## Employee Management System

1. Understand Array Representation

* Arrays are contiguous memory blocks where elements of the same data type are stored sequentially.
* They allow fast access to elements using an index.
* Arrays are ideal when the number of elements is fixed or changes infrequently.

1. Time Complexity Analysis

* **Add:** Adding an employee to the array takes constant time, O(1), if there is available space at the end of the array.
* **Search:** Searching for an employee by ID requires checking each element until a match is found, resulting in linear time, O(n).
* **Traverse:** Traversing the array to visit all employees takes linear time, O(n), since every element is accessed once.
* **Delete:** Deleting an employee involves finding the element and then shifting all subsequent elements to fill the gap, which takes linear time, O(n).

1. Limitations of Arrays

* **Fixed size**: You must define the maximum number of employees ahead of time.
* **Insertion and deletion** can be costly due to element shifting.
* **No dynamic resizing**: You can’t grow the array without copying to a larger one.

1. **When to Use Arrays**

* Use arrays when:
  + The number of employees is **small or constant**.
  + We need **fast access** by index.
  + Memory usage must be **efficient**.

For **more dynamic and flexible data**, we can consider using ArrayList or other dynamic collections.