HPCSE EX6

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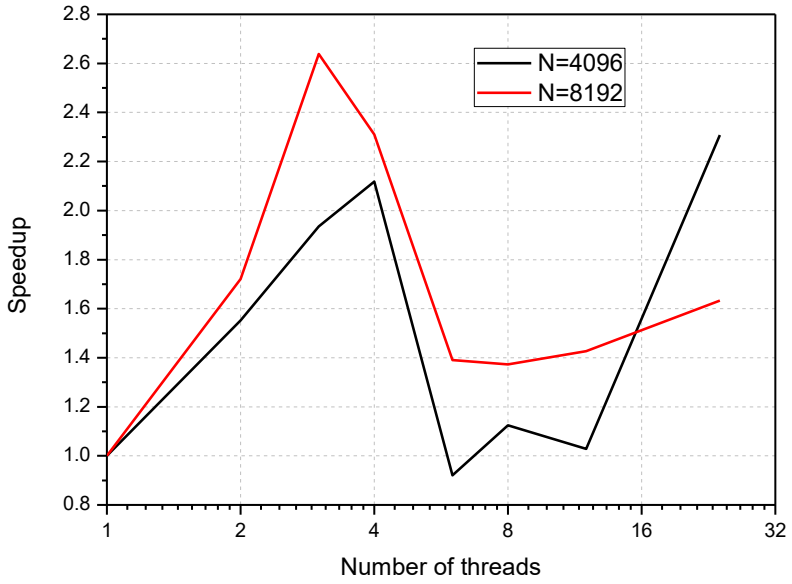
Q1:

	4096_seq	8192_seq
Initial time (s)	0.15	0.60
Slapse time (s)	3.60	25.62
Eigen_1	2232.13	4463.98
Eigen_2	665.85	1331.61
Eigen_3	316.64	633.24
Eigen_4	184.61	369.20
Eigen_5	120.805	241.59

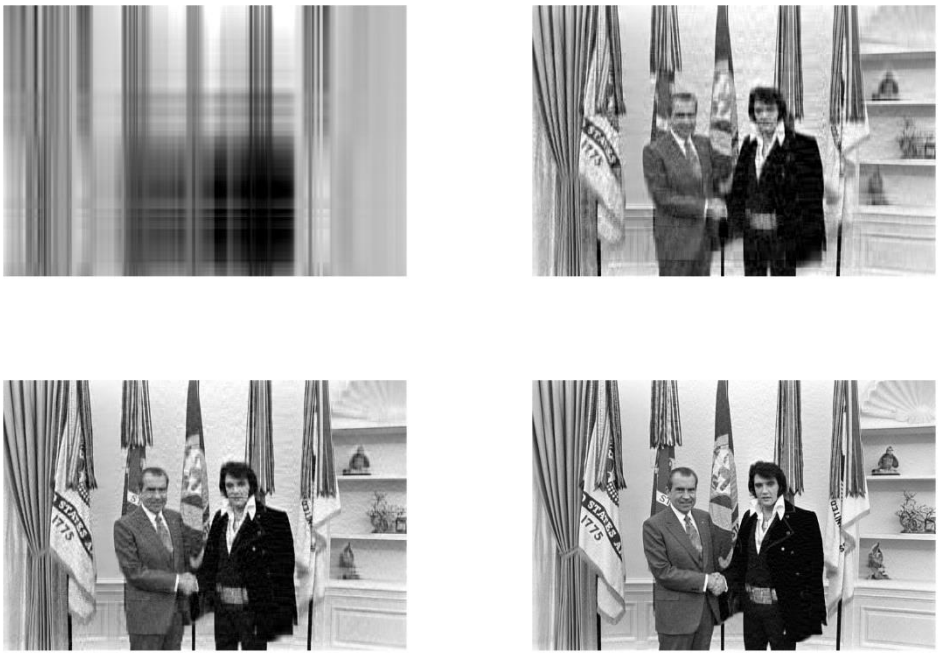


Multithreading of DSYEV have the linear scale up to 4 threads. And 3 or 4 threads multithreading achieve the speedup of 2 – 3 times. However, when further increasing the number of threads, the performance decrease (to 8 threads), and then increase again (up to 24 threads).

Q2:

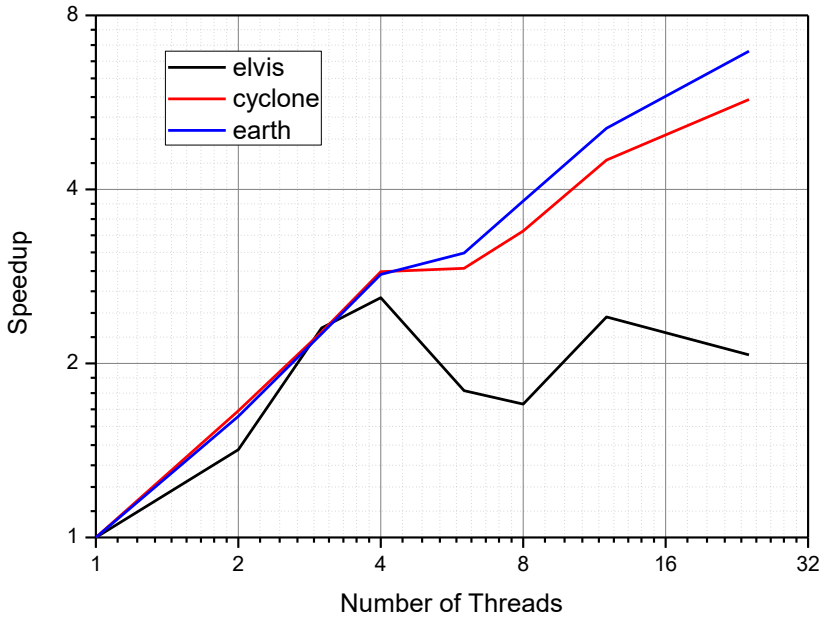
a)

NPC	Compress ratio
1	12700 %
30	900 %
50	500 %
100	200 %



PCA = 1, 30, 50, 100

b)



Top 100 principal components are chosen in each case. “C matrix formation”, “DSYEV” and “PCreduced” are parallelized (Other parts contribute little to the total time).
We can observe that with the increasing of figure size, parallelization can scale up better. Elvis can scale up to 4 threads, while the other two figures can scale up to 24 threads.