Lab Manual

CSC356-Human Computer Interaction

CUI

Department of Computer Science
Islamabad Campus

Lab Contents:

Identifying Design Flaws; Re-Design; PACT Analysis; Assessible Design; Conceptulizing Interaction; Surveys; Interviews; Qulaitative Analysis; Personas & Scenarios; Prototyping & Storyboarding; Expert Evaluation; Hi-Fiedelity Prototypes; User Evaluation; and Controlled Experiments

Student Outcomes (SO)

S.#	Description
2	Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines
3	Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations
4	Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations
5	Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings.
9	Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional

Intended Learning Outcomes

Sr.#	Description	Blooms Taxonomy Learning Level	SO
CLO -6	Create an interactive design using latest human-centered approaches.	*Creating*	2-5,9

Lab Assessment Policy

The lab work done by the student is evaluated using Psycho-motor rubrics defined by the course instructor, viva-voce, project work/performance. Marks distribution is as follows:

Assignments	Lab Mid Term Exam	Lab Terminal Exam	Total
25	25	50	100

Note: Midterm and Final term exams must be computer based.

List of Labs

Lab 01

Design Flaws

Objective:

The purpose of this lab is to introduce students with the basics of software interface designing.

Activity Outcomes:

The expected outcome of this lab activity is students' ability to:

- Critically look at interface design of any system
- Identify problems in system interface design
- Differentiate between good and bad interface design

Instructor Note:

Go through Chapter 1 of "The Design of Everyday Things" by Don Norman.

1) Solved Lab Activites

Sr.No	*Allocated Time*	*Level of Complexity*	*CLO Mapping*
Activity 1	*20 mins*	*Low*	*CLO-6*

Activity 1

The following homepage (Figure 1.1) is an example of bad design. Think about the reasons why it is not considered to be a good design. Discuss the given design in detail and discuss what is wrong with it.

Figure 1.1: Homepage of Havenworks.com

Solution:

- Too much Clutter
- Content is not organized in a useful way.
- The header has many useless headings.
- No proper spacing is provided which makes it hard to read
- No distinct color scheme

2) Graded Lab Tasks

Note: The instructor can design graded lab activities according to the level of difficult and complexity of the solved lab activities. The lab tasks assigned by the instructor should be evaluated in the same lab.

Lab Task 1

Figure 1.2 is a screenshot of a desktop application in which you can select a certificate template and then print it. To select a template, you go through the scroll bar and then choose the template that you like. Discuss if this is a good design, if not what are some of the main problems with the design. Think about a situation where you like a design and print one certificate and then later you come back to print the same certificate. How easy or difficult would it be to re select the same design that you have already chosen before.

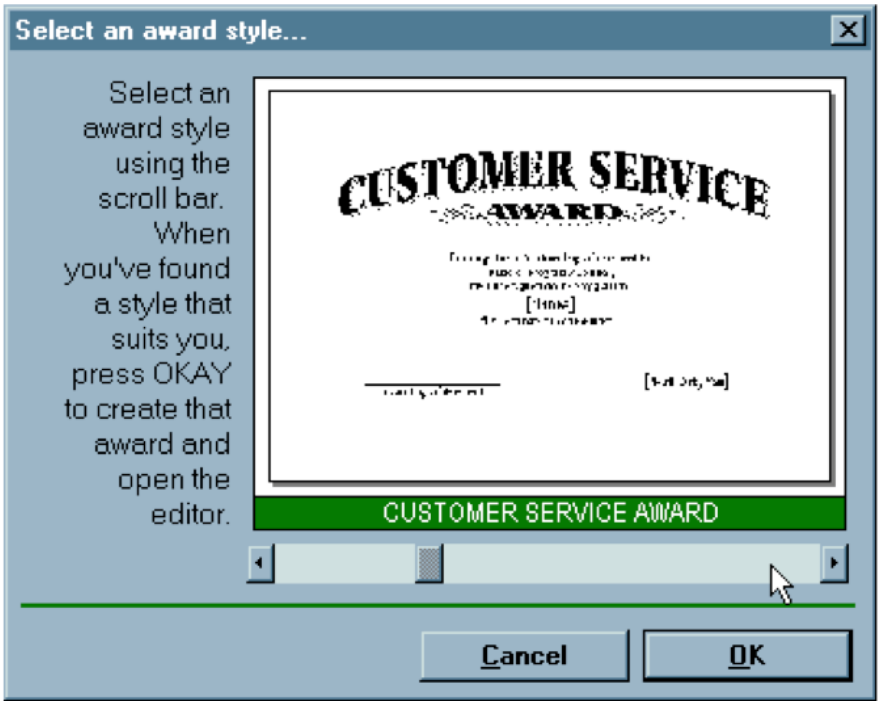


Figure 1.2: Desktop Application for Certificate Printing

Lab Task 2

The following screenshots (Figure 1.3 to 1.6) of Dominos website are related to placing order followed by the checkout. Please note that a registered customer (of the website) is performing this task.

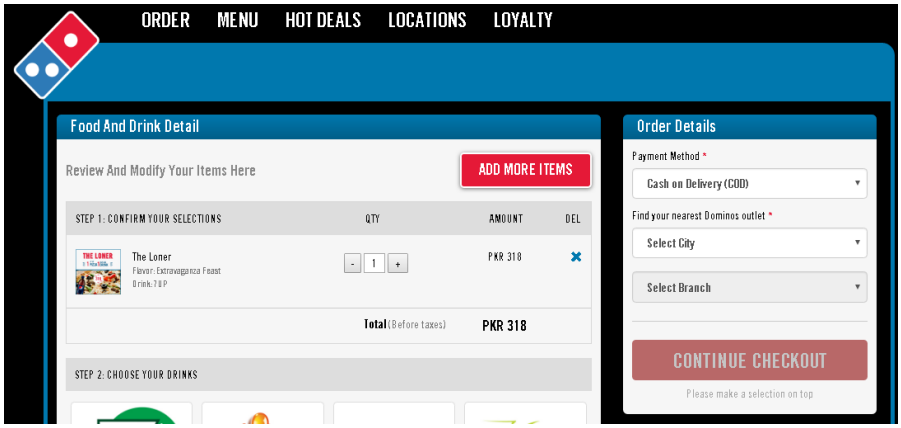


Figure 1.3: Checkout Page

After choosing the city and branch, it displays the further option (Figure 1.4).

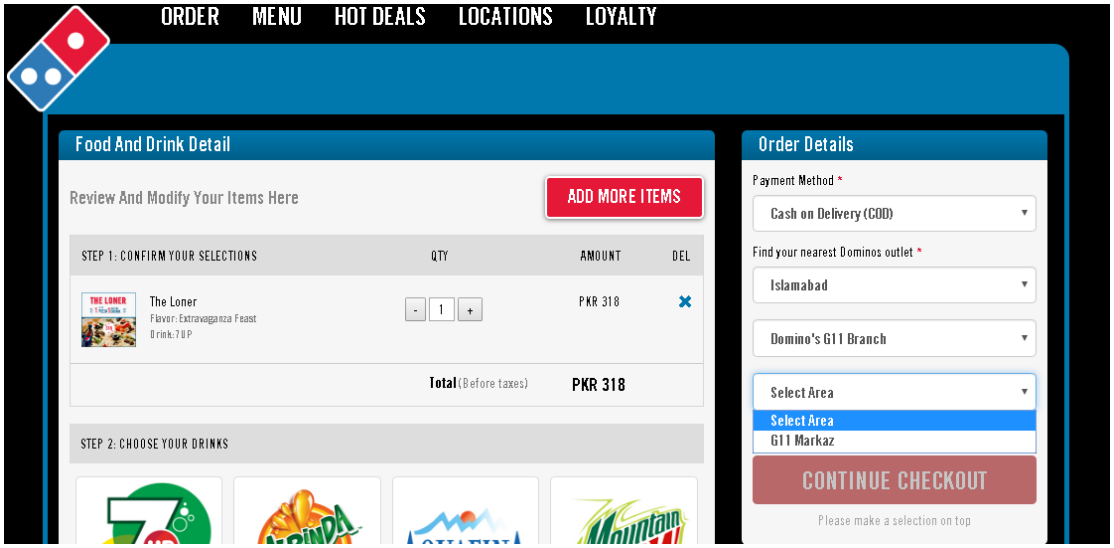


Figure 1.4: City and Branch Option

On the next step, the user is asked for the further contact information (Figure 1.5).

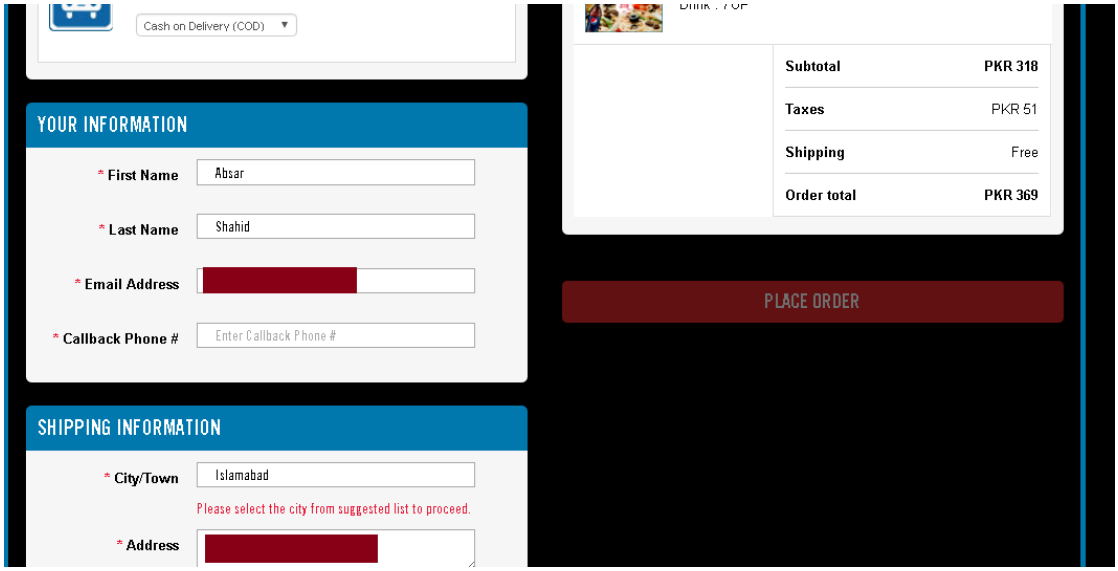


Figure 1.5: Contact Information Option

Address and e-mail address are already filled in. But the user must enter his phone number. Further in city/town, even though Islamabad is already selected but it is not a valid selection, the user must click on it to reveal a drop down menu as shown below (Figure 1.6).

