

1. Array – Data Structure

♦ Definition:

An **Array** is a **collection of elements** stored at **contiguous memory locations**. All elements are of the **same data type** and can be accessed using **index**.

♦ Key Features:

- Indexing starts from 0
 - Fixed size (in most languages)
 - Fast access via index
 - Stored in continuous memory blocks
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♦ Operations:

- **Access:** $O(1)$ time
 - **Insert at end:** $O(1)$ if space available
 - **Insert/Delete at middle:** $O(n)$
 - **Search:** $O(n)$ ($O(\log n)$ if sorted)
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♦ Example:

cpp

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```
int arr[5] = {10, 20, 30, 40, 50};
```

♦ **Real-life Example:**

- Student roll numbers
- List of product prices
- Monthly expenses tracking