COMPUTER ARCHITECTURE AND ORGANIZATION

Books

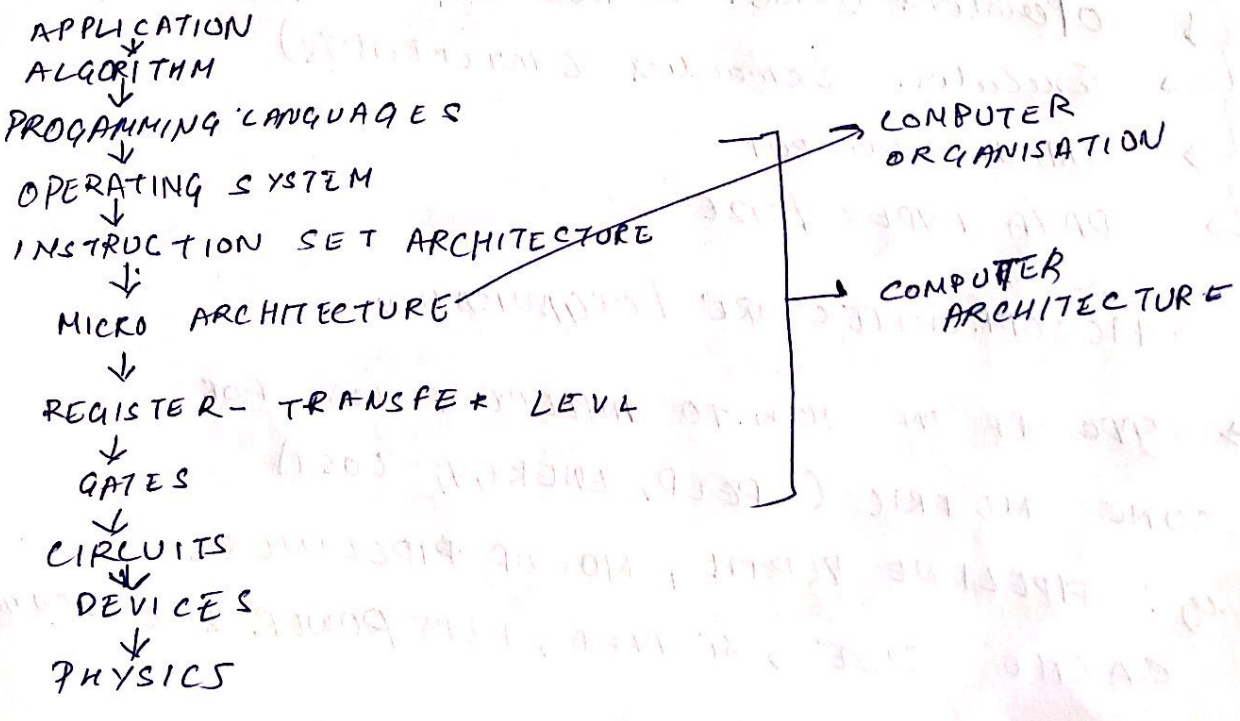
→ COMPUTER ARCHITECTURE AND ORGANIZATION – WILLIAM STALLING

→ COMPUTER ARCHITECTURE – MORISS MANO

→ FUNDAMENTALS OF COMPUTER ARCHITECTURE & ORGANISATION – MOSTAFA & MESAM (WILEY)

COMPUTER ARCHITECTURE

It is the design of the abstraction / implementation layer that allow us to execute information processing application efficiently using manufacturing technology



Computer Architecture (CA) refers to those attributes of a system visible to a programmer or those attributes that have a direct impact on the logical execution of a program

Instruction set Architecture (ISA) is a term often used interchangeably with Computer Architecture

ARCHITECTURE Vs MICROARCHITECTURE

ARCH / ISA → Abstraction Layer provided to software (S/W.

