Big O Basic Concepts:

- O(1): Constant Time
  - Doesn't depend on the size of the data set.
  - Example: Accessing an array element by its index.
- O(log n): Logarithmic Time
  - Splits the data in each step (divide and conquer).
  - Example: Binary search.
- O(n): Linear Time
  - Directly proportional to the data set size.
  - Example: Looping through an array.
- O(n log n): Linearithmic Time
  - Splits and sorts or searches data.
  - Example: Merge sort, quick sort.
- $O(n^2)$: Polynomial Time
  - Nested loops for each power of n.
  - Example: Bubble sort ($O(n^2)$).

Omega (Ω) – Best Case

- **What it means:** Omega (Ω) describes the best-case scenario for an algorithm.
- **In simple terms:** It tells you the fastest an algorithm can run in the best circumstances.

Theta (Θ) – Average Case

- **In simple terms:** It tells you what to generally expect in terms of time complexity.

Big O (O) - Worst Case

- **What it means:** Big O (O) describes the worst-case scenario for an algorithm.
- **In simple terms:** It tells you the slowest an algorithm can run in the worst circumstances.

Other Concepts:

- **Drop Non-Dominant Terms**
  - In $\mathbf{O(n^2 + n)}$, focus on $\mathbf{O(n^2)}$ as it will dominate for large **n**.
- **Drop Constants**
  - **O(2n)** simplifies to **O(n)**.