DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
THE UNIVERSITY OF TEXAS AT ARLINGTON

SYSTEM REQUIREMENTS SPECIFICATION
CSE 4316: SENIOR DESIGN I
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TEAM GI
INVENTORY DATABASE

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REVISION HISTORY

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1.0	10.23.2021	Whole Team	finished sections 1 & 2
2.0	12.4.2021	Jake Ryan	Revised to New Sponsors and Specifications
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3.0	4.22.2022	Ian McKenzie	Final revisions

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1 PRODUCT CONCEPT

This sections describes the purpose, use, and intended user audience for the UTA CSE Department Inventory Database. A high-level overview of the product's anticipated use cases, as well as a description of the client and their needs, are included here. The contents of this section help to illustrate the ways in which the Database will be used by the client. The client's specific requirements influence the design of the software product, and so they will be considered in this section along with the general use cases for such a product.

1.1 PURPOSE AND USE

The purpose of the this Database is to provide a fast, reliable, and secure way to track the inventory of the CSE department and who it was issued to. Keeping track of equipment and personal information is important to any efficient institution; the CSE's Database is designed to make the process of logging and viewing data effortless for members and administrators alike. Storing data without leaving it with the ability to be tampered with, and setting up the information in such a way that aditional features can be completed at the sponsors request is paramount.

1.2 INTENDED AUDIENCE

The Database was initially designed specifically for the ROTC program at UTA; due to reasons unspecified they decided that they did not want such a system after all and the CSE department seeing oporatunity made their offer. The system is remenicist of its origins, keeping its rank and user level structure to allow for ease of acsess in doling out equipment whether they be specifically for Profesors or Students.
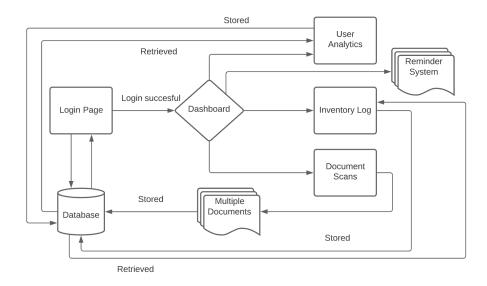

Figure 1: Intended Use Case Conceptual Drawing

2 PRODUCT DESCRIPTION

This section provides the reader with an overview of the UTA CSE Department Inventory Database. The primary operational aspects of the product, from the perspective of end users, maintainers and administrators, are defined here. The key features and functions found in the product, as well as critical user interactions and user interfaces are described in detail.

2.1 FEATURES & FUNCTIONS

The database will be hosted on a raspberry pi server, which for all purposes be local for tracking. Users will have different priviledge levels depending on their rank within the organization, allowing them to perform the necessary requests for said rank. The user is presented with an interface on the machine (the *client* side of the application) while the application runs on a remote host (the *server* side). The database on the server will store and organize user data – their personal informaton, equipment assignments, etc., while a web application receives and responds to incoming requests. Users with administrative priviledge will have access to additional tools, like *Inventory Management Options*. Inventory Management Options are needed to add new devices to be able to be checked out in the first place. The application will also implement a function to add new users if they are not already in the system to be able to get equipment that they need for classes/reaserch.

2.2 EXTERNAL INPUTS & OUTPUTS

The inputs from the user are

- User creation

which all essentially take the form of API calls posting data from the client's aplication. Administrators will perform the same inputs, with the added ability to

- modify the database

- Visualize Inventory

- Visualize Userbase

- Item checkout

- Item returns

- Report generation

The only output of the system would be the generated reports, which would really only be used to show whats where and who has or is using University property. The other abilities are for maintaining the operation of the databse.

2.3 PRODUCT INTERFACES

The interfaces avaliable will be determined based upon current User rank, with varying ability to act. Usage of dedicated machines to allow for self service above what a User's rank with low worth equipment being checked out via UTA ID card swiping or connecting and having a high enough rank permision to check out higher worth equipment is intended for general useage. A seperate interafce for admin level operations might also be the only way to check out the University's highest worth equipment.

3 CUSTOMER REQUIREMENTS

Customer requirements are those required features and functions specified for and by the intended audience for this product. This section establishes, clearly and concisely, the "look and feel" of the product, what each potential end-user should expect the product do and/or not do. Each requirement specified in this section is associated with a specific customer need that will be satisfied. In general Customer Requirements are the directly observable features and functions of the product that will be encountered by its users. Requirements specified in this section are created with, and must not be changed without, specific agreement of the intended customer/user/sponsor.

3.1 INVENTORY CHECKOUT AND RETURN

3.1.1 DESCRIPTION

Able to return and loan out equipment from the university

3.1.2 SOURCE

Sponsor

3.1.3 CONSTRAINTS

- Various different type of items.

- Different ways of loaning out the items.

