Introduction to microprocessor Unit 1 Lecture 1

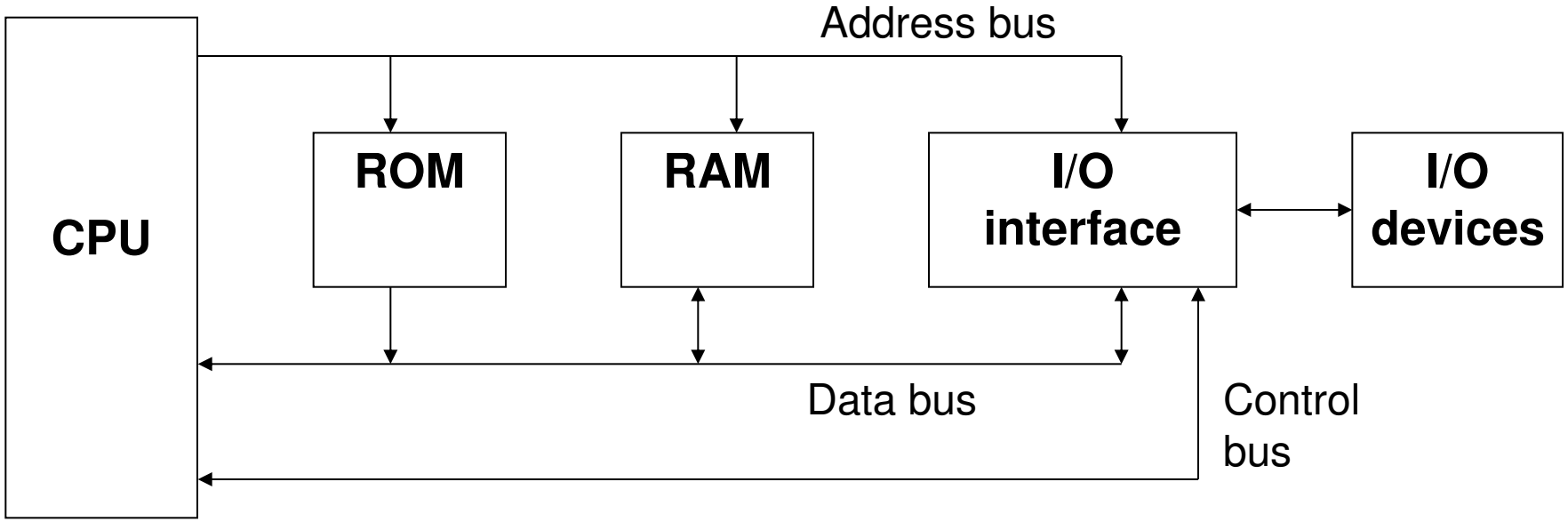
Gunjeet Kaur
Dronacharya Group of Institutions

Microprocessor

- The **microprocessor** is a multipurpose, programmable device that accepts digital data as input, processes it according to instructions stored in its memory, and provides results as output. It is an example of sequential digital logic, as it has internal memory.

BLOCK DIAGRAM OF A BASIC COMPUTER SYSTEM

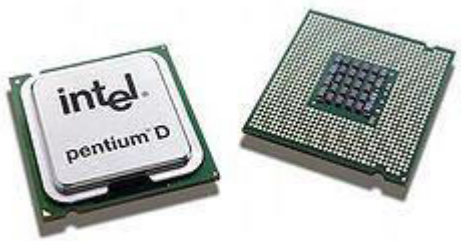
Basic computer system consist of a Central processing unit (CPU), memory (RAM and ROM), input/output (I/O) unit.



Block diagram of a basic computer system

Basic component of microcomputer

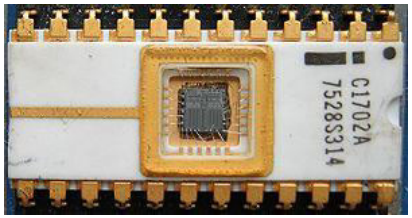
1. CPU - Central Processing Unit
   - the portion of a computer system that carries out the instructions of a computer program
   - the primary element carrying out the computer's functions. It is the unit that reads and executes program instructions.
   - The data in the instruction tells the processor what to do.



