AMATH 583: HW 3

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Problem 1

For details on the files and execute instructions, please read the README.txt file.

Problem 2

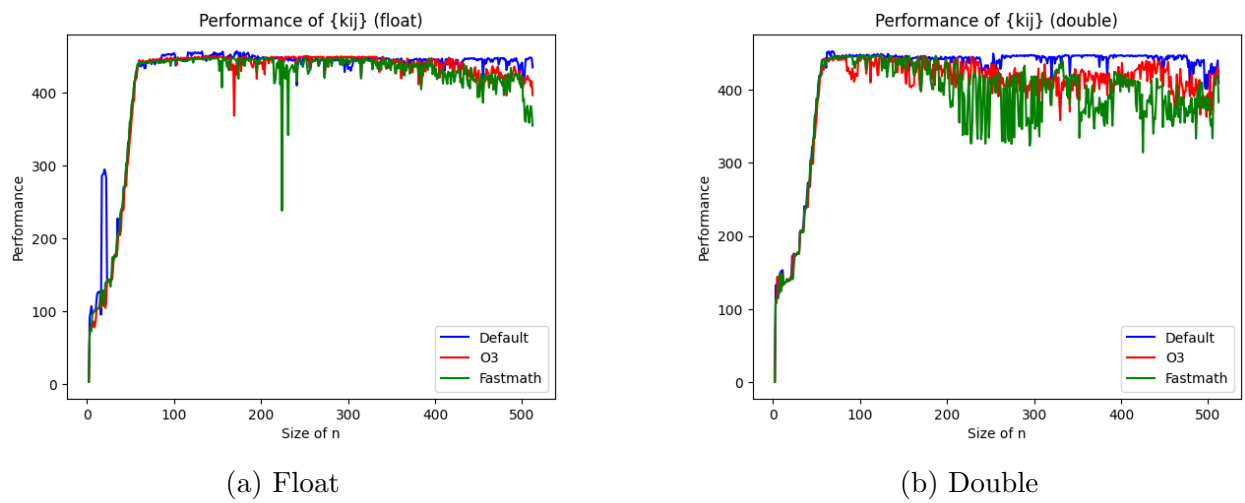For $\{kij\}$ loop permutation, we get the following plots:

(a) Float

(b) Double

Figure 1: Performance of $\{kij\}$ loop permutation

For $\{jki\}$ loop permutation, we get the following plots:

(a) Float

(b) Double
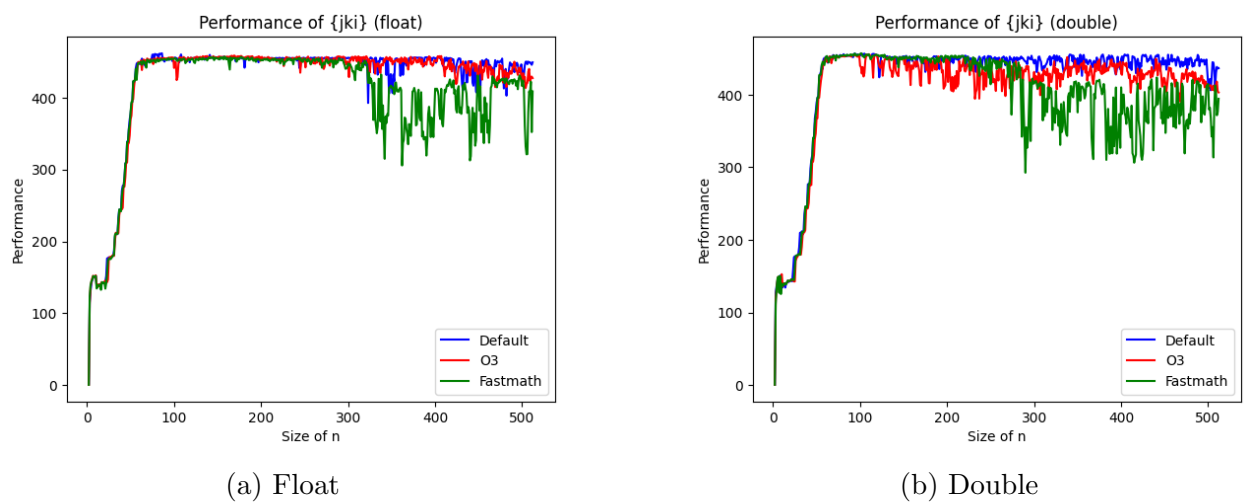
Figure 2: Performance of $\{jki\}$ loop permutation

Noticeable findings:

(1) Default optimization is the most stable in terms of performance.

(2) Fastmath optimization is the least stable in terms of performance.

(3) Float is more stable than double in terms of performance.

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(4) $\{kij\}$ loop permutation is more stable than $\{jki\}$ loop permutation in terms of performance.

Problem 3

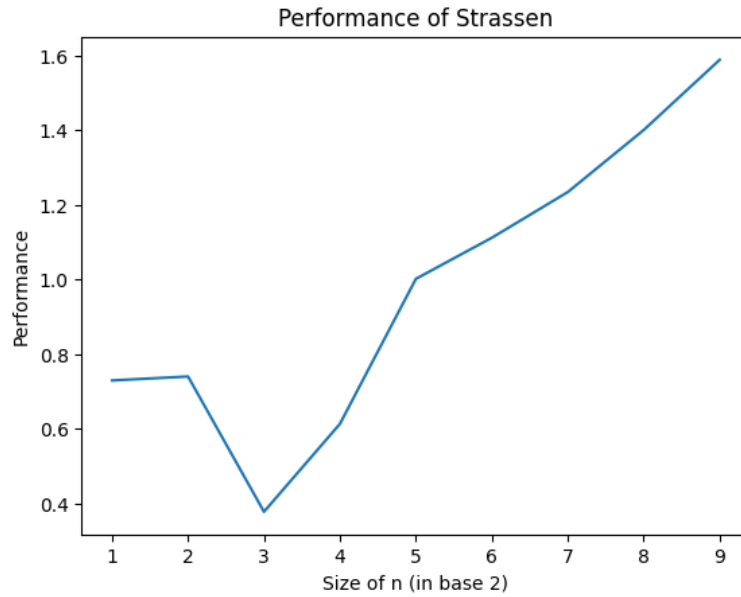Using the Strassen matrix multiplication function, we get:

Figure 3: Performance of Strassen matrix multiplication

The performance is not as high as single vector matrix multiplications in Problem 2. Also the increase in performance as size increases is minimal.