The ChocAn Simulator

Requirements Document

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1 Introduction

The intention of this document is to set out the project requirements for the development of ChocAn's data processing software. It will outline the product overview, functional requirements, non-functional requirements, and milestones & deliverables.

1.1 Purpose and Scope

The purpose of this document is to give a brief overview of what we believe are the required and expected goals of the software. This document is also meant to give information of the people or businesses that are going to be involved with the software in some way. This includes the type of information that they will be involved with and how they will be involved with it.

1.2 Target Audience

The document is intended to be read by the senior management team of ChocAn and the software development team of Just Four Guys Programming Co. to validate specification requirements for ChocAn's data processing software.

1.3 Terms and Definitions

- ChocAn - Chocoholics Anonymous, an organization dedicated to helping people addicted to chocolate.
- ChocAn Data Center - Database which holds member information.
- Electronic Funds Transfer (EFT) - Transfers currency from one account to another.
- HIPAA - Health Insurance Portability and Accountability Act, a bill passed by Congress in 1996, which mandates industry-wide standards for healthcare information.
- Interactive Mode - A mode which provides the user the ability to add, remove and update both members and providers.
- low-level software permissions.
- Manager - Administrative entity and user with admin. Software permissions
- Manager Terminal - a computer terminal accessible only to managers
- Member - A client of ChocAn who pay a monthly fee to have access to treatments provided by their providers.
- Object - An entity that contains certain attributes that relate to the context of its use.
- Operator - An employee at the ChocAn Data Center
- PHI - Protected Health Information
- Product Owner - Development team's point of contact with the customer, ChocAn.
- Provider - Health care professional who provides services to clients of ChocAn, with
- Provider Directory - A list of all providers stored on disk.
- Provider Reports - A weekly summary sent to providers which includes total fees
- Providers Terminal - A specially designed computer terminal, similar to a credit card machine in a shop.
- Service - counseling, healthcare, and lifestyle advice.

2 Product Overview

The software's focus is on the management of the data entered by any person that could be using ChocAn's services. A user is anyone that could be using this software; specifically, a Provider, ChocAn manager, or ChocAn Data Center operator.. A stakeholder is any person or organization involved with the software.

2.1 Users and Stakeholders

The purpose of this section is to explain who the Stakeholders are and the use cases for the software.

2.1.1 Managers, Providers, Operators, and Members of ChocAn

The managers are employees who manage the day to day operations of ChocAn. The providers are the health care professionals paid by ChocAn to provide the services to members. Operators maintain the database at the ChocAn Data Center. The members are the people that are paying customers of ChocAn.

2.1.1.1 Managers

The managers have access to account reports, a list of providers, and a summary report for the current week. They will be entrusted with all of the personal information that comes with these.

2.1.1.2 Providers

The providers of ChocAn entrust a large amount of personal information to ChocAn. This includes their full name, their street address, their city, their state, their zip code, the number of consultations with members, the total fee for every week, a list of service history, their ChocAn Provider ID, and their bank information(? I'm not sure about this one actually).

2.1.1.3 Operators

Employees at the ChocAn Data Center who during the day run the software in interactive mode to add new members, delete resigned members, and update member records. Likewise, provider records are added, deleted, and updated

2.1.1.4 Members

The members of ChocAn also entrust a large amount of personal information to ChocAn. This includes their full name, their street address, their city, their state, their zip code, their ChocAn Member ID, a service history which includes billing, services used, and the dates they were used.

2.1.2 AcMe Accounting Services

AcMe Accounting, a third party service, has been contracted by ChocAn to be the provider for the financial procedures such as recording payments of membership fees, suspending members for overdue fees, and reinstating suspended members whose account are back in good-standing. They will also be implementing the EFT component.

2.1.3 Just Four Guys Programming Co. (Us)

Just Four Guys Programming Co. is the company that is doing all of the programming and design for the data processing of this software.

2.1.4 Course Instructor / TA

The person grading the assignment and who role plays the role of ChocAn representative, and product owner.

2.2 Use cases

This section will identify those that will have an interaction with the software and describe the ways that the interaction will occur.

