

EE432 Data structures extra assignment

Make a team of 3 students then design and implement a desktop application in Python for managing a to-do list. The group can submit a project without GUI, but can get a maximum of 3 points.

This application should allow users to:

- Add new tasks: Each task should have a description (string), a priority level (e.g., High, Medium, Low), and a completion status (true/false).
- Delete existing tasks: Users should be able to remove tasks from the list.
- Search for tasks: The application should provide a way to quickly find tasks by their description. Efficiency is important for this feature.
- Display all tasks: Tasks should be displayed in a clear and organized manner. Consider options for sorting or filtering (e.g., by priority, completion status).
- Manage tasks by priority: The application should allow users to easily view and manage tasks based on their priority.

This project aims to assess your understanding and application of linked lists, hash tables, and binary search trees in Python within a practical desktop application context. Consider efficiency, Pythonic code style, and code clarity in your design and implementation.

Technical Requirements:

- Programming Language: Python is the required language for this project.
- No cooperation allowed between groups and the same homework AI rules apply in this assignment.
- Desktop Application Framework: While you are free to explore other options, the following frameworks are suggested for this project:
 - Tkinter: A built-in Python library for creating simple GUI applications. It's a good starting point for beginners.
 - PyQt: A more powerful and feature-rich framework for creating sophisticated desktop applications. It offers more widgets and customization options.
- Data Structures: The application must utilize the following data structures:
 - A linked list to store the tasks and maintain their order.
 - A hash table for efficient searching by task description.
 - A binary search tree to manage tasks based on priority.
- Implementation Focus: The primary focus of this project is the correct and efficient implementation of the specified data structures in Python. While a user-friendly interface is desirable, the emphasis should be on the underlying data structure logic. Choose a framework that allows you to clearly demonstrate your data structure implementation.
- You should upload your code to one of the student's github accounts and submit the link to the repository.
- Documentation: Provide clear and concise documentation explaining how the data structures are used, how the different functionalities are implemented in Python, and why you chose your specific framework. The percentage each student took in working for the project. Include any specific considerations or challenges you faced during the implementation.