



ROSE-HULMAN INSTITUTE OF TECHNOLOGY

University of Wisconsin–Madison | Department of Computer Sciences

Human-Computer Interaction Laboratory



MILESTONE 1

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Contents

1	Introduction	3
2	Client Background	3
3	Requirements	3
3.1	Usability	3
3.2	Performance	4
3.3	Reliability	4
3.4	Supportability	4
3.5	Hardware and Software Interfaces	4
3.5.1	Software Interfaces	4
3.5.2	Hardware Interfaces	5
3.6	Documentation	5
3.7	Installation	5
3.8	Legal/Licensing	5
3.9	Reliability	5
3.10	Usability	6
3.11	Performance	6
3.12	Supportability	6
4	Interaction Architecture	7
5	Use Cases	7
5.1	General Behaviour	7
5.2	Authentication Use Cases	8
5.3	Appointments	10
5.4	Experiment Management	12
5.5	Reports	13
6	Test Cases	17
6.1	Experiments	17
6.1.1	List Experiment Participants	17
6.1.2	Cancel Experiment Appointment	17
6.2	Experiment Management	18
6.2.1	Add Experiment	18
6.2.2	Modify Experiment	18
6.3	Authentication	19
6.3.1	Login	19
6.3.2	Logout	19
6.3.3	Create Account	20
6.4	Appointments	20
6.4.1	Select Experiment	20
6.4.2	Sign up for Experiment	20
6.5	Reports	23
6.5.1	Export Participants	23
7	Usability Report	24
7.1	Process	24
7.1.1	Informed Consent Form	24
7.1.2	Expert Instructions	24
7.1.3	Questionnaire	25
7.2	Analysis	32
7.2.1	Login	32

7.2.2	Add Experiment	33
7.2.3	Modify Experiment	33
7.2.4	Experiment Time and Date Range	34
7.2.5	Delete Experiment	34
7.3	Findings	35
7.3.1	Overall	35
7.3.2	Login	35
7.3.3	Add Experiment	35
7.3.4	Modify Experiment	35
7.3.5	Experiment Time and Date Range	35
7.3.6	Delete Experiment	36
8	Who Did What	37
9	References	37
10	Appendix	37
	Index	37

1 Introduction

The Human-Computer Interaction Lab at the University of Wisconsin-Madison wants a web-based system to better manage the scheduling of participants for their studies. These studies range from one-on-one experiments to group interactions, and many of them involve the robot used by the lab. Currently, each researcher arranges studies independently via email and is responsible for scheduling rooms, avoiding conflicts, and notifying participants of changes; unifying this information onto one system simplifies all of these tasks. To the client, the most important benefit of a unified system is the ability for participants to easily browse all available experiments, which is not possible over email. However, a variety of other functionality should be integrated into this utility to take advantage of the unity of information; most notable is recognizing room conflicts when scheduling studies, since the lab has only one robot and it cannot be moved.[1]

Project information will be documented as follows: Milestone 1 provides an overview of the project, from client background to key features and requirements. Milestone 2 covers the behaviour of the system, including use cases and data flow diagrams. Milestone 3 details constraints, back-end requirements, and elaborates upon the user interface. Testing and maintenance information can be found in Milestone 4. Milestone 5 will include usability data and interface re-design related to such data.

2 Client Background

The client is the Human-Computer Interaction Lab at the University of Wisconsin-Madison. Their research focus is the on the way humans perceive computers, and how this perception influences their actions. The main goal is to learn about this interaction through making hypotheses, experimenting, analysing the data, and then publishing papers on the results. They draw the participants for their experiments from a wide range of people, usually ranging from 18-65 years of age and from diverse technical backgrounds. As such, any system they use must be designed for all levels of technical competency.

3 Requirements

3.1 Usability

- For anyone who has used a web application before, there should be near-zero training time required before being able use this system. (Of course, all web applications are at least slightly different to use, so the training time cannot be zero.)
- For anyone who has never used a web application before, there should be minimal training time (a maximum of ten minutes) required before being able to use this system thanks to the on-screen help in the form of a walk-through. This assumes that the user possesses basic computer literacy. Otherwise, it may take the user significantly longer to learn this system.
- No more than half of the time required to actually visit, email, or call a researcher to schedule an appointment will be needed to use this system.
- The new system shall be judged by 99% of the user community to be at least as useful as the existing system and by 90% of the user community to be at least as useful as competing state of the art system.
- On-screen help will be an accessible option for struggling users.
- There will be no drastic interface changes from existing, accepted web application paradigms, so there will be no more than a slight learning curve for the user.

3.2 Performance

- The average response time for the next screen to appear after the user has selected an option that will change the screen will be thirty milliseconds and the maximum will be sixty milliseconds, not including network latency that cannot be controlled.
- A minimum of one page load per second will be supported, again not including network latency that cannot be controlled.
- Each individual session will support one concurrent user, while the overall system will support up to twenty users using the web application in parallel. The client specified the number of twenty. In the rare case that more than twenty users attempt to use the web application in parallel, everyone will be able to do so, but the ideal performance estimates will be invalidated.

3.3 Reliability

- The system will be up 99.99% of the time (less than one hour of downtime per year), independent of the maintenance crew taking it down up to twice a year for eight to ten hours at a time.
- On average, failures will not occur within three months of one another.
- Due to innovative remote diagnostics, updates, and repairs, 90% of all system failures will be able to be repaired within five minutes and 99.9% of all failures will be able to be repaired within one hour, depending on the maintenance crew.
- All appointments will be accurate to the nearest minute 100% of the time.
- Appointments will be successfully scheduled 99.99% of the time, and in the case a scheduling fails, the user will be able to try again 100% of the time.
- There will be no more than one bug per thousand lines of code.
- There will not be any critical or significant bugs. However, there will be up to one minor bug per thousand lines of code. Minor is defined as not affecting the usability of the system or scheduling data.
- It has been assumed that the system will be properly updated and patched at all times by the maintenance crew. Also, system settings, like date and time, have been assumed to always be correct.

3.4 Supportability

While the development team will not be involved with supporting the system once it is handed over to the customer, the system will still have some support. The team will create documentation throughout the development process. Also, the customer will receive all source code when the system is handed over. In order to facilitate supportability for the customer, the system will be written in Python and use PostgreSQL, both with which the current customer is familiar. With the code in a familiar language and the documentation, the customer should be able to fully support the system by themselves.

