Test Plan

VERSION 1.1

Cognitive Contact

This document outlines the testing protocols, results interpretation procedures, and testing schedule for the TheraTouch project of the Senior Design team Cognitive Contact.

Revision Sign-off

By signing the following, the team member asserts that he/she has read the entire document and has, to the best of his or her knowledge found the information contained herein to be accurate, relevant, and free of typographical error.

NAME	SIGNATURE	DATE
SCOTT BOYKIN		
ADAM BURT		
CRISTINA CLINE		
JEFF GETTEL		
ANDREW HUGHES		
JOEY WILKINSON		

Revision History

VERSION	DATE	CHANGES
Version 1.0	12/2/2011	Initial Draft
Version 1.1	12/13/2011	Implemented suggested revisions to first draft, cleaned up test cases, requirements traceability matrix, wording throughout the document, and formatting.

Contents

1. Introduction

1.1 Purpose

This Test Plan document establishes and outlines the appropriate procedures and methodology for testing, and related activities, of the TheraTouch system developed by Cognitive Contact. The purpose of this testing is to encourage quality assurance and user acceptance.

1.2 Scope

The scope of TheraTouch is to provide a system that allows users to perform cognitive and neuromuscular rehabilitation. The system will provide users with different activities and keep track of rehabilitation progress by storing the activity options and results into a database. The system will have the ability to keep track of multiple users and will be able to store one current session for a user. It will also keep track of previous sessions for viewing.

The Test Plan provides a means to coordinate and streamline the necessary unit, systems, and acceptance testing that will need to be done on TheraTouch. It also provides guidelines for interpreting results, reporting these results, and error tolerance.

1.3 Document Overview

Section 2 (Requirements Testing) is about system requirements, as well as testing if these requirements are met.

Section 3 (Unit Testing) is about testing all of the individual sections and activities of the system.

Section 4 (System Testing) is about testing all of the sections of the system when they are put together.

Section 5 (Acceptance Testing) is about testing for whether the users agree with the system.

Section 6 (Results Procedure) is about how testing results are handled and interpreted.

Section 7 (Testing Schedule) outlines a schedule for the testing to follow.

2. Requirements Validation

2.1 Overview

The purpose of Requirements Validation is to make sure that all of the requirements and specifications for the system are met. They can be found in the TheraTouch Requirements Document.

2.2 Testing Environment

Required Hardware and Software:

- Microsoft Surface v1.1 running TheraTouch

- Microsoft SQL Server 2008 database configured for TheraTouch

- Workstation connected to TheraLink via HTTPS

THERATOUCH

3. Unit Testing

3.1 Overview

The purpose of unit testing is to verify that all activities and individual programs function as intended. This is done prior to any sort of integration and mostly involves going through a list of items to check. These lists are located in the following subsections.

3.2 TheraLink

3.2.1 Iteration I

- Need accurate credentials to login

- Login security is present

- Login page is brought up if navigating to a secure page without being logged in

- Cookie is dumped on logout

- Logged in users can logout

- Authorized staff can add users

- Authorized staff can create sessions

- Validation for all fields in forms

- Navigation links lead to labeled locations

- Network connection errors are handled appropriately

3.3 TheraTouch

3.3.1 Iteration I

- Program starts and stops properly

- Accurate credentials and active session required to login

- User can access their session and do activities

- Navigation links lead to labeled locations

- Database is updated accordingly with statistics

- Database is read properly for session data

- User can logout when finished with session

3.4 CardMatch

3.4.1 Iteration I
- Game starts with instructions screen
- The size of the card grid is determined by the game options
- Cards flip over when touched and are selected one at a time
- When two cards have been selected and they are a match, they will disappear
- If they are not a match, they will flip back over
- Game ends when all card pairs have been found
- Game tracks time taken to complete the task

3.5 SeekShape

3.5.1 Iteration I
- Game starts with instructions screen
- Shapes follow the rules set down by the game options
- The user is shown which shape they are looking for
- Correct shapes change color when touched
- Incorrect shapes are ignored
- Game ends when all shapes have been found
- Game tracks total time taken and accuracy

3.6 Wipe the Table

3.6.1 Iteration II
-

3.7 Activity 4

3.7.1 Iteration I
-

4. System Testing

4.1   Overview

The purpose of system testing is to verify that all of the individual programs and activities are successfully integrated, as well as determine that all requirements and specifications are met.

