Definition of Array

- An array is a collection of elements stored in contiguous memory locations.
- All elements are of the same data type.
- Elements are accessed using indexing (0-based).
- Arrays are static in size (fixed at creation time).

Static vs Dynamic Array

- Static Array:

Fixed size, memory allocated at creation (e.g., Java arrays)

- Dynamic Array:

Size can grow/shrink during runtime (e.g., ArrayList in Java)

Indexing & Memory Layout

- Arrays use 0-based indexing.
- Memory layout is continuous: next element is stored immediately after the previous one.

Time Complexity of Access

- Accessing any element in an array is O(1) → constant time.
- Because elements are indexed, no traversal needed.