SW Engineering CSC648-848 Spring 2025

GatorXchange

team-10

Milestone 1

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History Table

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1. Executive Summary

Taking advantage of the demand for buying and selling unnecessary products or saving costs for students and staff at SFSU, GatorXchange was created to allow everyone working and studying at the university to exchange items they need. This platform maximizes economic benefits, reduces costs, promotes item reuse, and, most importantly, strengthens connections among members of the SFSU community.

With GatorXchange, users can browse currently listed products or filter suitable for their registered classes. They can then create an account to upload products they wish to sell or send a message to a seller if they're interested in buying a product. If the seller agrees, they can schedule a meeting on campus to complete a transaction, offering both parties a chance to connect. Admins can moderate the product postings, approving it before it can go live and deleting any inappropriate products or users.

The GatorXchange team consists of four skilled individuals. Angelie Bautista, the Project Lead, has passion for game development and leadership. As president of the Game Development Club, Angelie's enthusiasm for collaboration and experience in management drives the team's vision and progress. Alvin Tulud, the Front-End Lead, specializes in game development and UX/UI design. He is experienced in Unity game development and web technologies that further enhances his ability to create intuitive, user-friendly interfaces for the platform. Lap Pham, the Back-End Lead, has a strong background in full-stack development and data science research. Lap ensures GatorXchange has a robust back-end structure and database, with his expertise in Java, Python, C++, and web development. Lastly, Chan-Chun Yen, the GitHub Master, has strong knowledge in system programming and cloud computing. His experience with C, C++, Java, and AWS cloud services helps maintain the project's codebase and scalability, ensuring smooth transitions within GitHub. This team combines technical expertise and a collaborative spirit to create an online shopping experience that enhances connectivity and convenience for the SFSU community.

2. Personae

Nathan - The Freshman Student

- Age: 19
- Gender: Male
- Children: 0
- Occupation: First-Year Student
- Financial level: Middle Class
- Income: A monthly allowance of $500 from his father transferred to his checking account
- Nationality: USA

- Potential need: Looking for second-hand furniture (curtains, bedsheets, blanket, pillow) and textbooks due to the limited budget.
- Habits: Very enthusiastic to drive the car in his free time and collect souvenirs
- Attitude: Easygoing and thrill-seeking; prefers hand-on experiences over studying
- Skills: Likes to explore and figure out the functionality of the new application
- Pain points: Is color-blind and has ADHD
- Goals: Search for the discount products before starting classes

Joyce - The Senior International Student

- Age: 22
- Gender: Female
- Children: 0
- Occupation: Student and Software Developer
- Financial level: Rich
- Income: A monthly payment of $4000 from SW Internship
- Nationality: Taiwan
- Potential need: Gown, slove, and customized diploma for graduating
- Habits: Loves to explore the city and taste new desserts
- Attitude: Passionate with learning new knowledge and always needs to buy academic textbook for research
- Skills: Major in business and sensitive to the market price
- Pain points: Often needs to get rid of excess items
- Goals: Getting rid of old furniture and textbooks

Jonathan - The Junior Part-Time Student

- Age: 21
- Gender: Male
- Children: 0
- Occupation: Part-Time Student, Restaurant Server
- Financial level: Middle Class
- Income: A monthly Salary of $900 from a restaurant server position
- Nationality: USA
- Potential need: Affordable textbooks, and discount electronics

- Habits: Prefer online shopping over in-store visits
- Attitude: Very picky and serious
- Skills: Good at evaluate the price of the product based on the review from comments
- Pain points: Not familiar with the technology or WWW apps, impatient with browsing
- Goals: Find valuable products

Amanda - The Faculty

- Age: 35
- Gender: Female
- Children: 0
- Occupation: Faculty at SFSU
- Financial level: Lower Middle Class
- Income: Salary of 117k
- Nationality: USA
- Potential need: Looking for resources her students will potentially need, searching for links of a textbook and a lot of lab coats and goggles for cheap
- Habits: Does things at the last minute, goes on walks through the park sometimes and draws
- Attitude: Very passionate about the things that she enjoys but not as enthusiastic when she starts struggling, likes to talk things out to learn
- Skills: Very comfortable with online shopping and website navigation
- Pain points: Students are often unprepared in her class
- Goals: Be able to provide for others with as much value for a low price and set up her students for an early success in her course

Gerald - The Parent of a Student

- Age: 56
- Gender: Male
- Children: 3
- Occupation: Garbage Collector
- Financial level: Lower Middle Class
- Income: Salary of 70k
- Nationality: USA

