Exercise 4: Employee Management System

1. Understand Array Representation:

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

= In memory, arrays are stored in contiguous locations. Each element is stored in adjacent memory locations. The memory representation of an array is like a long tape of bytes, with each element taking up a certain number of bytes.

Advantages:

1. Fast access to elements using indices.

2. Efficient memory usage due to contiguous storage.

3. Simple and easy to use.

4. Analysis:

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

Time Complexity Analysis:

1. Add: O(1) 2. Search: O(n) 3. Traverse: O(n) 4. Delete: O(n)

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

= Limitations of Arrays:

1. Fixed size: Cannot dynamically resize.

2. Inefficient for insertions and deletions: Requires shifting elements.

3. Not suitable for large datasets if the size is not known in advance.

When to use Arrays:

1. When the size of the dataset is known and fixed.

2. When fast access to elements is required.