Layla Smith, Dan Ha, Ben Anderson, Ryan Niiya, Anh Ho, Linh Nguyen, Thomas Brooks

The Chocoholics Anonymous Simulator

Requirements Document

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1 Introduction

This is a Requirements Specification document for a new data processing software for Chocoholics Anonymous (ChocAn). This document is intended to define what is needed from the new data processing software for ChocAn. In this section the purpose/scope and target audience of the document will be described, and a glossary of terms used throughout the document will be provided. The rest of this document describes the stakeholders, use-cases, functional requirements, non-functional requirements, and timeline for the development of the data processing software.

1.1 Purpose and Scope

Chocoholics Anonymous is an organization dedicated to helping people addicted to chocolate through consultations and treatments with health care professionals. The new data processing software will provide an easy to use system for ChocAn that: simplifies the process of inputting sensitive data about ChocAn members, providers, and services; manages and stores this data for ease of access; and prepares/compiles data for preformatted, individualized reports. In more detail, the new data processing software will allow providers to check validation status of members, to charge members for their services, request a Provider Directory, add or delete members, and update member or provider records. The data processing software also stores all this data which is compiled into a record of electronic funds transfer (EFT) data which is written to the disk or as weekly reports sent to managers (who can also request this report at any time), members, and providers. The software is designed to run on a specially designed ChocAn computer terminal which has a card reader for member cards. It is also designed to accept the keyboard and card reader as input.

1.2 Target Audience

This document is intended to list the requirements as given by the customer for the customer to review and ensure correctness and completeness. It is also intended for system managers to plan the software's development process based on the requirements listed, for

system engineers to refer to as they develop the software based on the requirements listed, for system test engineers to refer to as they develop tests to refine and perfect the software, and for system maintenance engineers to refer to in order to see the relationships between each part of the software.

1.3 Terms and Definitions

Provider: Health care professional who provides services to ChocAn members.

Member: Patients of ChocAn who pay a monthly fee for access to unlimited consultations and treatments. (See Member Card)

Manager: Manages providers at ChocAn.

User: Those who will use the software directly, in this case the Providers and Managers.

Member Card: A plastic card embossed with the member's name and a nine digit member number and incorporating a magnetic strip on which that information is encoded

Service: An activity a provider provides to benefit a member.

Service Code: A six-digit code corresponding to a service provided by providers.

Provider Directory: An alphabetically ordered list of service names and corresponding service codes and fees sent to the provider as an email attachment. All providers may access this directory. (See Service Code)

Provider Number: A unique identifier for each provider, used to access the ChocAn terminal.

Stakeholder: A person, company, or business who is involved in the development of the project.

Use Case: Type of interactions between the company and a user.

2 Product Overview

This section is the overview of the product that shall be developed. It shall include information about the entities interacting with the ChocAn system. The individuals who are involved in the development of the project. And the type of events that will happen when the software is being used by numerous operators and users.

2.1 Users and Stakeholders

This section will define the people interacting, involved with, and using the system that is ChocAn.

2.1.1 Members

The members of ChocAn are a stakeholder through the membership process in the company. They help provide the necessary funds to keep the business healthy.

2.1.2 Providers

The providers will oversee the members that inquire about services. They are a stakeholder through the performance of the company and managing the services that the software provides.

2.1.3 Managers

People who oversee the providers' scheduling and everyday job task assignments. They are stakeholders through the management of providers, members, and various events in the company.

2.1.4 Acme Accounting Services

Acme accounting services is a stakeholder to help manage economics within the company. Without them, money supervision would inevitably be a problem.

2.2 Use cases

Use Cases are the interactions within the software. Whether that may be registering a new user into the system or a user who uses its services.

2.2.1 Receive Services

Summary	A registered member of ChocAn that requests a service or services.
Case Steps	1.) User hands their membership card to the provider who then passes it through the card reader. 2.) The terminal verifies the card number. 3.) The system verifies the card and validates it for the user to start receiving services.
Alternative Steps	Step 3 - The user is invalidated through an unrecognized card number and the user isn't provided any services. Step 3 - The user is invalidated through a suspended account where fees are overdue and the status remains suspended.
Requirements	The user must have a ChocAn membership card.
Result	Determines if the user has the ability to acquire services.