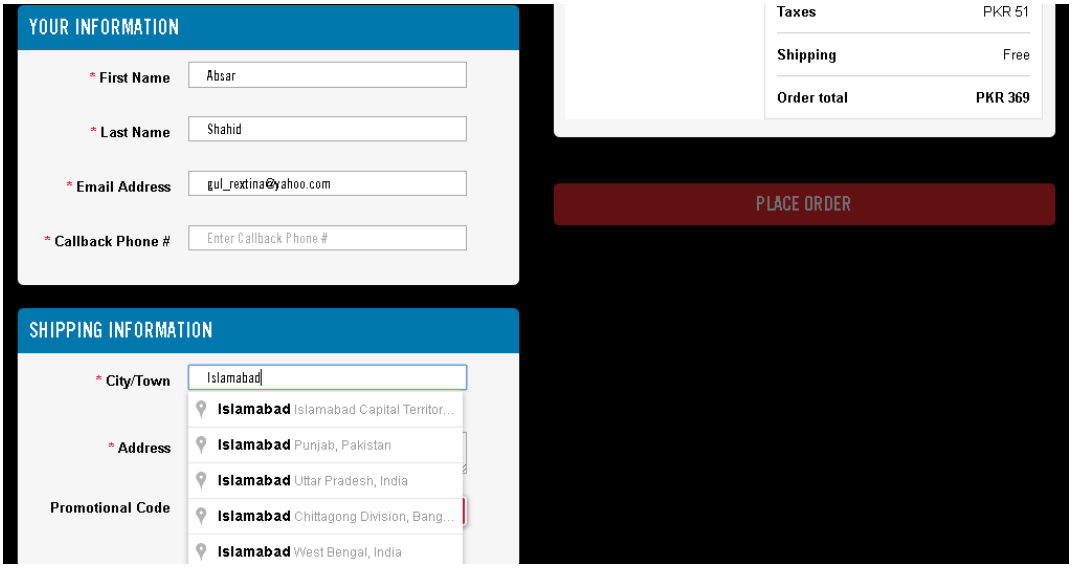


Figure 1.6: Shipping Information

Lab Task 3

You are looking for a bargain to buy some clothes for your niece who is five years old. You are on a budget so you are looking in the sales section.

- *Visit the following website:*

  https://www.minnieminors.com/pages/minnie-minors

You are only allowed to explore the sales section of the website. Go through the process except for checkout and list down the problems that you encountered.

- *Now visit the following and repeat the same process.*
  https://www.ilovehopscotch.com/new-in.html

Which one is better in your opinion in terms of ease of finding what you are looking for (Not the quality of the merchandise)

Lab Task 4:

Compare two university website. Take any website from Pakistan (not CUI) and one from USA. Its, easier to access a system if we have a specific task in mind. So imagine you are going for your masters and you need to make up your mind which degree to get, which website makes it easier to get the information and also which one is simpler in understanding the process of admission. Please include screenshots.

Lab 02
Re-Design

Objective:

The purpose of this lab is to help students redesign the software interfaces discussed in the previous lab session.

Activity Outcomes:

- The expected outcome of this lab activity is the student's ability to:
- Assess a software interface design in general
- Redesign (draw) software interface after identifying the problems

Instructor Note:

Go through Chapter 1 of "The Design of Everyday Things" by Don Norman.

1) Solved Lab Activites

Sr.No	*Allocated Time*	*Level of Complexity*	*CLO Mapping*
Activity 1	*30 min*	*Low*	*CLO-6*

Activity 1

Recalling the discussion (about the homepage, Figure 2.1) done in the previous lab, the task is to redraw this page. The main problem with the given interface is that, too many things are crammed into a little space. This makes it very hard to read and understand.

Figure 2.1: Homepage of Havenworks.com

The key design consideration must be to have clutter free interfaces for better usability.

2) Graded Lab Tasks

Note: The instructor can design graded lab activities according to the level of difficult and complexity of the solved lab activities. The lab tasks assigned by the instructor should be evaluated in the same lab.

Lab Task 1:

Redesign the desktop application (discussed in the previous lab session, Figure 2.2) in which you can select a certificate template and then print it. The main problem with this design is to scroll and no indication is given that how many total designs are present. After choosing a particular design, it is very difficult to choose the same design again.

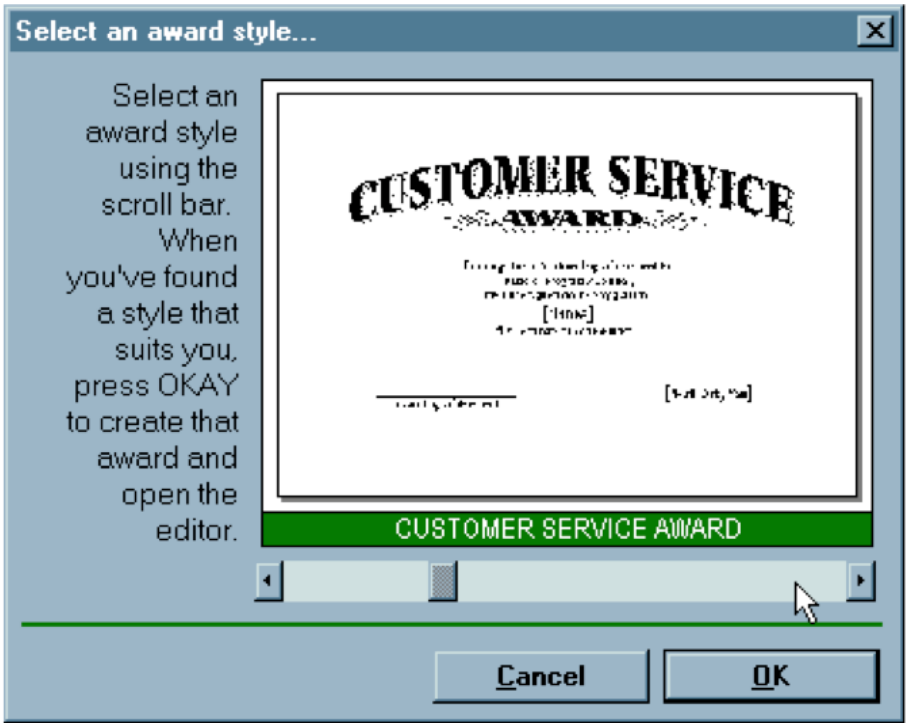


Figure 2.2: Desktop Application for Certificate Printing

There are many possible ways to get a better design. One possibility is to have thumb nails that show the different templates at the same time and we can directly click on one of the templates to choose it. Re selecting the same design a second time then becomes trivial.

Lab Task 2:

We discussed the checkout steps of Dominos website in the previous lab session. Just as a reminder please go through the checkout steps again (Figure 2.3 to 2.6) and improve the design.

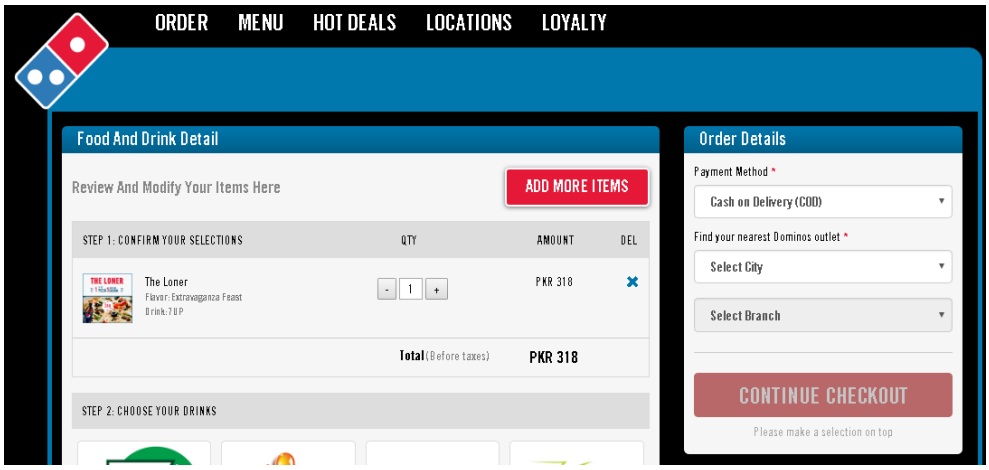


Figure 2.3: Checkout Page

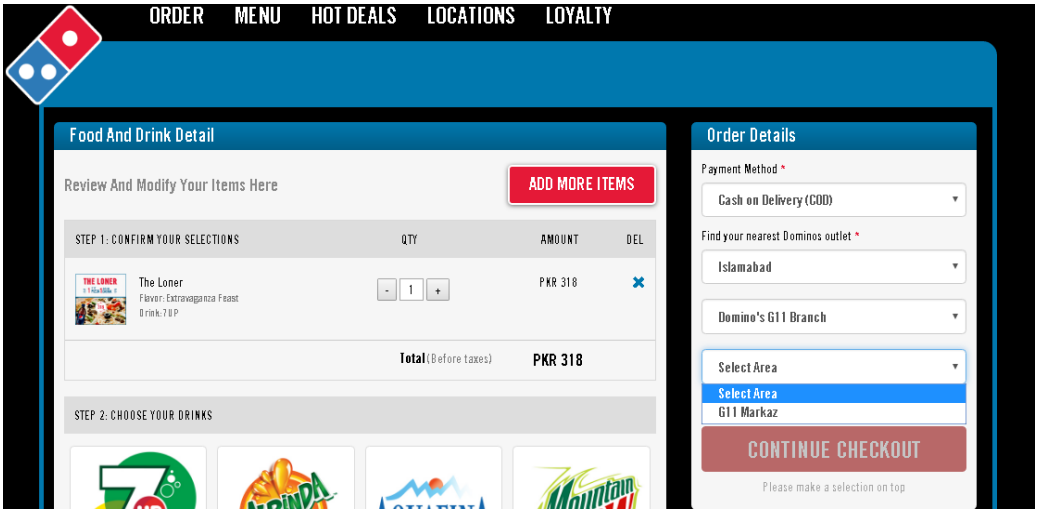


Figure 2.4: City and Branch Option

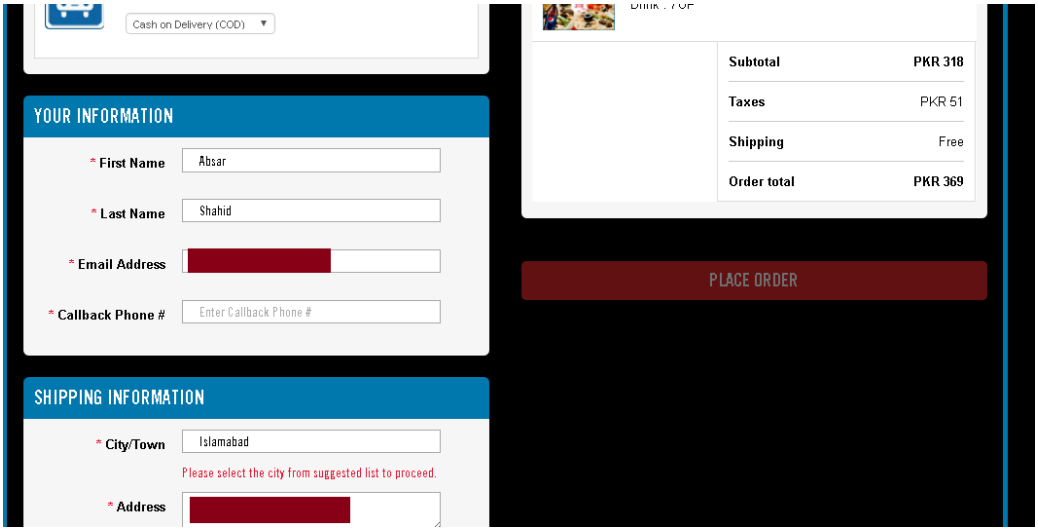


Figure 2.5: Contact Information Option

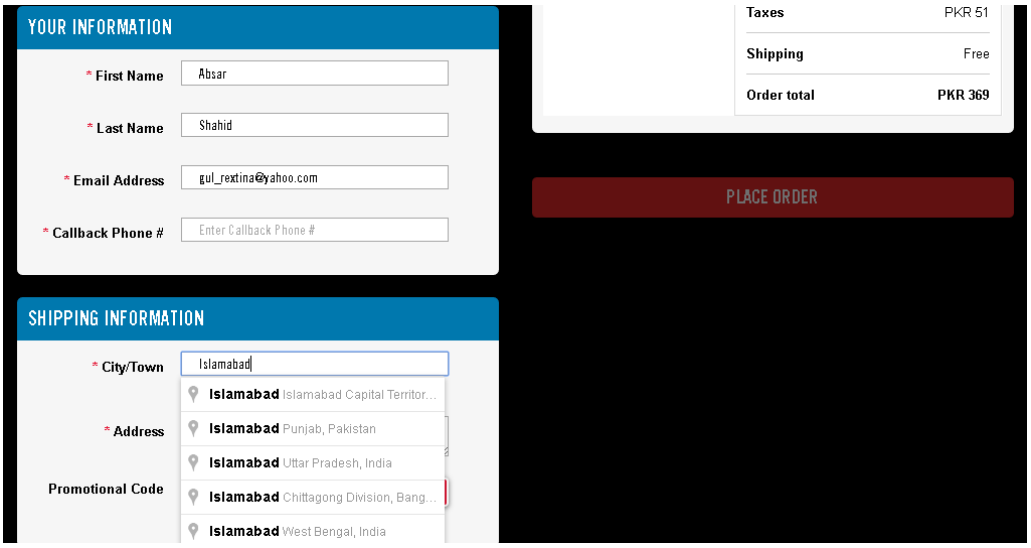


Figure 2.6: Shipping Information

The main flaw in this design is that it keeps asking for the same information again and again. A regular user who has registered would like to be able to order a pizza in minimum number of steps.

