Project Name: SolParking

Value Proposition:

This is a DePIN (Decentralized Physical Infrastructure Network) platform that utilizes blockchain and proximity sensors for a parking space marketplace. Homeowners who sign up to be parking space providers will not have to pay fees for listing a parking space unlike other apps. For drivers, rather than driving around endlessly upon arrival to find parking, a driver can use the app ahead of time to find and reserve a space near their destination, saving time and money. Users will own their data and have the option to sell to interested parties

Product-Market Fit:

Parking is troublesome to find in densely populated cities like LA and NYC. Cost of living is high also in these cities and this app could give homeowners another source of income while helping drivers find parking and saving them time, money and frustration.

Target User Profiles:

- **Homeowner:** This user has available parking in their driveway and would like to rent it out for extra income. Would be most effective for homeowners in densely populated areas near businesses with little to no parking.
- **Driver:** This user could initially be a crypto native who is comfortable with wallets to use an app to find parking and pay with Solana tokens. Someone who frequents busy areas and does not want to waste time finding parking. It could also be ideal for gig workers who drive around all day delivering to busy areas.

1. User Persona 1A

- **Name:** Homeowner
- **Role:** Provider
- **Goal:** Make money by renting out parking space

2. User Story: As a Homeowner, I want to rent out my parking space so that I can help drivers and make money at the same time.

3. Acceptance Criteria

- **Functionality:** The platform should allow users to create a parking space listing

- **Attributes:** The parking space listing should have the following attributes:
    - Address
    - Price per hour
    - Availability (date/times)
    - Status (reserved, available, in use, unavailable)
    - Picture of parking spot and surrounding area
    - Additional info input from user(special directions, gate code, etc)
- **User Interaction:** Users should be able to
    - Upload a picture of parking spot and surrounding area
    - Create/update listing

4. Priority

- High

5. Technical Notes

- **Dependencies:**
    - Wallet connected so the listing can link account address and later receive payment when parking space is rented
- **Considerations:**
    - Research data storage tradeoffs. Where should the listing data be stored for retrieval? Traditional database(mongoDB/mySQL)? IPFS/Arweave?
    - Use marketplace-like pattern/design for listing functionality
    - Listing and sensor data could be owned by homeowners and sold to interested parties

1. User Persona 1B

- **Name:** HomeOwner
- **Role:** Provider
- **Goal:** To get alerts of the renting status of a parking space and be able to choose communication settings for those alerts

2. User Story: As a Homeowner, I want to get an alert that someone has reserved a parking space so that I know who is coming. I would also like to get an alert when the driver has parked and triggered the sensor.

3. Acceptance Criteria

- **Functionality:** The platform should allow users to select how they get alerts.
- **Attributes:** The alert setting should have the following attributes:
    - App notification on phone

    - Text
    - Email
    - none
- **User Interaction:** Users should be able to
    - Select and change how they get alerts

4. Priority

- High

5. Technical Notes

- **Dependencies:**
    - Services for text/email notifications
    - Sensor data
- **Considerations:**
    - How to retrieve sensor data when driver parks

1. User Persona 1C

- **Name:** HomeOwner
- **Role:** Provider
- **Goal:** To confirm receipt of payment

2. User Story: As a homeowner, I want to see confirmation I got paid the amount owed and see my space become available again after driver leaves

3. Acceptance Criteria

- **Functionality:** The platform should allow users to see a list of transactions and parking space status update
- **Attributes:** The list of transactions should have the following attributes:
    - Date/time of transaction
    - Rate/hr
    - Duration driver parked
    - Payment received amount
- **User Interaction:** Users should be able to
    - See transaction of payment received in the app and wallet
    - See updated parking space sensor status on their listing

4. Priority

- High

5. Technical Notes

- **Dependencies:**
    - Sensor data - Proximity sensor will send data car has left the parking space
- **Considerations:**
    - How to compensate for unwanted triggers for sensor

1. User Persona 2A

- **Name:** Driver
- **Role:** User
- **Goal:** Finding a parking spot near a specified location matching their price range they are willing to pay

2. User Story: As a Driver, I want to search listings so that I can reserve a parking space.

3. Acceptance Criteria

- **Functionality:** The platform should allow users to enter a destination address and see a list of available parking spaces.
- **Attributes:** The list of available parking spaces should have the following attributes:
    - Address
    - Distance from destination
    - Approx walking time
    - Price per hr to rent parking space
- **User Interaction:** Users should be able to see a list sorted by distance or price

4. Priority

- High

5. Technical Notes

- **Dependencies:**
    - Use some kind of map api to calculate distances from parking space to user destination
- **Considerations:**
    - Performance in retrieving and displaying search results
    - How many results per page? 5, 10?

1. User Persona 2B

- **Name:** Driver
- **Role:** User
- **Goal:** Find and reserve a parking space

2. User Story: As a driver, I want to select from a list so that I can view details of the parking space and reserve it if I choose.

3. Acceptance Criteria

- **Functionality:** The platform should allow users to view details of a parking space and reserve it for a time they specify
- **Attributes:** The reservation page should have the following attributes:
  - Attributes of parking space listing
  - Time duration wanted for reservation
- **User Interaction:** Users should be able to reserve a parking space and get a confirmation of the reservation along with time, and reservation expiration

4. Priority

- High

5. Technical Notes

- **Dependencies:**
  - List of available parking spaces near a user's chosen destination
- **Considerations:**
  - How far ahead of time can a driver reserve a space?
  - User should be able to update/extend the time after parking

1. User Persona 2C

- **Name:** Driver
- **Role:** User
- **Goal:** Confirm arrival and use of parking space

2. User Story: As a driver, I want to confirm my arrival and use of the parking space by parking over the sensor and scanning a QR code provided by the homeowner

3. Acceptance Criteria

- **Functionality:** The platform should allow users to scan a QR code to confirm their use of the parking space

- **Attributes:** The parking space listing should have the following attributes:
    - Scanning a QR code will set a parked attribute to true and record the time as the start time
    - Parked start time
- **User Interaction:** Users should be able to scan the QR code and receive confirmation that time has started accruing and also remind them of their reservation duration and parking expiration time

4. Priority

- High

5. Technical Notes

- **Dependencies:**
    - Once driver confirms parking, time is recorded. Also permission is given to withdraw parking fee once driver leaves.
    - When driver leaves and sensor detects this , end time is recorded and driver will be charged accordingly. Funds will be transferred to homeowner
- **Considerations:**
    - Parking confirmation will be a 2 step process to deal with unwanted sensor triggers from other objects besides a car - 1. User parks over sensor. 2. User has phone with app running and scans unique QR code at location provided by homeowner
    - What if driver is late and stays longer than time reserved? Charge for extra time only? Or also charge an additional penalty?
    - How much of a grace period to give? 5min?