**EMPLOYEE MANAGEMENT SYSTEM**

1.Understand the Problem:

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

About four different sorting algorithms,

Arrays are a fundamental data structure in programming, and they are represented in memory as a contiguous block of memory locations. Each element in the array is stored in a separate memory location, and the elements are accessed using an index..

Advantages of array data structure:

* + Efficient memory usage: Arrays store elements in contiguous memory locations, which makes them memory-efficient.
  + Fast access: Arrays allow for fast access to elements using their index.
  + Cache-friendly: Arrays are cache-friendly, which means that the CPU can quickly access elements in the array.

4. Analysis

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

Time Complexity for Each Operation:

1. Add Employee: O(1) - adding an employee to the end of the array takes constant time.

2. Search Employee: O(n) - Searching through the array requires a linear scan, iterates through the array once for n elements

3. Traverse Employees: O(n) - traversing all employees takes linear time.

4. Delete Employee: O(n) - deleting an employee takes linear time because we need to shift elements to the left.

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

Limitations of Arrays:

1. Fixed Size: Arrays have a fixed size, which means we need to know the maximum number of elements in advance.

2. Inefficient Deletion and poor deletion: inserting or deleting elements in the middle of the array takes linear time.

3. Cache performance: arrays can have poor cache performance if the elements are not accessed sequentially.

* We should use arrays when:
  + We know the maximum number of elements in advance.
  + We need to store a small number of elements.
  + We need to access elements sequentially.