In Figure 2.4, the user is asked to again enter the city and branch which is redundant as the user is already registered. However, in order to give the user flexibility in case they want to order from another city, the default city and branch can be already selected but the user can change them if required. Similarly, in Figure 2.5, after choosing a particular branch, another dropdown menu appears to choose area and there is only one option. This dropdown menu can be removed completely.

In Figure 2.6, it is required to re-enter the phone number. This can be again filled in with the saved phone number with the option to change it if there is a need. Finally, the last dropdown menu does not even look like such menu and a user may not even be aware that it needs to be edited before he can proceed to check out. The dropdown menu should give strong visual cue and there is no need to ask for the city again.

Lab Task 3:

If you have a website for kids clothes. What criteria is important for a shoper when they are buying kids clothes. How can you design to show them valuable information as quickly as possible. Sketch out your design.

Lab Task 4:

Redesign (draw) the interfaces of two systems selected in the last lab session (assignment) to improve their design.

Lab 03
PACT Analysis

Objective:

The purpose of this lab is to learn the technique of PACT analysis for any given project.

Activity Outcomes:

The expected outcome of this lab activity is the student's ability to:

- After completing this lab, students will be able to apply this technique to scope out a problem:
- What differences among people are relevant to a given problem?
- What aspects of activities we have to consider for a problem?
- What is the context of use of the problem under consideration?
- Which technologies would be appropriate for the problem under consideration?

Instructor Note:

Go through Lecture Notes

1) Useful Concepts

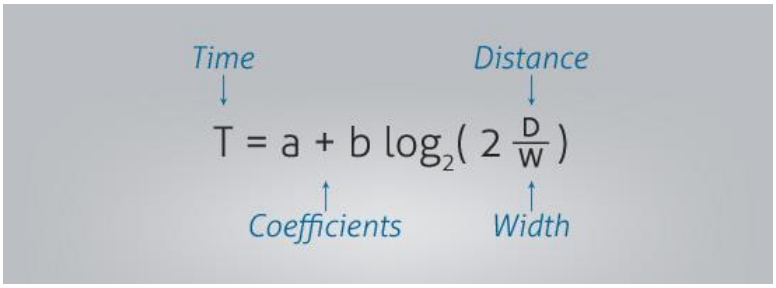
The aim of human-centred interactive systems design is to arrive at the best combination of the PACT elements with respect to a particular domain. Designers want to get the right mix of technologies to support the activities being undertaken by people in different contexts. A PACT analysis is useful for both analysis and design activities: understanding the current situation, seeing where possible improvements can be made or envisioning future situations. To do a PACT analysis the designer simply scopes out the variety of Ps, As, Cs and Ts that are possible, or likely, in a domain. This can be done using brainstorming and other envisionment techniques and by working with people through observations, interviews and workshops.

The designer should look for trade-offs between combinations of PACT and think about how these might affect design. For people, designers need to think about the physical, psychological and social differences and how those differences change in different circumstances and over time. It is most important that designers consider all the various stakeholders in a project. For activities they need to think about the complexity of the activity (focused or vague, simple or difficult, few steps or many), the temporal features (frequency, peaks and troughs, continuous or interruptible), cooperative features and the nature of the data. For contexts they think about the physical, social and organizational setting, and for technologies they concentrate on input, output, communication and content.

Fitts Law:

Interactive systems generally require the user to move to a particular target (button, icon, menu etc.) on a screen. The time required to move the cursor from a given location to a target is a function of target size and the distance to be moved. Fitt's law predicts this movement time as you will see during the course of this lab.

Equation: Fitts Law



2) Solved Lab Activites

Sr.No	*Allocated Time*	*Level of Complexity*	*CLO Mapping*
Activity 1	***15 min***	***Medium***	***CLO-6***
Activity 2	***15 min***	***Medium***	***CLO-6***

Activity 1:

As an example, let us assume that we have been asked by a university department to consider developing a system controlling access to their laboratories. A PACT analysis might include the following.

People

Students, lecturers and technicians are the main groups. These are all well educated and understand things such as swipe cards, passwords and so on. People in wheelchairs need to be considered, as do other design issues such as colour blindness. There may be language differences. Both occasional and frequent visitors need to be considered. However, there are other stakeholders who need access to rooms, such as cleaning staff and security personnel. What are the motivations for
management wanting to control access in the first place?

Activities

The overall purpose of the activity is to enter some form of security clearance and to open the door. This is a very well-defined activity that takes place in one step. It happens very frequently, with peaks at the start of each laboratory session. The data to be entered is a simple numeric or alpha-numeric code. It is an activity that does not require cooperation with others (though it may be done with others, of course). It is not safety-critical, though security is an important aspect.

Contexts

Physically the activity takes place indoors, but people might be carrying books and other things that makes doing anything complicated quite difficult. Socially it may happen in a crowd, but also it may happen late at night when no-one else is about. Organizationally, the context is primarily about security and who has access to which rooms and when they can gain access. This is likely to be quite a politically charged setting.

Technologies

A small amount of data has to be entered quickly. It must be obvious how to do this in order to accommodate visitors and people unfamiliar with the system. It needs to be accessible by people in wheelchairs. The output from the technology needs to be clear: that the security data has been accepted or not and the door has to be opened if the process was successful. Communication with a central database may be necessary to validate any data input, but there is little other content in the application

Activity 2:

PACT Analysis for a Tourism Website

An essential part of our approach to designing the Interactive E-Tourist website is to make it as user-centred as possible. We felt that performing a PACT analysis would be useful for both our analysis and design activities; understanding the current situations, seeing where possible improvements can be made and envisioning future situations.

With the PACT analysis we were able to bring together all our research on our target users and scope out the variety of different people, activities, contexts and technologies possible. From the analysis we could develop clear and concrete scenarios of how our target users would be interacting with our E-Tourist website. The results of the PACT analysis are presented below:

People

Making sure that my website caters for people with disabilities such as visibility impairment (such as long/short sight, colour-blinded etc.).

Website to be accessible to those people who are not so able (for all levels of cognitive ability).

Computer Literacy/Knowledge

Users accessing our site may be beginners, intermediate or experts, it is therefore, essential for the website to cater for all its users. Because the site focuses on tourism in Edinburgh, our site will only be accessed when people are considering a trip to Edinburgh. So, it is most probable that even those users that are very computer/internet literate may still be beginners when they visit our website.

Cognitive Abilities

Because people are better at recognizing things than remembering them, our site will be primarily be 'see and click'. This is so that users will be able to easily interact with the website.

Physical Abilities

It is essential for our website to be accessible for those users that are physically challenged: users with sight difficulties.

- Difficulty of seeing small things. We will need to make sure that the contents in our site can be magnified for such users - quality of the site is undisturbed when the information is magnified

- The second difficulty is colour blindness (difficulty distinguishing between yellow and blue and red and green), make sure that colours that can affect colour-blindness are not mixed.
- The third difficulty is moderate to fully blind users, we need to consider whether users can access the information in audio form. This is particularly important where images are used (describing the images in text form, in such a way that blind users can effectively understand the information about the images in the same way all other users can).
- Web designers also need to consider whether or not information and/or the whole website can be converted into Braille. This is important for those users who prefer to use Braille over audio.

Activities

There are many activities that designers need to consider (simple and complex). Below are the main characteristics of activities that need to be considered:

Temporal aspect (regularity of activities): is the activity done everyday, monthly, or annually?

Temporal aspect (response time from the system): how long does the website take to download?

Nature of content (colors used in the website): they have to be designed so that they are not an eye-sore

Nature of content (textual information): what font, size is going to be used?

What about the other aspects?

Main activities is a navigation map of the royal mile.

- Forums and blogs for opinions etc.
- Upload pictures of the city
- What tours are available for them, for example family tours.
- Search facility for users to use if the need to

Context

Activities constantly occur in a context. The context type that affects my website is the physical environment.

Physical environment- For example the website should cater for people who may be logging on to my web site in an area that has slow internet access. This will be a problem if they decide that the website is taking its time to upload.

Users will access the website in different places such as the home, workplace, educational institutions or internet cafes; therefore it is vital that the site is accessible for those visitors that use different resolutions, operating systems, color depths platforms and browsers

Technologies

Technologies can carry out a variety of operations and usually consist of a lot of data, or information. Interaction is required and so there is a need for a range of styles. platforms (Windows, Macintosh etc)

3) Graded Lab Tasks

Note: The instructor can design graded lab activities according to the level of difficult and complexity of the solved lab activities. The lab tasks assigned by the instructor should be evaluated in the same lab.

Lab Task 1

Fitts Law

Go the following interactive demo:

http://fww.few.vu.nl/hci/interactive/fitts/

And perform the instructed steps. When you are asked to click the targets, make at least 20~25 clicks before proceedings to the next step. (Go to the next step only when it says click next whenever you are ready)

Report the times for each experiment in your lab report.

