Weather Data Plotter

Statement of Purpose

The Weather Data Plotter is an application developed using R Shiny that allows users to plot historical weather data for multiple cities.

This application aims to provide users with a tool to visualize and analyze weather data for a selected location and period. Users can input a city name or click on the map to retrieve weather information. The app allows users to switch between viewing weather conditions and temperature data and provides statistics including maximum temperature, minimum temperature, total precipitation, total snowfall, total sunny days, and maximum wind speed.

Description of Individual User

Individual users of this application could be weather enthusiasts, travelers planning trips, or high school students who want to learn more about climates.

Assumption of Equipment

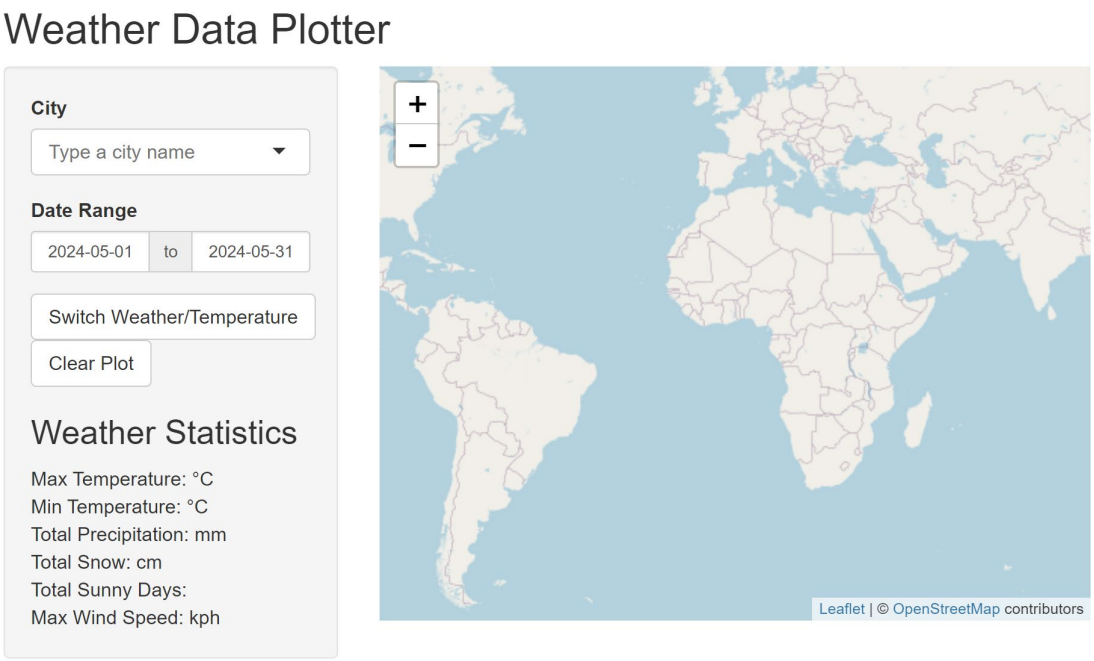
This app needs to be run in R. It relies on the following R packages:

- **shiny**: for running the user interface.
- **httr**: for making HTTP requests to the Weather API.
- **jsonlite**: for parsing JSON responses from the Weather API.
- **ggplot2**: for plotting the data.
- **leaflet**: for rendering the map.
- **stringr**: for URL handlements.

