TA Record Management System

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Introduction

The TA Record Management System is designed to manage and filter records of Teaching Assistants (TAs) in a department. The system allows users to load TA records from a file, remove invalid records (e.g., those who have graduated), add new records, and sort the existing records based on various criteria.

Features

The system is divided into three primary functionalities:

- **Filtering Invalid Records**: The system filters out records of TAs who are classified as "Alum," indicating they have graduated and are no longer eligible to be TAs. The filtering process involves reading the data from a file, checking each record's status, and then removing any record that does not meet the eligibility criteria. The filtered list is then saved back to the file, replacing the original data.

- **Adding New Records**: Users can add new TA records, ensuring that no duplicate Student IDs are added. The system prompts the user for details such as working hours, status, first name, student ID, and department. It performs checks to ensure the integrity of the data, such as verifying that the student ID is unique and that the status is one of the accepted values (e.g., "Grad," "UGrad"). If the data passes all integrity checks, the new TA is added to the list and saved to the file.

- **Sorting Records**: The system allows users to sort the records based on different columns such as Working Hours, Status, First Name, Student ID, and Department. The user can choose which column to sort by and whether the sorting should be in ascending or descending order. After sorting, the updated order is saved back to the file. This ensures that the data is not only organized but also easily accessible in a preferred order.

Code Implementation

The code is implemented in C++ and is structured into several functions that handle the various features of the system. Here's a breakdown of how the system works:

Main Program Flow

The main program initializes a vector to store TA records and manages the flow of the program, including error handling. The program starts by loading TA records from a file and filtering out invalid records. It then enters a user interaction phase where the user can add new TAs, sort existing records, or perform other tasks. The program includes robust error handling to manage issues such as invalid input or file errors.

Filtering Invalid TAs

This function is responsible for loading TA records from a file, filtering out invalid records, and saving the filtered data back to the file. The system reads the data, checks each record's classification, and removes any TA who has graduated (marked as "Alum"). The remaining valid records are then written back to the file, ensuring that the data set is always up to date.

Loading Behavior

The loading behavior function handles the process of reading the TA records from a file. It allows the user to retry if an incorrect file name is provided, with a limit on the number of attempts. This function ensures that the correct file is loaded and that the data is properly parsed and stored in the system for further processing.

User Interaction

This function provides the main user interface, allowing users to interact with the system by adding new TAs, sorting the records, and performing other tasks. The user is presented with a menu of options and can choose the desired action. The system then processes the user's input, whether it involves adding a new record, sorting the records, or saving the data. The interface is designed to be user-friendly and ensures that the user can easily manage TA records.

Adding New TAs

The function for adding new TAs facilitates the input of new records by prompting the user for details such as working hours, status, first name, student ID, and department. The system ensures that the entered data is valid and does not conflict with existing records (e.g., duplicate student IDs). If all checks are passed, the new record is added to the system and saved to the file.

Sorting Records

The sorting functionality allows the user to organize TA records based on a chosen column and order (ascending or descending). The user selects the column to sort by, and the system rearranges the records accordingly. The sorted records are then saved back to the file, ensuring that the data is consistently organized.