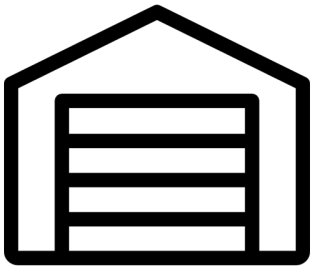
Department of Computer Science & Engineering
The University of Texas at Arlington

System Requirements Specification
CSE 4316: Senior Design I
Spring 2023



Team Stockers
General Inventory Management

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Revision History

Revision	Date	Author(s)	Description
0.1	03.31.2023	IC,JW,JS,RR	document creation
0.2	7.23.2023	JW	Edited Customer Requirements, Performance Requirements, Other Requirements, and Future Items
0.3	7.25.2023	JW	Edited Customer Requirements and Future Requirments
1.0	8.7.2023	JW	Final Review and Edit

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List of Figures

1 Product Concept

This section describes the propose of General Inventory Management application and the intended audience. This section will briefly describe the motivation for the application and the use cases for the application.

1.1 Purpose and Use

There are very few software programs that can keep track of inventory assets at a reasonable price. Most software programs offer this service but at outrageous prices. Our software aims to give the same quality at no cost to the users.

1.2 Intended Audience

The software is intended to be used as a "general use software" any user can use this program to keep track of their assets.

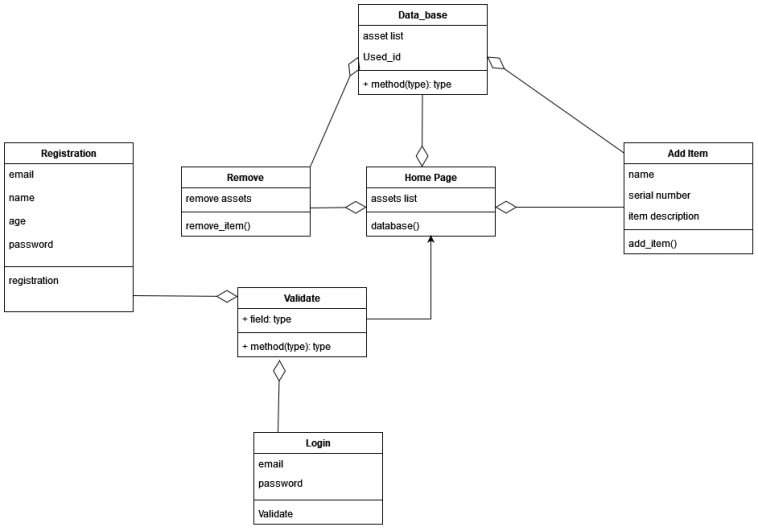

Figure 1: UML conceptual drawing

2 Product Description

This section is intended to provide the reader with an overview of General Inventory Management with its external inputs, features, and functionalities.

2.1 Features & Functions

The program will have features that will make it as simple as possible for the user to enter their items into a database to maintain their inventory. The program will have an option to display if the item was lent to an individual or is still in the user's inventory.

2.2 External Inputs & Outputs

Components	Input/External System	Output
Registration	Full Name, email, password,& age	New user is added
Login	email & password	User can enter their accounts and enters the homepage
Home	add, remove, undo, list of items	User sees list items that have been enter or can be an empty list if nothing has been entered

