Paper-II (MCA-102) : Computer Organization

UNIT- I

Introduction

Introduction: Structured Computer Organization: languages, levels and virtual machines, contemporary multilevel machines, evolution of multilevel machines. Milestones in Computer Architecture: various generations. The computer Zoo: technological and economic forces, the computer spectrum. Example computer families.

UNIT- II

Computer System Organization

Computer Systems Organization: Processors: CPU organization, instruction execution, RISC versus CISC, design principles for modern computers, instruction-level parallelism, processor-level parallelism. Primary Memory: Bits, memory addresses, byte ordering, error-correcting codes, cache memory, memory packaging and types. Secondary Memory: Memory hierarchies, magnetic disks, floppy disks, IDE disks, SCSI disks, RAID, CD-ROMs, CD-Recordables, DVD. INPUT/OUTPUT: Buses, terminals, mice, printers, modems, character codes.

UNIT- III

Digital Logic Level

The Digital Logic Level: Gates and Boolean Algebra: Gates, boolean algebra, implementation of boolean functions, circuit equivalence. Basic Digital Logic Circuits: Integrated circuits, combinational circuits, arithmetic circuits, clocks. Memory: Latches, flip-flops, registers, memory organization, memory chips, RAMs and ROMs. CPU Chips and Buses: CPU chips, computer buses, bus width, bus clocking, bus arbitration, bus operations. Example CPU chips and example buses. Interfacing: I/O chips, address decoding.

UNIT- IV

The Micro-Architecture Level

The Micro-architecture Level: An example micro-architecture: The data path, micro-instructions, micro-instruction control the MIC-1. An example ISA: IJVM: Stacks, the IJVM memory model, the IJVM instruction set, compiling Java to IJVM. An example implementation: micro-instruction and notation, implementation of IJVM using Mic-1. Design of the micro-architecture level: Speed versus cost, reducing the execution path length, a design with pre-fetching the Mic-2, a pipelined design the Mic-3, a seven-stage pipeline the Mic-4. Improving performance: Cache memory, branch prediction, out-of-order execution and register renaming, speculative execution. Examples of the micro-architecture level.

UNIT- V

Microprocessors

Microprocessors: Architecture of 8085 microprocessor; instructions of 8085, addressing modes, introduction to assembly language programming.

Recent Developments in Computer Hardware(CPU, Chipsets, memories, disks & interfaces used in desktops)

Text Books:

1. A.S.Tannenbaum : Structured Computer Organization.
2. Ramesh Gaonkar: Introduction to microprocessors.