

30000 Random

threshold	QSI	QSI	MSI	MSI	Quick	Merge
10	3764	3860	3771	3663		
30	3623	4170	3585	4269		
60	3690	4877	3863	5523		
90	3925	5653	3836	5451		4310
120	4183	6330	4696	7941	4184	
150	4433	7331	4728	7966		
200	4974	8370	4773	7983		
250	5582	10232	6695	12578		
300	6204	12016	6722	12711		

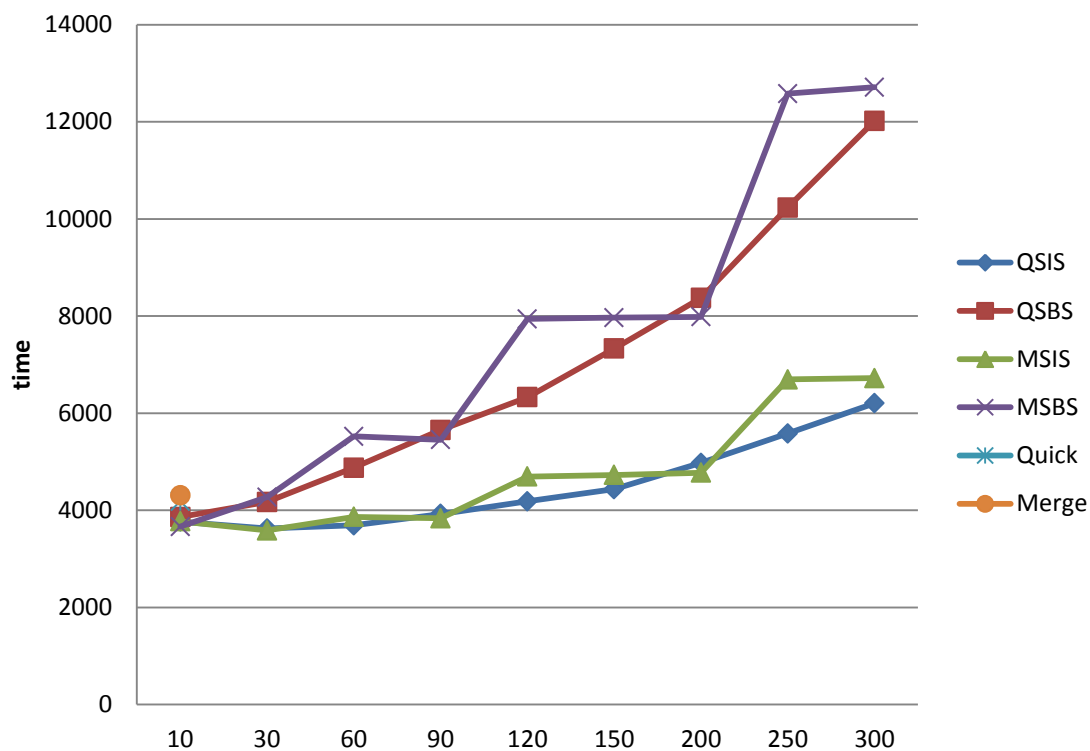
300000 Random

threshold	QSI	QSI	MSI	MSI	Quick	Merge
10	50279	46644	45924	45360		
30	45131	50267	44535	46288		
60	46167	57470	45640	53779		
90	48225	65600	49773	68550		51792
120	50651	75141	48942	69414	50006	
150	53569	82315	59691	97047		
200	58430	95408	60648	98643		
250	64338	108826	62774	96426		
300	68600	123156	84992	151178		