2.3 Product Interfaces

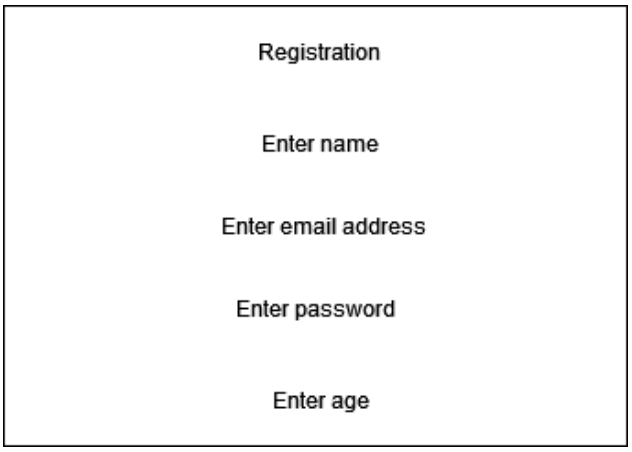

Figure 2: Registration Page conceptual drawing

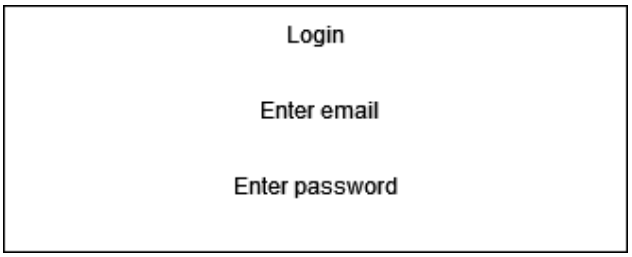

Figure 3: Login Page conceptual drawing

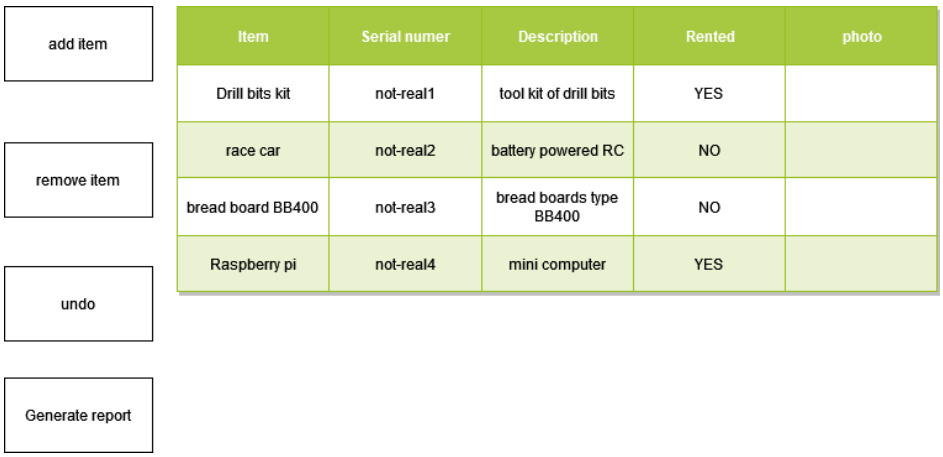

Figure 4: Home page conceptual drawing

3 Customer Requirements

The following requirements will showcase all of the necessary functionalities and features for the General Inventory Management Web App. These functionalities and features will range from basic aesthetic requirements to critical functionalities that are necessary for the application to operate properly. By the end of this section it will be clear to the reader what components are necessary for the application and what the final product should look and perform.

3.1 Landing Page

3.1.1 Description

The Landing Page provides a place where potential users can see an overview of what the Web App provides and how the application differs from other similar products.

3.1.2 Source

The team decided this was an important feature to provide to attract potential customers.

3.1.3 Constraints

- Images and a small description of available features
- Button for new users to register
- Button for current users to Log In

3.1.4 Standards

- The staging of available features will contain an Image of the feature, the feature name, and a small written description of the feature
- Background colors will be light blue (#007bff) and white (#ffffff)

3.1.5 Priority

- Critical

3.2 Login/Registration

3.2.1 Description

The page where current users can enter their credentials to enter the application and where new users can register and start using the system.

3.2.2 Source

CSE Senior Design project specifications

3.2.3 Constraints

Users must provide the following to Register/Login

- Email
- Password

When Registering the app will

- Send confirmation Email

3.2.4 Standards

No standards given the simplicity of the requirement

3.2.5 Priority

- Critical

3.3 Encryption

3.3.1 Description

The data maintained by the Web App is sensitive in nature and requires encryption to maintain security.

