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FACULTY OF ENGINEERING & TECHNOLOGY

CSPS-106 Computer Organization

Lecture-05

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OUTLINE

- ENIAC – BACKGROUND
- STRUCTURE OF VON NEUMANN MACHINE
- STRUCTURE OF IAS
- GENERATIONS OF COMPUTER
- PENTIUM EVOLUTION

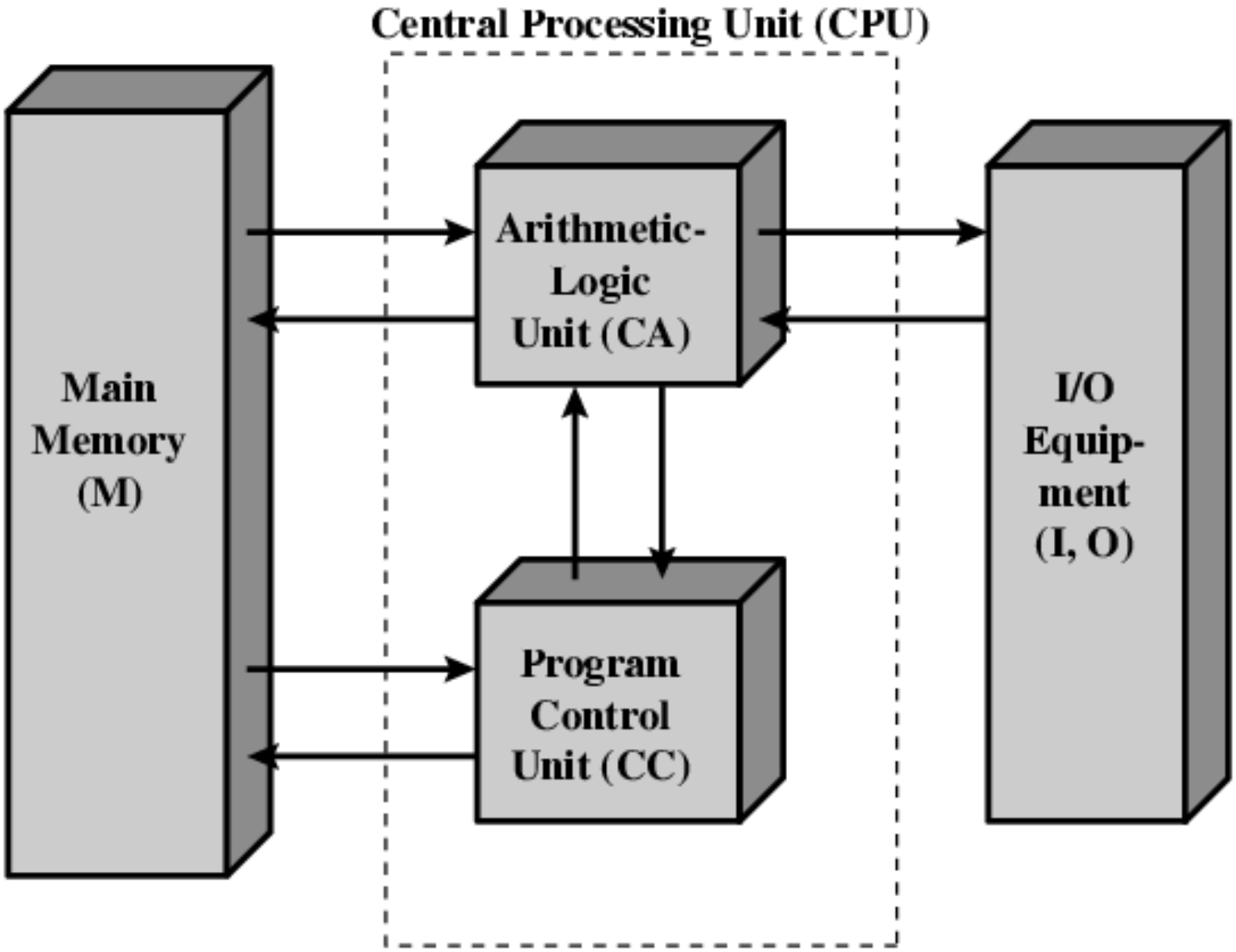
ENIAC - BACKGROUND

- Electronic Numerical Integrator And Computer
- Eckert and Mauchly
- University of Pennsylvania
- Trajectory tables for weapons
- Started 1943
- Finished 1946
  - Too late for war effort
- Used until 1955

ENIAC - DETAILS

- Decimal (not binary)
- 20 accumulators of 10 digits
- Programmed manually by switches
- 18,000 vacuum tubes
- 30 tons
- 15,000 square feet
- 140 kW power consumption
- 5,000 additions per second

