Software Design Document – Samhitha, Matt, Palak (HackStreet Boys)

Statement of Goals

What is the problem you are solving? Include a short paragraph describing the application and its intended audience.

Major transitions in life can be challenging for many groups of people such as young adults trying to live on their own, new immigrant families, and older adults trying to live independently. Current real estate websites only provide housing options based on minimal criteria such as location, budget, bedroom, and bathroom needs.

However, no product effectively provides housing options based on other criteria such as proximity to public transportation, schools, shopping centers, and more. A dream home goes beyond the features and infrastructure. The surrounding community holds an equal weight in the decision. The perfect house can be found in many places, but a strong community transforms a house into a true home.

The proposed application is called HackStreet, which would be able to filter homes based on criteria that the user defines as significant in buying a home. The user would be able to select their desired zip code and whether specific places such as hospitals, or grocery stores are important to them. Additionally, a resource page would include multiple modules to teach first-time buyers important financial terms and definitions. This application hopes to increase financial literacy and increase confidence before purchasing a new home.

Functional Description – Minimum Viable Product (MVP)

What does the application *do*? Your functional description should include a simple set of prioritized features (1-3) that are essential for your user to achieve their goals and solve the problem.

The application will be an extension of popular home-finding websites such as Zillow. However, the app will use algorithms or public APIs that can easily display the homes in a desired area and satisfy the user's needs.

Feature 1: Take input from users on requested wants and needs for housing. For example, distance from a hospital, public transportation, and other user-defined metrics.

Feature 2: Using user-inputted data along with an API of available housing, suggest multiple homes that fit the user's needs.

Feature 3: Module for learning what comes with living on your own (electricity, insurance, etc.). Allows young adults to understand the financial responsibilities that come with moving out.

Technical and Data Feasibility

What data does your application require?

Input from the user of requested location, price range, distance from certain businesses, etc. Also a map of open housing and prices. Additionally, it will require public school rankings so the parent users can learn about the rating and curriculum of the public schools in their district. The application also requires data about the current house listings, most likely from a public API from Zillow or similar real estate companies.

Where will you get it from?

Location, pricing, and such will be taken from the user, and a map of open housing and pricing will be either taken from a datasheet or API from Zillow. Specifically, the Zillow Listings

API will be used to access real-time house openings. The map component will come from public APIs as well, such as the TomTom API, MapQuest, or the Google Maps API. Public school ranking will be found using the Niche API.

What existing technologies/APIs does your app depend on?

It could run off of Zillow's listing API. Additionally, it would use APIs that include information about nearby hospitals and public transportation. A map API will most likely be used such as MapQuest or the TomTom API. The Niche API will be used to access public school rankings and data.

User Interface

Sketches of what the app will look like and the journey users will take as they click through the app. Include wireframes for each page, with detailed descriptions of the functionality represented.

