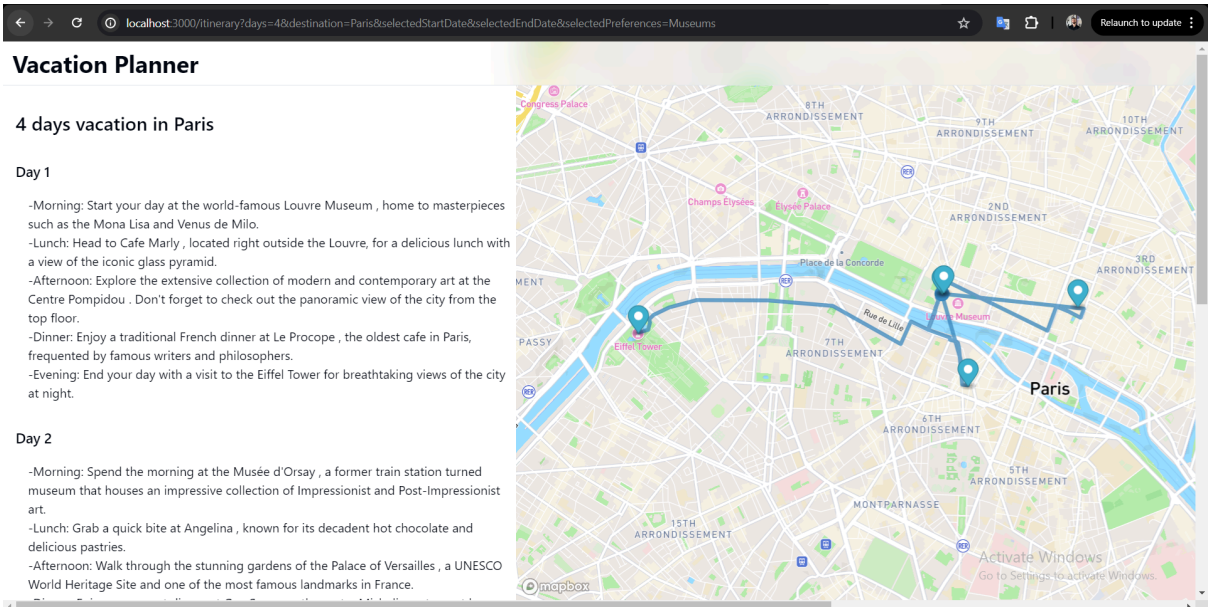
Generating Maps with custom routes

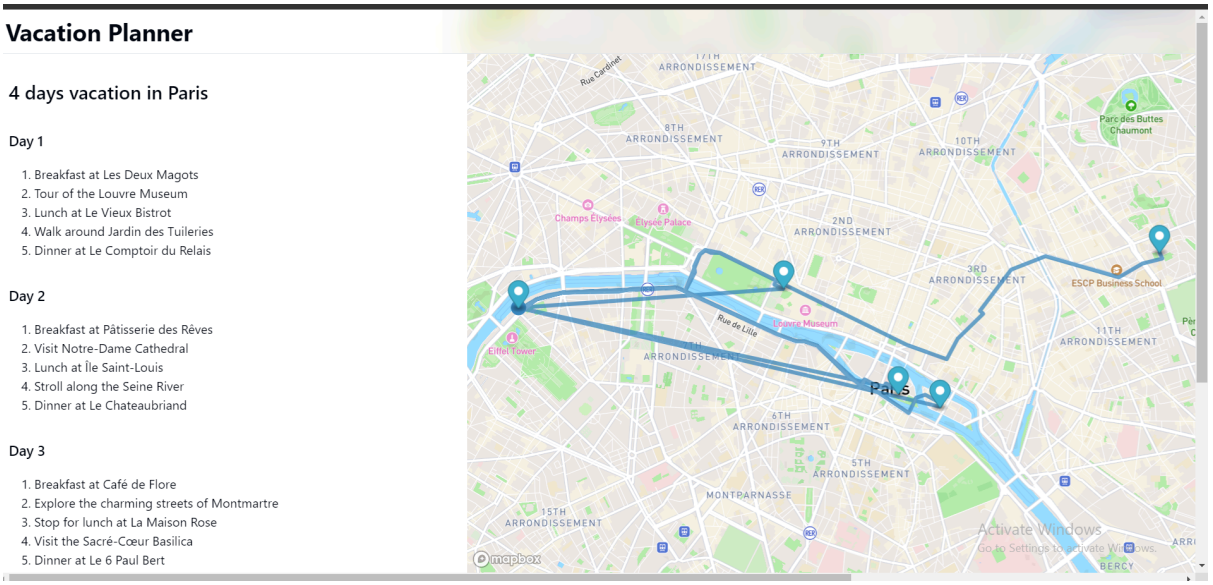
https://github.com/ViktorVelizarov/vacation-planner/tree/MapGenerator