3.5 Hardware and Software Interfaces

3.5.1 Software Interfaces

The software required for the system will be an operating system of Red Hat Enterprise Linux Server 6.1. Also, the software will be written in Python and use PostgreSQL database management system.

3.5.2 Hardware Interfaces

There are no hardware specifications that we must conform to since we are writing a hardware independent web application.

3.6 Documentation

As part of the usability requirements, the system we provide should be intuitive enough that the end user should have no difficulties navigating the system. However, the client prefers that we provide tool-tip type documentation for the entry forms. This documentation should provide clear, concise direction for the user when entering their information. On the back-end, similar tool-tip documentation will provide the administrator with the guidance to complete their tasks such as modifying experiments or researchers. Additionally, documentation for the installation will be provided in the form of step-by-step instructions as detailed in the installation requirements section. Finally, developer documentation will be in the source code. There will be documentation relating to the use of each class and public method.

3.7 Installation

Since our client is technically proficient, they prefer either step-by-step installation instructions or an install script. Installation instructions are typically more robust than an install script so we will be providing installation instructions with our solution. The installation instructions must be detailed enough that our client can install the web application on the machine provided by them. We have replicated to the best of our abilities the platform on which the web application will be deployed to be able to provide proper installation instructions.

3.8 Legal/Licensing

The client has specified that there are no legal or licensing requirements for this project. The code will be released under an open source license that is yet to be determined. The code is hosted publicly on GitHub and is freely available. The users will have to agree to the terms of the client when creating an account but these have not been finalized yet.

3.9 Reliability

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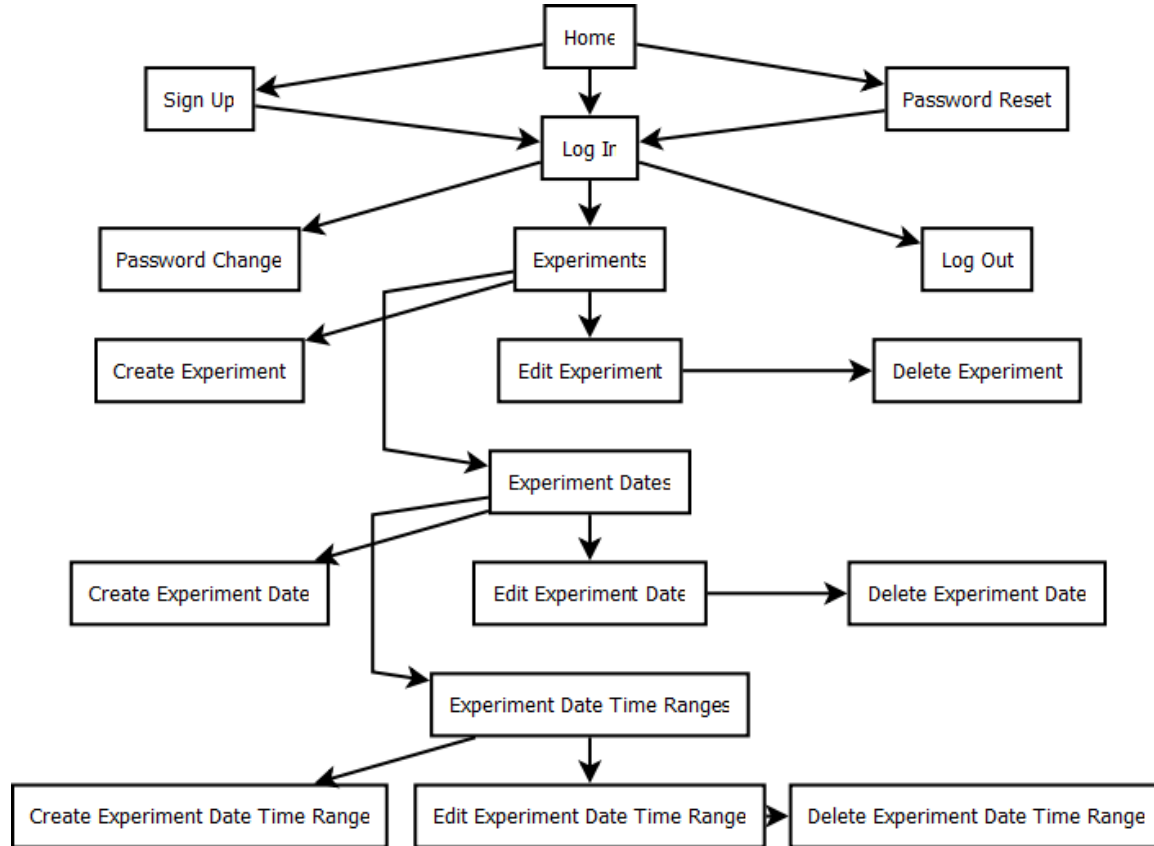
3.11 Performance

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4 Interaction Architecture



5 Use Cases

5.1 General Behaviour

Every page on the website possesses a “login/logout/create account” button. If the user is logged in, follow use case “Logout”. Otherwise, follow use case “Login”. In either case, unless noted otherwise, upon completion of that use case, the system will return to the page the button was clicked from. If that page had user-entered fields, they will be in the same state they were when the user clicked the button. A common exception is when a researcher or admin account logs out of a researcher or admin page, in which case they will be returned to the homepage; unauthenticated users cannot view or use researcher-only features.

Every page also possesses a button to return to the system homepage. This will exit any use case they are currently following and discard any temporarily stored information related to that use case, such as entered fields or selected options.

Whenever a table is displayed, there is some concern related to its size; however, due to the low expected number of experiments and participants per experiment, any handling of large tables will be outsourced to the browser (scroll bars being most common). Because the whole table will be loaded at once, browser search functionality is also sufficient to handle most searching needs; tables that can be otherwise sorted, filtered, or searched will be specifically noted.