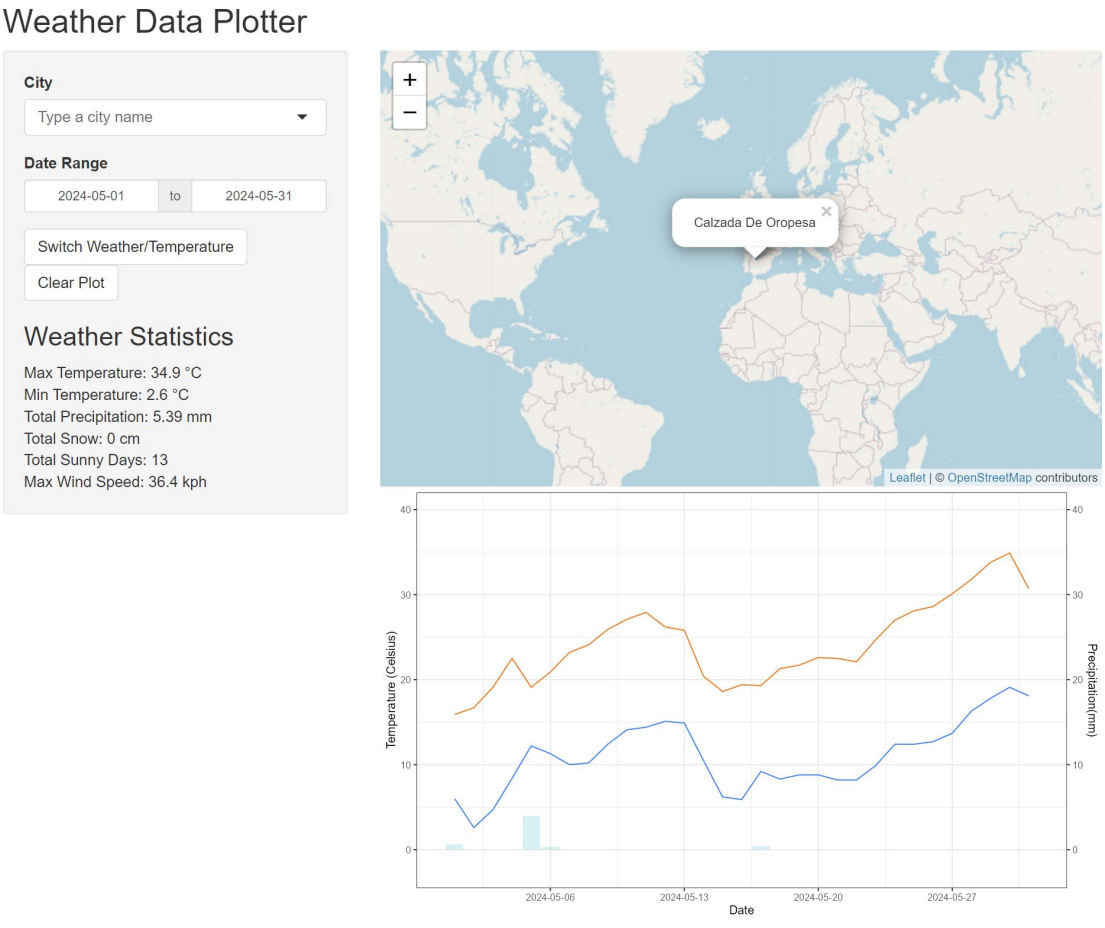
Scenario and how-to example

High school student Solario Eclipso recently got interested in geography, especially in the weather in different cities. They saw this package online and installed the app for fun.

