**Using Array Approach:**

Input and Results:

|  |  |  |  |
| --- | --- | --- | --- |
| Brute Force | Strassen's | Matrix Size | Input Size |
| 5988 | 33357 | 2 | 1-10 |
| 10264 | 285672 | 4 | 1-10 |
| 55595 | 1528007 | 8 | 1-10 |
| 487098 | 5922575 | 16 | 1-10 |
| 3321586 | 40965795 | 32 | 1-10 |
| 7014375 | 157087439 | 64 | 1-10 |
| 16010924 | 674742050 | 128 | 1-10 |
| 75848219 | 4572824066 | 256 | 1-10 |
| 364122684 | 28887065232 | 512 | 1-10 |
| 6046268701 | 204178378175 | 1024 | 1-10 |
| 84642961827 | 2857069798630 | 2048 | 1-10 |
| 22238 | 155666 | 2 | 1000-9999 |
| 40200 | 907481 | 4 | 1000-9999 |
| 195010 | 5459426 | 8 | 1000-9999 |
| 1187594 | 23578682 | 16 | 1000-9999 |
| 10781148 | 102540648 | 32 | 1000-9999 |
| 32014150 | 591796064 | 64 | 1000-9999 |
| 73636822 | 2575025627 | 128 | 1000-9999 |
| 435548537 | 24297155975 | 256 | 1000-9999 |
| 4086664862 | 133136167480 | 512 | 1000-9999 |
| 51459551879 | 2972862584628 | 1024 | 1000-9999 |
| 85121552417 | 4904715101005 | 2048 | 1000-9999 |

\*Time in nanoseconds

Findings:

1. The Strassen’s matrix multiplication algorithm divides the matrix into smaller size matrix until the matrix reaches a size of 1\*1.
2. In doing so it called a recursive method.
3. The complexity of this algorithm is O(n2.807) compared to the O(n3) of the Brute Force algorithm.

Conclusion:

1. On my computer specifications the Brute Force algorithm worked better than Strassen’s Matrix Multiplication Algorithm. Hence, I was unable to find the switching point between the two algorithms.
2. Even after increasing the size of the values in the array, Brute Force algorithm works better than Strassen’s Algorithm.

Possible Reasons:

1. Due to the recursive operations of dividing the matrix into 1\*1 matrix, makes the algorithm too slow.

**Using LinkedList Approach:**

Input and Results:

|  |  |  |
| --- | --- | --- |
| Brute Force | Strassen's | Matrix Size |
| 0 | 0 | 2 |
| 0 | 0 | 4 |
| 0 | 0 | 8 |
| 0 | 0 | 16 |
| 0 | 0 | 32 |
| 0 | 0 | 64 |
| 15 | 46 | 128 |
| 205 | 125 | 256 |
| 1093 | 594 | 512 |
| 2486 | 10285 | 1024 |
| 189639 | 10315 | 2048 |

\*Time in milliseconds

Findings:

1. The Strassen’s matrix multiplication algorithm divides the matrix into smaller size matrix until the matrix reaches a size of 1\*1.
2. In doing so it called a recursive method.
3. The complexity of this algorithm is O(n2.807) compared to the O(n3) of the Brute Force algorithm.

Conclusion:

1. On my computer specifications the Strassen’s Matrix Multiplication Algorithm worked better than Brute Force algorithm after matrix size 256. Hence, the switching point between the two algorithms is 256 for my system capacity.