

# **Microprocessor Programming and Interfacing**

## **Lecture-1 : Introduction**

Dr. Sanjay Vidhyadharan

# About the Course

- 8086 Architecture
- 8086 Addressing modes
- 8086 Instructions sets.
- Concept of Interrupts.
- Memory Interfacing.
- Programmable peripheral devices.

# Text Books

## Text Book:

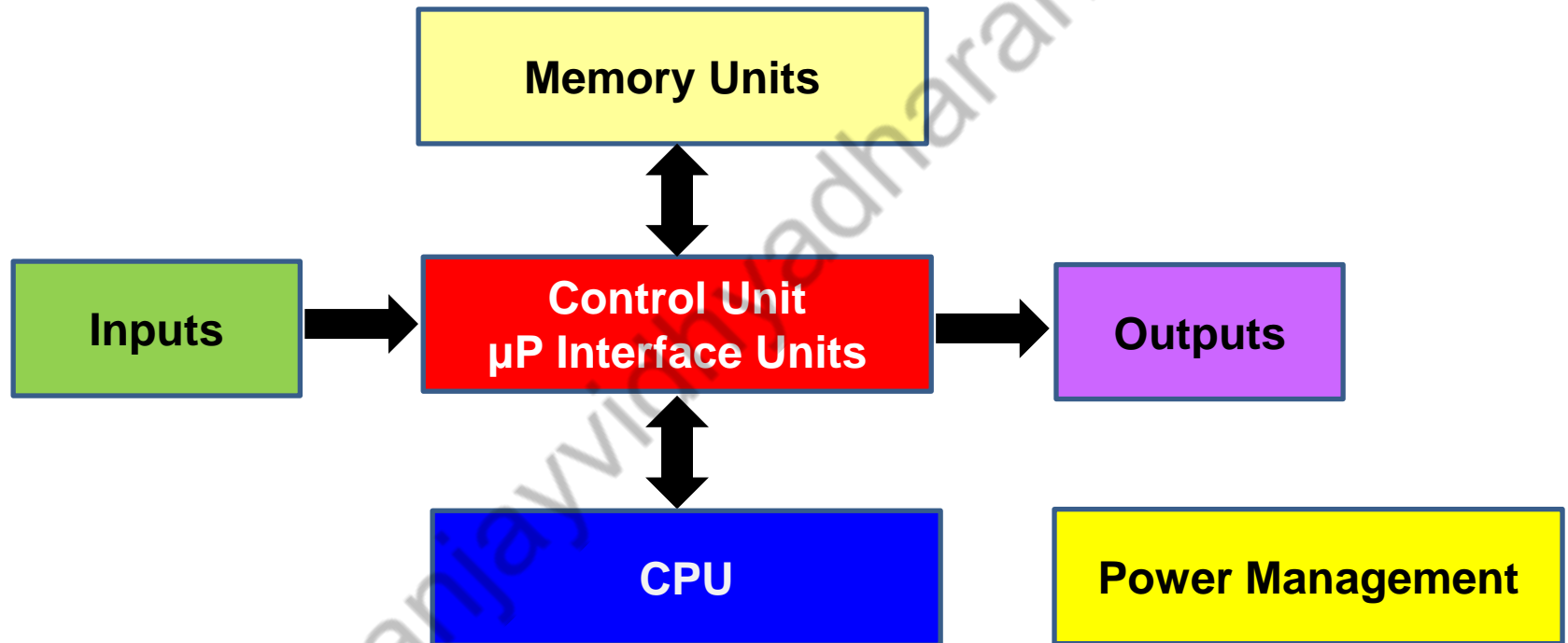
Barry B Brey, The Intel Microprocessors .Pearson, Eight Ed. 2009.