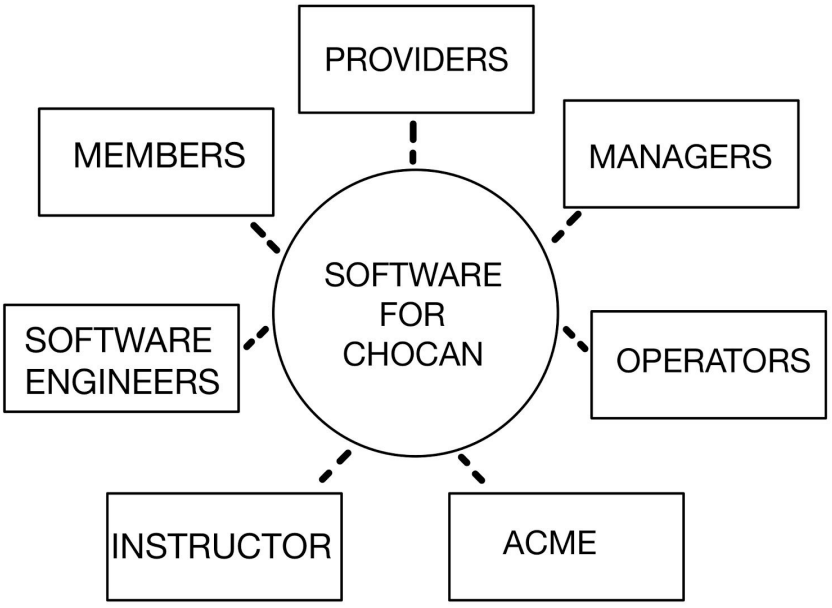


Figure 1: Users and stakeholders that will be interacting with the software.

2.2.1 Provider and Member

For a member to receive service from a provider, the provider must first enter their provider number into the terminal. A validation test will verify whether the provider number is valid. The terminal will return feedback to the provider. The member will then supply their membership card to the provider where it will be then swiped in the terminal. A verification test will confirm if the member is validated or not and return the data of that outcome to the provider. Figure 2 outlines this portion of the use case.

Once the service has been completed, the provider will create a service record by again swiping the member's card on the terminal. The validation test will be performed and the member's status with ChocAn will be displayed to the provider. The provider will now enter additional service data including the date and a service code. The record will be written to the disk and the terminal will display the fee of the completed service to the provider. The provider will fill out a provider form with the current date and time, member name and number, service code, the date of the service, and the fee that is owed. Figure 3 outlines this last portion of the use case involving both the provider and member.

