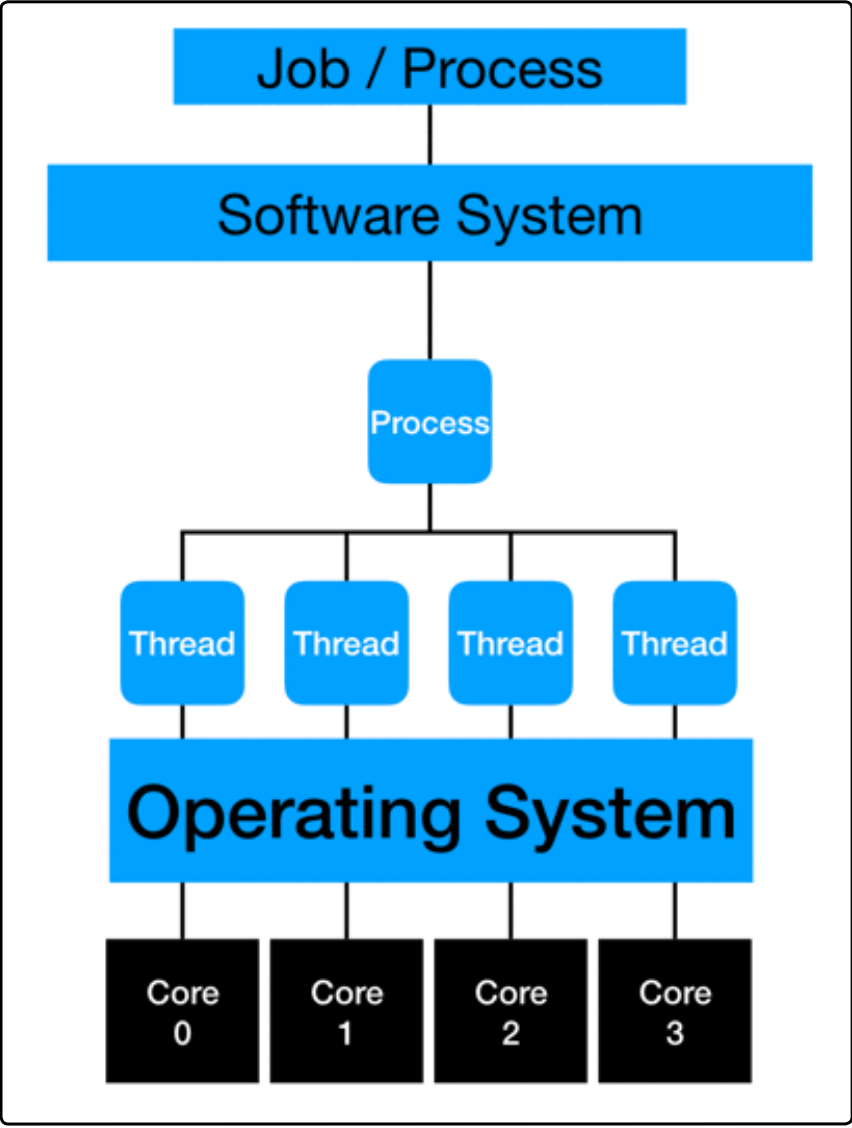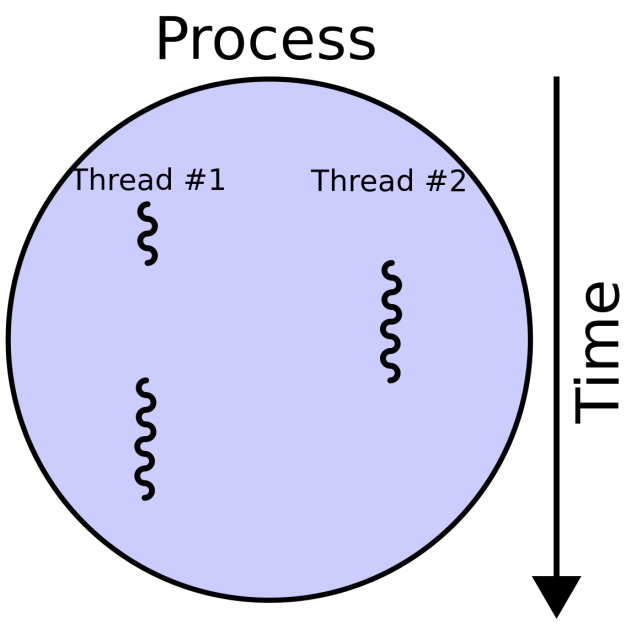# High Performance Computing - SCE

What is multi-threading?