3.1.4 STANDARDS

- Can acurately loan out and return items

- No limit to amount of items loaned out

3.1.5 PRIORITY

Critical

3.2 INVENTORY STATUS

3.2.1 DESCRIPTION

Able to keep track of Users and Items avlaiable

3.2.2 SOURCE

Sponsor

3.2.3 CONSTRAINTS

- Able to tell who has what item

- Able to tell when they were given it and when the University can expect it back

3.2.4 STANDARDS

- Information is being kept in such a way to be able to be presentable

- Information is being kept up to date

3.2.5 PRIORITY

Critical

4 Packaging Requirements

This is still being determined as the exactness of what will be accessible online or be done by a dedicated system is still being determined. There will be a documentation to explain how to operate and do things step by step, and a notification system through email to be usabel as needed.

4.1 Multi-platform

4.1.1 Description

The Inventory Management software will look and act properly whether it is access from a mobile phone browser or a browser on a computer.

4.1.2 Source

Sponsor

4.1.3 Constraints

* The website will not look exactly the same and may have to limit functionality through accessing from a mobile device.

4.1.4 Standards

* Able to login through both mobile phone and computer.

* Able to insert information through both mobile phone and computer.

* Able to pull information through both mobile phone and computer.

4.1.5 Priority

Canceled

4.2 Printing

4.2.1 Description

The reports should be able to be able to be printed at any time

4.2.2 Source

Sponsor

4.2.3 Constraints

* The reports should be uniform

4.2.4 Standards

* The server should be able to immediately print without issue.

4.2.5 Priority

High

4.3 Documentation

4.3.1 Description

Detailed step by step processes of how to do tasks on the website

4.3.2 SOURCE

Sponsor

4.3.3 CONSTRAINTS

- Writing something that will cover ever detail and understandable.

4.3.4 STANDARDS

- How to add a User.

- How to edit User information.

- How to delete Users.

- How to add a Item.

- How to checkout a Item.

- How to return a Item.

- How to delete Items.

4.3.5 PRIORITY

High

4.4 NOTIFICATIONS

4.4.1 DESCRIPTION

Able to send a emailed notification to the user about their item being due to return.

4.4.2 SOURCE

Sponsor

4.4.3 CONSTRAINTS

- Creating a method for automating emails

4.4.4 STANDARDS

- Able to create different type of priority or personalized emails.

4.4.5 PRIORITY

Canceled

5   Performance Requirements

Our customer did not have specific requirements for our product to meet, however we want to make sure that the application responds in a timely manner and will not cause more headache then the system it is replacing.

5.1   Posting information

5.1.1   Description

When users need to post new information into the database in a form submission (e.g. a new user submitting that he is borrowing a Rasberi Pi for a class). This should be doable in under a minute.

5.1.2   Source

Team

5.1.3   Constraints

None

5.1.4   Standards

None

5.1.5   Priority

High - 4

5.2   Retrieving information

5.2.1   Description

When users need to retrieve information from the database to a form (e.g. a user attempting to print out their current inventory list and generating the pdf). This will take a maximum of 10 seconds on any device.

5.2.2   Source

Team

5.2.3   Constraints

None

5.2.4   Standards

None

5.2.5   Priority

Medium - 3

5.3   Account creation

5.3.1   Description

Users will be able to complete a form to setup a new User account tied to their University ID within a matter of minutes for a standard rational user who knows computer basics.

5.3.2   Source

Team

5.3.3 CONSTRAINTS

None

5.3.4 STANDARDS

None

5.3.5 PRIORITY

Medium - 3

5.4 ACCOUNT DELETION

5.4.1 DESCRIPTION

Admins will be able to delete User accounts within 5 minutes.

5.4.2 SOURCE

Team

5.4.3 CONSTRAINTS

Verification process will be needed to make sure that an account isn't deleted unintentionally.

5.4.4 STANDARDS

None

5.4.5 PRIORITY

Medium - 3

6 SAFETY REQUIREMENTS

Our product is almost a purely virtual product in nature, and will need no robotics, though electronics and lab equipment is in the current plan. The exact needed though are trivial being a device to run software to connect with the database and operate a card reader which is potentially being already present and not needed. Included are standard safety procedures in case for some reason we need to use the lab or electronics in the future.

6.1 LABORATORY EQUIPMENT LOCKOUT/TAGOUT (LOTO) PROCEDURES

6.1.1 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.

6.1.2 SOURCE

CSE Senior Design laboratory policy

6.1.3 CONSTRAINTS

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

6.1.4 STANDARDS

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

6.1.5 PRIORITY

Critical - 5

6.2 NATIONAL ELECTRIC CODE (NEC) WIRING COMPLIANCE

6.2.1 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.

6.2.2 SOURCE

CSE Senior Design laboratory policy

6.2.3 CONSTRAINTS

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

6.2.4 STANDARDS

NFPA 70

6.2.5 PRIORITY

Critical - 5

6.3 RIA ROBOTIC MANIPULATOR SAFETY STANDARDS

6.3.1 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.

6.3.2 SOURCE

CSE Senior Design laboratory policy

6.3.3 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.

