Hackathon - Project

Objective

Develop a Python CLI (Command Line Interface) tool to perform weather data analysis using JSON files. The tool will read weather data from a JSON file, calculate average temperatures for each city, and provide functionalities to display the results in different ways, including temperature conversion and filtering by city. Additionally, the tool will have a help command to guide users on how to use the various features.

- **Repository Setup:**
  - **Create a GitHub Repository:** Create a public repository on your GitHub account for this project with name `weather-data-analyzer-cli`
  - **Commit Your Code:** All code should be committed to the `master` branch.
  - **Submission:** Submit the link to your public GitHub repository as your hackathon project submission.
- **Create a JSON File:**
  - Start by creating a JSON file named `weather.json` with weather data entries for various cities. The data should include the temperature readings for multiple cities with each entry containing a `city` and `temperature` field. Use the expanded data provided below:

```
[
    {"city": "New York", "temperature": 30},
    {"city": "Los Angeles", "temperature": 25},
    {"city": "New York", "temperature": 28},
    {"city": "Los Angeles", "temperature": 26},
    {"city": "Chicago", "temperature": 22},
    {"city": "Chicago", "temperature": 20},
    {"city": "Houston", "temperature": 35},
    {"city": "Houston", "temperature": 36},
    {"city": "Phoenix", "temperature": 40},
    {"city": "Phoenix", "temperature": 42},
    {"city": "Miami", "temperature": 32},
    {"city": "Miami", "temperature": 31},
    {"city": "Seattle", "temperature": 18},
    {"city": "Seattle", "temperature": 20},
    {"city": "Boston", "temperature": 24},
    {"city": "Boston", "temperature": 23},
    {"city": "San Francisco", "temperature": 22},
    {"city": "San Francisco", "temperature": 21},
    {"city": "Dallas", "temperature": 37},
    {"city": "Dallas", "temperature": 38},
    {"city": "Philadelphia", "temperature": 27},
    {"city": "Philadelphia", "temperature": 28},
    {"city": "Atlanta", "temperature": 29},
    {"city": "Atlanta", "temperature": 30},
    {"city": "Denver", "temperature": 19},
    {"city": "Denver", "temperature": 21},
    {"city": "Las Vegas", "temperature": 41},
    {"city": "Las Vegas", "temperature": 43},
    {"city": "San Diego", "temperature": 23},
    {"city": "San Diego", "temperature": 24},
    {"city": "Orlando", "temperature": 33},
    {"city": "Orlando", "temperature": 34},
    {"city": "Portland", "temperature": 17},
    {"city": "Portland", "temperature": 18},
```

```
    {"city": "San Antonio", "temperature": 35},
    {"city": "San Antonio", "temperature": 36},
    {"city": "Austin", "temperature": 34},
    {"city": "Austin", "temperature": 35},
    {"city": "Charlotte", "temperature": 28},
    {"city": "Charlotte", "temperature": 29}
]
```

- **Develop the CLI Tool:**
  - Write a Python script named `weather_cli.py` to perform the following:
    - **Read the JSON Data:** Load the data from the `weather.json` file.
    - **Calculate Average Temperatures:** Compute the average temperature for each city.
    - **Display Options:**
      - **Default Output:** Display average temperatures for all cities in Celsius.
      - **Filter by City:** Use the `--city CITY_NAME` argument to display the average temperature for a specific city.
      - **Convert Temperatures:** Use the `--convert fahrenheit` argument to display temperatures in Fahrenheit.
      - **List Cities:** Use the `--list` argument to display all available cities in the dataset.
      - **Help:** Use the `--help` argument to display information about how to use the CLI tool.
    - **Error Handling:** Include exception handling to manage scenarios such as missing files or invalid command inputs.
- **Testing and Validation:**
  - Test the CLI tool using various commands to ensure it functions as expected. Use the provided test cases as examples of what the output should look like.

Task Description Recap

- Read weather data from a JSON file using Python.
- Develop a CLI tool using `sys.argv` to interact with the data.
- Calculate average temperatures for cities.
- Provide command-line options for filtering data and converting temperature units.
- Handle errors gracefully and provide help documentation through CLI.

Test Cases

Calculate and display average temperatures for all cities in Celsius

Command:

```
python weather_cli.py
```

Expected Output:

```
Average Temperatures:
New York: 29.0
Los Angeles: 25.5
Chicago: 21.0
Houston: 35.5
Phoenix: 41.0

Average temperatures have been written to average_temperatures.json.
```

List all cities for which weather data is available

Command:

```
python weather_cli.py --list
```

Expected Output:

```
Available Cities:
- New York
- Los Angeles
- Chicago
- Houston
- Phoenix
```

Display average temperature only for a City

Command:

```
python weather_cli.py --city New York
```

Expected Output:

```
Average Temperatures:
New York: 29.0

Average temperatures have been written to average_temperatures.json.
```

Convert temperatures to Fahrenheit and display

Command:

```
python weather_cli.py --convert fahrenheit
```

Expected Output:

```
Average Temperatures:
New York: 84.2
Los Angeles: 77.9
Chicago: 69.8
Houston: 95.9
Phoenix: 105.8

Average temperatures have been written to average_temperatures.json.
```

View help

Command:

```
python weather_cli.py --help
```

Expected Output:

```
Weather CLI Tool Usage:

python weather_cli.py [OPTIONS]

This CLI tool reads weather data from a JSON file, calculates the average temperature for each city,
```

```
writes the results to a new JSON file, and prints the average temperatures in the terminal with colored
output.

Arguments:
--help                  Show this help message and exit.
--city CITY_NAME        Calculate and display the average temperature for the specified city only.
--convert UNIT          Convert temperatures to 'fahrenheit' or 'celsius' (default is Celsius).

Examples:
python weather_cli.py
python weather_cli.py --list
python weather_cli.py --city New York
python weather_cli.py --convert fahrenheit

```