



**Motilal Nehru National Institute of Technology, Allahabad**

# Hitch-Hike-2.0 : A Carpooling App

A smarter way to commute

PRESENTED BY:-

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HITCH-HIKE 2.0:  
A CARPOOLING APP

# What is Carpooling?

Multiple people sharing a single ride.





HITCH-HIKE 2.0:  
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# Why Carpooling?

In 2024, the number of cars in the world has grown to 1.475 billion.

| Country rank | World rank ▲ | City      | Average travel time per 10 km ▼ | Change from 2022 ▼ | Time in rush hour per year |
|--------------|--------------|-----------|---------------------------------|--------------------|----------------------------|
| 1            | 6            | Bengaluru | 28 min                          | - 1 min            | 257 hours →                |
| 2            | 7            | Pune      | 28 min                          | + 30 s             | 256 hours →                |
| 3            | 44           | New Delhi | 22 min                          | - 30 s             | 191 hours →                |
| 4            | 54           | Mumbai    | 21 min                          | + 10 s             | 198 hours →                |

## Mumbai



Travel time  
(yearly)

**198<sup>h</sup>**

time spent driving

92h due to congestion

39 x

Approximately 39 books



Emissions  
(yearly)

**1004<sup>kg</sup>**

CO<sub>2</sub> emitted

313 kg due to congestion

100 x

100 trees grown over a year to absorb

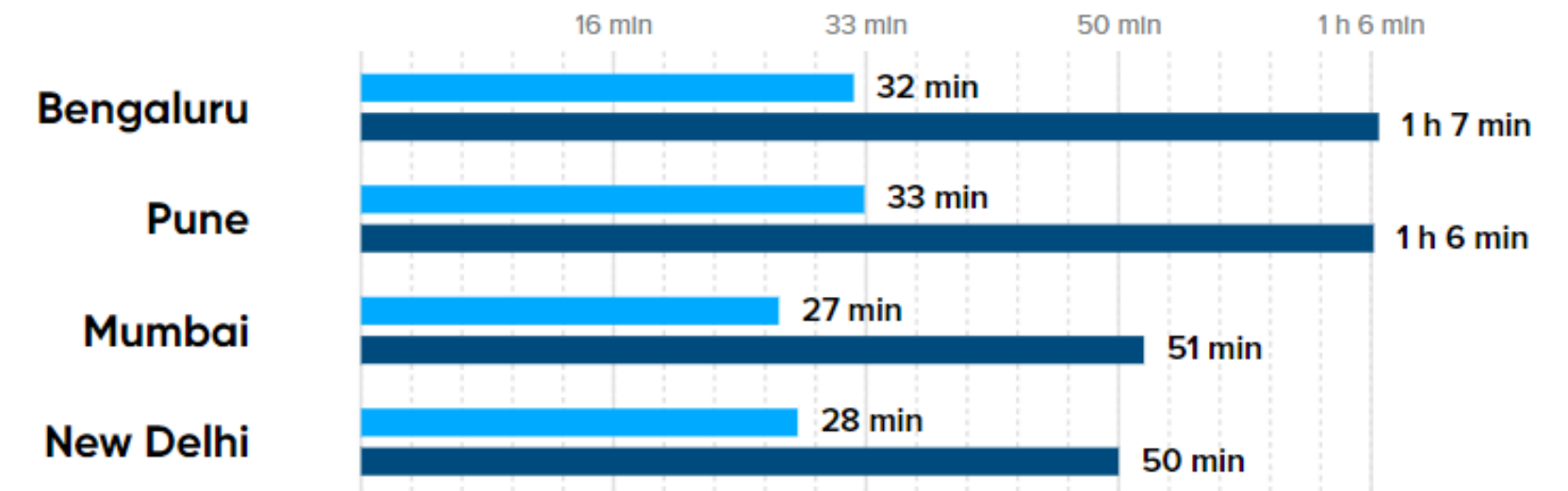


## Daily round trip travel times during rush hour and optimal travel time

On an average weekday, how did driving during rush hour compare to driving during the optimal travel time (when traffic was at its lowest)?

■ Optimal travel time ■ Travel during rush hour

One-way commute



We can reduce traffic congestion and environmental impact by sharing rides!



HITCH-HIKE 2.0:  
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# How Carpooling?