- ↳ Programmer visible state (MEM & REG)
- ↳ Operations (INST & How they work)
- ↳ Execution Semantics (INTERRUPTS)
- ↳ INPUT / OUTPUT
- ↳ DATA TYPES / SIZE

MICROARCHITECTURE / ORGANISATION

↳ TRADE OFF ON HOW TO IMPLEMENT ISA FOR SOME METRIC (SPEED, ENERGY, COST)

↳ eg: PIPELINE DEPTH, NO. OF PIPELINES, CACHE SIZE, & AREA, PEAK POWER & EXECUTION

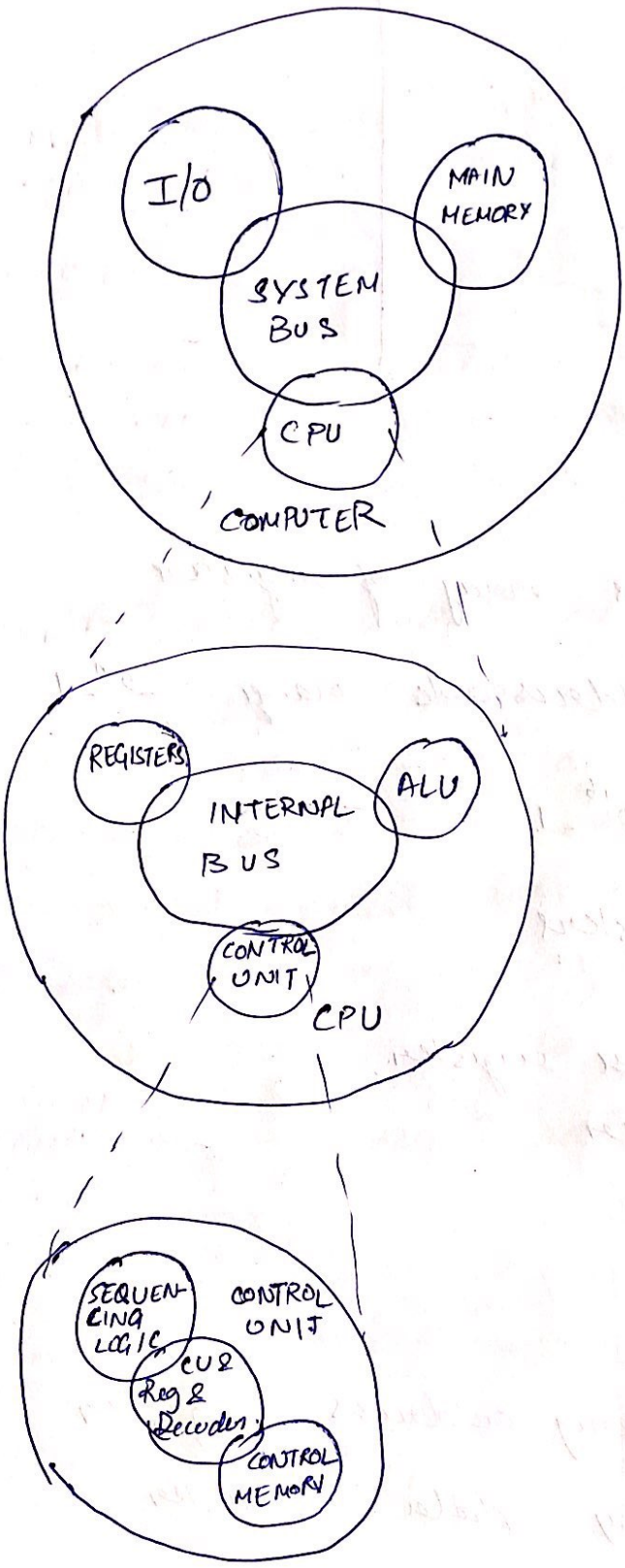


FIG: COMPUTER STRUCTURE

IMP

	STRUCTURE	FUNCTION
CPU		
MAIN MEMORY		
I/O		
SYS INTER-CONNECTION		

Memory : It is array of registers

Maximum addressable range = $2^n - 1$

16 bit = $2^{16} - 1$

Types of registers

→ General purpose register.
→ Special register
→ Temp registry

Read operation

MAR - Memory address register

MDR - Memory data register

WORKING