TEAM CONTRACT

GNG2101, Section # B01.1

Team Members:

1) Ryan Langley

2) Jamie Watson

3) Nick Mesquita

4) Matthew Hadjis

5) Leonardo Atalla

Team Procedures

1. Day, time, and place for regular **team meetings**:

Thursday, 4:15, A04

2. Preferred method of **communication** (e.g. e-mail, cell phone, Facebook, Blackboard Discussion Board, face-to-face, in a certain class) in order to discuss the project and to inform each other of team meetings, announcement, updates, reminders, problems:

   Instagram, Outlook

3. **Decision-making policy** (by consensus? by majority vote?):

1. Consensus preferred, majority vote if necessaryMethod of **record keeping** (Who will be responsible for recording & disseminating minutes? How & when will the minutes be disseminated? Where will all agendas & minutes be kept?):

All meetings are expected to be attended by all members, however in the case of an absence meeting notes will be taken by those present and shared with the rest of the team.

Team Expectations

Work Quality

1. **Project standards** (What is a realistic level of quality for team presentations, collaborative writing, individual research, preparation of drafts, peer reviews, etc.?):

We will aim for the highest level of quality, however as long as everyone puts in their respective full effort, the resulting quality of the task will be acceptable with the team's consensus.

2. **Strategies** to fulfill these standards:

- Everyone gives their full effort and cooperation during meeting times
- Once the work is finished, it will be reviewed by the whole group so we can all agree that it meets our standards
- Communication is key, as everyone gives their input on what they perceive as meeting an excellent quality standard, therefore everyone giving their opinion during the meetings is an important strategy to ensure a group standard is met

Team Participation

1. Strategies to ensure cooperation and equal distribution of tasks:

- Ensure that no singular person has a markedly higher workload than others when assigning tasks/roles.

- Frequent communication regarding tasks and task progress

2. Strategies for encouraging/including ideas from all team members (team maintenance):

- Ensure all members can contribute and add ideas during discussions.

- Make attempts to have all ideas heard and discussed if possible

3. Strategies for keeping on task (task maintenance):

Regular maintenance of the Gantt chart and status updates during meetings, labs, and classes.

4. Preferences for leadership (informal, formal, individual, shared):

Shared leadership, each team member is equally valuable and responsible for the group's sucess.

Personal Accountability

1. Expected individual attendance, punctuality, and participation at all team meetings:

- Expected attendance at every meeting at the designated time. If not possible, communicating beforehand is expected, and remote options / meeting minutes will be considered.

2. Expected level of responsibility for fulfilling team assignments, timelines, and deadlines:

Each member is expected to fulfil their own assigned tasks by agreed upon deadlines.

3. Expected level of communication with other team members:

Each member should openly communicate with the rest of the team about the status of their work. Updates should be provided at minimum during the weekly meetings and labs. If additional help is required, the team should be notified immediately.

4. Expected level of commitment to team decisions and tasks:

- All members should participate in team decisions, and have their vote cast. Tasks should be completed in a timely manner. If assistance is needed on a task, this should be communicated before the due date.

Consequences for Failing to Follow Procedures and Fulfill Expectations

1. Describe, as a group, how you would handle **infractions** of any of the obligations of this team contract:

- Communicate with the individual performing said infractions, attempt to understand why they are happening. If it cannot be resolved either by a different distribution of work or some other method, escalation will occur.

2. Describe what your team will do **if the infractions continue**:

If the infractions continue, then the team will be forced to report it to the TAs and if it is very serious, then the professor will have to be notified as well.

****

a) *I participated in formulating the standards, roles, and procedures as stated in this contract.*
b) *I understand that I am obligated to abide by these terms and conditions.*
c) *I understand that if I do not abide by these terms and conditions, I will suffer the consequences as stated in this contract.*

1) Nick Mesquita date: September 12th, 2024

2) Leonardo Atalla date: September 12th, 2024

3) Jamie Watson date: September 12th, 2024

4) Matthew Hadjis date: September 12, 2024

5) Ryan Langley date: September 12th, 2024

* This template was adapted from https://cns.utexas.edu/images/CNS/TIDES/teaching-portal/**Team_Contract**.doc

Client Meeting Preparations

1.) Current knowledge;

- Bethany Children's Health Center is a children's hospital in Bethany, Oklahoma.

- They specialize in pediatric rehabilitation and 24-hour complex care in patients ranging from birth to 21 years old.

- They make common use of assistive technology such as wheelchairs, standers, and switches due to many patients having significant motor deficits.

- They have an immense number of assets and are looking for a simple inventory system to manage their items.

2.) What we don't know:

-How the previous software worked. We want to design something similar to the more expensive solution so that it is easy for the health center staff to adjust.

-Do they want a Barcode scanner vs. QR code scanner

-Do specific assistive technologies require labeling (I.E. can we say A wheelchair has been checked out, or describe that wheelchair 23 has been checked out)

-Have any solutions not worked in the past to solve the problem

-

3.) Tools and methods:

- The purpose is to understand their needs, not assume that we know what they need, therefore entering the interview strictly ready to listen is key. Listening attentively will help us uncover any needs that the client has mentioned, and allows us to learn all the possible information so that we can hopefully empathize with the client

- Engaging with the client is important when they are answering questions, because it lets them know that we are actively receiving the information that they are giving us. This can be done by not simply asking random questions, but asking questions that follow up on previous information.

- We will ask questions neutrally, and not insert our own opinion because it gives the client the opportunity to input their opinion on the subject at hand, and allows us to truly understand where they are coming from.

4.) Interview guide

-Group introductions, introduce ourselves, uOttawa, the course goals and objectives

-General questions, client describes their problem, how they would want to see it solved.

-Specific questions, these questions will help guide our design process. WIll be more technically focused

-Open again to questions from the client.

-Wrap up.

Possible questions:

How do you intend for the product to be used/function?

What is the current process used for asset inventory management?

What kind of tools or equipment is being kept track of?

Does each individual item require its own individual tracker?

What former ways has the problem attempted to be addressed?

