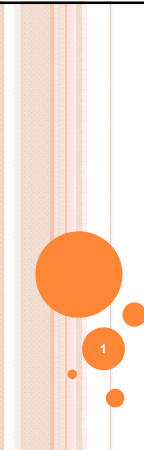


# HISTORY OF MICROPROCESSORS



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- > 4-Bit Microprocessors
- > 8-Bit Microprocessors
- > 16-Bit Microprocessors
- > 32-Bit Microprocessors
- > 64-Bit Microprocessors

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## INTRODUCTION

- > Fairchild Semiconductors (founded in 1957) invented the first IC in 1959.
- > In 1968, **Robert Noyce, Gordon Moore, Andrew Grove** resigned from Fairchild Semiconductors.
- > They founded their own company **Intel** (Integrated Electronics).
- > Intel grown from 3 man start-up in 1968 to industrial giant by 1981.
- > It had 20,000 employees and \$188 million revenue.

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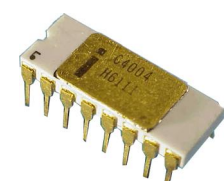
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## 4-BIT MICROPROCESSORS

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## INTEL 4004

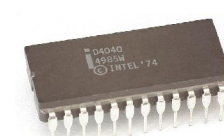


- > Introduced in 1971.
- > It was the first microprocessor by Intel.
- > It was a 4-bit  $\mu$ P.
- > Its clock speed was 740KHz.
- > It had 2,300 transistors.
- > It could execute around 60,000 instructions per second.

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## INTEL 4040



- > Introduced in 1974.
- > It was also 4-bit  $\mu$ P.

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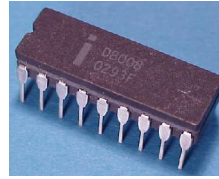
## 8-BIT MICROPROCESSORS

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### INTEL 8008



- > Introduced in 1972.
- > It was first 8-bit  $\mu$ P.
- > Its clock speed was 500 KHz.
- > Could execute 50,000 instructions per second.

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### INTEL 8080



- > Introduced in 1974.
- > It was also 8-bit  $\mu$ P.
- > Its clock speed was 2 MHz.
- > It had 6,000 transistors.
- > Was 10 times faster than 8008.
- > Could execute 5,00,000 instructions per second.

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### INTEL 8085



- > Introduced in 1976.
- > It was also 8-bit  $\mu$ P.
- > Its clock speed was 3 MHz.
- > Its data bus is 8-bit and address bus is 16-bit.
- > It had 6,500 transistors.
- > Could execute 7,69,230 instructions per second.
- > It could access 64 KB of memory.
- > It had 246 instructions.
- > Over 100 million copies were sold.

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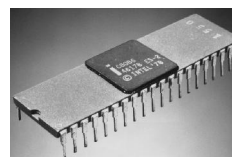
## 16-BIT MICROPROCESSORS

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### INTEL 8086



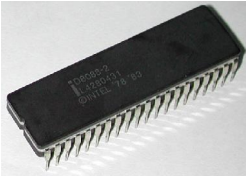
- > Introduced in 1978.
- > It was first 16-bit  $\mu$ P.
- > Its clock speed is 4.77 MHz, 8 MHz and 10 MHz, depending on the version.
- > Its data bus is 16-bit and address bus is 20-bit.
- > It had 29,000 transistors.
- > Could execute 2.5 million instructions per second.
- > It could access 1 MB of memory.
- > It had 22,000 instructions.
- > It had **Multiply** and **Divide** instructions.

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### INTEL 8088



- Introduced in 1979.
- It was also 16-bit  $\mu$ P.
- It was created as a cheaper version of Intel's 8086.
- It was a 16-bit processor with an 8-bit external bus.
- Could execute 2.5 million instructions per second.
- This chip became the most popular in the computer industry when IBM used it for its first PC.

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### INTEL 80186 & 80188



- Introduced in 1982.
- They were 16-bit  $\mu$ Ps.
- Clock speed was 6 MHz.
- 80188 was a cheaper version of 80186 with an 8-bit external data bus.
- They had additional components like:
  - Interrupt Controller
  - Clock Generator
  - Local Bus Controller
  - Counters

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### INTEL 80286




- Introduced in 1982.
- It was 16-bit  $\mu$ P.
- Its clock speed was 8 MHz.
- Its data bus is 16-bit and address bus is 24-bit.
- It could address 16 MB of memory.
- It had 1,34,000 transistors.
- It could execute 4 million instructions per second.

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## 32-BIT MICROPROCESSORS

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### INTEL 80386



- Introduced in 1986.
- It was first 32-bit  $\mu$ P.
- Its data bus is 32-bit and address bus is 32-bit.
- It could address 4 GB of memory.
- It had 2,75,000 transistors.
- Its clock speed varied from 16 MHz to 33 MHz depending upon the various versions.
- Different versions:
  - 80386 DX
  - 80386 SX
  - 80386 SL
- Intel 80386 became the best selling microprocessor in history.