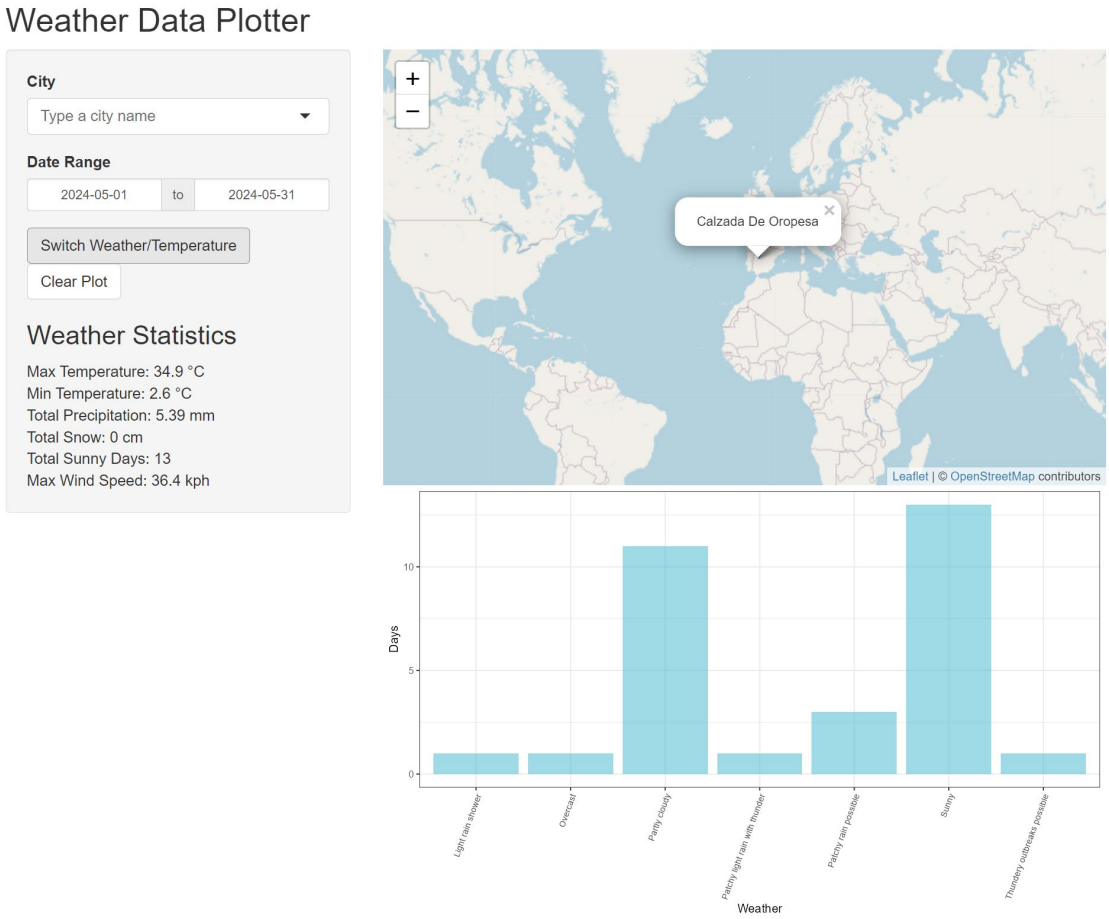
Upon running the app a user interface shows up.



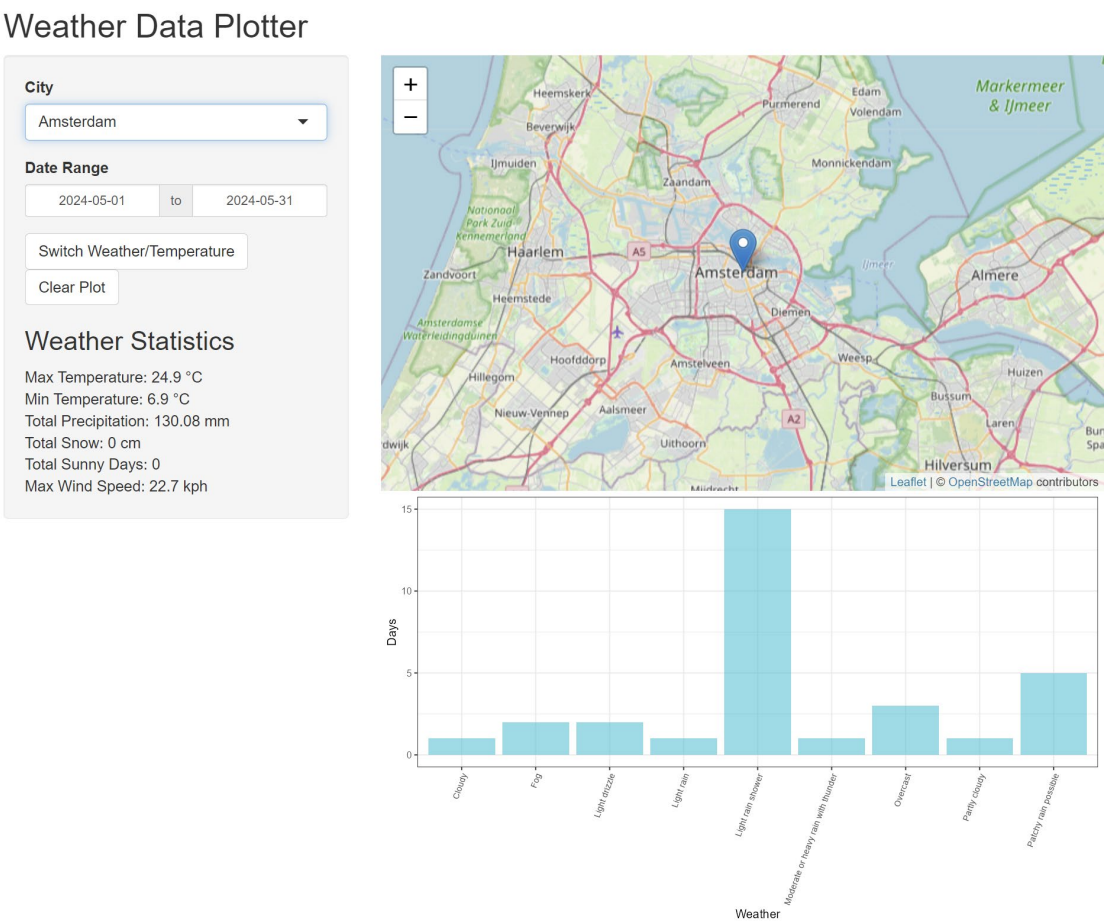
Then Solario clicks on a random spot on the map. The app plots the maximum and minimum temperature of the recent month as well as the precipitation each day. On the left side, some weather data summaries are also given.