Pentium D dual core processors

2. MEMORY

- Physical devices used to store data or programs (sequences of instructions) on a temporary or permanent basis for use in an electronic digital computer.
- Computer main memory comes in two principal varieties: random access memory (RAM) and read only memory(ROM).
- RAM can be read and written to anytime the CPU commands it, but ROM is pre-loaded with data and software that never changes, so the CPU can only read from it.



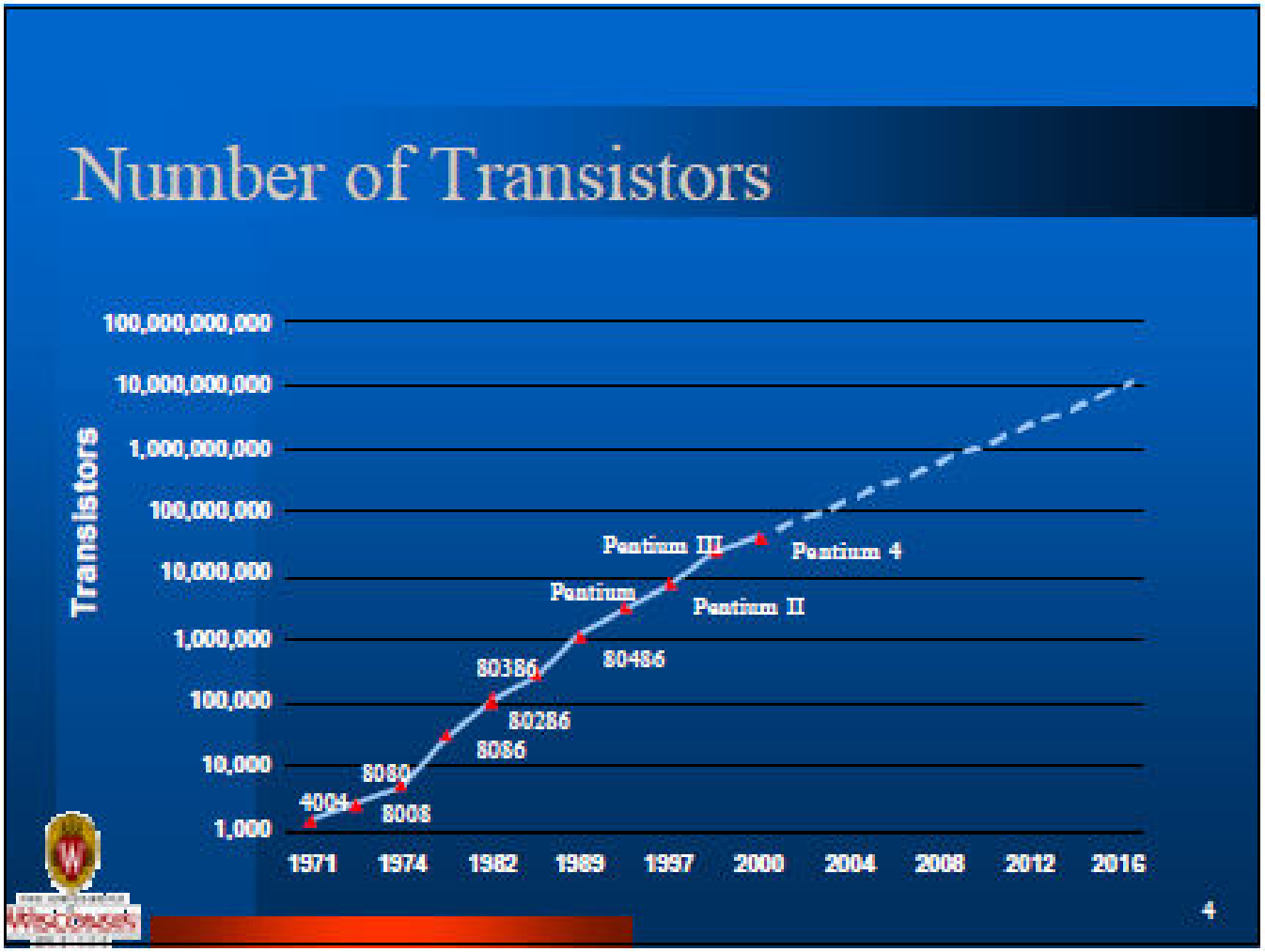
(CONT.)

