

Software Engineering CSC648/848 Spring 2019

~ Project Pegasus ~

Team Number 104

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Executive Summary

We are Team Pegasus. In this document we propose a housing search web application exclusive to university students. The application will focus initially on San Francisco State University (SFSU) students, with later expansion to students attending universities and colleges around the US. Students have unique requirements when it comes to housing. Most have a limited budget and expect to live with roommates, where an incompatible roommate can cause extra stress in a student's already hectic life. Many are moving out of their parents' homes for the first time, or relocating from elsewhere in the US or abroad, with little knowledge of the local neighborhoods. Many students hold jobs off campus, and require housing that allows them to commute easily both to campus and to their workplace. Unlike typical housing seekers, students follow a university schedule, often wishing to leave the university area during summer or winter breaks. Current housing search applications fail to address these unique challenges.

The Pegasus platform provides the functionality of currently available applications, allowing users to search for housing by type, size, neighborhood, nearby locales, and amenities. However, our application provides significant added value in addressing student-specific challenges. Most importantly, Pegasus incorporates a student neighbor network, through which registered students can get to know one another before electing to live together. It allows students who are looking for roommates to provide information about themselves, and to see information about students seeking housing. A roommate compatibility score helps prevent roommate related stress, by matching students based on preferences for cleanliness, social habits, pets, special skills, etc. The student neighbor network also provides pages where students can post about their neighborhood, and prospective tenants can decide which neighborhoods fit their needs.

Pegasus will be easier to use for landlords, property managers, and student residents as well. A handy calendar feature allows those listing a residence to provide their availability for open houses, where prospective tenants can sign up with one click. Upon signing up for an open house, the prospective tenant's information is shared with the lister, and their name is added to the guest list for that time slot. The lister can then easily contact the entire guest list if more information about the listing needs to be shared, or if they require more information (such as an official application) from the prospective tenants.

Pegasus will make better use of maps than currently available housing search sites. The geographic overlay will allow intuitive searching by neighborhood, and will give users the option to view local points of interest and navigate from the residence to the university, as well as the student's saved locations, such as their workplace or childcare center. The user will have the option to view nearby shops, restaurants, parks, hospitals, and other services, as well as commute information and crime rate. This information can be selected or deselected to allow the user to view as much or as little information at a time as they'd like. Students will also be able to save their searches and preferences to a watch list, and can receive notifications. Together, these added features make Pegasus a valuable resource for the student community.

Personas and User Stories

Within each category, personas / user stories are numbered by priority.

Students

1. **Alessandro Russo.** 32-year old Alessandro is an international graduate student, currently majoring in medieval history. He is coming to the United States for the first time in his life. He expects to work on campus, and so he would like to be able to get an apartment or other residence as close to campus as possible. As this is his first time in San Francisco, he would like to get to know potential roommates before deciding to move in with them. He is also unfamiliar with the weather and general community surrounding San Francisco, and would like to be able to discuss with people who already live there to get a better idea of what San Francisco is like to live in. He likes to cook, and would very often cook his favorite foods for his friends back home. On the weekends, he plays football (soccer, to us) and watches action films on Netflix. During the F1 racing season, he would host parties with his friends back home where he would make his favorite dish-- arancini di riso, along with a few calzones and sparkling wine.
2. **Ally Simmons.** Ally, short for Allison, is a 22 year-old sophomore currently studying at San Francisco State. She recently landed a marketing internship with the Museum of Ice Cream in downtown San Francisco. She was able to schedule all of her classes on Mondays and Wednesdays, leaving the rest of the week free for her internship. However, she feels that commuting all the way downtown from Park Merced is a bit more commuting than she would like to do. Because of this, and constant disagreements with her current roommate, she is trying to look for a place somewhere between the Financial District and Park Merced, so as to cut down on her overall commute time. She would also like to stay with other finance or marketing majors who would be able to help her if she gets stuck on a problem with her new internship, since most of her friends are either majoring in Biology, Chemistry, or Music. When she's not studying, she likes to find cheap things to do in San Francisco, like visiting local artists' open studios, or buying tickets to and attending shows. She also enjoys roller blading in Golden Gate Park on the weekends and flying kites with her dog Spot on Ocean Beach. She's had Spot for 10 years now, and she really isn't willing to give him up-- her new living space must be okay with pets.
3. **Kyle Mallison.** Kyle is a 22 year-old senior civil engineer who only has one semester left before he graduates SFSU. His grades are decent, but he much more enjoys spending time hanging out with his friends and his girlfriend Patty than he does studying. His parents live up north in Chico, so on most weekends where he has not made plans playing basketball or hiking with his friends, he and Patty drive up north to spend the weekend with his parents. When his schedule permits, he occasionally spends time at the gym on campus. The lease at his current apartment is up and he was not able to renew it. He doesn't know where he'll get his full time job when he graduates, so he doesn't want to commit to another long term lease and would rather find something close

to campus for the next semester. Currently, he and Patty live apart-- with his next lease, Kyle is looking for a place where both he and Patty can live together, albeit for just a semester.

