**Parallel Processing:**

Parallel processing is a method in computing of running two or more processors (CPUs) to handle separate parts of an overall task. Breaking up different parts of a task among multiple processors will help reduce the amount of time to run a program. Any system that has more than one CPU can perform parallel processing, as well a multi-core processors which are commonly found on computers today.

Multi-core processors are IC chips that contain two or more processors for better performance, reduced power consumption and more efficient processing of multiple tasks. These multi-core set-ups are similar to having multiple, separate processors installed in the same computer. Most computers may have anywhere from two-four cores; increasing up to 12 cores.

Parallel processing is commonly used to perform complex tasks and computations. Data scientists will commonly make use of parallel processing for compute and data-intensive tasks.

### **How parallel processing works**

Typically a computer scientist will divide a complex task into multiple parts with a software tool and assign each part to a processor, then each processor will solve its part, and the data is reassembled by a software tool to read the solution or execute the task.

Typically each processor will operate normally and will perform operations in parallel as instructed, pulling data from the computer’s memory. Processors will also rely on software to communicate with each other so they can stay in sync concerning changes in data values. Assuming all the processors remain in sync with one another, at the end of a task, software will fit all the data pieces together.

Computers without multiple processors can still be used in parallel processing if they are networked together to form a cluster.

### **Types of parallel processing**

There are multiple types of parallel processing, two of the most commonly used types include SIMD and MIMD. SIMD, or single instruction multiple data, is a form of parallel processing in which a computer will have two or more processors follow the same instruction set while each processor handles different data. SIMD is typically used to analyze large data sets that are based on the same specified benchmarks.

MIMD, or multiple instruction multiple data, is another common form of parallel processing which each computer has two or more of its own processors and will get data from separate data streams.

Another, less used, type of parallel processing includes MISD, or multiple instruction single data, where each processor will use a different algorithm with the same input data.