📊 Why Is Analysis of Algorithms Important?

⚡ Efficiency

- ❖ **What it means**: An efficient algorithm solves a problem quickly and uses minimal computer resources.
- ❖ **Example**: If you're searching for a name in a list of 1,000 people, a good algorithm might find it in seconds, while a bad one could take minutes.
- ❖ **Why it matters**: Faster programs save time, reduce costs, and improve user experience.

📈 Scalability

- ❖ **What it means**: A scalable algorithm continues to perform well even as the amount of data increases.
- ❖ **Example**: An algorithm that works fine for 100 users might crash or slow down with 1 million users unless it's scalable.
- ❖ **Why it matters**: Real-world applications often grow over time, so algorithms must handle larger inputs smoothly.

🔍 Comparison

- ❖ **What it means**: Analysis lets you compare different algorithms to find the best one for your needs.
- ❖ **Example**: You might compare bubble sort and quicksort to see which sorts data faster.
- ❖ **Why it matters**: Choosing the right algorithm can make your program much more efficient and reliable.