Class Specifications
Water Reminder Application

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1. User Class

- **Purpose**: Serves as a representation with each app user, keeping track of their preferences, hydration goals and personal data.

- **Attributes**:
  - Username: Each user unique identifier.
  - Email: Contact details that are used to send notifications about accounts.
  - Hydration Goal: A user customizable daily water consumption target.
  - Intake Log: Keeps track of daily milliliters of water used.
  - Preferences: The user's choices on the timing and frequency of notifications.

- **Methods**:
  - The user can establish or modify their hydration goal using update_goal(new_goal).
  - log_intake(amount): Records the amount of water used during the day.
  - update_preferences(new_preferences): Modifies preferences and reminder settings.
  - view_progress(): Provides an overview of the daily and weekly goals progress.

2. Reminder Class

- **Purpose**: Manages the scheduling and sending of hydration reminders.

- **Attributes**:
  - User: The linked user object that receives reminders.
  - Frequency: The regularity of reminders (e.g., hourly).
  - Reminder Times: The user's preferred times for reminders.

- **Methods**:
  - schedule_reminders(): Configures reminders according to the user's desired times and frequency.
  - At the designated times, send_reminder() notifies the user's device.
  - adjust_frequency(new_frequency): Enables the frequency of reminders to be changed in response to user input.

3. HydrationLog Class

- **Purpose**: Keeps detailed records of each user's daily water intake.
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- **Attributes**:
  - Date: The log entry date.
  - Intake Amounts: A list of the daily amounts of water consumed.
  - Total Intake: The total amount of water consumed during the day.

- **Methods**:
  - add_entry(amount): This function adds an entry for a given intake quantity.
  - Based on intake_amounts, calculate_total_intake() modifies total_intake.
  - At the end of each day the clear_log() function deletes the intake log.

4. Analytics Class

- **Purpose**: Provides insights into hydration patterns, encouraging better hydration habits.

- **Attributes**:
  - User: The related user object.
  - Hydration Logs: Daily logs for analysis in a list.

- **Methods**:
  - calculate_weekly_average(): Determines and provides the user's weekly average consumption of each day.
  - generate_trends(): Examines and displays user hydration patterns including periods of reduced intake.
  - recommendation(): Promotes healthy habits by offering trend based, individualized hydration advice.

Considerations for Design and Implementation

- **Encapsulation:** The code remain simple and maintainable since each class focuses on particular functionality.
- **Inheritance and Polymorphism:** When expanding functions such as adding new features to a Premium user subclass, inheritance and flexibility may be used.
- **Data security:** Take into account protecting user data, especially any information related to health.