Lab Task 2

PACT ANALYSIS

You are creating a fitness app that will not only keep track of your fitness but also motivate you to eat healthy and exercise. Do a PACT analysis of the fitness app. Discuss all the four parts of PACT analysis in detail. Create a proper document and submit on teams

Lab 04
Accessible Design

Objective:

The objective of this lab is to understand the various accessibliy guidelines and to apply them on web and mobile applications

Activity Outcomes:

The activities provide hands - on practice with the following topics

- Understanding of accessibility guidelines
- Manually checking website for accessibility compliance
- Manually checking a mobile application for accessibility compliance
- Using a tool to check a website for accessibility

Instructor Note:

Please go through the lecture notes as well as the links provided

1) Useful Concepts

Use the following links for accessibility guidlines

Accessibility Guidelines
https://usability.yale.edu/web-accessibility/articles/wcag2-checklist https://stuff.mit.edu/afs/sipb/project/android/docs/guide/topics/ui/accessibility/checklist.html

2) Solved Lab Activites

Sr.No	*Allocated Time*	*Level of Complexity*	*CLO Mapping*
Activity 1	***30 min***	***Medium***	***CLO-6***

Activity 1:

Use wave accessibility tool to check for accessibility of the following website and report the results

https://www.ilovehopscotch.com/

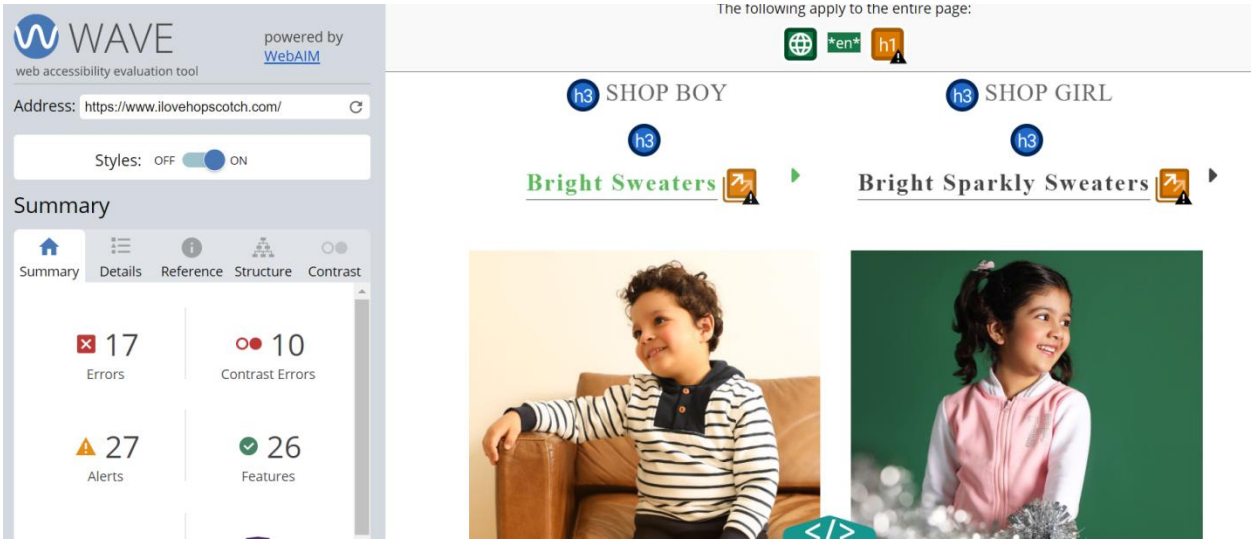


Figure 4.1: Hopscotch Website

3) Graded Lab Tasks

Note: The instructor can design graded lab activities according to the level of difficult and complexity of the solved lab activities. The lab tasks assigned by the instructor should be evaluated in the same lab.

Lab Task 1

Use the following checklist and evaluate the accessibility of any website of your choice. Sumerize your findings

https://usability.yale.edu/web-accessibility/articles/wcag2-checklist

Lab Task 2

Andriod has the following accessibility checklist. Use this list to evaluate the accessibility of Careem/Uber/InDrive and write down your findings.

https://stuff.mit.edu/afs/sipb/project/android/docs/guide/topics/ui/accessibility/checklist.html

Lab Task 3

Use the following online automated accessibility testing tool and analyze the results. Do you think you find more problems in automated checking or manual checking?

The tool: https://wave.webaim.org/

Website to check: Same as you did in Lab task 1. Did you find more errors? Did you miss somethings?

Lab Task 4

Turn on the TalkBack feature on your phone. Try to use whatsapp relying on talkback alone without looking at the screen. How easily were you able to use it? Did you face any problems.

Lab Task 5

Use the narrator on windows and without using a mouse test if you are able to go to amazon website and find books on interactive design. List down the problems you encountered. How was your experience?

Lab 05
Conceptualizing Interaction

Objective:

The objective of this lab is to understand how to come up with a project idea and establish proof of concept.

Activity Outcomes:

The activities provide hands - on practice with the following topics

- Understanding of proposing a project
- Brainstorm the underlying assumptions and claims
- Deciding on the overall conceptual model of the system

Instructor Note:

Read chapter 3 of your text book (Note its chapter 2 in the older edition)

1) Useful Concepts

Use the following links for accessibility guidelines

Key Points
• Having a clear understanding of why and how you are going to design something can save enormous amounts of time, effort, and money later on in the design process. • It is important to understand and conceptualize what is currently the user experience/product and how this is going to be improved or changed. • This requires a design team thinking through how their ideas will support or extend the way people communicate and interact in their everyday activities. • Another important consideration is to make explicit underlying assumptions and claims • **Assumption:** By an assumption is meant taking something for granted when it needs further investigation, e.g. people will want to watch TV while driving. • **Claim:** Stating something to be true when it is still open to question, e.g. a multimodal style of interaction for controlling a car navigation system – one that involves speaking while driving – is perfectly safe

2) Solved Lab Activates

Sr.No	***Allocated Time***	***Level of Complexity***	***CLO Mapping***
Activity 1	***30 min***	***Low***	***CLO-6***

Activity 1:

A Hypothetical Scenario of Early Design Highlighting the Assumptions and Claims Made by Different Members of a Design Team

A large software company has decided it needs to develop an upgrade of its web browser for smartphones because its marketing team has discovered that many of the company's customers have switched over to using another mobile browser. The marketing people assume something is wrong with their browser and that their rivals have a better product. But they don't know what the problem is with theirs. The design team put in charge of this project assume they need to improve the usability of a number of the browser's functions. They claim that this will win back users by making features of the interface simpler, more attractive, and more flexible to use.

The user experience researchers on the design team conduct an initial user study investigating how people use the company's web browser on a variety of smartphones. They also look at other mobile web browsers on the market and compare their functionality and usability. They observe and talk to many

different users. They discover several things about the usability of their web browser, some of which they were not expecting.

One revelation is that many of their customers have never actually used the bookmarking tool. They present their findings to the rest of the team and have a long discussion about why each of them thinks it is not being used. One member claims that the web browser's function for organizing bookmarks is fiddly and error-prone and assumes this is the reason why many users do not use it. Another member backs her up, saying how awkward it is to use this method when wanting to move bookmarks between folders. One of the user experience architects agrees, noting how several of the users he talked to mentioned how difficult and time consuming they found it when trying to move bookmarks between folders and how they often ended up accidentally putting them into the wrong folders.

A software engineer reflects on what has been said, and makes the claim that the bookmark function is no longer needed since he assumes that most people do what he does, which is to revisit a website by flicking through their history list of previously visited pages. Another member of the team disagrees with him, claiming that many users do not like to leave a trail of the sites they have visited and would prefer to be able to save only sites they think they might want to revisit. The bookmark function provides them with this option. Another option discussed is whether to include most-frequently visited sites as thumbnail images or as tabs. The software engineer agrees that providing all options could be a solution but worries how this might clutter the small screen interface.

3) Graded Lab Tasks

Note: The instructor can design graded lab activities according to the level of difficulty and complexity of the solved lab activities. The lab tasks assigned by the instructor should be evaluated in the same lab.

Lab Task 1

In groups of two, come up with an interesting project idea. It has to involve sufficient user interaction. We will follow this project until a working prototype and its evaluation.

Lab Task 2

Write down your assumptions and claims. Brainstorm with your group members and you can also take input from other class fellows to make sure these claims and assumptions are valid.

Lab Task 3

Briefly describe what kind of interaction would be involved. Would there be any metaphors used in the interface? If yes, then which ones?

Lab Task 4

Do PACT analysis of your project. Only discuss the People and Activities for your idea.

Lab 06
Requirements Gathering

Objective:

The purpose of this lab is to learn how to gather data requirements.

Activity Outcomes:

The activities provide hands - on practice with the following topics

- What technique is appropriate in a given scenario?
- How to design a study?
- How to carry out the study?
- How to report the results?

Instructor Note:

Go through the lecture first.

1) Useful Concepts

https://www.uxbooth.com/articles/the-essential-guide-to-writing-effective-survey-questions/

2) Solved Lab Activites

Sr.No	*Allocated Time*	*Level of Complexity*	*CLO Mapping*
Activity 1	*30 min*	*Low*	*CLO-6*

Survey Design Sample
https://www.nngroup.com/articles/survey-questions-iterative-design/

3) Graded Lab Tasks

Note: The instructor can design graded lab activities according to the level of difficulty and complexity of the solved lab activities. The lab tasks assigned by the instructor should be evaluated in the same lab.

Lab Task 1

Brain Storming

You have to design a Fitness app. Your task is to understand the general trends of how such an app might be used using Surveys. First of all, discuss with your group partner what kind of information will you be looking for. Write down points for all the main pieces of information you will be interested in. Consider the attributes of people you are designing for.

Lab Task 2

Design The Consent Form

The next task is to design the Consent form. Inform the user why you are conducting the Survey and approximate time it would take.

Lab Task 3

Designing the Survey

Use Google Forms to design your survey. Carefully consider what question to ask, how to ask etc. Refer to the link above and other sources of your choice to design a survey. Carefully consider what kind of questions will give you more information. The goal is to understand your audience

Lab Task 4

Conduct Your Survey

Ask five people to fill your survey

Lab Task 5

Report Your Results

What would be a good way to report your results? Find an appropriate way to report the results and see if you can see any different patterns of usage or priorities that people have when in relevance to the app.

Lab 07
Interview Protocol

Objective:

The purpose of this lab is to learn the technique of designing a semi-structured interview for needs finding study of a medium sized software (course project).

Activity Outcomes:

After completing this lab, students will be able to apply this technique in user-centered design of systems/ softwares. They will have a good insight about:

- How to design a semi-structured interview. What are the different phases involved?
- What are the components of an interview protocol?
- How to write an interview protocol
- How to recruit participants and conduct an interview

Instructor Note

Please refer to lecture notes

1) Useful Concepts

Before you conduct your semi-structured interviews, you will need to prepare an interview protocol. In this lab, you will write and submit the interview protocol for your interviews. Refer the Sample Interview Protocol given to get a sense for what is expected. (Note, though, that that protocol was developed for a 15-minute interview. You will be conducting 30-60 minutes of interview with observation.)

Write an introduction script. Generally, this will apply for all the protocols, and you can base yours off of the Sample Interview Protocol handout that is provided. The introduction script should include…

- A self-introduction
- The purpose of the interview
- What you will do during the interview and why
- Expected duration of the interview
- Confidentiality statement. The nature of this will depend on the user needs assessment and whom you are conducting it for, but for this course, just relay general remarks to the extent that you will not attach personally identifiable information (such as their name) with any final outcomes of the project.
- Voluntary nature of the interview. Participants should be aware that they can quit or cancel the interview at any time.
- How you will follow up
- Permission to make an audio recording of the interview, if possible

Formulate one or two overarching questions. These will be the core questions you keep in mind throughout the interview. You should not have more than two overarching questions for your mini-project. (In bigger projects, you might have a few overarching questions, but even then, it is helpful to keep it to one or two.)

- Write 5-10 core questions (4 is too few; 20 is too many). Tips for core questions…
- Where possible, ask interviewees to talk through concrete instances, rather than asking generic, summarizing questions. “Tell me about the last time you performed this process,” is better than, “Can you tell me how this process typically goes?” (You can ask the latter kind of questions, too, but don’t forget to ask about specific instances.)

