**Intermediate Programming Concepts and**

**Applications for Embedded Systems**

Logo

Description automatically generated



**Project ENEB340- User Details Management System**

**Procedure:**

* Execute all parts in Raspberry Pi OS. Create a `lab10` directory. Each part should be in a separate file.
* Provide a flowchart to explain your solution. We recommend using Smartdraw Flowchart Editor.

**Objective**:

Develop a User Details Management System in C, utilizing data structures like structs and linked lists. This system will store user information in a CSV file named "ENEB340.csv" and perform operations like search, insert, delete, update, and calculate averages on this data.

**File Structure:**

1. **Data Structures**: Implement structs and linked lists in one file.

2. **Data Storage**: Handle CSV file operations (read/write) in a separate file.

3. **Functions**: Implement all user operation functions in another file.

4. **Main Menu**: Design the main menu in the main file.

5. **Makefile:** Create a makefile for compilation.

**Steps**:

1. **Struct Definition**:

- Define a ‘User’ struct with fields: ‘name’, ‘age’, ‘weight’, and ‘height’.

- Initialize the CSV file "ENEB340.csv" with the following data:

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Age | Height | Weight |
| Olivia | 29 | 1.81 meters | 250.62 lbs |
| Emma | 67 | 1.88 meters | 257.1 lbs |
| Amelia | 28 | 1.5 meters | 247.4 lbs |
| Sophia | 13 | 1.83 meters | 271.03 lbs |
| Charlotte | 87 | 1.8 meters | 105.36 lbs |
| Ava | 72 | 1.92 meters | 114.07 lbs |
| Isabella | 33 | 1.76 meters | 106.93 lbs |
| Mia | 26 | 1.98 meters | 225.74 lbs |
| Olivia | 72 | 1.63 meters | 198.92 lbs |
| Evelyn | 20 | 1.83 meters | 126.25 lbs |

Menu: Select an Option to Perform

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1. Count the Number of Users

2. Search for a User

3. Sort List by Name

4. Add a New User

5. Remove a User

6. Update User Information

2. **Linked List Creation**:

- Implement functions for linked list creation and manipulation.

3. **Develop Functions for User Operations**:

- **Count Users**: Function to count users in the linked list.

- **Search User**: Function to search a user by name.

- **Sort List by Name**: Ensure sorted insertion of new users.

- **Insert User**: Function to add a new user.

- **Delete User**: Function to remove a user by name.

- **Update User**: Function to update user details.

- **Calculate Averages**: Function to calculate average weight and height.

**CSV File Handling:**

- **Read:** Implement a function to load user data from "ENEB340.csv" into the linked list.

- **Write:** Implement a function to save updates in the linked list back into the "ENEB340.csv" file.

**Tasks:**

- Perform the functions defined in step 3 and ensure data consistency with the CSV file.

**Note:**

- Create multifile and makefile as specified in the file structure.

- Ensure all data manipulations are reflected in the "ENEB340.csv" file.

This revised structure integrates CSV file handling into the project, ensuring that all data operations are reflected in the "ENEB340.csv" file, providing a more real-world application scenario for the students.

**Submission Criteria:** Submit your answer in a file called ENEB340\_YourName.pdf or YourName.doc(x). Add your flowchart and code snippet corresponding to each part and take a screenshot of output of each part.

**Report**

1. Follow the report template of the course.
2. Attach all pictures*/*screenshots to the report (both required pictures and some pictures you took when following steps in the procedure that you think may be important to include them), including with the picture number and a short description of each picture.
3. Include an Analysis part (if any).
4. Include the Conclusion part where you can write down what you’ve learned from the lab session, as well as what can be improved in the future.

Important note: The report template is to be used for the rest of the lab sessions.