4. **Sheryl Sinclair.** 32-year old Sheryl Sinclair is currently studying to become a nurse at SFSU. She already possesses a degree in Psychology, but realized that a few years after her initial graduation that there weren't many jobs in her field that she would seriously enjoy doing for an extended period of time. Her decision to return to school was also partly influenced by her husband, Joseph. Joseph works as a manager at Qualcomm, and is able to make a decent living to support Sheryl, but is in doubt if he alone would be able to support Sheryl along with the child that is soon to come. Given this, Joseph convinced Sheryl to return to school and hopefully land a well-paying and long-lasting job in a few years that will give them the financial security they need to raise their family. Because she is now going back to school, Sheryl would like to move closer to State. Given her circumstances, Sheryl and Joseph's number one priority when looking for new places is it must provide enough room for both Sheryl, Joseph, and Eliza, their soon to be daughter. Proximity to other child-centric services are also of major import-- daycare and kindergarten, for example. In addition, their new lodgings must be safe-- it simply will not do to bring a child into a place that she herself does not feel is safe, Sheryl often exclaims.

Landlords / Tenants

1. **Marybeth Lawson.** Originally born and raised in Orange County, 42-year-old Marybeth Lawson spent her early career working as a property manager for an apartment complex in Irvine. In 1998, she met her eventual husband, Samuel Lawson, while he was visiting from Fremont for a conference. One year later, the recently married couple moved to a quiet neighborhood in El Cerrito. Luckily for Marybeth, her apartment management company also owned a few properties in the East Bay. She was able to quickly get back to work replacing a retired property manager of an apartment building in Berkeley. Although not incredibly tech savvy, Marybeth has extensive experience working in property management and knows that using every tool and technology is essential to finding tenants to fill all her units, including apartment listing services. From her previous time managing the property in Irvine, she had plenty of positive experiences leasing units to college students. And given her property's proximity to several major universities, it would be beneficial for her to do the same in Berkeley. Unfortunately, most listing sites do not provide a distinction between students searching for housing and other potential tenants. She would like to have a service that allows her to quickly post listings for available units, and also allow her to quickly get in contact with interested applicants. In addition, one of her most important tasks is advertising the dates for her complex's annual open house for prospective tenants. In her marginal free time, Marybeth enjoys hiking with her husband and reading mystery novels by the fireplace.

2. **Andy Clarkson.** Andy, which strangely enough is not short for anything, is a 20 year-old sophomore applied mathematics major. He is actually currently leasing an apartment through our service, but his roommate Jackson unfortunately had to leave-- Jackson recently got engaged, and he and his soon-to-be wife Samantha were able to move together up to Humboldt, which is both cheaper, and better for Samantha's prospective career in agriculture. Though Andy is incredibly happy for both Jackson and Samantha, he needs to find a new roommate soon or he won't be able to afford the rent of his place. Since Andy himself is still studying, it would make sense to bunk with another student. However, Andy would like to make sure this student would be a good fit for him before signing the contract.
3. **Don McIntyre.** "Donny" to his mother and "Grampy Don" to his grandchildren, 75-year old Don McIntyre is a retired sailor currently living in a two story corner house near Merced Heights. Don graduated from SFSU with a degree in marine biology back in 1964 and went to into the armed forces shortly thereafter. Specifically, he served with the Navy during the Vietnam War. When he returned, he wasn't sure what exactly to do. He ended up working as a lead researcher for the National Oceanic and Atmospheric Administration. As Don got older, he began to want to share his love of the sea with the younger generations, and became a professor of marine biology at SFSU during most of the 90s and the early 2000s. Since the passage of his wife in 2015, his house now has a few spare rooms and knowing the housing crisis in San Francisco, he is willing to rent out a few of his rooms to current students of SFSU. Though he is very well versed in the world of marine technology, his ability to navigate smartphones and modern websites is certainly not the best, and while he can usually can do everything he needs to on his computer on his own, it may take him a little while longer than someone else.