- Some of the core questions should prompt the interviewee the relevant work flow and talk through the process as you observe.
- For the core questions, cluster them by theme. Think about the ordering of the clusters, and also the ordering of questions within each cluster:
  - Topics should flow in a way that is easy for interviewees to follow.
  - Questions that are more open-ended should precede more specific questions about the same topic. This allows the interviewee to respond first with the way they think about the topic.
  - Questions that might be sensitive should be asked toward the end of a cluster, or even toward the end of the interview. If a question might erode rapport with the client, you want to do it later in a cluster of questions or later in the interview.
  - Sometimes, it's OK to say, "Let's switch to a different topic."

For each core question, write several follow-up questions. (For grading, I will be expecting an average of 3 or more follow-up questions per core question.) Include them under the core question in indented form, or as a bulleted list. These questions should help you do follow up, but if your core questions are good, the respondent will cover some on their own, and you may not need to ask follow-up questions explicitly.

Follow-up questions are meant to fill holes in information, or to hear more about interesting issues that the interviewee raises. The goal is either to make sure the interviewee has really addressed the core question to your satisfaction, or to follow up on leads that you may not have anticipated, but which are relevant to the problem.

Write a conclusion script.

Avoiding Common Pitfalls

Throughout the protocol, avoid these common errors:

- Including too many closed-ended, short-answer questions. If most of your questions are closed ended, you will have a short interview in which you learn very little. (However, it's OK to have some short-answer questions, especially during warm up, or when you need concrete information to ask an open-ended follow-up question.)

- Asking about basic information that you could have easily found out through other means, such as an online search.
- Asking irrelevant questions that don't contribute to the overarching question, or which aren't pertinent to your understanding of the problem.
- Adopting a tone that could be interpreted as doubting the interviewee, or evaluating the interviewee's competence. "Why isn't this a problem you can solve by looking up online help?" could sound accusatory. A better way to phrase this question is, "When you encounter obstacles like this, how do you go about addressing them?"
- Asking leading questions that include an assumption that may not be true, or which influence the interviewee to answer in a particular way. Examples…
- "Is it because of a bad process that this task is difficult?"
- Instead, try: "What do you think makes this task difficult?"
- "Isn't this a poor user interface?"
- Instead, try: "Is this user interface good or bad?"
- Even better: "What do you think of this user interface, and why?"

- Write a conclusion script.
- Ask them if they have any other things to tell you. Let them know the interview is over. Thank the interviewee. Let them know what will happen next. Again, feel free to use the Sample Interview Protocol as a template.

2) Solved Lab Activites

Sr.No	***Allocated Time***	***Level of Complexity***	***CLO Mapping***
Activity 1	***30 min***	***Low***	***CLO-6***

This interview protocol was developed for a 15-minute interview with a user of GPS mapping applications, seeking to understand unusual or unexpected things about their usage habits.

Protocol
[Overarching Question]

What unusual or unexpected uses of GPS does the participant make when navigating from one place to another, especially in the context of informing new or improved GPS features?

[Introduction]

Hi, my name is Kentaro Toyama, and **I'm here to understand better how you use GPS technology, particularly for navigating from one point to another.** This interview will take about **10-15 minutes**, during which time we'll go through some questions. Throughout, I'd like you to treat me as if you're describing the situation to someone who isn't familiar with GPS devices. I'm here to learn from you.

A couple of things before we start. To the extent possible, I will take your comments to be **confidential**. My research team and I will aggregate all the comments from several interviews we're conducting so that your comments are not easily traced to you. If we quote you in our final report, we will do so without identifying your name or specific role. If there's anything you really don't want on the record, even if it's anonymized, please let me know that, too. Also, this interview is entirely **voluntary** on your part – if for any reason you want to stop, please let me know. We can end the interview at that point with no repercussions for you of any kind. I can also throw out anything you've told me until that point.

Do you have any questions for me? All right, then, let's proceed.

[Once the interview gets underway…]

Oh, and by the way, do you mind if I take an **audio recording**? This is just so that I don't miss anything – no one other than the research team will have access to the recording. Thanks.

[Warm up]

How often do you use GPS for navigating?

In general, are you happy with GPS technologies?

[Recent use of GPS]

I'd like you to think back to the most recent time when you used a GPS to navigate from one place to another. Can you tell me a bit about that trip?

[Follow up, if they don't include in their response]

- When did the trip take place? From where to where did you go? Roughly how long was the trip?
- When exactly did you turn the GPS on?
- How did you input the destination location? [E.g., by address, by landmark, etc.]
- Did you have to interact with the GPS once you set the destination, and if so, when and why?
- Did you have other passengers, and did any help with navigation?
- Do you remember turning the GPS off, and if so when was that?

- Did anything unusual happen on that trip?
- Would you say that that was a typical trip? If not, what was unusual about it?

[Repeat above, for other trips, if fruitful.]

[Unusual trip – if nothing interesting comes up above]

Now, I'd like you to think about a recent trip that was unusual or uncommon for you. For example, if you were on vacation, or in an accident, or part of a group of drivers going to the same location, and so on.

- Can you think of anything like that?
- What made the trip unusual?
- Did you use a GPS device? And if so, did the unusual nature of the trip change how you used the GPS?
- Who was in the car with you, and did they help with navigation?

[Other questions]

One of the things I'm most interested in are situations under which the GPS is used in an unusual way. Can you think of any instances when you used the GPS in a way that isn't typical?

- [Use follow-up questions from above.]
- Is there anything else that might be relevant – unusual uses of GPS, for example?

[Conclusion]

Thank you – those are all the questions I have for you. If anything else occurs to you after I leave, please don't hesitate to let me know by email. I may be in touch with you again to ask a few followup questions. If you'd like, I can send a version of the report that we'll write based on this interview. Do you have any questions? Thanks again!

3) Graded Lab Tasks

Note: The instructor can design graded lab activities according to the level of difficult and complexity of the solved lab activities. The lab tasks assigned by the instructor should be evaluated in the same lab.

Lab Task 1

Plan Need Finding for Improving CUOnline

Step	*Activities*	*Output*	*Time*
Plan needs finding study	• Establish study goals • Develop recruiting criteria	Study plan	2 hours

Now that you've created your project brief, it's time to get to work! The first step will be to conduct a study to better understand, in detail, your users' needs with respect to the activities that your system will support.

For this activity, you will plan your study, including the following:

- ***Establishing your high-level study goals:*** these are the questions you want to answer with your study. Most likely, the key question will be
- "How do <users in my population> currently do <activity>?" along with
- "What problems do <users in my population> face when trying to accomplish <activity>?" and
- "What goals, values, other activities, relationships, and constraints (e.g., applications and platforms currently in use, money, time, technical expertise) inform how and
- Why <users in my population> do <activity> the way they do?"

  Depending on particulars, you may have additional, more specific questions to add as well.

- **Defining your recruiting criteria and plans:** Nail down your specific criteria for recruiting participants in your needs finding study. Your recruitment criteria ought to look into Expertise, Characteristics, Behaviors and Attitudes of your target users. You should plan to interact with at least 4 potential users of your proposed system. The interactions should include an interview of at least 30 minutes, and may include observations as well. If possible, you should identify particular individuals you plan to ask to participate, though you don't need to contact them.

Lab Task 2

Designing an Interview Protocol for Improving CUOnline

- **Designing the interview protocol:**. For the interview protocol, you should follow the guidelines and template provided.
- For the interview you will use of a semi-structured approach, the incorporation of observations along with direct questions (in this case you'll be observing how they do things now, using whatever tools or methods they happen to use), and good questions vs not-so-good questions. Reviewing these guidelines is strongly recommended before putting together your protocol. If you deviate from the recommended protocol for some reason (e.g., not including observations) you should explain this decision in your protocol.
- Conduct interview with atleast four people and attach the transcripts.

Lab 08
Personas & Scenarios

Objective:

The purpose of this lab is to give students practice in creating Personas and Scenarios for any given Project.

Activity Outcomes:

The activities provide hands - on practice with the following topics

- Critically look at the information that you have obtained through any Need Finding techniques (such as Interviews or Ethnographic studies)
- Create realistic Persona
- Know what details to add and what to leave out
- Learn how to write positive context scenarios

Instructor Note:

You can use a template available online for Persona's or you can chose to just write in the form of a paragraph.

1) Useful Concepts

The first stage of starting any intranet or website design project understands the needs of your users. Only after understanding the needs of the user it is possible to identify the features and functionality that will make the intranet or website a success, and how the design can support users with different goals and levels of skill.
There are many ways to identify the needs of users, such as usability testing, interviewing users, discussions with business stakeholders, and conducting surveys. However, one technique that has grown in popularity and acceptance is the use of personas: the development of archetypal users to direct the vision and design of a web solution.

What Are Personas?

Personas are archetypal users of an intranet or website that represent the needs of larger groups of users, in terms of their goals and personal characteristics. They act as 'stand-ins' for real users and help guide decisions about functionality and design.
Personas identify the user motivations, expectations and goals responsible for driving online behavior, and bring users to life by giving them names, personalities and often a photo.
Although personas are fictitious, they are based on knowledge of real users. Some form of user research is conducted before they are written to ensure they represent end users, rather than the opinion of the person writing the personas.

Analyzing Research Data

Review all the research data and look for patterns in attitudes and behaviors. For example, if you interviewed people about travel, you might find patterns like users who are price driven as opposed to quality driven, users who travel frequently as opposed to infrequently, and users who prefer to research their holiday rather than asking others for suggestions.
For an intranet project, users who need to access information under strict time pressures, users who spend a large amount of their time researching, and users who like to be seen as the experts in the organization.
Whilst listing these patterns, you will begin to see clusters of attitudes and behaviors that make up different personas, such as the frequent traveler that is skilled in researching holidays and finding the best prices. This persona is motivated by keeping the cost of each holiday down so they can travel more in the future. The persona's goal is to go on as many holidays as possible.
Once you have defined these clusters of attitudes and behaviors, give each persona a brief description, such as 'independent traveler' or 'bargain hunter'. There is no ideal number of personas, however try to keep the set small. Four or five personas work as effective design tools, whilst over ten personas may introduce the same confusion as a large user requirements document.

Writing Personas

Start writing the personas by adding details around the behavioral traits. Select details from your research, such as working environment, frustrations, relationships with others, skill level, and some demographics. Give each persona a name and a photo, unless your organizational or team culture is better suited to the more generic personas.
Here are some tips to follow regardless of whether you write your personas as narrative or bullet points:

- Keep your personas to one page, so they remain effective communication tools and can be referred to quickly during design discussions.
- Add personal details but don't go overboard.
- Include goals for each persona.
- Identify the primary and secondary personas (explained in the class) to help direct design priorities

Once your personas are written, review them to ensure they have remained realistic and based on your research data. Check that you have a manageable number of personas, and if two personas seem close in behaviors and goals, see if you can merge them into one persona. Finally, to ensure you have a polished product, ask someone to review the personas for accuracy in spelling and grammar.

2) Solved Lab Activites

Sr.No	*Allocated Time*	*Level of Complexity*	*CLO Mapping*
Activity 1	***15 mins***	***Low***	***CLO-6***
Activity 2	***15 mins***	***Medium***	***CLO-6***
Activity 3	***10 mins***	***Medium***	***CLO-6***

Activity 1:

You are creating a website that deals with properties. People should be able to buy and sell properties with the help of your website. Your website should ideally include information that can help people make the decision. Create Persona for a user who has to buy a house but has no previous experience buying or selling properties.

