Travel Assistant with Parking Planner

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Motivation

- There are already numerous well-functional websites that can help us find a place to go.
- However, from our previous experiences, we found it annoying to search again and again if there are many places we want to go.
- Also, finding a parking lot is nightmare in a city and it might be very far to walk to our destination.
- Therefore, we designed an web application that integrates **attraction/parking lot search** with **travel time estimation** and automatically schedules a recommend **travel itinerary**.

Target Users

- Those who are new to a place and want to take a quick look at the most famous tourist attractions without **wasting time searching** online.
- Those who rent a car in a city and worry about **finding a parking lot**.
- Those who feel annoying **using multiple apps** to search for attractions, restaurants, and parking lots.
- Those who want to get a **travel schedule** and **estimate traffic time** in advance instead of frequently finding the next stop.

To avoid killing the joy of traveling, all the concerns mentioned above should be (and can be) perfectly taken cared by a single application intuitively!

Methodology

We designed a web application to help tourists find a perfect travel plan:

- Front-end (Yingqiong):
    a. Display **forms** for users to indicate their preference.
    b. Send **queries** to backend.
    c. Show **routes** detail on the map with **GoogleMaps API**.
- Back-end (Ting-Yu):
    a. Implement **attraction/parking finding** logic and **route planning** algorithm.
    b. Based on user preference to get a set of tourist attractions with **Yelp API**.
    c. Find **parking lots** for each attractions with **Google Place API**.
    d. Calculate **best route** and **travel time** with **Google Distance Matrix API**.
- Database (Ting-Yu)
    a. Store pre-specified attractions
    b. Store category lists

Tools and Technologies

- Front-end: reactJS, Material-UI, Bootstrap
- Back-end: nodeJS, Express
- Database: MongoDB
- API: Google (Place, Distance Matrix, Maps, Geolocation), Yelp Fusion
- Web Server: Heroku
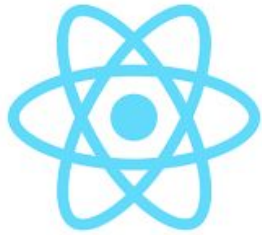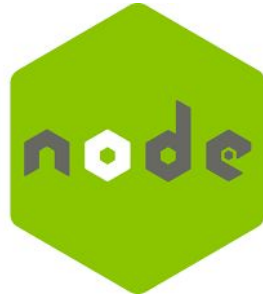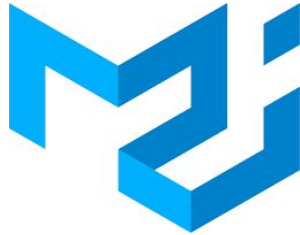
Two Searching Mode

1. Auto attraction search

   Based on user-indicated categories and current location, find several attraction groups.
   - User is **open to explore** any attractions.
   - Automatically find attractions based on user-indicated categories and current location.
   - Return a traveling route between attractions with parking information and traveling time.