4.2   Database – Iteration I

- Information is inserted into the correct fields

- Correct information is retrieved from specified fields

- Information is secured according to HIPPA standards

- Query time is within acceptable limits

4.3   Framework – Iteration I

- Staff credentials work on TheraLink and TheraTouch

- Users are handled in TheraLink and work on TheraTouch

- Sessions are handled in TheraLink and work on TheraTouch

- Individual activities are recognized and handled by TheraTouch automatically

4.4   Activities

The Requirements Traceability Matrix for the system can be found in Appendix A. The Test Cases for the system and activities can be found in Appendices B-E.

5. Acceptance Testing

5.1   Overview

Acceptance testing will be done once the entire system is built and ready for deployment towards the end of Iteration IV. This will encompass testing done from the perspective of an end user to determine whether users feel the system is acceptable to them.

5.2   Iteration IV

6. Regression Testing

6.1   Overview

Regression testing will be done onwards from Iteration II. This will include testing from previous iterations to verify that nothing was broken from one iteration to the next.

6.2   Iteration II

7. Results Procedures

7.1 Overview

The following section outlines how to record results and analyze the data from these results during testing of the TheraTouch System.

7.2 Testing Procedure

The testers will be given a checklist of items to examine and will record whether or not the item is functioning as intended. Space will be given for miscellaneous comments and opinions.

7.3 Results Procedure

Completed testing lists will be given to the lead tester who will then organize them. Results will be presented to the group as a whole in the event that any decisions need to be made. Simple errors, such as logical coding errors, will be handled by the coders.

8. Testing Schedule

8.1 Iteration I

- ▪ **Testing Starts**   November 22, 2011

  Start of testing period for Iteration I.

- ▪ **Unit Testing**   November 22 - December 9, 2011

  Start of unit testing for Iteration I. This includes TheraLink, TheraTouch, Wipe the Table, and Seek the Shape.

- ▪ **Examine Results**   November 22 - December 9, 2011

  Examine the results from unit testing, consolidate errors, possibly propose changes to the group, and implement any necessary fixes.

- ▪ **System Testing**   December 9-13, 2011

  Start of integration testing for Iteration I. This includes the links between TheraLink, TheraTouch, Wipe the Table, and Seek the Shape.

- ▪ **Examine Results**   December 9-13, 2011

- ▪ Examine the results from integration testing, consolidate errors, possibly propose changes to the group, and implement any necessary fixes.

8.2 Iteration II

8.3 Iteration III

8.4 Iteration IV

9. Glossary

Acceptance Testing – Testing that evaluates the user experience and determines if people, in general, like the software.

Cognitive Contact – The team name chosen for the 2011-2012 Senior Design Group X.

Dynamic Session – A session whose activities can be completed in any order.

HIPAA – Health Insurance Portability and Accountability Act of 1996, it protects health insurance coverage for workers and their families when they change or lose their jobs.

Microsoft Surface – A multi-touch tabletop computing device that uses gesture recognition to allow users interact with the machine.

Sequenced Session – A session whose activities are set up to played in a specific order.

Session – A session starts after a user identification tag is placed onto the surface and the user is logged in. A session ends when the user logs out of the system.

Simulator – In this context, a simulated Microsoft Surface environment used in conjunction with Visual Studio.

Staff Workstation – The workstation used by staff to connect to the TheraLink web application.

System Testing – Testing that evaluates how well the individual parts of the system handle when integrated and whether the requirements and specifications of the system were met.

TheraLink – The name of the clinician workstation application developed by Cognitive Contact.