A computing technique where multiple threads execute concurrently within a single process, enabling efficient utilization of CPU resources for parallel execution.
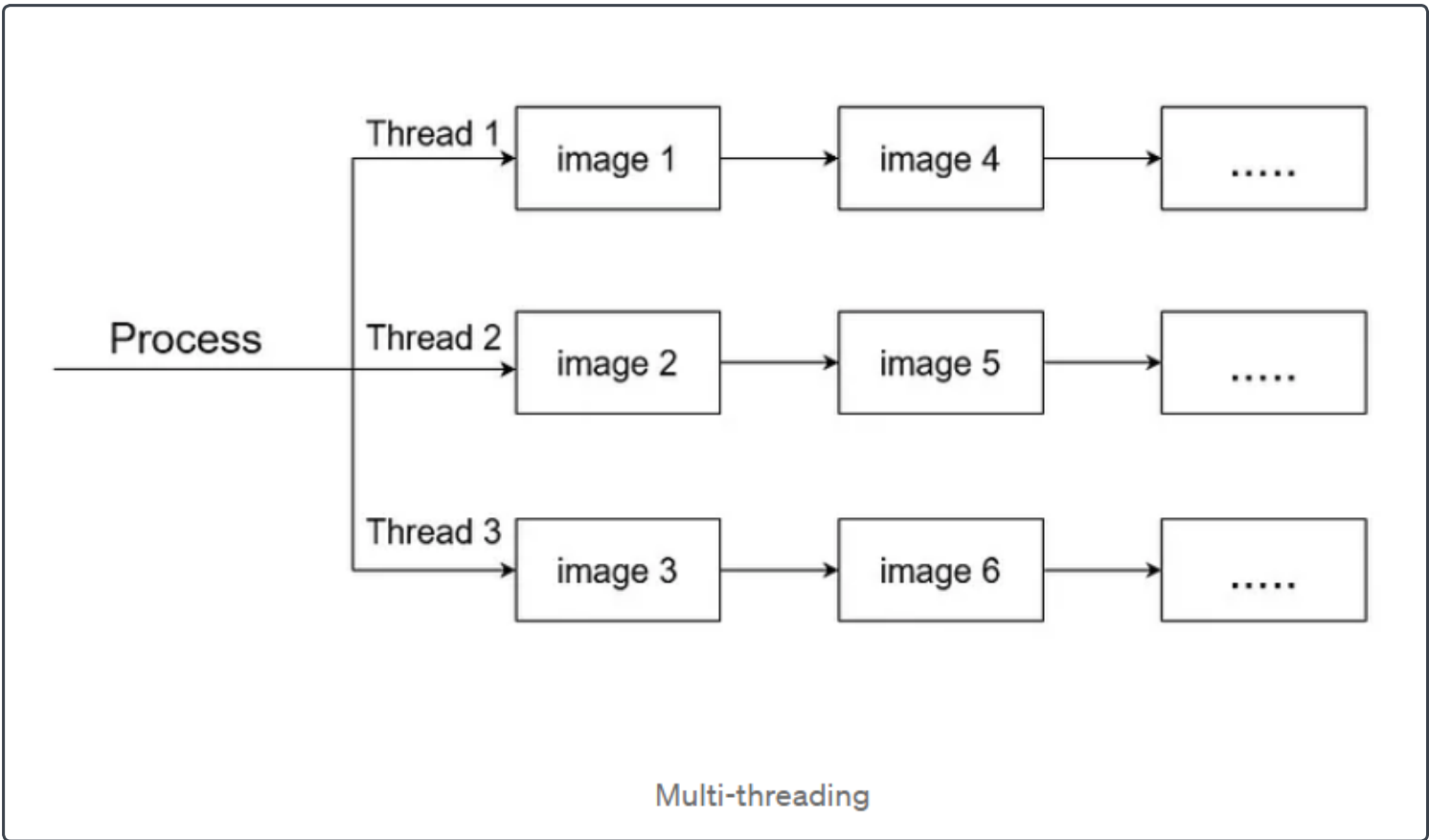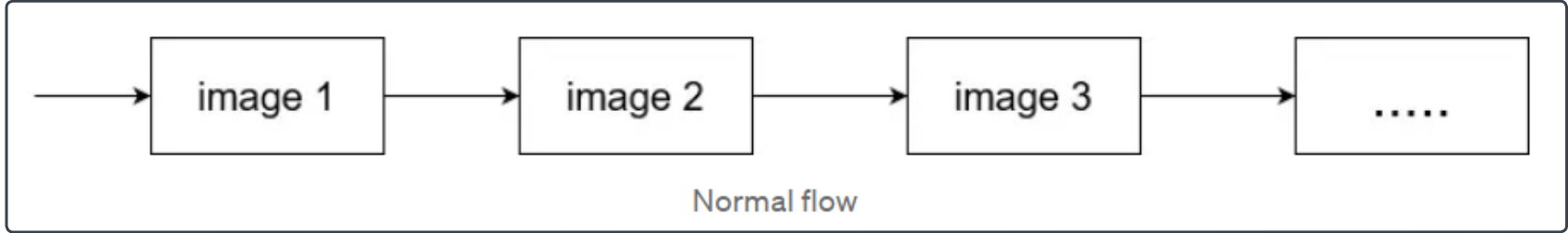

