

The Personal Diary Application is a console-based program that allows users to register, login, and maintain their diary entries. The diary entries are stored in a file, and the content is encrypted to ensure privacy. Let's go through the working mechanism of the application based on the entire code:

1. The application starts by displaying the main menu with three options: Register, Login, and Exit.
2. If the user selects the "Register" option, they can create a new account by providing a username and password. The password is hashed using a simple hashing algorithm, and the user's information is stored in a file named "users.txt".
3. If the user selects the "Login" option, they are prompted to enter their username and password. The application reads the "users.txt" file, hashes the provided password, and checks if the credentials match any of the registered users. If the login is successful, the user is redirected to the user menu.
4. The user menu provides four options: Write an Entry, View Previous Entries, Search Entries, and Logout.
5. If the user selects "Write an Entry", they are prompted to enter the date (in the format DD-MM-YYYY) and the content of the diary entry (up to 200 characters). The application encrypts the content using a simple encryption algorithm and then saves the entry to the "diary.txt" file along with the username and date.
6. If the user selects "View Previous Entries", the application reads the "diary.txt" file and displays all previous diary entries associated with the logged-in user. The encrypted content is decrypted before displaying it to the user.
7. If the user selects "Search Entries", they can search for previous diary entries based on a search term (either the date or the content). The application reads the "diary.txt" file, decrypts the content, and checks for a match with the search term. If a match is found, the corresponding entry is displayed to the user.
8. If the user selects "Logout", they are logged out of the current session, and the application returns to the main menu.

9. The application uses functions for various tasks, such as hashing passwords, validating dates, encrypting and decrypting content, and clearing the input buffer.

10. The main data structures used in the application are `struct DiaryEntry`` to store diary entries and `struct User`` to store user information.

11. The application uses files to store user information and diary entries. The "users.txt" file stores user information (username and hashed password), while the "diary.txt" file stores diary entries (username, date, and encrypted content).

12. The encryption and decryption algorithms used in the application are simple and not meant for strong security but to provide a basic level of privacy for the diary entries.

Overall, the Personal Diary Application allows users to maintain a personal diary with the ability to register, login, write entries, view previous entries, search for specific entries, and maintain some level of privacy through content encryption.