6.3.4 STANDARDS

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

6.3.5 PRIORITY

Critical - 5

7 Maintenance & Support Requirements

To continue to keep this projects goal working in the long term, a few things must be actively maintained and some others will potentially need updates as required.Though much of the project in its implementation will not require this, parts of it will and need recognizing.

7.1 Aplication Maintenance

7.1.1 Description

Another group or team would need to maintain the source code as the original team graduates. This will consists of working with the current sponsor to address any bugs, issues, or new features.

7.1.2 Source

Sponsor

7.1.3 Constraints

Relies solely on the sponsors decision to coordinate with other professors to have other students maintain source code.

7.1.4 Standards

N/A

7.1.5 Priority

Future

7.2 Database Maintenance

7.2.1 Description

The database will need to be maintained in ways such as adding new individuals and cleaning out old individuals. For this section removal of old individuals is the primary focus.

7.2.2 Source

Sponsor

7.2.3 Constraints

Someone has to spend time to clean out members of the database system who no longer are attending the university.

7.2.4 Standards

Removing individuals elegantly while not disrupting the main functionality of the system.

7.2.5 Priority

Future

7.3 Item Maintenance

7.3.1 Description

Making sure that the items being asked to be loaned out are up to date and actually exist. That those Items are being held by who they say that they are at the time for any checked out.

7.3.2 Source

Sponsor/Inherent

7.3.3 CONSTRAINTS

Practicality and Time

7.3.4 STANDARDS

NA?

7.3.5 PRIORITY

Low

7.4 CARD SCANNER SYSTEM

7.4.1 DESCRIPTION

The machine to operate and interface most often with the database, as well as the machine to inerface with said machine to function for users to actually card swipe will need to be made sure to be functioning properly.

7.4.2 SOURCE

Sponsor/Inherent

7.4.3 CONSTRAINTS

Needs to not have the database wreck itself whenever it gets checked for matinence.

7.4.4 STANDARDS

Able to operate reliably as it is going to be the main interaction point for most users.

7.4.5 PRIORITY

Medium

8   OTHER REQUIREMENTS

This will be a section that will list requirements from our customer that before the customer will even consider our project being complete. This will cover any technical requirements from requiring the front or back end to be adaptable with certain machines, or to be available using certain systems/languages. Other potential things would be goal availability, like options for things in which would be needed for the initial implementation, or future implementations but would not be needed to be kept or maintained.

8.1   EASE OF ACCESS FORMER REQUIREMENT

8.1.1   DESCRIPTION

This system was required to be heavily portable in order to allow for it to be used in conjunction with a variety of devices whether that be phones or computer systems running any number of operating systems. Due to that systems in which to make that are no longer needed but were planed for and intended to make this project worthy of being a senior project needing to be maintained.

8.1.2   SOURCE

Customer requirements and their Implementation

8.1.3   CONSTRAINTS

Needing to have the right type of user hierarchy to keep data input clean, and potentially halt theft. Needing to use some systems deliberatly to maintain project complexity, in this case to simulate ability to do the ease of acsess.

8.1.4   STANDARDS

Usage of some sort of backup database system using cloud services.

8.1.5   PRIORITY

Low

9   FUTURE ITEMS

Future work for this project will consist of maintenance as the system is being proposed to manage the inventory of other senior design lab cycles. Maintenace will cover the addition of features if needed and database maintanance. In the future we would also like to implement a reminder or notification system that would allow admins to send out return reminders to students from the system.

9.1   NOTIFICATIONS

9.1.1   DESCRIPTION

A feature of the system would be that admin users being able to send out emails to people in the database. The admin would be able to send an email to many in a uniform manner.

9.1.2   SOURCE

Team suggestion

9.1.3   CONSTRAINTS

- Would need to have access to many email address to test at larger scale

- Time as could prove difficult

9.1.4   STANDARDS

- Able to create different type of groups

- Able to send multiple emails to different people

9.1.5   PRIORITY

Future

9.2   APLICATION MAINTENANCE

9.2.1   DESCRIPTION

Another group or team would need to maintain the source code as the original team graduates. This will consists of working with the current sponsor to address any bugs, issues, or new features.

9.2.2   SOURCE

Sponsor

9.2.3   CONSTRAINTS

Relies solely on the sponsors decision to coordinate with other professors to have other students maintain source code.

9.2.4   STANDARDS

N/A

9.2.5   PRIORITY

Future

9.3   DATABASE MAINTENANCE

9.3.1   DESCRIPTION

The database will need to be maintained in ways such as adding new individuals and cleaning out old individuals. For this section removal of old individuals is the primary focus.

9.3.2   SOURCE

Sponsor

9.3.3   CONSTRAINTS

Someone has to spend time to clean out members of the database system who no longer are in ROTC.

9.3.4   STANDARDS

Removing individuals elegantly while not disrupting the main functionality of the system.

9.3.5   PRIORITY

Future