**MONICA B (SUPERSET ID - 5008627)**

**Exercise 4: Employee Management System**

1. Explain how arrays are represented in memory and their advantages.

1.Arrays are contiguous blocks of memory where each element occupies a fixed amount of space.

2. The starting address of the array is the address of the first element.

3.The memory representation of an array is like a long tape of bytes

ADVANTAGES :-

1.Arrays allow direct access to any element using its index.

2. Arrays are simple to use and understand.

3.Suitable for storing and accessing a fixed number of elements.

4.Better performance in some scenarios.

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

1.Add - O(1) - Adding an employee is a constant-time.

2.Search - O(n) - Needs to check each and every element.

3.Traverse - O(n) - it requires visiting each element at least once.

4.Delete - O(n) - involved in a search for an employee .

1. Discuss the limitations of arrays and when to use them.

Limitations of Array :-

1.Fixed Array Size - Arrays have a fixed size, which makes them less flexible to dynamic data. Once the array is full, no additional elements can be added without resizing.

2.Resizing - Resizing an array involves creating a new array and copying elements, and it is an expensive operation.

3.Memory usage - Arrays can waste memory if not fully utilized,if the capacity is Larger than the stored value.

WHEN TO USE ARRAY :-

Arrays work best when the number of elements is known in advance and remains reasonably constant. When quick, direct access to items using an index is necessary. When memory continuity and cache friendliness are critical for performance.