2.2.2 Billing

Summary	After the user has been provided the services they requested, they must pay the required amount.
Case Steps	1.) User acquires the service(s) that they requested. 2.) User shall pass their member card through the card reader. 3.) After their card is validated, the provider shall insert the time the service(s) was provided in MM-DD-YYYY format. 4.) Provider uses directory to find the six digit code that corresponds with the service(s) provided. 5.) Software then displays the name of the service to confirm the correct service has been found. 6.) Software records appropriate information about service(s) provided. 7.) Software looks up fee to be paid and adds it to the total fees to be paid on a weekly basis.

Alternative Steps	
Requirements	The user must be a member.
Result	User gets the services they requested and the appropriate fee added to their bill.

2.2.3 Interactive Mode - Add Member

Summary	When the software is in interactive mode, providers have the ability to add a new member.
Case Steps	1.) New user asks the provider for a membership. 2.) User is added to the membership service. 3.) User is then provided with a membership card with their respective information in the system.
Alternative Steps	
Requirements	The new user must not be a member.
Result	New user gets a membership card to where they can inquire services from ChocAn.

2.2.4 Interactive Mode - Delete Member

Summary	After the user has been provided the services they requested, they must pay the required amount.
Case Steps	1.) User requests to be deleted from a provider. 2.) Users' information is deleted from the software. 3.) Users' membership card is no longer valid to be used at ChocAn.
Alternative Steps	
Requirements	The user must be a member.
Result	User no longer has the ability to receive services from ChocAn.

2.2.5 Report Request

Summary	Run a report individually.
Case Steps	1.) User requests a report through the system. 2.) System generates a report.
Alternative Steps	
Requirements	User must be a manager at ChocAn.
Result	Prints a report of services in the past week.

2.2.6 Member Report

Summary	At the end of the week, a report is generated to be sent out to members.
Case Steps	1.) System generates a list of services given to users. 2.) System sends out an e-mail attachment to all members who received services during that week.
Alternative Steps	
Requirements	Recipient(s) must be a member and must have utilized at least one service during the week.
Result	A report with respective information about the service, date, name, and the members private information.

2.2.7 Provider Report

Summary	At the end of the week, a report is generated for the services he/she provided to members.
Case Steps	1.) System generates a list of services provided to users. 2.) System sends out an e-mail attachment to all providers who provided services.
Alternative Steps	
Requirements	Recipient(s) must be a provider and must have provided at least one service to a member.
Result	A report with information from the provider's form, list of services provided, number of consultations and the total fee for the week.

3 Functional Requirements

This section describes the features of the ChocAn system. It describes the functional requirements of the ChocAn product including services that should be provided, and how it should react to and behave in particular situations.

3.1 Printing Out Reports Based On A Request

The main purpose of the ChocAn system is to print out weekly reports based on a user's request. These reports will be sent to members, providers, the manager for accounts payable, and the accounting services who have responsibility for electronic funds transfer (EFT) data.

3.1.1 Looking Up A Member Profile By A Member Name/Number

Each member who has consulted a ChocAn provider during that week will receive a member report via email. Therefore, the ChocAn system allows providers to request searching a member by name and display all the information as a report which includes:

1. Member name (25 characters).
2. Member number (9 digits).
3. Member street address (25 characters).
4. Member city (14 characters).
5. Member state (2 letters).
6. Member zip code (5 digits).

For each service provided, the following details are required:

a. Date of service (MM-DD-YYYY).
b. Provider name (25 characters).
c. Service name (20 characters).

Moreover, the system would offer an option to display all the member names that are sorted in order of service date. If the ChocAn system could not find a member name or load display all the member name, it would give a notice to a user that their request is invalid (eg: Error: "Unfortunately, we could not find < member name > in our system based on

your request!" or "there is an empty list!"). When the request is valid, the week's report will be displayed as well as sent to email with an attachment.

3.1.2 Looking Up A Provider Profile By Provider Name/Number

Each provider who has billed ChocAn during that week will receive a provider report via email. The report will contain provider's information and what services the provider provided to ChocAn members. It will be sorted in order of when the data were received by the computer.

1. Provider name (25 characters).
2. Provider number (9 digits).
3. Provider street address (25 characters).
4. Provider city (14 characters).
5. Provider state (2 letters).
6. Provider zip code (5 digits).