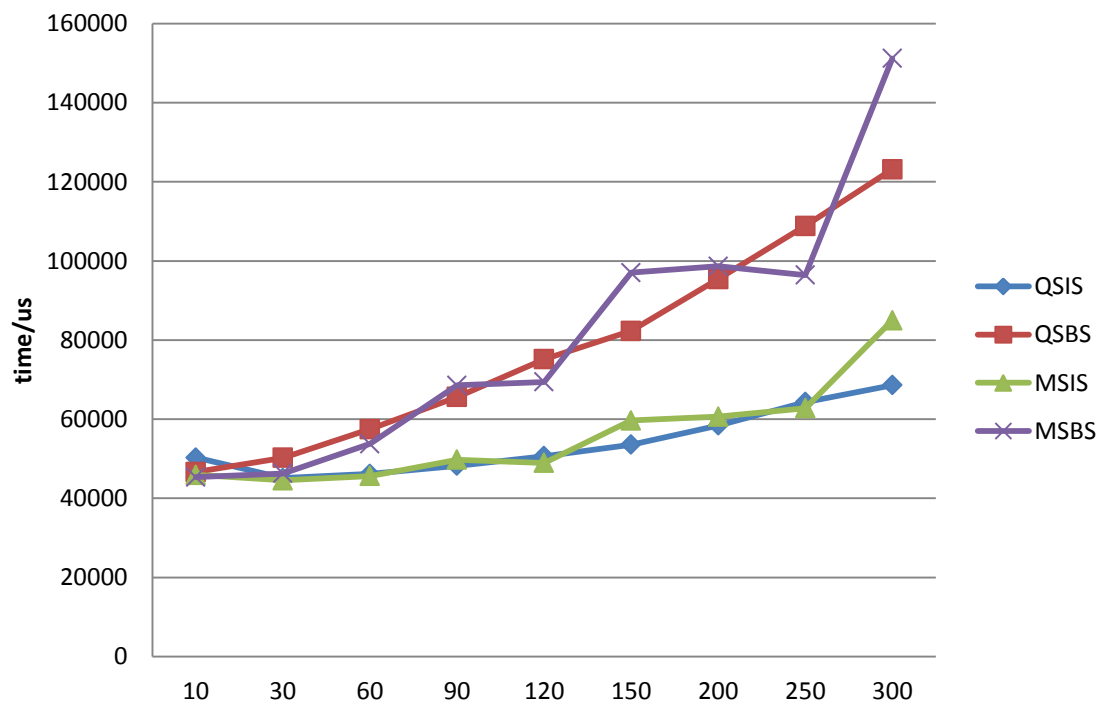
Random threshold 30

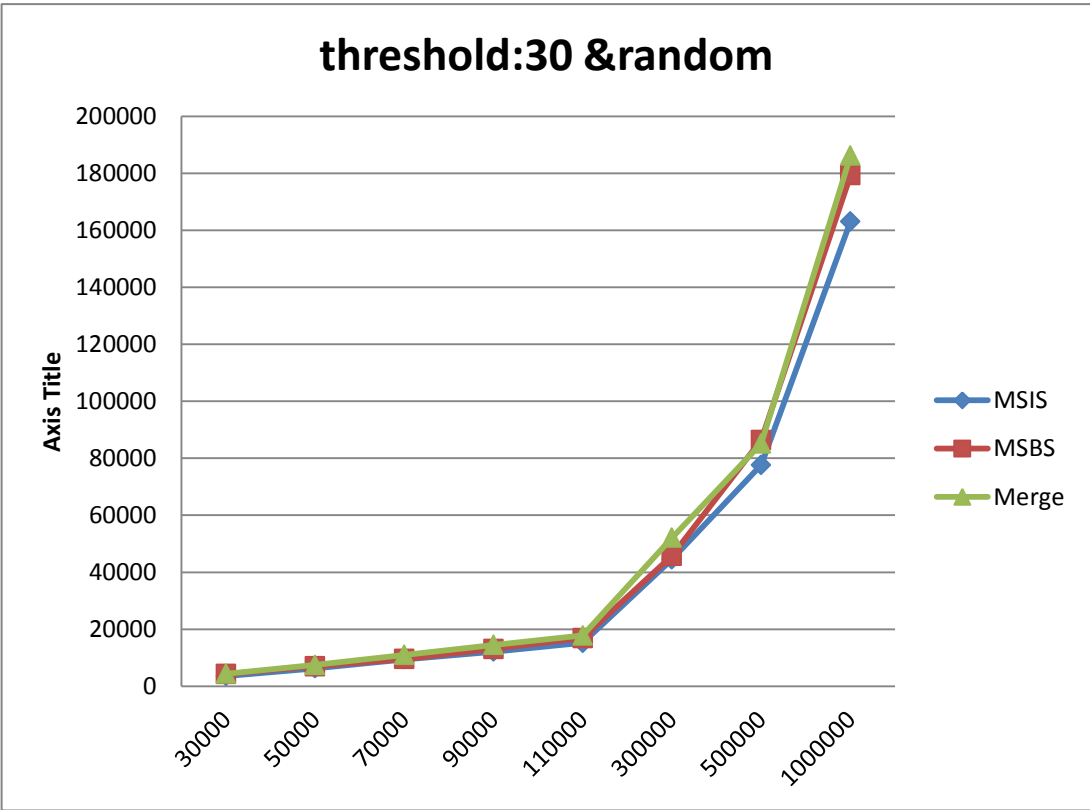
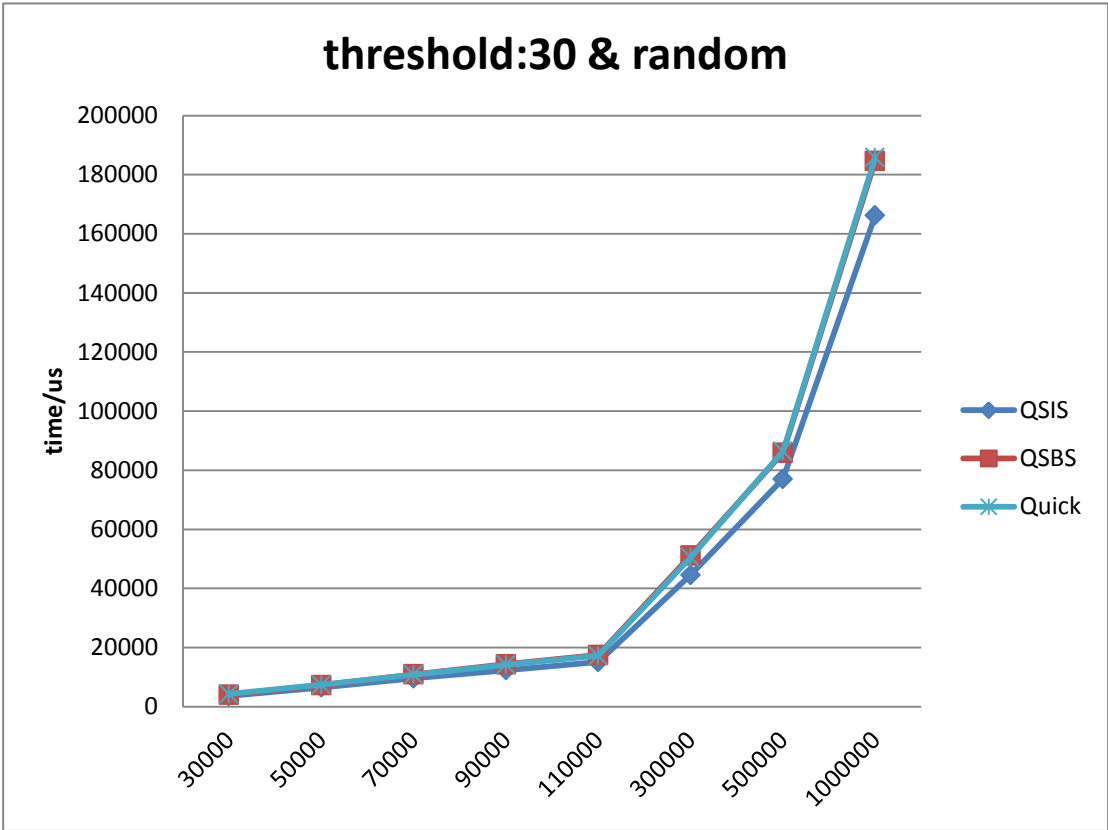
size	QSI	QSI	MSI	MSI	Quick	Merge
30000	3609	4090	3588	4261	4257	4384
50000	6487	7251	6294	7027	7432	7492
70000	9562	10945	9457	9524	10851	11026
90000	12371	14327	12133	13060	14195	14510
110000	15125	17492	15191	16881	17257	17789
300000	44575	51112	44548	45770	50441	52100
500000	77062	85923	77641	86395	86418	85157
1000000	166210	184691	163122	179338	185792	186170

### 30000 Random(x-threshold)



### 300000 random(x-threshold)





From the first graph, I can find that QSI and MSI is faster than QBS and MBS when the threshold increases (array size is 30000). Moreover, time costs increase while threshold increases. When the array size is 30000, time cost of quick sort is 4184us, but when use QSI and QBS, the time costs are less than quick sort (threshold < 90), they are more efficiency. Time cost of merge sort is 4310us, if we use MSI, the time cost will be less than merge sort when the threshold less than 90.

From the second graph, the array size is 300,000, with threshold increases, time costs increase. And QSI and MSI is faster than QBS and MBS when the array size and threshold size are same. Compared with pure Quick sort and Merge sort, QSI is more efficiency than Quick when the thresholds are less than 90. MSI and MBS are more efficiency than Merge sort when the threshold sizes are less than 90.

In the third and fourth graphs, when array sizes increase with fixed threshold, QSI is more efficiency than Quick sort. MSI is more efficiency than pure Merge sort.