

# COMP526 HW5

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We have two instructions: the chunked and interleaved.

For each situation, we keep TOTALSIZE fixed at 8192 , then vary the number of processors NUM\_PROCESSORS for the values: 1, 2, 4, 8, and 16.

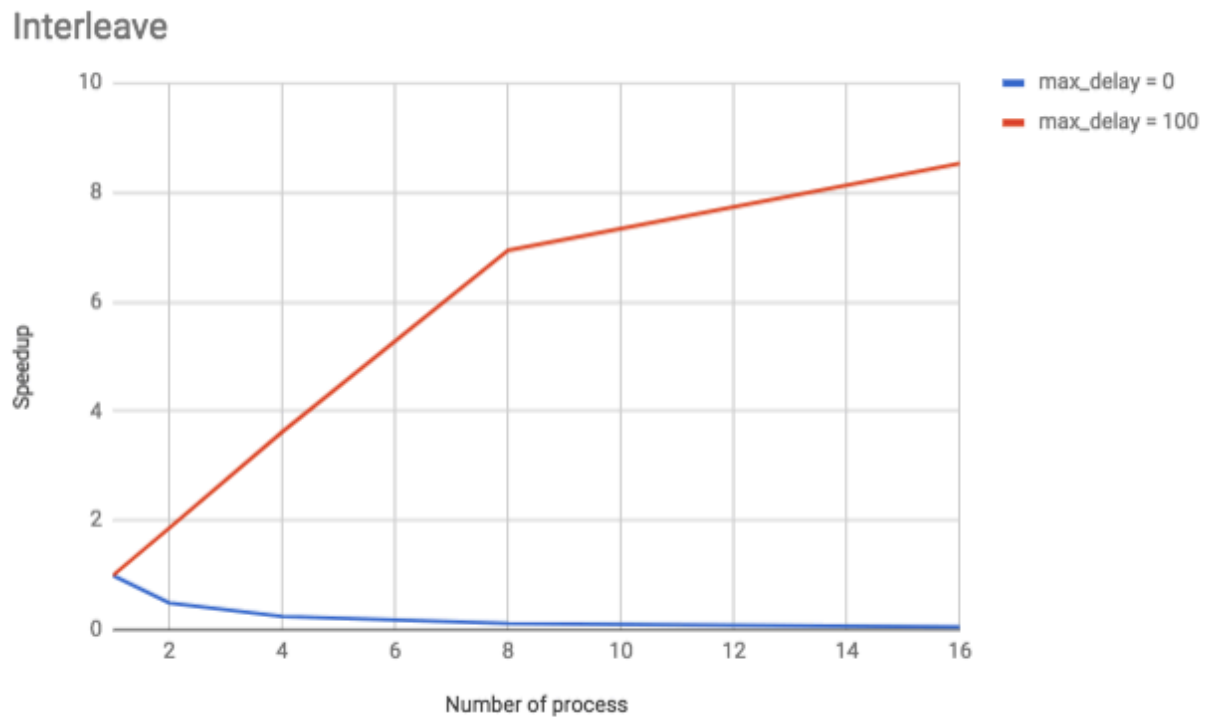
## 1. Interleave max\_delay = 0

max_delay=0								
Number of process	Read Hit	Read Miss	Silent Write Hit	Upgrade	Write Miss	Write Back	EXECUTION_TIME	Speedup
1	8192	1024	7168	1024	0	1023	39926	
2	8192	3389	4487	2683	3388	1023	96923.01	0.4119352051
4	8192	4098	7157	1026	3083	1023	98455	0.4055253669
8	8192	8192	1024	1024	7168	1023	196599	0.2030834338
16	8192	8192	0	1024	7168	1022	196588	0.2030947972

## 2. Interleave max\_delay = 100

max_delay=100								
Number of process	Read Hit	Read Miss	Silent Write Hit	Upgrade	Write Miss	Write Back	EXECUTION_TIME	Speedup
1	8192	1024	7168	1024	0	1023	1678326	
2	8192	5120	4096	4096	4096	1023	899074.01	1.866727301
4	8192	7168	6144	2048	6144	1023	462884.01	3.625802499
8	8192	8192	7168	1024	7168	1023	241738	6.942747934
16	8192	8192	514	1024	7168	1023	196689	8.532892028

For interleaved situation, we got this figure:



In MSI, each block contained inside a cache can three possible states: Modified, Shared and Invalid. By interleaving the array elements among the processors, we vary the number of process from 1 to 16, and we can see an increase of Speedup when max\_delay = 100, and a decrease of Speedup when max\_delay = 0. When the time between successive memory requests by a processor increase, the execution time will decrease when number of process increase. On the contrast, the execution time will increase with number of process when the time between successive memory requests by a processor is 0.