Solution:

Name: Fatima Ali

Age: 38

Marital Status: Married

Fatima Ali has always dreamed about owning a house. Recently with the promotion of her husband Ali Javaid her dream can finally be turned into a reality. The main problem for her now is she has no idea where to start. She is not sure what kind of factors would go into the price. She knows what kind of house she is looking for but knows nothing about the property marker. Ali is too busy with his job to think about these things and has left it all to his wife.

She would like a website which gives her all the information that she needs in one place without drowning her in information. She is quite comfortable with online shopping but this is a big decision and she wants to make the right choice.

It is very important for her to know about what kind of areas or neighborhoods are undesirable. Another factor that is important is that she wants to live in a quite area with good schools and parks for her 3 year old twin girls.

Activity 2:

You have been asked to develop a health management system for a hospital. The current system that they have is manual. A significant portion of the time of the nurses is wasted doing paper work. The hospital would like you to develop a system that would reduce the time doing different paper work. Anything that can be automated should be automated. Write a Persona for a nurse who is currently busy in paper work and would greatly benefit from such a system.

Solution

Name : Rhonda

Marital Status: Married with two children

Location: Rawalpindi

Rhonda is a 36-year-old registered nurse who has worked at several skilled nursing facilities. She started out in acute care but moved to long-term care so she could have more autonomy. Rhonda was promoted to Unit Coordinator four years ago because she is very competent and generally well organized.

Rhonda is entirely overwhelmed and is drowning in paper, even more so than the average nurse. She often misses eating dinner with her family because she has to work late, filling out forms and reports. Rhonda‘s goals are to: Spend time on patient care and staff supervision, not paperwork. Be proactive. Rhonda needs to understand trends in order to solve problems before they happen, instead of just reacting to crises. Know that things are being done right. Rhonda supervises the unit because she’s good at what she does. If nurses aren’t following procedure or documenting things, she wants to know right away.

Activity 3

In the light of the security situation of Pakistan, CIIT has decided to increase the security level. They have observed that simply putting guards on every gate is not increasing the security as students and faculty argue with the guards and enter the university without showing their university cards.

To overcome this situation the higher authorities have decided to have a fully automated entry system. At every entry point at CIIT, the gates would be locked and would only be opened by some sort of security mechanism such as finger print recognition or card swiping etc.

Keeping in mind the above scenario write a persona for a student.

3) Graded Lab Tasks

Note: The instructor can design graded lab activities according to the level of difficult and complexity of the solved lab activities. The lab tasks assigned by the instructor should be evaluated in the same lab.

Lab Task 1

Create 2-3 Personas for the project that you have chosen for this course. You might initially create more than three Personas and then merge the similar ones. Make sure you identify the type of Personas as well.

Lab Task 2

Write scenario of use for each Persona. The scenario would be context scenario and you can choose to write scenario about first time use or after they have been using it for a while.

Lab 9
Prototyping & Stroyboarding

Objective:

The purpose of this lab is to help students learn the prototyping as a method to involve the users in testing design ideas and get their feedback in the early stage of development, thus to reduce the time and cost.

Activity Outcomes:

After completing this lab, students will be able to:

- Build prototypes for any given project

Instructor Note:

All prototypes in this lab will be hand drawn.

1) Useful Concepts

Prototyping provides an efficient and effective way to refine and optimize interfaces through discussion, exploration, testing and iterative revision. Early evaluation can be based on faster and cheaper prototypes before the start of a full-scale implementation. The prototypes can be changed many times until a better understanding of the user interface design has been achieved with the joint efforts of both the designers and the users.

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Prototypes are experimental and incomplete designs which are cheaply and fast developed. Prototyping, which is the process of developing prototypes, is an integral part of iterative user-centered design because it enables designers to try out their ideas with users and to gather feedback.

Types of Prototyping

Prototyping can be divided into low-fidelity prototyping, medium-fidelity prototyping and high-fidelity prototyping. In some literature, it is only simply classified as low-fidelity prototyping (also called Lo-Fi) and high-fidelity prototyping (also called Hi-Fi), where low-fidelity prototyping is mainly about paper-based mock-up, and high-fidelity is mainly about computer-based simulation. The determining factor in prototype fidelity is the degree to which the prototype accurately represents the appearance and interaction of the product, not the degree to which the code and other attributes invisible to the user are accurate.

Low-fidelity prototypes are quickly constructed to depict concepts, design alternatives, and screen layouts, rather than to model the user interaction with a system. Low-fidelity prototypes provide limited or no functionality.

In contrast, high-fidelity prototypes are fully interactive, simulating much of the functionality in the final product. Users can operate on the prototype, or even perform some real tasks with it.

Sketches

Sketching techniques, a kind of visual brainstorming, can be useful for exploring all kinds of design ideas. After producing initial sketches the best ideas can be further developed by constructing cardboard representations of the design, which can be evaluated with users. This can then be followed by developing scenarios, software or video prototypes.

Freehand sketches are essential for crystallizing ideas in the early stages of design. Through the act of putting ideas down on paper and inspecting them, designers see new relations and features

that suggest ways to refine and revise their ideas. Sketches make apparent to designers not only perceptual features but also inherently non-visual functional relations, allowing them to extract functions from perception in sketches.

The type of mock-up depends on how advanced the idea is. It may be quicker and cheaper to use paper-and-pencil forms at early stages, whereas computer-based prototypes may be important in later stages for exploring and demonstrating interaction and design consistency.

As one can imagine, the sketch technique is as simple as drawing the outward appearance of intended system on paper. However, creativeness is needed. There are some useful training exercises in to help designers get used to visual thinking.

Storyboard

Storyboard origins from the film industry, where a series of panels roughly depicts snapshots from an intended film sequence in order to get the idea about the eventual scene. Storyboard is a graphical depiction of the outward appearance of the intended system without accompanying system functionality. Storyboard provides snapshots of the interface at particular points in the interaction so that the users can determine quickly if the design is heading in the right direction.

Storyboards do not require much in terms of computing power to construct, in fact, they can be mocked up without the aid of computers. The materials needed are office stationery, such as pens or pencils of different colors, Post-It, stickers, and so on. However, modern graphical drawing packages make it possible to create storyboards with the aid of a computer instead of by hand. It is also possible to provide crude but effective animation by automated sequencing through a series of snapshots

Figure 10.1: Storyboard

2) Solved Lab Activites

Sr.No	*Allocated Time*	*Level of Complexity*	*CLO Mapping*
Activity 1	*30 min*	*High*	*CLO-6*

Activity 1:

We allow ourselves to clutter our lives with our immediate to-dos and goals, often neglecting to remember the moments of happiness that we can be grateful for. Keeping track of these moments can help us appreciate them, grow in self-awareness and be happier. Everyone being happier makes the world a happier place.

We need to do storyboarding and prototyping for the above described idea.

Solution

The complete solution is available on

http://d.ucsd.edu/class/intro-hci/2016/assignments/examples/a03example1.html

3) Graded Lab Tasks

Note: The instructor can design graded lab activities according to the level of difficult and complexity of the solved lab activities. The lab tasks assigned by the instructor should be evaluated in the same lab.

Lab Task 1

Draw a storyboard depicting your project concept.

Lab Task 2

Draw the low fidelity prototypes of your project.

Lab 10
Expert Evaluation

Objective:

This lab will make students learn the technique of evaluating interactive system's design through expert evaluation.

Activity Outcomes:

After completing this lab, students will be able to apply this technique to evaluate interactive system's design. They will have a good insight about:

- How to evaluate design with experts.
- What are the different steps involved?
- Benefits and drawbacks of evaluation with Experts

Instructor Note:

Please refer to lecture notes

1) Useful Concepts

There are two types of expert evaluation

Heuristic Evaluation

- Evaluators use a checklist of basic usability heuristics
- Evaluators go through an interface twice
- 1st pass get a feel for the flow and general scope
- 2nd pass refer to checklist of usability heuristics and focus on individual elements
- The findings of evaluators are combined and assessed

Nielsen Revised 10 Usability Heuristics	
Visibility of system status	Recognition not recall
Match between system and the real world	Flexibility and efficiency (includes shortcuts, macros)
User control and freedom	Aesthetic and minimalist design
Consistency	Help users diagnose and recover from errors
Error prevention	Help and documentation

Cognitive Walkthrough

In Cognitive walkthrough the expert uses the prototype from the point of view of a particular type of user (could be a Persona) and asks the following questions at each step. The task and the detailed steps are provided to the expert.

Questions to Ask at Every Step

- What is the user goal and why? (Is effect of current action same as user goal?)
- Is the action obviously available? (Is the action visible?)
- Does the action or label match the goal? Will the user recognize the action as the correct one?
- Is there good feedback?

2) Solved Lab Activites

Sr.No	*Allocated Time*	*Level of Complexity*	*CLO Mapping*
Activity 1	***20 min***	***High***	***CLO-6***
Activity 2	***20 min***	***High***	***CLO-6***

Activity 1:

Perform HE for the following

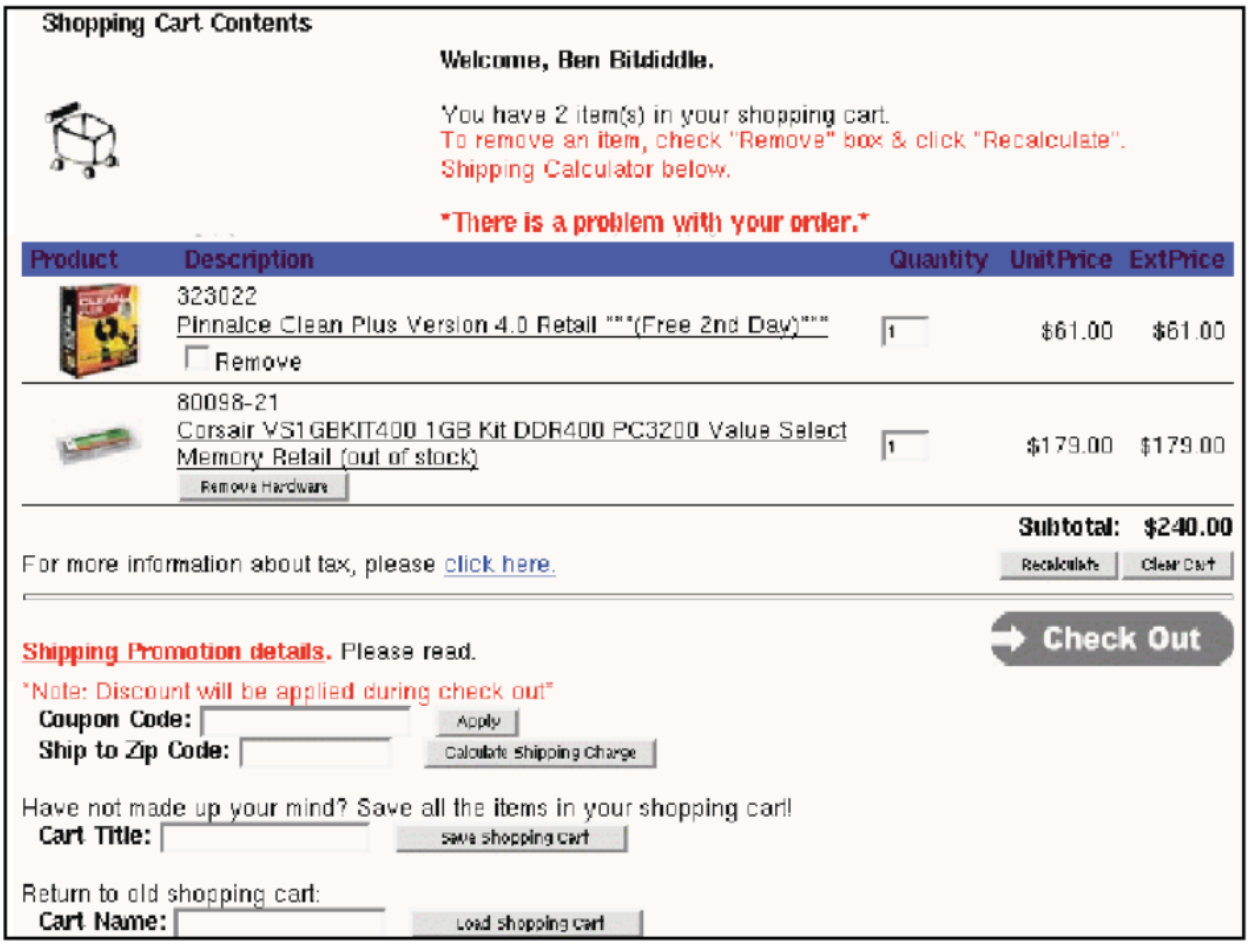


Figure 11.1: Interface for Heuristic Evaluation

Solution:

The following problems along with the heuristic violated are given below.

