

Objective

This assignment will test your ability to handle both front-end and back-end development, with a focus on creating an intuitive and interactive user interface (UI) and experience (UX). You will work with climate data to display temperature trends and provide the user with data visualization and customization options.

While we prefer **JavaScript** (e.g., React, Vue.js, or Angular) or **Python** (e.g., Flask, Django, FastAPI for backend, and Plotly, Dash, or Matplotlib for plotting), you are free to use any programming languages or frameworks you feel will deliver the best results. Your final application can be either a **web** or **desktop** app.

Requirements

- Create an interactive UI with a **load button** and a **plotting area** (e.g., a graph or chart).
- The application should allow the user to **upload a .csv file** containing climate data with timestamps (e.g., temperature data over time).
- Upon successful loading of the file, the app should plot the climate data, offering users various options to customize the plot.

Key Features

1. File handling

- The app should accept .csv files with the same format as the provided file ([IDCJAC0002_066062_Data12.csv](#)).
- This file contains temperature data for Sydney, Australia, from 1859 to the present, which can be downloaded from the Bureau of Meteorology website.
- Although the .csv is self-explanatory, you can get more data-structure details from the provided text file ([IDCJAC0002_066062_Note.txt](#)).

2. Plot display

- After the file is loaded and parsed, the app should **plot temperature data per month**.

3. Plot customization

- **Group data by yearly averages:** The user should have an option to display the data as **yearly averages**, instead of monthly values. This will reduce the data points on the plot by a factor of 12.
- **Overlay $\pm 1\sigma$ (standard deviation):** When displaying annual averages, offer the ability to **overlay a range of $\pm 1\sigma$** around the mean value. That is, if T_m are the monthly temperature values for a given year, the plot should display $\text{mean}(T_m)$, $\text{mean}(T_m) + \text{std}(T_m)$ and $\text{mean}(T_m) - \text{std}(T_m)$.

- **Zoom Controls:** Implement a feature that allows users to zoom in on a specific year. The zoom feature should allow users to enter a year of interest and adjust the zoom level using custom controls (e.g., text input, sliders).

4. Error handling

- Ensure the application handles incorrect file formats or data gracefully, with appropriate error messages. Validate that the user selects a proper .csv file before attempting to load the data.

5. Intuitive UX design

- The interface should be user-friendly, guiding the user through loading the data, plotting, and customizing the visualization with minimal confusion (providing thus a seamless User eXperience).

6. Maintainable code

- Follow coding best practices and structure your project to allow for future expansions. For example, make sure functions are modular and scalable, with clear documentation where needed.

Timeline and deliverables

The candidate should complete the assignment within 3 days. For example, given the assignment on Tuesday morning, he/she should be handing it back by Thursday evening (end of business day). If a weekend occurs within the allowed 3-day timeline, an extra day will be allowed.

The candidate can use any resource deemed necessary; online documentation, tutorials, questions in forums/peers. Having said that, the final code should be developed by the candidate himself/herself. It may incorporate snippets of code found on the web, but the overall concept and bringing together of functions/callbacks should be the original work of the candidate.

Upon completion, please zip all the requested source code and compiled files and e-mail them back to your recruiter. As a next step, the candidate will be asked to demonstrate the UI during the technical interview that will be subsequently scheduled. Among the general discussion, the candidate may explain the challenges faced and the strategies chosen to deal with them. Emphasis will also be given on presenting the code architecture.

For any clarifications, you can reach out to your HR recruiter. Good luck!