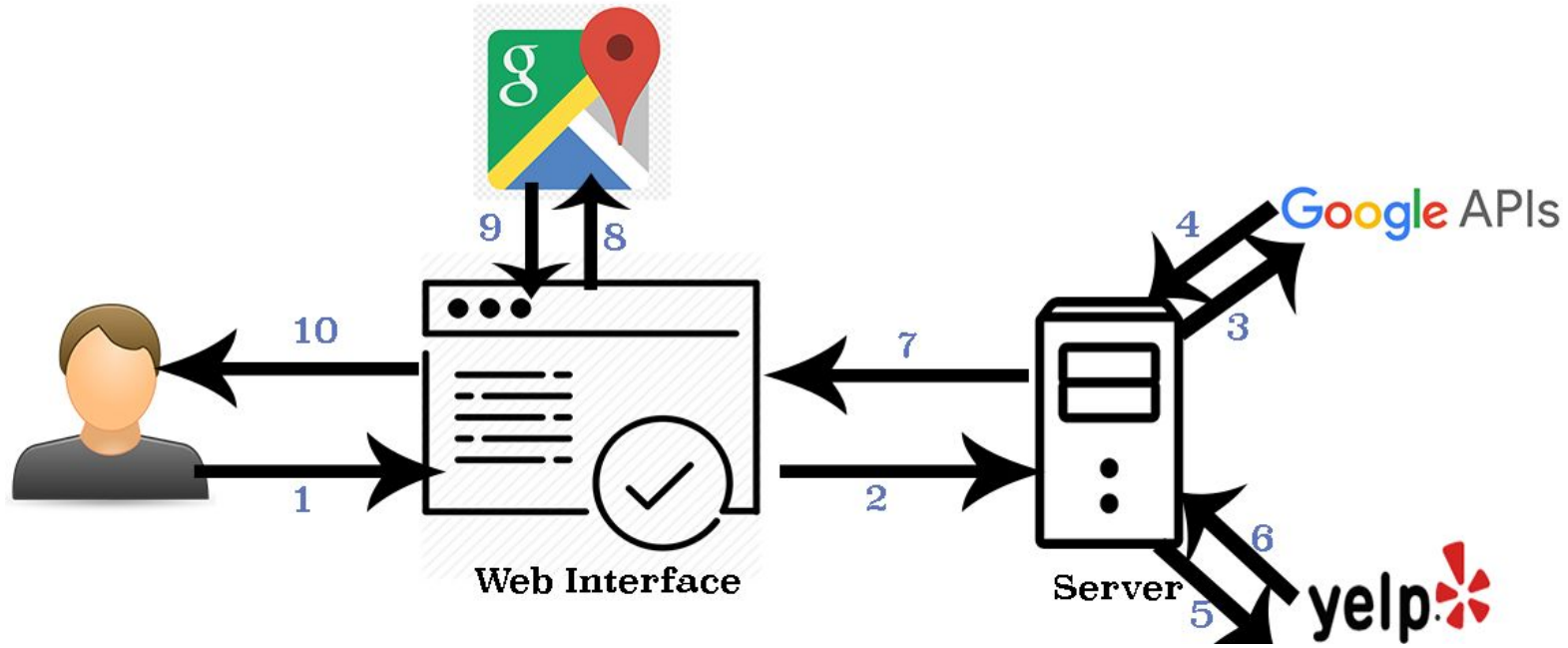2. Specified attraction search

   Based on user-indicated attractions and current location, find a best travel-parking plan.
   - User wants to indicate **specific places** to visit with parking information.
   - Automatically find parking lots for each attraction that user want to visit.
   - Return a traveling route between attractions with parking information and traveling time.

Application Logic (Data Preprocess)

Preprocessed Data:
Attraction Category List &
Famous Attractions List
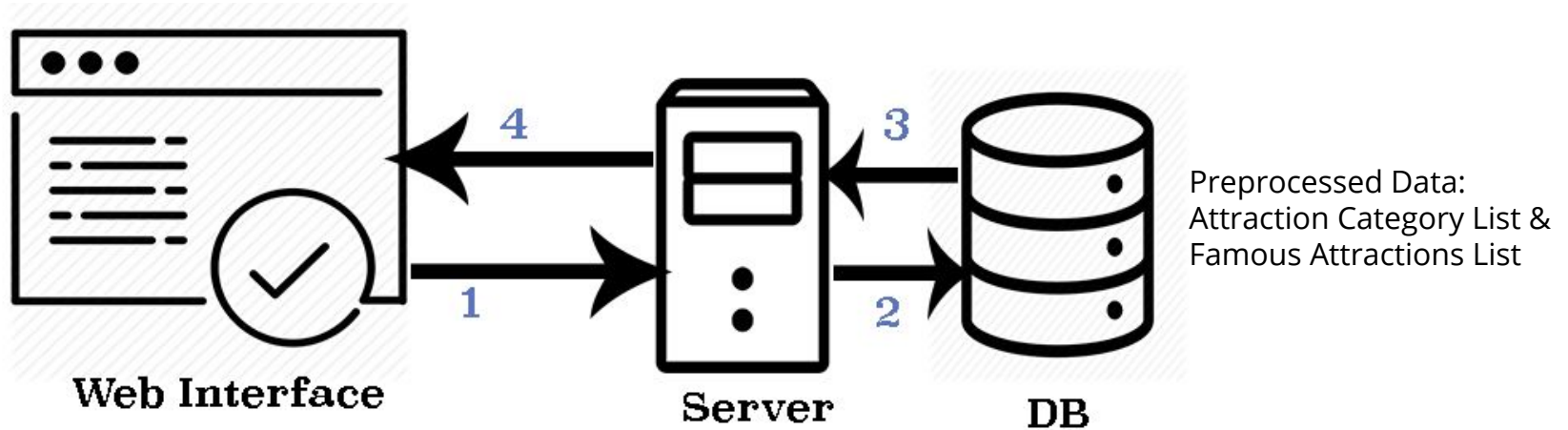
Application Logic (After Form Submission)

