Report on Time Complexity and Space Complexity of Singly Linked List and Dynamic Arrays

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Time Complexity

Linked List

- Access: O(n)
- Search: O(n)
- Insertion (at beginning): O(1)
- Insertion (at end): O(1) if tail pointer is maintained, otherwise O(n)
- Deletion: O(1) if node to delete is given, otherwise O(n)
- Updating: O(1) if node location is given, otherwise O(n)

Dynamic Arrays

- Access: O(1)
- Search: O(n)
- Insertion (at end): O(1) average, O(n) worst case (resizing required)
- Insertion (at beginning): O(n) (all elements need to be shifted)
- Deletion: O(n) (all elements need to be shifted)
- Updating: O(1)

Space Complexity

Linked List

- Requires extra space for pointers, typically 2-4 times the size of the data.
- Space complexity for n elements: O(n)

Dynamic Arrays

- Space complexity for n elements: O(n)

Thank You