

Microprocessor Systems

Course Outline

1. Introduction

- History of computation: Mechanical, Electrical, Transistor ages
- Intel microprocessor family: 4004 to Pentium
- Reasons behind microprocessor technology
- Main components of microprocessor-based systems
- Functions of a microprocessor

2. Intel Microprocessors Architecture

- Operation Modes and Registers
- Flag Register Bits
- Real Mode Address Generation
- Protected Mode Address Generation
- Memory Paging

3. Intel Family Programming

- Data Addressing Modes
- Program Flow Addressing Modes
- Stack Addressing Modes
- Instruction Encoding
- Instruction Set

4. Intel Family Hardware

- Intel 8086 and 8088
- Pin Functions
- Intel 8284A Clock Generator
- Bus Buffering and Latching
- Bus Timing for Read and Write

5. Memory Structures and Interfacing

- Memory Types and characteristics
- Memory Address Decoding
- Memory Interfacing with Decoders
- Memory Interfacing with PROMs

- Memory Banks for 16 to 64 Bit Buses

6. Error Detection and Correction Techniques

- Parity Bit Error Detection
- Hamming Codes

7. Input/Output Structures

- Basic I/O Interfacing
- Debouncing Switching Contacts
- I/O Address Decoding
- Interface Units
- Impact of I/O on System Performance
- Magnetic Disks

8. Input/Output Communications

- Serial and Parallel Communications
- Synchronous and Asynchronous Methods
- Polling
- Interrupts
- Direct Memory Access (DMA)

9. Motorola Microprocessor Family

- 68000 Architecture and Register File
- Address Generation and Addressing Modes
- Instruction Set

10. Computer Performance

- Throughput and Response Time
- Execution Time and MIPS

11. Digital Signal Processors

- Characteristics and Design
- Fixed Point and Floating Point DSPs

12. Multiprocessors

- Single Bus Multiprocessors
- Network Connected Multiprocessors