



A close-up photograph of white daisies with yellow centers, growing on green grass against a bright blue sky.A photograph of a tropical beach scene, featuring large green palm fronds in the foreground, a clear blue sky, and a glimpse of a sandy beach and turquoise water in the background.

WEATHER TO GO THERE?

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A photograph of vibrant autumn leaves in shades of red, orange, and yellow, with a soft, out-of-focus background.A photograph of red berries covered in a thick layer of white snow, set against a blurred white background.



SUMMARY

Purpose:

Create a dashboard for a user to investigate U.S. weather to help determine whether to visit or move to a location in the U.S.

Data Source:

NOAA Global Surface Summary of the Day (GSOD) DB

- Over 9000 weather stations globally (2500+ U.S.)
- Daily temperature, precipitation, critical event flags

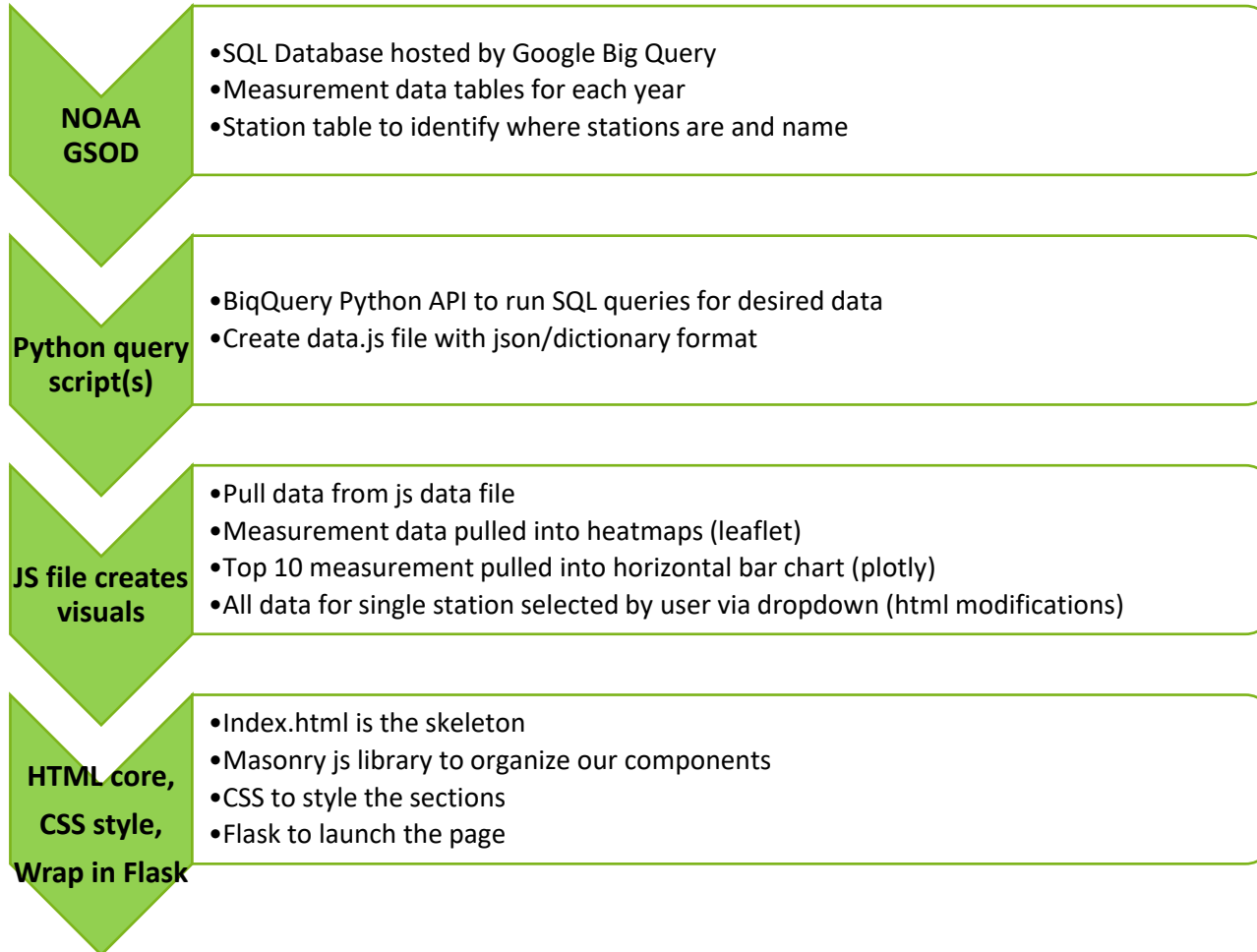
Visuals:

