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Microprocessor Programming and Interfacing Lecture-1 : Introduction

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About the Course

- Course No. : CS/ECE/EEE/INSTR F241
- Course Title : Microprocessor Programming & Interfacing

Lecture Class Timings : Tue, Thus, Sat 9:00 to 9:50 AM

Tutorial Timing

: Mon, Tue, Wed 8.00 AM

Lab Timings

: Mon, Tue, Wed, Thus, Fri 14:00 to 16:00 Mon, Wed, Fri - 11:00 AM to 1:00 PM

Google Class Code : 4n5fmjk

8/29/2021

Course description

- Study of Programmer model of X86 processors, processor architecture, addressing modes and instructions set of X86 processors.
- Assembly programming using different instructions, subroutines and macros etc.
- Concept of Interrupts.
- Memory Interfacing.
- Programmable peripheral devices.

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Text Books

Text Book:

Barry B Brey, The Intel Microprocessors .Pearson, Eight Ed. Jack Contract of the second se 2009.

Reference Book:

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Douglas V Hall, Microprocessor and Interfacing, TMH, Second Edition.

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Motivation to Study Microprocessors

• Microprocessor is the heart of all Computers

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• Microprocessors/Micro-controllers can be programmed to do a Litted ta wide variety of practical-oriented tasks. (Automation)

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Introduction to Microprocessors



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• First general-purpose, programmable electronic computer system developed in 1946. (at University of Pennsylvania)

- Electronic Numerical Integrator and Calculator (ENIAC), a huge machine.
 - ver 17,000 vacuum tubes;
 - 500 miles of wires
 - weighed over 30 tons
 - about 100,000 operations per second



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- **#** Programmed by rewiring its circuits.
 - * process took many workers several days
 - * workers changed electrical connections on plug-boards like early telephone switchboards

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Required frequent maintenance.

x vacuum tube service life a problem



1.11. December 23, 1947, John Bardeen, William Shockley, Ħ and Walter Brattain develop the Transistor at Bell Labs. Sanjay



The First Integrated Circuit – Jack Kilby, Texas Instruments 1 Transistor and 4 Other Devices on 1 Chip In the year 1958 Salia

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In the early 1970s, CMOS technology replaced NMOS-only logic which started suffering from high power consumption. Ever since, CMOS has been the dominant digital technology.





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The First Microprocessor -- 1971

The Intel 4004 – 2,300 Transistors, **1 MHz operation** THE FIRST COMPUTER ON A SINGLE CHIP *BEGINNING OF LARGE SCALE INTEGRATION TECHNOLOGY*





10 µm process

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The First Microprocessor -- 1971

- The world's first microprocessor, the Intel 4004, was a 4-bit microprocessor-a programmable controller on a chip.
- It addressed a mere 4096 (12 address lines).
- Its instruction set contained only 45 different instructions.

First General-Purpose Microprocessor -- 1974

8-Bit Intel 8080 and 8085, Intel Corporation – 4,500 Transistors



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Intel 8086 microprocessor (1978)



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Advancement in Microprocessors

- Microprocessors that are common today include the 8086/8088, which were the first 16-bit microprocessors.
- Following these early 16-bit machines were the 80286, 80386, 80486, Pentium, Pentium Pro, Pentium II, Pentium III, Pentium 4, and Core2 processors.
- The architecture has changed from 16 bits to 32 bits and to 64 bits. 32-bit is also an 86 series architecture. Max RAM supported in 32-bit architecture is 4 GB.

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		MSBuild	09-10-2020 22:18	File folder
		NCH Software	13-10-2020 13:46	File folder
		NortonInstaller	09-10-2020 10:09	File folder
		NVIDIA Corporation	10-11-2020 20:06	File folder

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Advantages of CMOS Scaling



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Limitations of CMOS Scaling

• High Power

Increase in Freq due to improvement in : Technology + Architecture Higher Packing Density due to improvement in : Technology + Routing Algo

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Low Noise Margins

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Limitations of CMOS Scaling



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