Search4House
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Team 35
CS 157A Sec 01

1 Project Description

1.1 Overview

This project will be a database application that is hosted for the housing industry to become easier to manage, and provide a simplified process for finding, arranging, and dealing with these properties. Its purpose is to create a single interface that allows the best interaction experience between the renter and the rentee.

1.1.1 The goal of this project is to build a community of housing-seekers and building owners to be able to find each other and match together to find a balance between those who need rooms and others who are looking to rent out spaces and get some extra cash. The demand for such an application is strong within the area surrounding SJSU, with so many students posting on several different social applications in order to find what would be the perfect fit for them. However, using such methods is not as effective as having a single web app that could do all of the research and matching done for a user, minimizing time, struggles, and energy for the users.

1.1.2 Currently, it is not easy to accomplish trustworthy research when it comes to finding housing accommodation, especially in Downtown San Jose, CA, where many San Jose State University students spend long durations of time seeking even just a bed to use for a night, instead of commuting far away, or paying thousands of dollars for a full apartment or even studio in the area. Our motivation is our own struggles going through this hunting party to find the best match for location, price, roommates, and lease length. As the economy in The Bay Area's Silicon Valley grows, so does the costs of living, which includes rent. Taking this into account with school tuition, and other living fees and expenses, having such an app could truly help many students save money in space that they may not be using.

1.1.3 The stakeholders for such a project idea would obviously be the students of that local university. These are the users that would get the primary benefit from having an application like this around and distributed to the neighborhoods within walking distance of the school. They would be finding the cheapest rent costs nearby and saving significant amounts of money that will add up after several months of discounted rent, minimizing some struggles related to housing and decreasing possible homelessness. The other users that would make sense to have as common stakeholders are the rentees, or the people with extra space to rent out, whether it's just a bed or area on the floor in a room to sleep in, to full rooms in houses, to apartments in a building, to a whole mansion. The range is very wide in order to accommodate people with different housing requirements, and access based on needs and available income. The owners of these places would be able to get more income on the side, through renting out to anyone starting from a single roommate to a large number of people willing to

live together to lower the rent paid by each renter, and still provide the homeowner good income.

Less common stakeholders could be neighbors of those renting out their spaces, because sometimes having so many roommates in a single space as neighbors could be very loud or messy or just uncomfortable. These people would need to adjust to the new number of people living near them, or at the very least have to come to an understanding or compromise about some rules which may involve noise levels, having friends over, and keeping parking spaces available. Another group that may also be forgotten about often times is the families of the students who are moving into housing locations on this application. Their emotions do play an aspect in how happy the students are living with strange people rather than back home with family, for the cost of commuting plus vs the rent of the apartment or room. Having worried or unsupportive family members could make the experience so much worse and harder than it should be if not all parties have settled with the issue.
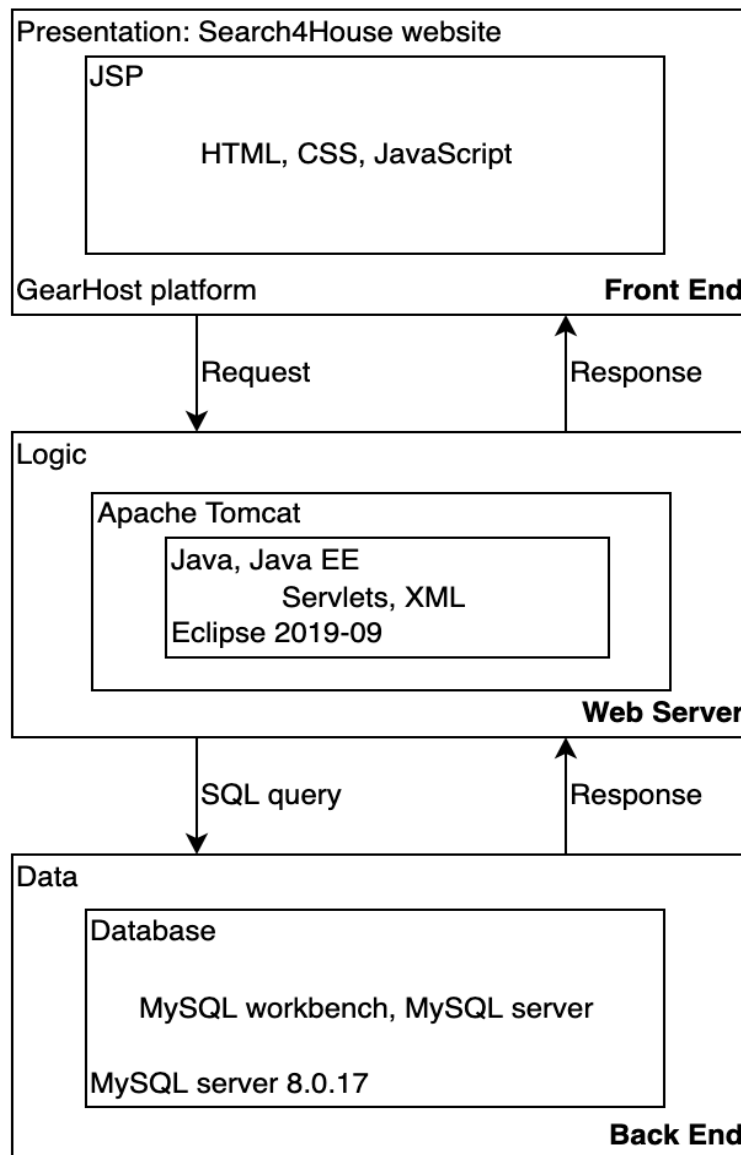
1.1.4 The application domain is the housing industry in the neighborhoods in the areas near big city colleges and other places with condensed populations. This industry currently has many old school organizations successfully working in this department, and there are newer methods that are similar applications, but these either do not provide all of the options in an area, so one may not be able to find the best deal if it's not posted onto the application, or that the greatest deals found are all from scammers, and that there is nothing realistic about how many matches are made through the application. Our workaround is to look through other authenticated housing listings and set up a reference post on our web app as well, and also make sure to have all rentees' posted listings be authenticated and proved as a true place with accurate numbers, statistics, and rent costs.