3.3.2 Source

CSE Senior Design project specifications

3.3.3 Constraints

The following list will include all items that will need to be encrypted

- Email
- Passwords
- Assets

3.3.4 Standards

List of applicable standards

- Secure Socket Layer (SSL)
- HTTPS
- Advanced Encryption Standard (AES)

3.3.5 Priority

- Critical

3.4 Add Assets

3.4.1 Description

The users will be able to add new Assets to the Inventory System. While adding an Asset the user can provide additional information to the Asses as required.

3.4.2 Source

CSE Senior Design project specifications

3.4.3 Constraints

When adding an Asset the user will can provide the following:

- Name
- Description
- Location
- Condition
- Dynamically add or remove fields

3.4.4 Standards

Assets must be encrypted using the standards described above

3.4.5 Priority

- Critical

3.5 Remove Assets

3.5.1 Description

If an Asset has been retired the users can delete the Asset from the main inventory. The asset is then place in a temporary storage that a user can access if an Asset was remove in error. The temporary storage will permanently delete the Asset after a specified amount of time.

3.5.2 Source

Determined by the Team as important to provide a better user experience.

3.5.3 Constraints

When an Asset is removed the system will:

- Place Asset in temporary storage
- Remove Asset after 30 days

3.5.4 Standards

No standard for removing items from inventory

3.5.5 Priority

- High

3.6 Barcode Scanning

3.6.1 Description

The web app supports barcode scanning for quick and accurate data entry and inventory tracking. It should be able to read both 1D and 2D barcodes and allow users to scan items using a mobile device or barcode scanner.

3.6.2 Source

Determined by the Team as important to provide a better user experience

3.6.3 Constraints

The barcode scanning must be reliable and able to handle a high volume of scans without errors. It must also be compatible with a range of barcode scanner models and mobile devices.

3.6.4 Standards

Applicable standards include GS1-128 and ISO/IEC 15418.

3.6.5 Priority

- Future

3.7 Reporting and Analytics

3.7.1 Description

The web app must be able to generate a range of reports and analytics on inventory levels, purchasing history, and other key metrics. It should also provide visualizations and dashboards to help users monitor trends.

3.7.2 Source

Determined by the Team as important to provide a better user experience

3.7.3 Constraints

Reporting and analytics must be based on accurate and reliable data and should be customizable to meet different user needs. The system should also be able to handle large volumes of data.

3.7.4 Standards

No specific standards for generating custom reports

3.7.5 Priority

- High

3.8 Mobile Access

3.8.1 Description

The web app must be accessible on mobile devices, with a responsive design and optimized user interface. It should also support offline access and synchronization when internet connectivity is restored.

3.8.2 Source

Determined by the Team as important to provide a better user experience

3.8.3 Constraints

Mobile access must be reliable and provide a seamless user experience, with minimal risk of data loss or errors. It must also be compatible with a range of mobile devices and operating systems.

3.8.4 Standards

List of applicable standards

3.8.5 Priority

- High

3.9 Price Prediction

3.9.1 Description

The web app will incorporate machine learning algorithms to predict the future price of inventory assets based on historical sales data, market trends, and other relevant factors. It should provide accurate and up-to-date price predictions to help users make informed decisions about inventory management and pricing strategies.

3.9.2 Source

Determined by the Team as important to provide a better user experience

3.9.3 Constraints

Price prediction using machine learning must be based on reliable and relevant data, with minimal risk of bias or errors. It must also be scalable and able to handle large volumes of data.

3.9.4 Standards

Applicable standards include IEEE Standard for Data Mining and ISO 9001.

3.9.5 Priority

- Moderate

3.10 Report Generation

3.10.1 Description

Using the system to generate reports of items that an authorized individual may have checked out. This could also be used to generate reports of stolen items or items damaged in a fire or natural disaster.

3.10.2 Source

This was a feature that was part of the requirements from Dr. Conly at the time the project was assigned.