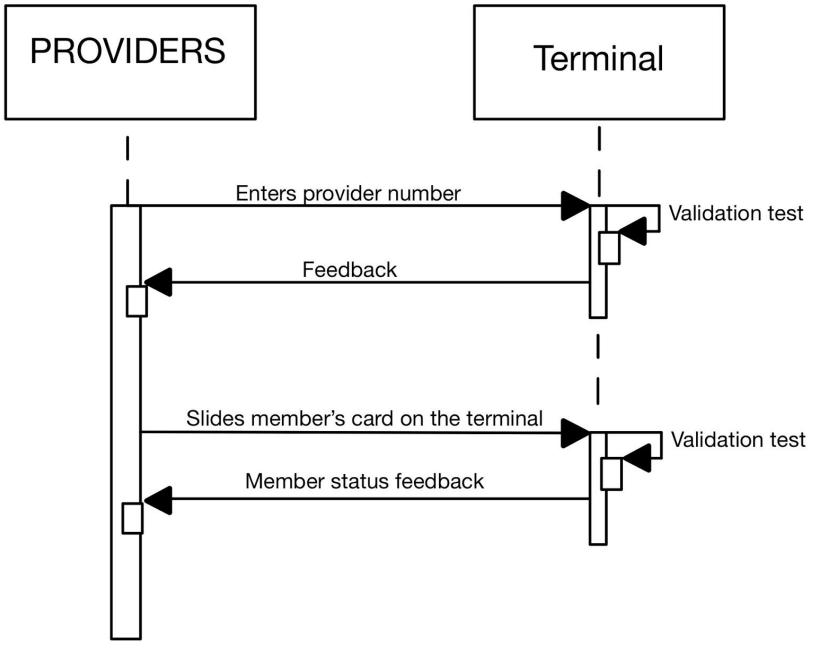


Figure 2: Initial use case involving provider and member

2.2.2 Provider, Manager, and Operator

When it is time to bill ChocAn for a service that has been provided to a member, the provider will initiate the latter process in use case 2.2.1 (Figure 3). The provider will total the fees to be paid by ChocAn for the week. At midnight on Friday, an operator at the ChocAn Data Center receives the week's file of services (Figure4).

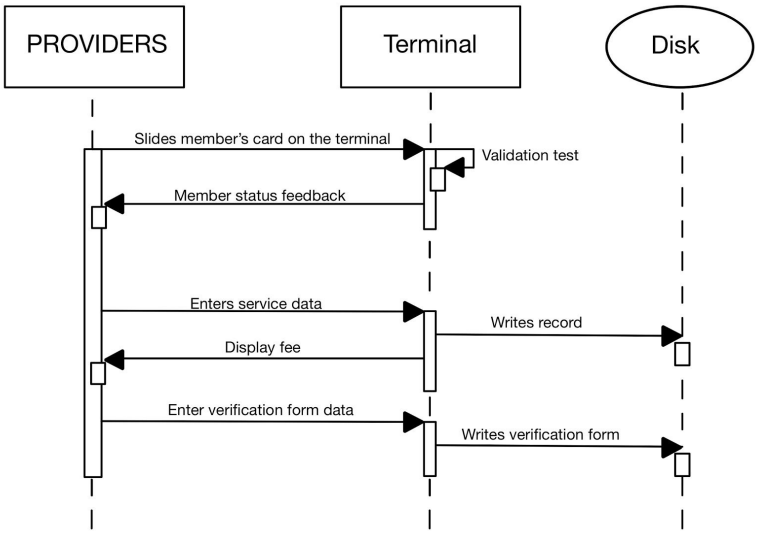


Figure 3: The provider stores the member's service data to the disk

A ChocAn manager can request a report at any time during the week. The operator will send a week's report that lists all the services that were completed by the provider. The report will include a summary that includes the number of consultations with members and the total fee for the week. The manager will receive a summary report listing every provider to be paid that week, the number of consultations each provider had, and their total fee for that week. In addition, the manager terminal will display the total number of consultations, total number of providers who provided services, and the overall fee total (Figure 5). Both managers and providers can access the Provider Directory from their respective terminal where service and provider codes are stored.