- Red is used both for help messages and for error messages (consistency, match real world)

- “There is a problem with your order”, but no explanation or suggestions for resolution (error reporting**)**
- No “Continue shopping" button (user control & freedom)
- Recalculate is very close to Clear Cart (error prevention)
- “Check Out” button doesn’t look like other buttons (consistency, both internal & external)
- Must recall and type in cart title to load (recognition not recall, error prevention, efficiency)

Activity 2:

Cognitive Walkthrough

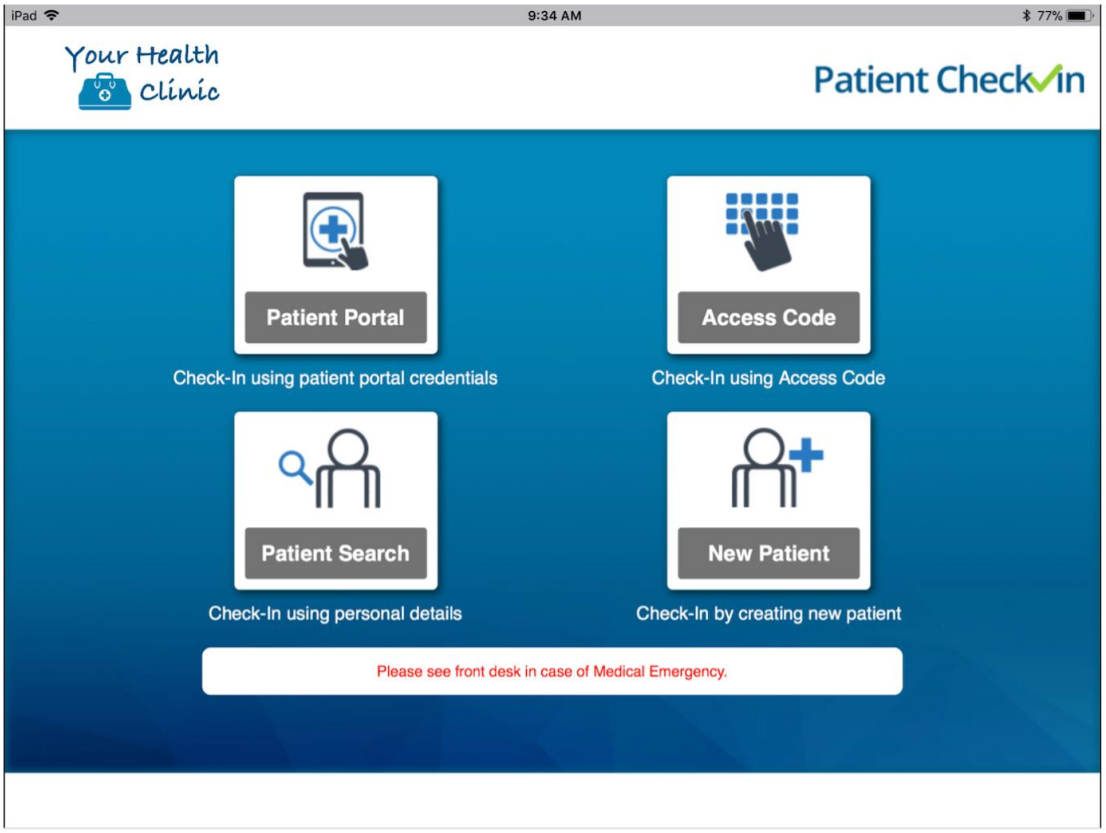


Figure 11.2: Interface for Cognitive walkthrough

Imagine a tablet interface used by health-clinic patients to check in for a visit and update their patient information. To assess the user experience using a cognitive walkthrough, the reviewers would focus on evaluating the steps that patients go through within the interface to complete these activities in preparation for their visit.

The key user tasks that should be evaluated using this methodology would include:

Checkin: A patient new to the clinic (of a predefined persona) arrives for an appointment and is asked by the receptionist to check in using the provided tablet application.

Record update: - A returning patient (of a predefined persona) arrives for an appointment and is asked by the receptionist to review and update patient information and health history using the provided tablet application.

What is the user goal and why?	The patient wants to check in
Is the action obviously available?	Yes: all action buttons are positioned within the body of the page using a highly salient visual styling that effectively communicates tapability.
Does the action or label match the goal?	No: the group discusses that selecting from the four options provided on the screen requires a lot of cognitive effort for new patients, because they must assess and eliminate the incorrect options before determining the correct one, New Patient Some patients may assume they have a patient record because they have an appointment. Others may simply see the Patient Search option first and take action before assessing the New Patient option.
Is there good feedback?	Yes: the page changes and a form with the heading Enter your personal information is displayed.

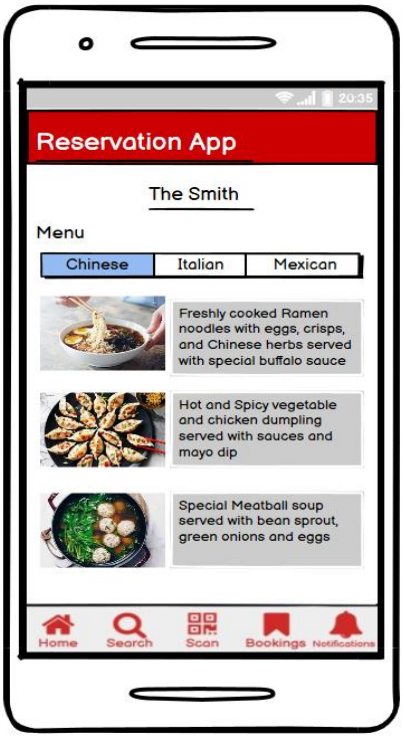
3) Graded Lab Tasks

Note: The instructor can design graded lab activities according to the level of difficult and complexity of the solved lab activities. The lab tasks assigned by the instructor should be evaluated in the same lab.

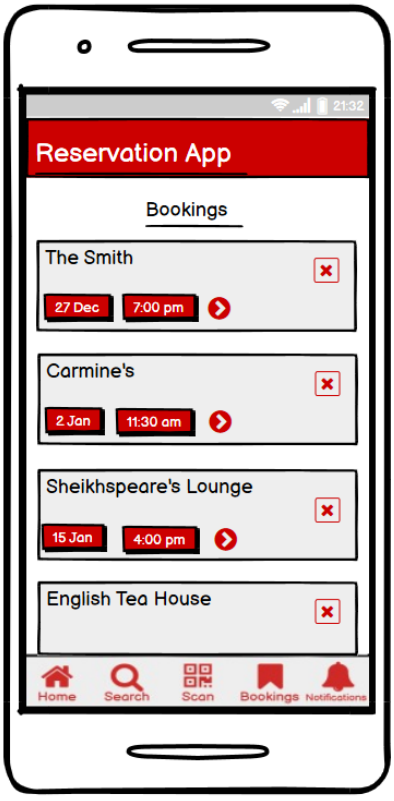
Lab Task 1:

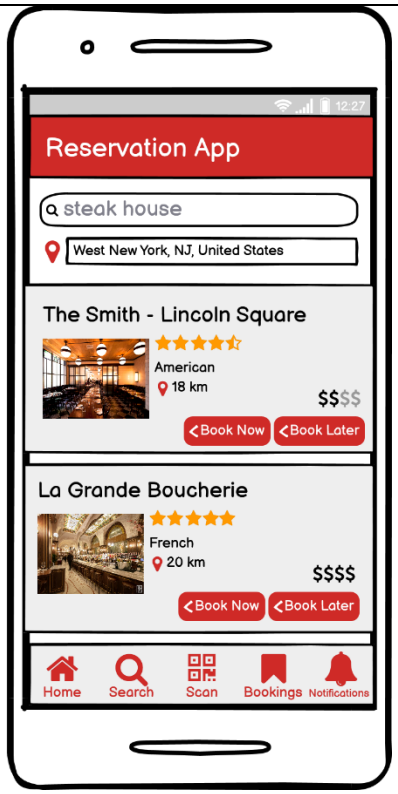
Perform Heuristic Evaluation for the following reservation app

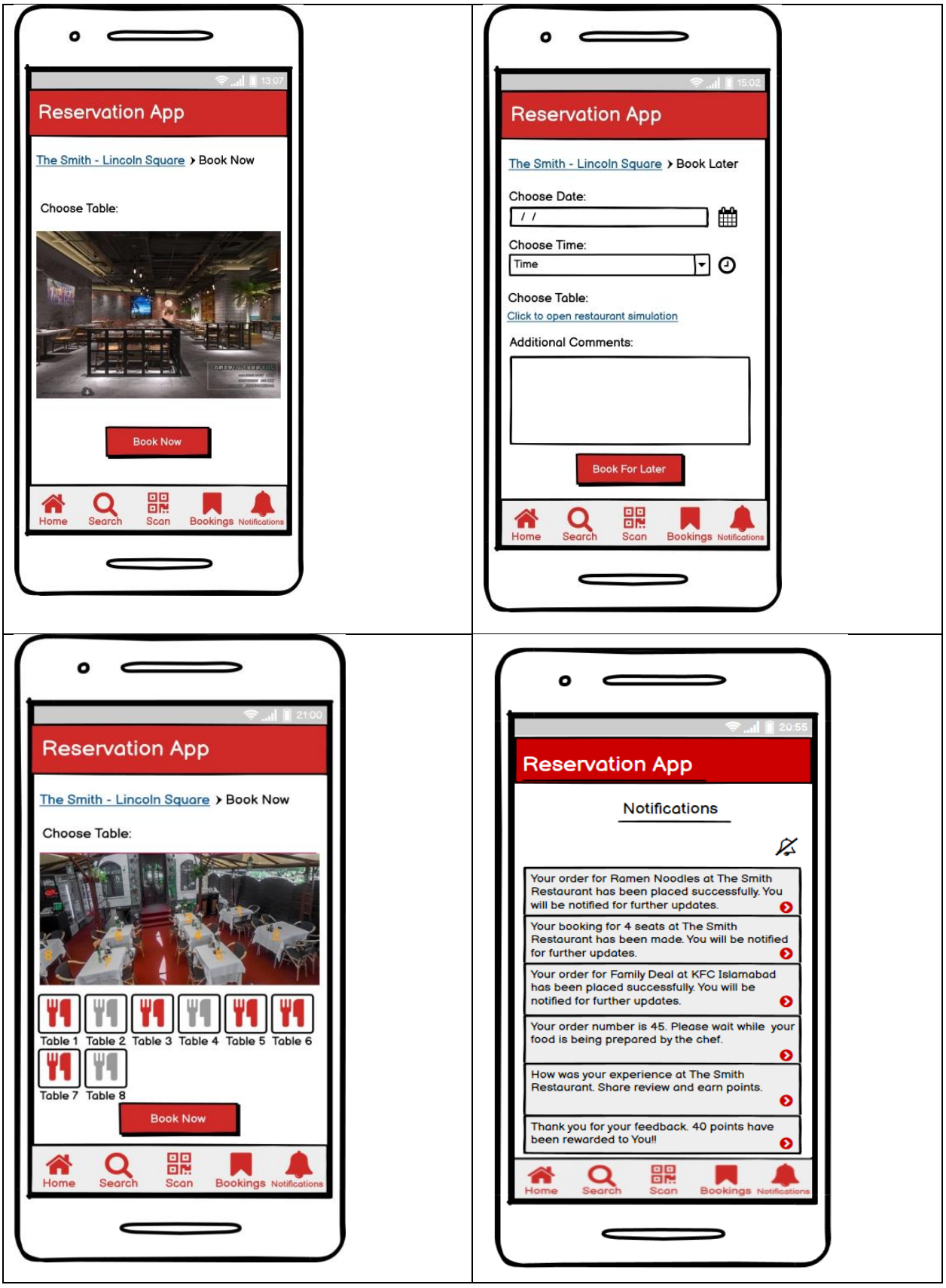
Write observations in proper form.


