**COVaxManage: Project Pipeline**

This C++ project provides a basic management system for COVID-19 vaccination, catering to both administrative and user functionalities. The core of the system revolves around managing vaccine stock, patient data, and doctor information.

**1. System Initialization & Main Menu:** \* The main function initiates the Main\_control class object. \* It sets the console color ( system("color B") ). \* The menu() function is called, which displays the primary options: ADMIN, USER, or EXIT.

**2. User Authentication (Admin & User):** \* **Admin Login (admin\_password()):** \* Requires a hardcoded username ("safwan") and password ("1234"). \* Implements a simple captcha for an extra layer of security. \* Provides access to the Admin Menu upon successful login or returns to the main menu if authentication fails. \* **User Authentication (user\_password()):** \* Presents a sub-menu for user registration ("Create Account") or login ("Login"). \* **Registration:** \* Prompts for name, username, and password. \* Includes a valid() function to check if the entered username already exists (by checking for a corresponding .txt file). \* Stores user credentials in a text file named after the username (e.g., "username.txt"). \* **Login:** \* Prompts for username and password. \* Checks if the username file exists and if the entered credentials match the stored ones. \* Grants access to the User Menu upon successful login or prompts for registration if the user is not found.

**3. Admin Module (admin()):** \* After successful admin login, this function presents the Admin Menu with various options: \* **Add Vaccine Stock (add\_vaccine\_stock()):** \* Allows the admin to add vaccine doses to three predefined centers ("1st-center", "2nd-center", "3rd-center"). \* Updates the vaccine count for each center in separate text files (e.g., "center1.txt"). \* **Show Vaccine Center (search\_center()):** \* Displays the current vaccine stock available at each of the three centers by reading from their respective text files. \* **Show Vaccine Stock (display\_vaccine\_stock()):** \* Calculates and displays the total available vaccine stock, considering an initial TOTAL\_VACCINE constant and subtracting the number of applied vaccines (read from "Patient\_Data.dat"). \* **Show Patient Data (show\_patient\_data()):** \* Presents a sub-menu to search patient data based on NIC, Age, Profession, or Gender. \* **Search by NIC (search\_by\_NIC()):** Searches "Patient\_Data.dat" for records matching the entered NIC. \* **Search by Age (search\_by\_age()):** Searches "Patient\_Data.dat" for records matching the entered age. \* **Search by Profession (search\_by\_profession()):** Searches "Patient\_Data.dat" for records matching the entered profession. \* **Search by Gender (search\_by\_gender()):** Searches "Patient\_Data.dat" for records matching the entered gender. \* Uses show\_data() to display the found patient details. \* **Show Total Number Of Vaccines Applied (applied\_vaccine()):** \* Counts the total number of patient records in "Patient\_Data.dat" to determine the total vaccines applied. \* **Add New Doctor Data (add\_doctor()):** \* Prompts the admin to enter details for a new doctor, including name, identification ID, NIC, mobile number, gender, age, specialization, and allotted center. \* Includes basic validation for NIC (12 digits, not starting with 0 or 1) and phone number (10 digits, not starting with 0 or 1). \* Stores the doctor's data in "Doctor\_Data.dat" (binary file). \* **Search Doctor Data (search\_doctor\_data()):** \* Offers options to search doctor data by NIC, Identification ID, Center, or Gender. \* Reads from "Doctor\_Data.dat" and uses doctor\_show\_data() to display matching records. \* **Show Doctor Data (display\_doctor\_data()):** \* Reads and displays all doctor records stored in "Doctor\_Data.dat" using the doctor\_show\_data() helper function. \* **LOG OUT:** Returns to the main menu.

**4. User Module (user()):** \* After successful user login, this function presents the User Menu with options: \* **Search Vaccination Center (search\_center()):** \* Same functionality as the admin's "Show Vaccine Center" option, displaying available vaccine stock at each center. \* **Apply For Vaccine First Dose (add\_patient\_data()):** \* Prompts the user to enter their personal details (name, NIC, mobile number, gender, age, profession, address, vaccine name, dose, and allotted center). \* Includes basic validation for NIC and phone number. \* Stores the patient's data in "Patient\_Data.dat" (binary file). \* Assumes this is for the first dose. \* **Show Details (patient\_show\_data()):** \* Allows the user to search and view their vaccination details by entering their NIC. \* Reads from "Patient\_Data.dat" and displays the record using show\_data(). \* **Apply For Vaccine Second Dose (update\_patient\_data()):** \* Prompts the user for their NIC. \* Searches "Patient\_Data.dat" for the matching record. \* If found, increments the dose field for that record and updates it in the file. \* Indicates successful vaccination for the second dose. \* **LOG OUT:** Returns to the main menu.

**5. Data Storage:** \* **User Credentials:** Stored in individual text files (e.g., username.txt). \* **Vaccine Stock:** Stored in separate text files for each center (e.g., "center1.txt"). \* **Patient Data:** Stored in a binary file ("Patient\_Data.dat"). \* **Doctor Data:** Stored in a binary file ("Doctor\_Data.dat").

**6. Helper Functions:** \* valid(string str): Checks for existing usernames during user registration. \* show\_data(): Formats and displays patient details. \* doctor\_show\_data(): Formats and displays doctor details. \* getch(): Used for character input without pressing enter (likely from conio.h). \* system("cls"): Clears the console screen. \* Sleep(): Pauses execution for a specified duration. \* fflush(stdin): Clears the input buffer.