Computer parts

The main component and the most important part of a computer is the processor, or so called microprocessor, since it has been miniaturized so much that it can no longer be seen without a microscope. The processor can be considered the brain of the computer. It performs all the operations, executes all the instructions and makes all the calculations and decisions necessary to solve problems. Therefore, the microprocessor is the true computer. All the rest is just add-ons that allow it to communicate with the user. If the microprocessor is the brain, the motherboard is the spinal cord. The motherboard establishes a link between the microprocessor and other parts such as the memory and the peripheral devices. It acts like a fast data highway that transports the information from one component to another.

The Microprocessor is the result of encapsulating a Central Process Unit (CPU) in a microchip. The central process unit is sometimes confused with the computer case, probably because the CPU is inside the case. The main parts of the Microprocessor are the following:

* Central Unit: Its mission is to fetch a program instruction from the memory and execute it.
* Arithmetic-logic unit or ALU. It is a pretty fast calculator for integers. It is capable of performing basic operations like adding, subtracting, dividing and multiplying; not to mention logic operations such as OR, XOR, AND, etc.
* Floating Point Unit or FPU. It is an ALU for real numbers. A computer can represent a finite range of infinite real numbers. Thanks to this unit, a computer can approximate real numbers in the range (\_1038 .. 1038) for single precision and (-10 08 .. 10308) for double precision.
* Registers bank. A register is a memory cell, the smallest and fastest memory that computers have. These registers are connected directly to the ALU and the FPU. They are used to store the operands and results of executed instructions.
* Cache Memory. This memory is faster than RAM, but slower than registers. It is used to store recently executed instructions and data. Most of them are predictive because they are able to predict and get the instructions which are about to be executed. That memory helps the computer to improve its performance.

Software advances very quickly. Because of this, more powerful microprocessors are needed to support new technologies. Performance improvement has become a tricky problem to solve. Traditionally, this problem has been solved through miniaturization, in other words: making the components smaller, grouping thousands of rnillions of transistors in the same amount of space. Another way to obtain faster processors is to increase the dock speed although dock speeding causes a great increase of temperature that is difficult to cool. For that reason, manufacturers paved the way for multi-core technology: In order to improve microprocessor's performance, the best option is adding two or more processors in the same chip.

The motherboard contains a socket to house the microprocessor. This socket has enough lines to communicate the rest of the computer with the processor. These lines are grouped in units called buses and they transport information to the memory, the graphics card and the peripheral devices. All these buses are controlled by two main chips: On one hand, the north bridge chip, which controls the faster links, like the link between the processor and the memory. On the other hand, the south bridge chip is responsible for slower communications like the link between the processor and serial ports. It is directly connected to the north bridge through a special bus called direct media interface (DMI).

This organization improves the computer's performance by avoiding bottle necks caused by transmissions from the slowest devices which are not fast enough to travel through the north bridge. There are also other important chips included in the motherboard like the BIOS and other integrated devices such as the network card, USB controllers, etc. All the chips in the motherboard are collectively called the chipset. This, along with the socket, is essential to know in order to comply with the compatibility of the microprocessor.

**1.-Answer the following questions:**

1. Why are computer processors called microprocessors?
2. What functions does a processor carry out?
3. What is the main function of the motherboard?
4. What is the difference between registers and cache memory?
5. What operations can a FPU perform that an ALU cannot?
6. What is the main problem when increasing the frequency of the dock of the processor?
7. What is the purpose of the motherboard buses?

**2.-Are the statements true or false?**

1. Performance improvement is almost impossible to achieve.
2. Multicore processors have come up to solve high temperature problems.
3. The north bridge is a part of the microprocessor which controls fast devices.
4. Chipset is divided in two main chips to avoid bottlenecks.
5. The integrated network card is part of the chipset.
6. The chipset has nothing to do with the compatibility between the motherboard and the microprocessor.
7. The microprocessor is the intelligence of the computer and the motherboard can be considered the controller of the nerves, which would be the buses.
8. The best way to improve performance is to group million of transistors in a very small amount of space.