3.10.3 Constraints

Once the customer marks all items as stolen or destroyed and requests a report information retrieval should be instant.

3.10.4 Standards

The report should be emailed to the user if they so choose, and the user should also have the option to print the report out if they have a printer available. The report should be in the form of a PDF document.

3.10.5 Priority

- Medium

3.11 Display Inventory

3.11.1 Description

The customer should be able to display the inventory that they have put into the system.

3.11.2 Source

This is a feature that was given to the team as a requirement of the project by Dr. Conly.

3.11.3 Constraints

Display only data that is relevant to what the customer has asked for.

3.11.4 Standards

The data should be retrieved and displayed within a second or two.

3.11.5 Priority

- High

3.12 Bar Code reader

3.12.1 Description

A bar code reader would make it faster and easier for a user to mark an item as lent or not.

3.12.2 Source

Groups members have thought about its implementation by possibly using a USB barcode reader

3.12.3 Constraints

Bar code reader must be used with the program opened.

3.12.4 Standards

N/A

3.12.5 Priority

- Future

3.13 Confirmation Email

3.13.1 Description

Once a user has signed up an email should be sent to the email account they used to create an account. The email should have a link in it that upon being clicked by the user would take them to the confirmation page of the website.

3.13.2 Source

The team decided this would be necessary to confirm that the user signed up with a valid email address in the event they need to reset their password.

3.13.3 Constraints

For the protection of the user's data, they should not be able to use the system until they click the link and relog into their account.

3.13.4 Standards

N/A

3.13.5 Priority

- Future

3.14 Modify Asset

3.14.1 Description

The user should have the ability to modify an entry in case they make a mistake with the name, description, serial number, or picture.

3.14.2 Source

CSE Senior Design specifications.

3.14.3 Constraints

Upon modifying the category the user should be prompted within a separate window containing a confirm button to confirm that they wish to make the modification to the entry.

3.14.4 Standards

N/A

3.14.5 Priority

- High

3.15 Store Multiple Pictures

3.15.1 Description

The user should have the ability to store 2 or 3 images if they desire.

3.15.2 Source

CSE Senior Design specifications.

3.15.3 Constraints

In order to conserve space on the server there should be a max of 3 pictures for any single entry.

3.15.4 Standards

The acceptable file type of the picture should be JPEG or PNG.

3.15.5 Priority

- Future

3.16 Add Categories

3.16.1 Description

The user should be able to customize the categories to make them specific or generic in accordance with their needs.

3.16.2 Source

CSE Senior Design specification.

3.16.3 Constraints

N/A

3.16.4 Standards

N/A

3.16.5 Priority

- High

3.17 Modify Categories

3.17.1 Description

The user must have the ability to modify the category as needed.

3.17.2 Source

CSE Senior Design specification.

3.17.3 Constraints

Upon modifying the category the user should be prompted within a separate window containing a confirm button to confirm that they wish to make the modification to the category.

3.17.4 Standards

N/A

3.17.5 Priority

- High

3.18 Choose the type of report to run

3.18.1 Description

The user should have the ability to run reports based on whether an item or group of items has the status of either stolen, checked out, a specific category or the entire inventory.

3.18.2 Source

CSE Senior Design specification.

3.18.3 Constraints

The report should only be generated if the user selects one or no categories.

3.18.4 Standards

The report will be generated as a PDF file.

3.18.5 Priority

- Future

4 Packaging Requirements

The General Inventory Management system will primarily be accessed through the internet via a website.

4.1 Web App

4.1.1 Description

The user will be able to access the Web App features if they have internet access and once they have been authenticated. Since the system is a Web App, users on mobile devices will be able to use he system as well.

