PHASE 5: Project Documentation & Submission

PROJECT OBJECTIVE:

The main objectives of the project are to design and implement a real-time parking availability system that benefits drivers and alleviates parking issues. This system involves several components, including IoT Raspberry Pi Pico sensor setup, mobile app development using HTML, CSS, JavaScript, and Flask, Raspberry Pi integration, and the use of IBM Cloud DB2 to store data received from the Wokwi Raspberry Pi.

COMPONENTS OF THE PROJECT:

IoT Raspberry Pi Pico on Wokwi Sensor Setup:

- Configure and set up a network of IoT devices using Raspberry Pi Pico microcontrollers.
- Implement sensors and actuators to monitor parking spaces in real-time.
- Connect the Raspberry Pi Pico boards to a central server for data collection and processing.

Mobile App Development (HTML, CSS, JavaScript, Flask):

- Create a mobile app that allows users to access real-time parking availability information.
- Design the user interface using HTML and CSS for an intuitive and user-friendly experience.
- Develop the app's functionality using JavaScript for interactivity.
- Implement a Flask-based server to handle communication between the app and the IoT devices.

Raspberry Pi Integration:

- Integrate Raspberry Pi boards with sensors (e.g., ultrasonic sensors) to detect vehicle presence in parking spaces.
- Use Wi-Fi or another suitable communication protocol to transmit data from the Raspberry Pi boards to the central server.

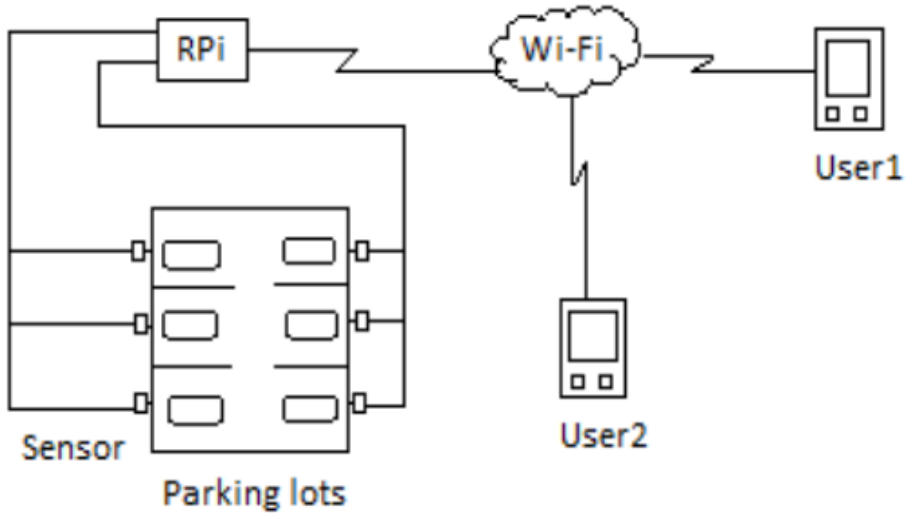
IBM Cloud DB2 Integration:

- Use IBM Cloud DB2 or a similar database service to store data received from the Wokwi Raspberry Pi.
- Create a database schema to store information about parking spaces, their availability, and relevant metadata.

Code Implementation:

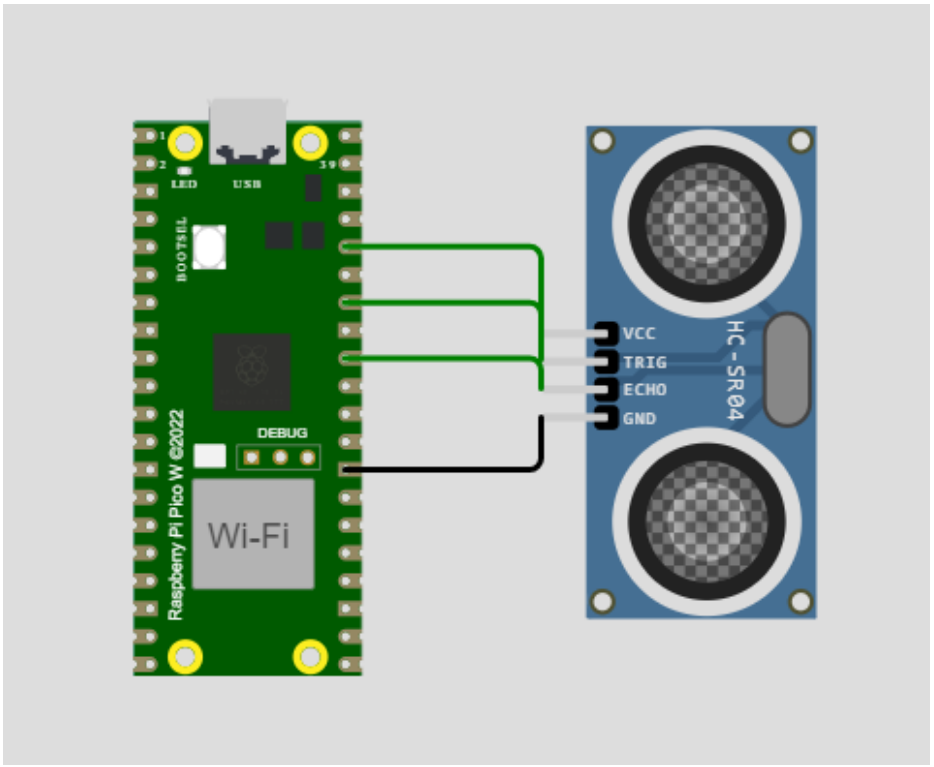
- Write code for the Raspberry Pi Pico to capture sensor data and transmit it to the server.
- Develop the server-side code to handle incoming data, update the database, and serve the data to the mobile app.
- Implement the mobile app's functionality for users to interact with the system.

DIAGRAM:



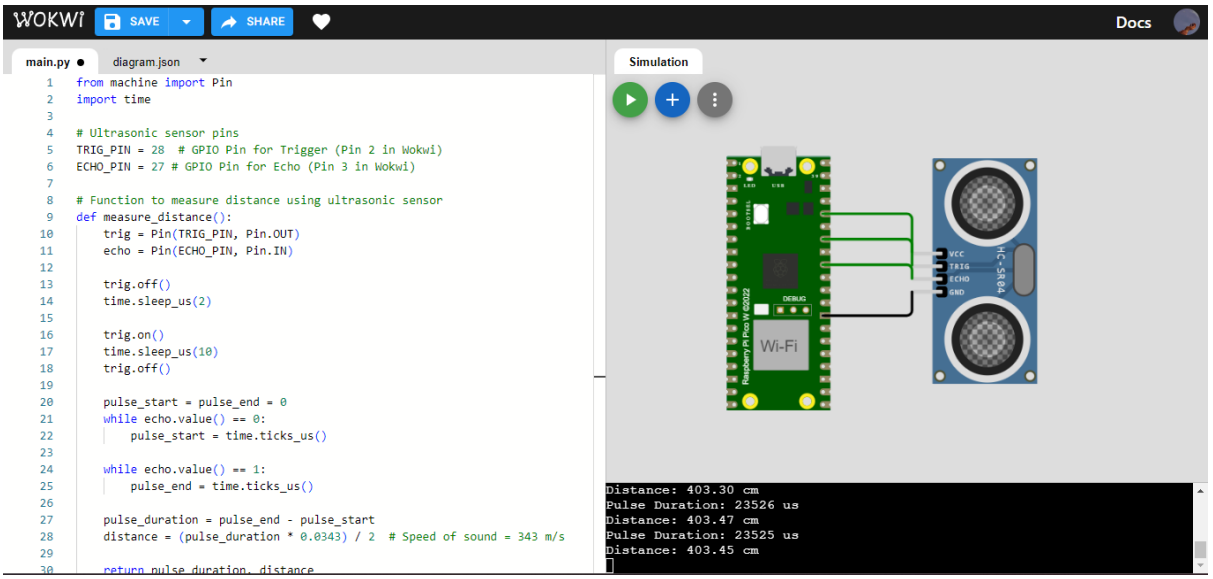
“The above is the working diagram of,0 How the entire project work on . It includes sensors of the parking slot, Cloud connection to receive data and an application to make all together”.