Intro

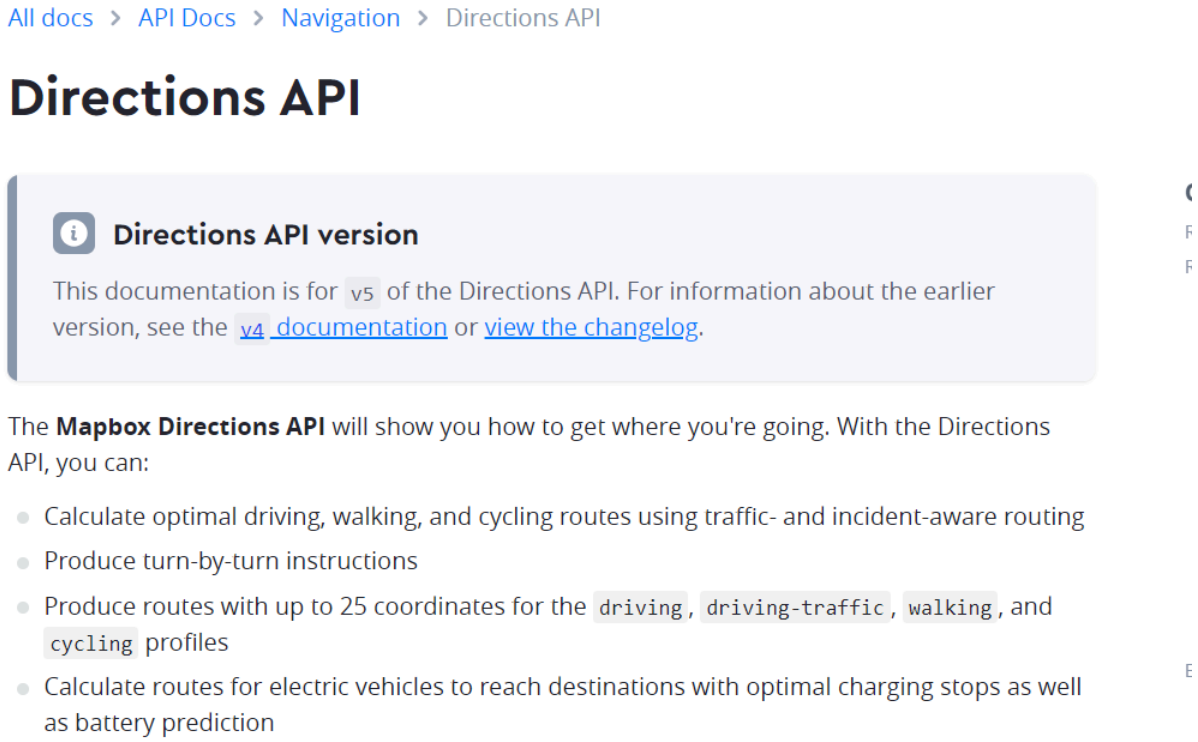
This is a feature of my personal project that I worked on during Sprint 3. I implemented generated maps in the application that show the route a user needs to take for each day of their vacation based on the vacation plan that the app generates. The idea of this map feature is to help the user visualize their custom vacation better and help with the planning process. This is what the feature looks like(ignore the design part, for now, I am just trying to show its functionality):



Right now Day 1 is clicked, so it only shows the route for the 4 destinations related to Day1's plan. If the user clicks another day, then the route for that day will show up:



I use the **Mapbox** Collection of Web APIs which provide customizable maps for the web. In my case, I use their **Directions API** which lets me display a route from a set of predefined coordinates on a map:



I render the map in the **MapWithMarkers.vue** component by using the **mapbox-gl** JS library, which happens in the following steps:

- First, when the component mounts, I create a map object which is basically just a map without any routes or markers on it:

```
mounted() {
  const map = new mapboxgl.Map({  //create a map object from the Mapbox API
    container: 'map',
    style: 'mapbox://styles/mapbox/streets-v12',
    center: this.coordinatesArray[0], // Set center as the first coordinate
    zoom: 12
  });
```

- Then after the map loads I call this function which creates a route connecting all coordinates passed as parameters to it. This is where I use the Directions API I mentioned earlier to get a route.

```
map.on('load', () => {
  getRoute(this.coordinatesArray.slice(0));
```

```
async function getRoute(ends) {
  let routeCoordinates = [];
  for (const end of ends) {
    // make a directions request using cycling profile
    const query = await fetch(
      `https://api.mapbox.com/directions/v5/mapbox/cycling/${start[0]},${start[1]};${end[0]},${end[1]}?steps
      { method: 'GET' }
    );
    const json = await query.json();
    const data = json.routes[0];
    routeCoordinates.push(...data.geometry.coordinates);
  }
```

- Also in this function I add a marker on the map for each coordinate, which is just a visual representation of that coordinate and I can use it later to make it so for example when you click on the coordinate you get a popup with more info about it:

```
coordinates.forEach(coord => {
  new mapboxgl.Marker()
    .setLngLat(coord)
    .addTo(map)
    .setPopup(new mapboxgl.Popup().setHTML(`<h3>${coord[0]}, ${coord[1]}</h3>`));
});
```

To get the coordinates of each destination for each different day in the generated vacation plans I changed the AI generative prompt a little bit:

```
promptText += preferencesText;
promptText += '. Also at the end of each day can you provide the provide the coordinates'
 '[longtitude FIRST,then latitude] for each destination, example: Eiffel Tower [2.2945, 48.8584].'
  'Put the cooridnates in [] and separate them by ,';
```

Which turned the generated vacation plan text into this:

```
Day 1:
- Rijksmuseum: A must-see for art lovers, with a collection of over 8,000 Dutch masterpieces [4.8855, 52.3592]
- Van Gogh Museum: Admire the works of the famous Dutch artist, including "Sunflowers" and "The Bedroom" [4.8792, 52.3585]
- Anne Frank House: Learn about the life of Anne Frank and her family during the Nazi occupation [4.8843, 52.3752]
- Restaurant Greetje: Enjoy traditional Dutch cuisine in a cozy atmosphere [4.9040, 52.3734]

Day 2:
- Stedelijk Museum: Discover contemporary and modern art in this impressive museum [4.8798, 52.3584]
- Jordaan: Stroll through the charming neighborhood and admire the beautiful canals [4.8742, 52.3767]
- Heineken Experience: Learn about the history of the famous beer and enjoy a tasting [4.8918, 52.3578]
- Foodhallen: Taste a variety of delicious dishes from local vendors in this indoor food market [4.8663, 52.3639]

Day 3:
- Van Gogh's Studio: Visit the house where Van Gogh lived and worked during his time in Amsterdam [4.8857, 52.3529]
- Hermitage Amsterdam: See rotating exhibitions of art and artifacts from the renowned Hermitage Museum in St. Petersburg [4.9122, 52.3643]
- Vondelpark: Relax in the largest park in Amsterdam and check out the open-air theater [4.8666, 52.3582]
- De Kaaskamer: Sample and purchase various types of Dutch cheese at this local cheese shop [4.8925, 52.3748]
```

Then I extract the coordinates from the text and save them in a separate variable, which is then sent to the **MapWithMarkers.vue** component.

```
this.itinerary = daysArray.map(day => {
  const matches = day.match(coordinatesRegex);
  const coordinates = matches ? matches.map(match => {
    const [latitude, longitude] = match.replace(/[\[\]]/g, '').split(',').map(parseFloat);
    return [latitude, longitude];
  }) : [];
  const activities = day.replace(coordinatesRegex, '').trim().split('\n');
  return { activities, coordinates };
});
```

More things I would like to do with the Maps:

- Find a way to optimize every route so it's the most efficient way to visit all destinations/coordinates for a given day
- Add a popup with more information about a destination/coordinate that shows up when you click its marker on the map
- Improve the design of the page