Solario clicks on the "Switch Weather/Temperature" button to change the weather conditions' plot. Then the number of days of each weather condition within the recent month is shown.



Solario then decides to see the weather where they live. They entered ‘Amsterdam’ in the text input box and the weather conditions of Amsterdam showed up.



Solario also looks at earlier dates from 2024-04-15 to 2024-04-30. A calendar pops up when clicking on the date ranges.

Weather Data Plotter

City

Amsterdam

Date Range

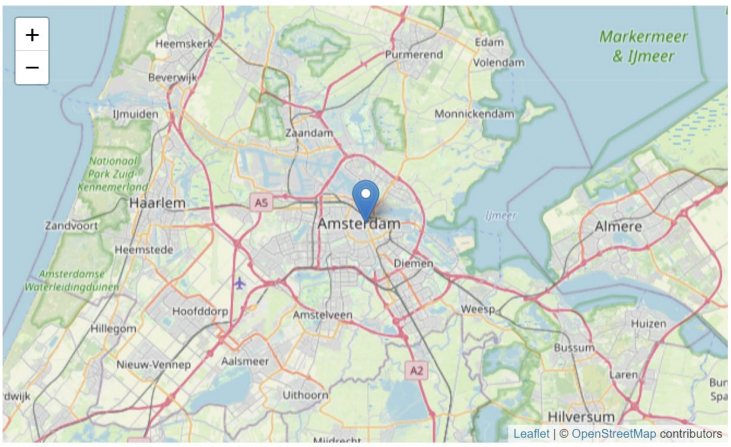
