

EMPLOYEE MANAGEMENT SYSTEM

Q1) Understanding array representation :

Arrays are represented in memory as a contiguous block of memory locations, each of which holds a single element of the array. The elements are stored in a linear sequence, with the first element at the lowest memory address and the last element at the highest memory address.

Advantages:

Arrays provide efficient memory usage, as the memory is allocated only once when the array is created. Arrays also offer fast access time, as elements can be accessed directly using their index. Additionally, arrays are cache-friendly, which improves performance by reducing the number of cache misses. Arrays are also simple to implement and understand, making them a good choice for simple applications. Furthermore, arrays are good for sequential access, as elements are stored in a linear sequence, making it efficient to iterate over the array.

Q4) Analysis:

Add Operation: The add operation checks if the array is full, and if not, adds the new employee at the next available index. Time Complexity : $O(1)$

Search Operation: The search operation iterates through the array to find the employee with the specified ID. Time Complexity : $O(n)$

Traverse Operation: The traverse operation iterates through the entire array to print all employees. Time Complexity : $O(n)$

Discussion:

When to use array:

when working with small, fixed-size data sets where the size is known in advance. Arrays provide good cache efficiency, making them a good choice for performance-critical code. They are also simple to implement and understand, making them a good choice for simple applications. Additionally, arrays are useful when working with primitive data types, such as integers or characters, where the overhead of objects is not necessary.

Limitations of Arrays:

They have fixed size that cannot be changed once they are created, which can lead to wasted space or errors.

They do not support dynamic resizing, which can be a problem when dealing with large datasets.

Arrays require contiguous memory allocation, which can be a problem for large arrays

Arrays do not provide built-in support for common operations like sorting, searching, or inserting elements, making them less convenient to use.