

SW Engineering CSC 648 / 848 Spring 2019"

Milestone 1:

Use cases, High Level Requirements and Architecture



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Executive Summary

Team 4 will be creating a web application called “Litlister,” which will be a service for San Francisco State University students who want to buy and sell used or new books. The purpose of the web application is to allow its users to list books for sale they have used for previous classes and purchase or exchange books with other users. Users will save money on buying books, and make money through selling their books.

The website will work by connecting students to the books they need based on their search query. Sellers will be able to create five free listings, and any further listings will require a small listing fee. Buyers will be able to browse those listings, and buy a book that fits their needs. Buyers and sellers will pick a time and location inside the University that is good for their schedule, and will make the book exchange in person. The transactions will be verified by a unique code that will be given to the buyer and the buyer will give to the seller at the time of the transaction. Sellers will be advised to use the code at the time of the meeting, so they can verify that they gave the book to the buyer.

The website also provides customer services via chat or email when a conflict arises between users. The customer service will filter the user input, and pass along the conflicts that require admin rights to the admin. The admin has the right to ban / suspend users, remove inappropriate listings, and retrieve user information under the agreement of the affected users. As the website becomes popular, Litlister will be extending its services to other campuses.

Personae and main User Cases

Use Cases

1. **Guest / Unregistered User:** Philip is a junior at SFSU. He has heard of a new platform called “LitLister”. He has been buying books through Amazon and occasionally through the school bookstore. He looks up this new platform on his laptop and searches for a book he will need for the semester. He can not yet see the book prices, because he is not a registered user. He is curious about the prices so he decides it is probably worth it to create an account. He creates and verifies his account using his SFSU e-mail, and he is now free to browse any part of the site he’d like to.
2. **General User/ Registered User:** Jake has been browsing through LitLister for awhile as a guest. He finds a book that he needs, but he is not sure whether he wants to buy the book immediately because the price is not visible. Jake registers an account at LitLister. Jake can see the prices on the list now, so he navigates to a listing for a book he needs and purchases the book. Jake and the seller meet and Jake receives his book. At the end of the year, Jake no longer needs the book, so he returns to LitLister, logs in to his account, and creates a listing to sell his book. A buyer purchases Jake’s book, and Jake and the buyer arrange a time and place to meet to exchange the book using the website. Jake and the buyer meet, and Jake exchanges his book.
3. **Buyer / Buying User:** Bob is a sophomore student enrolled in classes at SFSU. Bob has many classes that require textbooks, but Bob struggles to buy his books due to how expensive textbooks are. Bob speaks to his friends, and they tell him about LitLister, a website where SFSU students can buy and sell books. Bob goes to the site, and he creates an account with his SFSU student email. He verifies his account using his SFSU email, and then searches for the books he needs for the semester using the title of the book. He finds a listing containing the book he needs, and he buys the book from the student selling the book. He and the seller arrange a time and place to meet to exchange the book via the website. Bob and the seller meet, and Bob receives his book.
4. **Seller / Selling User:** Jane is a senior at SFSU, and she has just finished her last semester at the school. She has many left over books from all her classes and decides that she needs to sell them to make up some of the money she spent on college. She visits our website and sees that there are options for selling and exchanging books. She decides to make an account and lists her books for sale through the website. After selecting the time and location she would like to sell at, another student sees the posting, and contacts Jane about the posting. Jane and the buyer meet at the designated location and exchange the book concluding the transaction.
5. **Customer Service:** Obama is working with LitLister as a customer service representative. He clocks in his hour as he logs in into the LitLister website. Obama sees a few message notifications that he’s responsible to reply to. He opens up one of them, and it was a conflict where the seller violates the meeting

agreement with the buyer by not showing up, and the occasion has happened more than two times for this seller. The buyer asked for a refund in the message that he sent to the customer service. Obama responds to the buyer based on the company protocol, and since the conflict requires a refund, Obama forwards the chain of messages to the admin for further actions.