- Potential need: A place for his kid to rent out, a newer end laptop, a nice cheap backpack
- Habits: Providing more than his kids actually need and very protective of them
- Attitude: Stubborn but very persistent when doing things
- Skills: Go-getter with a very good sense of time management and schedules
- Pain points: Unfamiliar with online shopping
- Goals: Set his kid up with everything he thinks they need with good access to all resources (library, short school commute), would also be nice if his kid's rental unit was a convenient location for him to visit and had good parking

3. High-level Use cases

1. Buying an item

Nathan wants to buy furniture because the dormitory bedroom comes without any furniture. He also wants to figure out where he can access or get the textbook. He enters our website and clicks each **listing** to become familiar with the functionality. Then, he searches up and filters for second hand furniture and textbooks. He reviews the list of search results and wants to buy a chair. He is currently an **unregistered user** so he is prompted by our website to **register**. After registration, Nathan sends a **message** to a **seller**.

2. Selling an item

Joyce is thinking about selling her used textbooks and her furniture after moving out of the dormitory. She enters our website as a **registered user** and starts reading the instructions for selling a **product**. Afterward, she uploads pictures of the products and writes down details, leaving the contact information for a potential **buyer**. She waits for it to be approved, checking her **dashboard** for updates.

3. Recommendation List

Jonathan likes to do online shopping. He's looking for a valuable and economic product, no matter what it is. He goes onto our site and inputs his **class number** to receive a **recommendation list** for his classes. Also, he compares the features and the price of the similar products to analyze the pros and cons.

4. Admin Access

Amanda does a lot of online shopping to find the items she needs for teaching. Now, she wants to provide resources for her students where she can link them to brand new and used goggles and lab coats, which are needed for her course. She is an **admin** for the website. So, she filters through the items after searching to try to find as many of the same exact product to link to her student. She connects them to her **class number**. She must also approve products before users can publicly see them.

5. Browsing

Gerald is trying to set up his kid for success by buying everything they could possibly need. He is having trouble signing in, however, since he does not have his child's **user information**. He uses **filters** to find products that are only rentals.

4. List of main data items and entities — data glossary/description

User Types

Unregistered users (UU) - can browse and search for products.
Registered users (RU) - inherits permissions of unregistered users. Users are also allowed to upload products for approval.
Admins (AD) - has all privileges, able to access and modify permissions for all registered users, can approve products for registered users

Key Data Entries

User Information - Information that the registered user used to create and authenticate themselves. Has sub items of

- ID
- Name
- Class
- Email
- Password
- Access (Normal, Admin)

Product - An article or item meant for selling. Has sub items of

- Seller
- Name
- Category
- Date
- Description

Category - A group of products with common characteristics (Book, Furniture, Tools, Room…) Has sub items of

- Category
- Type

Transaction - A listing that has been completed. Has sub items of

- Transaction
- Buyer
- Product
- Date

Message - A message the buyer sends to a seller to indicate interest. Has sub items of

- Message
- Buyer
- Product

- Content
- Date

Other Elements
Register/Registration - The creation of a registered user by inputting user information
Recommendation List - A filter based on class number
Listing - Approved products up for sale.
Dashboard - Section where registered users can check their products and messages they may have received
Search - Finding a product through keywords
Filters - Removes unwanted products with a category while searching
Class Number - the ID for a specific class at SFSU
Seller - Registered user who uploaded the product
Buyer - Registered user who sent a message to a seller

5. List high-level functional requirements

Unregistered Users (UU)

1. UU shall be able to browse all available products
2. UU shall be able to search the available products
3. UU shall be able to register an account by SFSU email to buy or sell products

Registered Users (RU)

4. RU shall be able to access and update their user information. (Name, email, password)
5. RU shall be able to sell/buy products.
6. RU shall be able to remove their products.
7. RU shall be able to send a message to other RU.
8. RU shall be able to browse all available products.
9. RU shall be able to sort results based on relevance, date, price, or class number.

Admin

10. Admins shall be able to access a list of RU.
11. Admins shall be able to manage or remove RU.
12. Admins shall be able to approve or remove RU's products.
13. Admins shall be able to add items to an associated class number.

System

14. System shall support user authentication and authorization.
15. System shall be able to show a list of Admins and RU.
16. System shall be able to edit and update users' information
17. System shall be able to grant permission to Admins and RUs.
18. System should provide filters and search functionality.