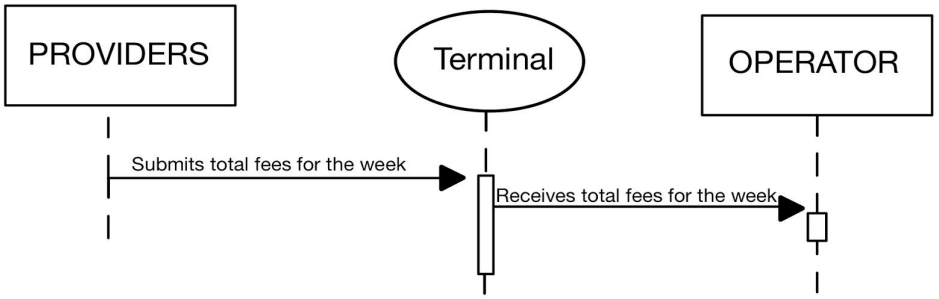


Figure 4: Provider submits total fees for the week

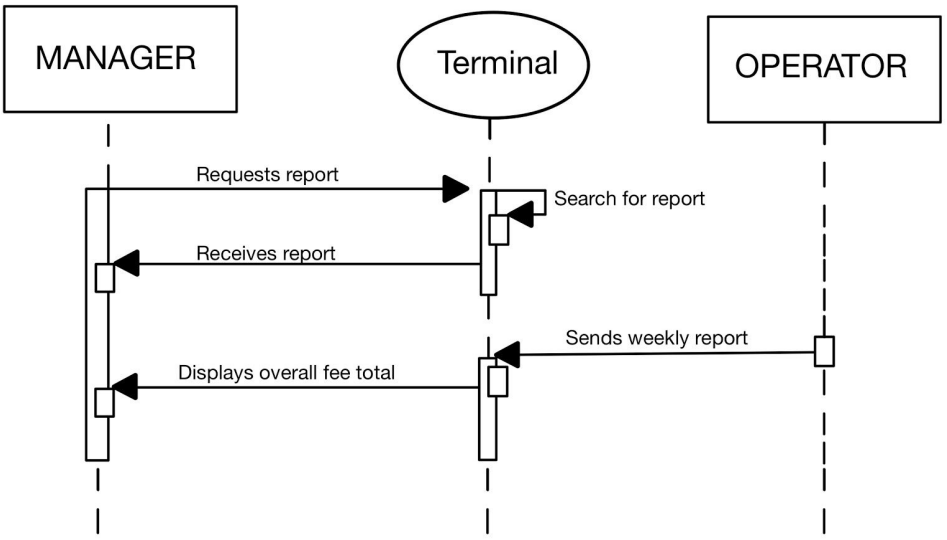


Figure 5: Manager requests report and Operator sends weekly report

2.2.3 Member, Operator, and Acme Accounting Services

Members are expected to pay membership dues to keep their validated status. Doing so allows members to obtain service from a provider. The payment by members will be handled by Acme Accounting Services. Acme is responsible for recording payments, suspending members whose fees are overdue, and reinstating suspended members who have paid what was owed. Acme's accounting will be handled by different software, but the data they provide will be held at the ChocAn Data Center. Operators can add new members to ChocAn, delete members who have resigned, and update member records using the data provided by Acme.

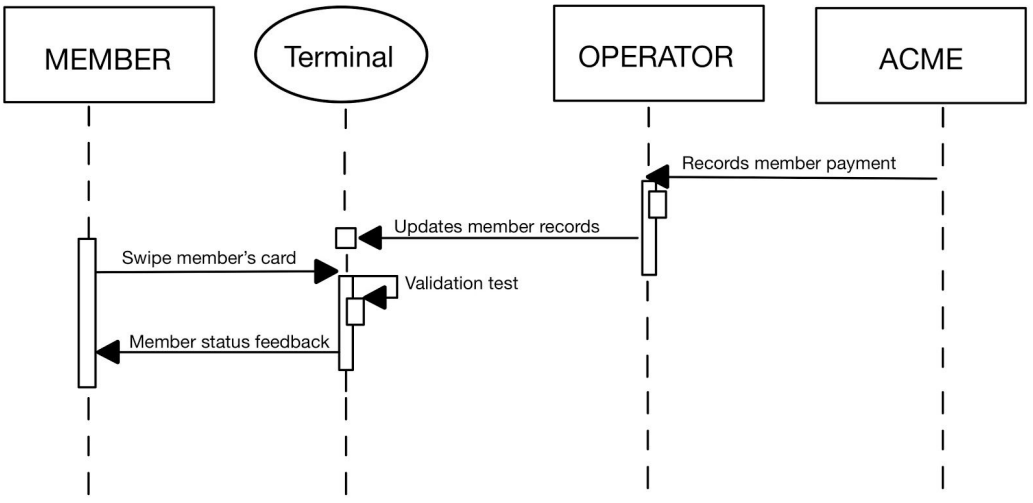


Figure 6: Sequence showing how a member's status is modified and receiving member status feedback

2.2.4 Just Four Guys Programming Co. and Course Instructor

The software engineers for this software project, Just Four Guys Programming Co., will be expected to implement requirements outlined by subsequent portions of this report. Testing and debugging will occur upon completion of the project. Some areas of emphasis will be proper implementation of efficient data structures and object oriented programming using inheritance hierarchy. The project will be evaluated by the course instructor upon completion.

3 Functional Requirements

This section outlines and defines the softwares functionality and behavior. Each requirement is a functionality that the software must provide, and contains a description of that functionalities behavior in the system.