Deliverable B: Sustainability Report + DFX

GNG2101

Design Project Progress Update

<B1.1>

Submitted by:

Nick Mesquita, 300361908

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Jaime Watson

<September 16th, 2024>

University of Ottawa

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List of Acronyms and Glossary

Table 1. Acronyms

Acronym	Definition
AIS	Asset Inventory System
BCHC	Bethany Children's Health Center
CSS	Cascading Style Sheets
DFX	Design For X
LCA	Life Cycle Analysis

Table 2. Glossary

Term	Acronym	Definition

Introduction

This report outlines the potential societal, environmental, and economic impacts that may arise from the actual production of a theoretical final concept of the Asset Inventory System

(AIS) through the use of a sustainability report. It is assumed that the final prototype has continued to develop into an actual product, production has begun, and the final prototype is being prepared to be sold. In addition, as part of the analysis of the project's sustainability, an LCA is conducted.

The sustainability report assesses each aspect of the potential impacts with the aid of a triple bottom line analysis, and a life cycle assessment framework. The LCA addresses four main topics: the objective and scope, inventory analysis, impact assessment, and interpretation. These topics contribute towards the overall analysis of the sustainability of the life cycle by giving information regarding each stage of the production. Moreover, the sustainability report is supplemented with design for x (DFX) considerations. The most important factors in the design of the prototype are chosen and the reasoning behind each DFX selection ensures that the necessary requirements for the prototype are met.

The purpose of the sustainability report is to ensure that the prototype is developed in a socially and environmentally responsible way, while also keeping the economic impact in mind. Along with the DFX requirements, the report establishes that all the necessary requirements are considered when putting a product up for production.

1 Sustainability Report and DFX

1.1 Sustainability report

Our project itself mainly has social and economic effects, given its lack of physical material. The system is online, and the theoretical physical attributes of the AIS are items that the hospital likely has already. Knowing this, we move on to the social effects of the AIS. However, the AIS will also have economic impact through its use.

The AIS stands to only the benefit those using and around it. It will simplify the asset checkout and return process. In doing this, the physical therapists using the system will have more time to work with their patients, especially in short 30-minute sessions. This leads to the patients progressing further, faster, increasing their quality of life. On the other side, the physical therapists themselves will be less stressed knowing that they'll have more time with their patients than they did with the previous system, as they won't spend precious minutes entering information into the system when they could be working with their patients. Overall, this adds a positive social impact.

Following this are the economic effects. For the Bethany Children's Health Center (BCHC), this will be a positive economic effect. They currently must pay per asset and per person who can access their system. They have 2,000+ assets and 2,500+ people, meaning they likely pay a considerable amount for the system they have currently. The AIS we plan to implement will come at no cost to them, save for possibly several barcode scanners which can be found relatively cheaply. As such, our system will also have a positive economic impact for the BCHC.

Additionally, the AIS will also have a positive environmental impact. Through the use of the AIS, the assets which BCHC has will be easier to track and keep control over. It will also have sections dedicated to notes, including preventative maintenance. In using these notes, staff will be able to check when, for example, a car seat needs to be recertified and can do so before the certification expires. This allows the assets to have a higher uptime, reducing the need for more assets to be acquired, and old ones thrown away. This prevents more waste from entering the environment, adding to a positive environmental impact.

Economic Balance Sheet	Social Balance Sheet	Environmental Balance Sheet
Reduction in Cost	Reduction in wait time for assets	Increase in asset uptime, decrease in asset discarding
There are no negative aspects to this system economically.	There are no negative aspects of this system socially.	There are no negative aspects of this system environmentally.
Increase in Profit. Cost will be reduced as less time is spent using the system, decreasing the power cost.	Net social benefit. The less time patients spend waiting for assets, the faster they can get to treatment. The more treatment time they get within their appointment window, the faster they will recover.	Net environmental benefit. As asset uptime increases due to the increase in efficiency in the system, assets are discarded less. Assets being discarded less often leads to an overall decrease in waste due.

Life Cycle Analysis (LCA) Framework

Objective and Scope

The boundaries that will be considered are the AIS itself and its integration with the physical barcode scanners.

Inventory Analysis

Given that the majority of our product is digital, we will be focusing on the materials and manufacturing of barcode scanners themselves. The main components of a barcode scanner are the housing, illumination system, sensor and decoder. The housing is typically made of plastic, as such it follows the typical plastic life cycle of raw material extraction, material refining, polymerization and final processing. The electronic components have many materials, such as glass, copper, resin, and LEDs. These have much less impactful life cycles, as many of the materials can be recycled or otherwise have a smaller impact on the environment compared to plastic.

Environmental Interactions, Emissions, and Raw Material Consumption

There is a lack of concrete data regarding the emissions of manufacturing of barcode scanners specifically, but there is data regarding plastic. According to the University of Colorado; the transport of raw materials to be used in plastic processing emits 1.5-12.5 million metric tons of greenhouse gases, the refinement of plastics releases 184-213 million metric tons, and removing forested land for oil extraction and pipeline construction releases more than 1.6 billion metric tons of CO_2 into the atmosphere [(1)]. The specific raw material consumption of

plastic and the other components within barcode scanners is difficult to measure given the sheer amount of material used within these processes.

Impact Assessment

Manufacturing and Materials – 60-80%

- Plastic Housing – 75%

- Internal Electronics – 25%

Packaging and Transport – 5-10%

Usage – 10-15%

End of Life – 2.5-5%

Interpretation

Taking the above information into account, it can be interpreted that; although the plastics industry is harmful to the environment and the use of plastics should be dissuaded, the individual plastic use of this project is so minimal that it has very little to no impact at all. Additionally, the system doesn't require new materials or manufacturing and can use existing products currently on the market. As such, the logical next steps would be to try to find second-hand barcode scanners to be able to test the system when the time comes, to even further reduce the carbon emission potential.

1.2 Design for X

Design for Simplicity: throughout the interview, it was clear that one of the main problems the hospital staff have with the currently implemented AIS is how tedious the process of checking an item in or out is. This is especially prominent due to the fast-paced nature of their jobs. A design for simplicity would alleviate this issue, allowing for quicker “transaction" of used assets. An example of designing for simplicity is automatically adding timestamps for when an asset is checked in or out.

Design for Affordability: the client currently uses third-party software that charges per item and per user. Since there are over 2000 items currently being tracked by the AIS, and over 2000 employees with access to the system, the cost of their current software is not sustainable. By designing for affordability, we can lower the maintenance costs of the AIS, allowing them to utilize their resources in other areas of need.