Front-End Features

- Form for Auto Attraction Search
- Form for Specified Attraction Search
- Overview of routes between groups/current location
- Driving route between groups/current location
- Attractions & parking for each group
- Walking route between attractions/parking
- Single attraction view

Form for Auto Attraction Search

Auto Attraction Search

Attraction Type 1

| Select Attraction Type | ⏷ |

Attraction Type 2

| Select Attraction Type | ⏷ |

Attraction Type 3

| Select Attraction Type | ⏷ |

Parking Number

| Select number of parkings | ⏷ |

Submit   Clear

Form for Specified Attraction Search

Specified Attraction Search

Famous Attractions

☐ Pier 39

☐ Golden Gate Bridge

☐ San Francisco Botanical Garden

☐ Fort Point

☐ Fisherman's Wharf

☐ Golden Gate Park

☐ Union Square

☐ Lombard Street

☐ San Francisco Chinatown

☐ Coit Tower

☐ The Presidio

☐ Palace Of Fine Arts

☐ Twin Peaks

☐ California Academy of Sciences

☐ North Beach

☐ San Francisco Museum of Modern Art

☐ Japanese Tea Garden

☐ San Francisco City Hall

☐ The Castro District

☐ San Francisco Museum of Modern Art

Submit

Overview of routes between groups/current location
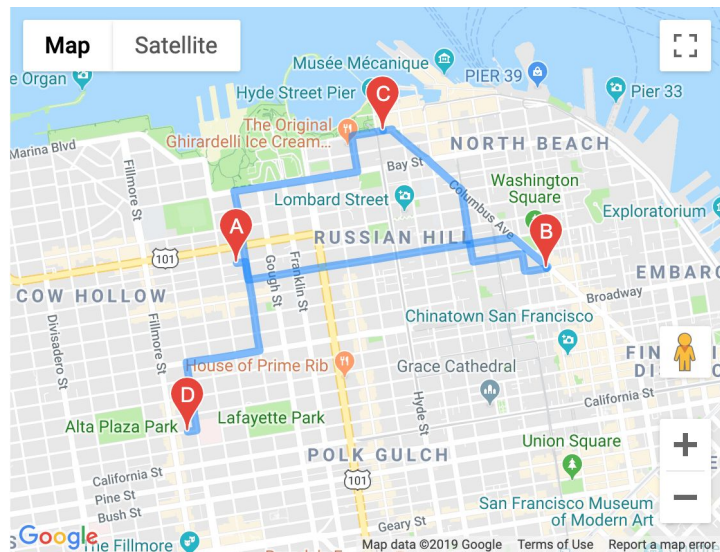
OVERVIEW
(total transit time between groups: 26 mins, total atraction number: 25)

📍 Current Location

🚗 Current Location to Group 1 (8 mins)

📍 Attractions Group 1

🚗 Attractions Group 1 to Attractions Group 2 (7 mins)

📍 Attractions Group 2

🚗 Attractions Group 2 to Attractions Group 3 (10 mins)

📍 Attractions Group 3

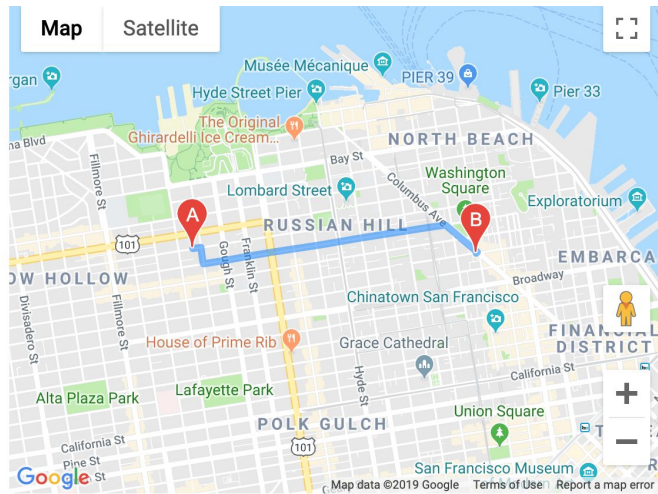total driving time between groups of attractions/current location