This is where our app comes in!



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A CARPOOLING APP

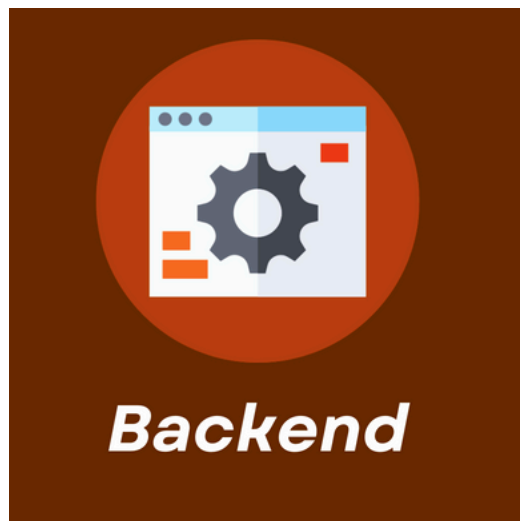
# Introduction

Hitch-Hike-2.0 aims to reduce the number of vehicles on the road, leading to smoother commutes and a decreased carbon footprint. This not only benefits the environment, but also provides significant cost savings for users by enabling them to share fuel expenses.



# Technologies used





# Mapping and location services



Mapbox (Maps and  
Location Data Platform)



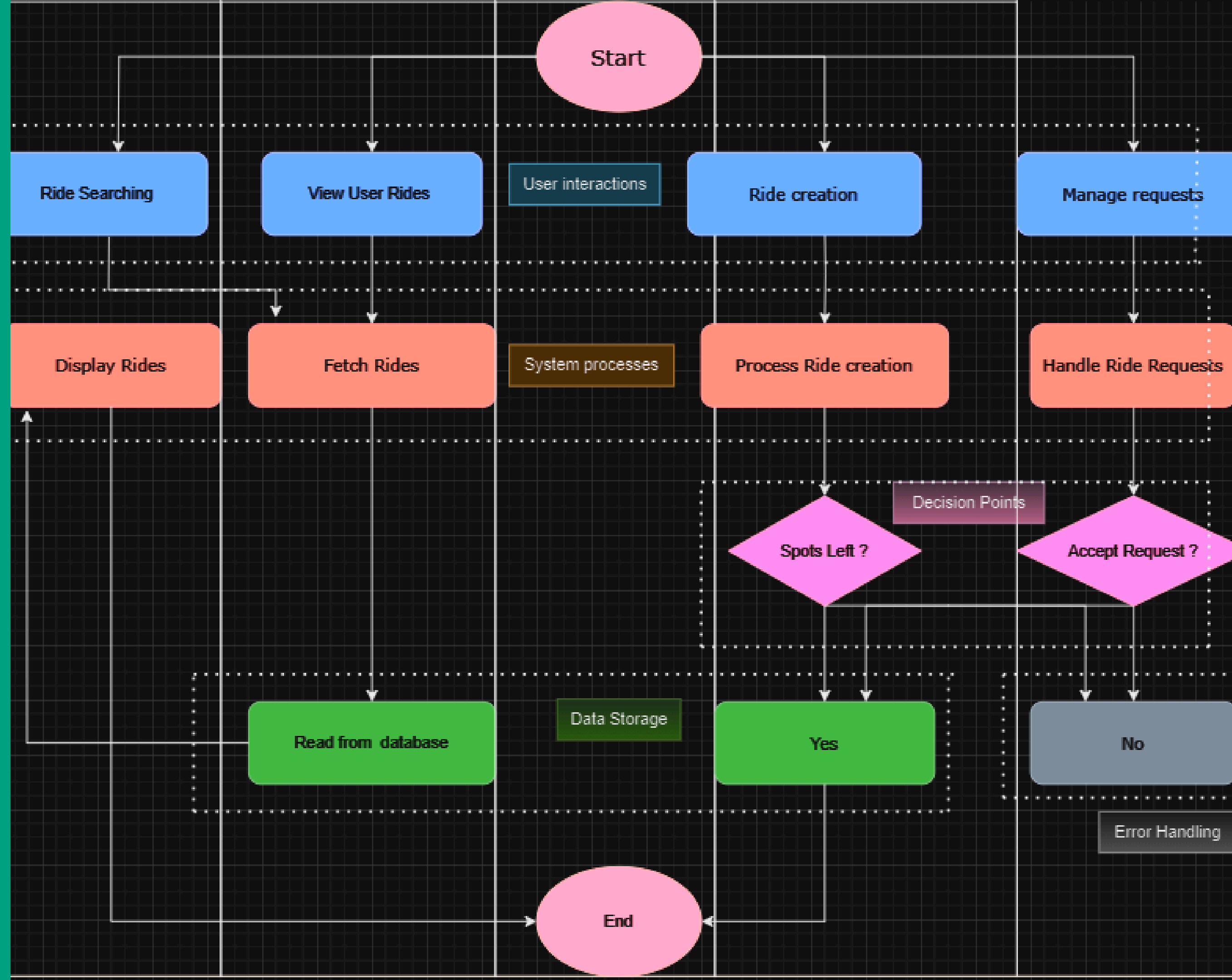
Nominatim (Open-Source  
Geocoding and Address  
Search)

