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ENGL 516

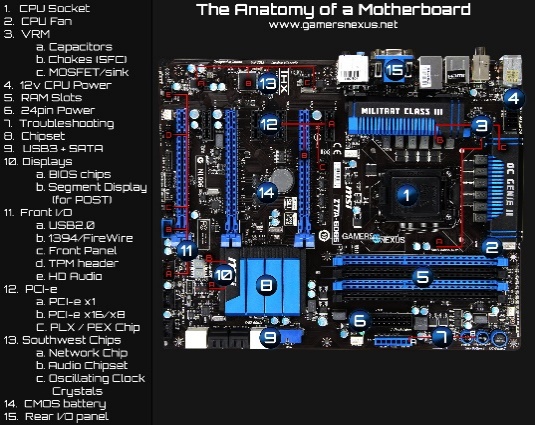
An Overview of Computers

The computer has evolved on an exponential scale since its creation in 1946. The world’s first computer weighed over 50 tons and covered over 1800 square feet. Nowadays, a computer is everywhere from our smart phones to massive clusters of supercomputers. According to Merriam-Webster, a computer can be defined as an electronic device for storing and processing data, typically in binary form, according to instructions given to it in a variable program. Computers are everywhere and, at least soon, will continue to be a very prominent part of society.

 To start, there are many different components that go into a computer. The main component of a computer is the central processing unit, often referred to as the CPU. The processor acts as the brain of the computer by sending signals to all other components and controlling the hardware. In the picture, it shows the front and back of a processor. The metallic top is called a heatsink, a material to properly disperse heat evenly. The body of the processor is made of microprocessors and millions of transistors. The microprocessors are integrated circuits containing all functions of the processor, operating on a register-based system storing data by using binary. The microprocessor uses the transistors as logic gates to hold 0’s or 1’s. On each processor, they can contain multiple cores and threads. A core is an independent processing unit on the chip, able to read and execute programs either together or independently. A thread of execution is the smallest sequence of programmed instructions that can be managed independently by a scheduler, which is typically a part of the operating system. The clock speed of the processor is measured in Hertz but referenced to as gigahertz, meaning one billion Hertz. The clock speed refers to the clock cycles per second. As an example, the Intel i7-8700k, a high-end gaming processor, has a base clock speed of 3.7 GHz and a boost clock speed of up to 4.7 GHz. The base clock speed means that this is the normal speed of the chip under a light load. The processor can increase the speed up to 4.7 GHz if it is being given a lot of work or under a heavy load.

On the processor, it contains registers and cache to help store small amounts of data. A register is a quickly accessible memory location on the actual CPU. There are different levels of cache, ranging in sizes indirectly related to the speed; the smaller the size, the faster the processor can access the memory. The processor uses cache to store small amounts of data to avoid calls to main memory. On the bottom of the processor are over 200 tiny pins. They are laid out in a way to connect to a specific chipset of the motherboard.

There are two main manufacturers of processors, Intel and Advanced Micro Devices (AMD). The battle between the two processor giants has been going on for over 40 years and is constantly back and forth. Intel has always prided itself in single core performance while AMD focuses on the value per dollar. Both companies have been pushing the limits of computer processors with both moving towards a much smaller process. This means that they are wanting the surface area of each microprocessor to decrease as much as possible. Currently, the majority of microprocessors are on a 14nm process and moving towards a 10nm process or even a 7nm process. Decreasing the process size will increase speeds, the amount of hardware you can fit on the processor, and efficiency.

 Inside of the computer, the processor sits on the motherboard. The motherboard is a large circuit board that holds the processor, the graphics card, and the connectors for all pieces of hardware inside the computer. As you can see by the pictures, there is a lot going on. The main section of the motherboard is the processor socket. The processor socket has a chipset that must match the processor otherwise the hardware will be damaged and it will not work.