3.1 Terminal User-Interface (UI)

Terminal based software that provides 2 different UI's that correspond with the user-type. A Manager terminal and a Provider terminal, both provide different accessible features.

3.1.1 Login

Upon software execution, the user is prompted to login using their User-Number. Once a valid User-Number is provided the terminal will prompt the user for a corresponding password. If the correct password is provided then the user menu will display. If an incorrect password is provided, the terminal will print "ACCESS DENIED" and user terminal will not be accessible.

3.1.2 Terminals

Once logged in, the user is given access to features that correspond with their user-type. Terminal is navigated via option-select, i.e. entering characters that correspond with actions displayed.

3.1.3 Member Validation

To imitate the members plastic card, which is embossed with a nine-digit member number, the program will accept data from keyboard input. If the provided member numbers correspond to a valid member number held in the ChocAn Data Center, the terminal will print "VALIDATED", else if a member is suspended, "MEMBER SUSPENDED" will be printed. In both scenarios the information associated with that user will then appear on the terminal. If an invalid number is provided, "INVALID NUMBER" will simply be printed on the terminal.

3.2 User Objects

User objects contain data that correspond with every user-type, and are at the top of the user hierarchy. Contains name, and user-ID number data members.

3.2.1 Provider Object

Contains provider type, either Dietitian, Internists, or Exercise Specialist, and hold list of services offered (Pointer to service list). Has street address, city, state, and zip data members.

3.2.2 Member Object

Contains member street address, city, and zip-code. Tracks account balance.

3.2.3 Manager Object

Has access to account reports, and list of providers. Holds summary report for current week.

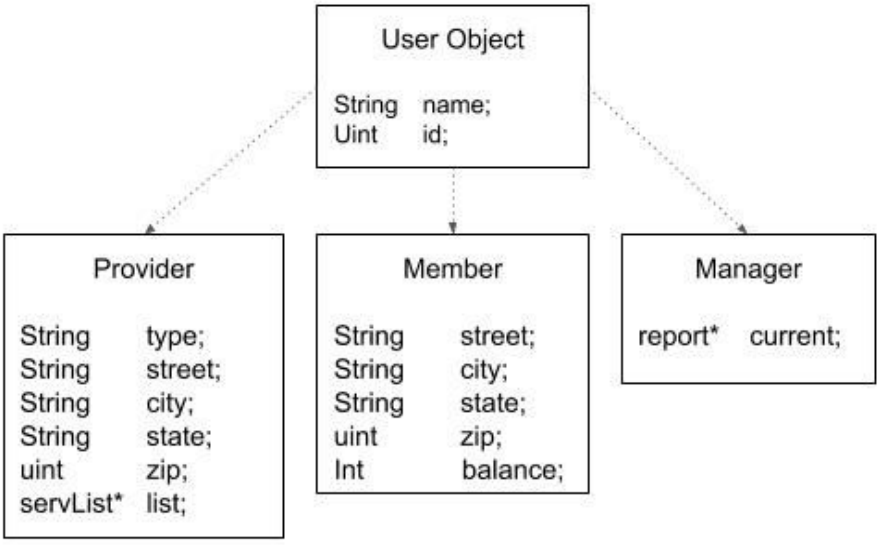


Figure 3.2.1 (a) User-Object hierarchy

3.3 Provider Directory

At any time, a provider can print an alphabetically ordered list of the service objects contained in the Provider Directory. Each provider type has a unique service list that corresponds to the services offered by that provider.

3.3.1 Service Object

Each service object contains data members that correspond with the service code, date, name, and fee (Up to $999.99).

3.4 User Storage

Each user type is stored in a file that contains the credentials for each user of that type. When logging in, the first 2 digits of the login code provided, corresponds with the user-type, and tells the system which file to search in. All members stored in member file, providers in provider file, and manager(s) in manager file. Each file is sorted alphabetically by user name.

3.4.1 Storage Security

Each user's login number will be stored after being hashed via SHA-2 algorithm, and then stored locally on disk.