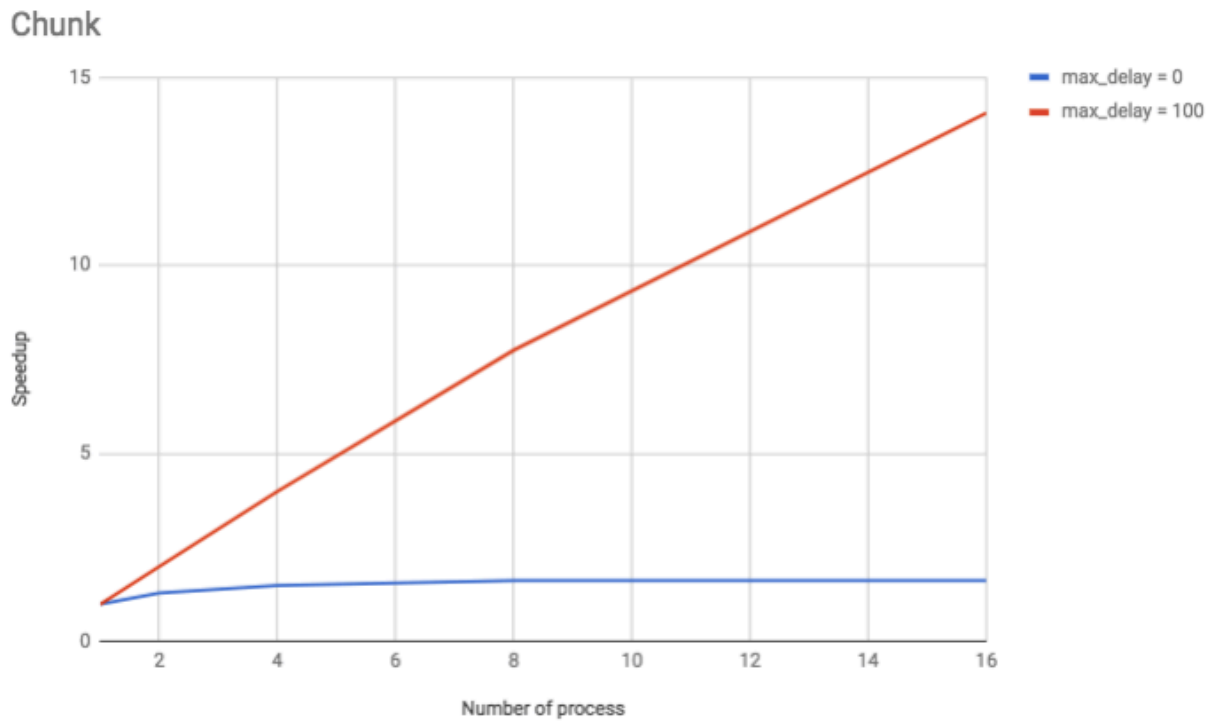
### 3. Chunk max\_delay = 0

max_delay=0								
Number of process	Read Hit	Read Miss	Silent Write Hit	Upgrade	Write Miss	Write Back	EXECUTION_TIME	Speedup
1	8192	1024	7168	1024	0	1023	39926	1
2	8192	1024	7168	1024	0	1022	30702	1.300436454
4	8192	1024	7168	1024	0	1020	26590	1.501541933
8	8192	1024	7168	1024	0	1016	24510	1.628967768
16	8192	1024	7168	1024	0	1008	24430	1.634302088

### 4. Chunk max\_delay = 100

max_delay=100								
Number of process	Read Hit	Read Miss	Silent Write Hit	Upgrade	Write Miss	Write Back	EXECUTION_TIME	Speedup
1	8192	1024	7168	1024	0	1023	1678326	
2	8192	1024	7168	4096	4096	1023	839180	1.999959484
4	8192	1024	7168	2048	6144	1023	419640	3.999442379
8	8192	1024	7168	1024	7168	1023	216614	7.748003361
16	8192	1024	7168	1024	7168	1023	119493	14.04539178

For chunked situation, we got this figure:



when partitioning the array among the processors either in large contiguous chunks, the tendency is a little different. This time whatever the time between successive memory requests by a processor, the execution will decrease with the increase of number of process. But it will show bigger change for max\_delay = 100 situation.