

ECE 563
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ECE 563 Small Project Step 1 Report

Tree search:

| Run times \ Cores | 1 | 2 | 4 | 8 | 16 |
|-------------------|--------|-------|-------|-------|-------|
| 1 | 0.941 | 0.545 | 0.624 | 0.452 | 0.386 |
| 2 | 0.932 | 0.634 | 0.467 | 0.825 | 0.461 |
| 3 | 1.025 | 0.982 | 0.791 | 0.361 | 0.310 |
| 4 | 1.153 | 0.714 | 0.743 | 0.459 | 0.390 |
| Average | 1.0127 | 0.724 | 0.647 | 0.516 | 0.401 |
| Avg Speedup | 1 | 1.491 | 1.667 | 2.194 | 2.745 |
| Best Speedup | 1 | 1.769 | 2.458 | 2.774 | 2.975 |

Conclusion:

From the table results we can tell that the tree search does not have an obviously and significant speedup increase. The results clearly showed an increase when I added cores, but as expected it was not as sharp. When running the analysis, some cores would find upwards of 10x, 100x, or 1000x more matches than other cores. This is because of distribution with random numbers and the fact that I distribute the work using a breadth first search.

Matrix Multiply:

| Run times \ Cores | 1 | 2 | 4 | 8 | 16 |
|-------------------|--------|-------|-------|-------|--------|
| 1 | 10.923 | 6.152 | 3.263 | 1.612 | 1.161 |
| 2 | 12.874 | 5.723 | 2.912 | 1.551 | 0.813 |
| 3 | 11.246 | 5.261 | 3.623 | 1.914 | 0.873 |
| 4 | 11.324 | 4.723 | 2.616 | 1.251 | 0.924 |
| Average | 11.502 | 5.512 | 3.165 | 1.512 | 0.976 |
| Avg Speedup | 1 | 2.167 | 3.589 | 7.125 | 12.236 |
| Best Speedup | 1 | 2.618 | 3.878 | 8.621 | 13.234 |

Conclusion:

From the table results we can tell that the matrix multiply does have an obviously and significant speedup increase compare to tree search. The results clearly showed the huge increase of the speedup as the core number increase. I think it is because that the arrays can be divided evenly, and each core did the same amount of work. This means that increasing the number of cores directly increases the speed.

