Exercise 4: Employee Management System

1. Understanding Array Representation:

Arrays in Java:

- Arrays are fixed-size data structures that store elements of the same data type in contiguous memory locations.

- They are zero-indexed, meaning the first element is at index 0.

- In Java, arrays are objects. When you declare an array, memory is allocated on the heap.

Memory Representation:

- For an array of objects (like Employee[]), Java stores references to the objects in contiguous memory.

- The actual object data is stored separately, and the array holds pointers to each object.

Example:

Employee[] arr = new Employee[3];

- This creates an array capable of holding 3 Employee object references.

Advantages of Arrays:

- Constant-time access to any element using an index: O(1).

- Simple and efficient in terms of memory when the number of elements is known in advance.

Disadvantages of Arrays:

- Fixed size: Once created, the size cannot be changed.

- Costly insertion and deletion operations (except at the end).

- No built-in methods for resizing, searching, or inserting (unlike ArrayList).