total number of attractions in all the groups

Ⓐ 1832 Greenwich St, San Francisco, CA 94123, USA

1.3 mi. About 8 mins

1. Head **east** on **Greenwich St** toward **Octavia St**   187 ft

2. Turn **right** at the 1st cross street onto **Octavia St**   344 ft

3. Turn **left** at the 1st cross street onto **Filbert St**   1.0 mi

4. Turn **right** onto **Columbus Ave**

detailed routing information

Driving route between groups/current location

OVERVIEW
(total transit time between groups: 26 mins, total atraction number: 25)

📍 Current Location

🚗 Current Location to Group 1 (8 mins)

📍 Attractions Group 1 ⌄

🚗 Attractions Group 1 to Attractions Group 2 (7 mins)
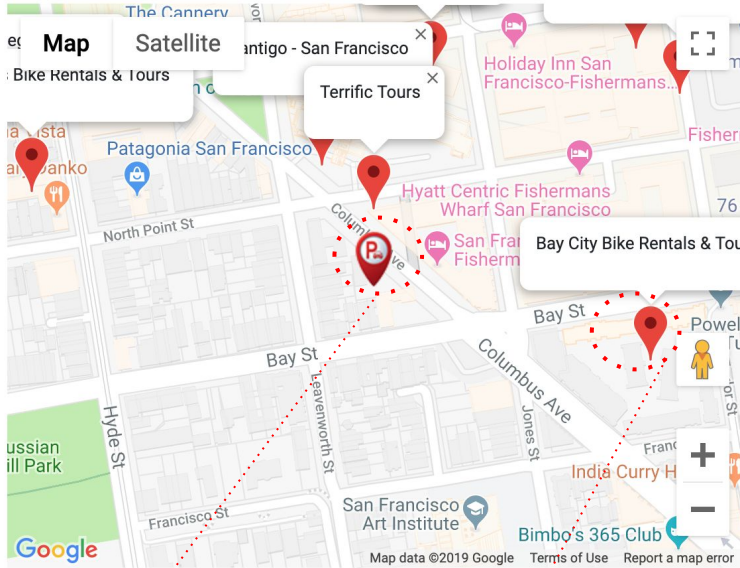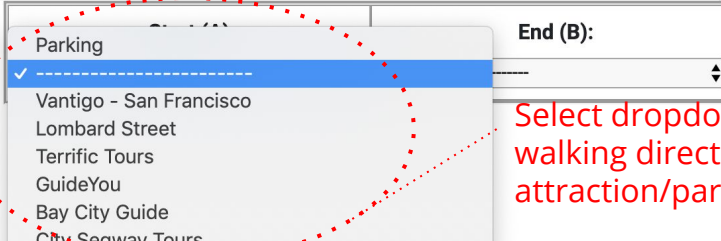
📍 Attractions Group 2 ⌄

🚗 Attractions Group 2 to Attractions Group 3 (10 mins)

📍 Attractions Group 3 ⌄

select route from current location to the parking of 1st groups of attractions

Ⓐ 1832 Greenwich St, San Francisco, CA 94123, USA.

1.3 mi. About 8 mins

1. Head **east** on **Greenwich St** toward **Octavia St**   187 ft

↱ 2. Turn **right** at the 1st cross street onto **Octavia St**   344 ft

↰ 3. Turn **left** at the 1st cross street onto **Filbert St**   1.0 mi

↱ 4. Turn **right** onto **Columbus Ave**   0.2 mi

↱ 5. Turn **right** onto **Beach Blanket Babylon Blvd/Green St** 33 ft
Destination will be on the left.

