**What is Moore’s Law?**

Moore's law is an observation and projection of a historical trend that, **the number of transistors in a dense integrated circuit doubles about every two years**. It is an empirical relationship and not a physical or natural law.

Simply put, the density of transistors doubles every two years.

It was observed by Gordon Moore, co-founder of Intel, in 1965. Moore predicted that this trend would continue for the foreseeable future.

But this would eventually come to an end by the late 2000s.

Moore’s law is probably no longer possible.

The reasons are as follows.

1. **Heat generation**

As we try to double the density of transistors in an integrated circuit, this results in smaller transistor size which in turn means that the switching between 0s and 1s takes place at a higher speed. This causes significant rise in the heat dissipation which cannot be handled by the hardware performing the tasks.

1. **Power consumption**

As aforementioned, the increase in the binary switches gives better performance. But this demands more power which we cannot afford to use.

1. **Electrical Leakage**

For decades, as transistors got smaller, they became more energy efficient. Now, however, they have gotten so small, as small as 10 nanometers, that the channel that carries the electrical current through the transistor cannot always contain it.

1. **Threshold Voltage (Dennard Scaling)**

Every transistor has a threshold voltage, below which a switch between 0V and 5V cannot be performed. To reduce the heat generation, the transistors have to operate at lower voltages. But the threshold voltage is much larger than the desirable voltage we want the transistors to operate at.

1. **Noise Problem (Dennard Scaling)**

Dennard Scaling postulated that; the voltage should scale with transistor sizes. As the size of a transistor is decreasing, to avoid the previously mentioned losses, the voltage should scale, which brings us back to the threshold voltage part. Now, as we intend to decrease the voltage switch of the transistors, there is a problem with noise. As of now, transistors operate at 0V to 5V with around 0.5V - 0.3V just being noise, which is not even 10 percent of the total switch that happens. So, sometimes we even cannot observe the noise. Now, with Dennard Scaling, transistors are said to be operated at lower voltages which can result in higher percentage of noise. This affects the output quality of the system.