Final Project - University Search App

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1. Project Overview

The University Search App provides a platform for U.S. university exploration, enabling users to view, filter, and manage data to aid students in their college selection process. The application has a graphical user interface (GUI) written in Java, using the Swing library, and it communicates with a MySQL database backend.

2. Usage Instructions

1) View All Universities Button

Purpose: Retrieve and display a comprehensive list of all U.S. universities in the main data table.

➔ How to Use:

- Click the "View All Universities" button on the top panel.
    - The main table will be populated with data for all universities, showing the following columns:

1. University Name
2. City
3. State
4. University Link
5. Tuition Fees (Domestic)
6. Type of Institution
7. Undergraduate Population
8. Acceptance Rate

9. Average SAT/ACT Score
10. National Ranking
11. Graduation Rate
12. Percentage of International Students

2) Add to Favorites Button

Purpose: Add a selected university to the favorites list.

➔ How to Use:

- Select a university from the main table. Click the "Add to Favorites" button.
    - If successful, a confirmation message will appear.
    - The university will be added to the favorites table in the database.

- Error Cases:
    - If no university is selected, an error message will appear.

3) Remove to Favorites Button

Purpose:Remove a selected university from the favorites list.

➔ How to Use:

- Select a university from the main table. Click the "Remove from Favorites" button.
    - If successful, a confirmation message will appear.
    - The university will be removed from the favorites table in the database.

- Error Cases:
    - If no university is selected or the university is not in the favorites list, an error message will appear.

4) View Favorites Button

Purpose: Display a list of all favorite universities.

➔ How to Use:

- Click the "View Favorites" button.
    - The main table will be populated with data from the favorites table.

5) Filter Criteria Option

Purpose: Filter universities based on specific criteria such as state, tuition fee, ranking, etc.

➔ How to Use:

- Select a Filter Criterion: Use the dropdown menu in the filter panel to select one of the following criteria:
    1. State
    2. Max Tuition Fee
    3. Type of Institution
    4. Max Undergraduate Population
    5. National Ranking
- Enter Search Value: Type the corresponding value in the search field (e.g., "TX" for State, "30000" for Max Tuition Fee).
- Click "Search":
    - The main table will be updated to display only universities matching the specified criteria.

6) Reset Filters Button

Purpose: The purpose is to erase any existing input in the search field and restore the filtered data to its initial state.

➔ How to Use:

- Click the "Reset" button:
    - Search field will be cleared and the entire dataset will be shown now to display all universities again.
- Error Cases:
    - If the search field is empty or the value is invalid, an error message will appear.

7) Open University Homepage Button

Purpose: Open the official homepage of the selected university in the default web browser.

➔ How to Use:

- Select a university from the main table.
- Click the "Open University Homepage" button.
    - The university's homepage URL will open in the default web browser.

- Error Cases:
    - If no university is selected, an error message will appear.

8) Sorting Each Column Option

Purpose: Sort the list of universities based on any column in ascending or descending order.

➔ How to Use:

- Click the column header of any column in the main table (e.g., "Tuition Fees (Domestic)").
    - The data will be sorted in ascending order initially.
    - Click the same column header again to toggle between ascending and descending order.

2. Dataset References

The dataset used in this project was obtained from the U.S. Department of Education - College Scorecard.

Source: U.S. Department of Education - College Scorecard

Data Cleaning & Preparation

Initial Data Collection:

- Collected relevant institution-level data files from the website and downloaded it.

Data Cleaning:

- Tools Used: R programming language.
- Process: Extracted essential fields like University Names, State, City, and Links to the official university websites from the downloaded data file.
- Tidied the dataset by removing unnecessary columns.

Data Generation:

- For remaining columns, generated random but realistic data within specific bounds:
- Tuition Fees (Domestic): Between $5,000 and $50,000
- Type of Institution: "Public" or "Private"
- Undergraduate Population: Between 1,000 and 40,000
- Acceptance Rate: Between 5% and 100%
- Average SAT/ACT Score: Between 800 and 1600
- National Ranking: Unique ranking for each university
- Graduation Rate: Between 50% and 98%
- Percentage of International Students: Between 0% and 25%

3. External Libraries

Java Libraries:

- MySQL Connector/J: A JDBC driver for connecting Java applications to MySQL databases.
- Swing Library: The Java Swing library is used for creating the GUI. Included in the Java SDK.

4. Installation Instructions

Prepare the CSV File:

- Use the command prompt to import your CSV file into MySQL. Make sure the file path and database details are correct.

Create Tables in MySQL:

- Run the SQL script using MySQL Workbench to create the required tables in the database.
- The SQL code required to create the necessary tables and import the CSV data can be found in the ZIP file with the following name FINAL_FINAL.sql.

Configure Database Connection:

- Download the MySQL Connector/J JDBC driver from MySQL Downloads and configure it based on the instructions given in notes that you gave.
- Add the downloaded .jar file to your project folder.
- In the Java code (UniversityDatabaseApp.java), modify the connectToDatabase method to reflect your MySQL username and password.