**Step 1: Understand Array Representation: -**

Q1) Explain how arrays are represented in memory and their advantages.

Solution: -

Arrays are stored in a contiguous memory location, which means each element is placed next to the previous one.

This allows for efficient access since the computer can quickly calculate the address of the element using its index.

Advantages:

->Fast access: We can directly access any element using its index value.

->Memory Efficiency: No extra memory for pointers or metadata associated with the elements.

->Easy Traversal: Easy to loop through any element.

**Step 4: Analysis: -**

Q1) Analyze the time complexity of each operation (add, search, traverse, delete).

Solution: -

The time complexity of each of the operations is:

->add: O (1)

->search: O(n)

->traverse: O(n)

->delete: O(n)

Q2) Discuss the limitations of arrays and when to use them.

Solution: -

Limitations of arrays:

->Fixed Size: Cannot change size once declared.

->Homogeneous Data: Only stores elements of the same type.

->Inefficient Insertions/Deletions: Especially in the middle of the array.

->Memory Waste: Unused elements still occupy space.

When to use:

->Fixed Size Collections: Like days of the week.

->Sequential Access: When you need to iterate over elements.

->Random Access: Fast access using an index.

->Homogeneous Data: Storing similar data types like exam scores.