**CS 521 ML & Compilers Spring 2025 – MP1**

**Student Name: Joyce Au**

**NetID: joyceau2**

**Part 1 CPU**

1.2) **Ablation Study:**

***Insight:*** For the larger matrices (Size =1000), each optimization yields a greater speedup over the naïve version, reflecting that tilting and parallelization pay off more at a significantly greater scale.

1.3) **Scaling Study:**

***Insight:*** For smaller matrix sizes such as 100, there is not much of a speedup difference between After O1 and O1-O4. However, as the size grows larger beyond 1000, the fully optimized code (O1-O4) scales a lot better. This shows that utilizing parallelization and vectorization can significantly lower runtime than just loop reordering due to its optimizations in cache-blocking, parallel loop scheduling and vectorization.

**Part 2 GPU**

2.2) **Ablation Study:**

***Insight:*** one paragraph describing the results above

2.3) **Scaling Study:**

***Insight:*** one paragraph describing the results above