

SW Engineering CSC 648-848-05 Fall2023

SFStudentRents.com

Team03

Milestone 1

Version 1.0

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History Table

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1. Executive Summary

SFStudentRent is dedicated to creating a secure and supportive community for university students searching for housing compatible roommates near their campus. Safety is our top priority, recognizing that students often need a safe and secure environment as they embark on their journey towards higher education and independent living. Our platform offers a range of key features to enhance the student housing experience. Firstly, we provide an extensive selection of housing listings, making it easier for students to find suitable apartments and houses in close proximity to their campus. Whether they're seeking short-term rentals or more long-term arrangements.

SFStudentRent is more than just a housing marketplace; it's a social platform tailored for students. We encourage interaction and networking among students by enabling them to post and share housing opportunities. Moreover, user profiles on our platform can include links to social media profiles, allowing for even more extensive connectivity. We understand the importance of finding the right roommate, and our platform facilitates this by providing detailed bio pages. These pages offer insights into potential roommates personalities and preferences, ensuring students can find compatible living arrangements that suit their needs and lifestyle.

SFStudentRent aims to empower students, not only by simplifying their housing search but also by fostering a sense of community and security. Our platform is designed to help students make informed choices, build supportive living environments, and focus on their academic pursuits. Join us in creating a secure and enriching student housing experience.

2. Main Use Cases

1. Use Case: Promote Real Estate Listing and Events

Actor: Real Estate Agent/ Company

General User: Prior to the platform's launch, real estate agents mainly depended on conventional advertising channels like handing out flyers or using websites like Craigslist and Zillow to sell properties. On these sites, potential clients would often need to start direct contact with agents if they wanted information about open houses. However, this scenario has changed since the introduction of our platform. After signing up on our platform, an agent can now effectively market their properties on a site made for housing and interaction. They can list the property and open houses here along with other relevant housing events. Users can watch, RSVP to, or even forward questions regarding these events. The platform also offers a unique capability that enables agents to create focused groups. Agents can assemble their listings, updates, and events through these groups. Users can then join these groups whether they are interested in a specific agent's services or the overall scope of a real estate organization. By doing this, they are guaranteed to receive regular updates and have easy access to the agent's information. As a result, the platform not only makes it easier for agents to advertise, but it also centralizes information access for potential tenants or buyers.

2. Use Case: Tenant Verification for Landlords

Actor: Landlord

Landlord: Finding dependable tenants has traditionally been a risky and uncertain task for landlords. With our site, landlords are better equipped to handle this difficulty. Landlords can submit rental listings by including property information after creating an account on the platform. Once the listing is active, prospective tenants can browse it, show their interest, and contact the landlord directly. As the inquiries come in, landlords don't have to fear that these are fraudulent since all users on the platform are verified. This methodical investigation confirms the legitimacy of each prospective tenant's identity and background, providing the landlord with a condensed but thorough report without violating privacy laws. The platform also has a student verification process in recognition of the fact that some landlords have a particular preference for

tenants who are students. As a result, the landlord has access to thorough, trustworthy information about each prospective renter, empowering them to make wise rental decisions. These functions let the platform act as a trusted intermediary between tenants and landlords, expediting the leasing process and encouraging real interactions.

3. **Use Case:** Registered User Verification

Actor: Registered User

Registered User: Before a user can fully engage with the site, beyond basic content viewing, they must complete a registration and verification process. This step ensures the user's authenticity, a vital aspect when interacting with property listings from landlords. Once registered, users gain access to features like commenting, posting roommate requests, and sharing personal profiles to engage more extensively with the community and listing. This verification process not only fosters trust but also enhances the overall experiences, empowering users to make meaningful connections, find suitable accommodations, and showcase their personalities and preferences to the world.

4. **Use Case:** Registered User Friend Request

Actor: Registered User

Registered User: A registered user must complete the registration and verification process to unlock enhanced interaction features on the site. Once registered and verified, users gain the ability to send friend requests to other registered users. This feature promotes a sense of security, as the site's background checks ensure that all users are genuine individuals. Users can confidently connect with others who share similar qualities and goals, through a suggested friends tab that will suggest users who are similar to what you might like, such as both being interested in door activities and searching for apartments in the same area. This shared compatibility makes adding friends an appealing and productive step in the process of finding potential roommates. Users can also search for a user individually to send a friend request, they can click their post or profile picture to get to their profile tab to then send them a friend request. By sending a friend request, registered users initiate a connection that allows them to

explore the possibilities of living together, fostering a community where like-minded individuals can pursue their housing goals with confidence.