Administrators

1. **Velvet Crowe.** Velvet, 24, has recently graduated from SFSU with an undergraduate degree in medicine. She is hoping to further her career and perhaps pursue nursing. She has decided to take a short break from studying though. This is not to say she isn't working on anything though-- far from it. Through a series of connections, she was able to land a job maintaining the listings for our Pegasus service. She has mentioned that she would prefer the UI to be easy to use, and to allow her to more quickly approve or reject prospective lists that come through. Though this service is still small, having to sort through listings one by one can certainly be laborious task, but an important one nonetheless. In the spare amount of free time she does have where she's not helping improve Pegasus, she often plays video games on her Playstation 4.

Data Definitions

- **Student**: a student at San Francisco State University. Can be a Registered User, an Unregistered User, or a non-user.
- **Unregistered User**: a user who does not have an account or is not currently logged in. They use the website to browse listings and be able to create account.
- **Registered User**: a user who has an account and is currently logged in. They use the website to browse listings and contact landlords.
- **Administrator**: a user who has elevated privileges including access to the website database. They use the website to perform administrative tasks and to moderate listings and users.
- **Domicile**: a residence, which can be an apartment, house, room, garage, half-room, or other rentable dwelling.
- **Landlord**: The owner of a domicile, which can be a private homeowner or a property management company. They have an account and are logged in. They use the website to browse listings, post listings, and receive messages from registered users.
- **Tenant**: Current resident of a domicile. Tenants can create listings to rent out portions of their current domicile.
- **Listing**: the entity that represents a property for rent. Listings contain information on location, property amenities, number of bedrooms, number of bathrooms, price, and landlords. Listings are posted by landlords and available to users. Listings may be moderated at the discretion of the administrator.

Initial List of Functional Requirements

In order of priority. *User stories are referenced by category and number, from S1-S4, L1-L3, or A1, where S: Student; L: Landlord/tenant; A: Administrator, and the number refers to their number in the above personas / user stories section.*

1. **Post listings.** Landlords and tenants will be able to create listings with information about their domicile. Information includes square footage, type of domicile, price, number of occupants, length of commitment, parking, utilities policy, number of each type of room, pet policy, amenities, furnished or unfurnished, individual or group leasing, disability accessibility, and subletting policy. Listings may also include information regarding types of security, renovation status, move-in specials, noise levels and policy, rent control policy, age of the building, or lease renewal. Each listing will also have at least one picture of the domicile. The site administrator will approve all listings prior to posting. *L1, L2, L3, A1.*
2. **Search and Filter.** Registered and unregistered users can search available domiciles using filters for proximity to school, size and type of the domicile (private bedroom in a house or apartment, shared bedroom, private apartment), price range, number of occupants, utilities included, pet friendliness, furnished or unfurnished, length of commitment, parking, rent control policy, security type, noise level, renters insurance requirements, subletting policy, rent payment methods, in-unit laundry, gym, individual or group leasing, disability accessibility, age of building, etc. *S1, S2, S3, S4.*
3. **Registration.** University students will be able to register, create an account and student profile, and contact landlords, tenants, and other registered users through the site. *S1, S2, S3, S4.*
4. **Geographic overlay.** Registered and unregistered users can visualize the available apartments on a geographic overlay. Users can additionally use the geographic overlay to map their route from the apartment to campus, or from the apartment to another selected location (such as their work address, or child care), or place markers for points of interest. Users can also visualize nearby landmarks, like parks, grocery stores, or transit stops. *S1, S2, S3, S4.*
5. **Messaging.** Registered users can message each other without having to reveal personal email addresses or phone numbers. Registered users can also contact landlords and tenants through the messaging function. *S1, S2, S3, S4, L1, L2, L3.*
6. **Calendar.** Landlords and tenants can create an embedded calendar with open-house hours that allow registered users to sign up. Signing up for an open house will forward the profile of the registered user to the landlord or tenant. Registered users will also be able to visualize which open houses they are registered for in an embedded calendar. *L1, L2, L3, S1, S2, S3, S4.*

7. **Application.** After registering for an open house, registered users can fill out any additional information required by the landlord or tenant. *L1, L2, L3.*
8. **Watch list.** Registered users can create a watch list for residences that meet their requirements. *S1, S2, S3, S4.*
9. **Notifications.** The application will have the ability to send notifications to registered users when a desired domicile becomes available, reminders for upcoming open houses. *S1, S2, S3, S4.*
10. **Find roommates.** Registered users will be able to seek out other registered students who are looking to co-lease a domicile. *S1, S2.*
11. **Neighborhood pages.** Registered users can post information about their neighborhoods in neighborhood pages, including neighborhood events, nearby services and entertainment, security, etc., and registered and unregistered users can view the pages to better understand each neighborhood. *S1, S2, S3, S4.*
12. **Comments, likes, and shares.** Registered users can comment, like, and share listings with their connections. Users will also be able to view reviews for a neighborhood or domicile. *S1, S2, S3, S4.*
13. **Classifieds pages.** Pages allow users to share information about moving services, or buying / selling furniture and household items. *S1, S2, S3, S4.*
14. **Daytime and nighttime photos.** Landlords and tenants are required to post photos of their listings that encompass two different lighting environments.