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### INTEL 80486



- Introduced in 1989.
- It was also 32-bit  $\mu$ P.
- It had 1.2 million transistors.
- Its clock speed varied from 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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### INTEL PENTIUM




- > Introduced in 1993.
- > It was also 32-bit  $\mu$ P.
- > It was originally named 80586.
- > Its clock speed was 66 MHz.
- > Its data bus is 32-bit and address bus is 32-bit.
- > It could address 4 GB of memory.
- > Could execute 110 million instructions per second.
- > Cache memory:
  - > 8 KB for instructions.
  - > 8 KB for data.

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### INTEL PENTIUM PRO




- > Introduced in 1995.
- > It was also 32-bit  $\mu$ P.
- > It had L2 cache of 256 KB.
- > It had 21 million transistors.
- > It was primarily used in server systems.
- > Cache memory:
  - > 8 KB for instructions.
  - > 8 KB for data.
- > It had L2 cache of 256 KB.

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### INTEL PENTIUM II




- > Introduced in 1997.
- > It was also 32-bit  $\mu$ P.
- > Its clock speed was 233 MHz to 500 MHz.
- > Could execute 333 million instructions per second.
- > MMX technology was supported.
- > L2 cache & processor were on one circuit.

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### INTEL PENTIUM II XEON




- > Introduced in 1998.
- > It was also 32-bit  $\mu$ P.
- > It was designed for servers.
- > Its clock speed was 400 MHz to 450 MHz.
- > L1 cache of 32 KB & L2 cache of 512 KB, 1MB or 2 MB.
- > It could work with 4 Xeons in same system.

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### INTEL PENTIUM III




- > Introduced in 1999.
- > It was also 32-bit  $\mu$ P.
- > Its clock speed varied from 500 MHz to 1.4 GHz.
- > It had 9.5 million transistors.

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### INTEL PENTIUM IV




- > Introduced in 2000.
- > It was also 32-bit  $\mu$ P.
- > Its clock speed was from 1.3 GHz to 3.8 GHz.
- > L1 cache was of 32 KB & L2 cache of 256 KB.
- > It had 42 million transistors.
- > All internal connections were made from aluminium to copper.

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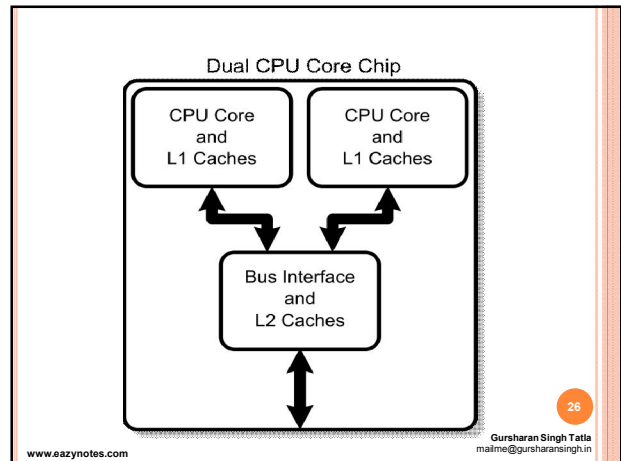
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### INTEL DUAL CORE



- Introduced in 2006.
- It is 32-bit or 64-bit  $\mu$ P.
- It has two cores.
- Both the cores have their own internal bus and L1 cache, but share the external bus and L2 cache (Next Slide).
- It supported SMT technology.
- SMT: Simultaneously Multi-Threading
- E.g.: Adobe Photoshop supported SMT.


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## 64-BIT MICROPROCESSORS

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### INTEL CORE 2



- Introduced in 2006.
- It is a 64-bit  $\mu$ P.
- Its clock speed is from 1.2 GHz to 3 GHz.
- It has 291 million transistors.
- It has 64 KB of L1 cache per core and 4 MB of L2 cache.
- It is launched in three different versions:
  - Intel Core 2 Duo
  - Intel Core 2 Quad
  - Intel Core 2 Extreme

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### INTEL CORE I7



- Introduced in 2008.
- It is a 64-bit  $\mu$ P.
- It has 4 physical cores.
- Its clock speed is from 2.66 GHz to 3.33 GHz.
- It has 781 million transistors.
- It has 64 KB of L1 cache per core, 256 KB of L2 cache and 8 MB of L3 cache.

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### INTEL CORE I5



- Introduced in 2009.
- It is a 64-bit  $\mu$ P.
- It has 4 physical cores.
- Its clock speed is from 2.40 GHz to 3.60 GHz.
- It has 781 million transistors.
- It has 64 KB of L1 cache per core, 256 KB of L2 cache and 8 MB of L3 cache.

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### INTEL CORE I3



- Introduced in 2010.
- It is a 64-bit  $\mu$ P.
- It has 2 physical cores.
- Its clock speed is from 2.93 GHz to 3.33 GHz.
- It has 781 million transistors.
- It has 64 KB of L1 cache per core, 512 KB of L2 cache and 4 MB of L3 cache.

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Thank You 🙋  
Have a Nice Day 😊



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