# Spatial Analysis

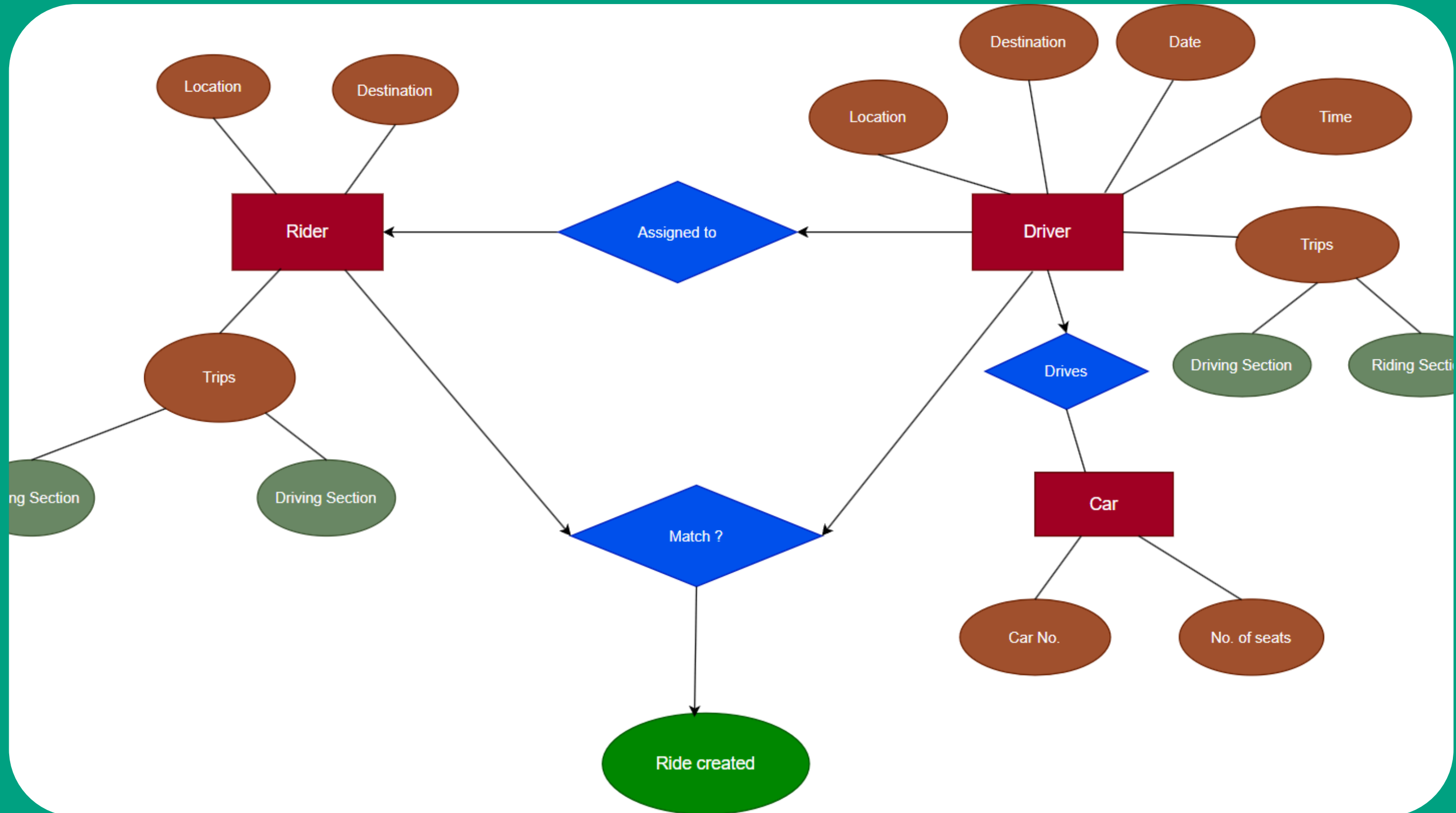


Turf.js (JavaScript Library  
for Spatial Operations)

