

Microprocessor (Unit-1::Lecture – 1)

(BEI – I/II & BCT – II/II)

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Intel Founders – [1]

- **Robert Noyce:**
 - Physicist
 - Nicknamed “Mayor of Silicon Valley”
 - Cofounded Fairchild Semiconductor in 1957
 - Co-invented the first integrated circuit (IC) in 1959
 - Cofounded Intel in 1968



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Intel Founders – [2]

- **Gordon Moore:**
 - Chemist
 - Cofounded Intel in 1968
 - Moore’s Law:
 - The number of transistors on a computer chip doubles every year (observed in 1965)
 - Since 1975, transistor count has doubled every two years



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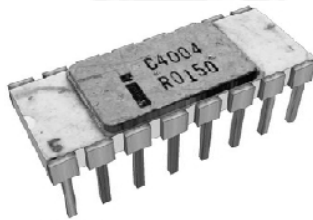
Pop Quiz

- What is the full form of Intel?
- Who invented the transistor and when?
- Who were the traitorous eight?

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Evolution of Microprocessors – [1] (Intel 4004)



- Introduced in 1971
- First microprocessor by Intel
- It is a 4-bit microprocessor
- Processing technology = 10 microns
- Data bus width = 4 bits
- Address bus width = 12 bits
- Clock speed = 740 KHz
- Number of transistors = 2,300
- Accessible memory = 4 KB

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Evolution of Microprocessors – [2] (Intel 8008)

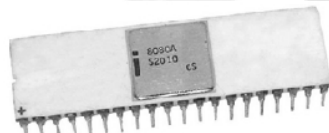


- Introduced in 1972
- First 8-bit microprocessor by Intel
- Processing technology = 10 microns
- Data bus width = 8 bits
- Address bus width = 14 bits
- Clock speed = 200 KHz to 800 KHz
- Number of transistors = 3,500
- Accessible memory = 16 KB

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Evolution of Microprocessors – [3] (Intel 8080)



- Introduced in 1974
- It was also a 8-bit microprocessor
- Processing Technology = 6 microns
- Data bus width = 8 bits
- Address bus width = 16 bits
- Its clock speed was 2 MHz to 3 MHz
- Number of transistors = 6,000
- Was 10 times faster than 8008
- Accessible memory = 64 KB

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Evolution of Microprocessors – [4] (Intel 8085)

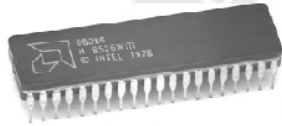


- Introduced in 1976
- It was also a 8-bit microprocessor
- Processing technology = 3 microns
- Data bus width = 8 bits
- Address bus width = 16 bits
- Clock speed = 3 MHz
- Number of transistors = 6,500
- Number of instructions = 246
- Accessible memory = 64 KB

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Evolution of Microprocessors – [5] (Intel 8086)

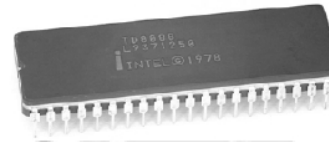


- Introduced in 1978
- First 16-bit microprocessor by Intel
- Clock speed = 4.77 MHz, 8 MHz and 10 MHz, depending on the version
- Processing technology = 3 microns
- Data bus width = 16 bits
- Address bus width = 20 bits
- Number of transistors = 29,000
- Number of instructions = 22,000 instructions
- Accessible memory = 1 MB
- It has Multiply and Divide instructions

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Evolution of Microprocessors – [6] (Intel 8088)

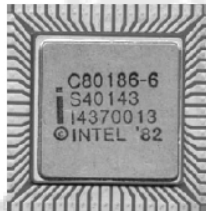


- Introduced in 1978
- 16-bit processor
- Processing technology = 3 microns
- Clock speed = 5 MHz to 10 MHz
- Number of transistors = 29,000
- Data bus width = 8 bits (external), 16 bits (internal)
- Address bus width = 20 bits
- Accessible memory = 1 MB

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Evolution of Microprocessors – [7] (Intel 80186)



- Introduced in 1982
- It is a 16-bit microprocessor
- Processing technology = 3 microns
- Clock speed = 6 MHz to 25 MHz depending on version
- Data bus width = 16 bits
- Address bus width = 20 bits
- Number of transistors = 55,000
- Accessible memory = 1 MB
- Introduced components like:
 - Interrupt Controller, Clock Generator, Local Bus Controller, Counters

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Evolution of Microprocessors – [8] (Intel 80286)



- Introduced in 1982
- It is a 16-bit microprocessor
- Clock speed = 4 MHz to 25 MHz depending on the version
- Processing technology = 1.5 microns
- Data bus width = 16 bits
- Address bus width = 24 bits
- Accessible memory = 16 MB
- Number of transistors = 1,34,000 transistors

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Evolution of Microprocessors – [9] (Intel 80386)



- Introduced in 1985
- First 32-bit microprocessor by Intel
- Processing technology = 1 to 1.5 microns
- Data bus width = 32 bits
- Address bus width = 32 bits
- Accessible memory = 4 GB of memory
- Number of transistors = 2,75,000
- Clock speed = 16 MHz to 33 MHz depending on version
- Different versions
 - 80386 DX, 80386 SX, 80386 SL

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Evolution of Microprocessors – [10] (Intel 80486)



- Introduced in 1989
- It was also 32-bit microprocessor
- Processing technology = 0.6 to 1 microns
- Number of transistors = 1.2 million transistors
- Data bus width = 32 bits
- Address bus width = 32 bits
- Clock speed = 16 MHz to 100 MHz, depending upon the various versions
- It had five different versions:
 - 80486 DX, 80486 SX, 80486 DX2, 80486 SL, 80486 DX4
- 8 KB of cache memory was introduced

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Evolution of Microprocessors – [11] (Intel Pentium)



- Introduced in 1992
- It was also 32-bit microprocessor
- It was originally named 80586
- Processing technology = 0.35 to 0.8 microns
- Clock speed = 60 MHz, 66 MHz
- Data bus width = 32 bits (internal), 64 bits (external)
- Address bus width = 32 bits
- It could address 4 GB of memory
- Number of transistors = 3.1 million
- Cache memory:
 - 8 KB for instructions, 8 KB for data

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Pop Quiz

- Provide the full forms and briefly explain the meanings of the following acronyms in the context of processor technology:
 - SX
 - SL
 - DX
 - DX2
 - DX4

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