19. System shall be able to store products.

6. List of non-functional requirements

1. Application shall be developed, tested and deployed using tools and cloud servers approved by Class CTO and as agreed in M0
2. Application shall be optimized for standard desktop/laptop browsers e.g., must render correctly on the two latest versions of two major browsers
3. All or selected application functions shall render well on mobile devices (no native app to be developed)
4. Posting of sales information and messaging to sellers shall be limited only to SFSU students
5. Critical data shall be stored in the database on the team's deployment server.
6. No more than 50 concurrent users shall be accessing the application at any time
7. Privacy of users shall be protected
8. The language used shall be English (no localization needed)
9. Application shall be very easy to use and intuitive
10. Application shall follow established architecture patterns
11. Application code and its repository shall be easy to inspect and maintain
12. Google Analytics shall be used
13. No e-mail clients or chat services shall be allowed. Interested users can only message to sellers via in-site messaging. One round of messaging (from user to seller) is enough for this application
14. Pay functionality, if any (e.g., paying for goods and services) shall not be implemented nor simulated in UI.
15. Site security: basic best practices shall be applied (as covered in the class) for main data items
16. Media formats shall be standard as used in the market today
17. Modern SE processes and tools shall be used as specified in the class, including collaborative and continuous SW development and GenAI tools
18. The application UI (WWW and mobile) shall prominently display the following exact text on all pages "SFSU Software Engineering Project CSC 648-848, Spring 2025. For Demonstration Only" at the top of the WWW page Nav bar. (Important so as to not confuse this with a real application). You have to use this exact text without any editing.

7. Competitive analysis (functions/features only, not business or marketing)

Feature	**Facebook**	**Depop**	**Craigslist**	**GatorXchange**
Text Search	++	++	+	+

Variety of items	++	+	++	+
GUI Design	+	++	-	+
Messaging	++	+	+	+
Recommendation list	+	+	-	++

In this competitive analysis, our platform stands out by offering a specific recommendation list, which will be specialized and stronger than Facebook Marketplace and Depop. The recommendation list feature provides our users a better experience during shopping, which recommends users more personalized suggestions based on the class number they inputted and the algorithm with the recent searching history. It will be faster for students to be prepared for the school semester. While Depop has a well-designed GUI, our product will also offer a simplified and student-friendly interface, similar to Facebook Marketplace but be easier to manipulate. In terms of variety of the item, we focus on selling the products which are more related to needs from students and faculty in the campus, allowing them to trade in the campus. Text search will be the fundamental feature in our product, enabling users to loop up the specific item they want.

8. High-level system architecture and technologies used:

Main SW components and versions:

- Server host: AWS
- Operating System: Ubuntu 20
- Database: MySQL 9.20
- Web Server: Nodejs v20
- SSL: JavaScript

Deployment cloud servicer:

- AWS Cloud

Front end frameworks:

- Tailwind CSS
- Express 4.21.2
- Middleware: EJS 3.1.10

Supported Browsers:

- Google Chrome version 134.0

- Safari version 18.3

Major additional external open source APIs:

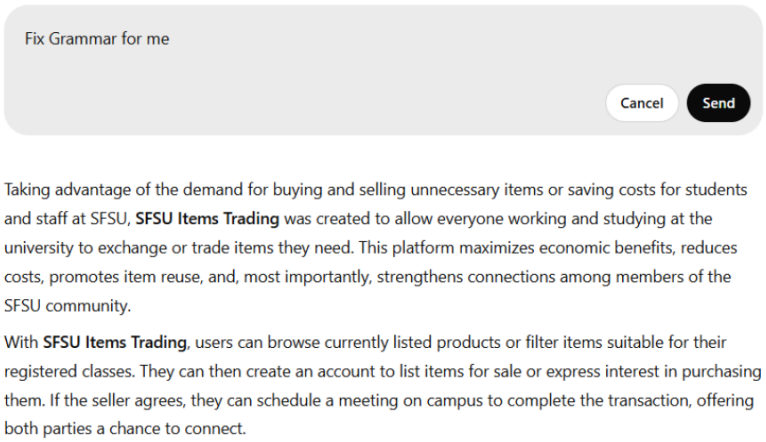
- Google Analytics
- Google Font
- ChatGPT API
- Google API….

9. Use of GenAI tools like ChatGPT and Copilot for Milestone 1

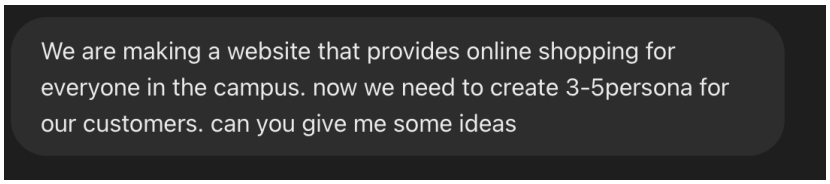
For all tasks, ChatGPT-4 was used.
It was used for:

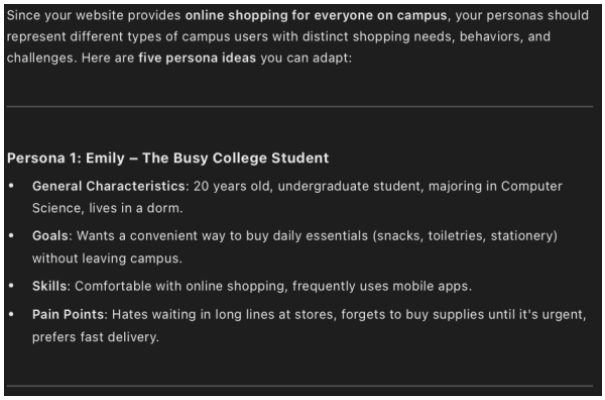
- Grammar check - MEDIUM
- Finding Ideas - HIGH

Grammar check
We used ChatGPT to check the grammar of an early draft of an executive summary. It ran through the text quickly, and it cut down on editing. Screenshot of the interaction is below.



Finding ideas
So far, ChatGPT has been useful for collecting ideas. We used it for high-level requirements, as well as personaes, so we can have a basis to start on. The response it gave was sufficient, but also understandably somewhat irrelevant to what we're actually creating. Screenshots of an interaction are below.

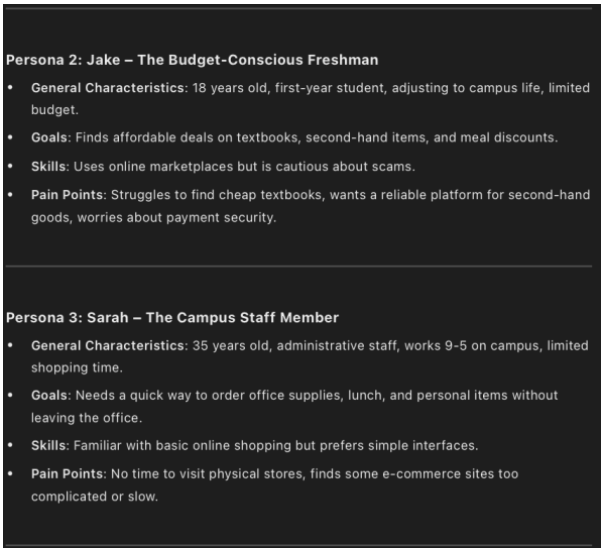




Since your website provides **online shopping for everyone on campus**, your personas should represent different types of campus users with distinct shopping needs, behaviors, and challenges. Here are **five persona ideas** you can adapt:

Persona 1: Emily – The Busy College Student

- **General Characteristics**: 20 years old, undergraduate student, majoring in Computer Science, lives in a dorm.
- **Goals**: Wants a convenient way to buy daily essentials (snacks, toiletries, stationery) without leaving campus.
- **Skills**: Comfortable with online shopping, frequently uses mobile apps.
- **Pain Points**: Hates waiting in long lines at stores, forgets to buy supplies until it's urgent, prefers fast delivery.



Persona 2: Jake – The Budget-Conscious Freshman

- **General Characteristics**: 18 years old, first-year student, adjusting to campus life, limited budget.
- **Goals**: Finds affordable deals on textbooks, second-hand items, and meal discounts.
- **Skills**: Uses online marketplaces but is cautious about scams.
- **Pain Points**: Struggles to find cheap textbooks, wants a reliable platform for second-hand goods, worries about payment security.

Persona 3: Sarah – The Campus Staff Member

- **General Characteristics**: 35 years old, administrative staff, works 9-5 on campus, limited shopping time.
- **Goals**: Needs a quick way to order office supplies, lunch, and personal items without leaving the office.
- **Skills**: Familiar with basic online shopping but prefers simple interfaces.
- **Pain Points**: No time to visit physical stores, finds some e-commerce sites too complicated or slow.

10. Team and roles

Angelie Bautista	abautista13@sfsu.edu	Team Lead
Lap Pham	lpham15@sfsu.edu	Back End Lead
Alvin Tulud	atulud@sfsu.edu	Front End Lead
Chan-Chun Yen	cyen@sfsu.edu	Github Master

11. Team Lead Checklist to be completed by team lead

DONE - So far, all team members are fully engaged and attending team sessions when required

DONE - Team found a time slot to meet outside of the class

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 reviewed class slides on requirements and use cases before drafting Milestone 1

DONE - Team reviewed non-functional requirements from “How to start...” document and developed Milestone 1 consistently

DONE - Team lead checked Milestone 1 document for quality, completeness, formatting and compliance with instructions before the submission

DONE - Team lead ensured that all team members read the final M1 and agree/understand it before submission

DONE - Team shared and discussed experience with GenAI tools among themselves

DONE - GitHub organized as discussed in class (e.g. master branch, development branch, folder for milestone documents etc.)