

IT 3007 Assignment

Objective:

To understand and apply various data structures in programming.

Instructions:

Complete the following tasks within 2 hours.

Submit your code and a brief explanation for each task.

Tasks:

- Implement a Stack:
 - Create a stack data structure in your preferred programming language.
 - Implement the following operations: push, pop, peek, and isEmpty.
 - Write a function to reverse a string using the stack.
- Implement a Queue:
 - Create a queue data structure in your preferred programming language.
 - Implement the following operations: enqueue, dequeue, front, and isEmpty.
 - Write a function to check if a given sequence of parentheses is balanced using the queue.

Case Study 1: Library Management System

- Imagine you are designing a library management system.
- Use a data structure (e.g., linked list) to manage a collection of books.
- Implement the following operations:
 - Add a new book to the collection.
 - Remove a book from the collection.
 - Search for a book by title.

Case Study 2: Social Media Platform

- Imagine you are designing a simple social media platform.
- Use a data structure (e.g., hash map) to manage user profiles.
- Implement the following operations:
- Create a new user profile.
- Delete an existing user profile.
- Retrieve a user profile by username.