4.1.2 Source

CSE Senior Design project specifications

4.1.3 Constraints

The user will need an initial internet connection to be authenticated and access the system

4.1.4 Standards

There will be a tutorial on how to use the systems features

4.1.5 Priority

- Critical

5 Safety Requirements

Include a header paragraph specific to your product here. Safety requirements might address items specific to your product such as: no exposure to toxic chemicals; lack of sharp edges that could harm a user; no breakable glass in the enclosure; no direct eye exposure to infrared/laser beams; packaging/grounding of electrical connections to avoid shock; etc.

5.1 Laboratory equipment lockout/tagout (LOTO) procedures

5.1.1 Description

Any fabrication equipment provided used in the development of the project shall be used in accordance with OSHA standard LOTO procedures. Locks and tags are installed on all equipment items that present use hazards, and ONLY the course instructor or designated teaching assistants may remove a lock. All locks will be immediately replaced once the equipment is no longer in use.

5.1.2 Source

CSE Senior Design laboratory policy

5.1.3 Constraints

Equipment usage, due to lock removal policies, will be limited to availability of the course instructor and designed teaching assistants.

5.1.4 Standards

Occupational Safety and Health Standards 1910.147 - The control of hazardous energy (lockout/tagout).

5.1.5 Priority

Critical

5.2 National Electric Code (NEC) wiring compliance

5.2.1 Description

Any electrical wiring must be completed in compliance with all requirements specified in the National Electric Code. This includes wire runs, insulation, grounding, enclosures, over-current protection, and all other specifications.

5.2.2 Source

CSE Senior Design laboratory policy

5.2.3 Constraints

High voltage power sources, as defined in NFPA 70, will be avoided as much as possible in order to minimize potential hazards.

5.2.4 Standards

NFPA 70

5.2.5 Priority

Critical

5.3 RIA robotic manipulator safety standards

5.3.1 Description

Robotic manipulators, if used, will either housed in a compliant lockout cell with all required safety interlocks, or certified as a "collaborative" unit from the manufacturer.

5.3.2 Source

CSE Senior Design laboratory policy

5.3.3 Constraints

Collaborative robotic manipulators will be preferred over non-collaborative units in order to minimize potential hazards. Sourcing and use of any required safety interlock mechanisms will be the responsibility of the engineering team.

5.3.4 Standards

ANSI/RIA R15.06-2012 American National Standard for Industrial Robots and Robot Systems, RIA TR15.606-2016 Collaborative Robots

5.3.5 Priority

Critical

6 Maintenance & Support Requirements

This section will focus on the maintenance and support for both the developers and users. The Web application allows users to report bugs and developers can utilize the source code and troubleshooting guide to fix any errors and bugs.

6.1 User Bug Reporting

6.1.1 Description

Allows software developers to address and correct bug issues submitted by users through the Web application in a timely manner.

6.1.2 Source

This was an essential requirement that was agreed upon by the back-end of the team.

6.1.3 Constraints

- Cost of software maintenance can be high

6.1.4 Standards

The software developer team will address and fix any bugs before more users discover them.

6.1.5 Priority

High

6.2 Source Code

6.2.1 Description

Formatted in a way developers can understand the fundamental components of the program. Source code will have comments/descriptions of definitions, calls, methods and other operational statements.

6.2.2 Source

Agreed upon by team members that this feature is critical to the functionality of the application.

6.2.3 Constraints

Descriptions and comments have to written in specific details that are readable and understandable to the developer.

6.2.4 Standards

Developers will reference the source code to fix and document any errors.

6.2.5 Priority

Medium

6.3 Troubleshooting guide for developers

6.3.1 Description

Developers will utilize troubleshooting guide to fix bugs and errors.

6.3.2 Source

Agreed upon by team members that this feature is critical to the functionality of the application.

6.3.3 Constraints

Developers will have to take the appropriate steps in troubleshooting.

6.3.4 STANDARDS

Resolved bugs and errors will be reported on troubleshooting backlog.

6.3.5 PRIORITY

Medium

7 Other Requirements

This section will focus on feasibility, portability, and extensibility of the program.