3.5 Billing

When a member is billed, a provider is prompted to enter the members number; when “VALIDATED” appears, the provider is prompted to enter the date in the format “MM-DD-YYYY”. The provider then uses the Provider Directory to look up the appropriate six-digit service code that corresponds with the service provided to the member. The provider then keys in the service code before being prompted to verify if the service found is the correct service. The prompt will display the name of the service corresponding to the service code, else if the code does not correspond to a service, the error message “WRONG SERVICE NUMBER” will be printed. The provider will also have the ability to enter comments about the service provided, once a correct service code is verified.

3.5.1 Writing Record to Disk

Once the information in **3.5** is filled out, a record of the transaction is then recorded to the disk, containing the following data:

- Current date and time (MM-DD-YYYY HH:MM:SS).
- Date service was provided (MM-DD-YYYY).
- Provider number (9 digits).
- Member number (9 digits).
- Service code (6 digits).
- Comments (100 characters) (optional).

The system then searches for the verification code entered, and displays the corresponding fee on the provider terminal. The provider will then be asked to verify once more.

3.5.2 Billing ChocAn

At the end of the week, the records for that provider are totalled up, and sent to ChocAn to be paid. Thus, each provider keeps a list of records.

3.5.3 Member Service Report

At the end of each week, if a member has received services that week, they are sent a report of all the services they received, order by the service date. The report contains the following data:

- Member name (25 char limit).
- Member number (9 digits).
- Member street address (25 char limit).
- Member city (14 char limit).
- Member state (2 char limit).
- Member zip (5 digits).
- For each service, the following is required:
    - Date service was provided (MM-DD-YYYY).
    - Provider name (25 char limit).
    - Service name (20 char limit).

3.5.4 Weekly Provider Report

If a provider has billed ChocAn that week, at the end of the week, a report will be generated for that provider with the following details:

- Provider name (25 char limit).
- Provider number (9 digits).
- Provider street address (25 char limit).
- Provider city (14 char limit).
- Provider state (2 char limit).
- Provider zip (5 digits).
- For each service, the following is required:
    - Date service was provided (MM-DD-YYYY).
    - Date and time data was received by the program (MM-DD-YYYY HH:MM:SS).
    - Member name (25 char limit).
    - Member number (9 digits).
    - Service code (6 digits).
    - Fee to be paid (Maximum of $999.99).
- Total number of consultations with members (3 digits).
- Total amount of fees for the week (Maximum of $99,999,99).

3.5.5 Paying Providers

For each provider, a file will be created containing the providers name, number and amount to be paid. This file is then used by Acme Accounting Services to transfer funds to each provider.

4 Nonfunctional Requirements

The nonfunctional requirements are parts of the software that isn't directly interacted with by a user, but is something that is or can be affected by the user. The nonfunctional requirements affect the software's development, design, and may affect functional requirements as well.

4.1 Reliability

It is pivotal for the software to be reliable in multiple facets. This includes the organization of data, the management of data, and run time efficiency. These are three important factors that determine the reliability of the software.

4.1.1 Data Management

The data that a user enters to be added, removed, or updated (whether it be for a session or a user profile) shall be added, removed, or updated to the proper location. This means that data shall not be overwritten, lost, or written into another user's data set.

4.1.2 Data Organization

The data will be organized in a way that the most frequently accessed items (like a user ID, username, or list of services provided) will be more readily accessible in comparison to something like the session history of a user. Data that is more detailed and will be accessed less will be further in the data structure.

4.1.3 Run Time Efficiency

Run time efficiency is directly affected by the way the data is organized. With data that is accessed more frequently towards the top of a data structure allows for faster access time when checking things like ID verification, Names, or the list of services provided. This is for a more quick experience when logging in or finding a specific service ID.

4.2 HIPAA

The HIPAA privacy regulations mandate health care providers and organizations, as well as their associates, to develop and follow procedures that ensure PHI is kept secure and confidential.

4.2.1 Security

To ensure compliance with HIPAA, every user will have a username paired with a unique password. The password will be salted and hashed to add an extra level of encryption and security for all users. The appropriate system will be logged into for the appropriate user. The logged in user will only have access to their appropriate data set and functions available to them.

