Factors affecting the speed of the CPU

# Number of cores

A processor will often have multiple processors or cores on a single chip – this means more than one instruction can be executed at a time.

# Size of the registers

The CPU contains small memory spaces called registers that store data and instructions while the CPU processes them. The size of the registers determines the amount of data with which the computer can work at a one time.

# RAM

The more RAM a PC has, the more program instructions and data can be held in memory, which is faster than disk storage. If a PC does not have enough memory to run a program, it must move data between RAM and the hard disk frequently – this process can greatly slow a PC’s performance.

# Clock speed

The computer’s system clock sets the pace of the CPU using a vibrating quartz crystal. A single "tick" of the clock is the time required to turn a transistor off and back on – this is called a clock cycle. Clock cycles are measured in hertz (Hz), a measure of cycles per second. The faster a PC’s clock runs, the more instructions the PC can execute per second.

# Data bus

The data bus width determines how many bits can be transmitted between the CPU and other devices. The wider the data bus, the more bits can be transmitted at once, reducing the number of fetches. The speed of data transfer along the bus also affects its performance.

# Cache

Cache memory is high-speed memory that holds the most recent data and instructions loaded by the CPU. Cache is located directly on the CPU, making it faster to access than normal RAM. Cache is made of very high-speed components and reduces the number of fetches for both instructions and data. Recently executed instructions – for example, in a loop – will be stored in the cache.