Introduction to Microprocessors

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Lesson Outline

- 1.1 Explanation of Terms
- 1.2 Evolution of the Microprocessor

Introduction

- The basic blocks of a computer are the central processing unit (CPU), the memory, and the input/output (I/O).
- Computer hardware includes such components as memory, CPU, transistors
- Computer software consists of a collection of programs that contain instructions and data for performing a specific task.
- A translator is necessary to convert such a program into binary and this is achieved using a translator program called a compiler.

Introduction

- Microprocessor is fabricated CPU on a single chip
- Both metal-oxide semiconductor (MOS) and bipolar technologies are used in the fabrication process.
- Along with the microprocessor chip, appropriate memory and I/O chips can be used to design a microcomputer.
- Microcontrollers include a microcomputer, timers, and A/D (analog-to- digital) and D/A (digital to analog) converters, all on a single chip.

1.1 Explanation of Terms

- An Address is a pattern of 0’s and 1’s that represents a specific location in memory or a particular I/O device. Typical 8-bit microprocessors have 16 address lines, and,
- these 16 lines can produce unique 16-bit patterns from to representing 65,536 different address combinations.

1.1 Explanation of Terms

- Addressing mode is the manner in which the microprocessor determines the operand (data) and destination addresses during execution of an instruction.
- An Arithmetic-logic unit (ALU) is a digital circuit that performs arithmetic and logic operations on two n-bit digital words.
- Bit is an abbreviation for the term binary digit. A binary digit can have only two values, which are represented by the symbols 0 and 1,

1.1 Explanation of Terms

- Bit size refers to the number of bits that can be processed simultaneously by the basic arithmetic circuits of a microprocessor. A number of bits taken as a group in this manner is called a word.
- For example, a 32- bit microprocessor can process a 32-bit word.
- An 8-bit word is referred to as a byte , and a 4-bit word is known as a nibble.

1.1 Explanation of Terms

- A bus consists of a number of conductors (wires) organized to provide a means of communication among different elements in a microprocessor system.
- Cache Memory is a high-speed, directly accessible, relatively small, semiconductor read/write memory block used to store data/instructions that the microprocessor may need in the immediate future.

1.1 Explanation of Terms

- The instruction set of a microprocessor is a list of commands that the microprocessor is designed to execute.
- Pipelining is a technique that overlaps instruction fetch (instruction read) with execution.

1.2 Evolution of the Microprocessor

- The Intel Corporation is generally acknowledged as the company that introduced the first microprocessor successfully into the marketplace.
- The 4004 is the first processor, was introduced in and evolved from a development effort while making a calculator chip set
- In 1973, second-generation microprocessors (8-bit microprocessors) such as the Motorola 6800 and the Intel 8080

1.2 Evolution of the Microprocessor

- A third generation microprocessor (16-bit microprocessors) introduced in 1978 is typically represented by the Intel 8086 and the Motorola, which are 16-bit microprocessors.
- During the 1980's, fourth-generation (32-bit microprocessor)
- Since 1985, more 32-bit microprocessors have been introduced.
- These include Motorola's 68020, 68030, 68040, 68060, PowerPC, Intel's , 80486, the Intel Pentium family, Core Duo, and Core2 Duo microprocessors.

1.2 Evolution of the Microprocessor

- The original Pentium processor was introduced by Intel in 1993.
- latest speed of 233 MHz.

1.2 Evolution of the Microprocessor

- Pentium II It basically takes attributes of the Pentium Pro processor plus the capabilities of MMX technology to yield processor speeds of 333, 300, 266, and 233 MHz.
- MMX (matrix math extensions) is intended for efficient multimedia and communications operations.
- The Intel Celeron processor speed up to 333 MHz

1.2 Evolution of the Microprocessor

- The Pentium III operates at 450 MHz and 500 MHz.
- The Pentium 4 currently available at 1.30, 1.40, 1.50, and 1.70 GHz.
- Intel introduced the 32-bit Pentium M microprocessor.
- It was designed specifically for the mobile computing market.
- In 2006, Intel introduced the 64-bit Core Duo microprocessor that ran at a speed of 1.66 to GHz.

1.2 Evolution of the Microprocessor

- The original Core 2 Duo ran at a speed of to 2.93 GHz.

Then What?

Thank You