5. Use Case: Landlord, New listing

Actor: Landlord (John)

Description: John is a landlord looking for someone to rent his 1 bedroom house. He had already registered on our website. So, he logs into his account, and clicks on the new listings button. He will be redirected to a new page and enter his home information in detail. His home data could be his address, some image, price, number of bedrooms and bathrooms, date available, his email or his phone number. Finally, after making the new listings, he enters the submit button to publish his new listings. Therefore, his new listing will be displayed on our website.

6. Use Case: Unregistered User,

Actor: Melissa

Description: Melissa, an unregistered user seeks to rent a house or apartment. Upon visiting our website, she encounters a user-friendly interface featuring a search bar and powerful filtering options. While pursuing, she notices advertisements for apartment rentals. Melissa's target is an apartment in California's Bay Area. She initiates her search by entering the zip code of her desired location into the search bar. The website promptly generates a list of apartments and houses, each with varying price points. To refine her search further, Melissa engages the filter feature. She specifies her preferences, opting for a one-bedroom, one-bathroom apartment, and sets price limits. With affordability in mind, she arranges the results from low to high prices. Upon discovering an interesting listing, Melissa endeavors to contact the landlord. However, the website reminds her to register as a user. Complying with this requirement, she provides her first name, last name, email address, and password, effectively becoming a registered user, enabling her to connect with the landlord effortlessly.

7. **Use Case:** Tenant, new listing

Actor: Registered User (Lisa)

Description: Lisa had a challenging year with her previous roommate, enduring mental stress, financial difficulties, and landlord disputes. Despite being the primary leaseholder, she struggled to enforce lease obligations and house rules. When the year-long lease ended, her landlord allowed her to stay and search for a roommate. Lisa, burdened by her demanding work schedule, turned to our website for help. Within just 30 minutes, she created an account and posted a listing. Shortly after, she found a compatible roommate. During the period between posting the listing and finding a roommate, our website sent notification to members who matched her criteria. This streamlined the search process made communication between Lisa and applicants effortless. Today, Lisa and her new roommate are content with their living arrangement, appreciating the ease and effectiveness of our services.

8. **Use Case:** Unregistered user, apartment seeking

Actor: Unregistered user (Tom)

Description: Tom, a busy professional preparing for a relocation to a new city many states away, faced the daunting task of finding a comfortable and secure place to live in an unfamiliar culture. In his search for a rental room, he scoured numerous renting websites, only to be left dissatisfied. While these platforms provided extensive listings, complete with photos, amenities, and pricing, they sorely lacked critical information about potential roommates. Determined to make an informed choice, Tom persevered in his search until he stumbled upon our website. Here, his confidence in making a decision was significantly bolstered. As a newcomer to the area, he grappled with legitimate concerns about the possibility of being taken advantage of. However, after creating an account on our platform, Tom scrolled through the media feed to see what was being promoted. Tom found another working professional also trying to save on money posting looking for roommates on the main feed. Tom opened the other users profile to find that they had similar matching qualities other than both being working

professionals, with their budgets being similar and desired location as well. Tom was able to see that this person was a real person as well through their social media pages being linked to the profile and being a verified through there. Tom found himself matched with a trustworthy roommate. Today, he enjoys a sense of security and contentment in his new city, all thanks to the positive experience facilitated by our platform.

9. **Use Case:** Searching the area

Actor: Registered user (Billy)