- ROM is typically used to store the computer's initial start-up instructions.
- In general, the contents of RAM are erased when the power to the computer is turned off, but ROM retains its data indefinitely.
- In a PC, the ROM contains a specialized program called the BIOS that orchestrates loading the computer's operating system from the hard disk drive into RAM whenever the computer is turned on or reset.

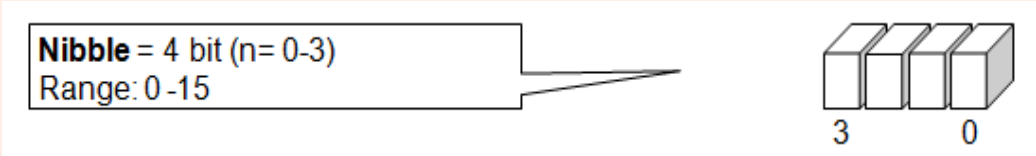
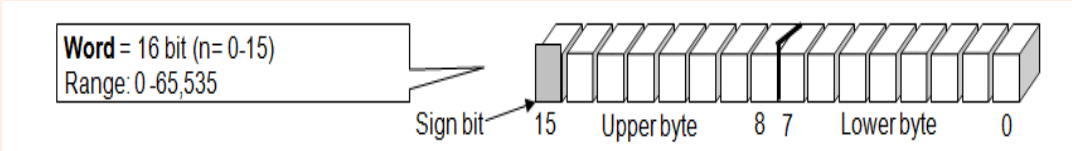
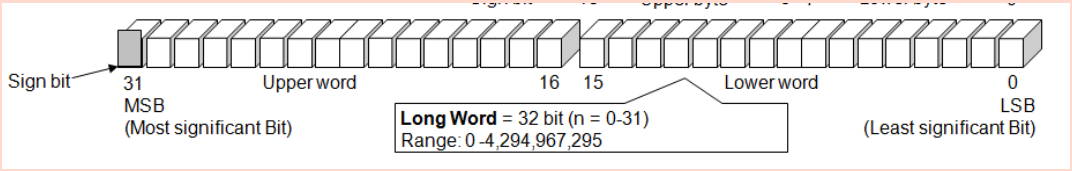
3. I/O UNIT

- **Input/output (I/O)**, refers to the communication between an information processing system (such as a computer), and the outside world possibly a human, or another information processing system.
- Inputs are the signals or data received by the system, and Outputs are the signals or data sent from it
- Devices that provide input or output to the computer are called peripherals.
- On a typical personal computer , peripherals include input devices like the keyboard and mouse, and output devices such as the display and printer . Hard disk drives, floppy disk drives and optical disc drives serve as both input and output devices. Computer networking is another form of I/O.