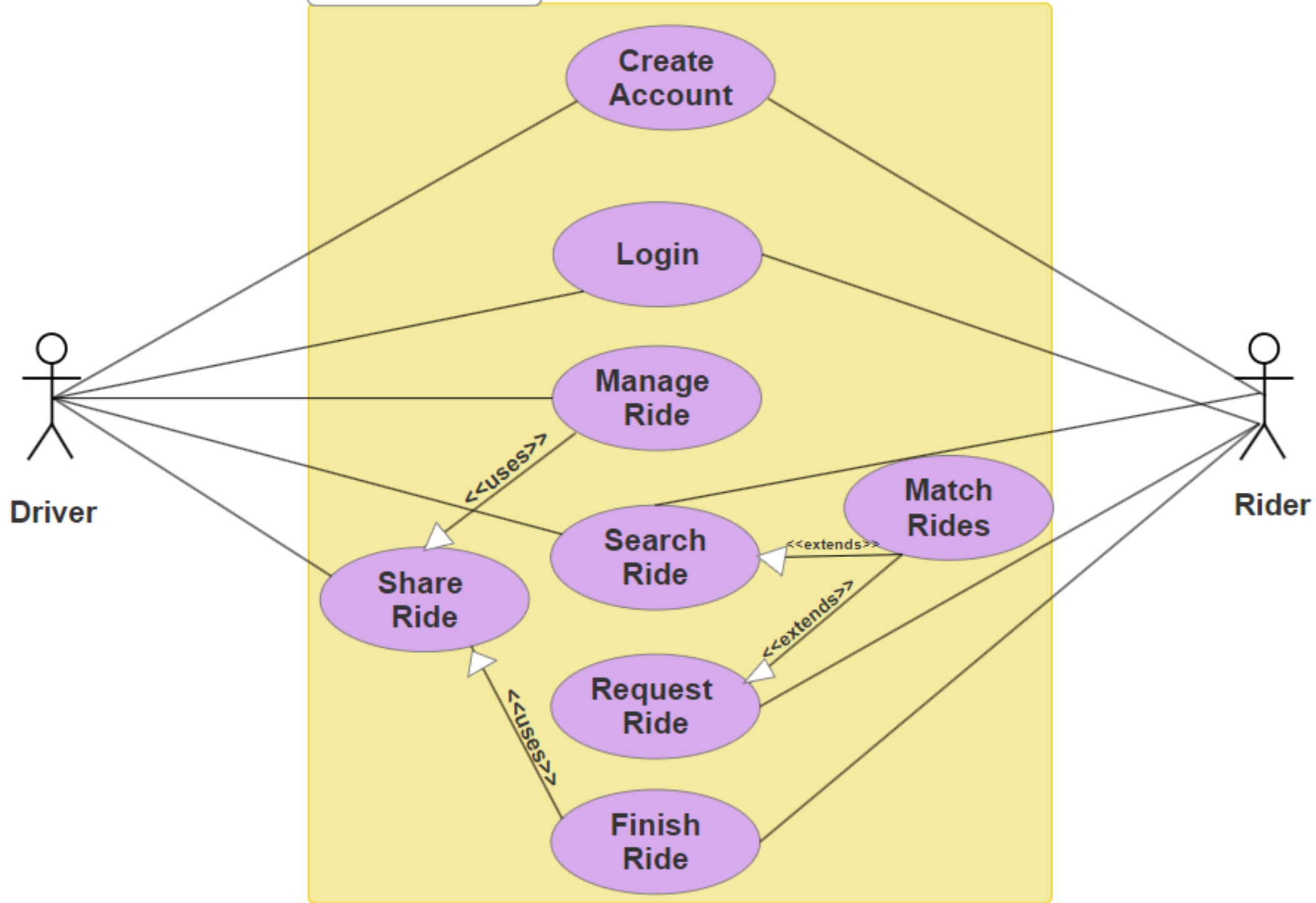
# Flowchart



# ER Diagram



Hitch-Hike 2.0



# Usecase Diagram

# Homepage

A guide for users towards their desired actions

## Join as a Driver

Share your ride and travel with company while saving costs.

Share Your Ride

## Join as a Rider

Find affordable rides to your destination with our trustworthy community.

Search for Trips

# Major Features

## Ride creation

allows drivers to easily set up their carpool offerings with essential details.

## Ride searching

allows passengers to conveniently search for carpool rides based on their travel needs