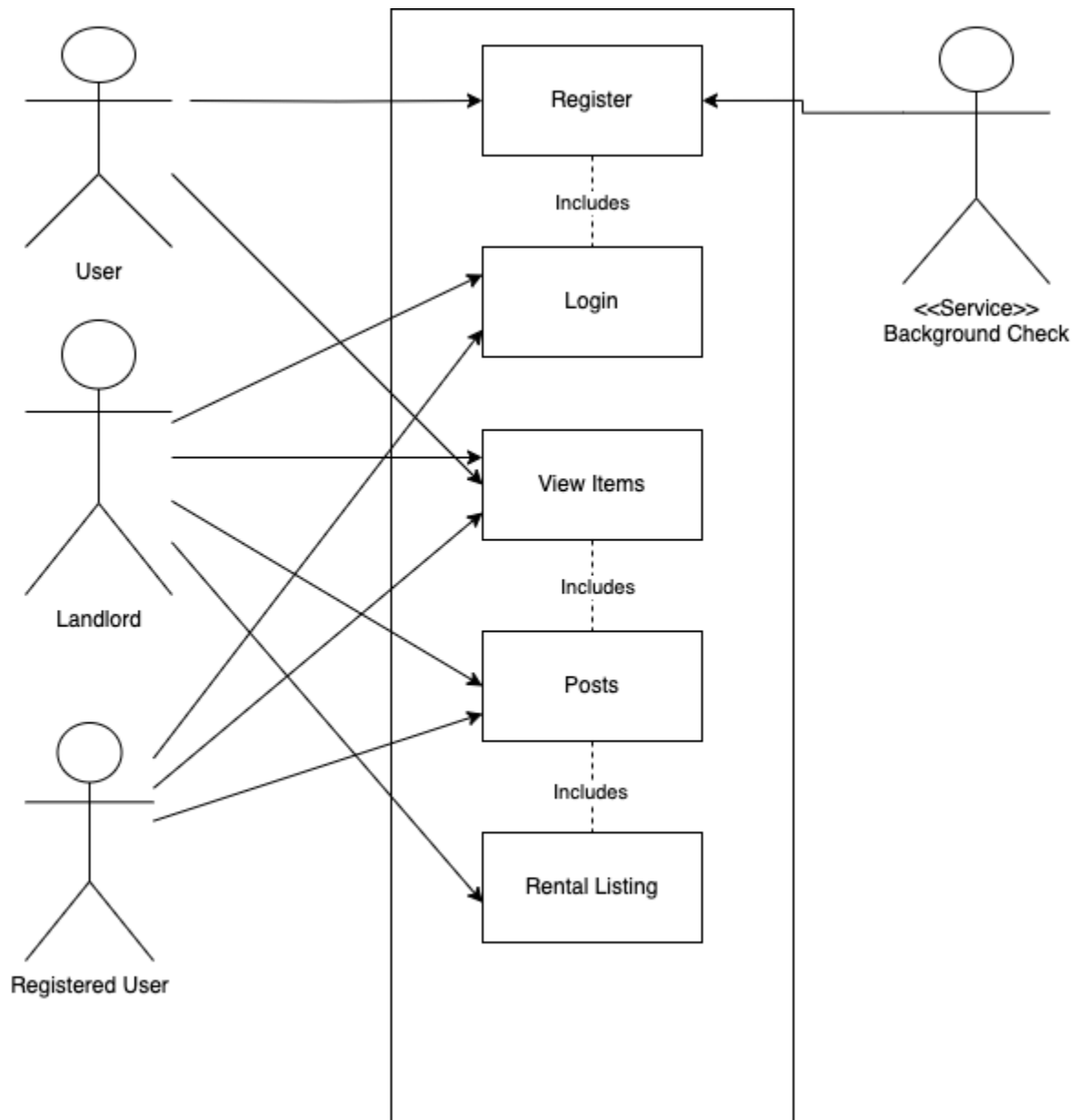
Description: Meet Billy, a regular user in our website to find a place to rent, he starts by typing in the area where he wants to rent, and our website helps him by suggesting places as he types. To make his search more specific, Billy can use filters, specifying how much he's willing to pay, how many bedrooms he wants and what extras he'd like in the place. When Billy sees a map on our site with markers, he can click on them to see the places available in those spots. It's like clicking on a map to see houses for rent in different neighborhoods. Here's the cool part. Billy can also draw a custom area on the map, and our side will show him places available in that area. It's saying "I want to see rentals only in this part of town". Billy is getting closer to finding his ideal rental place with every click.

10. **Use Case:** Setting up open houses

Actor: John (landlord)

Description: John, a landlord, is utilizing our website to connect with potential renters. His enthusiasm to showcase his property led him to create an open house listing on our platform. This comprehensive post includes crucial information such as the property's location, its appearance, and the scheduled viewing times. Prospective visitors can easily express their interest by signing up for the open house directly through the website. This sign-up process enables John to stay informed about who intends to visit his property. As the open house data approaches, both John and registered attendees receive timely notifications. These messages serve as reminders and confirmations, ensuring that everyone is well-prepared and eager for the upcoming

event. This streamlined process enhances the landlord's ability to showcase his property effectively and provides a smooth experience for potential renters.