Evolution of Microprocessor



DATA SIZE

Nibble	**4 bit**	
Byte	**8 bit**	
Word	**16 bit**	
Long word	**32 bit**	

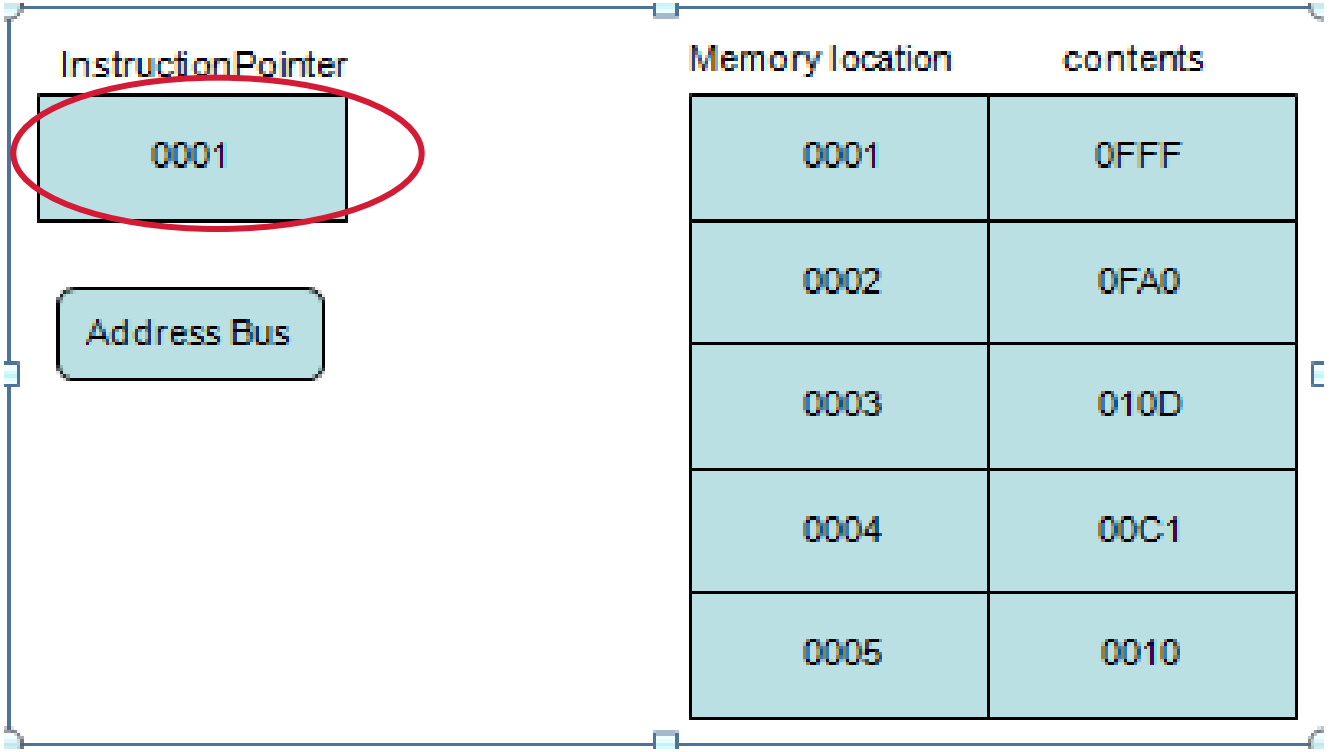
Fetching & Execution Cycles

- **Fetching Cycles**
  - The fetch cycle takes the instruction required from memory, stores it in the instruction register, and
  - moves the program counter on one so that it points to the next instruction.
- **Execute cycle**
  - The actual actions which occur during the execute cycle of an instruction.
  - depend on both the instruction itself and the addressing mode specified to be used to access the data that may be required.