## Ride matching


efficiently connects drivers with passengers who share similar travel needs





## Ride confirmation

streamlines the passenger-driver communication process and ensure a smoother carpool experience



# Ride creation



 Search  Share  Trips 

### Input Trip Details

Select a Source

Belly Gaon

Select a Destination

CMP Degree College

Get Route

Departure Date

05-05-2024

Departure Time

08:30

Spots in Your Car

4

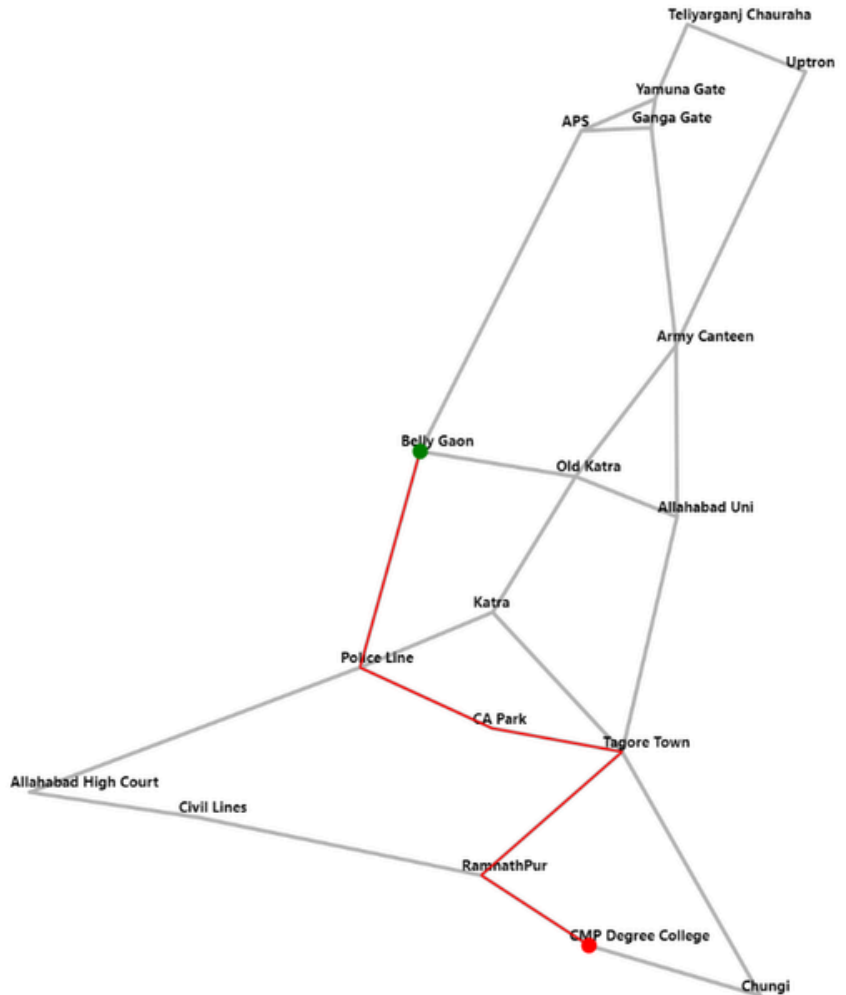
Car Number

UP16CD1996

Message

Message...