2024-04-15 to 2024-04-30

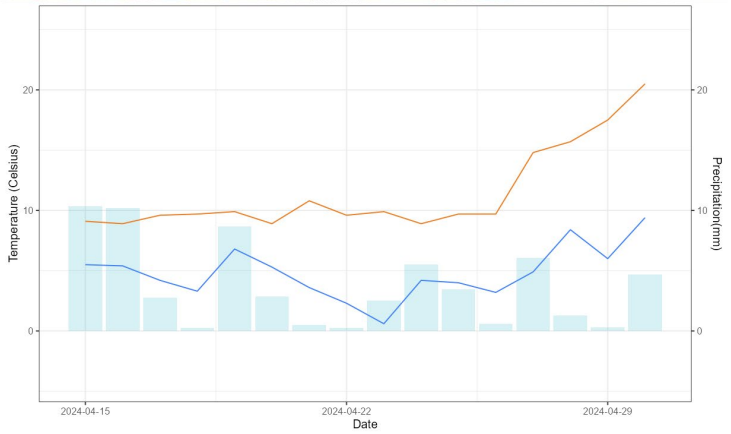
Switch Weather/Temperature

Clear Plot

Weather Statistics

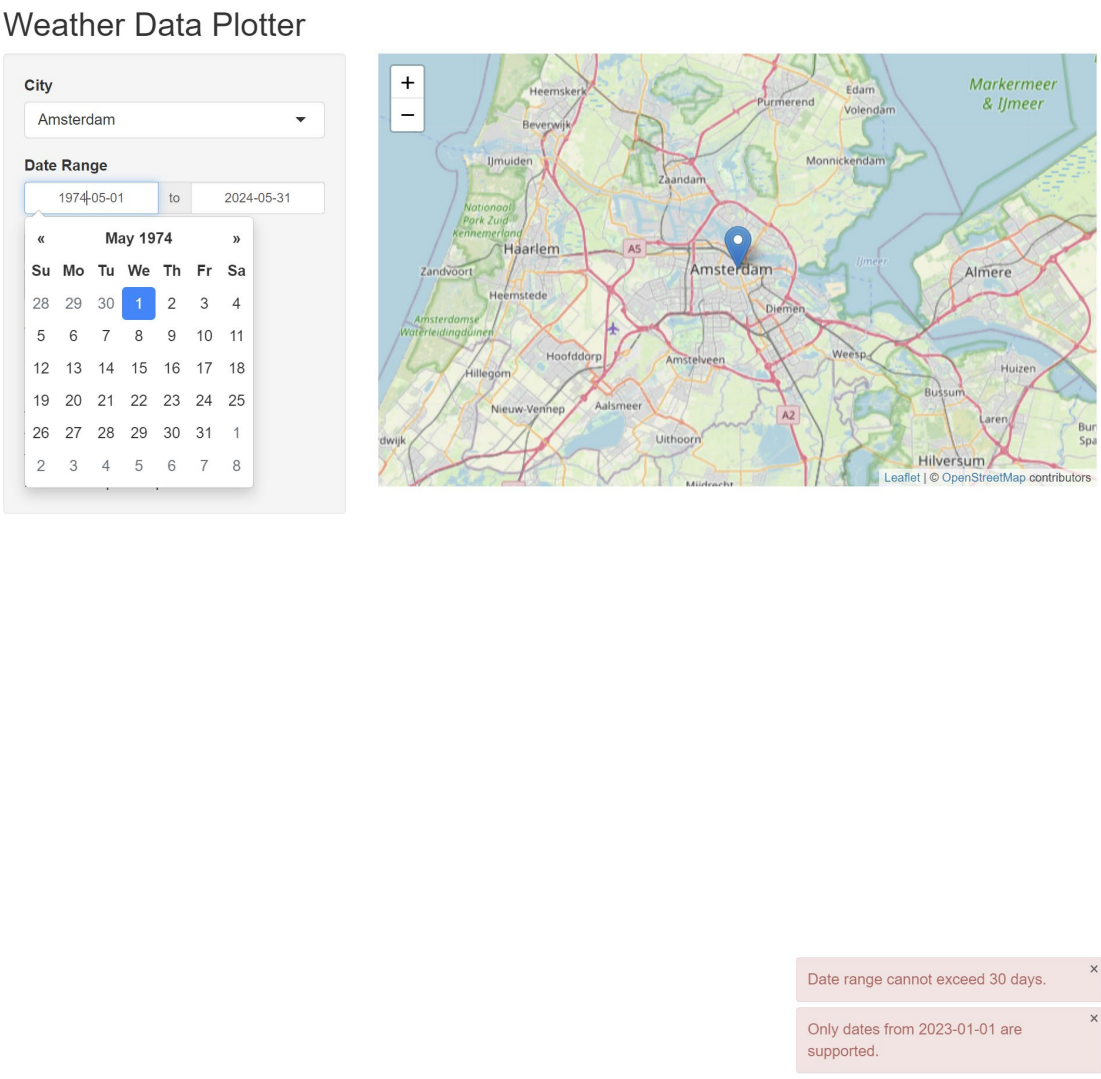
Max Temperature: 20.5 °C
Min Temperature: 0.6 °C
Total Precipitation: 60.17 mm
Total Snow: 0 cm
Total Sunny Days: 0
Max Wind Speed: 37.4 kph





Solario gets very sad as they found out that Amsterdam did not have a single sunny day in the past one and a half month. They wanted to see if there were more sunny days 50 years ago, so they changed the starting date to 1974-05-01.