6. Administrator: Michelle is an administrator working for LitLister. She logs into her administrator account, and sees that there are new general user accounts that she has to approve. Michelle audits the new user accounts, and sees they have verified their e-mail, and set up their accounts correctly, so she approves their accounts. She then moves on to the notifications about new listings. She sees a user tried to submit an inappropriate listing, and she rejects the listing. She then issues the user's account a warning. She sees that the rest of the listings look good, and she approves them. She is notified by a customer service representative of a buyer who did not receive his book from a seller after paying. Michelle sees that the buyer has done this multiple times, so she issues a permanent ban to the account. Michelle is done for the day after this, so she logs out of her admin account.

List of main data items and entities

Datum	Definition
Client	
<ul style="list-style-type: none"> • Guest / Unregistered User 	User that has not registered with the site, can browse the listing and public user profiles, but cannot make purchases, or sales.
<ul style="list-style-type: none"> • General User 	User that has registered with the site, can browse the listings, public user profiles, and can make purchases and sales.
<ul style="list-style-type: none"> • Buyer / Buying User 	User that has registered with the site, can browse the listings public user profiles, configure personal profile, and payment information, and make purchases.
<ul style="list-style-type: none"> • Seller / Selling User 	User that has registered with the site, can browse the listings, public user profiles, own sale log, configure personal profile, payment information, sale information and own listing, and make purchases and sales.
Company Employee	

<ul style="list-style-type: none"> • Customer Service 	<p>Employee that can observe buyer to seller exchanges of information and order history.</p> <p>Responsible to filter and to reply user inputs before passing them to the Admin</p> <p>Customer service representative will be available during business hours. They receive a notification every time a seller/buyer user disputes a transaction. Depending on the transaction, and after reviewing both sides, the customer service user can decide whether to refund the transaction, and fees. The customer service user also receives notifications when any user decides to contact customer service. The customer service user is able to advice the users in any of their problems, and they are able to fix any mistakes on their accounts.</p>
<ul style="list-style-type: none"> • Admin 	<p>Employee that has full access to the website. This employee can ban users and remove illegal profiles and lists.</p>
Other Data Definitions	
<ul style="list-style-type: none"> • Privacy Policy 	<p>Policies dealing with what data we collect, why we collect it, and what we do with the data</p>
<ul style="list-style-type: none"> • Help 	<p>A document explaining other customers' common issues</p>
<ul style="list-style-type: none"> • Meeting Location 	<p>A public place inside the San Francisco State University Campus</p>
<ul style="list-style-type: none"> • Approved credentials 	<p>Email verified as a valid San Francisco State University email</p>
<ul style="list-style-type: none"> • Contact Customer Service 	<p>A service offered to email customer service representatives when having any problems with the website</p>
<ul style="list-style-type: none"> • Book List 	<p>A post that contains the information of any book being sold</p>

Functional Specs

For guests/unregistered users:

1. Guests/unregistered who are SFSU students and faculty shall be able to sign up with their school email address.
2. Guests/unregistered who are Non-SFSU students or faculty shall not be able to sign up.
3. Guests/unregistered users shall be able to search for enlisted books.
4. Guests/unregistered users shall not be able to see who is listing the books.
5. Guests/unregistered users shall not be able to see all information about the listings.

For general users:

1. General users shall be able to login using their approved credentials.
2. General users shall be able to search for enlisted books.
3. General user shall be able to see who is listing the books.
4. General users shall be able to see all information about the listings.
5. General users shall be able to buy books.
6. General users shall be able to sell books.
7. General users shall be able to contact customer service.

For seller user:

1. Seller users shall be able to list books for sale.
2. Seller users shall be able to edit all information about their listing.
3. Seller users shall be able to adjust the displayed price of their listed items
4. Seller users shall be able to specify a meeting time that works for them.
5. Seller users shall be able to accept and decline meeting locations/time after buyer user accepts the listing.
6. Seller users shall be able to delete a listing.
7. Seller users shall be able to dispute a transaction.

For buyer user:

1. Buyer user shall be able to accept and purchase any listed item.
2. Buyer users shall be able to accept the available time, or contact the seller user if the chosen time doesn't work for them.
3. Buyer users shall be able to select one of the public meeting locations from a drop down list.
4. Buyer users shall be able to dispute a transaction.
5. Buyer users shall be able to cancel the transaction within a reasonable time.

For customer service user:

1. Customer service users shall be able to see all listings.
2. Customer service users shall be able to see all information related to each listing.
3. Customer service users shall be able to edit/remove any listing.
4. Customer service users shall be able to contact general users.
5. Customer service users shall be able to refund transactions.
6. Customer service users shall be able to edit general users' accounts.
7. Customer service users shall be able to suspend/ban general users' accounts.