For each service provided, the following details are required:

   a. Date of service (MM-DD-YYYY).
   b. Date and time data were received by the computer (MM-DD-YYYY HH:MM:SS).
   c. Member name (25 characters).
   d. Member number (9 digits).
   e. Service code (6 digits).
   f. Fee to be paid (up to $999.99).

7. Total number of consultations with members (3 digits).
8. Total fee for the week (up to $99,999.99).

3.1.3 Printing Out A Weekly Summary Report

The ChocAn system has built a summary report that is given to the manager for accounts payable. The report will list all the providers to get paid that week, the number of consultations each provider had, and also their total fee of that week. The report will be printed out including:

1. The total number of providers who provided services.
2. The total number of consultations.
3. The overall fee total

3.1.4 Printing Out The EFT Data And Recording Each Report to Its Own File

The EFT data stands for the electronic funds transfer data that is saved in a record and written to a file after displaying it on the screen for checking. This should be in the manager's terminal and must be simulated by the same keyboard and screen. Each member report must be written in its own file. The format of each file should begin with the member followed by the date of the report. The provider report will do the same way as the member report. The information is used by the banking computer, and it helps each provider's bank account be credited with an appropriate amount of their consultations with members. The Provider Directory must also be created as a file.
For the EFT data, when recording to a file, the file must be set up containing the provider name, provider number, and the amount to be transferred.

3.2 Adding, Removing, and Updating A Profile

3.2.1 Managers Have A Privilege To Manage Members and Providers.

Managers have their own terminal called Manager's terminal. They have the ability to expand or manage members and providers in The ChocAn Data Center.

1/ Adding A New Member/Provider In The ChocAn Data Center
The ChocAn Data Center will create a new member/provider profile and add them to the ChocAn system during the day. The information should be added following:

As a new member:

1. Member name (25 characters).
2. Member number (9 digits).
3. Member street address (25 characters).
4. Member city (14 characters).
5. Member state (2 letters).
6. Member zip code (5 digits).

As a new provider:

1. Provider name (25 characters).
2. Provider number (9 digits).
3. Provider street address (25 characters).
4. Provider city (14 characters).
5. Provider state (2 letters).
6. Provider zip code (5 digits).

2/ Removing/Updating A Member/Provider In The ChocAn Data Center

Moreover, the ChocAn system has designed a feature to look up a member/provider in order to remove them from the system or update their information if needed. To look up a member in the system, we would look it up by member name or member number. Similarly, finding a profile of a provider is also used by provider name or provider number. If the ChocAn Data Center responses with a "Validated" result after finding the data as requested, that means we successfully find a member/provider in the system, so we can move on to pick one of two options provided including (1) remove or (2) update the information for that data. If the Data Center can not find any result for that request, it will pop up a message on the screen for the user that is "Unfortunately, we could not find any data related to your request!"

3.2.2 Providers Have A Privilege To Manage ChocAn Members

Providers provide services for ChocAn members, so The ChocAn system has given some privileges to providers that help them manage their patients efficiently. How do providers interface with the ChocAn system? Providers will have their own terminal where they are allowed to search, update, add and remove members' records in the ChocAn system:

- **Searching**: providers can search their patients by member number with 9-digit numbers on the member card. If the ChocAn Data Center successfully verifies the

member number, the system will display “validated”. If the number is invalid, the system will display a message such as Invalid Number or Member Suspended.

- **Adding**: each provider is able to add a new member to the ChocAn Data Center. A new member will be sorted in order of the service date.
- **Updating**: After successfully searching for a member, the system will allow providers to access members’ records in order to update their information or leave a note for them after consulting services.
- **Removing:** If a member is no longer using the services at ChocAn or transferring to another service, providers can remove them from the system. That member will be marked as “Suspended” in ChocAn records.

3.3 Recording The Consultant Of A Provider Into Disk

The ChocAn system also records the data from the provider who enters data into the system when they consult a member. This information should be written to disk, and this data can be used when retrieving. This should be in the manager's terminal.

Each consultation should include the following fields:

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

The information from section 1 to 5 must be filled. If there is missing one of them, the system will ask users to fill it out unless the system will not accept the record. When the ChocAn Data System records the data into disk, it will display a message to let us know whether it’s successful or not.

4 Nonfunctional Requirements

This section will describe the qualities that the ChocAn system as a whole should have. These qualities will guide the implementation of the functional requirements above while also ensuring that the system is usable and conforms to all applicable regulations.

