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The ChocAn Simulator

Requirements Document

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1 Introduction

Chocoholics Anonymous (ChocAn) is an organization that helps people overcome their chocolate addiction by providing its members with a variety of services (e.g. consultations, treatments, access to health care professionals, etc.) that go towards achieving that goal. These are distributed across ChocAn's many providers with each provider having its own Provider Directory containing all the services it offers. Every time a member is given a service, details of the interaction such as the time and date, member number, service code, etc. are recorded into a disk. To have access to these services, each member pays the organization a monthly fee and is given their own member number.

Every Friday at midnight, the main accounting procedure at the ChocAn data center reads the week's file of services provided and prints the following reports: a member report for each member that consulted a ChocAn provider during that week; a provider report for each provider that has billed ChocAn; and a record consisting of electronic funds transfer (EFT) data. For more details regarding what each report is supposed to contain, please read Section 2.

This document provides the requirements specification for the data processing software required to implement the functionality outlined in the previous paragraph. It is divided into five sections: (1) Introduction, (2) Product Overview, (3) Functional Requirements, (4) Nonfunctional Requirements, and (5) Milestones and Deliverables.

1.1 Purpose and Scope

The purpose of this document is to describe what the ChocAn data processing software is supposed to do as well as how it is expected to perform.

1.2 Target Audience

The intended audience are ChocAn's shareholders and top business executives, in particular Mr. Christopher J. Gilmore.

1.3 Terms and Definitions

ChocAn – Chocoholics Anonymous

DPS – Data Processing Software

EFT – Electronic funds transfer

DS – Data structure

MN – Member number

SN – Service number

PN – Provider number

PD – Provider directory

SC – Service code

MM-DD-YYYY – Month/Day/Year

HH:MM:SS – Hour:Minute:Second

2 Product Overview

The present company will not be responsible for the following aspects of the ChocAn software. 1) The processing of payments of ChocAn membership fees – this is handed off to Acme Accounting Services. 2) The communications software. 3) Designing the ChocAn provider's terminal. 4) The software needed by Acme Accounting Services. 5) Implementing the EFT component. 2), 3), 4) and 5) are handed to some other third party organization. What we will be responsible for, however, is designing the DPS and also some software that simulates the provider and manager's terminals in order to verify that the DPS works correctly.

The DPS will process the week's file of services provided by ChocAn. From this it will create the following files. 1) A member report that contains: the member name, number, street address, city, state, zip code and, for each service provided to that member during that week, the date of service, provider name, and service name. 2) A provider report containing: the provider name, number, street address, city, state, and zip code. Also for each service provided, it must specify the date of service, the date and time data were received by the computer, the member name, the member number, the service code, and the fee to be paid. Finally, the provider report concludes with the total number of consultations with members and the total fee for the week. 3) A record consisting of the EFT data which consists of the provider name, phone number and the amount to be transferred. 4) A summary report to the manager for accounts payable that contains every provider to be paid that week, the number of consultations of each, the total fee for that week, the total number of providers who provided services, the total number of consultations and the overall fee total.

The provider and manager's terminals will simply contain a sufficiently large sample size of providers with a list of services for each. Also a sample list of members will be generated. Member interactions will be simulated via input to the keyboard, and each of the four reports will be written to separate files

2.1 Users and Stakeholders

The purpose of this section is to detail the users of the current software and also describe the parties affected by it.

2.1.1 ChocAn

The software will essentially provide ChocAn with weekly records of all of the services requested in each provider by their members. Hence the product is necessary for the organization's daily functioning since it is what generates their required documentation. In terms of project development, ChocAn's role is to help the programmers ensure that the product meets the desired requirements.

2.1.2 ChocAn Members

The product is required to print member reports that essentially detail the recordings of every member's activity with ChocAn during the particular week, if there was any. This is invaluable information for all members as it gives them the chance to verify that their activities are consistently being recorded and correctly charged. They do not have any role in developing the product, however.

2.1.3 ChocAn Providers

The software is required to allow providers to have access to their PD, which lists the services that they provide. Hence, this party is also affected. Individually though, the providers do not have a role in shaping the final product.