*Note: Weather conditions are fetched from the API as well; A partly cloudy day may not be counted as sunny.



Unfortunately, the API does not support dates older than 2023-01-01 and the maximum time interval is limited to 30 days. Solario then gets bored and closes the app.

Features

- **Temperature & Precipitation Plot**: The application plots both maximum and minimum temperatures for the selected city.\
- **Weather Stats**: The application gives the maximum and minimum temperature, total precipitation and snow, and the maximum wind speed of the given period.
- **Weather Condition Plot**: The application plots the number of days of each weather condition in the given period.
- **Automatic refreshments**: When a new city or a new date is entered or a new location is clicked on the map, the app automatically refreshes the weather plot.

Installation

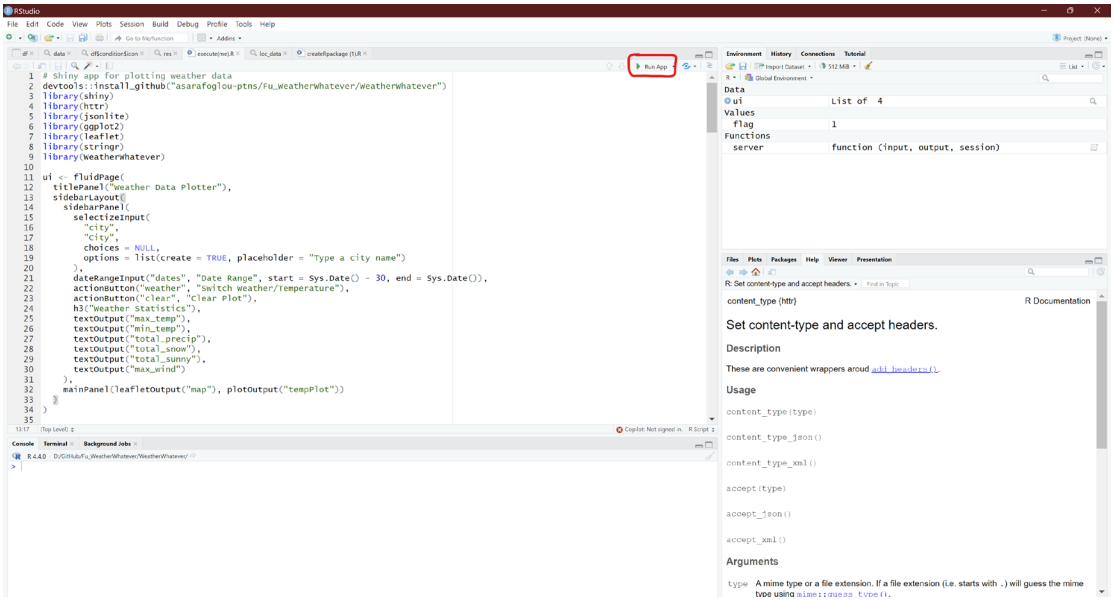
To run the Weather Data Plotter, follow these steps:

