Bomb Squad: Andy Shyklo, Abidur Rahman, Mark Ma, Tawab Berri
SoftDev
P01
2024-12-16
TARGET SHIP DATE: 2024-12-17

FINAL - VERSION 2

Overview

We are making our spinoff of Google's Santa Tracker, except we are "tracking" the one and only Topher Mykolyk as he travels around the world on his motorbike and delivers presents to worthy devos. We will write an algorithm that calculates the likelihood of countries that Topher visits on each day, based on several factors such as holidays, population, date, etc. We will incorporate visual elements such as a calendar of celebrated holidays all around the world, a map of where topher is on each day, and an algorithm to predict where Topher is most likely to be.

APIS (Usages are discussed in Program Components):

GeoDB Cities - Everything countries & cities
Abstract - Calendar and holidays information, also has features for phones and emails (not used)
Unsplash - Stock images based on searches that offer many parameters

Program Components:

- Home Page
    1. A map of the world and a pin where topher is on the selected day. The **GeoDB Cities** API will be useful in determining the longitude/latitude of Topher's location.
    2. The ability to switch to dates in the future / in the past.
    3. Important holidays that are ongoing in the country
    4. Image relating to the country Topher is at.
- Calendar Page
    1. Use the datetime module, create a calendar for each day and are able to switch months. Once clicked on a date, it will take you to the page where the prediction is made on that day.
    2. We will also have 2 error pages, just to make things clearer.
- Algorithm for predicting Topher's location
    1. Assign a score for each country in the world.
    2. Use the following factor to calculate the score of the country for each day. Each factor should be assigned its own weight:
        - Log of the population of the country. Uses the **GeoDB Cities** API.
        - Ongoing holidays in the country. Uses the amount of holidays times the log population.
        - Uses weighted probabilities to better ensure that high population countries aren't chosen all the time.

➔ Database and API

- ◆ We will use databases and the APIs to fetch data and store it.
- ◆ We will try to store as much information locally so that minimal API calls need to be made.

Bomb Squad: Andy Shyklo, Abidur Rahman, Mark Ma, Tawab Berri
SoftDev
P01
2024-12-16
TARGET SHIP DATE: 2024-12-17

Program Component Connections:

- Routes + Python: Allow users to navigate the website, connecting the different pages. Python handles data retrieval from APIs, processes predictions for Topher's location, and renders dynamic content in HTML templates. It manages user inputs (e.g., date or location selection) and sends appropriate data to the frontend.
- Databases: For all information that we can handle through static data, we will input it into SQL Databases. Otherwise, we will make a call to each API when needed. Our GeoDB API is not referenced anymore, since we converted all information into an SQL database.
- Templates: Allow for dynamic web pages. Templates update in real-time to display Topher's current and predicted locations, relevant holidays, and weather information.
- Javascript and APIs: Minimal use of Javascript would allow our frontend frameworks to run properly as well as giving more flexibility in styling the website. This is especially useful for our map.

Database Organization:

- Our API Database will have data that we take from the APIs in general. This will allow us to quickly refer back to data that we have saved in order to not make extra calls to the APIs, which would waste our daily/monthly calls. We will have holiday information, cities/regions/countries information, and images. Our GeoDB API is kept within an SQL Database, with only major cities greater than 1 million people listed.
- We will also have a database for the locations of Topher Mykolyk. This database will be the result of our algorithm, and will consist of a table for “Total Locations”. The Total locations table stores Topher's location by date, along with the data for that location and the holidays in that region/country, all of which will be factored into his location algorithm. This ensures that when a date is accessed again, Topher’s location can be retrieved without recalculating it. Along with this algorithm, we added on an image that Topher took (an image searched by the name of the city/country) in the place that he is visiting using the Unsplash API.

