

**MICHIGAN STATE**  

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**UNIVERSITY**

**Project Plan**  
**Shared Parking Access**  
**The Capstone Experience**

**Team Bedrock Detroit**

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*From Students...*  
*...to Professionals*

# Functional Specifications

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- Create an application that will determine where everyone will park
- Not everyone will come into work every day, parking spaces can be shared
- The application will allow more users to park closer to their office buildings
- The application will be able to dynamically change based on other factors determined by leadership



# Design Specifications

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- Import employee schedules from CSV file into a database
- Use a dynamic algorithm to determine optimal parking assignments for employees
- Design web application for administrators to allow them to create/edit/delete team members and work offices
- Handles approximately 25,000 employees



# Screen Mockup: User Management

Hand-drawn screen mockup for a User Management interface. The interface includes a top navigation bar with buttons for "Edit Roles", "manage offices", "manage Parking Facilities", "manage Team members", and "Log Out". A search bar labeled "search members" is positioned above a list of team members. To the right of the search bar are buttons for "New Team member manual Entry" and "import new team members from CSV".

On the left side, there is a sidebar with the heading "Sort Based on Team" and three input fields for "Team", "office", and "Parking Facility". Below these are radio button options for "Disabled" (Yes/No) and "Expecting" (Yes/No).

The main content area displays a list of team members, each with a checkbox and a set of action buttons:

- Select All members | Edit Office | Edit Parking | Send Email | Send SMS
- Name: Ritu Ahluwalia  
 Office: one campus martius  
Parking: Garage A | Edit Profile | Edit office | Edit Parking | Send Email | Send SMS
- Name: Will Lemmah  
 Office: one campus martius  
Parking: Garage A | Edit Profile | Edit office | Edit Parking | Send Email | Send SMS
- Name: Eric Podolsky  
 Office: one campus martius  
Parking: Garage V | Edit Profile | Edit office | Edit Parking | Send Email | Send SMS
- Name: Michelle Mao  
 Office: one woodward  
Parking: Garage B | Edit Profile | Edit office | Edit Parking | Send Email | Send SMS
- Name: Jude Jang  
 Office: one woodward  
Parking: Garage D | Edit Profile | Edit office | Edit Parking | Send Email | Send SMS

Vertical ellipsis dots are shown below the last team member entry.



# Screen Mockup: Parking Management

Hand-drawn screen mockup for a Parking Management system. The interface includes a navigation bar, a search bar, a list of parking facilities, and a report generation form.

Navigation Bar: Edit Roles | Manage Offices | Manage Parking Facilities | Manage Team Members | Log Out

Search: Search Parking Facilities

Actions: New Parking Facility Manual Entry | Import New Parking Facility from CSV

Facility List:

- Name: Garage A  
Address: 1001 Woodward Ave  
Fac Spaces: 365  
[Edit] [Remove]
- Name: Garage B  
Address: 1401 First St  
Fac Spaces: 360  
[Edit] [Remove]
- Name: Garage C  
Address: 100 E Congress St  
Fac Spaces: 545  
[Edit] [Remove]
- Name: Garage D  
Address: 615 W Lafayette Blvd  
Fac Spaces: 29  
[Edit] [Remove]
- Name: Garage E  
Address: 525 Griswold St  
Fac Spaces: 0  
[Edit] [Remove]
- Name: Garage F  
Address: 419 E Ford St  
Fac Spaces: 555  
[Edit] [Remove]

Report Generation Form:

Create Report Regarding Parking Assignments:

Office:

Parking Facility:

Team:

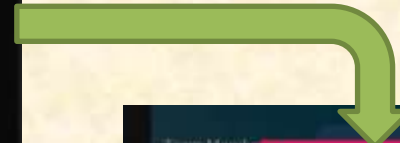
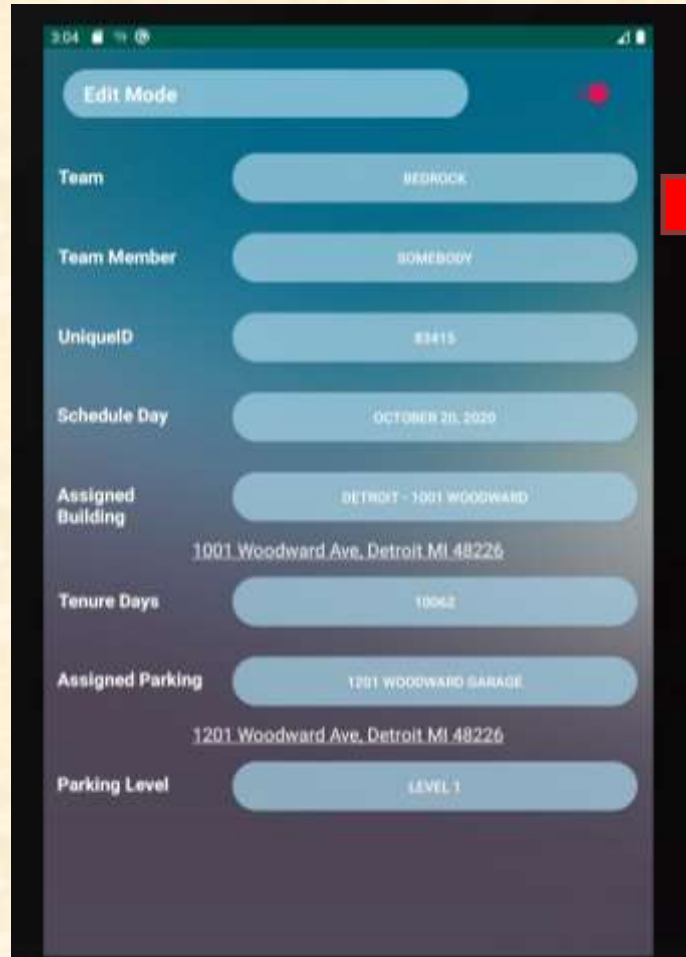
Disabilities:  Yes  No

Expectant Mothers:  Yes  No

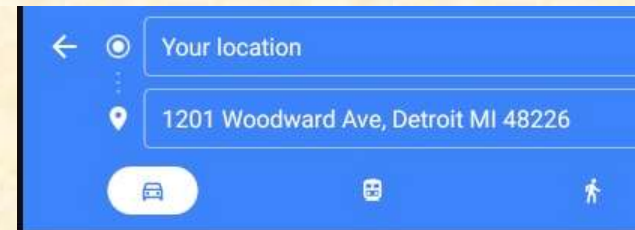
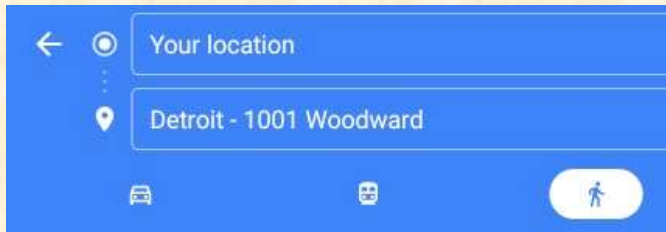
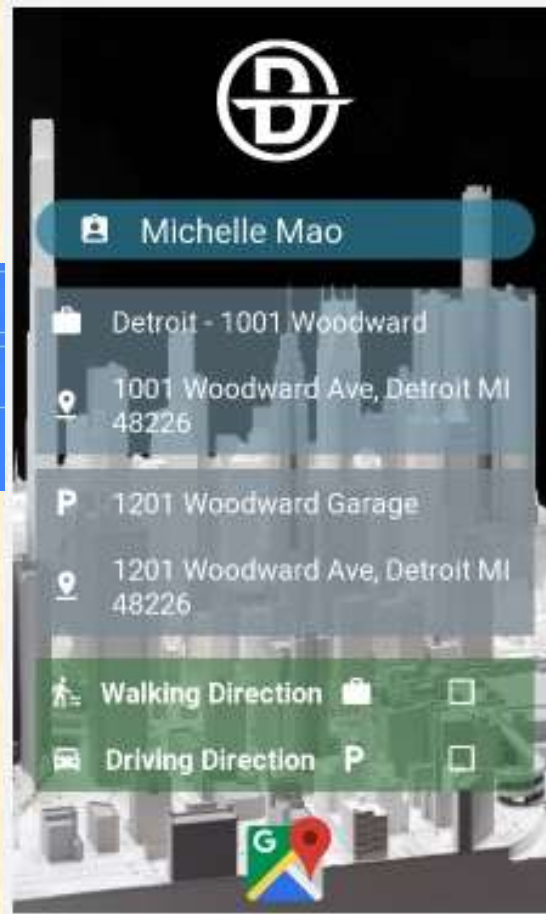
[Generate]



