УДК 004.31-181.48.

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Inside a CPU

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Whether you are using a desktop PC, a laptop, or even a smartphone, the central processing unit is by far the most important piece of hardware in it. The central processing unit or simply the processor is responsible for utilising and managing all the other computer components and, first of all, running your programs and performing computing tasks. Let's take a closer look at the primary element of every modern computer. The processor itself represents a specifically processed piece of electronic grade silicon, which is received from sand, by melting it and cleaning from any impurities. The silicon ingots are then cut into thin silicon disks, which are called wafers. After that, the wafer gets polished to a flawless and perfectly smooth surface. The following steps are carried out by nano technology, which requires the material to be perfectly clean from any microbes or dust, and the process to be carried out in special, clean rooms, which are being maintained at a 99% clean condition, as even the tiniest piece of dust may ruin the wafer. The wafers are then being covered with a layer of special chemical called photoresist. This chemical becomes solvent, when exposed to ultraviolet light. After that the whole surface of wafer gets exposed to UV-light through a special lens, which has a transistor shape engraved on it, the transistor is a basic electronic component, which allows to control the energy current flow through a circuit. The lens is very small and its focal point makes the UV-ray 4 times smaller as it reaches the wafer and reacts with photoresist. This resolves an imprint up to 10 nanometers small. After that, the photoresist that

has interacted with the light can be washed away. The remaining photoresist protects the silicon from etching whereas the areas that were exposed to light are being etched away with chemicals. After gaining desired pattern the wafer gets ionized, This procedure applied to silicon allows it to alter the energy flow, forming thousands of millions transistors of a very small size. Then a layer of insulation is being added on top and holes for connections are being etched in it. Next, the wafer is placed in copper sulphate solution, ions of copper travel from positive charged anode to negative charged cathode, which is represented by wafer surface, creating a thin layer of copper on top, this process is called electroplating. Then the excess copper is being etched, resolving wires, that connect multiple transistors in logical gates, memory and computing modules. The way the wires are arranged is determined by the CPU architecture. After that, the wafer gets cut into individual pieces, called dies, and every piece is being tested by running algorithms through all of its connections, if the response is wrong the die gets discarded. Finally the die is mounted on the interface panel, which allows the CPU to interact with other hardware using regular size wiring. The CPU crystal is usually divided into into cores, the set of logical circuits, that can perform a single calculation at a time using binary code. The cores have individual core controllers, which set the instructions for their core. And the data that is currently being used or achieved is stored in the cache. Various CPUs have various specifications depending on their architecture. The clock speed, measured in Ghz determines, how many instructions can a single core complete in a second. The number of cores, shows how many instructions can your processor carry out simultaneously. The tdp, measured in watts determines how much energy is your CPU consuming, and how much heat it emits. The development of CPUs continues today. The individual transistors became smaller. The clock speeds rise. And more cores are being provided in newer CPUs.