

# Lecture №1.2. Elements and components of computer technologies

## 1.2.1. Concept of architecture and structure

**Computer architecture** is the aggregate of basic devices, sites and computer blocks, and also structure of basic managing and informative connections between them, that provides implementation of the set functions.

**Architecture in an informatics** is conception of intercommunication of elements of difficult structure, includes components of logical, physical and programmatic structures.

**Computer architecture** is usually determined by the aggregate of her properties, substantial for an user.

In 1945 father of modern computer architecture John von Neumann, a large mathematician prepared a lecture about a machine which would keep the programs in memory. A lecture was sent to the scientists and got a mass appeal, as in him von Neumann clear and simply formulated general principles of functioning of universal computing devices, or computers. He was the consultant of project EDVAC and brought in the large personal payment in many fundamental inventions which underlay one of the first in history computers. In 1946 engineers which headed development, John Eckert and John Mauchly made attempt patent all bases of EDVAC technology, including those things which was thought by von Neumann. The first computer, in which principles von Neumann were incarnate, was built in 1949 by English researcher Maurice Wilkes. And for today swingeing majority of computers is done in accordance with principles of von Neumann (Fig. 1).

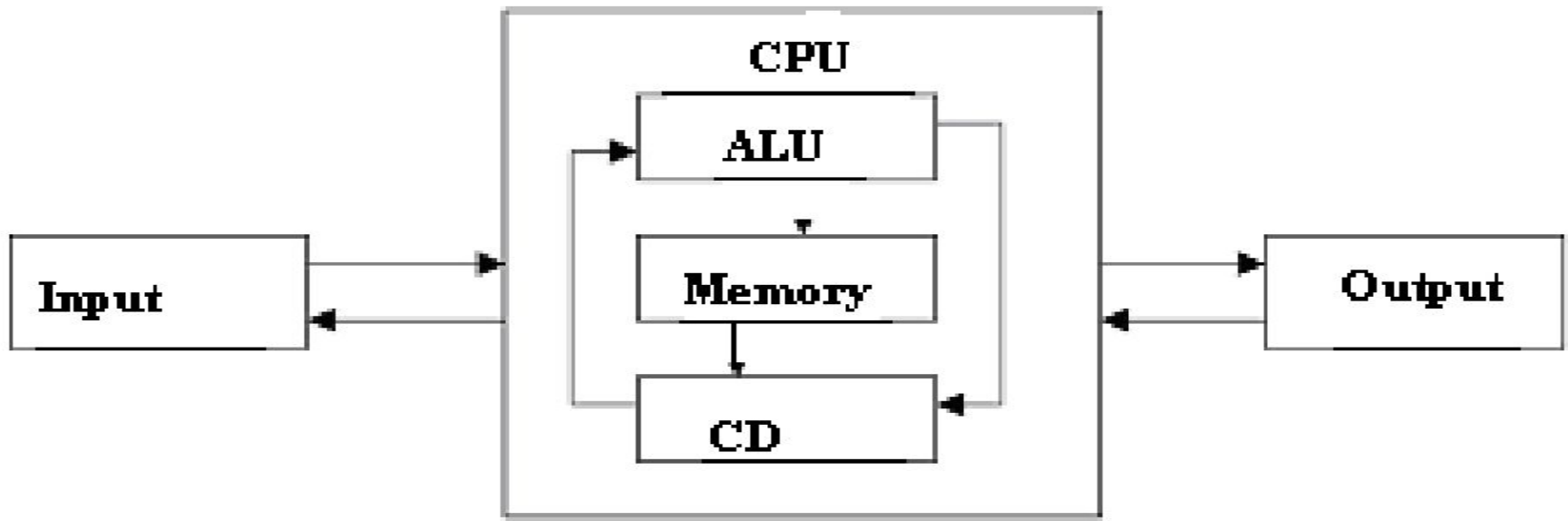


Fig. 1.

**CPU** is a central processor unit.

**ALU** is arithmetic and logic unit - for arithmetic calculations and acceptance of logical decisions.

**Memory** is storages of data - serves for storage of information.

**CU** is control unit - co-ordination of different blocks of COMPUTER.

***The system*** is a set of elements which submit to the only functional requirements.

***Principle of open architecture*** - folded in providing of possibility of the application programs portability between different platforms and providing of co-operation of the systems with each other. This possibility is arrived at due to the use of international standards on all programmatic and vehicle interfaces between components of the systems. It allows, at first, to execute modernization the PC (upgrade), complementing him new elements and substituting for out-of-date blocks, secondly, enables to the user to present independently a structure it the PC depending on concrete aims and tasks.

***Computer structure*** is some model which sets structure, order and co-operation principles for it inputting components.