4.2.2 Data Protection

Data shall not be accessed, copied, edited, or deleted without appropriate access authority.

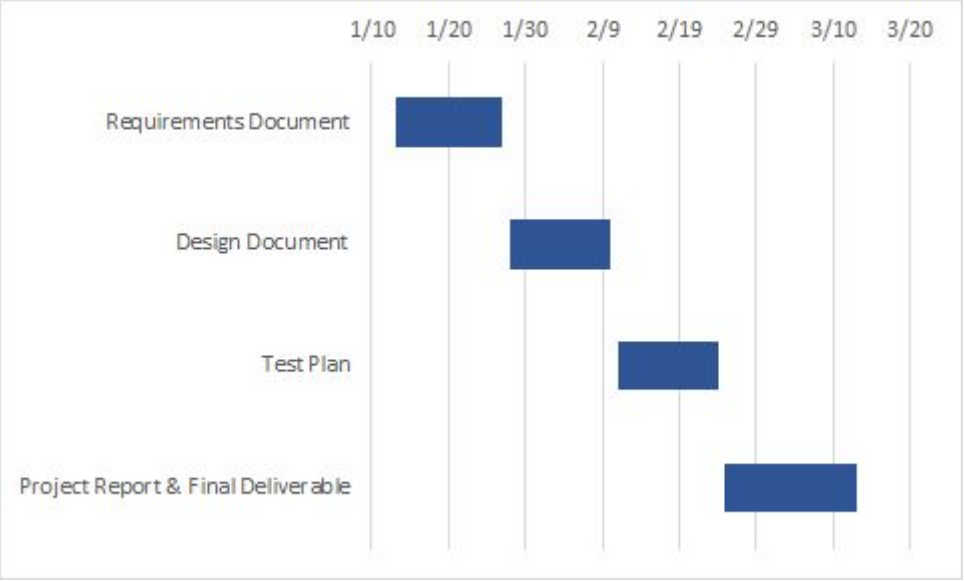
4.3 Simple I/O System

To try to make the user experience more friendly and simple, navigating the menus shall be direct with their purpose. The user should be able to return to the previous menu and logout from any menu they are currently in. Data will be echoed back to the user for verification when adding, removing, or updating any set of data. A success or failure message will be displayed for the appropriate user functions.

5 Milestones and Deliverables

For this project we are using the waterfall model for our software development process, The milestones will be a requirements document, design document, test plan, and the project report & final deliverables.

Here is an outline of our workflow:



5.1 Requirements Document

This document will set out the requirements that ChocAn desire from the software product along with a schedule of project deliverables. The predominant purpose of this document is to provide a forum for requirements validation.

5.2 Design Document

This document will describe the design for the ChocAn's data processing software. It will outline design considerations, system overview, system architecture, and a detailed system design.

5.3 Test Plan

This document will set out the plan to verify ChocAn's data processing software behaves in the manner desired and described in both the requirements and design documentation. It will provide a test plan description, unit testing, smoke testing, and system testing.

5.4 Project Report & Final Deliverable

At the end of the Winter term we will hand in the projects code along with a report and presentation. The report will act as a post mortem of our work throughout the quarter. The presentation be a roleplay, as if we were actually presenting to stakeholders our final product.

5.4.1 Completion of the Data Structure

One of the larger milestones in the creation of this software will be the completion of the Data structure. Once the Data structure is complete, adding, saving, retrieving, removing, and updating information should be easy to implement. This will give a mostly working version of the software, with only needing the implementation of the Terminals.

5.4.2 Completion of the Terminals

The next large milestone for the final deliverable would be a working version of the Terminals. This would give access to specific data and user functions depending on which terminal is logged into. The completion of this allows the proper user to handle the proper data that they are given privilege to work with.

5.4.3 Project Report

The project report will consist of an essay and a presentation. The essay will provide an analysis of how the project went, what we learned, and how processes could be improved upon. The presentation will demonstrate the finished project to stakeholders; discussing functionality, testing, and any defects or issues.