TheraTouch – The name of the Surface application developed by Cognitive Contact (also is used to refer to the overall system).

Tutorial – The Microsoft Surface tutorial that shows the basic controls to use the Surface.

Unit Testing – Testing that evaluates all of the activities and programs individually to check for bugs.

TheraLink – The name of the clinician workstation application developed by Cognitive Contact.

TheraTouch – The name of the Surface application developed by Cognitive Contact (also is used to refer to the overall system).

Appendix A: Requirements Traceability Matrix

Iteration I:

General Requirements [GEN]	Test Case						
	1	2	3	4	5	6	7
[GEN-1] The user shall be able to perform rehabilitative activities on the Surface.						x	x
[GEN-2] The TheraTouch Surface application and TheraLink web application shall be able to communicate with the database to store and retrieve information.	x	x	x	x	x	x	
[GEN-4] Activity results shall be stored for later retrieval, analysis, and reporting.						x	
[GEN-5] All applications shall have error-handling to handle any database disconnections or other errors.	x	x	x	x	x	x	x

TheraLink Requirements [STF]	Test Case						
	1	2	3	4	5	6	7
[STF-1] Staff shall log into TheraLink with a username and password stored in a SQL Server Database file stored in the project.		x					
[STF-2] Staff logins shall be secured and have appropriate safeguards against unauthorized attempts at gaining access to the database.		x					
[STF-3] Staff shall be able to register users into the database and print an ID card for the new user.			x				
[STF-4] A staff member with a manager permission level shall be able to create new staff users on an Admin Functions page. The manager will also be able to view and edit current staff users.	x						
[STF-6] Staff shall be able to create a new session of activities for a user. A session definition specifies the activities to be performed, the options set for each activity, and whether or not the activities must be performed in a specified order.				x			

TheraTouch Requirements [SUR]	Test Case						
	1	2	3	4	5	6	7
[SUR-1] The surface shall allow user log in with a printed User ID card.					x		
[SUR-3] Staff shall be able to log a user out at the end of a session.					x		
[SUR-4] The surface shall save activity results to the database upon the completion of an activity. After each activity it checks all other activities in the session to determine if the session is complete.						x	
[SUR-5] The surface shall have a current session set up with TheraLink before a user logs in.					x		
[SUR-6] The surface shall allow a user to practice an activity while a session is in progress.						x	
[SUR-7] The surface shall only show the activities of the user's current session.						x	
[SUR-8] The surface shall save session progress so if a user logs off before a session ends and they are not in the middle of an activity.						x	

Database Requirements [DBR]	Test Case						
	1	2	3	4	5	6	7
[DBR-1] The database shall allow for the TheraTouch application to connect to it to by SQL Server Authentication.					x	x	
[DBR-2] The database shall allow for the TheraLink web application to connect to it to add/modify users, add/modify report templates, and add/modify sessions.	x		x	x			
[DBR-3] The database shall store activity results after the completion of each activity in a session.						x	
[DBR-4] The database shall maintain only one active "current" session per user.				x		x	
[DBR-5] The database shall flag a session as complete after all activities in a session have been completed. After the completion of an activity, the surface will check if all other activities in the session are complete and then flag the session as complete if they are.						x	
[DBR-6] The database shall store a User ID that can be matched with a user's medical record number.			x			x	
[DBR-7] The database shall store user demographic information from the staff workstation in accordance with HIPAA regulations regarding private health information.			x				

SeekShape Requirements [SS]	Test Case						
	1	2	3	4	5	6	7
[SS-1] SeekShape shall implement Distinct, Total Type, and Object Type as Activity Options. Distinct will be an integer value between two and six. Total Type will be an integer value between two and twenty. Object Type will be a text value of letter, number, or shape.							
[SS-2] Users shall be able to complete the activity by finding all instances of the correct shape and selecting them.							
[SS-3] Selecting correct shapes will result in the shapes being marked, while incorrect shapes will not be.							
[SS-4] The activity will record the total time taken to complete the task, as well as the accuracy of the user in finding shapes to the database.							