Share





Input Trip Details

Motilal Nehru National Institute of Tec

Anand Bhawan, 11A, Circular Road, Kn

Departure Date: 07-05-2024

Departure Time: 10:30

Spots in Your Car: 3

Car Number: UP 16 CD 1996

Message: children friendly

Enter your current location and destination

Input Trip Details

Motilal Nehru National Institute of Tec

Anand Bhawan, 11A, Circular Road, Kn

Departure Date: 07-05-2024

Departure Time: 10:30

May, 2024

| Su | Mo | Tu | We | Th | Fr | Sa |
|----|----|----|----|----|----|----|
| 28 | 29 | 30 | 1  | 2  | 3  | 4  |
| 5  | 6  | 7  | 8  | 9  | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | 1  |
| 2  | 3  | 4  | 5  | 6  | 7  | 8  |

Specify the date and time of the carpool ride

Input Trip Details

Motilal Nehru National Institute of Tec

Anand Bhawan, 11A, Circular Road, Kn

Departure Date: 07-05-2024

Departure Time: 10:30

Spots in Your Car: 3

Car Number: UP 16 CD 1996

Message: children friendly

Enter no. of available seats, vehicle details and a brief message for passengers

# Input Trip Details

Select a Source

Uptron

▼

Select a Destination

Chungi

▼

Get Route

Departure Date

06-05-2024

📅

Departure Time

05:05

Spots in Your Car

4

Car Number

UP707777

Message

hiii

🔍

Share


## Ride Shared Successfully


Your ride has been shared successfully.


Close





# Ride Searching



 Search

 Share

 Trips



Search for Rides

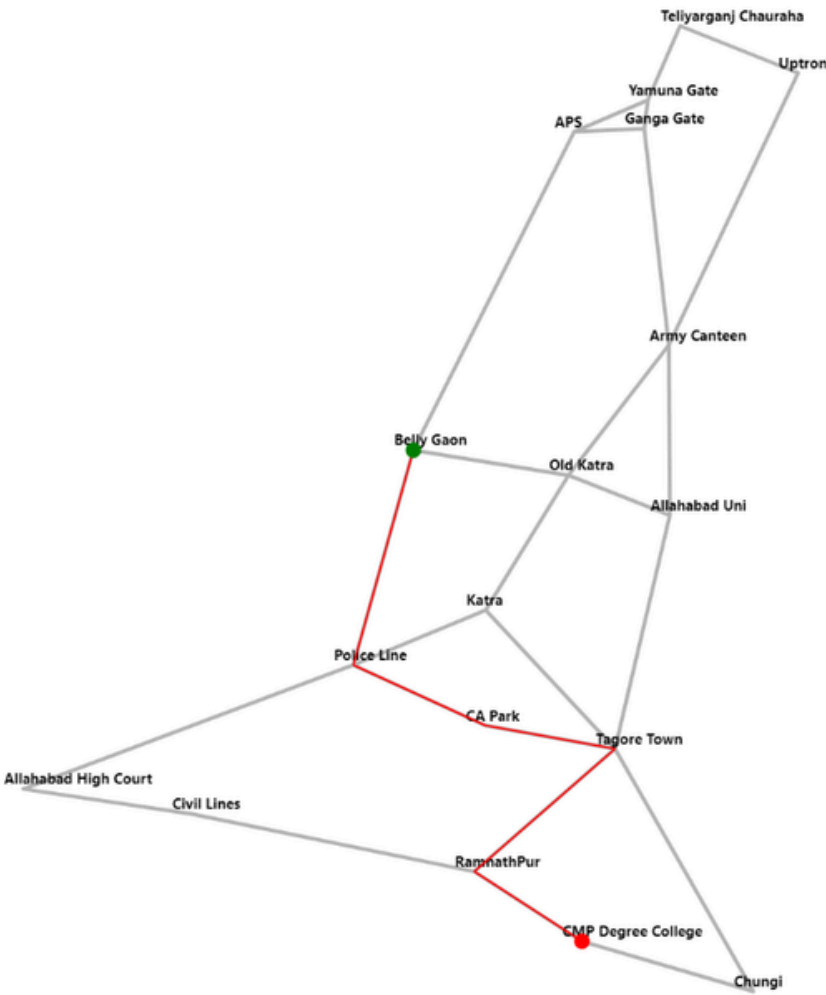
Select a Source

Belly Gaon

Select a Destination

CMP Degree College

Search



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# Search for Rides

Select a Source

Army Canteen

▼

Select a Destination

Tagore Town

▼

Search

## Search Results:

Source Name: Uptron

Destination Name: Civil Lines

Driver Name: raunak chauhan

Date: 2024-05-05T00:00:00.000Z

Time:

Message:

Distance: 5.9267999051726274

Request

Source Name: APS Old Cantt

Destination Name: Tagore Town

Driver Name: raunak chauhan

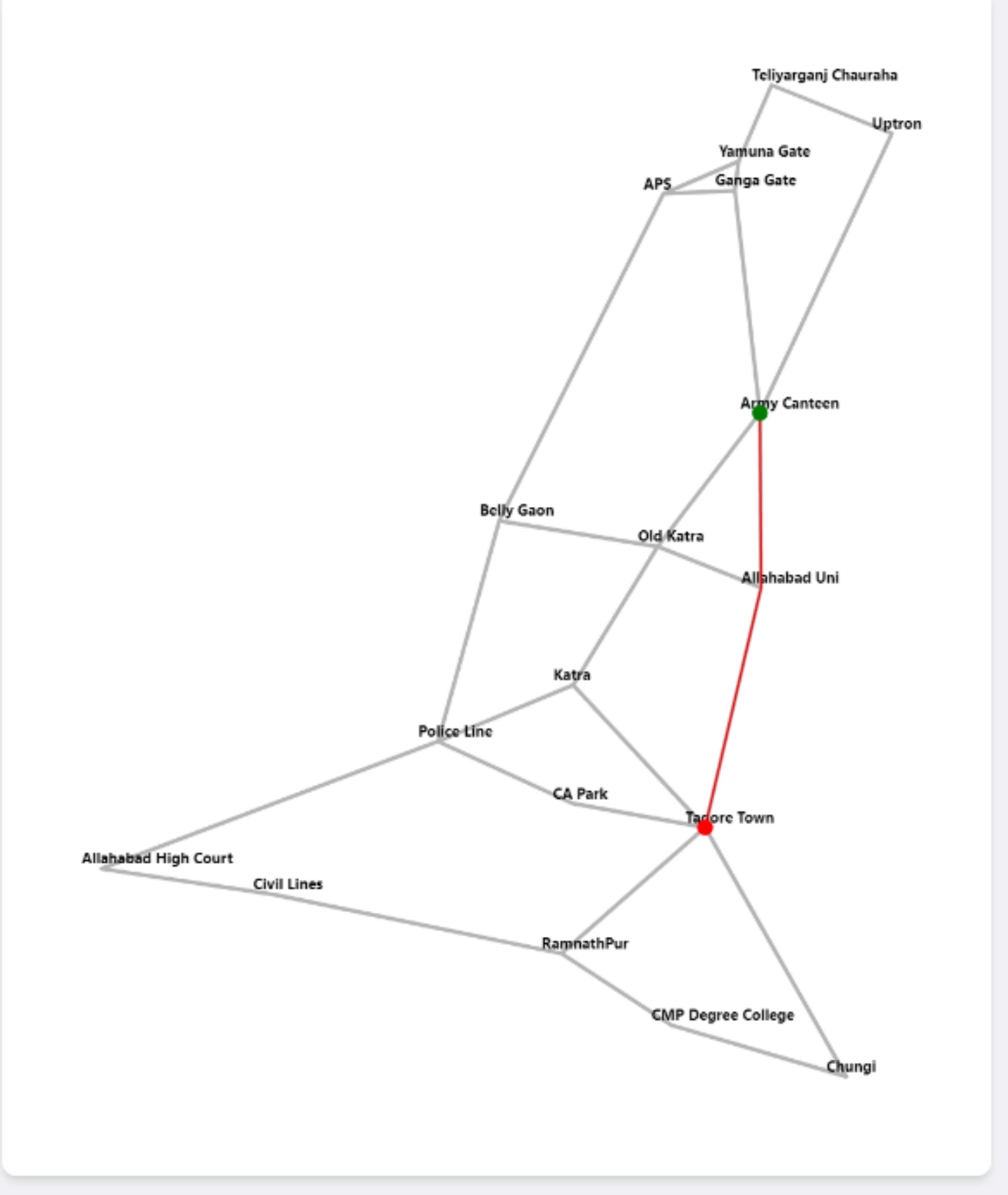
Date: 2024-05-05T00:00:00.000Z

Time:

Message:

Distance: 3.9822966240946105

Request



Search Results

# Ride Listing

## Driving

This section displays the trips you are driving. You can manage rider requests and update trip details here.

| Departure              | Origin             | Destination          | Available Spots | Action                   |
|------------------------|--------------------|----------------------|-----------------|--------------------------|
| Sun, 5/5/2024, 5:30 AM | Uptron             | Chungi               | 1               | <a href="#">Requests</a> |
| Sun, 5/5/2024, 5:30 AM | Uptron             | CA Park              | 1               | <a href="#">Requests</a> |
| Sun, 5/5/2024, 5:30 AM | Uptron             | Civil Lines          | 1               | <a href="#">Requests</a> |
| Sun, 5/5/2024, 5:30 AM | Ganga Gate         | Police Line          | 19              | <a href="#">Requests</a> |
| Sun, 5/5/2024, 5:30 AM | APS Old Cantt      | Tagore Town          | 1               | <a href="#">Requests</a> |
| Sun, 5/5/2024, 5:30 AM | CMP Degree College | Teliyarganj Chauraha | 0               | <a href="#">Requests</a> |
| Mon, 5/6/2024, 5:30 AM | Uptron             | Chungi               | 4               | <a href="#">Requests</a> |

## Riding

This section shows the trips you have requested to ride with others. You can track the status of your requests here.

| Departure              | Origin        | Destination | Request Status | Action  |
|------------------------|---------------|-------------|----------------|---|
| Sun, 5/5/2024, 5:30 AM | APS Old Cantt | Tagore Town | PENDING        | <a href="#">Finish/Cancel</a> <a href="#">Connect</a> |

# Dijkstra's Algorithm

Dijkstra's algorithm calculates the shortest path between the source and destination points, ensuring efficient route selection for the ride

DIJKSTRA( $G, w, s$ )

```
1  INITIALIZE-SINGLE-SOURCE( $G, s$ )
2   $S = \emptyset$ 
3   $Q = \emptyset$ 
4  for each vertex  $u \in G.V$ 
5      INSERT( $Q, u$ )
6  while  $Q \neq \emptyset$ 
7       $u = \text{EXTRACT-MIN}(Q)$ 
8       $S = S \cup \{u\}$ 
9      for each vertex  $v$  in  $G.Adj[u]$ 
10         RELAX( $u, v, w$ )
11         if the call of RELAX decreased  $v.d$ 
12             DECREASE-KEY( $Q, v, v.d$ )
```

# Haversine formula

- Haversine formula calculates the shortest distance between two points on a sphere using their latitudes and longitudes measured along the surface.
- It is important for use in navigation, crucial for various functionalities such as route planning and distance-based filtering.

**Haversine can be expressed in trigonometric functions**

$$a = \sin^2 \left( \frac{\Delta \text{lat}}{2} \right) + \cos(\text{lat}_1) \cdot \cos(\text{lat}_2) \cdot \sin^2 \left( \frac{\Delta \text{lon}}{2} \right)$$

$$c = 2 \cdot \text{atan2} \left( \sqrt{a}, \sqrt{1 - a} \right)$$

$$d = R \cdot c$$

# Conclusion

The project implements ride-matching algorithm that efficiently connects riders with drivers traveling along similar routes, leads to substantial cost savings on each journey. It also actively contribute to a more sustainable future through the reduction of carbon footprint and fostering a vibrant sense of community.





# Resources



[Haversine formula-geeksforgeeks](#)

[Introduction.to.Algorithms.4th.Leiserson.Stein.  
Rivest.Cormen.MIT](#)

[From Navigation to star hopping: Indian  
academy of sciences](#)

[Dijkstra's Algorithm-geeksforgeeks](#)

# Future works

**Develop a user reputation system based on ratings and reviews to promote trust and accountability within the carpool community**

**Authentication of Driving License**

**Cost Calculation and Payment Integration**

**Thank you!**