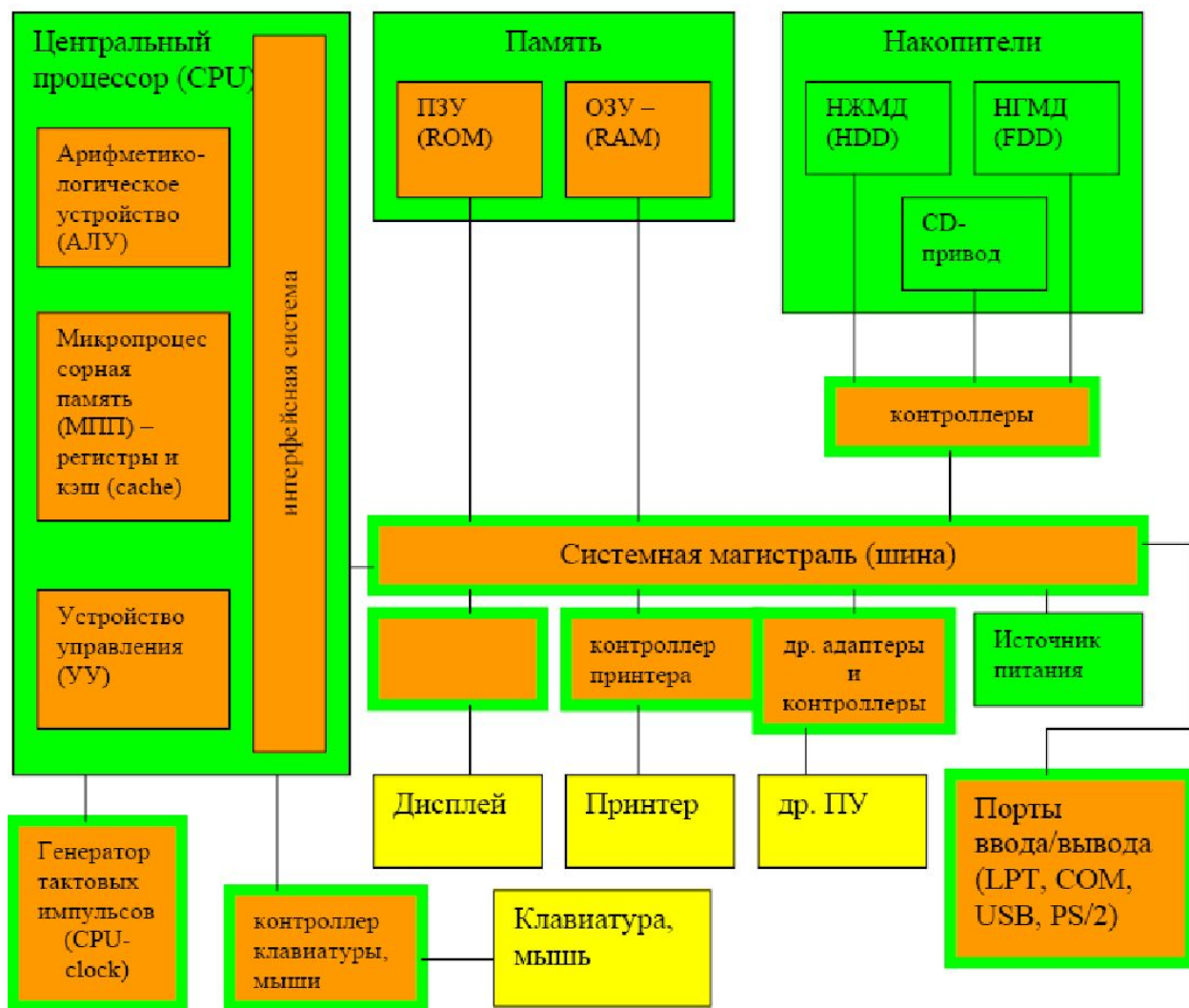


Fig. 2. Flow diagram of the personal computer

## 1.2.2. Structure of the personal computer (PC)

Will consider structure and purpose of basic blocks of the PC (fig. 2).

Conditional marks of place of location of components the personal COMPUTER:

- a system block;
- a system board;
- peripheral

PC consists of a *system block* and *peripheral equipment*.

**A system block** is a corps in which basic electronic components or modules is placed the PC. A system blocks are two basic varieties:



- vertical location (tower), to the variety: baby - tower, mini - tower, midi - tower, big - tower.



- horizontal location (desktop), to the variety: small - footprint, slimline, (ultra) superslimline.

In the complement of system block enter:

- the system board (motherboard);
- a disk drives or drives for variable stores;
- the power module.

**A system board** is intended for placing or connecting all other internalss of computer - serves as an original platform which all system configuration is built on the base of.

