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MONITORING THE WORK OF THE CENTRAL PROCESSOR

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The central processor is the main and most important element of the system. Thanks to all the tasks associated with data transfer, command execution, logical and arithmetic operations. The main characteristics of the CPU are: clock speed, performance, power consumption, standards of the lithographic process used in production (for microprocessors) and architecture.

The early CPUs were created in the form of unique components for unique, and even unique, computer systems. Later, from an expensive way of developing processors designed to perform one single or several highly specialized programs, computer manufacturers switched to mass production of typical classes of multi-purpose processor devices. The trend towards standardization of computer components began in the era of rapid development of semiconductor elements, mainframes and minicomputers, and with the advent of integrated circuits, it has become even more popular. The creation of microcircuits made it possible to further increase the complexity of the CPU while reducing their physical dimensions. Standardization and miniaturization of processors led to a deep penetration of digital devices based on them into everyday life. Modern processors can be found not only in high-tech devices such as computers, but also in cars, calculators, mobile phones and even in children's toys. Most often they are represented by microcontrollers, where, in addition to the computing device, additional components are located on the chip (program and data memory, interfaces, input / output ports, timers, etc.). Modern computing capabilities of the microcontroller are comparable with the processors of personal computers a decade ago, and often even significantly surpass their performance.

As you know, if a computer is operated in adverse conditions or in a dusty room, then over time it starts to work slower and slower as the condition of certain elements in its structure deteriorates.

Thus, among the most common causes of malfunctioning of modern computers are the following:

- Dusting of various connectors or microcircuits and, as a result, their overheating.
- Excessive oxidation of contacts.
- Overheating of components due to excessive heat.
- Burnout of contacts or components due to excessive voltage jump.
- Unstable operation of the installed power supply.
- Incorrect grounding.

7 typical (common) causes of hangs and PC failures As practice shows, the most common causes of hangs, failures and computer malfunctions include:

1. Contact violation in the PC hardware.
2. Overheating of the VLSI (superlarge integrated circuits) computer electronic circuits.
3. Rupture of foiled strips of multilayer electronics boards.
4. The failure of individual nodes, blocks, devices, PC.
5. Physical erasure of the magnetic layer of the system area of the hard disk (hard drive).
6. Violation of the integrity of the system software due to accidental or deliberate erasure.
7. Infection of software viruses.

It is easiest to test the operation of the CPU using special software. There are various utilities to determine the parameters and modes of operation of the processor.

Hot CPU Tester Pro - a set of programs for testing the speed and stability of the processor or motherboard under normal conditions and under heavy load. The program is based on DefectTech technology and is widely used in state test laboratories. There are many options and a nice, informative interface.

CPU-Z - this small utility allows you to quickly get quite detailed information about the processor, cache, motherboard and memory. If necessary, all received information is easy to save in a report (txt or htm). The program determines the technical characteristics of the CPU, motherboard and BIOS, RAM, video card, except for the hard disk. Popular among IT-specialists, computer technicians and repairmen, gamers and overclockers.

CPU Tester Pro is a popular benchmark that tests PC performance and stability. A feature of the program is that it checks both individual components (CPU, chipset, other devices associated with the motherboard), and the computer as a whole. Special attention is paid to the presence of errors and failures. A test may also be a professional test for rejection.

Central Brain Identifier - a utility designed for a PC based on AMD components. The program provides information about AMD processors. With the help of the Central Brain Identifier, you can determine the standard technical characteristics of the CPU, obtain information about the process and marking. The Central Brain Identifier also provides information about the cache (1st and 2nd levels) and available mobile functions (for the respective processor versions).

RightMark CPU Clock Utility - a utility designed to monitor the frequency and level of CPU usage in real time. The program monitors the work of processors and

can work with multiprocessor systems. In the latter case, it conducts independent monitoring for each processor and allows you to control their parameters separately.

The frequency and CPU usage is displayed as a graph. The resulting information can be saved to a text file. In addition, the program allows you to control power consumption, if the processor supports this feature.

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ВЛИЯНИЕ ВЕРОЯТНОСТИ ВЫБОРА МИНИМАЛЬНО ДОПУСТИМОГО ИЛИ СЛУЧАЙНОГО ЦВЕТА ДЛЯ ЖАДНОГО МЕТОДА ОЦЕНКИ ХРОМАТИЧЕСКОГО ЧИСЛА ГРАФА

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В работе приводится описание влияния цвета первой вершины на качество решений жадного метода поиска хроматического числа графа. Для разработанных программных реализаций приведены оценки временных затрат и скорости сходимости.

Существует большое количество практических задач, которые можно свети к задачам теории графов [1]. Одна из них – раскраска графа в минимальное количество цветов, которая может быть использована при разбиении графов, составлении расписаний, компиляции программ, решении задач на базе латинских квадратов и пр.

Решение задачи раскраски неориентированного графа $G = \langle A, V \rangle$ в минимальное количество цветов относится к классу NP-полных задач, где $A = \{a_1, a_2, \ldots, a_N\}$ – множество вершин графа, $N = |A|$ – число вершин, $V = \{v_1, v_2, \ldots, v_M\} \subseteq A \times A$ – множество рёбер, $M = |V|$ – общее число рёбер. В некоторых случаях граф может не быть полносвязным, что соответствует отсутствию связей между некоторыми парами вершин, при этом граф характеризуется значением «плотности» $d(G) = \dfrac{M}{N(N-1)}$ (данная характеристика является важной в связи с тем, что качество работы эвристических методов зависит от области в некотором многомерном пространстве, одной из координат которого в задачах на графах является плотность $d(G)$ этого графа [1, 2]). Необхо-