detailed routing information

Attractions & parking for each group

Parking of Group 1

An attraction in Group 1

Select dropdown list to show walking directions between attraction/parking

Walking route between attractions/parking

OVERVIEW
(total transit time between groups: 38 mins, total atraction number: 21)
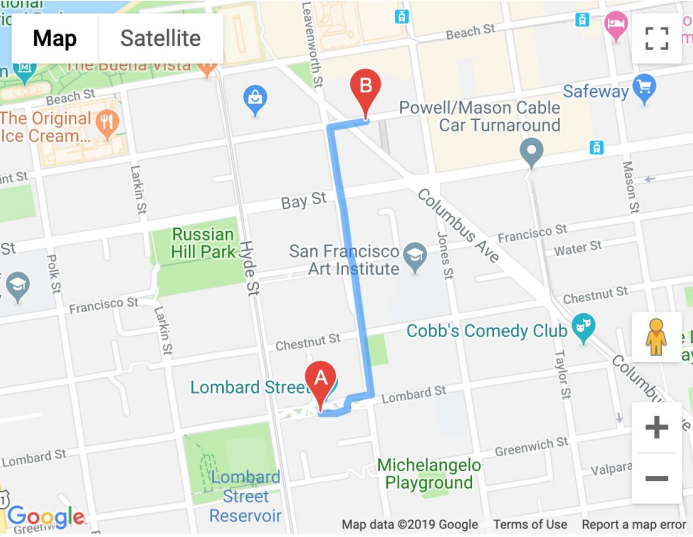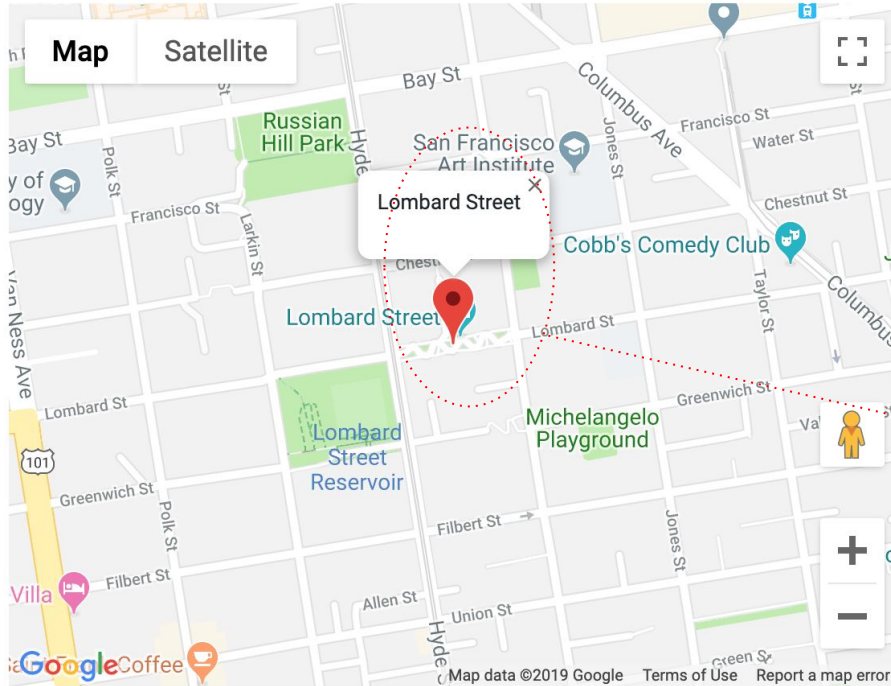
📍 Current Location

🚗 Current Location to Group 1 (6 mins)

📍 Attractions Group 1 ⌃

👤 Vantigo - San Francisco

👤 Lombard Street

👤 Terrific Tours

👤 GuideYou

👤 Bay City Guide

Start (A):	End (B):
Lombard Street	Terrific Tours

Map Satellite

Walking directions are in beta. Use caution – This route may be missing sidewalks or pedestrian paths.

