MICROPROCESSORS

EX 551

Lecture : 3 **Year : II**
Tutorial : 1 **Part : II**
Practical : 3

Course Objective:

To familiarize students with architecture, programming, hardware and application of microprocessor

1. Introduction **(4 hours)**

1.1 Introduction and History of Microprocessors
1.2 Basic Block Diagram of a Computer
1.3 Organization of Microprocessor Based System
1.4 Bus Organization
1.5 Stored program Concept and Von Neumann Machine
1.6 Processing Cycle of a Stored Program Computer
1.7 Microinstructions and Hardwired/Microprogrammed Control Unit
1.8 Introduction to Register Transfer Language

2. Programming with 8085 Microprocessor **(10 hours)**

2.1 Internal Architecture and Features of 8085 microprocessor
2.2 Instruction Format and Data Format
2.3 Addressing Modes of 8085
2.4 Intel 8085 Instruction Set
2.5 Various Programs in 8085
  2.5.1 Simple Programs with Arithmetic and Logical Operations
  2.5.2 Conditions and Loops
  2.5.3 Array and Table Processing
  2.5.4 Decimal BCD Conversion
  2.5.5 Multiplication and Division

3. Programming with 8086 Microprocessor **(12 hours)**

3.1 Internal Architecture and Features of 8086 Microprocessor
  3.1.1 BIU and Components
  3.1.2 EU and Components
  3.1.3 EU and BIU Operations
  3.1.4 Segment and Offset Address
3.2 Addressing Modes of 8086

3.3 Assembly Language Programming
3.4 High Level versus Low Level Programming
3.5 Assembly Language Syntax
  3.5.1 Comments
  3.5.2 Reserved words
  3.5.3 Identifiers
  3.5.4 Statements
  3.5.5 Directives
  3.5.6 Operators
  3.5.7 Instructions
3.6 EXE and COM programs
3.7 Assembling, Linking and Executing
3.8 One Pass and Two Pass Assemblers
3.9 Keyboard and Video Services
3.10 Various Programs in 8086
  3.10.1 Simple Programs for Arithmetic, Logical, String Input/Output
  3.10.2 Conditions and Loops
  3.10.3 Array and String Processing
  3.10.4 Read and Display ASCII and Decimal Numbers
  3.10.5 Displaying Numbers in Binary and Hexadecimal Formats

4. Microprocessor System **(10 hours)**

4.1 Pin Configuration of 8085 and 8086 Microprocessors
4.2 Bus Structure
  4.2.1 Synchronous Bus
  4.2.2 Asynchronous Bus
  4.2.3 Read and Write Bus Timing of 8085 and 8086 Microprocessors
4.3 Memory Device Classification and Hierarchy
4.4 Interfacing I/O and Memory
  4.4.1 Address Decoding
  4.4.2 Unique and Non Unique Address Decoding
  4.4.3 I/O Mapped I/O and Memory Mapped I/O
  4.4.4 Serial and Parallel Interfaces
  4.4.5 I/O Address Decoding with NAND and Block Decoders (8085, 8086)
  4.4.6 Memory Address Decoding with NAND, Block and PROM Decoders (8085, 8086)
4.5 Parallel Interface
  4.5.1 Modes: Simple, Wait, Single Handshaking and Double Handshaking

4.5.2 Introduction to Programmable Peripheral Interface (PPI)

4.6 Serial Interface

4.6.1 Synchronous and Asynchronous Transmission

4.6.2 Serial Interface Standards: RS232, RS423, RS422, USB

4.6.3 Introduction to USART

4.7 Introduction to Direct Memory Access (DMA) and DMA Controllers

5. Interrupt Operations **(5 hours)**

5.1 Polling versus Interrupt

5.2 Interrupt Processing Sequence

5.3 Interrupt Service Routine

5.4 Interrupt Processing in 8085

5.4.1 Interrupt Pins and Priorities

5.4.2 Using Programmable Interrupt Controllers (PIC)

5.4.3 Interrupt Instructions

5.5 Interrupt Processing in 8086

5.5.1 Interrupt Pins

5.5.2 Interrupt Vector Table and its Organization

5.5.3 Software and Hardware Interrupts

5.5.4 Interrupt Priorities

6. Advanced Topics **(4 hours)**

6.1 Multiprocessing Systems

6.1.1 Real and Pseudo-Parallelism

6.1.2 Flynn's Classification

6.1.3 Instruction Level, Thread Level and Process Level Parallelism

6.1.4 Interprocess Communication, Resource Allocation and Deadlock

6.1.5 Features of Typical Operating System

6.2 Different Microprocessor Architectures

6.2.1 Register Based and Accumulator Based Architecture

6.2.2 RISC and CISC Architectures

6.2.3 Digital Signal Processors

Practical:

There will be aout 12 lab exercises to program 8085 and 8086 microprocessors.

References:

1. Ramesh S. Gaonkar, "Microprocessor Architecture, Programming and Application with 8085", Prentice Hall
2. Peter Abel, "IBM PC Assembly Language and Programming", Pearson Education Inc.
3. D. V. Hall, "Microprocessor and Interfacing, Programming and Hardware", Tata McGraw Hill
4. John Uffenbeck, "Microcomputers and Microprocessors, The 8080, 8085 and Z-80 Programming, Interfacing and Troubleshooting", Prentice Hall
5. Walter A. Triebel and Avtar Singh, "The 8088 and 8086 Microprocessors, Programming, Interfacing, Software, Hardware and Applications", Prentice Hall
6. William Stalling, "Computer Organization and Architecture", Prentice Hall