# CS522 Programming Assignment #1

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# 1 Performance Comparison - Table

## 1.1 Grid size = 2800

| Program | # of MPI ranks | # of threads | Execution time(sec) | Max difference |
|---------|----------------|--------------|---------------------|----------------|
| seq-rb | 0 | 1 | 0.449 | 0.011927 |
| mt-rb | 0 | 2 | 0.405 | 0.011927 |
| mt-rb | 0 | 4 | 0.399 | 0.011927 |
| mt-rb | 0 | 8 | 0.420 | 0.011927 |
| dist-rb | 2 | 0 | 0.254 | 0.011927 |
| dist-rb | 4 | 0 | 0.157 | 0.011927 |
| dist-rb | 8 | 0 | 0.107 | 0.011927 |
| hybrid-rb | 2 | 2 | 0.238 | 0.011927 |
| hybrid-rb | 2 | 4 | 0.243 | 0.011927 |
| hybrid-rb | 2 | 8 | 0.397 | 0.011927 |
| hybrid-rb | 4 | 2 | 0.150 | 0.011927 |
| hybrid-rb | 4 | 4 | 0.149 | 0.011927 |
| hybrid-rb | 4 | 8 | 0.303 | 0.011927 |
| hybrid-rb | 8 | 2 | 0.091 | 0.011927 |
| hybrid-rb | 8 | 4 | 0.085 | 0.011927 |
| hybrid-rb | 8 | 8 | 0.238 | 0.011927 |

## 1.2 Grid size = 8080

*Note:* both my MPI program and MPI+OpenMPI hybrid program are not able to finish execution for the grid size more than 10000. They seem to wait for something forever, no segmentation fault, no system output. So I haven't figured out why? There might be something wrong with my programs. I am still working on this.

| Program | # of MPI ranks | # of threads | Execution time(sec) | Max difference |
|---|---|---|---|---|
| seq-rb | 0 | 1 | 3.602 | 0.011927 |
| mt-rb | 0 | 2 | 3.173 | 0.011927 |
| mt-rb | 0 | 4 | 3.300 | 0.011927 |
| mt-rb | 0 | 8 | 3.461 | 0.011927 |
| dist-rb | 2 | 0 | 1.900 | 0.011927 |
| dist-rb | 4 | 0 | 1.035 | 0.011927 |
| dist-rb | 8 | 0 | 0.601 | 0.011927 |
| hybrid-rb | 2 | 2 | 1.789 | 0.011927 |
| hybrid-rb | 2 | 4 | 1.847 | 0.011927 |
| hybrid-rb | 2 | 8 | 1.957 | 0.011927 |
| hybrid-rb | 4 | 2 | 0.981 | 0.011927 |
| hybrid-rb | 4 | 4 | 1.008 | 0.011927 |
| hybrid-rb | 4 | 8 | 1.059 | 0.011927 |
| hybrid-rb | 8 | 2 | 0.570 | 0.011927 |
| hybrid-rb | 8 | 4 | 0.584 | 0.011927 |
| hybrid-rb | 8 | 8 | 0.635 | 0.011927 |