Design for Reliability: The client employs a large number of nurses, physicians, and other health care professionals who are not as technically versed in troubleshooting of systems. Therefore, if bugs or glitches were to occur within the system, they cannot be expected to be able to troubleshoot or fix the issues. While time is of the essence for their work, a reliable system is necessary to allow them to do their jobs efficiently. By designing for reliability, we can ensure that the AIS does not cause unnecessary delays in the treatment of patients.

Design for Scalability: due to the large number of assets in the hospital’s possession (around 2000) and the number of assets always changing, a design that can account for all assets being added and deleted in an efficient way is required. For example, if an item added to the AIS shares an ID with another item already present, instead of adding another item to the system, the

quantity of the present item should increase. This will not only make for a more intuitive user experience, but will help with the scaling of the AIS.

Design for Testability: During the client meeting it was noted that the AIS must be designed for speed. The client noted that there were difficulties integrating the previous AIS into the health center as the software was too slow. This means that the software must be testable throughout all stages of its development to ensure that the speed and integration during the final iteration of the product is smooth. Further, designing for testability will allow correct time allocation when designing the product so that not too much time is spent checking individual interactive elements.

1.3 Conclusion

There were two main purposes of this report, and through a meeting with the client and external research done on the subject, these are the conclusions we were led to.

The first objective was to create and provide a sustainability report to discuss the AIS's major social, environmental, and economic impacts, then to do an LCA on the barcode scanner in hopes of reducing the carbon footprint of our product. The second part of the report discusses the priorities in the development of the AIS based on the needs of the client and research on the topic using DFXs.

The conclusions found during the report writing process are, the restraints based on sustainability are nearly nonexistent due to the virtual nature of the product, and the most important factors of the design are simplicity, affordability, reliability, scalability, and testability.

2 Problem Definition, Concept Development, and Project Plan

2.1 Introduction

The goal of this deliverable is to produce the problem definition, and develop concepts based on the understood problem. The use of these concepts can then be used further on during the development process for the development of the various prototypes of each subsystem and the overall system. Through the information learnt during the first client meeting the problem will be defined and the problem statement will be developed.

2.2 Abstract

The purpose of this deliverable is to define the Bethany Children Health Center's (BCHC) problem and develop concepts that can be further developed into prototypes to solve their issue. Utilizing information learnt from the client meeting as well as the team's own knowledge about software development practices and challenges the problem was determined to be the need for a new asset inventory system that speeds up the signing in and out of different pieces of equipment throughout the facility. **2.3 Problem definition**

During the interview process, the client detailed their needs based on the improvements that they would like to see from their current system. Currently, the client's inventory system works as follows: inventory is managed through the online platform Snipe-IT, and the therapists at the health center are given iPads to access this system to sign out equipment. Each piece of equipment has a QR code that can be scanned to check it out. However, this system is inefficient, meaning therapists who have specific time slots for their patients are wasting time using this system to check out equipment, and the platform that they currently use to manage their assets charges a significant amount for each asset, making the cost extremely high. Additionally, the primary users of this system will be the therapists, as they need the equipment for the sessions with their patients, so they must find it easy to use. Therefore, the main needs identified by the client were that the new system must be;

1. Easy to use for the therapists
2. Efficient
3. Affordable

Aside from the primary needs, other relevant information was outlined that will help with the creation of the system. First, the client requested that the system have a checkup system for the higher ups, where they can view when the equipment was checked out and checked back in. The equipment should be automatically timestamped when it is checked out, have an option to select either long-term or short-term use and indicates who has checked out the equipment. Additionally, the system should be able to have a section where the specifications for each piece of equipment can be inserted, such as the manufacturer, serial number, and expiry date, as well as a notes section where any specific information can be written by the user. In terms of programming the system, the client does not care which language is used, as long as the system can be used for Windows operating systems.

Problem Statement:Bethany Children's Health Center needs an asset inventory system to accurately track their equipment that is easy to use and can be updated as new equipment is added or old equipment is removed.

Needs

#	Need	Importance
1	The AIS supports a large number of items	5
2	The AIS supports a large number of users	5
3	The AIS streamlines the item check in/out process	4
4	The AIS supports the simple addition/removal of new items	4
5	The AIS is not expensive to maintain	4
6	The AIS tracks when items are checked in/out	3
7	The AIS displays information about the items at check out	4
8	The AIS displays the current location of the items as entered by users	3
9	The AIS displays how long a given item will be out for	2
10	The AIS is aesthetically pleasing	1

These needs were developed from the information the team learnt during the first client interview. The client indicated the features of their current asset inventory system that they liked and where they want to see improvements. Then based on their needs the team ranked their importance

Metrics

Metric #	Need #	Metric	Importance	Units
1	1	Number of Items	5	Items
2	2	Number of Users	5	Users
3	5	Cost	4	Dollars
4	3	Check in/out time	4	Seconds

These metrics were developed from the need statements above. Only four metrics were chosen as they have quantifiable units that can be benchmarked and compared to other existing products currently on the market.

Target Specifications

Metric #	Metric	Units	Marginal Value	Desired Value
1	Number of Items	Items	2000	Infinite
2	Number of Users	Users	2000	Infinite
3	Cost	Dollars	Free	Free
4	Check in/out time	Seconds	60	30

The target specifications were chosen based on the current needs of the client. The marginal values represent the minimum targets that the software should be able to handle to be considered an improvement over the client's current asset inventory system software. The desired values are our own targets that the team would like to achieve to deliver an outstanding product to the client.

Benchmarking

	Snipe IT (Self Hosted)	Snipe IT (Dedicated Hosting)	Sortly (Free)	Sortly (Enterprise)
Price	$0	$2499.99/year	$0	By quote
Max Users	Infinite	Infinite	1	12+
Max Assets	Infinite	Infinite	100	10,000+
Integrated Scanner	No	No	Barcode/QR	Barcode/QR
Operating Systems	Mac, Windows, Linux	Mac, Windows, Linux	Mac, Windows, Linux, Mobile	Mac, Windows, Linux, Mobile

The metrics developed were then benchmarked against the client's current asset inventory system and another software that completes a similar task also on the market. These were chosen so the team can focus their development directly on aspects of the design that can improve over what is currently available.

