1541 Homework 3

1.

Data

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| mat\_vec\_1.c |  |  |  |  |
|  | N | 1000 | 5000 | 10000 |
| P |  |  |  |  |
| 1 |  | 0.008187 | 0.136761 | 0.373385 |
| 2 |  | 0.009014 | 0.106802 | 0.250932 |
| 4 |  | 0.007434 | 0.086538 | 0.221695 |
| 8 |  | 0.011277 | 0.100419 | 0.219857 |
| 16 |  | 0.013949 | 0.094706 | 0.224729 |
| 32 |  | 0.021529 | 0.085558 | 0.182319 |
|  |  |  |  |  |
| mat\_vec\_2.c |  |  |  |  |
|  | N | 1000 | 5000 | 10000 |
| P |  |  |  |  |
| 1 |  | 0.008546 | 0.146005 | 0.357412 |
| 2 |  | 0.006372 | 0.109944 | 0.223227 |
| 4 |  | 0.0104 | 0.090069 | 0.203418 |
| 8 |  | 0.015065 | 0.116847 | 0.202717 |
| 16 |  | 0.018233 | 0.110291 | 0.226211 |
| 32 |  | 0.021607 | 0.130566 | 0.238018 |

These results seem reasonable. As the input size N increases, the runtimes increase. The thread count also affects the runtime. For the smaller inputs, it seems like the overhead from creating and joining the threads adds to the runtime, but as the problem size increases the additional threads doing work begin to help lower the runtime. This is especially visible with the input size of 10,000 on mat\_vec\_1.c.

2.

A)

|  |  |  |
| --- | --- | --- |
|  | Rtype | Mtype |
| 1 | A1 | A2 |
| 2 | A3 |  |
| 3 | A4 |  |
| 4 | A6 | A5 |
| 5 | A7 |  |
| 6 |  | A8 |
| 7 |  |  |
| 8 |  | B1 |
| 9 | B3 | B2 |
| 10 |  | B4 |
| 11 |  |  |
| 12 | A9 |  |
| 13 | A10 | A11 |
| 14 |  |  |
| 15 | B6 | B5 |
| 16 | B7 |  |
| 17 |  | B8 |

b)

|  |  |  |
| --- | --- | --- |
|  | Rtype | Mtype |
| 1 | A1 | A2 |
| 2 |  | B1 |
| 3 | A3 |  |
| 4 | B3 | B2 |
| 5 | A4 |  |
| 6 |  | B4 |
| 7 | A6 | A5 |
| 8 |  |  |
| 9 | A7 |  |
| 10 | B6 | B5 |
| 11 |  | A8 |
| 12 | B7 |  |
| 13 |  |  |
| 14 |  | B8 |
| 15 | A9 |  |
| 16 |  |  |
| 17 | A10 | A11 |

c)

|  |  |  |
| --- | --- | --- |
|  | Rtype | Mtype |
| 1 | A1 | A2 |
| 2 | A3 | B1 |
| 3 | A4 | B2 |
| 4 | A6 | A5 |
| 5 | A7 |  |
| 6 | B3 | A8 |
| 7 |  | B4 |
| 8 |  |  |
| 9 | B6 | B5 |
| 10 | A9 |  |
| 11 | A10 | A11 |
| 12 | B7 |  |
| 13 |  | B8 |
| 14 |  |  |
| 15 |  |  |