## Reference Book:

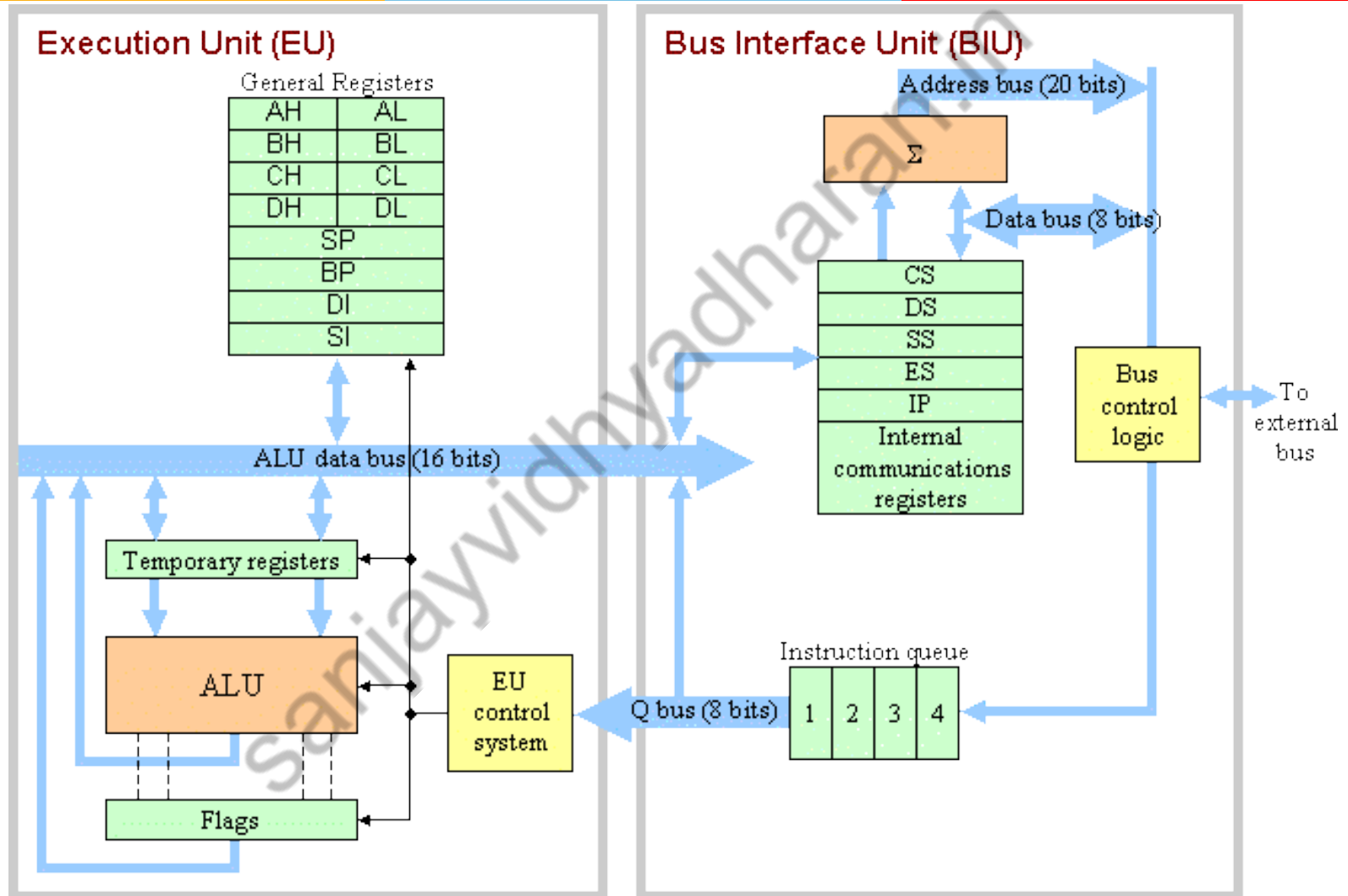
Douglas V Hall, Microprocessor and Interfacing, TMH, Second Edition.

# Introduction to Microprocessors

## Basic Block Diagram of a Computer



# Introduction to Microprocessors



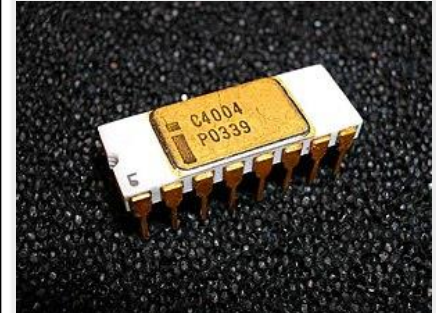
# History

## First Gen 1971 INTEL 4004

4-bit  $\mu$ P.