For admin user:

1. Admin users shall be able to see all listings.

2. Admin users shall be able to see all information related to each listing.
3. Admin users shall be able to edit/remove any listing.
4. Admin users shall be able to contact general users.
5. Admin users shall be able to adjust transactions.
6. Admin users shall be able to approve new accounts for creation
7. Admin users shall be able to edit general users' accounts.
8. Admin users shall be able to remove/suspend/ban general users' accounts.
9. Admin users shall be able to edit/remove customer service users' accounts.

Non-functional Specs

1. Security

- a. Login shall be required to make purchases
- b. User's shall verify their emails when registering an account
- c. User's shall be able to set a display name different than their email
- d. User's emails shall not be displayed by default
- e. Passwords shall be encrypted before storing in the database
- f. User's session timeout limit shall be decided by the administrator
- g. User's session shall only be ended by code design
- h. Content uploaded by users shall be audited by the administrator
- i. User's payment information shall be encrypted
- j. This site shall not accept any third party cookies
- k. The meeting time and places users make with each other to exchange books shall not be revealed to other users not involved in the transaction

2. Audit

- a. New registrations shall be audited by the administrator
- b. New registrations shall be approved by the administrator
- c. Users shall not be able to login to administrator accounts
- d. New sale listings shall be approved by the administrator

3. Performance

- a. The site loading time shall be less than 2 seconds for all screens
- b. Application shall be able to retrieve information from the database and react in a timely manner.
- c. The site shall handle requests asynchronously following a REST format

4. Capacity

- a. The total data storage for the site shall not exceed 80% of the server's capacity for this site
- b. The website shall be capable of handling at least 50 users
- c. The website shall be scalable, so that new features can be added easily

5. Reliability

- a. Downtime for maintenance shall be less than 3 hours per month
- b. Downtime for maintenance shall not affect the site's main functionality

- c. In all cases, users shall be informed of downtime for maintenance, either via an announcement on the main page, or e-mail

6. Recovery

- a. In case of a total site failure, the whole site shall be shut down for revision.
- b. If the site is broken, the mean time to recovery shall not exceed one day.
- c. User data is the most valuable aspect and priority will be placed on recovering such data in case of total failure.

7. Data Integrity

- a. Database tables shall be backed up weekly
- b. Administrator shall be able to execute a recovery if needed
- c. Image sizes shall be restricted to at most 1 megabyte
- d. Images shall be uploaded in jpg, jpeg, or png formats
- e. Images will be saved on Amazon's s3 storage server
- f. URLs to image will be stored on the database

8. Compatibility

- a. The site shall be compatible with the last version of the Safari browser version 11.1.2
- b. The site shall be compatible with the last version of the Firefox browser version 64
- c. The site shall be compatible with the last version of the Chrome browser version 73
- d. Third party applications shall not be able to modify any content that may affect the site compatibility
- e. Content should be able to be ignored by most popular ad-block services.
- f. The site shall be able to account for any other compatibility issues created as a result of browser updates in the future
- g. The site should be compatible to escalate to new databases

9. Conformance with Coding Standards

- a. Architecture and design standards shall meet all the requirements listed under the High-level system architecture and technologies used section of this document
- b. Design pattern is to be strictly enforced with all aspects of the site.
- c. Appropriate documentation must be created for all code that is individually written for future maintenance.
- d. Production code shall not have any log or output to the console.
- e. All errors must not halt the web application without appropriate error handling.
- f. Only working code that meets all code standards shall be submitted to the main branch of the project repository
- g. Code shall be thoroughly tested and debugged before being considered working code
- h. All internal errors and exceptions encountered when writing or modifying code shall be stored in a log
- i. Any error that can affect the site's functionality shall be reported to the user

- j. Errors shall be handled in a way that does not affect site functionality
- k. The whole production cycle of the site shall be finished at least one week before the delivery date
- l. The site shall be tested and debugged as a whole product at least one week before the delivery date
- m. The site shall not be launched without all priority one features finished and working
- n. All major changes to the application shall be discussed by the team and communicated to the class CTO.