2.4 Concept development

In the interview with the client, a preferred improvement to the current system was mentioned and can act as the foundation for the concept. Ideally, a computer station would be set up in each inventory room at the health center. Each therapist would have a barcode/QR code on their badge that could be scanned on the computer to check in. Then, the barcode/QR code on the piece of equipment would be scanned to check the equipment out, followed by the user's card to confirm the check out. The inventory system that would be on each computer would allow the user to quickly search for the needed equipment and read any important information, as well as indicate which and when the equipment was checked out once the item is scanned.

The front-end sub-system involves the digital components with which the user interacts with. This is the scanning of the barcode on a user ID badge and the asset barcode, and the entering of where any given asset is going. This is the simplicity aspect of the system, all the user has to do is scan two items and enter the destination, and they can move on.

The back-end sub-system involves the digital components with which the end user doesn't interact with. This is the referencing of the database from the user badge and asset barcode, the database itself, tracking of assets, and who and when they've been signed out by. This is scalable very easily as the only aspects that need to change are either adding the asset to the database or giving a user access to the system. Following this, it's affordable as it costs next to nothing to have a database located in a file. Additionally, the system is easily testable for speed as it can be tested frequently, and if it is too slow improvement can be made.

The physical sub system involves the handheld aspect of the concept, where the user uses the actual pieces to access the system. The main piece to the physical subsystem is the barcode scanner, which the user requires in order to access the front-end subsystem. This is reliable, given that as long as the barcode scanner doesn't break, the system will function. In the possibility that the scanner does break, they are easily replaceable for low cost.

The variation of concepts depends on the amount of selection that is involved with the project. At its core, the project requires a programming system that can access a database of information, and a user interface that connects to the programming system to display the information to the user. Therefore, the concepts can be described as follows:

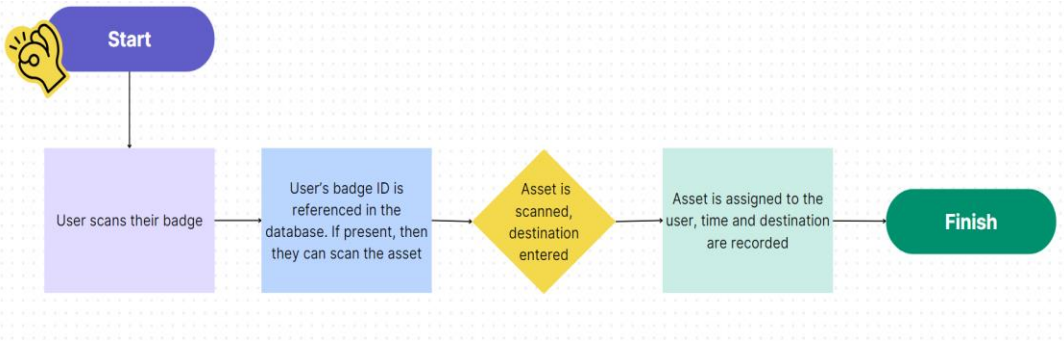
Every concept includes the basic usage of HTML, Cascading Style Sheets (CSS) and JavaScript

- Concept 1:
    - Programming language: Java, Application for creation of user interface: Springboot (open-source java framework for programming applications), Scanner type: QR Code
    - Analysis against target specifications: Creating the system from scratch, it is possible to fit the number of items and users using Java, and using Java is free as well. In addition, it is theoretically possible for the entire process to take under 60 seconds using Java but can only be tested with a prototype.
- Concept 2:
    - Programming language: C, Application for creation of user interface: Civetweb (web server that is designed for applications), Scanner type: QR Code
    - Analysis against target specifications: creating the system from scratch, it is possible to fit the number of items and users using C, and using C is free as well. In addition, it is theoretically possible for the entire process to take under 60 seconds using C but can only be tested with a prototype. However, this is the hardest to use in our opinion and may not result in an efficient process.
- Concept 3:
    - Programming language: Python, Application for creation of user interface: Django (high level Python web framework), Bootstrap (UI alignment), Scanner type: Barcode scanner
    - Analysis against target specifications: Python is the easiest programming language in our opinion and will hopefully result in the efficient running of the system. Creating the system from scratch, it is possible to fit the number of items and users using Python, and using Python is free as well. In addition, it is theoretically

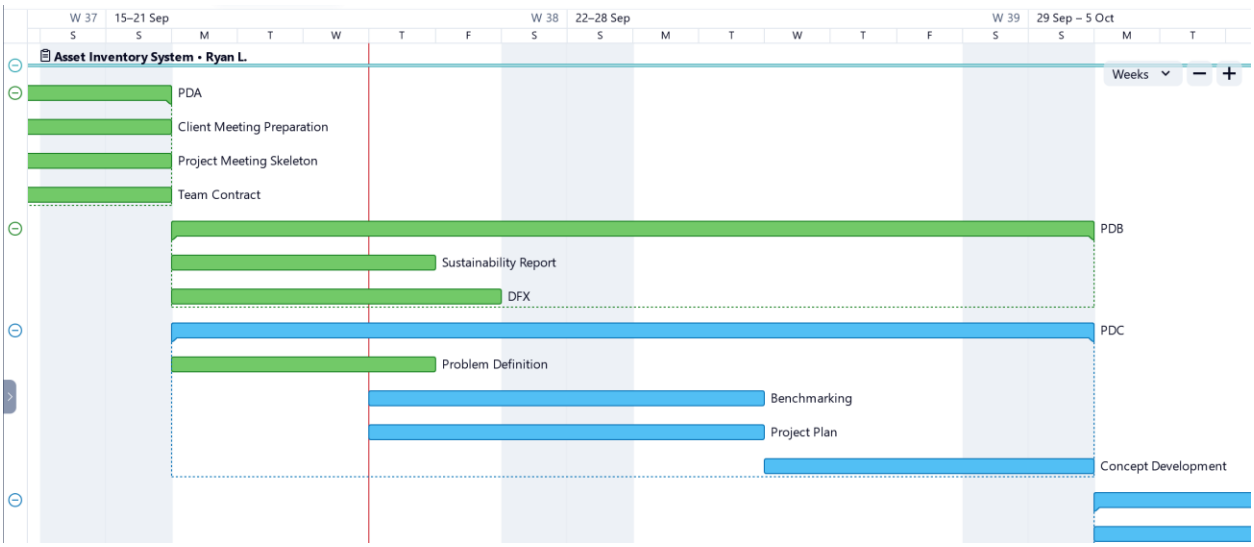
possible for the entire process to take under 60 seconds using Python but can only be tested with a prototype.

