



Republic of Iraq
Ministry of Higher Education
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Al-Mustaqbal University
Computer Engineering Techniques Department

Subject: المعالج والحاسبة الدقيقة

المحاضرة 3

Processors and Microprocessors

: اعداد

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The processing The computer you are using to read this page uses a microprocessor to do its work. The microprocessor is the heart of any normal computer, whether it is a desktop machine, a server or a laptop. There are many types of microprocessors, but they all do approximately the same thing in approximately the same way.

A microprocessor — also known as a CPU or central processing unit — is a complete computation engine that is fabricated on a single chip. The first microprocessor was the Intel 4004, introduced in 1971. The 4004 was not very powerful — all it could do was add and subtract, and it could only do that 4 bits at a time. But it was amazing that everything was on one chip. Prior to the 4004, engineers built computers either from collections of chips or from discrete components (transistors wired one at a time). The



4004 powered one of the first portable electronic calculators.

If you have ever wondered what the microprocessor in your computer is doing, or if you have ever wondered about the differences between types of microprocessors, then read on. In this article, you will learn how fairly simple digital logic techniques allow a computer to do its job, whether it's playing a game or spell checking a document!

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A chip is also called an integrated circuit. Generally it is a small, thin piece of silicon onto which the transistors making up the microprocessor have been etched. A chip might be as large as an inch on a side and can contain tens of millions of transistors. Simpler models might consist of a few thousand transistors etched onto a chip just a few millimeters square. It has become common to see chips in all kinds of devices with multiple cores, each of which is a processor.

What's a Chip?

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microprocessor Logic :

Microprocessor :

The previous section talked about the address and data buses, as well as the RD and WR lines. These buses and lines connect either to RAM or ROM — generally both. In our sample microprocessor, we have an address bus 8 bits wide and a data bus 8 bits wide. That means that the microprocessor can address 256 bytes of memory, and it can read or write 8 bits of the memory at a time. Let's assume that this simple microprocessor has 128 bytes of ROM starting at address 0 and 128 bytes of RAM starting at address 128.

ROM stands for read-only memory. A ROM chip is programmed with a permanent collection of pre-set bytes. The address bus tells the ROM chip which byte



to get and place on the data bus. When the RD line changes state, the ROM chip presents the selected byte onto the data bus.

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