Ex 4- employee management system

**Step 1: Understand Array Representation**

**Array Representation in Memory**:

* **Contiguous Memory Allocation**: Arrays are stored in contiguous memory locations, which means all elements of the array are placed next to each other in memory.
* **Fixed Size**: The size of an array is defined at the time of its creation and cannot be changed. This provides efficient access but limits flexibility.
* **Index-Based Access**: Each element in an array can be accessed directly using its index. This allows for O(1) time complexity for accessing elements.

**Advantages of Arrays**:

* **Constant Time Access**: Accessing any element in the array by index takes O(1) time.
* **Ease of Iteration**: Arrays are easy to traverse using loops.
* **Predictable Memory Usage**: Since the size is fixed, the memory usage is predictable and easy to manage.

**Step 4: Analysis**

**Time Complexity of Each Operation**:

* **Add**: O(1) - Adding an employee to the end of the array takes constant time.
* **Search**: O(n) - In the worst case, we might need to search through all n employees.
* **Traverse**: O(n) - Traversing through all employees takes linear time.
* **Delete**: O(n) - In the worst case, deleting an employee might require shifting n elements.

**Limitations of Arrays**:

* **Fixed Size**: The size of an array is fixed at the time of its creation, making it inflexible if the number of employees grows beyond the initial capacity.
* **Inefficient Deletion and Insertion**: Deleting or inserting elements (not at the end) requires shifting elements, which can be inefficient for large arrays.