- Concept 4:
    - Snipe it alternative (Sortly): this avoids using an actual programming language and building it from scratch, Scanner type: Barcode scanner
    - Analysis against target specifications: Might be a challenge to reach target specifications for cost and speed, as the alternative has an actual cost compared to the other concepts, and it is not a familiar platform. It is theoretically possible for the entire process to take under 60 seconds using Sortly, but can only be tested with a prototype

The solution we've chosen to move forward with is Python with integration into the Django web framework. We chose Python as the language with which we all have the most familiarity with. Additionally, the integration with Django allows us to have the database in Python, and just have it referenced when necessary. With respect to benchmarking, choosing Python demonstrates it is once again the best choice. It is free to use, so it is the cheapest option, and there is no theoretical limit on the number of users and assets we can add. In addition, it is applicable on all operating systems and can integrate the use of a barcode scanner.



2.5 Project plan



2.6 Conclusion

In conclusion, the project has been defined to be an asset inventory system software program that integrates with a barcode scanner so that staff at BCHC may easily sign in and out equipment. Several concepts were pitched utilizing different programming languages, structures, databases and tools. The concept selected to further prototype and develop will utilize python integrated with Django framework for web integration.

3 Detailed Design and BOM

3.1 Detailed design

Introduction

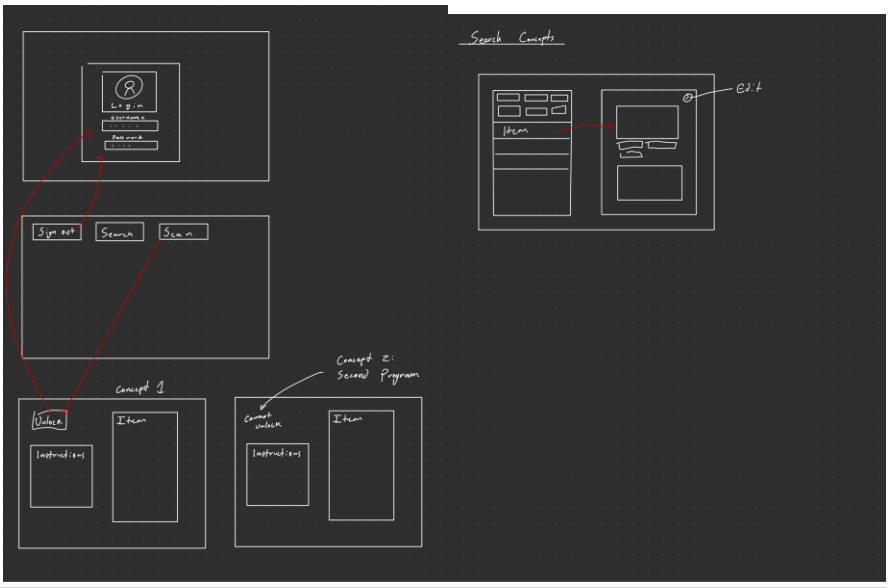
This deliverable's primary objective is to provide the design details for the chosen concept and a detailed Bill of Materials (BOM). In addition, supplementary information is given regarding the additional design details, such as its feasibility.

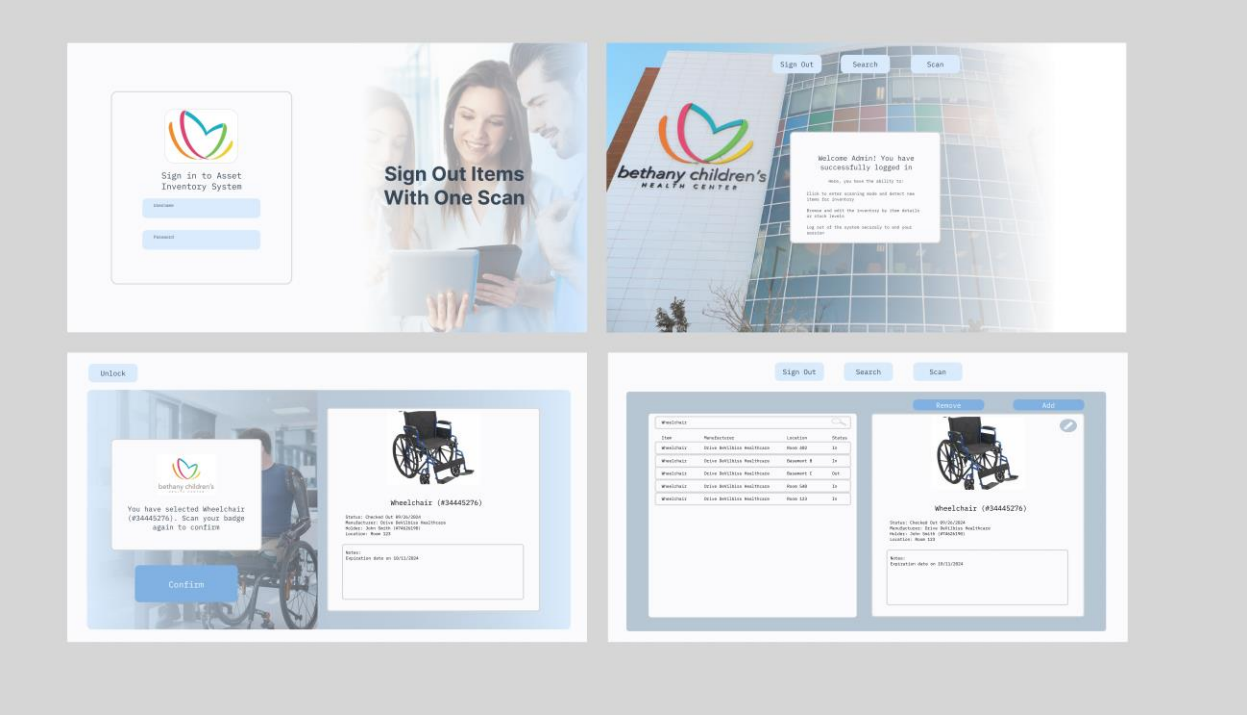
To begin, a summary of client meet 2 is provided where all the client feedback is outlined and allows us to take any further recommendations into account. With all requirements considered, an updated and detailed design is developed, which includes how each aspect of the design will work together as well as the considerations that must be taken to meet our DFX factors when creating our detailed design. Then, a list of any skills and available resources that will allow us to create our design is mentioned, along with a realistic assessment of the time required to implement the design. Finally, a detailed BOM is provided that declares each needed material as well as its cost.

