

Laboratory work №1. Calculating the performance metrics of a computer system: speed, efficiency, energy costs, Amdahl's law, cpu time

Objective:

- To study the basic performance metrics of a computer system: speed, efficiency, energy costs, Amdahl's law, CPU time and conduct RAM performance testing to build a PC structural diagram.

Methodological guide

- Everest Ultimate Edition - a program for viewing information about the hardware and software configuration of the computer. The program analyzes the computer configuration and provides detailed information about the devices installed in the system - processors, motherboards, video cards, audio cards, memory modules and etc, as well as information about their characteristics, supported sets of commands and operating modes, their manufacturers, installed software , operating system configuration and installed drivers.
- The program has a wide range of tests:
 - 1) reading from memory - tests the speed of data transfer from RAM to the processor;
 - 2) recording in memory;
 - 3) copy-in-memory - tests the speed of transferring data from one memory location to another via the processor's cache;
 - 4) memory latency - tests the average time the processor reads data from RAM;

Work assignment

Task 1. Read the summary information about the computer.

1. Write out from the list of the main parameters of the computer under examination in the right window:

- type of computer;
- type of operating system;
- user name;
- type of CPU;
- type of motherboard;
- the type of chipset of the motherboard;
- number and type of RAM;
- type of video adapter;
- type of monitor;
- type and amount of disk storage;
- List other In / Out devices on the PC under test.

Work assignment

Task 2. Get acquainted with CPU of the computer under investigation. Write down the main CPU parameters from the list in the right window:

- type of CPU;
- core name of the CPU;
- CPU stepping;
- instruction sets;
- initial frequency;
- the size and characteristics of the CPU's cache;
- physical parameters of the CPU

Control questions

- 1. The basic principles of building a computer, the structure of J. von Neumann.
- 2. The classical architecture of computers and the principles of von Neumann.
- 3. Draw a block diagram of the PC, explain the purpose of all components. CPU, the main characteristics. Memory system: composition, purpose. RAM: DRAM: structure, basic parameters. System bus: definition, purpose, parameters.
- 4. Bus FSB, Hyper Transport, PCI, PCI-E: purpose, basic parameters, speed.
- 5. "North Bridge", "South Bridge": composition, purpose.
- 6. PC I / O devices.
- 7. Factors affecting the performance of the PC.
- 8. Which devices can connect to which ports?