U.S. heat map to select with popup text for each station

Top ten stations within selected state

Station detail table for selected station

OUR APPROACH



File Structure

```
Project-3
├── static
│   ├── css
│   │   └── style.css
│   └── data
│       ├── stations_all.csv
│       ├── stations_all.js
│       └── stations_all.json
├── js
│   └── logic_heat_top10_table.js
├── py
│   ├── config.py
│   └── noaa-bigquery-scripts.ipynb
├── templates
│   └── index.html
├── .gitignore
├── app.py
└── README.md
```


DATA DEMO

Big Query IDE

Google Cloud project-3 Search (/) for resources, docs, products, and more

SANDBOX Set up billing to upgrade to the full BigQuery experience. [Learn more](#)

Explorer + ADD

Type to search

Viewing workspace resources. SHOW STARRED ONLY

project-3-400901 External connections

Untitled 13 RUN SAVE SHARE SCHEDULE MORE

```
1 WITH SnowDepthChanges AS (  
2   SELECT DISTINCT  
3     s.usaf, -- Replace 'stn' with 'usaf'  
4     g.date,  
5     MAX(g.sndp) AS max_snow_depth,  
6     CASE WHEN MAX(g.sndp) >= 6.0 THEN 1 ELSE 0 END AS saw_6_or_more_inches  
7   FROM bigquery-public-data.noaa\_gsod.gsod2022 AS g  
8   JOIN bigquery-public-data.noaa\_gsod.stations AS s ON g.stn = s.usaf  
9   WHERE s.country = 'US' AND s.state <> 'None'  
10  GROUP BY s.usaf, g.date -- Replace 'stn' with 'usaf'  
11 )  
12  
13 SELECT  
14   usaf, -- Replace 'stn' with 'usaf'  
15   SUM(CASE WHEN snow_depth_change >= 6.0 THEN 1 ELSE 0 END) AS days_with_snow_depth_change_6_or_more  
16 FROM (  
17   SELECT  
18     usaf, -- Replace 'stn' with 'usaf'  
19     date,  
20     max_snow_depth
```

Query results

JOB INFORMATION		RESULTS	JSON	EXECUTION DETAILS	CHART	PREVIEW	EXECUTION GRAPH
Row	usaf	days_with_snow_dep					
1	702310	34					
2	702615	28					
3	727790	24					
4	702350	18					
5	775446	17					

