DSA THEORY Exercise 4

Q4) **1. Array Representation**

**Memory Representation**:

* Arrays are contiguous memory blocks where each element is accessed using an index.
* Advantages: Fast access (O(1) time complexity) due to direct indexing.

**4. Analysis**

**Time Complexity**:

* **Add**: O(1) if space available, O(n) if resizing needed.
* **Search**: O(n) (linear search).
* **Traverse**: O(n).
* **Delete**: O(n) (shift elements after deletion).

**Limitations of Arrays**:

* Fixed size (requires resizing if full).
* Costly insertions and deletions (except at the end).
* Use arrays when you need simple, fast access to elements and the size is known or rarely changes. For dynamic sizing or frequent insertions/deletions, consider using other data structures like linked lists or dynamic arrays (e.g., ArrayList).