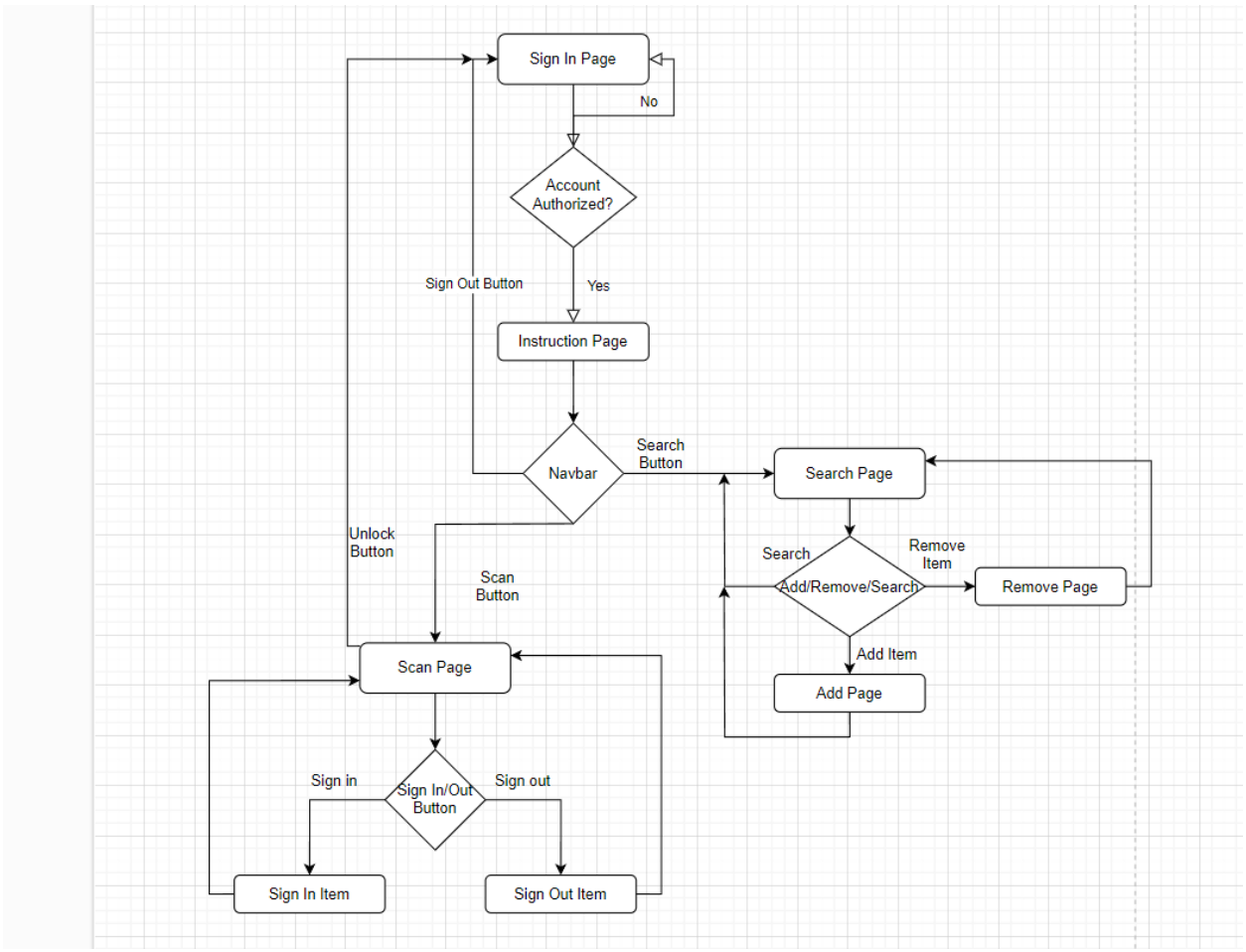
1.) Client Feeback Summary:

In sum, the client was very pleased with our initial design and UI. The only comments were to allow for the additional or lack thereof of a serial number for an asset, and a notes section to add other information if necessary. She also suggested that we have a section where items can be signed in. Additionally, the TA suggested that we add a section showing which admin user was logged in.