3. List of Main Data Items and Entities w/ Attributes

1.User:

- UID (User ID)

2. Background Check:

- CheckID

3. Registered User:

- UID (User ID)
- Email
- Name
- Username
- Filters

4. Renter Account:

- RenterID

5. Location of Rental Listings:

- Maps
- Filter
- Search

6. Rental Listings:

- ListingID
- Bedrooms
- Bathrooms
- Price
- Location
- Filters
- Time and Date
- Home Type
- Option to add more

7. Posts:

- Post ID
- Time and Date

8. Messages:

- MessageID
- Message time and date
- CommentID
- Time and Date

9. Notification:

- NotificationID

10. Events:

- EventID
- Time and Date

11. Friend Request:

- Date and time of the request
- Status
- RequestID

12. Saved Properties List:

- Number of houses
- Similarities in houses
- Pricing
- ListID

13. Housing Cost Calculator:

- Number of residents
- Duration of lease
- Expected growth of the area
- Interest

14. Groups:

- GroupID
- Name

15. Reports:

- ReportID
- Time and Date

4. Initial list of functional requirements

1. User

- Users shall be able to register an account using a unique email and set up a password.
- Users shall be able to browse the site without an account but will not be able to interact with posts or other users.
- A user can reset their password if forgotten.
- The system should verify user identities securely through email or phone number verification

2. Background Check Integration

- All registered users that wish to rent or rent out their place shall be subject to a background check.
- Registered users can open the status of the background check.
- The system shall integrate with predefined screening criteria and business rules, allowing property managers to set specific eligibility criteria based on factors such as credit score, criminal history, rental history, and income

3. Registered User

- Registered users shall be given the option to make posts on the site.
- Registered users shall save rental listings to their saved properties list.
- Registered users shall send and receive friend requests.
- A register user shall be able to create one free renter Account 8
- A Registered User shall be able to form groups of other registered users they wish to house with 7
- A Registered User shall be able to link their social media accounts such as Instagram and Twitter

4. Location of Rental Listing

- Locations shall include campus area, neighborhood, and proximity to public transport.

- Rental listings shall be separated into regions, where users can view by clicking interactable map region
- Users should be able to filter and view listings by clicking on map markers or drawing custom search areas.
- Users may opt to receive notifications when new rental listings by distance from a specified location(e.g., within 5 miles of a particular address or point of interest)
- The system shall provide autocomplete suggestions to assist users in specifying the location

5. Rental Listing

- Registered users shall be able to create, update or delete their rental listings, specifying details such as number of bedrooms, bathrooms, etc.
- Each rental listing shall have a unique ListingID.

6. Posts

- Posts shall be only edited by the author.
- A post shall be able to contain text, multimedia content(photos, links) and other metadata.
- Posts shall allow comments, each with a unique commentID and creation timestamp.
- A post shall be able to get pinned by the creator with a maximum of three for his or her account
- A post shall be able to get promoted by the creator at least twice with the boost lasting two days

7. Messages

- Registered users shall be able to initiate private messages with one other registered user.

- The system should allow users to organize their messages, including archiving or deleting old messages
- Users should receive real-time notifications(e.g., push notifications or email notifications) when they receive a new message or when there are updates to existing messages

8. Notification

- Each notification shall have a unique NotificationID.
- Registered users shall receive a notification upon receiving a new message.
- A notification shall be able to be turned off or on by a register user or group through notification settings in the future

9. Events

- Registered users shall be able to set up events(open house, etc) for other users to see.
- An event shall have its own location, date, eventID, and a list of confirmed attendees.

10. Friend Request

- Registered users can send friend requests to connect with other registered users.
- Every friend request shall have an unique requestID, date of creation, date and time of approval or denial, and status.
- Register users sending the friend request shall allow permission changes for the requesting friend to view content.

11. Saved Properties List

- Users can create lists of saved properties.
- Each saved list shall have a unique ListID.
- Properties List shall be under a registered user and not viewable to other non registered or registered users 9

12. Housing Cost Calculator

- Registered Users can generate approximate costs for chosen intervals and forecasts for the property 5
- The Calculator shall generate a curated list of houses best fit for a registered user based on filters and location 6

13. Groups

- A group shall share a saved properties list and all receive notifications for a property 11

14. Reports

- Registered users can generate reports on rental listings, user activity, and feedback.
- The system shall provide functionality to generate various types of rental reports, including rental transaction summaries, rental history for specific customers, and rental equipment utilization reports
- Users shall be able to customize the content and format of reports, including selecting specific date ranges, sorting options, and the inclusion/exclusion of specific rental data field, such as rental duration, customer information, and equipment details