CIRCUIT DIAGRAM :

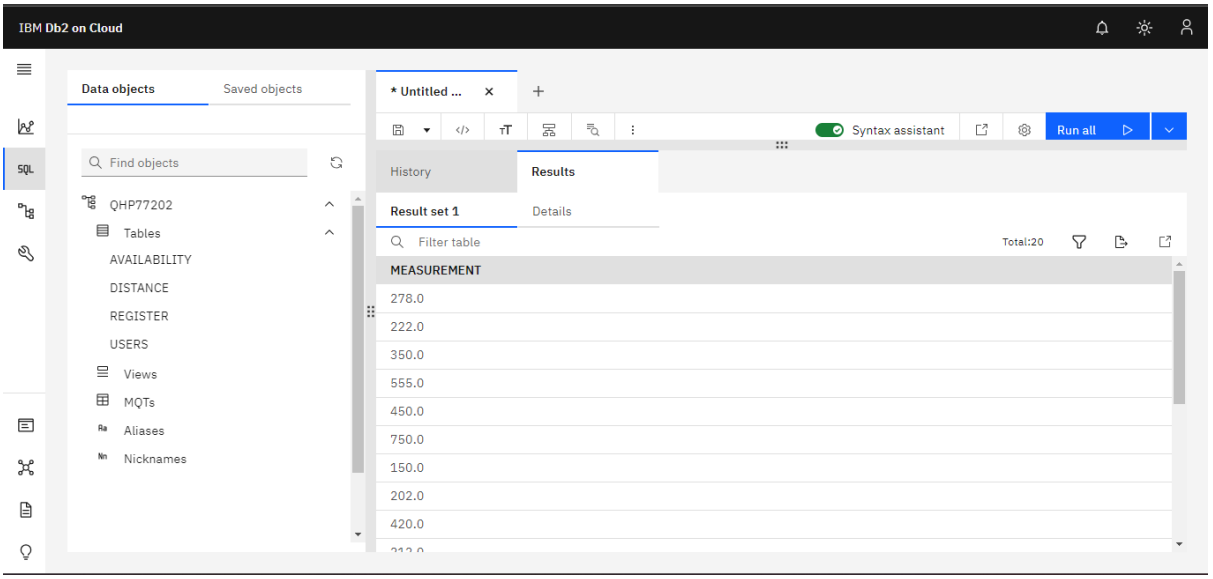


“The above circuit is done in WOKWI platform”

Connection of IoT sensors to detect parking space occupancy.

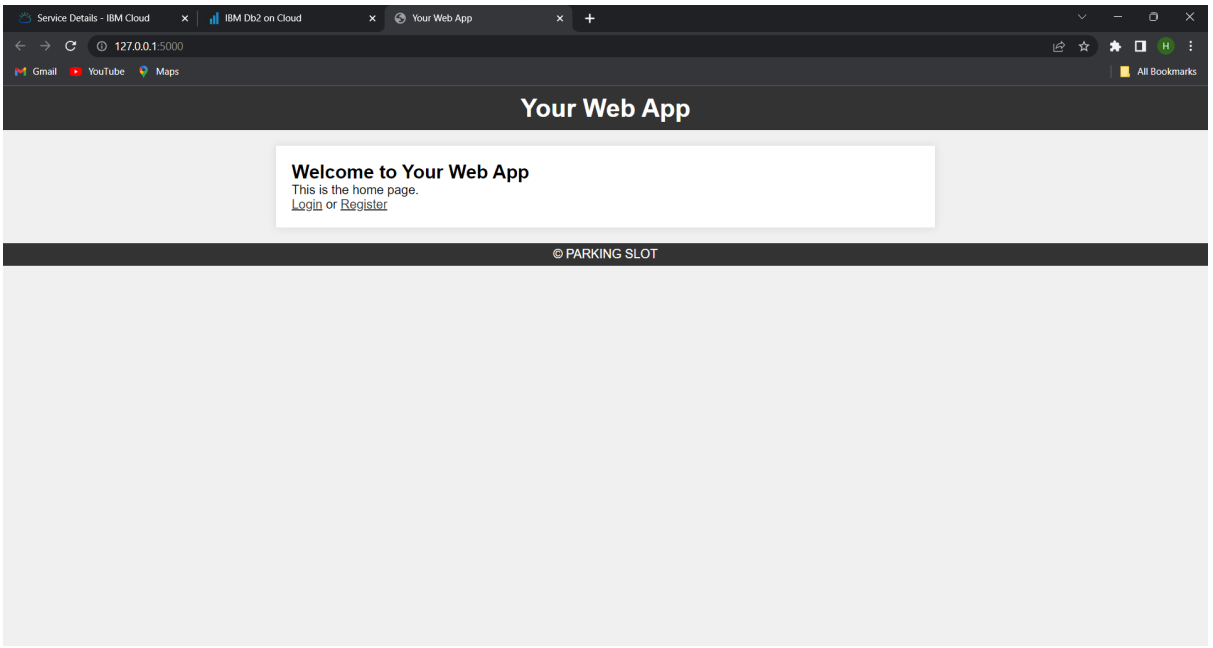


"Since Wokwi's MicroPython Raspberry Pi does not support IBM Cloud DB2 modules, simulated values are added to the table."