7.1 Portability

7.1.1 Description

The web application will need to be usable on computers, tablets, and phones as well as operating systems such as iOS, Windows, and Linux. It must also be supported on major web browsers such as Firefox, Google Chrome, Microsoft Edge, and Safari.

7.1.2 Source

The team agreed to use the programming language JavaScript since it is available on many operating systems and browsers, along with the ability to be used on multiple platforms.

7.1.3 Constraints

- Team members may have little or no experience with JavaScript and may need to learn the language.
- Users will have to be connected to the Internet for Web or mobile applications to function properly.

7.1.4 Standards

- Team members should keep a backlog on which operating systems and platforms the program can work on with little or no rework.
- Team members will have to stay informed with each other with a backlog showing details of any problems with web or the mobile application.

7.1.5 Priority

High

7.2 Extensibility

7.2.1 Description

The program will be designed to allow the addition of new capabilities or functionalities.

7.2.2 Source

This was a requirement that was agreed upon by every member of the team.

7.2.3 Constraints

- Developers will have to stay up to date with programming languages and libraries.

7.2.4 Standards

- Developers must make sure extended functionalities are working properly.

7.2.5 Priority

Medium

7.3 Web Application

7.3.1 Description

The system is a web application that will use React, TypeScript, HTML, and CSS. The performance will depend on the host being online as well as the user having a modern internet connection speed.

7.3.2 Source

Documentation for TypeScript Documentation for React

7.3.3 Constraints

Users must have a connection to the internet.

7.3.4 Standards

The web page should fit screens of different sizes properly.

7.3.5 Priority

The priority for this is high because if the user cannot connect to the application or it is too small or larger on their screen the app will be either too cumbersome to use or completely unusable.

7.4 Mongo DB

7.4.1 Description

The user's account information such as login ID and password will be stored on a Mongo DB and encrypted. All assets that are inventoried will also be on the database and encrypted. Each user will be given a unique

7.4.2 Source

Documentation for Mongo DB. The team agreed at the early stages of the project that Mongo DB would be used to store all data about and from users.

7.4.3 Constraints

The users must only receive or input data from or to their own accounts.

7.4.4 Standards

Use strong passwords and unique login IDs to distinguish which data belongs to which user.

7.4.5 Priority

The priority is high because without the database the application will be unusable. Also, the security of the user's data and login credentials is necessary to maintain their privacy.

8 Future Items

This section covers the requirements that would further enhance our software, but would require additional time.

8.1 Bar Code reader

8.1.1 Description

A bar code reader would make it faster and easier for a user to mark an item as lent or not.

8.1.2 Source

Groups members have thought about its implementation by possibly using a USB barcode reader

8.1.3 Constraints

Bar code reader must be used with the program opened.

8.1.4 Standards

N/A

8.1.5 Priority

- Future

8.2 Barcode Scanning

8.2.1 Description

The web app supports barcode scanning for quick and accurate data entry and inventory tracking. It should be able to read both 1D and 2D barcodes and allow users to scan items using a mobile device or barcode scanner.

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8.2.5 Priority

- Future

8.3 Confirmation Email

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8.3.2 Source

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8.3.3 Constraints

For the protection of the user's data, they should not be able to use the system until they click the link and relog into their account.

8.3.4 Standards

N/A

8.3.5 Priority

- Future

8.4 Store Multiple Pictures

8.4.1 Description

The user should have the ability to store 2 or 3 images if they desire.

8.4.2 Source

CSE Senior Design specifications.

8.4.3 Constraints

In order to conserve space on the server there should be a max of 3 pictures for any single entry.

8.4.4 Standards

The acceptable file type of the picture should be JPEG or PNG.

8.4.5 Priority

- Future

8.5 Choose the type of report to run

8.5.1 Description

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8.5.2 Source

CSE Senior Design specification.

8.5.3 Constraints

The report should only be generated if the user selects one or no categories.

8.5.4 Standards

The report will be generated as a PDF file.

8.5.5 Priority

- Future

REFERENCES