**Exercise 4: Employee Management System**

**Representation Of Arrays In Java**

Arrays in Java are **contiguous blocks of memory**, where elements are stored sequentially. The index of an element is calculated using the formula:  
address\_of\_element = base\_address + (index \* size\_of\_element)

#### Advantages:

* **Fast access** using index: O(1) time for retrieval.
* **Cache-friendly**: contiguous memory improves performance.
* **Simplicity**: Easy to declare and use for fixed-size data.

**Time Complexity Of Different Operations**

| Operation | Time Complexity |
| --- | --- |
| Add | O(1) |
| Search | O(n) |
| Delete | O(n) |
| Traverse | O(n) |

**Limitations Of Arrays**

* **Fixed size**: Cannot grow dynamically like ArrayList.
* **Inefficient deletions**: Requires shifting elements.
* **Waste of memory**: May allocate more than needed.

#### 🟢 Arrays are used when:

* The size is known in advance.
* Performance for **random access** is critical.
* Memory layout matters.