108 KHz.

Represent signed numbers in the range -8 to +7



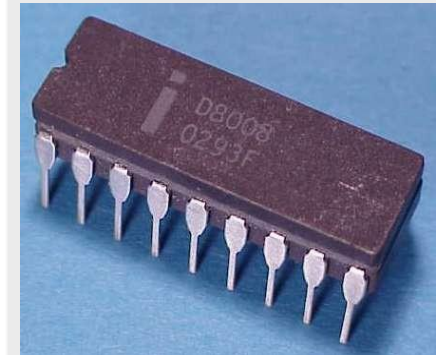
## Second Gen 1972 INTEL 8008

8-bit  $\mu$ P.

500 KHz.

Represent signed numbers in the range -128 to +127

Based on NMOS technology



# History

## Third Gen INTEL 8080

8-bit  $\mu$ P.

2 MHz.



## Third Gen INTEL 8085

8-bit  $\mu$ P.

3 MHz.

8-bit data bus and 16-bit address bus

5 V compatible with TTL



# History

## Third Gen INTEL 8086 (1978)

16-bit  $\mu$ P.

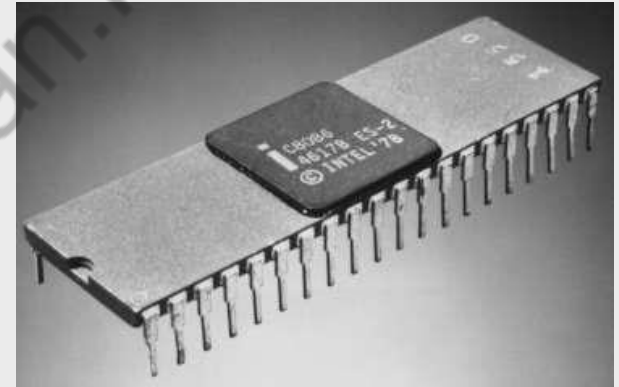
4.77 MHz, 8 MHz and 10 MHz,  
depending on the version