5. List of non-functional requirements

1. Performance

- The application shall provide high availability, minimizing downtime and ensuring accessibility to users.
- The application shall provide fast response times for user interactions.
- The system should support a minimum of 100 concurrent user sessions without a significant degradation in performance.
- Optimize search functionality to deliver fast and accurate results, even when dealing with a large number of listings
- The application shall have failover if an existing component fails or becomes unreachable.
- The application shall support a database index for fast access to table row data and to improve query performance

2. Storage

- The application shall support storage capacity for all post/listing, and user interactions.
- The application shall provide a mechanism for users to archive data.
- Define how long different types of data (e.g., user profiles, listings, messages) should be retained and when it should be archived or deleted

3. Security

- The application shall enforce an access control mechanism.
- The application shall hash and salt the user's password in the database.

- User authentication should be robust, requiring secure credentials (e.g., passwords) and supporting multi-factor authentication (MFA) for added security.
- Maintain detailed logs of security-related events and user activities
- The application shall use firewalls to detect vulnerabilities and prevent data leakage

4. Reliability

- The website should be available 24/7, with planned downtime communicated to users in advance
- The website should maintain reliability even during peak usage periods, ensuring consistent response times and availability
- The system should have a documented and tested data recovery plan in place.

5. Usability

- Ensure the website is responsive and adapts to various screen sizes and devices, including mobile phones, tablets, and desktop computers.
- Provide clear, concise, and well-organized content with easily readable text and appropriate use of headings, paragraphs, and lists.
- Allow users to provide feedback and ratings for rental listings, helping others make informed decisions and fostering trust in the platform
- Allow users to report any misdemeanors or suspicious activity by landlords or renters

6. Maintainability

- Implement thorough testing procedures and automated testing suites to quickly identify and address issues during maintenance.
- The website should be designed with a modular structure, allowing individual components to be updated or replaced without affecting the entire system.
- Keep third-party libraries and dependencies up to date to avoid security vulnerabilities and compatibility issues.

7. Data Privacy

- All sensitive user data, such as personal information and payment details, must be encrypted both in transit and at rest to protect against unauthorized access.
- Define and enforce data retention policies that specify how long user data will be stored and when it will be deleted or anonymized
- Have a documented plan and process in place for responding to data breaches, including notifying affected users and relevant authorities as required by data protection regulations.

8. Browser Compatibility

- The application should be compatible with a range of web browsers, including Chrome, Firefox, Safari.
- The website should adapt seamlessly to different screen sizes and devices, including desktop computers, laptops, tablets, and smartphones.

- Users should experience consistent functionality and visual design across different browsers, ensuring a uniform and user-friendly interface

9. Preferred language

- The website should support multiple languages, including but not limited to English, Spanish, French, and others based on user demand
- Users should be able to easily select their preferred language from a list of available options.

10. Displaying name of website

- Name of the website shall be shown on each page.

6. Competitive analysis

| Feature/Company | Zillow | Realtor.com | Apartments.com | Craigslist | Facebook Marketplace |
|-----------------|--|---|--|--|---|
| Strengths | Many listings, User-Friendly Interface. Zillow has an intuitive design that makes it easy for users to navigate. | Good hook on landing page, follows good design patterns,, high quality photographs, offers many services related to real estate | Has nice map layout with many listing, gives so much information about each property with virtual tours;Clean UI; a lot of filters for properties | Many listings | Many listing, smooth UI/UX, lots of filter option, posts come from accounts |
| Weakness | Reliance on User-Generated Data. User-generated content can lead to inaccuracies and outdated listings. | Business generally oriented to buying and selling property,listing on search engines is very low when looking for apartments | Inconvenient promoting of properties, less functionality for landlords, cannot regulate interactions between landlords and homeowners, anyone even without an account can harass or call landlords | Poor design, quality check on listings | Listings are missing information, some users have weak accounts as in very new and no profile |
| Pricing | Free for consumers | Free for renters and paid services for realtor | Free, with paid background checks | Free | Free |
| Social Media | Twitter, Instagram, TikTok, Facebook | Facebook, Linked In, Instagram, Twitter, | Instagram, Twitter, TikTok | None | Twitter, Instagram |

| | | | | | |
|-----------------------|---|---|---|--|---|
| | | Pinterest, You Tube | | | |
| Onboarding Experience | User-Friendly Sign-Up, Property Alerts. zillow allowing users to sign up using their email address or social media accounts | Instantaneous access to information about home and rental properties without requiring signing up or logging in. Automatic listings based on users location | Good for renters; asks for location and give properties with a map and prices with many filters. Landlords have to find where to add a property and not as user-friendly or intuitive for them. Also does not prompt making an account or signing in when first accessing the site. | Overwhelming, very simple, reliability | Simple, sign up/log in page is the first things you see |

