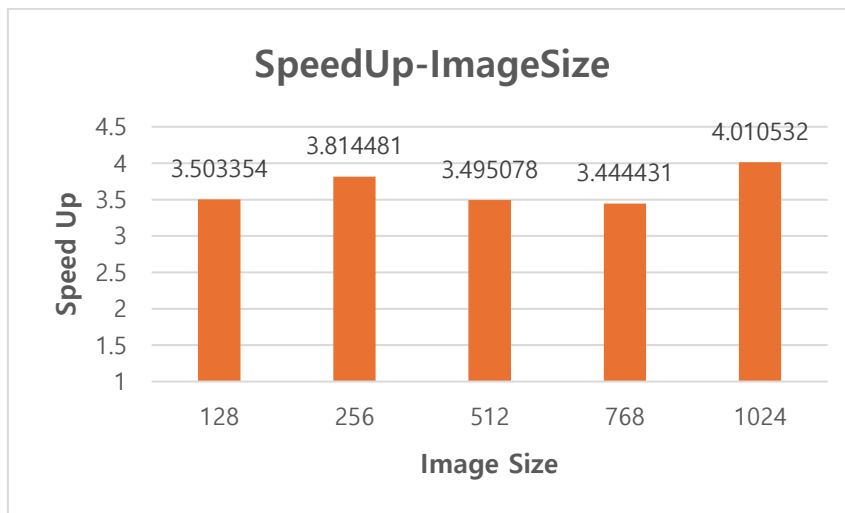


## CSE306 – HW2

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### 1. Results

128	Your speedup: 3.503354
256	Your speedup: 3.814481
512	Your speedup: 3.495078
768	Your speedup: 3.444431
1024	Your speedup: 4.010532



### 2. Optimization Strategy

- **Merging two functions into one function**

The original code separates the convolution computation into a separate function, convolution, which involves repeated calls and dynamic memory allocations. The optimized code merges the convolution logic directly into the filter\_optimized function, eliminating function call overhead and dynamic memory operations.

- **Block matrix (Tiling)**

The optimized code processes the image in tiles (16x16 blocks) to improve cache performance, reducing cache misses.

- **Loop-unrolling with pre-calculation**

The optimized code unrolls the loops for non-boundary pixels, reducing loop overhead and improving performance.

- **Boundary handling**

The optimized code handles boundary pixels separately to avoid unnecessary calculations for

non-boundary pixels.

- **Removing unnecessary memory allocation/deallocation**

The optimized code directly writes the result to the output array without using dynamic memory allocation for each pixel.