1.1.5 As mentioned all throughout the description, this project will provide the best deals for students to find housing nearby to their colleges, and the homeowners in the area would be able to rent out parts of their houses, full rooms, or share apartments for some extra income while making use of unused space. A typical user of this application would either be someone looking to make some money and rent out a space, or someone, usually a college student, looking for housing near a university, or in a large city. For example, a rentee could be someone who owns a large house and just simply has too much space and is looking for someone to live with them and possibly be friends with, or at least provide a little extra income for. It could also be someone renting out an apartment but would like to contribute some help to the community, so they provide some housing for anyone in need. Another possibility is that a bunch of college students are rooming together, but are focusing on school, so to afford rent they need even more roommates, and manage to split it with even more

people and for each to pay less. On the other hand, a renter could be a homeless person who just got a job, but does not have enough money saved to get their own place, or an international student who needs nearby housing for the time period of their student visa, or just a teenager looking to move out of their parents' or family's house and start living their life independently and on their own. These are all potential combinations for users to be matched up for housing with our application.

2 System Environment

2.1 Structure of the System:

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┌─────────────────────────────────────────────┐
│ Presentation: Search4House website          │
│   ┌───────────────────────────────────┐     │
│   │JSP                                │     │
│   │                                   │     │
│   │      HTML, CSS, JavaScript        │     │
│   │                                   │     │
│   │                                   │     │
│   └───────────────────────────────────┘     │
│ GearHost platform              Front End     │
└─────────────────────────────────────────────┘
            │ Request          ▲ Response
            ▼                  │
┌─────────────────────────────────────────────┐
│ Logic                                        │
│   ┌───────────────────────────────────┐     │
│   │Apache Tomcat                      │     │
│   │   ┌──────────────────────────┐    │     │
│   │   │Java, Java EE             │    │     │
│   │   │       Servlets, XML      │    │     │
│   │   │Eclipse 2019-09           │    │     │
│   │   └──────────────────────────┘    │     │
│   └───────────────────────────────────┘     │
│                              Web Server      │
└─────────────────────────────────────────────┘
            │ SQL query        ▲ Response
            ▼                  │
┌─────────────────────────────────────────────┐
│ Data                                         │
│   ┌───────────────────────────────────┐     │
│   │Database                           │     │
│   │                                   │     │
│   │   MySQL workbench, MySQL server   │     │
│   │                                   │     │
│   │MySQL server 8.0.17                │     │
│   └───────────────────────────────────┘     │
│                              Back End        │
└─────────────────────────────────────────────┘
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2.2 Hardware/Software:

2.2.1. Apache Tomcat v8.5 Server:

Apache Tomcat, an open-source web server, allows users to run their web-based applications developed with Java on their local host servers. With the server, users are able to run Java Server Pages, JSP, files and Java servlets, Java programs.