Bomb Squad: Andy Shyklo, Abidur Rahman, Mark Ma, Tawab Berri
SoftDev
P01
2024-12-16
TARGET SHIP DATE: 2024-12-17

API Output Map/SQL Database:

API Data stored in SQL Databases:

GeoDB Cities API
And
GeoDB Database

ID	Geoid	Type	City	Region	Region Code	Country	Country Code	Latitude	Longitude	Minimum Population
123	1223	City	NYC	New York	NY	US	US	40.736419	-73.982108	8250000
321	12333	ADM2	Chicago	Illinois	IL	US	US	41.867084	-87.644825	2664000

Unsplash Image API

Query	Image	Image Description	Image Author
NYC	https://…	Fluffy	John
Chicago	https://…	Fuzzy	Jerm

Holiday	Description	Region (optional)	Country	Year	Month	Day
Martin Luther King Jr. Day	Honors American Civil Rights Activist Martin Luther King Jr.		U.S.	2024	January	15
New Years Day	Celebrates the first day of the year		U.S.	2025	January	1

Abstract Holiday API

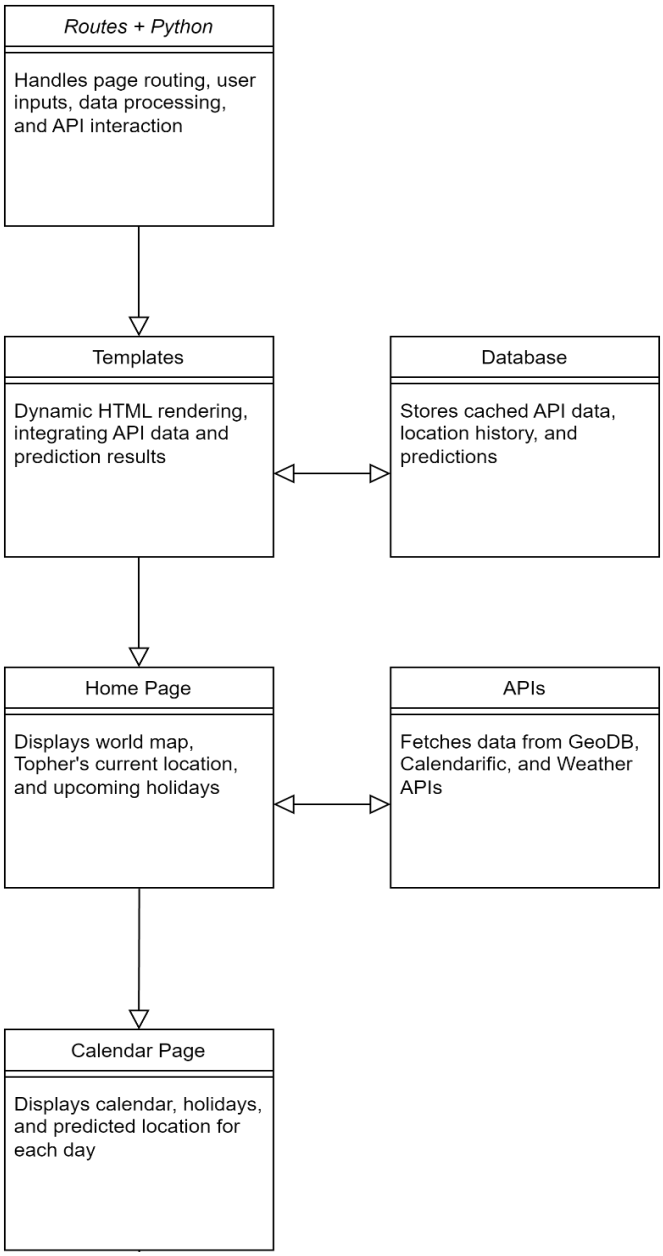
Location Data stored in SQL Database:

ID	Geoid	Type	City	Region	Region Code	Country	Country Code	Latitude	Longitude	Minimum Population	Score	Total Score
123	1223	City	NYC	New York	NY	US	US	40.736419	-73.982108	8250000	100	1000
321	12333	ADM2	Chicago	Illinois	IL	US	US	41.867084	-87.644825	2664000	50	1000

Country Population	Year	Month	Day	Number of Holidays	Holidays	Holidays Description	Image	Image Description	Image Author
320000000	2024	12	15	1	[Selection of Holiday API items]	[Descriptions of holidays]	url	Sunset	James
320000000	2024	12	31	2	[Selection of Holiday API items]	[Descriptions of holidays]	url	Skyscrapers	Joe

