**Exercise 4: Employee Management System**

**Understand Array Representation:**

**Question - Explain how arrays are represented in memory and their advantages.**

Answer - Arrays are blocks of memory that are contiguous and have an index to access each element, which is the same data type. By using their index, elements can be accessed in constant time with this representation.

Advantages :

* Contant -time Acess.
* Memory Efficiency
* Cache Friendliness.

**Question - Analyze the time complexity of each operation (add, search, traverse, delete).**

Answer –

Add Employee - O(1) ,Adding a new employee is a constant-time operation that requires inserting the new employee at the end of the array.

Search Employee:  
O(n), Iterating through the array until the employee is located or the end of the array is reached is the process of searching for an employee.

Traversing an Array:

O(n), traversing entails printing each employee after iterating through the full array.

Employee Delete:  
O(n), In order to delete an employee, you must first locate them, which takes O(n), and then you must move the following elements to take up the void, which likewise takes O(n).

**Question - Discuss the limitations of arrays and when to use them.**

Answer –

Fixed Size: If an array's initial capacity is exceeded by the number of employees, it may become restrictive.  
Inefficient Deletions: O(n) time complexity results from the need to move elements after a deletion.  
Inefficient Insertions: O(n) time complexity results from the need to move elements in order to insert them at random points.