5.2 Authentication Use Cases

1. Name: Login

- (a) Brief Description: User logs in.
- (b) Actors: User
- (c) Basic Flow:
 - i. User clicks the “login/logout/create account” button from any page.
 - ii. User prompted for Email and Password via text boxes.
 - iii. The system sends their login information to the database. [A2] [A3] [A4]
 - iv. System displays a message confirming successful login. The user is now logged in.
 - v. After 10 seconds or when the user clicks a link to do so immediately, the user is navigated out of the login use case as specified in General Behavior.
- (d) Alternate Flows:
 - A1 User navigates elsewhere on the website, through their browser or the “home” button. Unless the page they attempt to visit requires authentication, this simply drops them out of the use case.
 - A2 User entered an email that the database did not recognize. Run use case “Account Creation”.
 - A3 User entered an email recognized by the database but not the password associated with it. Return to email/password entry, displaying the message “Incorrect password, please retry.”
 - A4 System fails to connect to database. Display the message “Database unavailable; we are sorry for the inconvenience. Please try again later.” Then return the user to the page they entered the use case from.
- (e) Pre-conditions:
 - i. System is functional.
 - ii. User is not logged in.
 - iii. User has already created an account.
- (f) Post-conditions:
 - i. User is logged in, or cancelled login process.
- (g) Special Requirements:
 - i. N/A
- (h) Feature Mapping:
 - i. Levels of Authentication
 - ii. Accounts

2. Name: Logout

- (a) Brief Description: User logs out.
- (b) Actors: User
- (c) Basic Flow:
 - i. User clicks the “login/logout/create account” button from any page.
 - ii. System displays a message confirming successful logout. The user is now logged out.

- iii. After 10 seconds or when the user clicks a link to do so immediately, the user is navigated out of the logout use case as specified in General Behaviour.

(d) Alternate Flows:

- A1 User entered this use case from a page not available while logged out (appointment confirmation or researcher interfaces). The system will return them to the homepage unless otherwise specified.

(e) Pre-conditions:

- i. System is functional.
- ii. User is logged in.

(f) Post-conditions:

- i. User is logged out.

(g) Special Requirements:

- i. N/A

(h) Feature Mapping:

- i. Levels of Authentication
- ii. Accounts

3. Name: Create Account

(a) Brief Description: User creates an account.

(b) Actors: User

(c) Basic Flow:

- i. User clicks the “login/logout/create account” button from any page.
- ii. The system navigates the user to the login page.
- iii. User clicks the “create account” button from the login page.
- iv. The system navigates the user to the account creation page.
- v. User prompted for Email, Name, Phone, Password, and Confirm Password via text boxes.
- vi. User clicks “Submit” button. [A2] [A3] [A4]
- vii. The system sends the entered information to the database. [A5] [A6]
- viii. The system sends an email to the entered email address. [A7]
- ix. System displays a message confirming successful account creation. The user is now logged in.
- x. After 10 seconds or when the user clicks a link to do so immediately, the user is navigated out of the create account use case as specified in General Behaviour.

(d) Alternate Flows:

- A1 User navigates elsewhere on the website, through their browser or the “home” button. Unless the page they attempt to visit requires authentication, this simply drops them out of the use case.
- A2 User clicked “Submit” before filling in all fields on the account creation page. System does not leave the page, and displays the message “All fields must be completed to continue.”

- A3 User entered a user name, email, or password that does not meet requirements. See “special requirements”. System does not leave the page, and displays the message “Please check guidelines for account creation, one or more fields were not acceptable.”
- A4 User entered different text in the Password and Confirm Password fields on the account creation page. System does not leave the page, and displays the message “Password confirmation failed; please re-type it.”
- A5 System fails to connect to database. Display the message “Database unavailable; we are sorry for the inconvenience. Please try again later.” Then return the user to the page they entered the use case from.
- A6 User entered an email already present in the database on the account creation page. System does not leave the page, and displays the message “Email already registered.”
- A7 System fails to send an email to the entered address. System does not leave the page, and displays the message “Invalid email, please re-type.”
- (e) Pre-conditions:
 - i. System is functional.
 - ii. User is not logged in.
- (f) Post-conditions:
 - i. User is logged in with their new account, or cancelled account creation process.
- (g) Special Requirements:
 - i. Emails must be of the form <name>@<domain>. They are checked for validity when the system attempts to send to them.
 - ii. Names cannot include special characters other than . , ’
 - iii. Passwords must be at least six characters, and must have at least two of the following; letters, numbers, special characters.
- (h) Feature Mapping:
 - i. Levels of Authentication
 - ii. Accounts

5.3 Appointments

1. Name: Select Experiment

- (a) Brief Description: Participant views and selects experiment to join
- (b) Actors: Participant (henceforth “user”)
- (c) Basic Flow:
 - i. User can sort or filter experiment table by date, time, and location.
 - ii. User clicks an experiment. The system navigates them to that experiment’s page.
 - iii. Experiment page: Each experiment has a webpage with its name, description, and a list of timeslots, as well as a button to join the experiment.
 - iv. User reads experiment description and required qualifications.
 - v. User can sort or filter timeslot list.

- vi. User clicks “join experiment” or a timeslot button. This takes them to use case “sign up for experiment”.
- (d) Alternate Flows:
 - A1 User decides to view a different experiment by navigating with their browser or clicking a button on any page. They are returned to the homepage.
- (e) Pre-conditions:
 - i. System is functional.
 - ii. There is at least one experiment currently offered.
- (f) Post-conditions:
 - i. User has clicked “join experiment” or a timeslot button for some experiment.
- (g) Feature mapping:
 - i. Browse Experiments
 - ii. Filter Experiments

2. Name: Sign up for Experiment

- (a) Brief Description: Participant enters data and confirms appointment.
- (b) Actors: Participant (henceforth “user”)
- (c) Basic Flow:
 - i. If the user is not currently logged in, run use case “login”. They must be logged in to continue.
 - ii. Confirmation Page: This page is available only while logged in. It displays experiment name, required qualifications, and a check box for the user to verify they meet those qualifications. There is a list of timeslots. There is a “Confirm Appointment” button. [A2]
 - iii. The user selects a timeslot (or lets the system do it for them if they did so in “Select Experiment”) and checks the check box. [A2]
 - iv. The user clicks the “Confirm Appointment” button. [A1] [A2]
 - v. If there are no problems with the entered data, the system returns the user to the homepage and displays a message informing them of their successful registration. The system will also send an email containing the experiment and timeslot information to the email account used to register.
- (d) Alternate Flows:
 - A1 User attempts to “Confirm Appointment” before selecting a timeslot or checking the check box.
 - A. The system will return them to the confirmation page and inform them of what still needs to be done.
 - A2 User logs out while on the confirmation page. The system will return them to the experiment page.
- (e) Pre-conditions:
 - i. System is functional.
 - ii. User has selected an experiment via the “Select Experiment” use case.
 - iii. The selected experiment has at least one viable timeslot.
- (f) Post-conditions:

- i. Database has added appointment to user and experiment data.
 - ii. (Side effect) user is authenticated.
- (g) Special Requirements:
 - i. N/A
- (h) Feature Mapping:
 - i. Participant Schedule Experiment
 - ii. Notify Participant when Creating Appointment
 - iii. Prevent Scheduling Conflicts (Participant)

5.4 Experiment Management

1. Name: Add Experiment

- (a) Brief Description: Experiments can be created by Administrators and Researchers
- (b) Actors: Administrators and Researchers
- (c) Basic Flow: (user can cancel at any time and follow A1)
 - i. User must click on Add New Experiment link from the Administration “home” page
 - ii. System will display a screen with text boxes to enter experiment name, description, and qualifications, multiple date/time choosers for the schedule times, and a drop down list to specify the length of the schedule slots
 - iii. User must enter the experiment information for name, description, qualifications, and schedule slots
 - iv. User can then begin setting up the schedule times by choosing date, begin, and end time for each slot they want to run the experiment
 - v. User then must save the experiment by clicking the Save button
 - vi. System will then save the experiment to persistent storage and provide the user with confirmation that the experiment was created successfully and redirect user to all experiment view [A2]
- (d) Alternate Flows:
 - A1 User cancels out of creating an experiment
 - A2 Saving an experiment fails
- (e) Pre-conditions:
 - i. User is an Administrator and/or a Researcher and has authenticated
- (f) Post-conditions:
 - i. System will have recorded the experiment or the system will notify the user why the creation of the experiment failed
- (g) Special Requirements:
 - i. End times for each slot must be after begin times.
- (h) Feature mapping:
 - i. Add Experiment

- ii. Prevent Scheduling Conflicts (Administrator)

2. Name: Modify Experiment

- (a) Brief Description: Experiments can be modified by Administrators and Researchers to change all assets of the experiment
- (b) Actors: Administrators and Researchers
- (c) Basic Flow: (user can cancel at any time and follow A1)
 - i. System will display experiment fields (name, description, qualifications, schedule time, schedule slots, and participant list)
 - ii. User will click on desired field to modify [A3]
 - iii. System will allow field that user chooses to be editable in line
 - iv. User will then change field as desired and click away from the field or save when finished
 - v. System will update the database with the modified experiment information [A2] [A3]
- (d) Alternate Flows:
 - A1 User cancels out of creating an experiment. System will return user to the page where user came from
 - A2 Saving an experiment fails
 - A3 User deletes an experiment. System will remove experiment from database after user confirmation and display a message to the user indicating this was successful
- (e) Pre-conditions:
 - i. User is an Administrator and/or a Researcher and has authenticated
 - ii. User chose experiment through one of the experiment views
- (f) Post-conditions:
 - i. System will have recorded the modifications to the experiment or the system will notify the user why the modification of the experiment failed
- (g) Special Requirements:
 - i. End times for each slot must be after begin times.
- (h) Feature mapping:
 - i. Modify Experiment
 - ii. Remove Experiments
 - iii. Prevent Scheduling Conflicts (Administrator)

5.5 Reports

1. Name: List Experiment Participants

- (a) Brief description: Researcher logs in and views a list of all participants for a selected experiment.
- (b) Actors: Researcher
- (c) Basic flow:
 - i. (1) Researcher logs in, using the Login use case with a Researcher account
 - ii. (2) System displays table of researcher's experiments [A1]

- iii. (3) Researcher selects experiment from table
 - iv. (4) System displays list of all participants for selected experiment
- (d) Alternate flows:
 - A1 Researcher does not own any experiments
 - A. (2) displays an empty table
 - B. He cannot proceed past (2) until he creates an experiment or is added to another researcher's
 - i. Selected experiment has no participants
 - A. (4) displays an empty table
 - B. Nothing is displayed in (4) until a participant signs up for the selected experiment
- (e) Pre-conditions
 - i. System is running
 - ii. System is in ready state
 - iii. Researcher has account with correct permissions/groups
- (f) Post-conditions
 - i. Researcher knows who is signed up to participate in his selected experiment or there are no experiments/participants
- (g) Special Requirements:
 - i. N/A
- (h) Feature mapping:
 - i. Experiment Participants

2. Name: Cancel Experiment Appointment

- (a) Brief description: Participant logs in and cancels an appointment.
- (b) Actors: Participant (User)
- (c) Basic flow
 - i. (1) Participant logs in
 - ii. (2) System displays table of participant's appointments [A1]
 - iii. (3) Participant selects appointment from table
 - iv. (4) System displays details for selected appointment
 - v. (5) Participant selects cancel
 - vi. (6) System displays confirmation prompt
 - vii. (7) Participant selects confirm: appointment is marked cancelled and system returns to (2) with an affirmation message
 - viii. (8) Participant selects keep appointment: system returns to (4)
- (d) Alternate flows
 - A1 Participant has no appointments
 - A. (2) displays an empty table

- B. He cannot proceed past (2) until he signs up for an experiment
- (e) Pre-conditions
 - i. System is running
 - ii. System is in ready state
 - iii. Participant has account
- (f) Post-conditions
 - i. Participant cancelled selected appointment or participant cancelled operation
 - ii. Researcher(s) owning said appointment's experiment are notified via email
- (g) Special Requirements:
 - i. N/A
- (h) Feature mapping:
 - i. Cancel Experiment Appointment
 - ii. Notify Participant Appointment Cancellation Reminder