2.) Detailed Design



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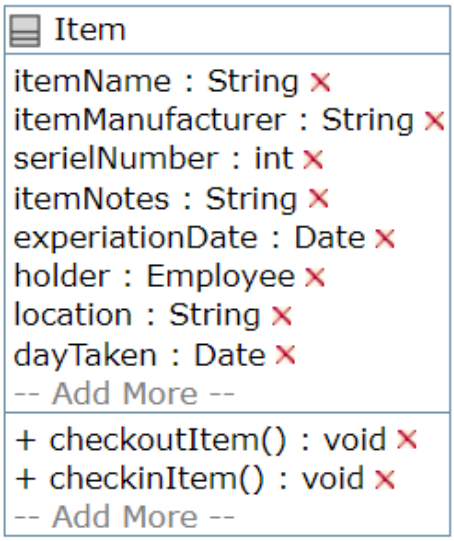
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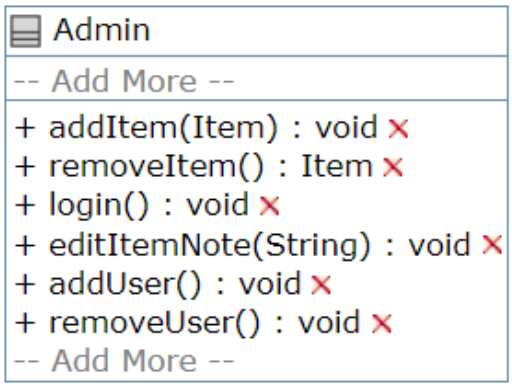
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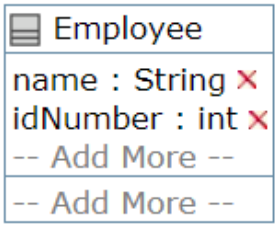
+ removeItem() : Item
+ login() : void
+ editItemNote(String) : void
+ addUser() : void
+ removeUser() : void
-- Add More --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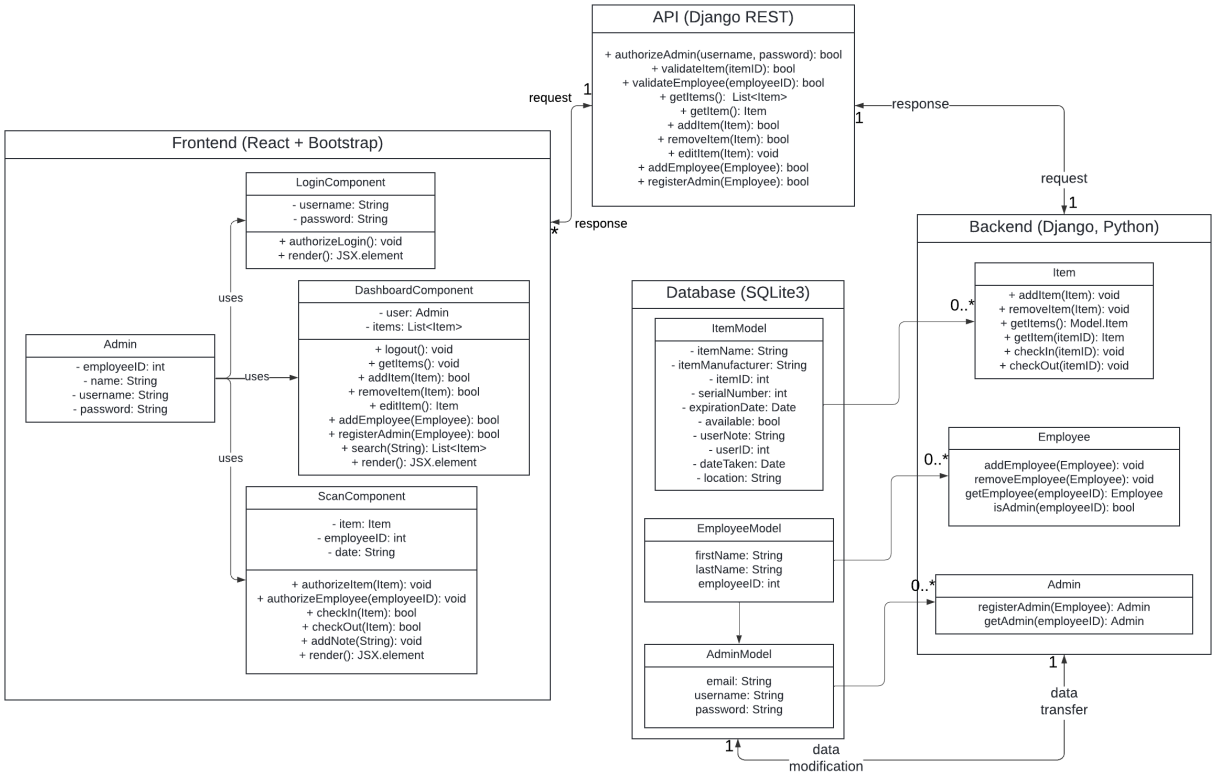
idNumber : int
-- Add More --
-- Add More --



There are two progression paths of the system depending on the type of user accessing the system. First, the admin: Making the assumption the system was locked the previous day, they would sign in to allow other users to access and use the system.

If this is done, then the normal user can use the system. The user initializes the system by scanning their badge with the barcode reader. Following this, they're presented with several options; the sign out option, which locks the system until an admin unlocks it again, the search function, the return function, and the scan function. The search function allows the user to search for an asset by several tags; asset type, manufacturer, name, and serial number. If the user goes down this path, they can select an asset, and one of two instances will occur. First, if the asset is present in the current storage room, they can find where it is in the room and sign it out. If it is not present, they can see on the display which storage room it is in, or who has it signed out currently.

Alternatively, they can use the scan function if they already have the desired asset on hand. If this is chosen, they;

1.) Scan the asset

2.) Scan their badge again

3.) The asset is assigned to them and loaned out.

The user can also use the return feature if they are returning an asset. If this is chosen, they follow similar steps to above;

1.) Scan their badge

2.) Choose the return option

3.) Scan the asset

4.) The asset is then un-assigned from them and added back to the storage room

3.) Manufacturing Concept Considerations

Our DFX factors are; Simplicity, affordability, reliability, testability, and scalability. Based on the updated detailed design, there are several considerations that must be taken into account.

- Is our design sufficiently simple and efficient for the users at BCHC?
- Does our system work consistently, and cheaply?
- Is the AIS scalable for multiple instances across the building?

These factors are all somewhat equally important, as without any one of the three we fail to meet both the client's needs and our DFX's. However, they are listed in the order of criticality to the system;

The system must function simply and efficiently, as if it does not, it makes no improvement over the current system with Snipe IT. This is the largest problem with the current system, as it can take anywhere from 1-5 minutes to sign out an asset, drastically reducing the time a therapist can spend with any given patient in a typically 30-minute time slot. If the system does not work consistently and isn't affordable, again it would offer no marked improvement over the current system.

While the current system is consistent, is it much more expensive as Snipe IT charges per asset and per user over a certain threshold, which BCHC has currently surpassed. Our design would cost BCHC nothing and is infinitely expandable both in user and in assets.

The final consideration is still important given the nature of BCHC having multiple storage rooms across the facility, but is not as crucial as the first two. In the worst-case scenario, the storage rooms could each have their own independent systems, and the AIS would still function. However, in doing so, it would fail the client's needs and our own DFX goals, making this an unacceptable option.

