Data Structure Tutorial - Outline

Data Structure Tutorial

I. Welcome

- Introduction
- Contact Info

II. Stack

- Introduction to Stack Data Structure
  - Definition and characteristics
  - LIFO (Last-In, First-Out) principle
  - Common use cases
- Implementation of Stack in Python
  - Design and structure
  - Operations: push, pop, size, empty
- Example: Solving a problem using a Stack
  - Describe a problem that can be efficiently solved using a stack
  - Step-by-step solution using stack operations
- Problem to Solve (Stack)
  - Present a problem for the reader to solve using a stack
  - Provide a link to the solution

III. Linked List

- Introduction to Linked List Data Structure
  - Definition and characteristics
  - Node structure and references
  - Singly linked list vs. doubly linked list
- Implementation of Linked List in Python
  - Design and structure
  - Operations: insert_head, insert_tail, insert, remove_head, remove_tail, remove, size, empty
- Example: Solving a problem using a Linked List
  - Describe a problem that can be efficiently solved using a linked list

    - Step-by-step solution using linked list operations
- Problem to Solve (Linked List)
    - Present a problem for the reader to solve using a linked list
    - Provide a link to the solution

IV. Tree

- Introduction to Tree Data Structure
    - Definition and characteristics
    - Terminology: nodes, root, parent, children, leaf, depth, height
- Implementation of Tree in Python
    - Design and structure
    - Operations: insert, remove, contains, traverse_forward, traverse_reverse, size, empty
- Example: Solving a problem using a Tree
    - Describe a problem that can be efficiently solved using a tree
    - Step-by-step solution using tree traversal and operations
- Problem to Solve (Tree)
    - Present a problem for the reader to solve using a tree
    - Provide a link to the solution