What is a process?

An instance of a computer program that is being executed.

What is a thread?

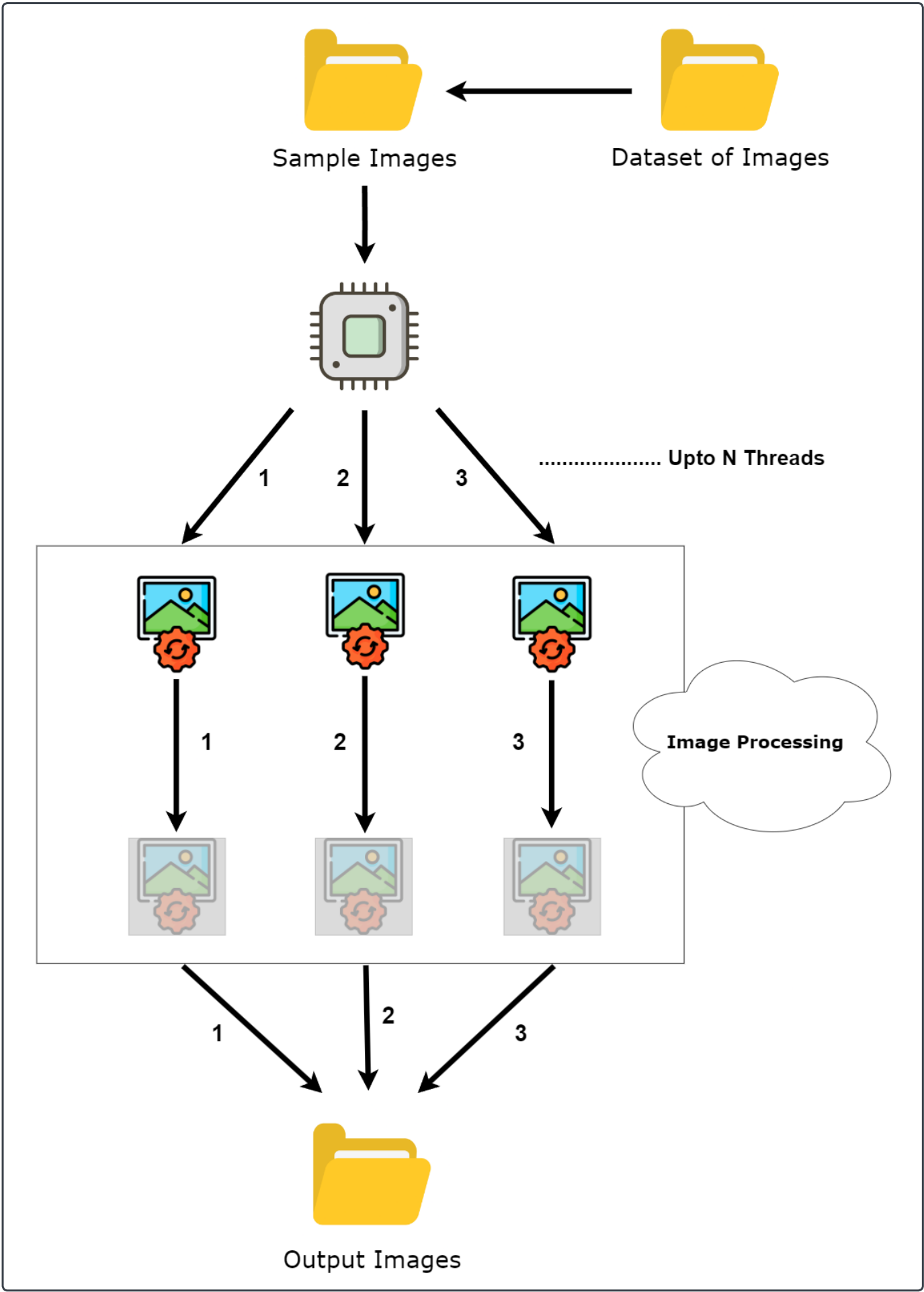A thread is the smallest unit of execution within a process.

