

Data Structures and Algorithms Project: Mini Social Network

Course: Data Structures and Algorithms

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Project Overview

The objective of this project is to design and implement a console-based application in Java that solves a given problem by effectively utilizing appropriate data structures and algorithms. The application will be controlled entirely through text commands entered into the console (CLI). Your program's main function should read these commands, parse them, and call the appropriate Java methods to execute the actions.

The project must be written in Java as a standalone, CLI-based program by teams of two. No external databases or GUIs are to be used. You are permitted to use Java's standard data structure implementations from the `java.util` package.

Project Details: Mini Social Network

This project's goal is to build a simplified social network where users can connect with friends and post messages. This will focus on key data structures such as graphs, linked lists, queues, and hash tables.

Core Requirements:

1. **User Management:** Each user will have a unique ID and a name. Store users in a hash table (or dictionary) for quick lookups by ID.
2. **Friend Connections:** Friendships are stored in a graph (adjacency list), where each node represents a user and an edge represents a friendship. The system must provide a method to find mutual friends between two users.
3. **Posts:** Each user can create posts, which are stored in a linked list or queue under the user's profile.
4. **News Feed:** A user's news feed displays posts from their friends. Store posts in a priority queue based on timestamps to always show the latest posts at the top.
5. **Friend Recommendations:** Suggest potential friends based on mutual friends or shared interests.

Required Data Structures:

- **Graph:** To manage user connections (friendships).
- **Hash Table:** For fast user lookup by ID.
- **Linked List or Queue:** To store user posts.
- **Priority Queue:** To show the latest posts in the news feed.

Required CLI Commands:

- `add_user`
- `add_friend`
- `find_mutual_friends`
- `post_message`
- `view_feed`
- `search_user`

Submission and Evaluation

Your final submission must be a single `.zip` file containing all your `.java` source files. The project evaluation will be conducted through a final presentation and a Q&A session where you will demonstrate your application and explain your design choices.