6425	38	45	8
	5	6.09	5.455	6.635	35	27	8
	Average	5.7755	5.689	6.643	39.8	34	8
50	1	7.538	7.874	8.72	86	49	10
	2	7.958	7.564	8.732	63	53	10
	3	7.898	7.754	8.72	54	46	10
	4	7.384	7.434	8.74	45	52	10
	5	7.536	7.33	8.668	49	54	10
	Average	7.6628	7.5912	8.716	59.4	50.8	10

- Graph of No. of Threads vs Average time is given below :

No. of Threads	Average		
	TAS	CAS	CAS-Bounded
10	0.916	0.968	1.088
20	2.704	2.695	3.025
30	4.605334	4.51	5.250002
40	5.7755	5.689	6.643
50	7.6628	7.5912	8.716

Average Time To Enter in CS

Average Time



- Graph of No. of Threads vs Worst time is given below :

No. of Threads	Worst		
	TAS	CAS	CAS-Bounded
10	4.2	5.4	2
20	17.6	15.8	4
30	27.2	24.4	6
40	39.8	34	8
50	59.4	50.8	10

Worst Time to Enter in CS

Worst Time

