Cpt S 411 Assignment Cover Sheet

Assignment #4

For individual assignments:

Bultsma, Trent

List of collaborative personnel (excluding team participants) or resources: None

[Include any other people who you may have discussed with for this assignment, or any online resources which you found useful as reading/reference materials for this assignment. No points will be deducted for this reason. It is a good practice to acknowledge such help.]

I1 certify that I have listed above all the sources that I consulted regarding this assignment, and that I have not received or given any assistance that is contrary to the letter or the spirit of the collaboration guidelines for this assignment.

I also certify that I have not referred to online solutions that may be available on the web or via generative AI tools or sought the help of other students outside the class, in preparing my solution.

I attest that the solution is 100% my own and if evidence is found to the contrary, I understand that I will be subject to the academic dishonesty policy as outlined in the course syllabus.

Assignment Project Participant(s):

Trent Bultsma

Today’s Date: 10/31/23

1 For the purpose of this document, “I” just includes yourself for individual assignments, and if you worked as a team (for team assignments), then the word “I” includes yourself and your team members. For team projects, all members of the team should submit their respective cover sheet.

I used the Pleiades cluster for my project

Time Table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | p = 1 | p = 2 | p = 4 | p = 8 |
| n = 1024 | 0.000195 | 0.000229 | 0.000279 | 0.000784 |
| n = 2048 | 0.000358 | 0.000303 | 0.000285 | 0.000453 |
| n = 4096 | 0.000699 | 0.000504 | 0.000472 | 0.000880 |
| n = 8192 | 0.001366 | 0.000811 | 0.000709 | 0.000593 |
| n = 16384 | 0.002716 | 0.001505 | 0.000903 | 0.000797 |
| n = 32768 | 0.005724 | 0.002881 | 0.001622 | 0.001219 |
| n = 65536 | 0.010822 | 0.005611 | 0.003005 | 0.002255 |
| n = 131072 | 0.021613 | 0.011159 | 0.006175 | 0.003387 |
| n = 262144 | 0.043223 | 0.021992 | 0.011390 | 0.007266 |
| n = 524288 | 0.086505 | 0.044189 | 0.022313 | 0.013095 |
| n = 1048576 | 0.173615 | 0.088272 | 0.044911 | 0.024141 |

Speedup Table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | p = 1 | p = 2 | p = 4 | p = 8 |
| n = 1024 | 1 | 0.851528 | 0.698925 | 0.248724 |
| n = 2048 | 1 | 1.181518 | 1.25614 | 0.790287 |
| n = 4096 | 1 | 1.386905 | 1.480932 | 0.794318 |
| n = 8192 | 1 | 1.68434 | 1.926657 | 2.303541 |
| n = 16384 | 1 | 1.804651 | 3.007752 | 3.407779 |
| n = 32768 | 1 | 1.98681 | 3.528977 | 4.695652 |
| n = 65536 | 1 | 1.928711 | 3.601331 | 4.799113 |
| n = 131072 | 1 | 1.936822 | 3.500081 | 6.381163 |
| n = 262144 | 1 | 1.965397 | 3.79482 | 5.948665 |
| n = 524288 | 1 | 1.957614 | 3.876888 | 6.605956 |
| n = 1048576 | 1 | 1.966818 | 3.865757 | 7.191707 |

Precision Testing:

|  |  |
| --- | --- |
| n | precision |
| 1 | 0 |
| 10 | 1 |
| 100 | 1 |
| 1000 | 2 |
| 10000 | 2 |
| 100000 | 3 |
| 1000000 | 3 |
| 10000000 | 4 |
| 100000000 | 5 |
| 1000000000 | 5 |
| 10000000000 | 6 |

I used p = 8 since it had the best speedup.

At this point in precision testing, the calculation took over three and a half minutes, so I opted not to test any more values of n.