Fetching an instruction

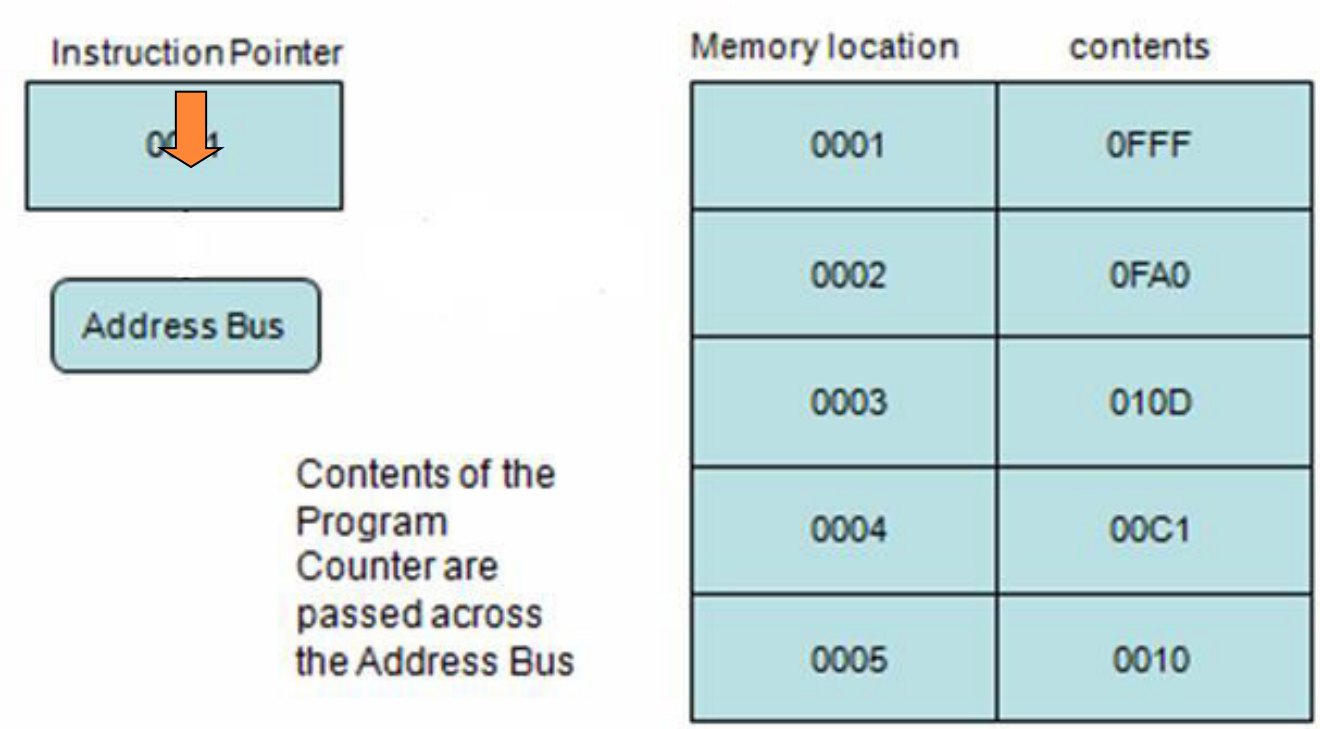
- **Step 1**

  Instruction pointer (program counter) hold the address of the next instruction to be fetch.



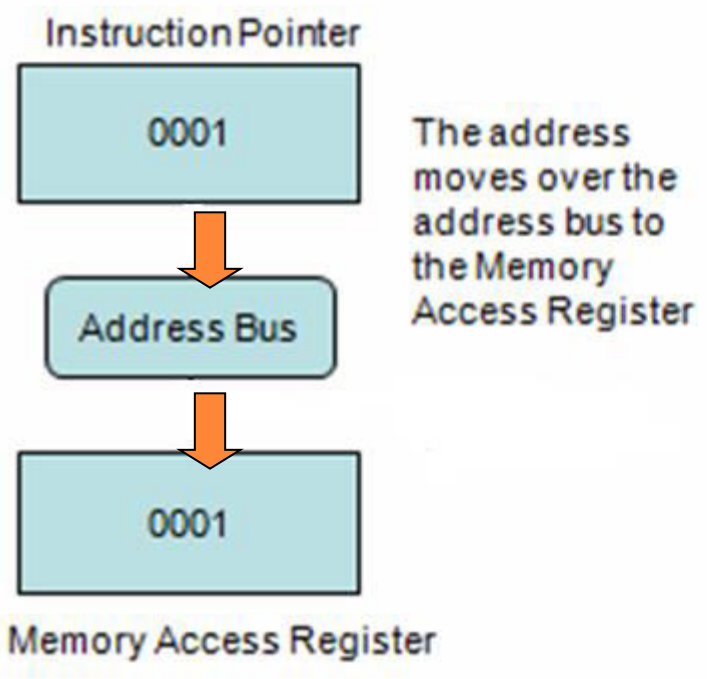
FETCHING AN INSTRUCTION (cont.)

