Assignment5 written problem

There are several differences between singly linked list and array

1. The way to access

In linked list we have to traverse through it for accessing element. So O(N) time required for accessing.

In array, elements can be randomly accessed using subscript variable. It is faster than linked list.

1. The memory structure

In linked list, element is stored at any available location, and the pointer to that memory location is stored in previous node.

In array, element is stored in contiguous memory locations.

1. The insertion and deletion

In linked list, we need to do is just change the pointer address field (pointer), so insertion and deletion operations are quite easy to implement.

In array, elements are stored in consecutive memory locations, while inserting elements, we have to create space for insertion. So more time required for creating space and insert element. When delete an element from given location, we need to shift all successive elements up by 1 position. It need more time than singly linked list.

1. Memory allocation

In linked list, memory can be allocated at run-time. Moreover, linked list use dynamic memory allocation.

In array, memory should be allocated at compile-time. The array use static memory allocation.

From above we can see that compared to array,

Linked list provides following two advantages

1. Dynamic size
2. Ease of insertion/deletion

Linked lists have following drawbacks

1. Random access is not allowed. We have to access elements sequentially starting from the first node. So we cannot do binary search with linked lists.
2. Extra memory space for a pointer is required with each element of the list.
3. Arrays have better cache locality that can make a pretty big difference in performance.