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Assignment

Suppose in January 2020, Intel announced a new microprocessor with 100 billion processors. According to Moore's law, when will Intel introduce a microprocessor with 800 billion transistors?

From Moore's Law, "the number of transistors on a microprocessor doubles approximately every two years."

Given the initial year of 2020 with a microprocessor of 100 billion, to find out the year Intel will introduce a microprocessor with 800 billion transistors,

$$t = t_0 + 2\log_2\left(\frac{N}{N_0}\right)$$

Where:

t = year when the new microprocessor is introduced.

t_0 = year when the current microprocessor was introduced.

N = number of transistors in the new microprocessor.

N_0 = number of transistors in the current microprocessor.

From the given question:

$$t = ?$$

$$t_0 = 2020$$

$$N = 800000000000$$

$$N_0 = 100000000000$$

$$t = 2020 + 2\log_2\left(\frac{800000000000}{100000000000}\right)$$

$$t = 2020 + 2\log_2(8)$$

$$t = 2020 + 6$$

$$t = 2026$$

According to Moore's law, Intel introduce a microprocessor with 800 billion transistors in the year 2026.

In 2007, the number of transistors in the Intel Core 2 Duo microprocessor was 170 million. What were the transistors count of the Core i7 microprocessor in 2016?

Using Moore's law, the number of transistors on a microprocessor doubles every two years. This means the number of microprocessor should increase by a factor of $2^{\frac{n}{2}}$, where n is the number years that have passed.

From 2007 to 2016, we have nine years. So, by 2016, the number of transistors on a microprocessor would be;

$$\begin{aligned} & 170000000 \times 2^{\frac{9}{2}} \\ &= 170000000 \times 2^{4.5} \\ &= 170000000 \times 22.627 \\ &= 384660889.655 \\ &\sim 3.8 \text{ billion transistors} \end{aligned}$$