4.) Detailed list of Skill and Resources

Skills include;

- Python
- Django
- Front-End: (HTML, CSS, JavaScript, Bootstrap, React)

Resources include:

- VS Code
- GitHub
- UML

5.) Realistic Time Assessment

The time required to complete the task will likely be several months due to the amount of coding required, both front and back end. Additionally, the barcode scanner requires integration into the system once completed, which will come with its own set of challenges. Given these conditions;

Task	Time Required
Front End	≅ 2 months*
Back End	≅ 2 months*
Integration	2 weeks

*Note – The front end and back end are worked on simultaneously, not sequentially.

3.2 BOM

Item Name	Description	Units of Measure	Quantity	Unit Cost	Extended Cost	Link
VS Code	Source code editor capable of coding in multiple languages through its extensive library of languages and features.	Free download	5	0	0	https://code.visualstudio.com/
Barcode Scanner	Scanner to use to test scanning	Online purchase	1	$39.99	$39.99	https://amazon.ca/dp

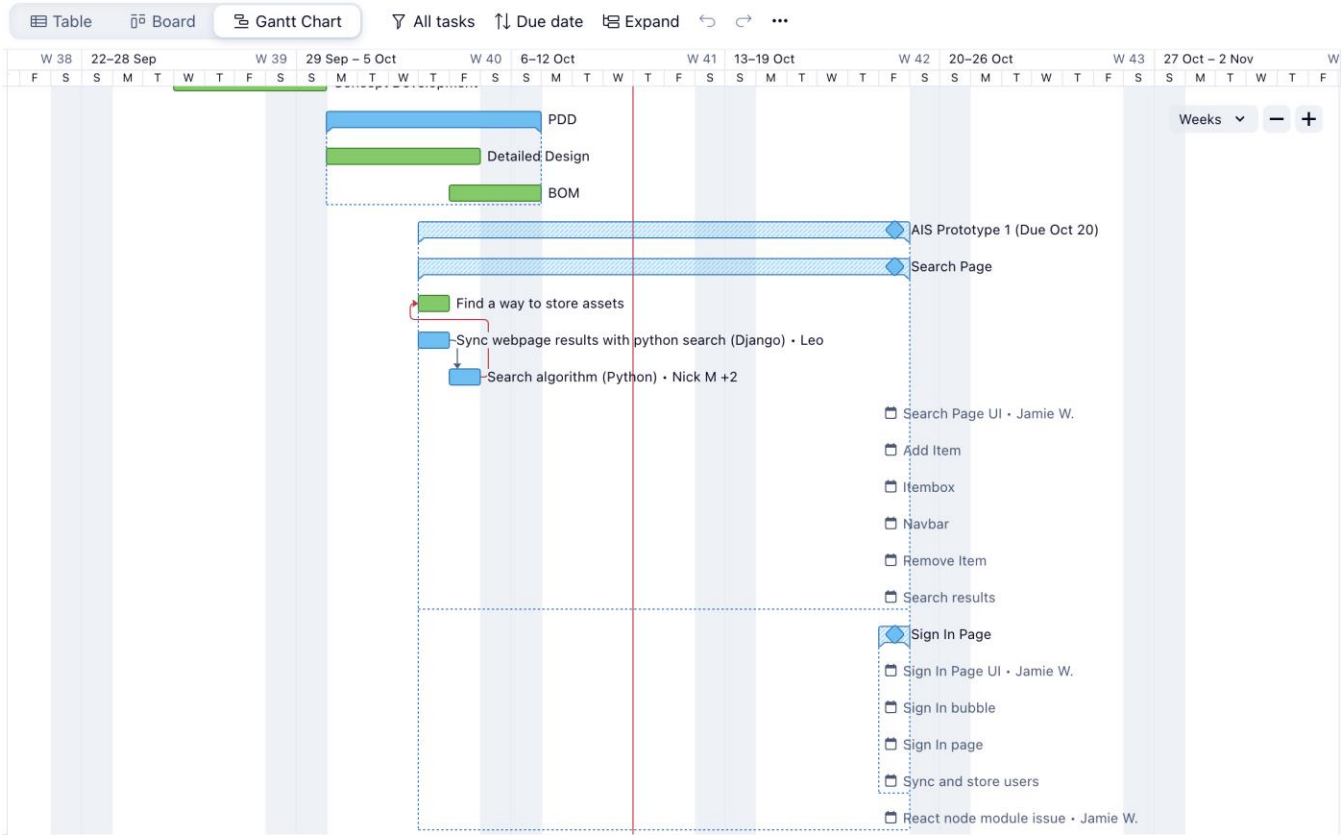
	integration and functionality					/B088QV215Y

https://www.amazon.ca/Eyoyo-Handheld-Convenience-Supermarket-Warehouse/dp/B088QV215Y/ref=asc_df_B088QV215Y/?hvadid=706745928895&hvpos=&hvnetw=g&hvrand=14380211918372518295&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9000671&hvtargid=pla-1220715379093&psc=1&mcid=31286a91c38036199f0d69b317abe91a&gad_source=1

Conclusion

In conclusion, the detailed design and BOM reflect the necessary adjustments made in response to client feedback. A detailed design that includes diagrams describing the overall design in terms of user experience, a flow chart that indicates how our design will work and a Unified Modeling Language (UML) diagram, which acts a visual representation of the systems involved in the program. Our DFX requirements are considered, and the importance of each factor is weighed. Although they are all important, the order in which they matter in terms of importance is provided. Additionally, the skills and available resources are addressed and a realistic estimate of time required to create each aspect of the project, with dates ranging from 2 weeks to 2 months. Finally, a detailed BOM list of 2 items with links (a source code editor and a barcode scanner) outlines the necessary elements of our final prototype, includes the actual cost and quantity of each item. With all this necessary information outlined, the quality and feasibility of the design can be assessed in the design review process.

4.3 Project plan update



5 Bibliography

Snipe IT features https://snipeitapp.com/product

Snipe IT pricing https://snipeitapp.com/pricing

Sortly features https://www.sortly.com/features/

Sortly pricing https://www.sortly.com/pricing/

VS Code https://code.visualstudio.com/

Insert your list of references here.