FindWeather

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Design Patterns Lab-08

Problem Statement

Create a console application that allows users to retrieve real-time weather information . This console application will depend on multiple (in this case two) weather service providers Open-Weather and WeatherStack, with functionality to determine the user's location by IP address. Do no take the IP address as user input.

   Please register in OpenWeather, WeatherStack and IpStack as free user and retrieve your API Keys to get started with this task. You can use https://api.ipify.org to find out your real IP.

Features

1. **Location Detection**

   - Implement functionality to determine user location using:
     - IP address-based automatic detection
     - City name input
   - Location data should include:
     - Latitude
     - Longitude
     - City name

2. **Weather Data Integration**

   - Integrate with multiple weather service providers:
     - OpenWeatherMap API
     - WeatherStack API
   - Each provider should return:
     - Temperature (in Celsius)
     - Weather conditions
     - Location information

3. **Caching System**

   - Implement a caching mechanism that:
     - Stores weather data for 10 minutes
     - Prevents unnecessary API calls for the same location

- Returns cached data when available

4. Rate Limiting

- Implement rate limiting that:
  - Enforces a 30-second cooldown between requests to the same weather provider
  - Automatically switches to an alternative provider when rate limit is reached
  - Provides appropriate user feedback about rate limiting

5. Error Handling

- Implement robust error handling for:
  - Network connectivity issues
  - API timeout scenarios
  - Invalid user input

6. User Interface

- Create a console-based interface that:
  - Provides clear options for location selection method
  - Displays weather information in a readable format
  - Shows the source of weather data (which provider)
  - Includes appropriate feedback messages

7. Data Model

- Create a weather data model that includes:
  - Temperature
  - Weather conditions
  - Location information
  - Data source

Technical Requirements

- Implement asynchronous operations for API calls

- Use HTTP client for API communications

- Handle API authentication using API keys

- Ensure proper separation of concerns in the codebase

Sample Output

```
Select location method: 1. By IP, 2. By City, 3. Exit
1
Getting weather data by IP...
Data retrieved from WeatherStack.
Weather in Mirpur from WeatherStack: 23°C, Clear
```