Here are some wireframe examples:
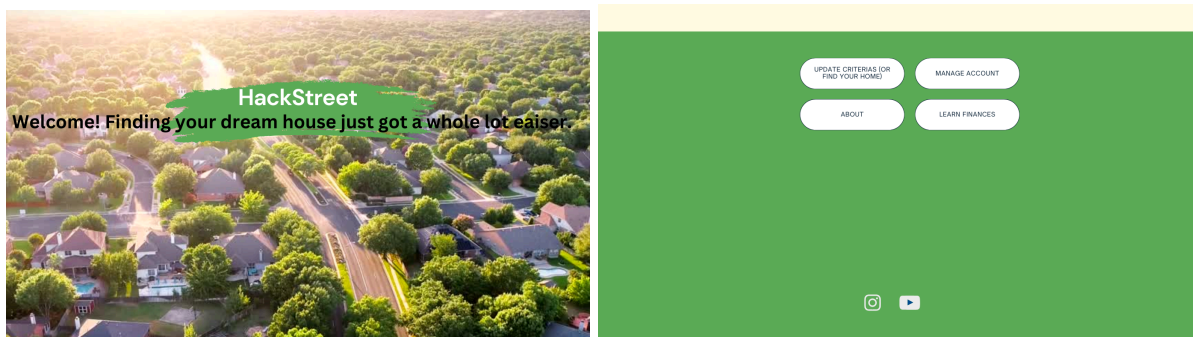
The home page would have a video and a welcome page to introduce the user to the website. When the user scrolls down, they will have multiple buttons to choose the specific service they want from the app.
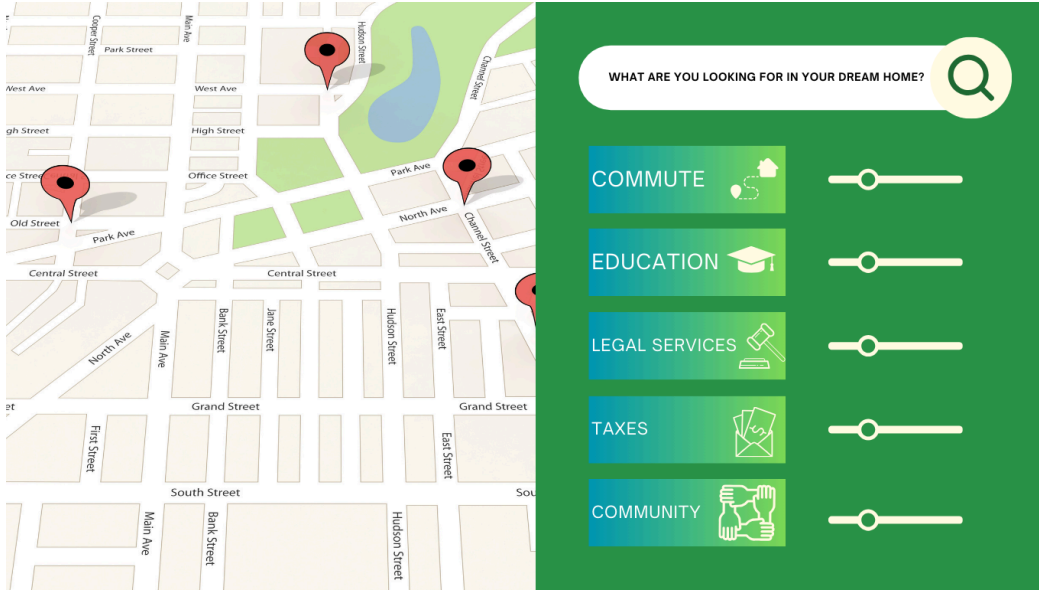
The criteria page would have a search bar where users can input their desired zip code. There would be scales where the user can enter the maximum distance from hospitals, schools, etc. The map would display all of the houses in the zip code area that matches the user's inputted criteria.
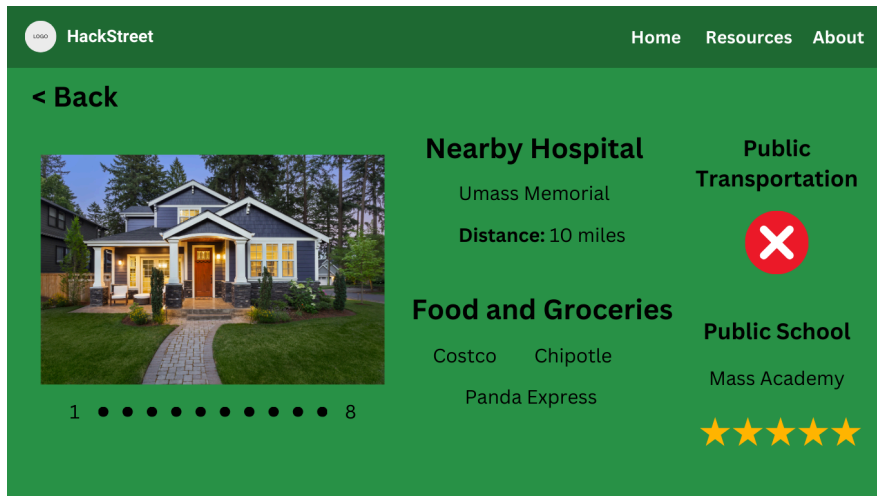
The user can press each home listing which would include data as shown in this wireframe. It would include images of the homes from the Zillow API and include hospital and grocery store data from the Map API. The Niche API will display the local school district and the rating of the school. Hospital and Public school data will be hyperlinked to the websites of the companies.

The Finance page will have different modules that define common financial terms and more resources for further information. After thorough research, we found that the most important financial terms include down payments, mortgages, loans, insurance, and other expenses that come with purchasing a new house.
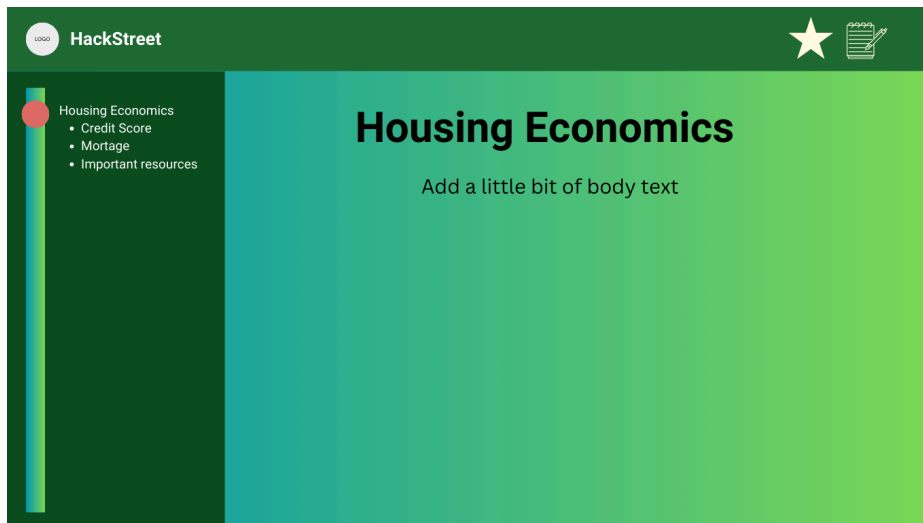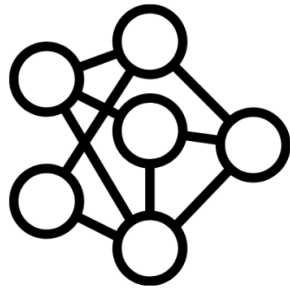