2.2 Use cases

The purpose of this section is to outline the individual use cases associated with the DPS and the simulation used to verify it. All use cases are done via a simple keyboard and monitor interface

2.2.1 Validate member

The sequence proceeds as:

1. The program prompts for the user (member) to enter their MN and proceeds to Step 2.

2. The input is then ran through the ChocAn's MN DS to make sure that it is contained in it. We then proceed to Step 3.

3. If the number is valid or is contained in the DS, the word **Validated** gets printed on the screen. Otherwise, the reason for the invalid number gets printed: this is either **Invalid Number**, indicating that the member does not exist in the system, or **Member suspended**, indicating that the member has not paid their membership fees for at least a month.

2.2.2 Charge the service

This scenario occurs after 2.2.1. The steps are as follows:

1. The date of the service is provided in the format MM-DD-YYYY. Proceed to Step 2

2. The six-digit SC is entered. Proceed to Step 3.

3. The PD is then referred to to look up the six-digit SC corresponding to the service provided. Proceed to Step 4.

4. If the code exists, the name of the service corresponding to the code is displayed and the user is asked to verify it. If the verification is not correct or a nonexistent SC was entered, then an error message is printed. Otherwise, the provider can enter comments about the service provided and proceed to Step 5. But if the code does not exist, an error message is printed.

5. The software writes a record to disk that contains the following fields and the proceeds to Step 6:

- 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)

6. The product then looks up the fee for the service and displays it on the terminal.

2.2.3 Request for PD

The user indicates that they'd like to view the PD for the corresponding provider. The program simply indicates a message saying that the PD has been sent to them. Of course no actual e-mail will be sent, but the message alone is sufficient to simulate that.

2.2.4 Add member

The user enters the new member's name, number, street address, city, state and zip code. The program then generates a new, unique MN to add to the MN DS. A message is outputted indicating that the member has been added to ChocAn.

2.2.5 Remove member

This is done through the following steps.

1. The user enters the MN of the member. Proceed to Step 2
2. The MN is looked up via the MN DS. Proceed to Step 3.
3. If the MN is invalid, a message pops up telling the user that the member does not exist. Otherwise, proceed to Step 4.
4. Display the member information (i.e. name, number, street address, city, state and zip code) and have the user verify that this is the member they wish to remove. If they indicate yes, then proceed to Step 5. Otherwise proceed to Step 1
5. Remove the member from the MN DS, and then output a message indicating that the member was removed.

3 Functional Requirements

This section describes what the ChocAn DPS is supposed to do. It describes the functional requirements of the final product, specifically the types of services it should provide and how it should react to and behave in particular situations and/or inputs.

3.1 The DPS is to print out four weekly reports

The primary purpose of the DPS is to print out several weekly reports for ChocAn, its members, providers, and also the accounting services in charge of the financial aspect of the organization.

3.1.1 Each member who has consulted a ChocAn provider for that week will be provided with a member report

The report is to contain the following fields:

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)

And for each service provided to the member, we need the following details:

a) Date of service (MM-DD-YYYY)

b) Provider name (25 characters)

c) Service name (20 characters)

3.1.2 Each provider that has billed ChocAn will receive a provider report

The fields of the report are:

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)

And for each service provided by the provider,

7. Service list

    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)

8. Total number of consultation with members (3 digits)

9. Total fee for the week ($99,999.99)

3.1.3 Each provider that has billed ChocAn will receive a provider report

The fields of the report are:

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)

And for each service provided by the provider,

7. Service list

    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)

8. Total number of consultation with members (3 digits)
9. Total fee for the week ($99,999.99)

3.1.4 A record consisting of the EFT data

This is written to a file.

3.1.5 Summary report (for the manager for accounts payable)

The report should contain the following:

1) A list of each provider to be paid for that week. This should include the number of consultations each had and their total fee for the week.

2) The total number of providers who provided services

3) The total number of consultations

4) Overall fee total

3.2 The software should have basic member addition and removal capabilities

Members should be added with the following information:

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)

.And the member ID (#2) should be the only field that is unique to every member.

Finally, members should be removed by looking up their member ID.

3.3 The software should have basic service addition and removal capabilities

Services should be added with the following information (at the minimum):

1. Service code (6 digits)
2. Service name (25 characters)
3. Service fee

and should be removed by looking up the service code.

3.4 Ready access to the Provider Directory

The simulation should be able to provide users access to every ChocAn provider's PD.

3.5 Every consultation should be recorded to a file for that provider

Each consultation should be formatted as follows:

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)

3.6 In the case of an invalid MN, SN, or PN the program should give the user the opportunity to reenter it or go back to the main menu

We should print an error message indicating that the number in question is invalid and then allow the user to re-enter it until they wish to quit. This is to avoid an abrupt termination to program execution.