10. Look and Feel Standards

- a. The application and it's layouts shall look professional
- b. The site shall be simple, so that it is usable to a wide range of users, and all previously mentioned parties
- c. Targeted users will be the main priority for ensuring usability and readability.
- d. Elements on screen shall meet the compatibility standards of all supported browsers
- e. Elements on screen shall meet the compatibility standards of all supported browsers on mobile devices
- f. Elements on screen shall be aesthetically pleasing
- g. The site shall be able to work correctly without mouse interaction
- h. The site shall be able to work correctly without keyboard interaction
- i. Elements in screen shall be resized automatically without user interaction when being loaded in all the different platforms supported by the site
- j. Application's user interface shall make it easy for user to find what they are looking for.

11. Internalization / Localization Requirements

- a. The default language of the site shall be English
- b. The site shall only allow SFSU students to register accounts initially
- c. The site shall be scalable to incorporate other schools into the user base

12. Scalability

- a. There shall be a whitelist of accepted school e-mails that can be updated to incorporate other schools
- b. The whitelist shall be stored in a file on the server
- c. The CPU instance and storage capacity shall be updated to be able to handle a large amount of users if needed

13. Web Site Policies

- a. A link to the policies of this site shall be always visible in all its pages to be accessible by all the parties
- b. The site will not store any payment information.
- c. Users payment information shall be kept confidential and secure
- d. The website shall allow users to register an account.
- e. Email verification shall be implemented upon registration.
- f. User's shall agree to application's privacy policy before using the product.

Competitive Analysis

Feature	LitLister	BookScouter	TextbookX	Barnes & Noble
General users can create an account for buying and selling books	+	+	+	+
General users can sell books at their own price directly to other students through creating a listing	+	-	+	-
General users use chat to set up a meeting time and location to sell the book via the website	+	-	-	-
General users can list books to sell for as low as \$1	+	+	+	-
General users can buy books directly from other general users instead of a book vendor	+	-	+	-

The advantages of using LitLister over other web services include LitLister's localization to San Francisco State Students, the great, dynamic control over how much to sell and buy books LitLister gives general users, and the simple and easy exchange meeting setup that LitLister provides. Unlike other book buying and selling platforms, Litlister is targeted directly at San Francisco State University students, so general user's can rest assured that their transactions involve other students from their school, and not private dealers or large corporations. Litlister also allows its general users to have dynamic control over their listings than other book buying and selling web services, because users can change the sell price of their listing at any moment, and they can choose to buy books that only fall within their budget.

Finally, LitLister beats the competition because of its unique exchange scheduling system; general users of LitLister will have an easier time buying and selling their books, because they can arrange a time and a safe place to meet to fit into their busy schedules.

High Level System Architecture and Technologies Used

1. Application shall be hosted on Amazon Web Services, as specified in Milestone 0.
2. Applications shall use Apache 2.4.29-1ubuntu4.5
3. Application's data shall be stored using MySQL 8.0.13 database in the team's account.
4. Application's front-end shall be developed using React and Bootstrap
5. Application's back-end shall be developed with Node.js 10.15.1 LTS
6. Application shall use Express.js 4.16.4 web framework.
7. Application shall be developed using IntelliJ, VSCode, Vim, and Sublime Text.
8. Payments on the application shall be handled via the Stripe API
9. User chat shall be handled using the Socket.IO API
10. Application shall be able to work on either mobile, laptop or website browsers including: Google Chrome, Mozilla Firefox, and Safari
11. Git and Github shall be used as a form of version control
12. PM2 shall be used to manage computational processes and minimize computational costs

Team

Name	Role(s)
Vismay Patel	Team Lead, Back End Engineer
John Mendoza	Back End Lead, Back End Engineer
Jesus Garnica	Front End Lead, Front End Engineer
Edwin Menjivar	GitHub Master, Back End Engineer
Leonid Grekhov	Front End Engineer
Michael Winata	Front End Engineer

Checklist

List	Check
Team found a time slot to meet outside of the class	✓
Github master chosen	✓
Team decided and agreed together on using the listed SW tools and deployment server	✓
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	✓
Team lead ensured that all team members read the final M1 and agree/ understand it before submission	✓
Github organized as discussed in class (e.g. master branch, development branch, folder for milestone documents etc.)	✓