2.2.2. Eclipse IDE for 2019-09:

An integrated development environment for Java Enterprise Edition (EE) used for web-development and web-applications. It includes the tools required to develop in both Java and JavaScript.

2.2.3. MacOS/Windows OS:

Our team will be using both Mac and Windows operating systems based on each members' preferences. Regardless of the OS, all members will be using the same software to develop the system.

2.2.4. GearHost

GearHost is a free web-hosting platform that allows for MySQL database testing. The platform allows users to directly publish from either their computer or from their git, making it easy for us to pull from a local or remote location.

2.3 RDBMS:

2.3.1. MySQL server 8.0.17:

Our team will be using MySQL to input, edit, and store our data. The server will be ran within our local host for running and testing during early development.

2.3.2. MySQL Workbench v8.0.17:

MySQL Workbench is a tool used for MySQL database development that allows users to visually view their database structure and values. Users can also generate and manage their database directly through the workbench.

2.4 Application languages:

2.4.1. Java 8:

Our team will be using Java for our main code. Our team is most familiar with this language and with MySQL Connector/J, it would be easy to connect our Java code to MySQL.

2.4.2. Java EE:

Java EE is built based on the regular Java programming language and also includes required tools for web development. Java EE allows for the 3-tier architecture in web development: presentation, logic, and data.

2.4.3. HTML:
HTML, Hypertext Markup Language, will be used for designing the basic formatting layout for our website.

2.4.4. CSS:
CSS, Cascading Style Sheets, will be used for designing the presentation version of our website. It will work along with HTML.

2.4.5. JavaScript:
JavaScript will be used for dynamic functions that directly communicates with HTML and user interactions and be able to communicate with the database.

2.4.6. XML:
XML, eXtensible Markup Language, will set rules and constraints on storing and sharing when publishing the data on the internet.

2.4.7. SQL:
SQL is the language used for MySQL. This will be the primary language used for database management.

3 Functional Requirements

3.1 Users and their permissions:
The user will open their browser and type in our website into the address bar. Once they enter that, they should be on our website. From there, the user can do multiple things. There are a few other options the user can do upon entering the website, including logging into their own personal account. Users are limited to editing their own data and any data they have created. That person can be a guest, or a registered user. A guest only has the ability to read, while a user has the ability to read and write. The system is functional for those looking for housing, and those who are looking to put up a listing onto the website. The former has the ability to read, and the latter has the ability to write, but as long as they are users, they have both options open to them.

3.2 Functions, functional processes, and I/O:

3.2.1a: Creating an Account:
If they do not already have an account, they would be able to do so by navigating to the new user button next to the returning user button. All they need to input is a login name and password to be able to create an account.

3.2.1b: Returning User
If s/he is a returning user, all the user needs to do is click on the returning user button and it will redirect them to the page asking them to type in their username and password. On failure to do so will prompt them to try again, or to create a new user. On success will lead them back to the home

page to resume their interactions. If they would like to log out of their account, there is a logout button where the new user button used to be.

3.2.2: Editing Profile:

If the user would like to edit their profile, they can do so by heading to the top right of the homepage. If the user is logged in, instead of the log-in button there would be a button named profile that they can click which would redirect them to a webpage that contains their user information. There they can edit any information that they have access to and apply those changes. There are also some other options that they can view and edit while on this webpage such as any listing that they have added to a favorites list, or any listing that they have uploaded themselves.

3.2.3a: Searching:

On the homepage, the user can click on the search bar in the middle of the page and start typing keywords like "bedroom apartment," "room for rent," or "shared room" to start searching and help refine those search results. If they would rather look at all results our websites has, they could push a button under the search bar to look at all the results on the website.