- **Step 2**



FETCHING AN INSTRUCTION (cont.)

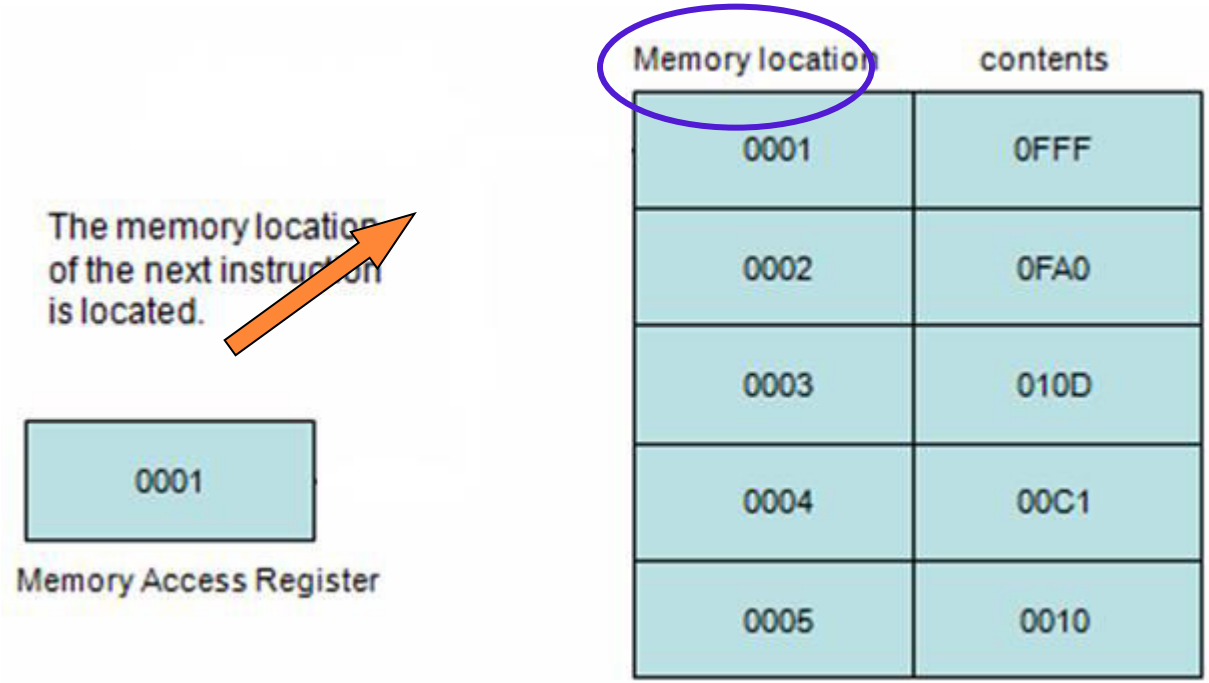
- **Step 3**



Memory location	contents
0001	0FFF
0002	0FA0
0003	010D
0004	00C1
0005	0010

FETCHING AN INSTRUCTION (cont.)

- **Step 4**



FETCHING AN INSTRUCTION (cont.)

- **Step 5**

Data Bus

The contents of memory at the given location are moved across the data bus

Memory location	contents
0001	0FFF
0002	0FA0
0003	010D
0004	00C1
0005	0010

FETCHING AN INSTRUCTION (cont.)

- **Step 6**