CardMatch Requirements [CM]	Test Case						
	1	2	3	4	5	6	7
[CM-1] CardMatch shall implement Grid Size and Shape Types as Activity Options. Grid Size will be an even number between two and ten. Shape Types will be a text value of either fruits, basic, animals, or coins.							
[CM-2] Users shall be able to complete the activity by selecting all pairs of identical cards.							
[CM-3] Selecting correct pairs will cause the cards to disappear, while selecting incorrect pairs will cause them to turn upside again.							
[SS-4] The activity will record the total time taken to complete the task to the database.							

Appendix B: Iteration I Test Cases

Test Case 1:   Creating a Staff Member Account

1. Once a staff member is logged in, they can access the staff management page. Selecting the add staff option will bring them to a form that must be filled in. Once the form is filled in and submitted, the new staff member account will be created.

    a. The form will have built in error checking, so correct data must be entered into the form or an error message will appear.

    b. Duplicate users will not be allowed if the inputted username is found in the database.

    c. Insufficient permissions for the staff member will block access to this page. They must be an administrator.

Test Case 2:   TheraLink Login/Logout

1. A staff member will go to the TheraLink login page and attempt to login, or be sent to the login page if they attempt to access a restricted area.

    a. A correct username and password should send the staff member to the home page or to the requested page.

    b. An incorrect combination should result in an error message.

    c. Too many incorrect attempts at logging in should result in the account being locked.

2. The staff member will be only logged out of TheraLink either by clicking the logout link on every page or by letting their session time out.

Test Case 3:   Adding Surface Users

1. Once a staff member is logged in, they can access the user management page. Selecting the add user option will bring them to a form that must be filled in. Once this form is filled in, they will save the user and print a tag.

    a. The form will have built in error checking, so correct data must be entered into the form or an error message will appear.

    b. Duplicate users will not be allowed if one is found in the database.

    c. Insufficient permissions for the staff member will block access to this page.

Test Case 4:   Creating a Surface Session

1. Once a staff member is logged in, they can access the session management page. Selecting the create session option will bring them to a page for putting together a session for a specific surface user.

2. They will be able to select activities one at a time, set options for them, and add them to a list. The staff has the option to set a session as locked or unlocked. After they have been added, the activities can be modified, deleted, or moved to a different place in the list.

    a. An invalid ID number for the surface user will result in an error message.

    b. Invalid data for any options will result in an error message.

    c. If a session already exists for the user, the staff member will be notified and asked if they want to end the older session.

    d. Insufficient permissions for the staff member will block access to this page.

Test Case 5:   TheraTouch Login/Logout

1. A user will go to the Surface and login by scanning their ID on the Surface. Once they have been identified, they will be brought to the session home screen.

    a. If the tag ID is not valid, an error message will appear.

    b. If the user does not have an active session, an error message will appear.

2. The user will be able to logout from the session home screen by clicking on the appropriate button.

Test Case 6:   Doing a Session

1. Once the user is at the session home screen, they will be allowed to start their session. If the session is not locked, they can select any activity, otherwise they must select the first activity in the session.

2. The user has the option of either starting the activity or doing the activity in practice mode.

    a. If the user selects practice mode, they will be allowed to run through the activity without any data being recorded. They are allowed to return to the session home screen at any time.

    b. If the user opts to start the activity, they will be sent to the activity and they must go through it from start to finish. Once they are done, the data will be

recorded by the database and they will be sent back to the session home screen, where they can either do the next activity, if there is one, or logout.

3. Once the session is completed, it will be flagged as completed in the database.

Test Case 7:   Accessing Freeplay

1. Anybody will be able to access Freeplay mode by launching the appropriate application from the Surface home screen.

2. The person will be brought to the Freeplay screen which will allow them to select an activity and then choose to play it. They can also return to the Surface home screen by selecting the appropriate button.

3. No data should be retrieved from or saved to the database.