4.1 Security, Protection of Member & Provider Data

Because the system will store personal data about ChocAn members and providers, the system shall be secure in order to keep that information confidential.

4.1.1 Salting & Hashing of Member & Provider Numbers

All ChocAn member and provider numbers shall be salted and then hashed before being stored in the database. This should limit access to ChocAn services and systems to only authorized persons: those who have a member card or know their ChocAn member number or provider number.

4.1.2 Encryption of Personal & Patient Data

All ChocAn member data and some ChocAn provider data shall be encrypted to protect their privacy. Both groups shall have their personal addresses encrypted to protect their personal privacy. The confidentiality members are entitled to as ChocAn patients shall be protected by encrypting any and all information about the services they have received as well as comments that their providers have written down.

4.1.3 Measuring & Improving System Security

The following data shall be collected throughout development and testing, as well as after deployment, to measure how secure the system is:

- Frequency of bugs or vulnerabilities found per unit of time
- Time to patch bugs and vulnerabilities

Regular security tests shall also be conducted to ensure that the system can handle known threats and check for existing vulnerabilities. Using the data collected from these tests and the metrics listed above, security patches shall be engineered and released regularly to keep

the system secure. These patches shall also keep the system's protections updated as new potential vulnerabilities are discovered and as new security technologies develop.

4.2 Reliability, Minimal System Downtimes

The system shall be accessible to all ChocAn users during active business hours. Any maintenance on ChocAn servers and systems should aim to be outside active hours and be communicated to all users in advance.

4.2.1 Local Copies of Data

In the event of server failures and unexpected system downtimes, records of all operations done and all data entered shall be stored locally. These records shall then be uploaded to the general ChocAn system server at the next available opportunity.

4.2.2 Measuring & Improving System Reliability

The following data shall be collected throughout development and testing, as well as after deployment, to track how reliable the system is:

- Average time between unexpected system failures
- Average time to troubleshoot and restore the system after unexpected failures (average length of unexpected system downtimes)
- Causes of each system failure

These data shall then be used to engineer improvements to the system's reliability.

4.3 Usability

The system shall be easy to use, especially for providers and managers. As there may be hundreds of providers across each location that ChocAn services, time, money, and frustration can all be saved with a system that minimizes mistakes and confusion.

4.3.1 "Help" Options & Messages

Each page within the system that requires user input shall have a "help" command allowing users to get more information about what they are expected to input.

4.3.2 Fields with Character Limits

All fields in which users must enter data that also have a character limit shall alert the user of said limit prior to accepting input. If the input collected exceeds that limit, the user shall be notified and given a chance to edit the entry before submitting the form.

4.3.3 Specially Formatted Fields

All fields that expect inputs to be in a specific format shall alert the user of that format prior to receiving input. If the input does not match the accepted format, the user shall be notified and given a chance to edit the entry before submitting the form.

4.3.4 Measuring Usability

The system's overall design shall allow 90% of users to be able to comfortably and confidently use the system after no more than 1 hour of exposure and training total. Ideally, this should be 30 minutes or less, including for uses who have never been exposed to this system before.

4.4 Ability to Support Simultaneous Active Users

The system shall be able to support simultaneous active users across all of ChocAn's active locations, each performing their own data entry, deletion, or modification actions. This will be increasingly important if ChocAn expands into new locations.

4.4.1 Measuring Capability of Mass Support

The system shall be able to maintain its fast response times and reliability even at ChocAn's busiest hours.

4.5 Fast Response Time

To minimize user frustration and also allow providers and managers to quickly and efficiently complete their other job duties, the system shall have a fast response time.

4.5.1 Measuring System Response Times

Under average conditions (moderately busy hours, clear weather, etc), the system shall complete tasks and return confirmation messages to users within 100 milliseconds. The system shall also be able to process at least 100 database entry creation, deletion, and modification requests each second.

4.6 Robust, Low Chance of Data Corruption or System Failure

To ensure that no data is lost or stored incorrectly, the system shall be robust and have a low chance of corruption or failure. Providers should not have to re-enter the same data often (if ever) and members should have the correct statuses and be able to access ChocAn services accordingly.

4.6.1 Data Backups

Provider, member, and EFT reports shall be uploaded to a secure server as backups in case of local system data loss.