3. Name: Report Experiment Participant Lists

- (a) Brief Description: When the user is a researcher, the user will be able to export a CSV file, filed with the Experiment name and participant and times.
- (b) Actors: Researcher
- (c) Basic Flow:
 - i. The researcher will check what experiments to export to the CSV file from the list of experiments in the researcher side view
 - ii. The researcher will click "Export to CSV [A1]
 - iii. The system will generate a CSV file from the selected experiment displaying the name of the experiment and the names of participants with their times [A2] [A3]
 - iv. The system will then start the download of the file to the researcher's computer [A4] [A5]
 - v. When the system has completed 3 and 4, the system will display a message box Export Complete!
 - vi. The researcher will click "OK or the exit button on the message box
 - vii. The system will return to the researcher side view.
- (d) Alternative Flow:
 - A1 The researcher did not select any experiment. An error window will appear.
 - A2 The system encounters an error when pulling data from the database. An error window will appear
 - A3 The system encounters any error when creating the CSV file. An error window will appear
 - A4 The system cannot download the file to the researcher's computer. An error window will appear
 - A5 The researcher will deny the download of the CSV. A message box will appear
 - A6 The user exits the browser
- (e) Preconditions:

- i. The researcher must be logged in as a researcher
 - ii. The system is in the researcher side view
 - iii. The researcher must already have experiments scheduled
 - (f) Postconditions:
 - i. The system is back in the researcher side view
 - (g) Feature mapping:
 - i. Export Experiment Participant List
- 4. Name: Calendar/List of All Experiments**
- (a) Basic Description: The list will show all ongoing experiments and will allow for a user to click and view more information on the experiment
 - (b) Basic Flow:
 - i. The system displays all experiments that have not yet occurred [A1]
 - ii. The user can scroll down the list
 - iii. The user selects an experiment, as per use case Select Experiment
 - (c) Alternative Flow:
 - A1 There are no experiments to display. In this case, there is nothing to show the user, and no experiment can be selected.
 - (d) Preconditions:
 - i. The user is on the web page
 - (e) Postconditions:
 - i. The system is showing an experiment or the browser is on a new page
 - (f) Feature mapping:
 - i. All calendar Experiments
 - ii. Browse Experiments
 - iii. Persistent Experiment Storage

6 Test Cases

6.1 Experiments

6.1.1 List Experiment Participants

Conditions:

- A Researcher does not own any experiments
- B Selected experiment has no participants

Test Case	Scenario	Description	Cond A	Cond B	Expected Result
1	1	Basic flow	I	I	System displays list of all participants for selected experiment
2	2	Alternate flow: Researcher does not own any experiments	V	N/A	System displays an empty table of experiments
3	3	Alternate flow: Selected experiment has no participants	N/A	V	System displays an empty table of participants

6.1.2 Cancel Experiment Appointment

Conditions:

- A Participant selects confirm
- B Participant selects cancel
- C Participant has no appointments

Test Case	Scenario	Description	Cond A	Cond B	Cond C	Expected Result
1	1	Basic flow: Participant selects confirm	V	I	I	Appointment is marked cancelled and system returns with an affirmation message
2	1	Basic flow: Participant selects cancel	I	V	I	System returns user to page they came from
3	2	Alternate flow: Participant has no appointments	N/A	N/A	V	System displays an empty table of appointments

6.2 Experiment Management

6.2.1 Add Experiment

Conditions:

A Experiment information (includes name, description, qualifications, date/time schedule, and slot length) - Must check each combination

Test Case	Scenario	Description	Cond A	Expected Result
1	1	Basic flow: Administrator enters experiment information	V	Experiment is created and user is notified that creation of experiment was successful
2	2	Basic flow: Administrator enters experiment information	I	Experiment is not created and user is notified of invalid field entry and the corresponding field
3	3	Alternate flow: Administrator tries to save experiment	N/A	System notifies user that the save failed and returns user to Add Experiment page with pre-filled values
4	4	Alternate flow: Administrator clicks cancel	N/A	System returns user to page they came from

6.2.2 Modify Experiment

Conditions:

A Experiment information (includes name, description, qualifications, date/time schedule, and slot length) - Must check each combination

Test Case	Scenario	Description	Cond A	Expected Result
1	1	Basic flow: Administrator enters experiment information	V	Experiment information is updated and user is notified that modification of the experiment was successful
2	2	Basic flow: Administrator enters experiment information	I	Experiment information is not updated and user is notified of invalid field entry and the corresponding field
3	3	Alternate flow: Administrator tries to save experiment	N/A	System notifies user that the save failed and returns user to Add Experiment page with pre-filled values
4	4	Alternate flow: Administrator clicks cancel	N/A	System returns user to page they came from
5	5	Alternate flow: Administrator deletes the experiment	N/A	System notified the user that the experiment has been deleted and returns user to experiment management page

6.3 Authentication

6.3.1 Login

Conditions:

A Email entered and in database

B Password entered and matches email in database

Test Case	Scenario	Description	Cond A	Cond B	Expected Result
1	Any page	Basic flow: User clicks "login/create account" link from any page.	N/A	N/A	System navigates user to login page.
2	Login page	Alternate flow: User clicks "submit" button.	I	N/A	System navigates user to create account page (see test cases for Account Creation).
2	Login page	Alternate flow: User clicks "submit" button.	V	I	System displays message informing user their password is incorrect.
3	Login page	Basic flow: User clicks "submit" button.	V	V	System displays message confirming successful login.
4	Success message	Basic flow: User clicks "return immediately" link.	N/A	N/A	System takes down success message and navigates back to initial page.
5	Success message	Alternate flow: 10 seconds pass after message displayed.	N/A	N/A	System takes down success message and navigates back to initial page.

6.3.2 Logout

Test Case	Scenario	Description	Expected Result
1	Any page	Basic flow: User clicks "logout" link from any page.	System displays message confirming successful logout.
2	Logout message	Basic flow: User clicks "return immediately" link.	System takes down logout message.
3	Logout message	Alternate flow: 10 seconds pass after clicking "logout" .	System takes down logout message.

6.3.3 Create Account

Conditions:

- A Email entered and is not in database
 - i. Emails must be of the form <name>@<domain>
- B Password entered and follows guidelines
 - i. Password guidelines: must be at least six characters, containing at least two of the following character types: letters, numbers, special characters.
- C Confirm password entered and matches password
- D User name entered and follows guidelines
 - i. User name guidelines: Names cannot include any special characters other than periods, commas, and apostrophes.