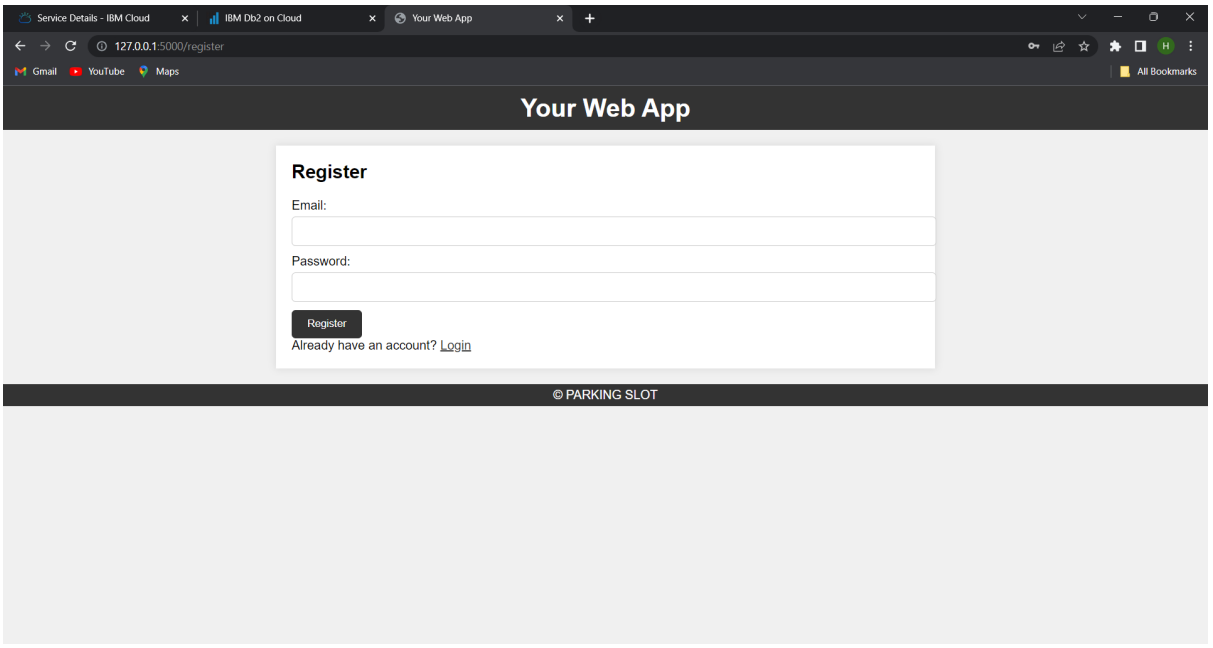


APPLICATION:

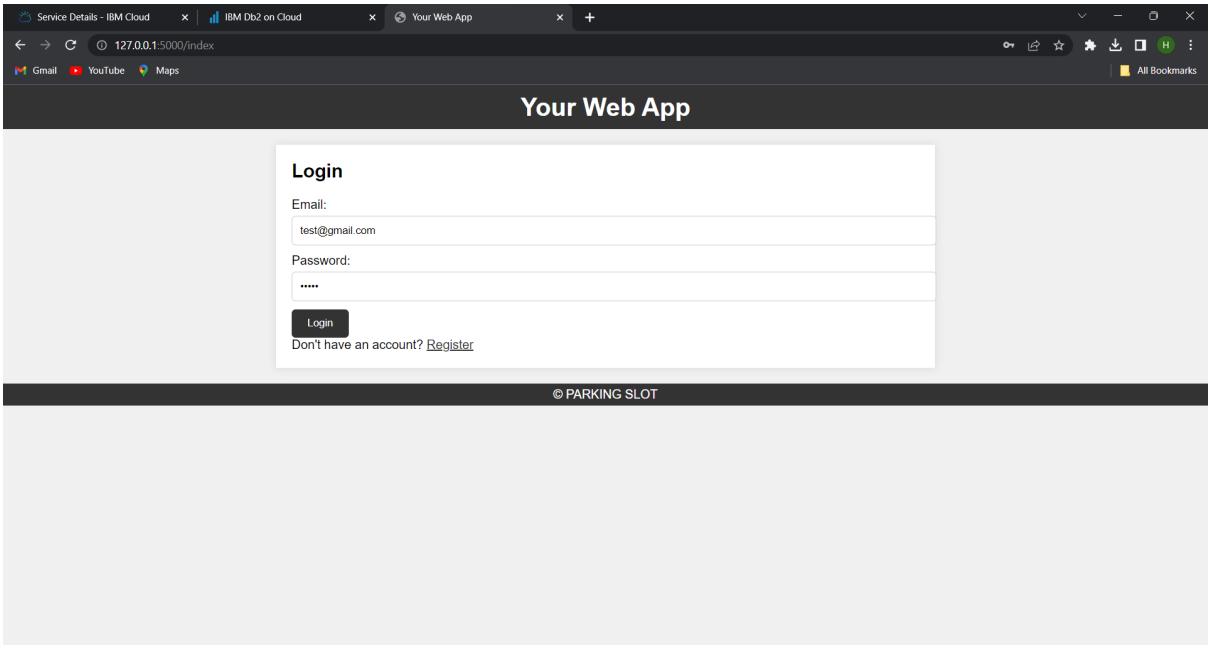
HOME PAGE:

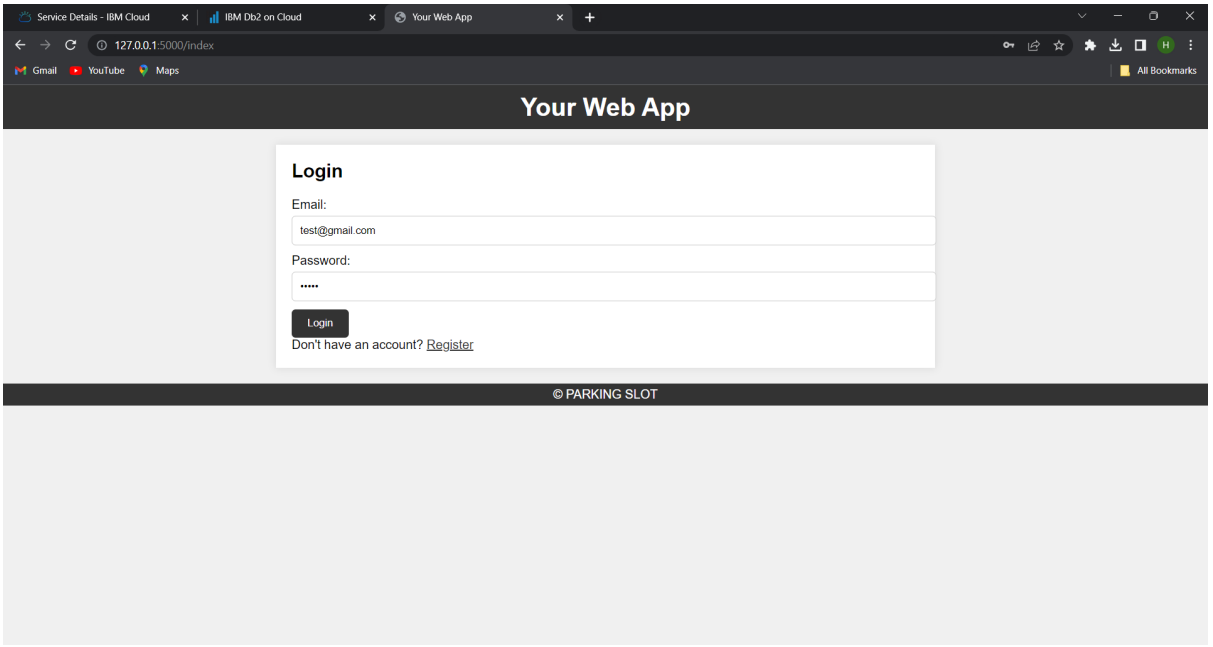


Registration page:



Login page:


Service Details - IBM Cloud
IBM Db2 on Cloud
Your Web App
127.0.0.1:5000/index
Gmail
YouTube
Maps
All Bookmarks
Your Web App
Login
Email:
test@gmail.com
Password:
Login
Don't have an account? Register
© PARKING SLOT