STRUCTURE OF VON NEUMANN MACHINE

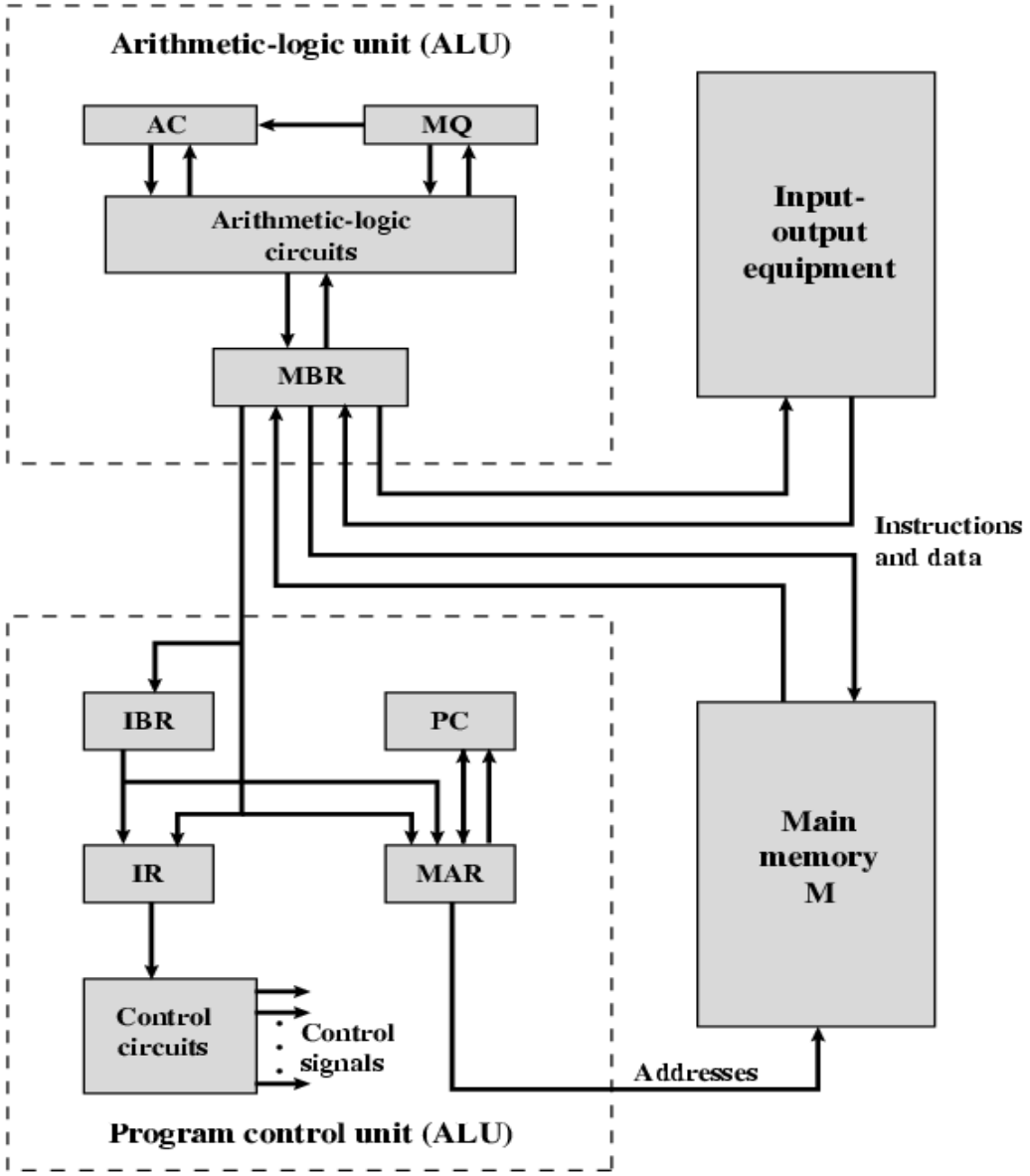


IAS - details

- Set of registers (storage in CPU)
  - Memory Buffer Register (MBR)
  - Memory Address Register (MAR)
  - Instruction Register (IR)
  - Instruction Buffer Register (IBR)
  - Program Counter (PC)
  - Accumulator (AC)
  - Multiplier Quotient (MQ)

STRUCTURE OF IAS

Figure illustrates *Fetch cycle* and *Execution cycle*, which taken together is the *Instruction cycle*.