6.4 Appointments

6.4.1 Select Experiment

6.4.2 Sign up for Experiment

Conditions:

- A User logged in
- B User has clicked check box and selected valid timeslot

Test Case	Scenario	Description	Cond A	Cond B	Cond C	Cond D	Expected Result
1	Any page	Basic flow: User clicks “login/create account” link from any page.	N/A	N/A	N/A	N/A	System navigates user to login page.
2	Login page	Basic flow: User clicks “create account” button.	N/A	N/A	N/A	N/A	System navigates user to create account page.
3	Login page	Alternate flow: User clicks “submit” button.	V	N/A	N/A	N/A	System navigates user to create account page.
4	Create account page	Alternate flow: User clicks “submit” button.	I	N/A	N/A	N/A	System displays message informing user that email is already in use.
5	Create account page	Alternate flow: User clicks “submit” button.	V	I	N/A	N/A	System displays message informing user that password does not meet guidelines.
6	Create account page	Alternate flow: User clicks “submit” button.	V	V	I	N/A	System displays message informing user that password and confirmation do not match.
7	Create account page	Alternate flow: User clicks “submit” button.	V	V	V	I	System displays message informing user that name does not meet guidelines.
8	Create account page	Basic flow: User clicks “submit” button.	V	V	V	V	System displays message confirming successful account creation.
9	Success message	Basic flow: User clicks “return immediately” link.	N/A	N/A	N/A	N/A	System takes down success message and navigates back to initial page.
10	Success message	Alternate flow: 10 seconds pass after message displayed.	N/A	N/A	N/A	N/A	System takes down success message and navigates back to initial page.

Test Case	Scenario	Description	Expected Result
1	Home page	Basic flow: User clicks an experiment from the table.	System navigates user to that experiment’s page.
2	Experiment page	Basic flow: User clicks “join experiment”.	System navigates to appointment page (see Sign Up for Experiment).
3	Experiment page	Alternate flow: User selects a timeslot.	System navigates to appointment page (see Sign Up for Experiment) with timeslot information.

Test Case	Scenario	Description	Cond A	Cond B	Expected Result
1	Appointment page	Alternate flow: User is on appointment page.	I	N/A	System navigates user to login page.
2	Appointment page	Basic flow: User is on appointment page.	V	N/A	Selected timeslot from experiment page already selected.
3	Appointment page	Alternate flow: User clicks “confirm appointment” button.	V	I	System informs user they must complete the form.
4	Appointment page	Basic flow: User clicks “confirm appointment” button.	V	V	System displays message confirming successful appointment.
5	Success message	Basic flow: User clicks “return immediately” link.	N/A	N/A	System takes down success message and navigates back to home page.
6	Success message	Alternate flow: 10 seconds pass after message displayed.	N/A	N/A	System takes down success message and navigates back to home page.

6.5 Reports

6.5.1 Export Participants

Test Case	Scenario	Description	Precondition	Expected Results
1	Export Experiment Participant List	Basic Flow: The researcher clicks Export to CSV	There are no experiments checked	Error box asking the user to select an experiment
2	Export Experiment Participant List	Basic Flow: The researcher clicks Export to CSV	There are experiments checked	The system generates a CSV file
3	Export Experiment Participant List	Basic Flow: The system starts the download of the file	The CSV creation succeeded	The file downloads and a message box is displayed "Export Complete"
4	Export Experiment Participant List	Alternate Flow: An Error occurs when pulling from the database	The researcher has selected experiments and Clicked Export CSV	The system displays an error message
5	Export Experiment Participant List	Alternate Flow: The system cannot download the file to the researchers computer	The CSV creation succeeded and the download has started	The system displays an error message
6	Export Experiment Participant List	Alternate Flow: The researcher denies the download of the CSV	The CSV creation succeeded and the download has started	The system displays a message box

7 Usability Report

7.1 Process

In order to conduct the usability study, our team used the human computer interaction experts at the University of Wisconsin-Madison HCI Lab. Our client contacted 5 experts and they reviewed our prototype system. Before the experts could review our system, they had to agree to an Informed Consent Form that is included below. A list of tasks was then provided to the experts with instructions to fill out a questionnaire on Google Documents. The questionnaire included the Informed Consent Form at the top of the form and by submitting the questionnaire the experts were agreeing to the terms of the Informed Consent Form. The specific instructions given to the experts are included below as well. Once the experts had completed the tasks, they filled out the questionnaire here <https://docs.google.com/spreadsheets/viewform?formkey=dExyUjl2cGJiMUlfb0dfMkFNT1k1UEE6MQ> and the questions have been copied below. This process proved to be useful since we did not have to find a common meeting time for everyone and the experts could complete the tasks on his or her own time.

7.1.1 Informed Consent Form

Please read this informed consent document carefully before you decide to participate in this study.

The purpose of this study is to analyze and test the design of the proposed Participant Scheduling System for use at the Human-Computer Interaction Lab at the University of Wisconsin in Madison (henceforth HCI lab).

This study is being conducted by Trey Cahill, Chris Gropp, Samad Jawaaid, and Kevin Ridsen, with additional support from Sriram Mohan, Jimmy Theis, and Allie Terrell (henceforth the study organizers). No other persons or agencies will assist in this study or be allowed access to any identifying information.

This study is confidential; your name and specific responses will not be available to anyone outside of the study organizers. Only aggregate information will be available to the general public, and your name will not be released in any capacity (as part of a list or otherwise) to anyone outside of the study organizers.

Your specific responses and any identifying information will be destroyed no later than June 2012, even amongst the records of the study organizers.

Your participation in this study is entirely voluntary. You may refuse to answer any questions posed, and may choose to stop participating at any time.

If you have questions about the study, please contact Kevin Ridsen by email at risdenkj@rose-hulman.edu

Your completion and submission of the questionnaire indicates your consent to participate in this study under the terms stated above.

7.1.2 Expert Instructions

Thanks so much for agreeing to help out with this usability study. As you saw in my previous email, this is for the participant scheduling system for the lab and is being completed as part of a class project by a team of students from my undergraduate school. Kevin Ridsen (who is heading the team working on this) is CCed on this email - please feel free to email him with any questions (CC me), or if you have further comments after completing the study.

The study should take about 30 minutes to complete - instructions are below this message. Note that there is a feedback form as well via Google Docs. Since this is part of a class, the team needs your responses by Thursday morning so they can complete their milestone. Additionally, I will be out of town all day Thursday. I've asked Kevin to send out a reminder email if he doesn't have all of the responses by then.

Keep in mind that this is a prototype - their winter quarter will be spent developing the working system. So, provide constructive feedback for the team, particularly regarding the design and functionality.

