

**Task:**

Define Moore's law and explain why it has now stopped being true. Be sure to describe all of the physical limitations that have prevented Moore's law from continuing to be true.

**Answer:**

Moore's Law is the idea that the number of transistors on a chip doubles about every two years, which used to mean computers got faster and more powerful over time. But this is no longer happening because of several physical limits:

1. Heat and Power Issues

When we put more transistors on a chip, it uses more power and gets hotter. Cooling systems like fans can't remove that much heat, and if the chip gets too hot, it can't run any faster.

2. Voltage Can't Keep Shrinking

In the past, as transistors got smaller, we could also lower the voltage, which helped save power. But now, we can't reduce voltage much more without causing problems like signal noise or unstable behavior.

3. Electricity Leaks

Today's tiny transistors can leak electricity even when they're supposed to be off. This waste of energy adds to power problems and wasn't a big issue in older, larger transistors.

4. Physical Size Limits

Transistors are now only a few atoms wide. At this size, strange things happen due to quantum physics, making it harder to make them smaller or more reliable.

5. Faster Clock Speeds Don't Work Anymore

We used to make processors faster by increasing their clock speed. But now, doing that just creates more heat. That's why modern computers use multiple cores instead — they run tasks in parallel instead of just one thing faster.