List of Non-Functional Requirements

1. Application shall be developed, tested, and deployed using tools specified in M0 and reviewed and approved by Nicholas Stepanov.
2. Application shall be optimized for standard desktop/laptop browsers and will render correctly on the two latest versions of two major browsers.
3. Data shall be stored in our chosen database on our deployment server.
4. Privacy of users shall be protected and all privacy policies will be appropriately communicated to the users.
5. Application shall be easy to use and intuitive.
6. No email clients shall be allowed.
7. Pay functionality shall not be implemented nor simulated.
8. Basic site security best practices shall be applied.
 - a. Web traffic should travel over HTTPS. Users must log in to be able to post or apply to listings. Login credentials must be stored in an encrypted format (preferably SHA-512).
9. Before posted live, all content (apartment listings and images) must be approved by site administrator.
10. Modern software engineering processes and practices shall be used as specified in the class, including collaborative and continuous software development.
11. The website shall prominently display the following exact text on all pages: "SFSU Software Engineering Project CSC 648-848, Spring 2019. For Demonstration Only." at the top of the WWW page.
12. The website shall be fast. Searching for and applying to listings should not take more than 3 seconds per event.
13. The website must have high fault tolerance.

Competitive Analysis

The chart below represents the current state of the competitive field. +/- is used to indicate presence or absence of the functionality.

	Team Pegasus	Zillow	Craigslist	Realtor	Trulia
Search by address (city, zip)	+	+	+	+	+
Filter (Price, #of bedrooms, etc)	+	+	+	+	+
Registered users (username/password) w/ ability to contact landlords	+	-	-	-	-
Integration of Google Maps	+	+	-	-	+
Integration of Google Calendar	+	-	-	-	-
Neighbor Network	+	-	-	-	-

Our Pegasus application provides greater benefit to students than the competitors above because of its more intuitive integration of geographical overlays, its use of Google Calendar, and its incorporation of the student neighbor network. Competitors like Zillow and Trulia offer a geographical overlay, but it is not especially useful. Zillow provides a map showing apartment locations, but does not use the locations to provide more information to the users. Trulia offers more information, including commute information, crime map, and nearby points of interest, but this information cannot be viewed simultaneously. The user interface is also not very intuitive, and requires a lot of navigation to find the right information. All of the competitive sites also offer ways to contact the lister of the property, but none include an embedded calendar. We believe this added functionality will make the task of setting up showings much easier for both landlords and registered users. The greatest benefit that Pegasus provides to students is registration and its integrated Student Neighbor Network. This network allows users to find and match with roommates, learn details about each neighborhood, find and use services, and foster a sense of community among SFSU students.

High-level System Requirements

1. Server Host: AWS
2. Operating System: Linux Ubuntu
3. Database: PostgreSQL
4. Web Server: Apache
5. Server-side Language: Python
6. Framework: Django
7. IDE: PyCharm
8. Supported Browsers: Chrome, Firefox
9. Additional technologies:
 - a. React
 - b. Google Maps API
 - c. Google Calendar API
 - d. Weather API
 - e. Bootstrap
 - f. JQuery

Team Pegasus

- ★ Brenna Tirumalashetty - Team Lead
- ★ Omar Alaniz - Scrum Master
- ★ Zachary Prince - Back End Lead and GitHub Master
- ★ Quan Lu - Back End Developer
- ★ Adan Guanlao - Back End / Front End Liaison
- ★ Fatma Khan - Front End Lead
- ★ Wafi Mohamed - Front End Developer

Checklist

- Team found a time slot to meet outside of class: **DONE**
- Github master chosen: **DONE**
- Team decided and agreed together on using the listed SW tools and deployment server: **DONE**
- Team ready and able to use the chosen back and front end frameworks and those who need to learn are working on it: **DONE**
- Team lead ensured that all team members read the final M1 and agree / understand it before submission: **ON TRACK**