3.7 The providers within the system should refuse to accept members seeking consultations if they have already reached their weekly cap of 999 or if their total fee for the week has reached $99,999.

This is an acceptable requirement for the present project since the essential component of it that will be used in the actual system is the DPS. The DPS does not concern itself with these limits and even if it does, they can easily be adjusted by making them global constants if we are using static memory, or the software can be easily modified if we are using dynamic memory.

4 Nonfunctional Requirements

This section presents requirements that characterize the system as a whole instead of what it's supposed to do. In essence, it presents the nonfunctional requirements.

4.1 Any provider that has no recorded activity during a particular week shouldn't be given a provider report.

This is a direct consequence of functional requirement 3.1.2.

4.2 Any member that has no recorded activity during a particular week shouldn't be given a member report

Directly from functional requirement 3.1.1

4.3 After being pre-loaded with a set of providers, services, and members, the system should consistently be able to correctly generate the reports outlined in requirement 3.1 consecutively for several weeks

Correctly refers to generating all of the member and provider reports for those members and providers who recorded activity with ChocAn for the week, as well as the EFT and summary reports. For the case of no activity, no member or provider report should be generated while the EFT and summary reports should have suitable values to show this (e.g. a total fee of $0.00, for example).

4.4 The user should only require an hour of training with the software and acquaintanceship with the project goals in order to effectively verify that the DPS functions correctly.

Effectively this states that the final simulation should be user-driven so that they know how to access features such as the member list, to switch between providers, to change the date to the next day, to request a service, etc.

4.5 The program code should be easy to read and modifiable

Since the DPS resulting from this project is a proof-of-concept rather than a final product, since the latter requires the other components of the software to be implemented, the core functionality of its source code should be abstracted so that future modifications (e.g. having a variable character name and digit length sizes) do not require a significant overhaul of the core code.

5 Milestones and Deliverables

The purpose of this section is to outline the project plan. Specifically, all of the tasks required towards achieving the final product will be listed and described in detail.

5.1 Design Document – Due November 3rd

This milestone will consist of designing the actual program required to implement the requirements outlined above. The main work here is to define the essential aspects of a ChocAn member, service, and provider while also deciding the main data structures that should be used to implement the program. In this part of the project, the classes will be built and conceptualized.

5.1.1 Member Class – Due by October 28th

This is where the main ChocAn member class will be designed. The fields will consist of those outlined in Requirement 3.2.

5.1.2 Service Class – Due by October 28th

Here a ChocAn service class will be designed. Its main fields are listed in Requirement 3.3.

5.1.3 Provider Class – Due by November 1st

The provider class will consist of fields 1 – 6 in Requirement 3.1.3 along with a few other features (e.g. a service list that can be extracted from the provider directory).

5.2 Design the Main Program – Due November 18th

Here is where the main program will be designed, where the provider terminal and the global terminal will be simulated. In essence, this portion of the design will implement all of the functional requirements. It is split up as follows.

5.2.1 Provider Terminal – Due by November 15th

The end goal of this is to have a terminal that allows the provider to enter a member number, validate it, enter a corresponding service, and then write this interaction to disk. Further it should also grant access to the provider's corresponding provider directory.

5.2.2 Global Terminal – Due by November 17th

The global terminal will allow one to access ChocAn's entire member list and also each individual provider. It will effectively go to a certain provider and enter its terminal for simulation – the user can switch to the global menu anytime. In the corresponding terminal, the user can simulate member activity until they wish to either end the simulation or advance the day.

5.3 Test Plan – Due November 24th

This is where the test plan for the DPS and simulation software will be created. It will be divided as follows.

5.3.1 Provider Terminal – Due by November 22nd

Here the provider terminal will be tested to verify that it correctly adds and removes members, and also processes member interactions (e.g. correctly recording the service to the disk as specified by Requirement 3.5).

5.3.2 Global Terminal – Due by November 23rd

The global terminal will be required to correctly jump from provider to provider and to also display ChocAn's membership information when necessary. It will also be tested to see if it can separate the files corresponding to each provider's services for that week.

5.3.3 DPS – Due by November 24th

This portion of the program will ensure that the correct reports outlined in Requirement 3.1 are printed and that they are tossed into the specified files. Specifically, tests will have to be planned that makes sure that each member gets a copy of their member report, that each provider gets a copy of their provider report, and that the totals in the EFT and summary report are consistent with what's found in the provider reports.