Assignment 2

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The values vary with each execution; hence, the average of five runs is calculated.

It was observed that the execution speed increased as the size of the image grew.

Image Size (pixels)	128	256	512	768	1024
Average Time (s)	1.423	1.440	1.486	1.498	1.976

- **Minimizing Memory Allocation**:
  By storing the convolution results directly in the output buffer, instead of repeatedly calling `malloc` and `free`, the overhead associated with memory allocation and deallocation is reduced. This minimizes the time and resource waste associated with these operations, thereby improving performance.
- **Minimizing Conditional Statements**:
  The use of conditional statements within loops is minimized. By eliminating unnecessary `if` statements, the efficiency of the loop is increased. Reducing the execution of conditionals within the loop enhances the overall execution speed.
- **Variable Reuse and Local Variable Utilization**:
  Pre-computing the variables
  `nx` and `ny` reduces repetitive calculations. Additionally, calculating `offset` and `filter_offset` beforehand increases efficiency. This reduction in repetitive computations enhances performance.
- **Improving Cache Efficiency**:
  Accessing data sequentially improves the efficiency of CPU cache usage. Optimizing memory access patterns results in better cache utilization.