Jupyter Notebook



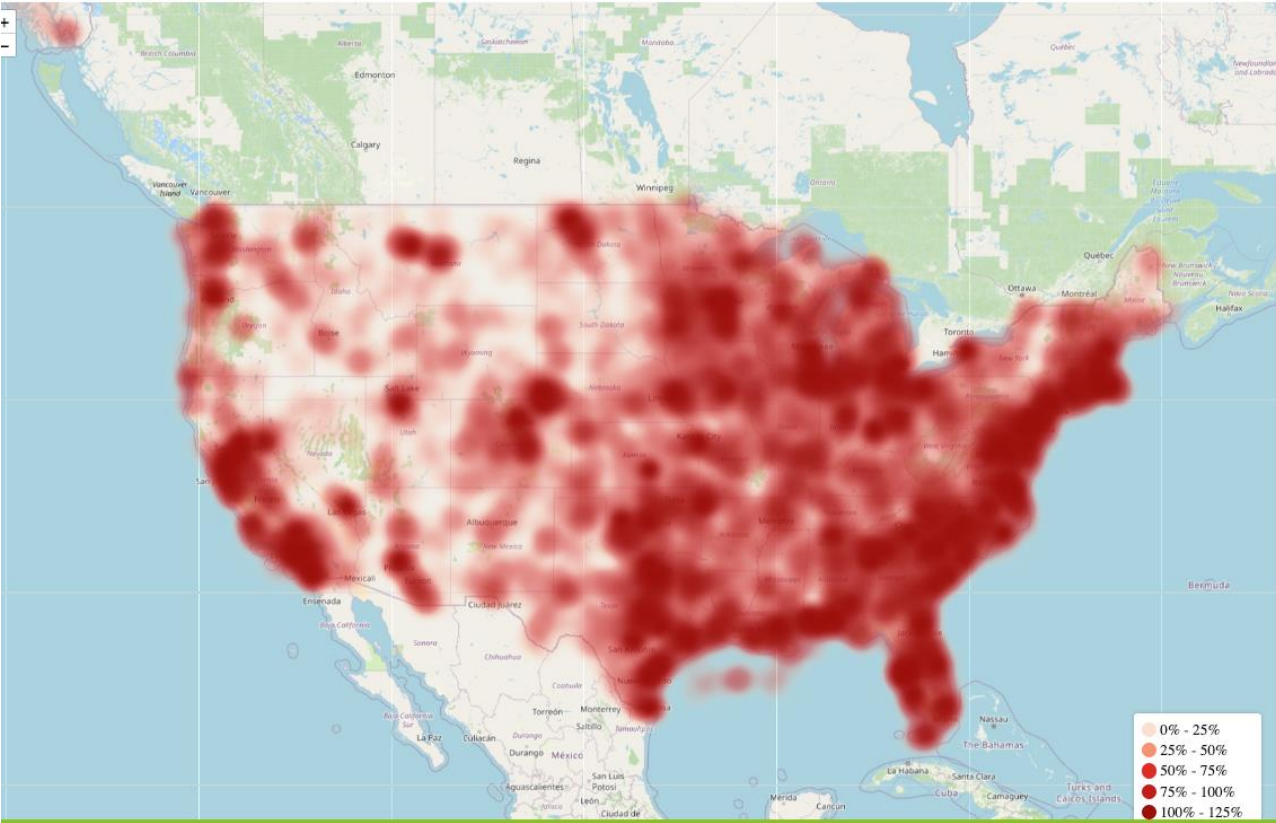
WEBSITE DEMO

Weather to Go There in the U.S.?

A brief look at 2022 weather in the U.S.

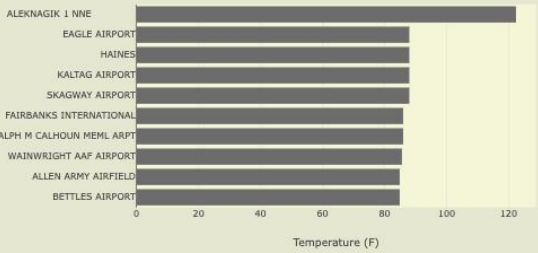
Select the weather aspect you want to review. Hover over the map to see specific values by weather station.
The Top Ten Stations chart will adapt based on the chosen weather select and the state you choose.
To dive into more detail by station, select the desired station.
Data Source: [NOAA Global Surface Summary of the Day \(GSOD\)](#)

Hottest ▾



Select a State: AK ▾

Top 10 Stations by Selected State & Weather Condition



Select a Station: AK: ADAK (NAS) ▾

2022 Summary: 704540 ADAK (NAS) , AK	
Absolute Min Temp (°F)	12.9
Mean Temp (°F)	41.9574175824
Absolute Max Temp (°F)	69.1
Total Snow	0
Total Precipitation	46.22
Days with Hail	0
Days with Tornado(s)	0



DATA & VISUALS LESSON LEARNED

- Documentation is good but... never perfect
- Understand how to fact check the data to validate query results
- Craft your queries carefully...
 - 2.7+ million rows with 1.8+ million duplicates!
- Heatmap – colors not as expected



JS, HTML, CSS LESSONS LEARNED

- Learning so many languages in quick succession is hard!
- Integration!
 - Being on the same page / syntax familiarity
 - It worked outside Flask, what happened?!?
 - Use multiple logic.js files but...
- Learning a new library
 - Defining this before doing HTML & JS
 - experiment... experiment...

FUTURE FEATURES?

- State summary table for the year: temperature summary across stations (absolute min, absolute max, mean temp, standard deviation, quartiles in laymen terms)
- Station statistics: quartiles in laymen terms
- Station table update when click on heatmap stations
- Add more years / another option

Thinking big

- Split out by month or season
- Go beyond the U.S.
- Update real-time: e.g. last 12 months
- Add earthquake data (separate data set)



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NOAA GSOD LINKS

- NOAA's base page: <https://data.noaa.gov/dataset/dataset/global-surface-summary-of-the-day-gsod>
 - Further documentation (including Readme):
<https://www.ncei.noaa.gov/metadata/geoportal/rest/metadata/item/gov.noaa.ncdc%3AC00516/html#>
- Google's link (option to do SQL query on-line with free trial...):
<https://console.cloud.google.com/marketplace/product/noaa-public/gsod?pli=1>
- kaggle link with some helpful info (including example code to access Kaggle dataset using python and SQL (usually jupyter notebooks):
<https://www.kaggle.com/datasets/noaa/gsod>