Assignment 6: Elementary Data Structures

Part 2: Data Structures

Implementation

- **Arrays and Matrices**: Basic operations (insertion, deletion, access).
- **Stacks and Queues**: Implemented using arrays with functions for push/pop and enqueue/dequeue.
- **Linked Lists**: Singly linked list with insertion, deletion, and traversal.

Performance Analysis

1. **Arrays**:
   - Access: O(1).
   - Insertion/Deletion: O(n) due to shifting.

2. **Stacks and Queues**:
   - Both operations have O(1) complexity when using arrays.

3. **Linked Lists**:
   - Traversal: O(n).
   - Insertion/Deletion: O(1) at head.

Practical Applications

- Arrays: Fast access in data-heavy applications.
- Stacks: Expression evaluation, recursion simulation.

- Queues: Process scheduling, buffering.

- Linked Lists: Dynamic memory applications.

Code Details

- Fully documented Python implementations for all data structures.