4.6.2 Measuring Robustness

The following data shall be collected all throughout development, testing, and after deployment to track how robust the system is:

- Average time for the user's terminal to restart after local failures
- Chance of data corruption or data loss due to failures

This data shall then be used to engineer improvements to the system's robustness.

5 Milestones and Deliverables

For the ChocAn simulator, past the completion of the team's current milestone (this requirements document), there will be three more milestones met. Milestones included are the design document, a test plan, and finally both the project report and final deliverables of the software project being developed. Every milestone listed previously will be reached and delivered sequentially in two week increments. The requirements will be submitted first on October 19th, 2022. Following the first milestone, the design document will be submitted October 31st, the test plan on November 14th, and the project report and final deliverables on December 2nd. Included below is a Gantt chart outlining the current working plan for the team's milestones and deliverables.

ChocAn simulator Gantt Chart

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Requirements Document								
Design Document								
Test Plan								
Final Deliverables and Project Report								

5.1 Requirements Document

The first milestone to be met is the completion and submission of the requirements document, which is this current document. As listed previously, the submission date for this document will be no later than October 19th, 2022. As seen in previous sections, the requirements document will contain outlines for the requirements listed to us for the creation of the ChocAn Simulator. Listed sections in the requirements document include an introduction, an overview of the document and project as a whole, the product overview,

which gives a high level overview of the functionality of the software being developed, functional and non-functional requirements for the ChocAn simulator, along with the current section listing the milestones and deliverables that will be met.

5.2 Design Document

The second milestone to be reached will be the submission of the design document, which will be submitted no later than October 31st, 2022. The design document will primarily feature the team's plan and design for the software being developed. Sections of the document will include:

- *Design considerations*: focusing on constraints and dependencies of the system being developed, as well as the software engineering methodology or methodologies chosen.
- *System overview*: a high level description of the system that will be developed by the team.
- *System architecture*: a description entailing the different subsystems and components that will be parts of the software being developed.
- *Detailed system design*: a highly detailed description of each subsystem and component that will be used in the system, from a programmer's perspective. Will include pseudo code, functions, data structures that will be used, etc.

5.3 Test Plan

The third milestone that will be submitted by the team is the test plan for the ChocAn simulator. Again, as outlined in the introduction paragraph to this section, the test plan will be submitted no later than November 14th, 2022. The test plan will go over the testing methodology utilized to ensure that, when the software is undergoing development, it will operate as planned. Sections include a general description of the test plan, including scope and schedule, unit testing strategies, test cases for smoke testing, and test cases for system testing.

5.4 Project Report and Final Deliverables

Both the project report and the final deliverables are the last milestones to be reached in this project. They will both be submitted no later than December 2nd, 2022.

5.4.1 Final Deliverables

The primary final deliverable of this project is the software itself. A majority of the information concerning what will need to be done and what will be included in the final software deliverables are outlined in detail in both the function and nonfunctional requirements section of this document. In general, the software that will be developed and delivered is a simulator of the Chocoholics Anonymous service. The simulator will first validate the member number given, checking if the member is suspended or not. Once validated, the software will take and save a six digit code representing the services provided, and then find the fee to be paid by the member. Providers for ChocAn will be able to access a provider directory, a list containing names, service codes and fees. At midnight on each Friday, the ChocAn data center will provide the number of reports listed - reports can also be run individually by ChocAn managers. Every member who has utilized the ChocAn service will then be sent an email attachment containing information about their account, along with the service they received. Providers who have billed ChocAn will receive a report, sent as an email attachment, listing the services provided to ChocAn members. A record consisting of electronic funds transfer data will be saved, and a summary report will be delivered to the manager for all accounts payable. While the software is run in interactive mode, operators will be able to add, delete, and update member information and records. Once all of these requirements and functionalities are met and the software has been thoroughly tested for any bugs or issues, the project will have completed development and will be ready for delivery.

5.4.2 Project Report

The project report will primarily consist of two parts: a project retrospective, and a slideset presented by the development team. Included in the report will be what the team did well and what did not go well, acting as a sort of “postmortem” for the software developed. Suggestions for improving the parts of the project that did not turn out well will be

discussed in the report, along with any lessons learned that could be applied to future projects. The presentation slides will consist of 3 or 4 slides used to present the finished product to stakeholders. Included in the slides will be completed functionality, system testing procedures, and any known bugs, issues, or defects with the software.