Fig. 3. Example of system board

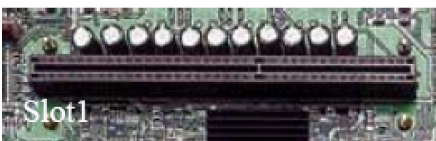
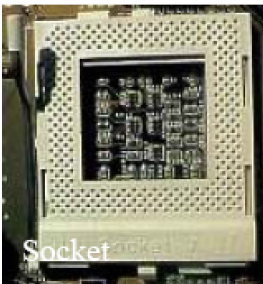


## ***Central processing unit (CPU)***

***Central processing unit (CPU)*** – is the hardware within a computer system which carries out the instructions of a computer program by performing the basic arithmetical, logical, and input/output operations of the systems.



CPU can be named a heart of computer. Computer architecture is determined by the type of CPU. For placing of processor on a system board the special nest will be used, such as Socket or other nest - Slot1.



For cooling of processor a small ventilator, set on a radiator, will be used - CPU Cooler. This system reduces the temperature of processor approximately on 40 degrees.

Fig. 4. Example of CPU



## Memory

Major component of PC. An important parameter is a maximal volume of the addressed memory. He depends on the bit of processor. Part of memory is reserved for system aims, part remains free (for an user and programs).

Memory consists of two parts:

**ROM** is constantly storages of data, intended for storage of information which must not change during implementation of the program a processor.

**RAM** is operative memory (RAM - Random Access Memory "memory of arbitrary access", id est in any moment of time access can be carried out to the arbitrarily chosen cell) of

data - temporary storage, provides possibility of operative treason of information, including in the process of implementation of operation.

### ROM vs RAM

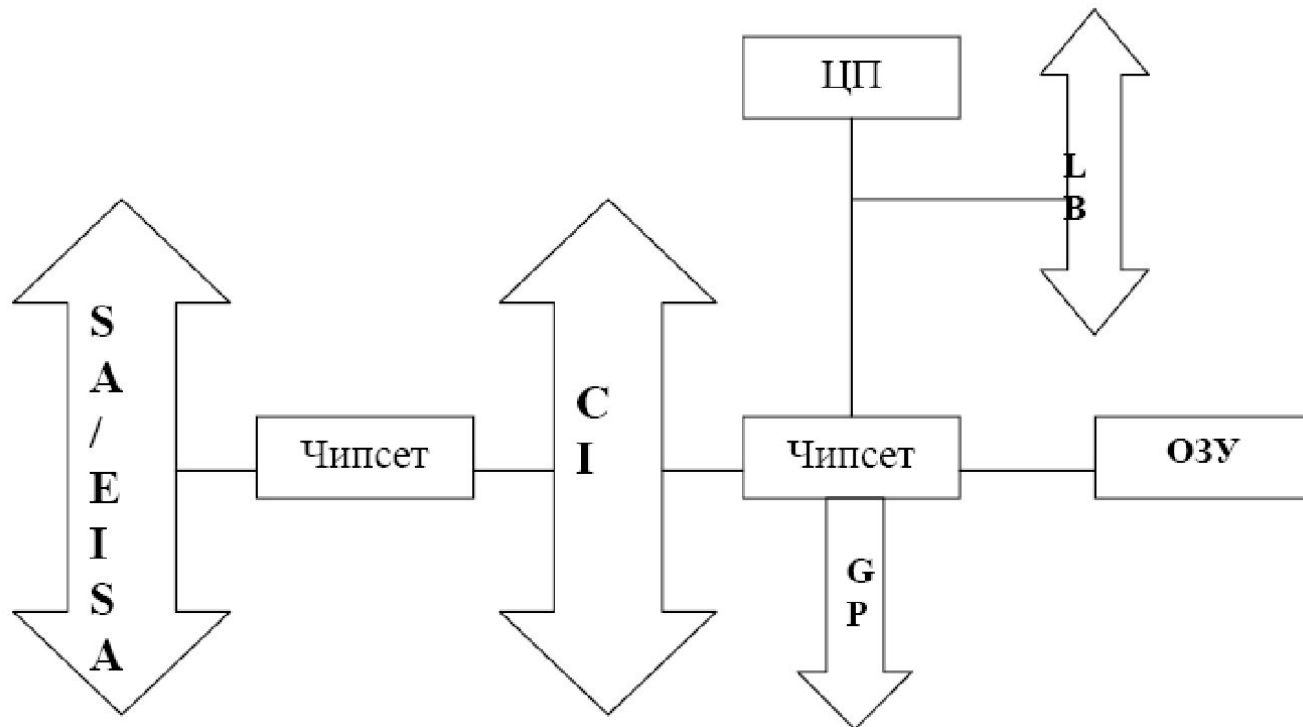


## ***System bus***

It basic interface on computer system.

***System bus*** - an interface (interface) is an aggregate of connection tools and computer devices connection which provides them effective co-operation.

### **Expansion busses in architecture the PC**



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Thank you for your attention