Prototype: <http://pss.csse.rose-hulman.edu/>

Below is a provided username and password to use to login to the system.

Username: aterrell

Password: temp123

Before attempting to complete the tasks below, spend a few minutes exploring the system to gain an understanding of it.

As a HCI Lab Researcher, here is the list of tasks to complete:

- Login
- Add Experiment
- Modify Experiment
- Experiment Time and Date Range
- Delete Experiment

Please complete a feedback form at <https://docs.google.com/spreadsheet/viewform?formkey=dExyUjl2cGJiMUlfb0dfMkFNT> as you proceed through the tasks.

Limitations:

Signup will not work due to verification emails not being allowed outside the Rose-Hulman Institute of Technology firewall.

7.1.3 Questionnaire

Task Review Questionnaire

Please read this informed consent document carefully before you decide to participate in this study.

The purpose of this study is to analyze and test the design of the proposed Participant Scheduling System for use at the Human-Computer Interaction Lab at the University of Wisconsin in Madison (henceforth HCI lab).

This study is being conducted by Trey Cahill, Chris Gropp, Samad Jawaid, and Kevin Ridsen, with additional support from Sriram Mohan, Jimmy Theis, and Allie Terrell (henceforth the study organizers). No other persons or agencies will assist in this study or be allowed access to any identifying information.

This study is confidential; your name and specific responses will not be available to anyone outside of the study organizers. Only aggregate information will be available to the general public, and your name will not be released in any capacity (as part of a list or otherwise) to anyone outside of the study organizers.

Your specific responses and any identifying information will be destroyed no later than June 2012, even amongst the records of the study organizers.

Your participation in this study is entirely voluntary. You may refuse to answer any questions posed, and may choose to stop participating at any time.

If you have questions about the study, please contact Kevin Ridsen by email at risdenkj@rose-hulman.edu

Your completion and submission of the questionnaire indicates your consent to participate in this study under the terms stated above.

Please fill out this survey for each task you are asked to complete.

* Required

Name: *

Log In

What is the Task? *

- ☐ Log In
- ☐ Create Experiment
- ☐ Modify Experiment
- ☐ Select Time and Date range for the experiment
- ☐ Delete Experiment

The screens are well designed: *

- ☐ Strongly Disagree

- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly Agree

Are there any areas of the screen that need improvement?

Are there any areas of the screens that were well done?

Create Experiment

What is the Task? *

- ☐ Log In
- ☐ Create Experiment
- ☐ Modify Experiment
- ☐ Select Time and Date range for the experiment
- ☐ Delete Experiment

The screens are well designed: *

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly Agree

Are that any areas of the screen that need improvement?

Are there any areas of the screens that were well done?

Modify Experiment

What is the Task? *

- ☐ Log In
- ☐ Create Experiment
- ☐ Modify Experiment
- ☐ Select Time and Date range for the experiment
- ☐ Delete Experiment

The screens are well designed: *

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly Agree

Are that any areas of the screen that need improvement?

Are there any areas of the screens that were well done?

Select Experiment Dates and Times

What is the Task? *

- ☐ Log In
- ☐ Create Experiment
- ☐ Modify Experiment
- ☐ Select Time and Date range for the experiment
- ☐ Delete Experiment

The screens are well designed: *

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly Agree

Are that any areas of the screen that need improvement?

Are there any areas of the screens that were well done?

Delete Experiment

What is the Task? *

- ☐ Log In
- ☐ Create Experiment
- ☐ Modify Experiment
- ☐ Select Time and Date range for the experiment
- ☐ Delete Experiment

The screens are well designed: *

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly Agree

Are that any areas of the screen that need improvement?

Are there any areas of the screens that were well done?

For All Tasks

List and explain any design flaws that you have found

Are there any areas that "annoy" you?

General Comments:

Submit

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7.2 Analysis

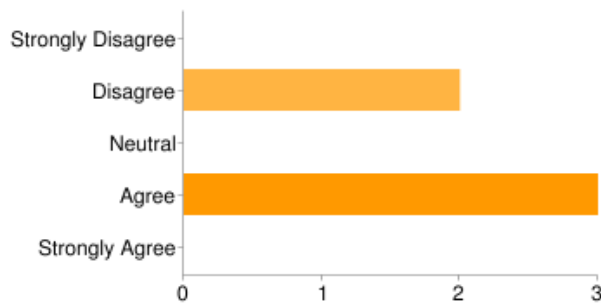
Using the Google Documents form and corresponding spreadsheet provided a convenient way to aggregate the data and analyse it. The raw data was downloaded from Google Docs in Excel format and then the analysis of each task was done following the general structure outlined here:

- A bar chart showing the number of each type of response for how well the screen was designed.
- The answers for the how well screen(s) were designed question were given a numerical value. Strongly disagree was given a 1, disagree a 2, neutral a 3, agree a 4, and strongly agree a 5. These scores were averaged to give an overall score for how well each task was designed in terms of the screens.
- Common themes for the two open ended questions were identified.

The three open ended questions at the end of the questionnaire relating to the overall feel of the system were each analysed for common themes. Based on the feedback from each participant, follow-up questions were generated in order to gain more specific information.

7.2.1 Login

The screen was well designed



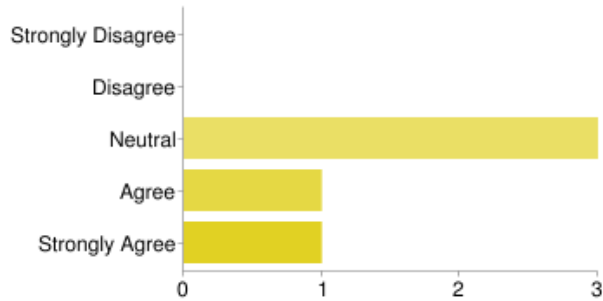
Average Score: 3.2

Common Themes:

- Positive
 - Simple
 - Clean
 - Straightforward
- Negative
 - Main page needs more content

7.2.2 Add Experiment

The screen was well designed



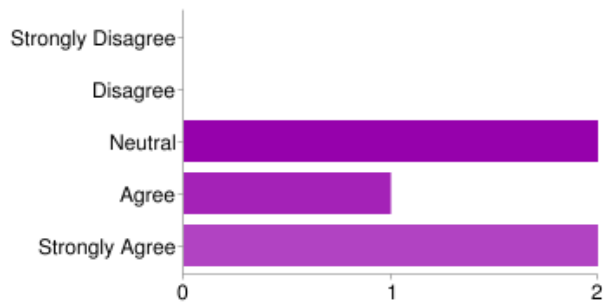
Average Score: 3.6

Common Themes:

