What Is an Array?

1. Definition

An array is a data structure that stores a collection of elements, usually of the same data type (like numbers, strings, or objects), arranged in a specific order. It allows you to access each element using an index (a number that represents the element's position).

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2. Key Characteristics

Feature	Description
Structure	Ordered collection of elements
Indexing	Each element is accessed by its position (starting from index 0 in most languages)
Data Type	Usually stores elements of the same kind (e.g., all integers or all strings)
Fixed/Variable Size	Some arrays have a fixed size (like in C), others can grow dynamically (like in Python lists or JavaScript arrays)

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3. Example in Different Languages

Python Example:

numbers = [10, 20, 30, 40] print(numbers[0]) # Output: 10

C Example:

int numbers[4] = {10, 20, 30, 40}; printf("%d", numbers[0]); // Output: 10

JavaScript Example:

let numbers = [10, 20, 30, 40]; console.log(numbers[0]); // Output: 10

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4. Why Arrays Are Useful

- Store large amounts of related data efficiently
- Access data quickly using index positions

- Simplify operations like sorting, searching, and iteration

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5. Real-World Analogy

Think of an array as a row of mailboxes, each labeled with a number (the index) and containing an item (the value). You can open any mailbox directly by its number — that's how array indexing works.

Quick Summary

Concept	Description
Array	Collection of ordered, same-type elements
Index Starts At	0 in most languages
Purpose	Fast access, efficient data storage
Common Operations	Insert, delete, traverse, sort, search