Each of the modules on the research page will open to another page that contains information about finance and important terms and definitions when buying a house.
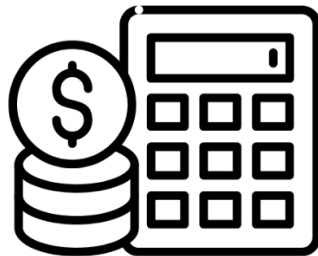
Flow Chart and/or Structural Diagram

User information

- Housing perferenaces
- Location
- budget
- Credit Score

Algorithm

- House lisitng recommendations

Modules

- Trainings to understand finances

How will data flow within the application?

The user input data will be stored locally on the application and used to present the optimal house listing as provided by real estate, public transportation, healthcare location, and other APIs used in the application. The user will make an account where their data is stored to their email address and they can access their specific criteria and modify it as needed.

For the Home Search feature, the user will input the zip code in which they want to see home listings. Using the Zillow Listings API, the home listings will be filtered to only include homes in the zip code entered.

Then, the user will enter their budget and the maximum distances for specific community places, such as hospitals, shopping malls, grocery stores, and restaurants. The Map API (Mapquest) will use the locations of all the open homes in the zip code and filter them out to make sure they satisfy the user's criteria. For example, it will filter homes based on price, ones that are close to hospitals, and filter that subset of homes based on one's closet to grocery stores, etc. If the user wants public transportation, the Map API will finally filter the homes based on districts that have public transportation. In the end, there will be small, but significant options of homes for the user to choose from. The users can select the homes, which will include data on public schools, and the exact distances in the criteria the user wants. The Niche API will use the town of each of the homes and display simple ranking data.

Additionally, Map APIs (MapQuest and Google Maps) have the ability to access websites and basic data about restaurants and hospitals. Along with public school rankings, the house modules will have links to websites and nearby grocery stores/restaurants so the user can further investigate the community of the homes.

Does the application require user input?

The user will be able to enter information on the following criteria that will be stored locally on the application to search for their dream house:

- Finances: Budget, estimated mortgage, and compatibility with one's credit score
- General: location, type of housing, number of rooms and bathrooms, and other amenities
- Specialized: schooling preferences, proximity to healthcare services and public transportation, sense of community (determined by online resident reviews and age ranges of residents).

Does the application require the use of sensors?

No, the app does not require the use of sensors.

Map out the algorithms from the perspective of your app in your program (include user input, data storage, and other program flow details).

House Search		
Function	Description	API/Algorithm

Selecting criteria and constraints	Finding the perfect home is a challenging process as a wide range of variables must be considered to make the right decision. Our goal is to narrow down the dream home list efficiently by allowing the user to input a variety of criteria and constraints. The user will be able to modify their preferences as many times as they like.	A Decision Matrix will allow the user to rank the preferences selected by the user in the categories provided. Below is the default prioritize that will be embedded in the application, however, the user will have the ability to modify that.
		1. Financial constraints
		   a. Budget
		   b. Estimated Mortage
		   c. Credit score
		2. Essential Needs
		   a. Public transportation
		   b. Proximity to healthcare
		   c. Neighborhood safety
		3. Good to have
		   a. Shopping facilities
		   b. School services
		   c. Sense of community
		   d. Age of Residents

Home listings	The home listing provided to them will be tailored to their needs and wants and will be presented in a map and list format.	The Zillow and other publicly accessible real estate APIs will be used to access houses on markets: https://www.zillowgroup.com/developers/api/rentals/listing-api/ The Niche and Great Schools API will be used to find school listings in an area. Niche also provides safety ranking and a sense of community factor.
Bookmarking homes of interest	The homes that are bookmarked will be displayed on a separate page and each home's features will be listed in a way to make comparison easier.	

Decision Making	The user will be able to further shortlist their selection by adding their rating, and other reflections from open house visits, and rank the importance of different features to facilitate efficient decision-making.	

Financial Literacy		
Function	Description	API/Algorithm
Learn about the finances required to live independently	The application will provide modules and lessons for the user to learn about the journey of building a strong credit score and the financial aspect of living independently. The modules will include access to videos, websites, legal services, and informational articles to learn the 101 of financing and provide dynamic checklists and trackers for the user to keep their financial journey organized. The user will be provided with a list of resources and legal services to contact based on their expertise in home financing.	Collect information from government and reliable websites and provide access to online mortgage and credit score calculators. The Zillow API also provides a framework to connect with real estate agents, however incorporating this feature is not a priority for us to include as connecting with real estate agents can be done from existing applications after a user develops their dream home lists using our application.

Persistent Storage

How does your application store data?

The data will be stored locally and will be available even if the user closes the app. More research will be done about saving user information in the background of the device.

What data needs to be saved?

The user's criteria need to be saved so the application can provide the best housing information.

Where does it need to be saved? The application will store data about the user locally but housing information will be updated regularly from the cloud.