16-bit data bus and 20-bit address bus

1 MB of memory

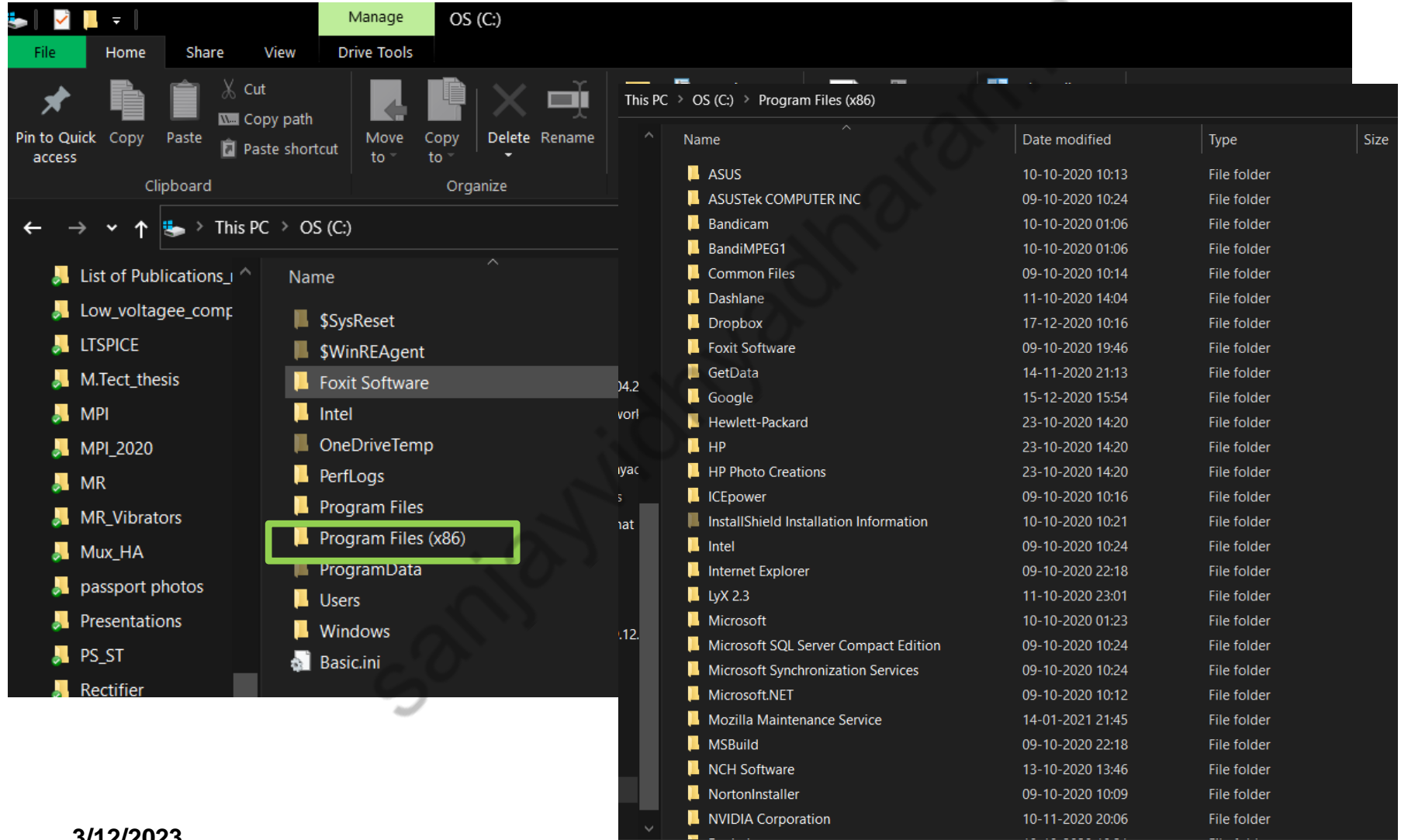
Range of  $-32,768$  to  $+32,767$

CMOS Technology





# History



3/12/2023

# History

## Fourth Gen

32-bit  $\mu$ P. 80386 range  $\pm 2 \times 10^9$

32-bit  $\mu$ P Pentium 4. 1.5 GHz Year 2000



## Fifth Gen

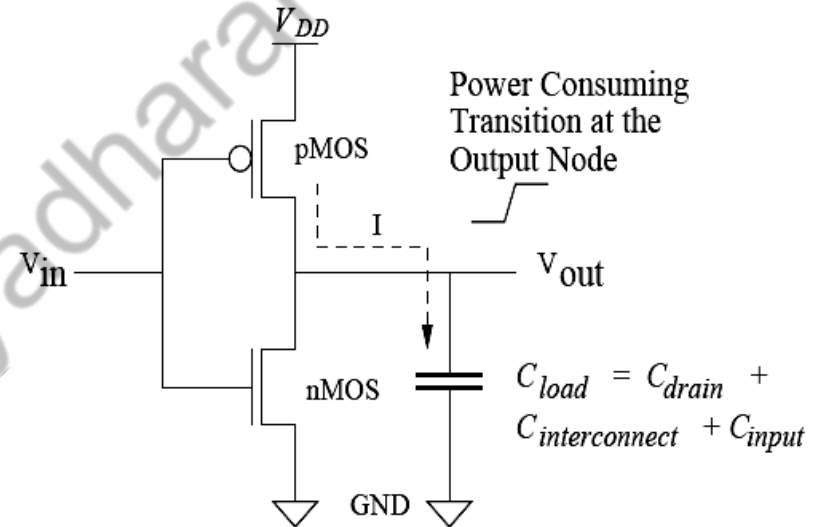
64-bit  $\mu$ P. INTEL CORE 2 Year 2000

64-bit  $\mu$ P. INTEL i7 1.3-3.5 GHz



# Advantages of CMOS Scaling

- Faster
- Lower Power
- Higher packing density



# 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

- Low Noise Margins

- $V_{DD}$  reduced to keep Electrical Field Constant
- High Static Currents

# Limitations of CMOS Scaling



sanjayvidhyadharan.in

**Thankyou**

sanjayvidhyadharan.in