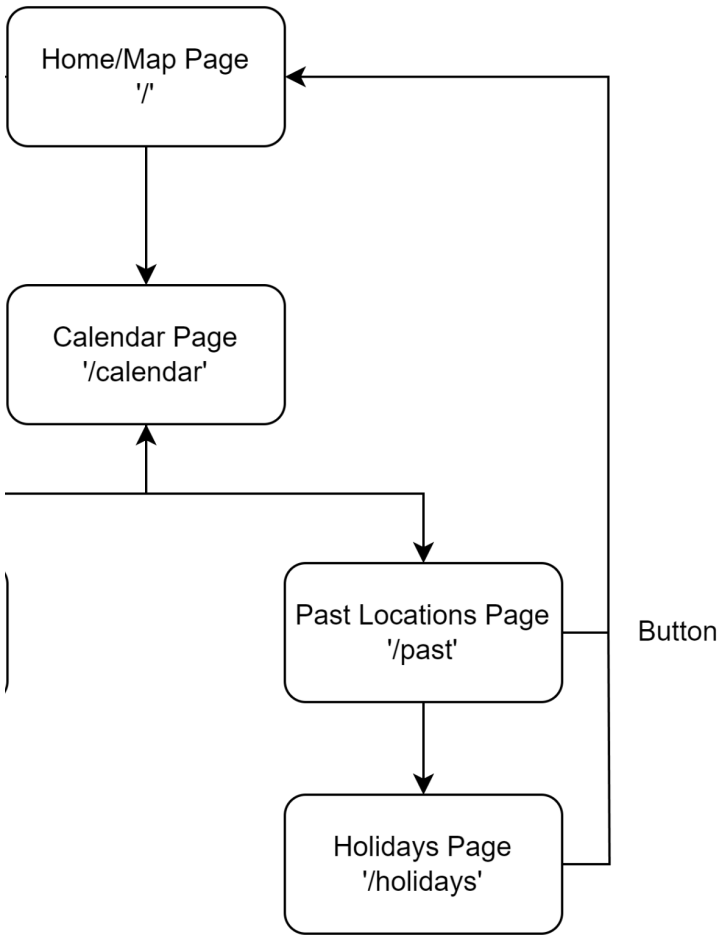
Bomb Squad: Andy Shyklo, Abidur Rahman, Mark Ma, Tawab Berri
SoftDev
P01
2024-12-16
TARGET SHIP DATE: 2024-12-17

Component Map:



Bomb Squad: Andy Shyklo, Abidur Rahman, Mark Ma, Tawab Berri
SoftDev
P01
2024-12-16
TARGET SHIP DATE: 2024-12-17

Site Map:



Bomb Squad: Andy Shyklo, Abidur Rahman, Mark Ma, Tawab Berri
SoftDev
P01
2024-12-16
TARGET SHIP DATE: 2024-12-17

Task Breakdown:

- Andy
    - Oversees the project and assists other members in their tasks.
    - Organizes the overall structure and ensures the team stays on track with deadlines.
    - Stores and Filters data from the GeoDB Cities API to meet demands made by other APIs.
    - Oversees general relations between APIs and Databases, especially with Abstract API (resource-intensive). Also, integrating frontend with backend methods.
- Mark
    - Develops the Home Page:
    - Integrates the map to display Topher's location using GeoDB Cities API.
    - Adds the ability to switch between past/future dates.
    - Displays predicted locations for the next day, sorted by probability.
- Tawab
    - Implements Backend/Database functionality:
    - Facilitates storing dates and Topher's previous locations in SQLite databases.
    - Works on the algorithm to calculate Topher’s likely next location based on factors like population, holidays, weather, and previous locations.
- Abidur
    - Develops the Calendar Page and Weather Page.
    - Creates the interface for displaying holidays, weather, and Topher's likely next locations for each day.
    - Integrates the Unsplash API to show data for images
    - Implements the National Weather Service API to display weather for a specific location.

Front-end Framework

We will use Tailwind as our Front-end Framework. Given the nature of our app, users will constantly access it on the go through a variety of devices. Tailwind's responsive design ('sm', 'md', 'lg', 'xl', '2xl') will help ensure that pages such as the Calendar Page work seamlessly on both desktop and mobile screens, as well as large and small devices in general.