Multithread Image Processing In Python

Normal flow

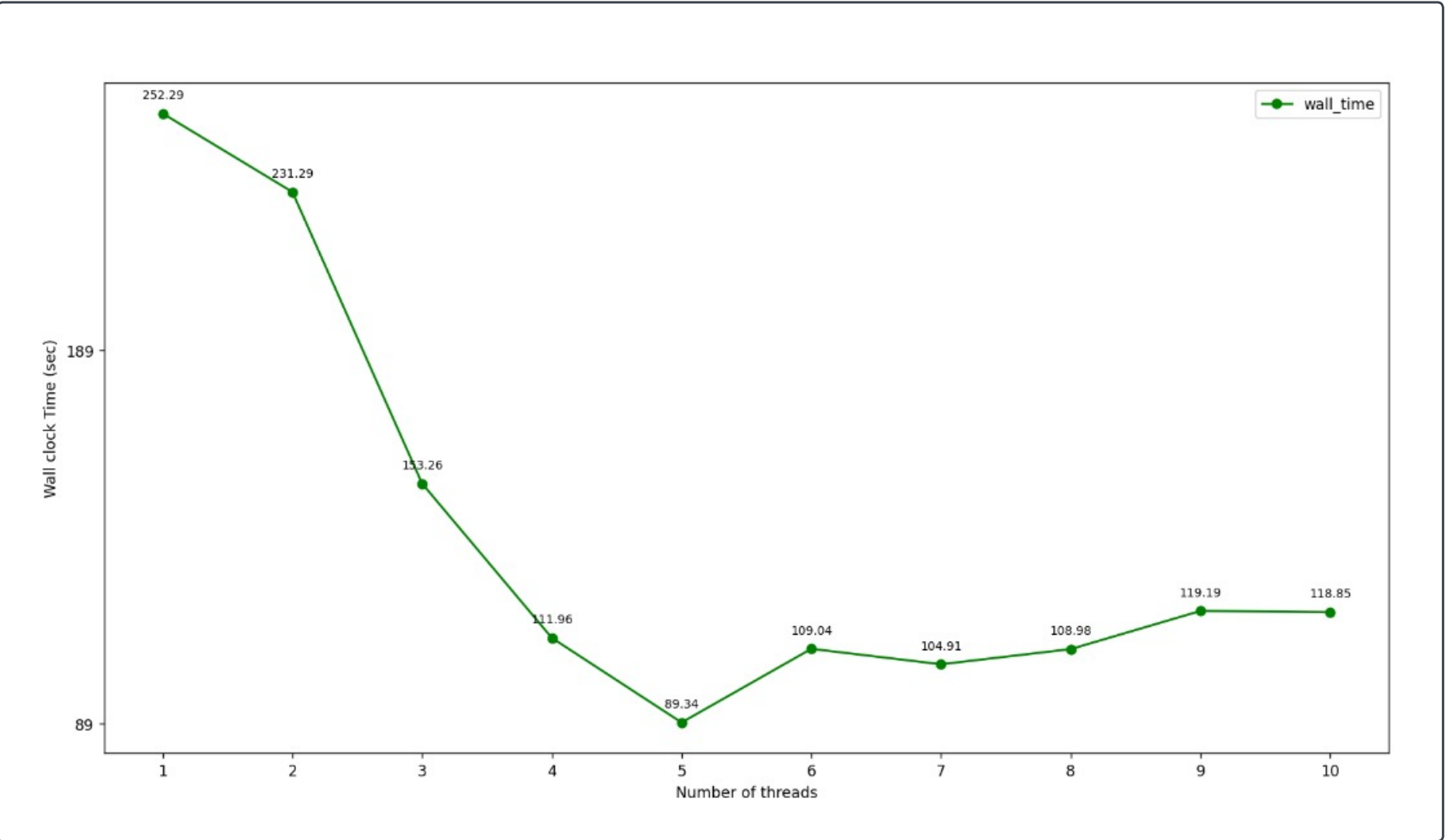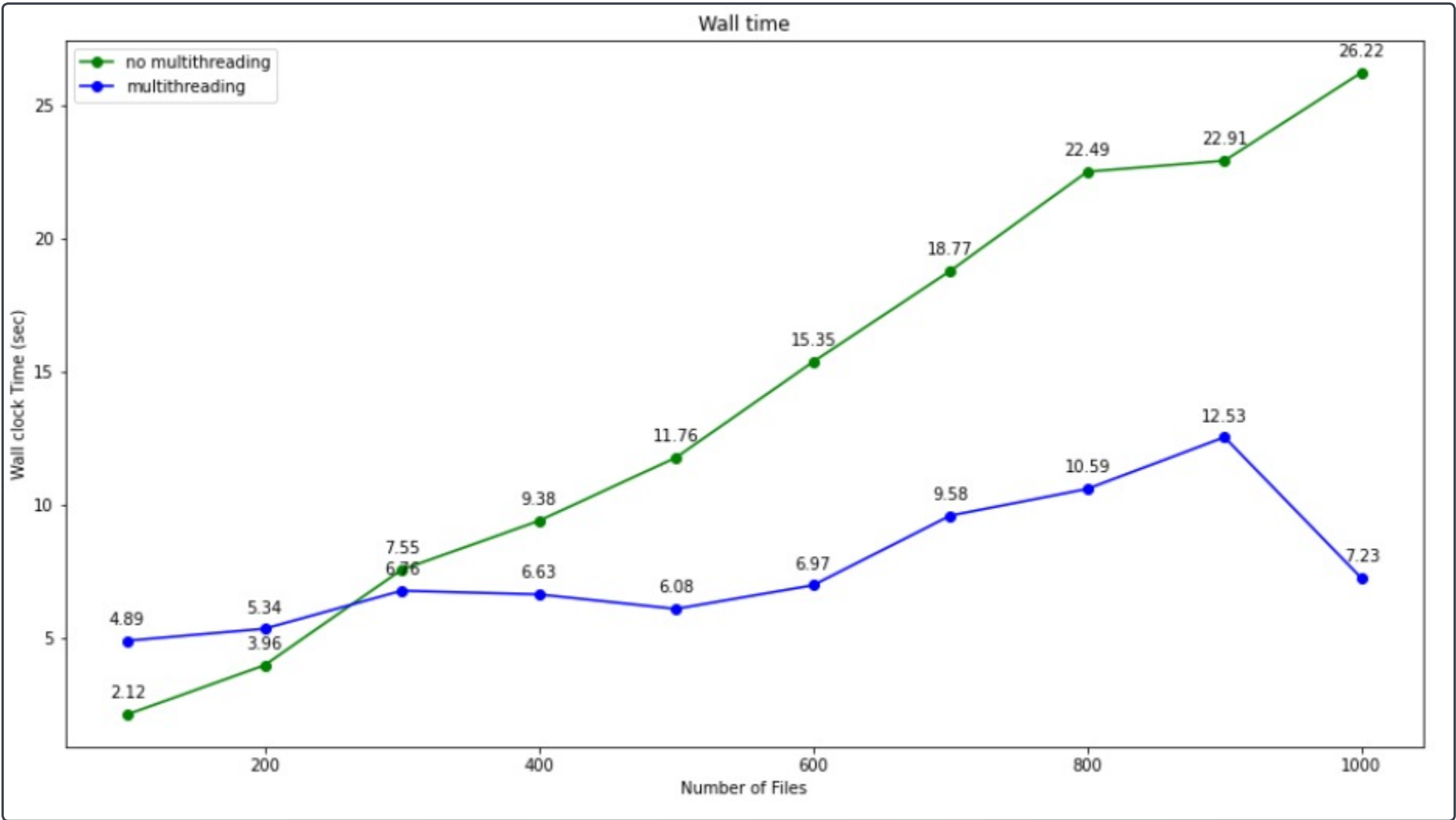**Why is multithreading used in image processing?**

It allows for parallel execution of tasks, such as loading, filtering, and rendering, which significantly improves performance by utilizing multiple CPU cores simultaneously, leading to faster processing and responsiveness.

Multi-threading

Flow of Execution:

In our Python project, we demonstrate image processing using multi-threading. With a collection of 1000 random images, we apply grayscale transformation, comparing execution times between single-threaded and multi-threaded approaches. We analyze performance with varying thread counts, visualizing through plotted graphs for comparison.

Results:

~ Thank You

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