1. Install R and Rstudio if you haven't already.

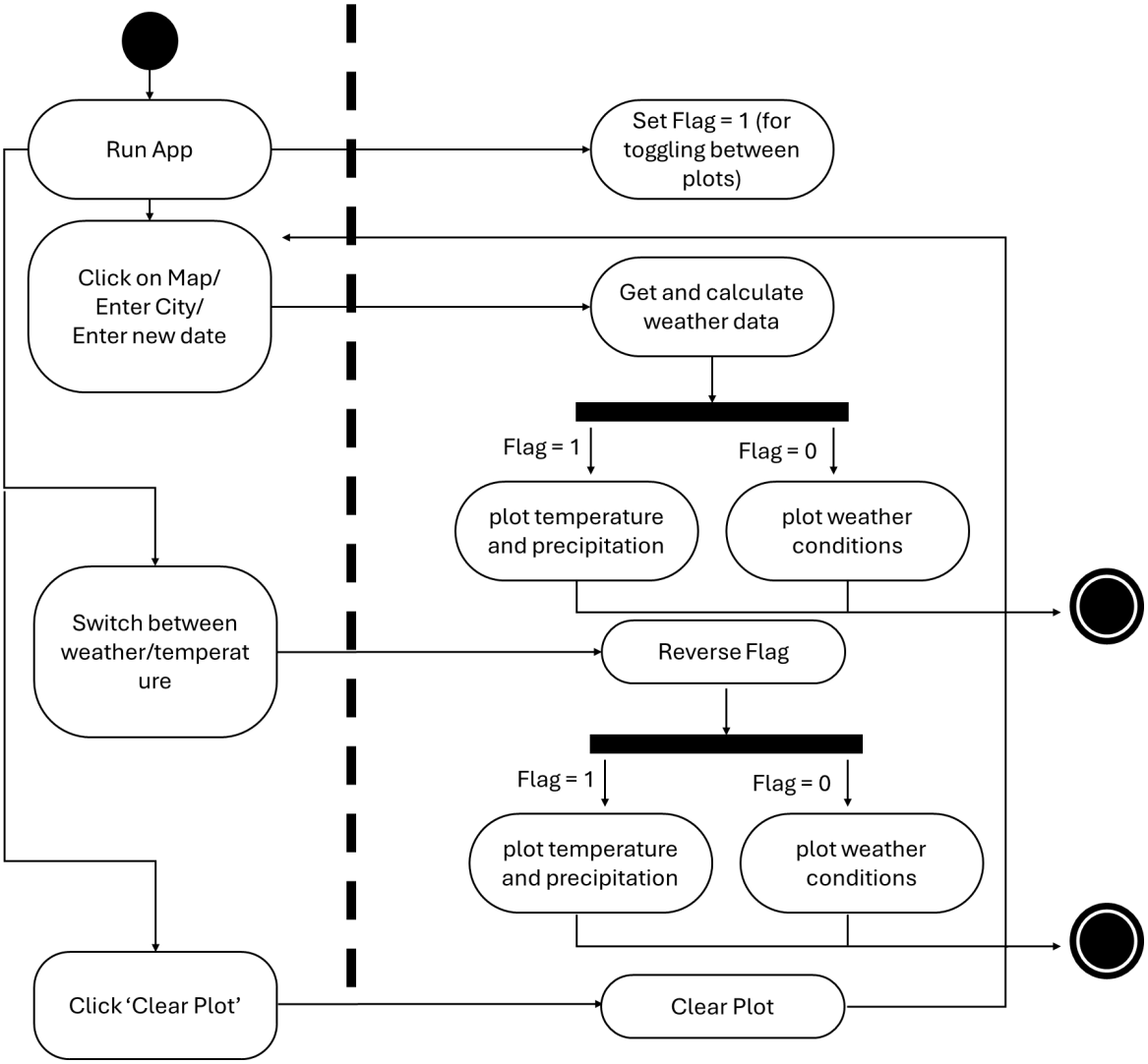
2. Install the required packages with the following command in R:

   install.packages(c("shiny", "httr", "jsonlite", "ggplot2", “leaflet”, “stringr”))

3. Download “execute(me).R” from https://github.com/asarafoglou-ptns/Fu_WeatherWhatever/ and open it in R. Click ‘Run App’ on the upper right.



Flowchart


Run App
Set Flag = 1 (for toggling between plots)
Click on Map/ Enter City/ Enter new date
Get and calculate weather data
Flag = 1
Flag = 0
plot temperature and precipitation
plot weather conditions
Switch between weather/temperature
Reverse Flag
Flag = 1
Flag = 0
plot temperature and precipitation
plot weather conditions
Click 'Clear Plot'
Clear Plot