3.2.3b: Filtering

If they want to refine these results even further, we have a filter on the side of the results that can search for desired results. Whether they are searching for a house, shared house, apartment, room, or shared room they can narrow down the search results to their heart's content by clicking on the boxes which checks off that specification in the filter menu and clicking the apply button. Similarly, the filter also includes other categories such as the number of roommates or housemates, size of the bedroom or house, amount of bathrooms and bedrooms, other necessities like air conditioning or having a pool, price range, and duration of the lease all of which are on the filter bar to the side of the search results. If the filtered results are not to the liking of the user, s/he can compromise and remove one or more of the filters by unchecking the marked box(es) and clicking apply to expand the results in order to find a better housing option.

3.2.4: View Listing:

If the user has selected a housing option, they can expand on their chosen by clicking the expand button which would redirect them to the page containing all the information on the listing. On that webpage, the person can find all the information pertaining to the listing as well as additional information like the contact information of the person who input the listing. The user could also message the person on the website and converse that way.

3.2.5: Favorite List:

If multiple listings are found to be favorable, but the user still wants to look around, the user can click the star button next to the listing to put it onto their favorites list to look at later. This list can be viewed in their profile. If the user wanted to view this list, they would head to their profile and a button on the webpage of the profile would say favorite. By clicking this button, it will redirect them to a different webpage that contains all the favorited listings. From here, they can either view the listing by clicking on the expand button, or unfavorite the listing by clicking on the star button again.

3.2.6: Creating a Listing:

If the user is looking to put up a listing onto the website, on the homepage, there is a button stating, "put up listing." If the user is not already logged in, then it will redirect them to do so. If the user is already logged in, then it will redirect them to a different webpage that will prompt them for information on the lodge such as pricing, bedrooms, bathrooms, the number of people who will be living there, any extra amenities provided, etc. It will also prompt the user for some contact information in case someone does take an interest in the listing. Once all the needed information has been successfully inputted, the user can press the submit button at the bottom of the page to put the listing in our database for our website to display. If the needed information was failed to be inputted, it the webpage will display an error stating to the user to input information in the required boxes.

3.2.7: Editing a Listing:

If the user would like to instead edit or take down a listing that they had put up, if they are logged in, they can head to their profile where that information. Once at the profile, the user can click on the listings button on the side of their profile which will redirect them to a webpage displaying all their listings. If the user clicks on one of the listings, then a popup will display prompting the user to either view, edit, or delete the listing. View will take the user to the webpage of the listing, edit will take the user to a webpage to edit the listing, and delete will prompt the user to make sure that they want to delete the listing before deleting it.

4 Non-functional Issues

4.1 Graphical User Interface (GUI):

The website will have some basic components: log in/out button and a search bar. These are the essential components for the front page. When pressing on the login button, it will send the user to a page where the user will be able to fill out their credentials with a login button underneath. The front page will also show 3-5 random listings from the listing database. The search bar will be at the top of the front page. The search bar will toggle down and allow the user to input keywords or select filters such as the type of housing. Once the user is logged in, the login button changes to a logout button and a "View Profile" hyperlink will appear next to it. The front page will now show the option to create a listing and view listings. The listing creation page will be a form that the user will fill out and will include variables to be filled out such as a title, pricing, number of bedrooms and bathrooms, and housing type. On the same page, the renter must provide a phone number and email address as well and a "Submit" button will be enabled at the bottom of the form once every requirement is filled out. When selecting the view listings page, it will give the user the option to select different categories of listings such as "House" or "Room." From there, the user will be shown a page of listings of that category. When the user selects the "View Profile," it will show the user's information including name, profile picture, description, and listings. From here, the user is able to edit each information. When editing the listings, it will send the user to another page that shows all their listings and an "edit" hypertext. Once pressed, the user will be sent to a page that has all of the listing information filled out, and the user will be able to edit and press the "Confirm Changes" button at the bottom of the form.

4.2 Security:

Each user will require an email and password in order to login and access listings that only they have created and their own personal account information. The email and password will be stored in the server's database and no users will be able to have access to view this.

4.3 Access Control:

Users will have access to their house listings and information such as description and pricing corresponding to it. Because they have access to this, users will be allowed to modify their listings through editing, deleting, or adding more listings. Users will be able to access their account information; this includes their name, contact information, and profile picture. However, users will not have direct access to the database in which their accounts and listings reside in. If they wish to make any changes to these, they will send a request to the database. The logic tier will read the changes and make changes to the database accordingly.