Program Structures and Algorithms
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GITHUB LINK: https://github.com/LearningMach1ne/INFO6205

Task: Assignment 5 (Parallel Sorting):

Conclusion:

	A	B	C	D	E	F
1	Degree of parallelism: 9	array length = 1000000	Degree of parallelism: 9	array length = 2000000	Degree of parallelism: 9	array length = 4000000
5	cutoff: 810000	10times Time:402ms	cutoff: 1620000	10times Time:833ms	cutoff: 3240000	10times Time:1699ms
6	cutoff: 825000	10times Time:411ms	cutoff: 1650000	10times Time:817ms	cutoff: 3300000	10times Time:1691ms
7	cutoff: 840000	10times Time:403ms	cutoff: 1680000	10times Time:821ms	cutoff: 3360000	10times Time:1713ms
8	cutoff: 855000	10times Time:403ms	cutoff: 1710000	10times Time:823ms	cutoff: 3420000	10times Time:1679ms
9	cutoff: 870000	10times Time:395ms	cutoff: 1740000	10times Time:823ms	cutoff: 3480000	10times Time:1672ms
10	cutoff: 885000	10times Time:399ms	cutoff: 1770000	10times Time:821ms	cutoff: 3540000	10times Time:1695ms
11	cutoff: 900000	10times Time:400ms	cutoff: 1800000	10times Time:820ms	cutoff: 3600000	10times Time:1676ms
12	cutoff: 915000	10times Time:396ms	cutoff: 1830000	10times Time:827ms	cutoff: 3660000	10times Time:1668ms
13	cutoff: 930000	10times Time:403ms	cutoff: 1860000	10times Time:826ms	cutoff: 3720000	10times Time:1675ms
14	cutoff: 945000	10times Time:404ms	cutoff: 1890000	10times Time:819ms	cutoff: 3780000	10times Time:1680ms
15	cutoff: 960000	10times Time:393ms	cutoff: 1920000	10times Time:822ms	cutoff: 3840000	10times Time:1691ms
16	cutoff: 975000	10times Time:396ms	cutoff: 1950000	10times Time:823ms	cutoff: 3900000	10times Time:1673ms
17	cutoff: 990000	10times Time:395ms	cutoff: 1980000	10times Time:820ms	cutoff: 3960000	10times Time:1684ms
18	cutoff: 1005000	10times Time:608ms	cutoff: 2010000	10times Time:1276ms	cutoff: 4020000	10times Time:2669ms
19	cutoff: 1020000	10times Time:604ms	cutoff: 2040000	10times Time:1267ms	cutoff: 4080000	10times Time:2674ms
20	cutoff: 1035000	10times Time:602ms	cutoff: 2070000	10times Time:1276ms	cutoff: 4140000	10times Time:2660ms
21	cutoff: 1050000	10times Time:609ms	cutoff: 2100000	10times Time:1287ms	cutoff: 4200000	10times Time:2664ms
22	cutoff: 1065000	10times Time:603ms	cutoff: 2130000	10times Time:1290ms	cutoff: 4260000	10times Time:2664ms
23	cutoff: 1080000	10times Time:609ms	cutoff: 2160000	10times Time:1291ms	cutoff: 4320000	10times Time:2660ms
24	cutoff: 1095000	10times Time:608ms	cutoff: 2190000	10times Time:1293ms	cutoff: 4380000	10times Time:2663ms
25	cutoff: 1110000	10times Time:609ms	cutoff: 2220000	10times Time:1278ms	cutoff: 4440000	10times Time:2647ms
26	cutoff: 1125000	10times Time:607ms	cutoff: 2250000	10times Time:1289ms	cutoff: 4500000	10times Time:2652ms
27	cutoff: 1140000	10times Time:605ms	cutoff: 2280000	10times Time:1301ms	cutoff: 4560000	10times Time:2645ms
28	cutoff: 1155000	10times Time:606ms	cutoff: 2310000	10times Time:1289ms	cutoff: 4620000	10times Time:2659ms
29	cutoff: 1170000	10times Time:608ms	cutoff: 2340000	10times Time:1289ms	cutoff: 4680000	10times Time:2665ms
30	cutoff: 1185000	10times Time:606ms	cutoff: 2370000	10times Time:1273ms	cutoff: 4740000	10times Time:2661ms
31	cutoff: 1200000	10times Time:607ms	cutoff: 2400000	10times Time:1286ms	cutoff: 4800000	10times Time:2653ms
32	cutoff: 1215000	10times Time:604ms	cutoff: 2430000	10times Time:1313ms	cutoff: 4860000	10times Time:2666ms
33	cutoff: 1230000	10times Time:606ms	cutoff: 2460000	10times Time:1293ms	cutoff: 4920000	10times Time:2680ms

In this experiment, when the array length is below the cutoff, we use parallel sort, and when the array length is larger than the cutoff, we use Array.sort in the system. According to the result in the picture, the parallel sort method has better performance than the sort method in the system when the array length is large. Besides, as the array length increases, the performance difference between parallel sort and system sort increases, which means parallel sort works better in longer arrays.