Ⓐ 1037 Lombard St, San Francisco, CA 94109, USA

0.3 mi. About 8 mins

1. Head **east** — 131 ft
   Take the stairs

detailed walking routing information for selected start and end
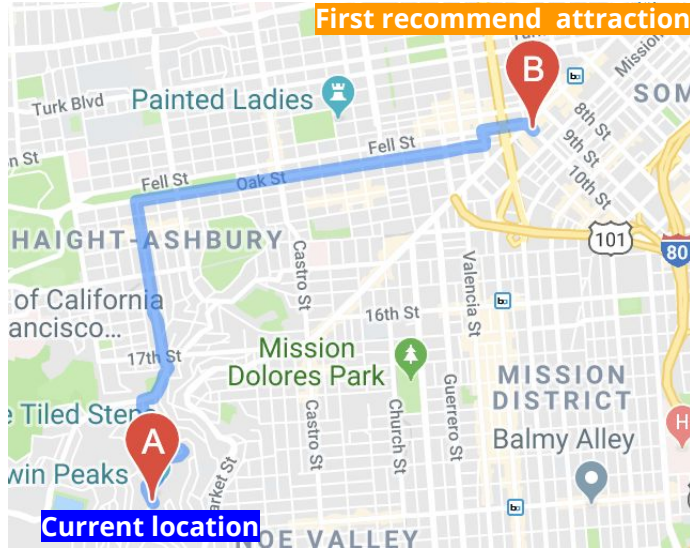
Single attraction view

Back-End Implementations

- Auto Attraction Search
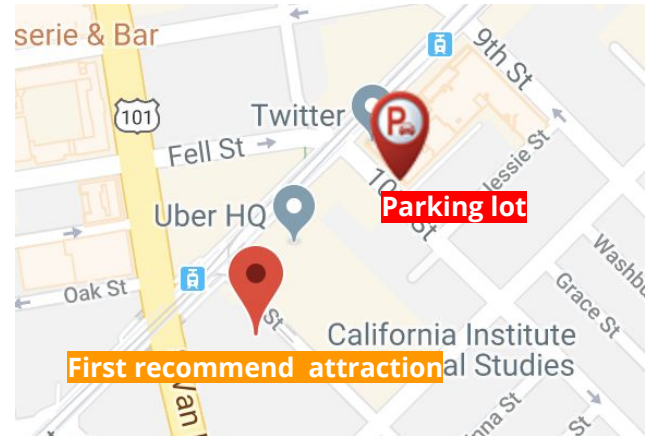- Specified Attraction Search

Part1: Auto Attraction Search (Detail)

Based on user-indicated **categories** and current location, find several **attraction groups**.

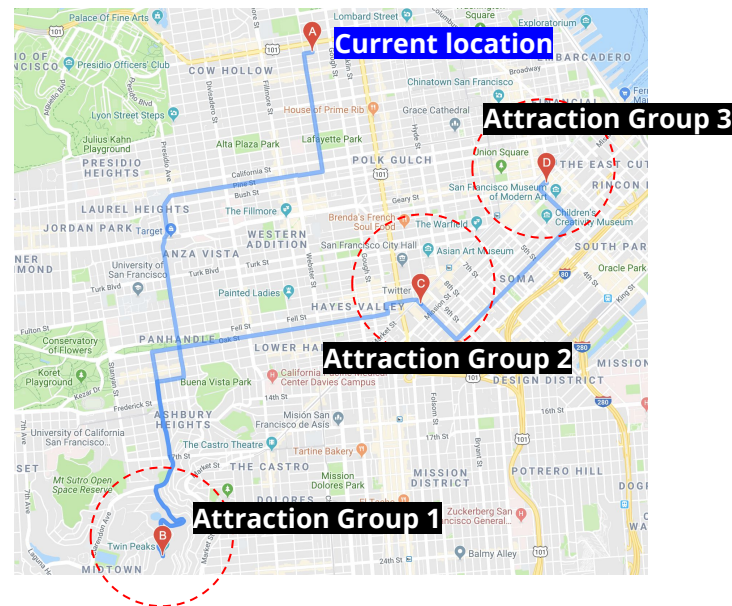1. Find a most recommended attraction using Yelp API

First recommend attraction

Current location

2. Find a parking lot near the attraction using Google Place API

Parking lot

First recommend attraction

Part1: Auto Attraction Search (Detail)

