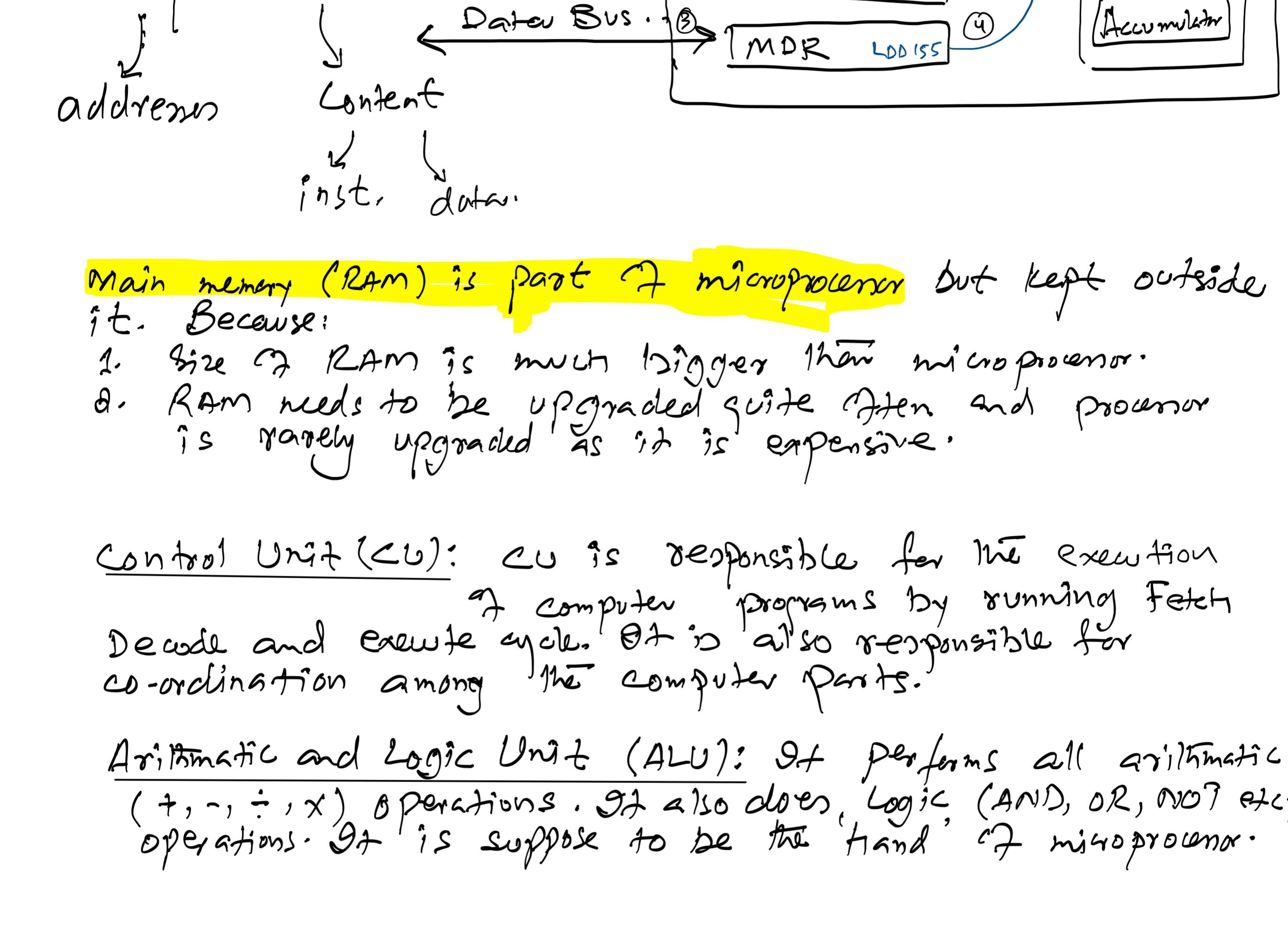


Definition:

It was defined by John Von Neumann in 1945. It defines:

1. Both the instructions and data, when in binary form, are indistinguishable and will be kept in the same main memory.
2. It is a single processor, made up of control unit, Arithmetic & Logic Unit and Memory Unit.
3. It will make use of input, output and storage devices. That's why this architecture is also known as "idea of stored program".
4. It is a sequential machine.

Architecture:

Main memory (RAM) is part of microprocessor but kept outside it. Because:

1. Size of RAM is much bigger than microprocessor.
2. RAM needs to be upgraded quite often and processor is rarely upgraded as it is expensive.

Control Unit (CU): CU is responsible for the execution of computer programs by running Fetch Decode and execute cycle. It is also responsible for co-ordination among the computer parts.

Arithmetic and Logic Unit (ALU): It performs all arithmetic (+, -, ÷, ×) operations. It also does logic (AND, OR, NOT etc.) operations. It is supposed to be the brain of microprocessor.

System Buses: These are physical wires running over the motherboard and connect the microprocessor with outside world, particularly main memory. There are 3 system buses.

Control Bus: CU uses this bus to communicate & co-ordinate with other parts to run system smoothly. It is a bi-directional bus.

Address Bus: A uni-directional bus that connects microprocessor with memory addresses. It carries the add. of current inst. or data required.

Data Bus: It is a bi-directional, which moves the data back and forth b/w microprocessor and main memory.

Computer microprocessor Registers: These are smallest, fastest & closest memories available to microprocessor for specific purposes. There are two types of registers:

Special Purpose: These are having only one predefined specific purpose. There are four of them:

Program Counter (PC): It holds the address of next instruction.

Memory Address Register (MAR): It holds the address of current instruction.

Memory Data Register (MDR): It holds the instruction whose address is mentioned in MAR.

Current Instruction Register (CIR): It decodes and executes current instruction.

General Purpose:

Accumulator: It holds all the data produced during the execution of program and the final result.

Fetch-Decode-Execute Cycle (FDEC):

1. Add. of the next inst. goes to (copy) MAR from PC.

2. PC increases itself by 1.

3. MAR points to main memory through address bus.

4. MDR receives the instruction from main memory whose address is mentioned in MAR.

5. From MDR inst. goes to CIR.

6. If the inst. has an address part then it goes to MAR.

7. Inst. is decoded and executed.