One of the major challenges I encountered was thoughtfully considering what errors might occur and planning messages for them. For example, when using the API to fetch data, a user could make a typo and then the API wouldn't recognize the location. The API itself could also have issues retrieving data even if a city was typed in normally. So, this code block called for at least two error messages during the API call. It was harder to think up ways the program could fail from the back-end, which must be how computer and data scientists feel all the time, trying to make a program that will cover all possible errors.

Another challenge was understanding how to perform calculations in the SQL tables. I ended up doing all calculations inside the query after trying to make edits after the query was run was troublesome for me. I also struggled a lot with the DateTime column for my data; I'm not confident in my ability to handle that type of variable, so I didn't do any calculations with time, although I would have liked to if I were more adept with datetime format.

The process of pulling and storing the data from the Weatherstack API was smoother than expected. I got very comfortable with their documentation page, so I could see the structure of the data returned in JSON format. This made it easier for me as opposed to the other assignments I've done where I didn't completely understand how I was getting variables from the API's response.

An aspect more challenging than expected was incorporating information into print statements, like {index}, for example. I really wanted to include data like this, such as to make a numbered list for one of my queries about the top-ten cities. I used this to include the city and country name in print statements so the output would have context.

Although this is a basic project, I can see its advanced applications. The ability to pull weather data from an API and process it in real-time could be extremely useful for projects focused on climate research or natural disasters. For future projects, the approach of using multiple tools (APIs, databases/datasets, and the pandas package) can be adapted for many industries.