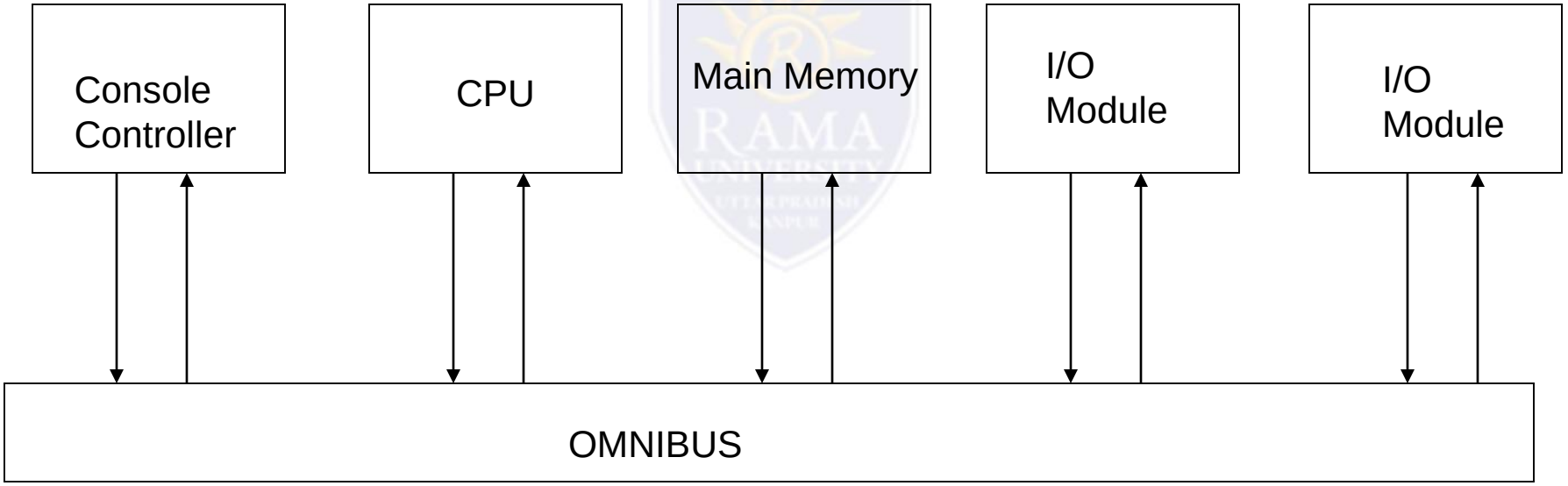
COMMERCIAL COMPUTERS

- 1947 - Eckert-Mauchly Computer Corporation
- UNIVAC I (Universal Automatic Computer)
- US Bureau of Census 1950 calculations
- Became part of Sperry-Rand Corporation
- Late 1950s - UNIVAC II
  - Faster
  - More memory

GENERATIONS OF COMPUTER

- Vacuum tube - 1946-1957
- Transistor - 1958-1964
- Small scale integration - 1965 on
  - Up to 100 devices on a chip
- Medium scale integration - to 1971
  - 100-3,000 devices on a chip
- Large scale integration - 1971-1977
  - 3,000 - 100,000 devices on a chip
- Very large scale integration - 1978 to date
  - 100,000 - 100,000,000 devices on a chip

DEC - PDP-8 BUS STRUCTURE



PENTIUM EVOLUTION

- 8080
  - first general purpose microprocessor
  - 8 bit data path
  - Used in first personal computer – Altair
- 8086
  - much more powerful
  - 16 bit
  - instruction cache, prefetch few instructions
  - 8088 (8 bit external bus) used in first IBM PC
- 80286
  - 16 Mbyte memory addressable
  - up from 1Mb
- 80386
  - 32 bit
  - Support for multitasking

PENTIUM EVOLUTION

- 80486
  - sophisticated powerful cache and instruction pipelining
  - built in maths co-processor
- Pentium
  - Superscalar
  - Multiple instructions executed in parallel
- Pentium Pro
  - Increased superscalar organization
  - Aggressive register renaming
  - branch prediction
  - data flow analysis
  - speculative execution

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PENTIUM EVOLUTION

- Pentium II
  - MMX technology
  - graphics, video & audio processing
- Pentium III
  - Additional floating point instructions for 3D graphics
- Pentium 4
  - Note Arabic rather than Roman numerals
  - Further floating point and multimedia enhancements
- Itanium
  - 64 bit
- See Intel web pages for detailed information on processors

Multiple Choice Question

MUTIPLE CHOICE QUESTIONS:

Sr no	Question	Option A	Option B	OptionC	OptionD
1	The ultimate goal of a compiler is to _____	Reduce the clock cycles for a programming task	Reduce the size of the object code	Be versatile	Be able to detect even the smallest of errors
2	CISC stands for _____	Complete Instruction Sequential Compilation	Computer Integrated Sequential Compiler	Complex Instruction Set Computer	Complex Instruction Sequential Compilation
3	SPEC stands for _____	Standard Performance Evaluation Code	System Performance Evaluation Corporation	System Processing Enhancing Code	none of the above
4	_____ is used to store data in registers.	D flip flop	T flip flop	SR flip flop	DS flight flop
5	In the case of, Zero-address instruction method the operands are stored in _____	Registers	Accumulators	Push down stack	cache

REFERENCES

- http://www.engppt.com/search/label/Computer%20Organization%20and%20Architecture
- http://www.engppt.com/search/label/Computer%20Architecture%20ppt