Service Details - IBM Cloud
IBM Db2 on Cloud
Your Web App
127.0.0.1:5000/index
Gmail
YouTube
Maps
All Bookmarks
Your Web App
Login
Email:
test@gmail.com
Password:
Login
Don't have an account? Register
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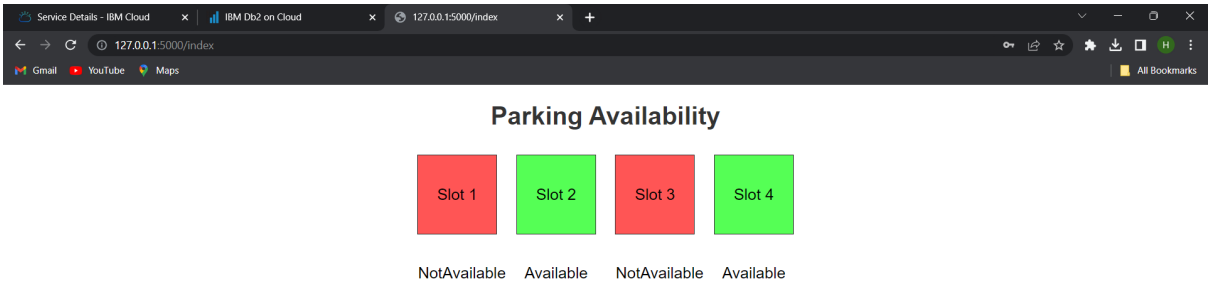
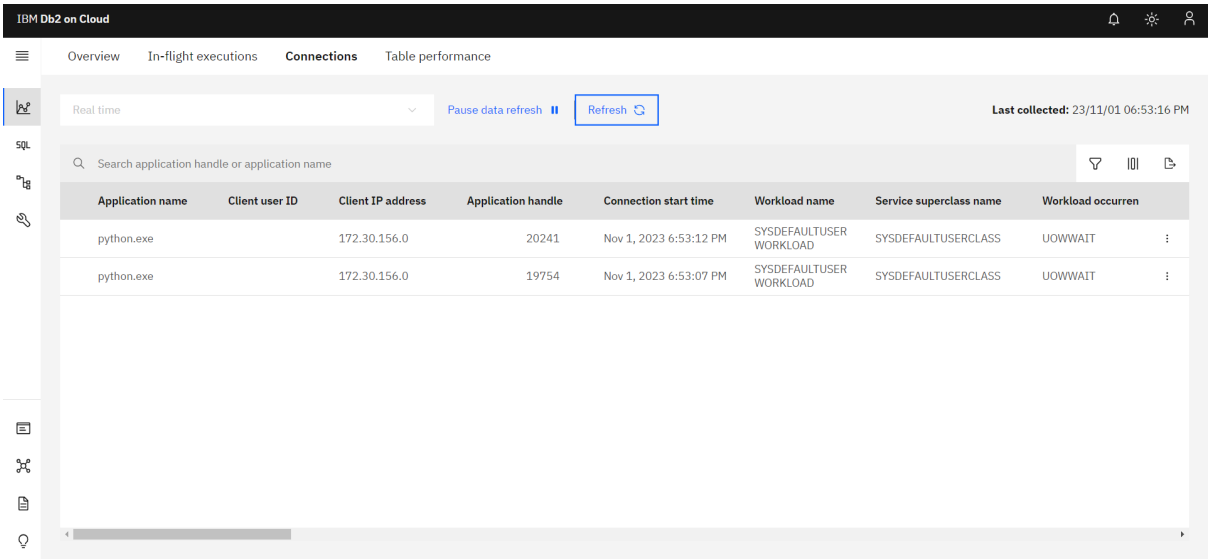
Parking Availability:



CLOUD CONNECTION:



“In the previous phases, necessary steps and code have been included .As a result , the above screenshot have been provided”.

Benefits of the Real-time Parking Availability System:

- **Reduced Traffic Congestion:** Drivers can access real-time information about available parking spaces, reducing the time spent searching for parking spots. This leads to less traffic congestion and a more efficient flow of vehicles.

- **Time and Fuel Savings:** Drivers can save time and fuel by quickly finding parking spaces without circling around or waiting for spots to become available.

- **Improved User Experience:** The mobile app provides a convenient and user-friendly way for drivers to plan their parking, reserve spots in advance, and receive alerts when their reserved spot is about to become available.

- **Reduced Environmental Impact:** Less time spent searching for parking results in reduced fuel consumption and emissions, contributing to a more environmentally friendly transportation system.

- **Data-Driven Insights:** The system collects valuable data on parking space usage, allowing city planners and businesses to analyze trends, optimize parking management, and make data-driven decisions for future infrastructure development.

- **Revenue Generation:** Parking space owners can monetize the system by offering reservations and collecting fees from users, creating a new revenue stream.

CONCLUSION:

The real-time parking availability system aims to enhance the overall parking experience for drivers, improve traffic flow, and provide valuable data for urban planning. It represents a practical and data-driven solution to address parking issues in urban areas.