- Positive
 - Intuitive
 - Style of page/buttons
- Negative
 - Combine Add Experiment with Date/Time Range selection
 - Add Save button to top of page

7.2.3 Modify Experiment

The screen was well designed



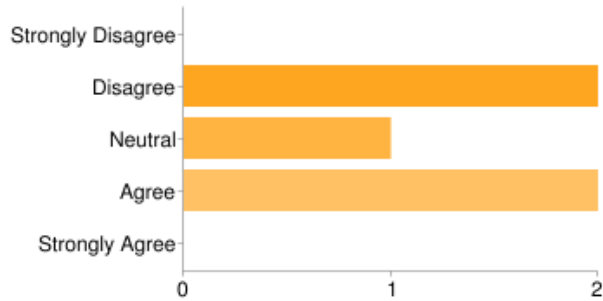
Average Score: 4

Common Themes:

- Positive
 - Easy to use
 - Straightforward
- Negative
 - Combine Add Experiment with Date/Time Range selection
 - Modify button on list experiments page

7.2.4 Experiment Time and Date Range

The screen was well designed



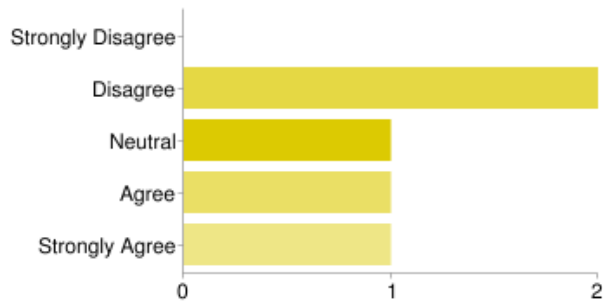
Average Score: 3

Common Themes:

- Positive
 - Entering time is clear and simple
- Negative
 - Combine Add Experiment with Date/Time Range selection
 - Use Google Calendar type interface
 - Cannot range over multiple days at once
 - Forced to use widget to enter time

7.2.5 Delete Experiment

The screen was well designed



Average Score: 3.2

Common Themes:

- Positive
 - Confirmation before actually deleting
- Negative
 - Add delete ability to list all experiments page
 - Delete button hidden

7.3 Findings

The analysis of the usability study provided some results that were expected due to the level of the prototype, but also some results that were unexpected. Overall findings are listed first followed by the findings broken out into the tasks the experts completed.

7.3.1 Overall

The experts' opinions in general showed that the prototype showed promise and the parts that were completed had only some minor issues. For each task, the average score was at or above 3 meaning that the experts either were neutral or agreed with our design. The biggest issue was the separation of experiment length and date from the experiment time slot creation. Aside from that, the minor issues included not having a meaningful home page, changing the colours of the delete experiment button, and providing indication in the top navigation bar as to what page you are on. Many of the changes suggested were already on the roadmap to be completed in the next revision. This shows that our product is on the right track and that we have done a good job relating to usability this far.

7.3.2 Login

The overall sentiment showed that the experts liked the simplicity of the home page and login page. The other suggestion was that the home page should provide information about the lab, which is planned for a later version when the experiments are displayed on the home page for participants to choose from. With the overall average rating being a 3.2, the experts were close to neutral due to the lack of content on the home page, but this was planned to be changed when more of the system is implemented.

7.3.3 Add Experiment

The comments for the Add Experiment question suggested that the division of creating an experiment and the time slots separately was a bad design. This should be integrated into one screen since the two activities are related. The ability to add rooms, qualifications, and researchers while creating an experiment is a feature that was missing from the initial prototype but is on the radar to be completed in the next revision. This hurt the usability since the experts could not create a new room or add a qualification. One comment related to not knowing what a qualification was and we attribute this to not using the same terminology when they create an experiment. If this is a common theme with later studies, we may look into changing the wording. The positive attributes of the Add Experiment task was that it was straightforward and that the interface had a nice pleasing layout to the eye.

7.3.4 Modify Experiment

Much of the feedback for Modify Experiment mirrored the Add Experiment feedback since they were similar in the page design. Since the two designs are similar the fixes for Add Experiment will also apply to the Modify Experiment task. There was some more positive feedback for the Modify Experiment page such as providing a green line when modifying the experiment was a good indicator. Another good design feedback was that the experts liked the modify button the side of the experiment list. On the downside, the delete button was too hidden and hard to find when needed. The next revision plans to fix the delete button issue and is addressed more in the Delete Experiment task.

7.3.5 Experiment Time and Date Range

The Experiment Time and Date Range had varied feedback since some users liked the use of military time for entering the time but others wanted a Google Calendar type approach to entering the time. In addition

to this, some of the experts wanted the ability to type in a date and time instead of being forced to use the calendar and time widgets. The important critical feedback we received was that the experts did not like having the Experiment Time and Date Range task separate from the Create/Modify Experiment task. They felt that this is the same task and should be handled on one screen instead of two separate screens. This feedback means that we need to redesign how the time and date ranges are chosen for our next releases of the prototype.

7.3.6 Delete Experiment

The major issue pointed out during the Delete Experiment task was that the delete button was hard to impossible to find. It did not match the look and feel of the other buttons on the site and this made it a difficult button to find. The experts felt that button should be more subtle than the save button but still fit the look and feel of the other buttons. Another suggestion was to include a way to delete experiments from the experiment list instead of having to open an experiment first. The positive feedback was that deleting an experiment was straightforward once the delete button was found. The next revision was planned to redesign the way the delete button worked so now we know how the delete button should be redesigned based on the expert feedback.

8 Who Did What

Who	Section / Part Completed	Task / Comments	Effort
Trey	Document	Put together entire Document from Parts	.5 hours
Katie	Document	Review Document and requirements	.3 hours
Samad	Document	Review Document and requirements	.3 hours
Kevin	Document	Review Document and requirements	.3 hours

9 References

- [1] University of Wisconsin-Madison. Human-Computer Interaction Laboratory, 2010.

10 Appendix

Index

Human-Computer Interaction Lab, 3