# Screen Mockup: Admin Information



# Screen Mockup: User Information



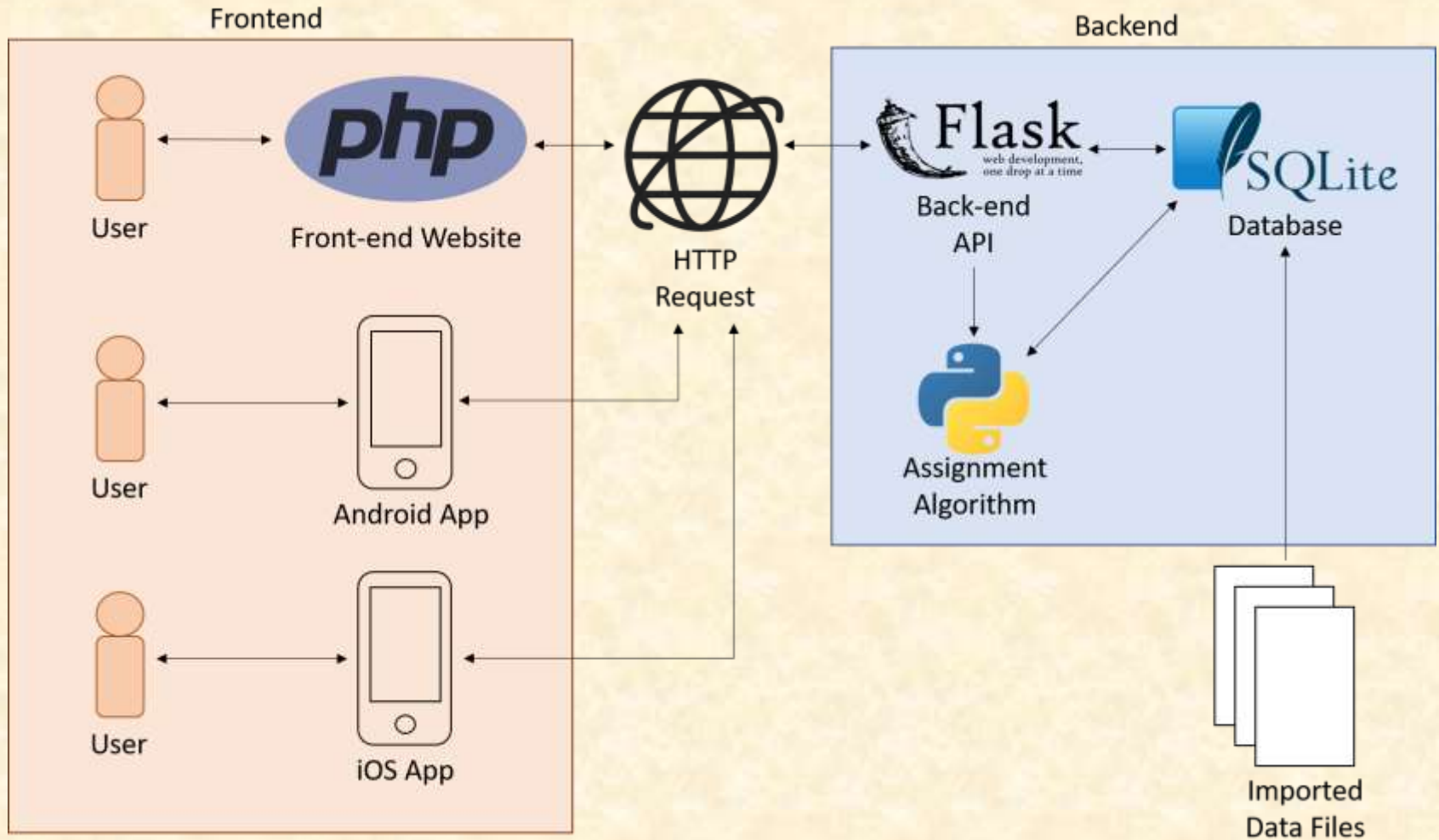
# Technical Specifications

- Backend
  - Python
  - Geopy / Google Maps API
  - Sqlite3
- API
  - Auth0 user authentication
  - Flask
- Frontend
  - PHP
  - Xcode
  - Android Studio





# System Architecture



# System Components

- Hardware Platforms
  - iMac
  - iOS
  - Android
- Software Platforms / Technologies
  - PHP
  - Python
  - IntelliJ IDEs
  - Xcode
  - Android Studio
  - Google Maps API
  - SQLite



# Risks

- API Security
  - Any of our internet traffic is at risk of being compromised
  - Integrate OAuth2 security through Auth0
- Run Time
  - The application will have to analyze over 25,000 employees
  - Create greedy algorithms that sort quickly and compare their run times to our main algorithm
- Making our API open to integration
  - The client is planning on creating their own software to interact with our API in the future.
  - After we create a new route, we will document it's use cases, inputs, and outputs, then test it with a different team member who didn't help build the route
- No assigned server location
  - The client has given us the opportunity to choose where to host the app
  - Setup the app locally, and then repeat the process on AWS



# Questions?

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