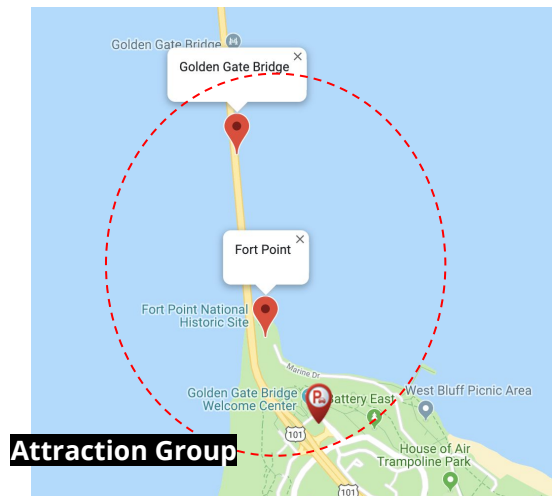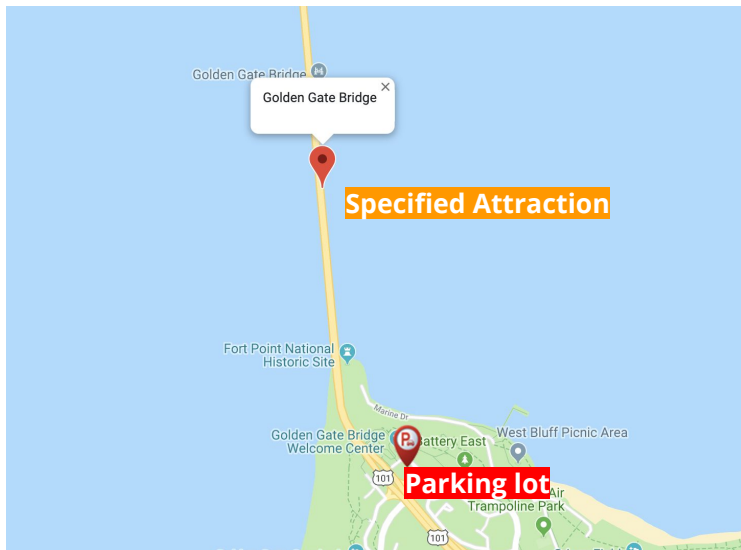Based on user-indicated categories and current location, find several **attraction groups**.

3. Centered at the parking lot, search other close attractions to be an attraction group using Yelp API again.

4. Return a route that connects all attraction groups and parking lots with travel time using Google distance matrix API.

Near attractions

500m (walking distance)

Parking lot

First recommend attraction

Attraction Group 1

Current location

Attraction Group 3

Attraction Group 2

Attraction Group 1

Part2: Specified Attraction Search (Detail)

Based on user-indicated **attractions** and current location, find a best **travel-parking plan**.

1. Find a nearest parking lot for each attraction using Google Place API

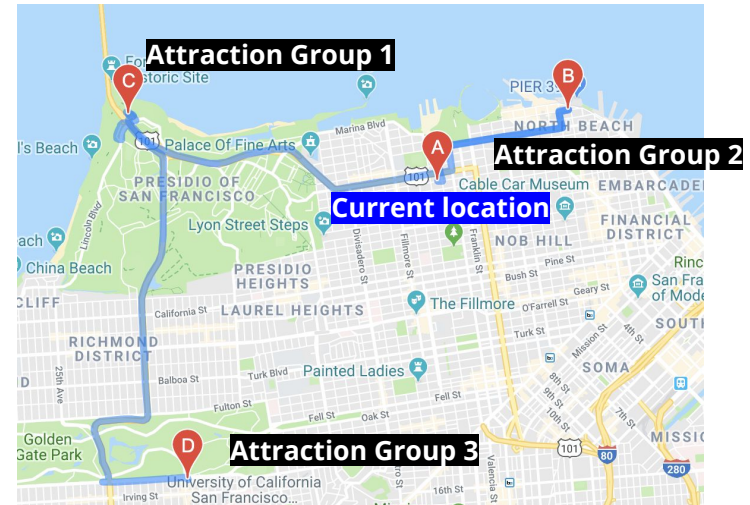2. Group attractions if they are with a same parking lot.

Part2: Specified Attraction Search (Detail)

Based on user-indicated **attractions** and current location, find a best **travel-parking plan**.

3. Calculate an order to visit each attraction based on the distance.

4. Return a route that connects all attraction groups and parking lots with travel time using Google distance matrix API.


```
travel to:
Pier 39
1884.7811774180132(m)
travel to:
Golden Gate Bridge
5575.295440111965(m)
travel to:
San Francisco Botanical Garden
4686.158166719054(m)
```

DEMO

https://cs6365final-frontend.herokuapp.com/