| Feature | Zillow | Realtor.com | Apartment.com | Craigslist | Facebook | Our future product |
|----------------|--------|-------------|---------------|------------|----------|--------------------|
| Text Search | ++ | ++ | + | + | + | + |
| Boolean Search | + | - | - | + | - | + |
| Browse | ++ | ++ | ++ | + | + | + |

| | | | | | | |
|--------------------------|---|---|---|---|---|----|
| Shopping Cart | + | - | - | - | - | - |
| Social Media Integration | - | - | - | - | + | ++ |

Our future product will have the capability of searching for properties such as its competitors in an efficient and location-based manner with many filters and details in every search. What will differentiate our product is how it will allow for users to find compatible roommates who are background checked and with built-in social media links can easily connect with future roommates. Every other company either has a property or roommate finder but none of them have yet to integrate both in one platform. For the property finder aspect we will prioritize user experience by notifying anytime a detail of a property changes, if an open house is available, and recommended a curated list of properties that best fit the needs of a user. A lot of these user-based needs are missing in our competitors and they rely solely on filter-based searching. We will also take into account the needs of landlords and provide securities from them which are not present in competitors. For example, making sure landlords have features as well to enhance their search of users, and adding a security layer where only a registered and interested buyer can contact them. Also, in the platform will incorporate a way to report misdemeanors between buyers or landlords and any suspicious activities which is missing in many of our competitors. With the social media component, integration of property and roommate search, user-friendly design and principles, and securities for landlords as well as renters our product will provide the most complete and satisfying experience on the market.

7. System Architecture and Technologies

1. Server and Hosting

- Cloud Provider: Amazon AWS
- CLI: AWS CLI V2

2. Operating System:

- OS: Ubuntu 22.04.03 LTS

3. Database:

- RDBMS: MySQL 8.0

4. Web Server:

- Server: Nginx 1.18

5. Development:

- Server-Side Language: JavaScript
- Web Framework: React
- IDE: Visual Studios Code

6. Security:

- SSL: Amazon Certificate Manager
 - Not yet available due to missing domain
 - Unable to find free service for domain name

8. Checklist

- Team found a time slot to meet outside of the 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 learning and practicing: **DONE**
- Team lead ensured that all team members read the final M1 and agree/understand it before submission: **DONE**
- Github organized as discussed in class (e.g. master branch, development branch, folder for milestone documents etc.): **DONE**

9. List of team contributions M1

| Names | Contributions | Rating |
|------------------|---|--------|
| Jeremy Tran | <ul style="list-style-type: none"> • Set up instance and hosted server • Created the skeleton for the About page • Finished functional requirement, use case, competitive analysis and within timely manner • Organized Documentation • Filled out Section 7 of document • Created Discord server dedicated for communication before access to #TEAM03 and now for chat that doesn't involve the whole team | |
| Geovanni Valadez | <ul style="list-style-type: none"> • Organized and set up document • Finished functional requirement, use case, competitive analysis and executive summary • Finished a working About page • Very responsive and involved with the group • Attended every group meeting • Collected time availability of each group member • Finished all work on time | 10 |
| Mozhgan Ahsant | <ul style="list-style-type: none"> • Finished functional requirement, use case, competitive analysis within timely manner • Very communicative and asked for help when needed • Responsive and involved with the group • Finished About page • Checked over document | 8 |

| | | |
|------------------|---|---|
| | <ul style="list-style-type: none"> • Has attended every group meeting | |
| Anthony Silva | <ul style="list-style-type: none"> • Finished use case, competitive analysis • Finished About page • Assisted with database set up in instance • Helped check server side set-up • Responsive and involved with the group • Finished all task within timely manner and communicated if couldn't | 9 |
| Aman Khera | <ul style="list-style-type: none"> • Finished functional requirement, use case and competitive analysis • Finished About page within timely manner • Is researching about SSL • Has attended every group meeting • Been responsive and involved with the group • Checked over the document and left comments where needed work done | 8 |
| Ivan Ayala-Brito | <ul style="list-style-type: none"> • Did functional requirements and use cases • Checked over the document • Reorganized and reformatted documents • Finished About page • Communicative through private chat | 6 |