Reservation App
The Smith
Menu
Chinese
Italian
Mexican
Freshly cooked Ramen noodles with eggs, crisps, and Chinese herbs served with special buffalo sauce
Hot and Spicy vegetable and chicken dumpling served with sauces and mayo dip
Special Meatball soup served with bean sprout, green onions and eggs
Home
Search
Scan
Bookings
Notifications


Reservation App
The Smith
Scan for Menu
Point your phone to the QR code for viewing the menu.
Home
Search
Scan
Bookings
Notifications


Reservation App
Bookings
The Smith
27 Dec
7:00 pm
Carmine's
2 Jan
11:30 am
Sheikhspeare's Lounge
15 Jan
4:00 pm
English Tea House
Home
Search
Scan
Bookings
Notifications


Reservation App
steak house
West New York, NJ, United States
The Smith - Lincoln Square
American
18 km
$$$$
Book Now
Book Later
La Grande Boucherie
French
20 km
$$$$
Book Now
Book Later
Home
Search
Scan
Bookings
Notifications


Reservation App
The Smith - Lincoln Square › Book Now
Choose Table:
Book Now
Home
Search
Scan
Bookings
Notifications
Reservation App
The Smith - Lincoln Square › Book Later
Choose Date:
Choose Time:
Time
Choose Table:
Click to open restaurant simulation
Additional Comments:
Book For Later
Home
Search
Scan
Bookings
Notifications
Reservation App
The Smith - Lincoln Square › Book Now
Choose Table:
Table 1
Table 2
Table 3
Table 4
Table 5
Table 6
Table 7
Table 8
Book Now
Home
Search
Scan
Bookings
Notifications
Reservation App
Notifications
Your order for Ramen Noodles at The Smith Restaurant has been placed successfully. You will be notified for further updates.
Your booking for 4 seats at The Smith Restaurant has been made. You will be notified for further updates.
Your order for Family Deal at KFC Islamabad has been placed successfully. You will be notified for further updates.
Your order number is 45. Please wait while your food is being prepared by the chef.
How was your experience at The Smith Restaurant. Share review and earn points.
Thank you for your feedback. 40 points have been rewarded to You!!
Home
Search
Scan
Bookings
Notifications

Lab Task 2:

Do Cognitive Walkthrough of the above given prototype.

Task: Table reservation

User: First time user not too familiar with technology

Lab 11
High Fidility Prototyping

Objective:

The purpose of this lab is to help students learn the prototyping as a method to involve the users in testing design ideas and get their feedback in the early stage of development, thus to reduce the time and cost.

Activity Outcomes:

The activities provide hands - on practice with the following topics

- Mood Boards.
- High Fidelity Prototyping.

Instructor Note:

You can use Figma or any other prototyping tool of your choice

1) Useful Concepts

Mood Boards

A collection of assets and materials intended to communicate the style, voice, direction, and language of a particular design, brand, or project.

What does in a mood board include?

It can include any reference, but the most important thing is the correlation and balance between all the elements that compose the mood board. Some common elements are:

Colors – Register the colors of the brand or competitors, try new palettes related to the emotions you want to explore within new concepts.

Textures and Patterns – These are great ways to evoke affectional memories and can indirectly indicate established concepts.

Text – Organize your notes, insights, keywords, or quotes, along with other elements of the board, to emphasize your ideas.

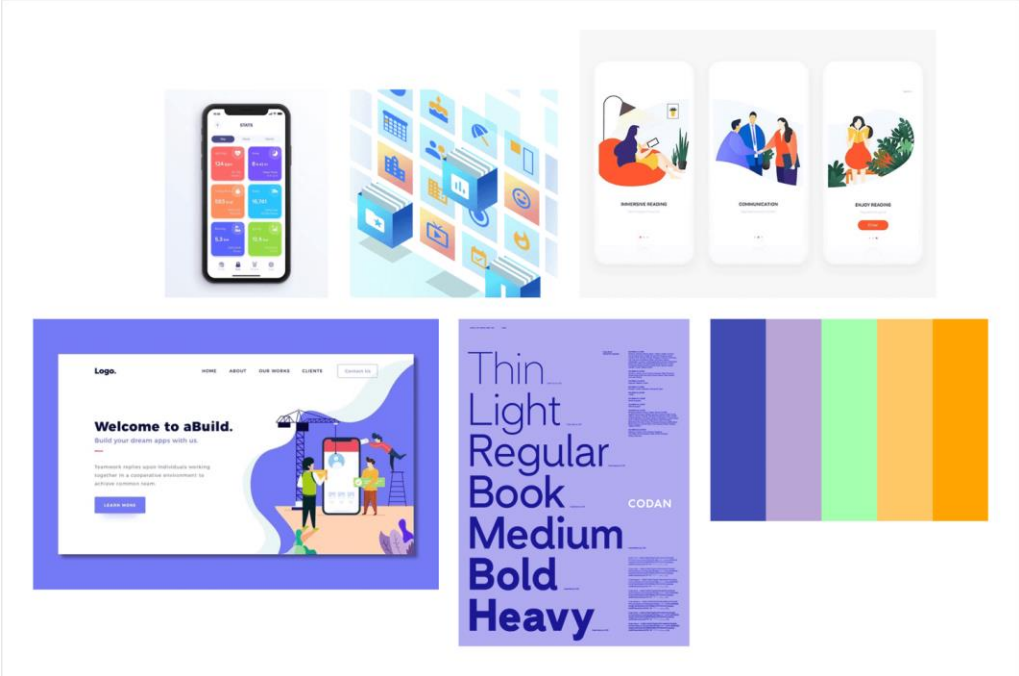


Figure 12.1: Example of a Mood Board

Hi Fidelity Protyping:

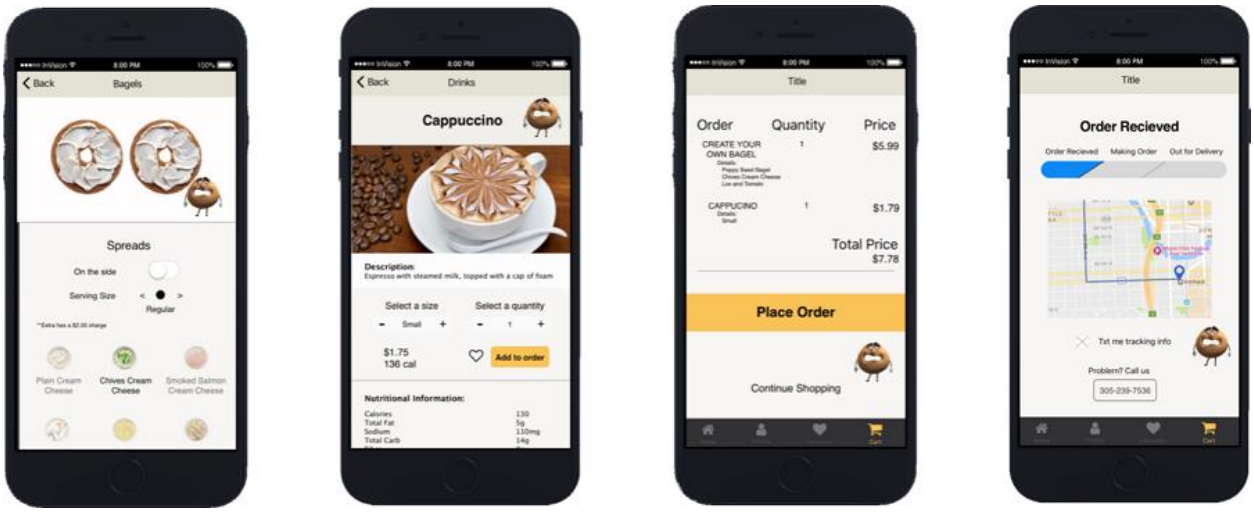


Figure 12.2: Hi-Fidelity Prototype Example

2) Solved Lab Activites

Sr.No	*Allocated Time*	*Level of Complexity*	*CLO Mapping*
Activity 1	*20 min*	*High*	*CLO-6*

Activity 1:

Create Hi-fidelity prototype for Bus reservation app.

NATOURS

Hello, Danish

Book a Ride

Your Wallet

Your Rides

Need Help

NATOURS

Book A Ride

Pick up Location

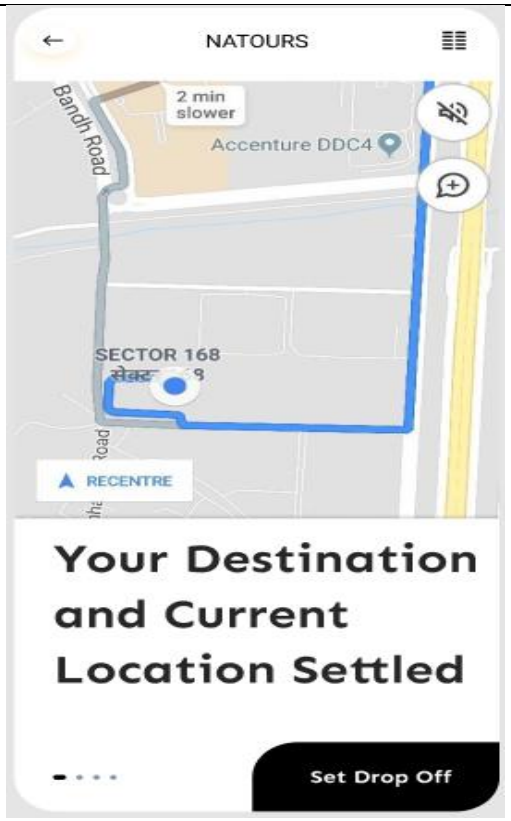
Set Current

Drop Off Location

Set Location on Map

Find a Ride

NATOURS

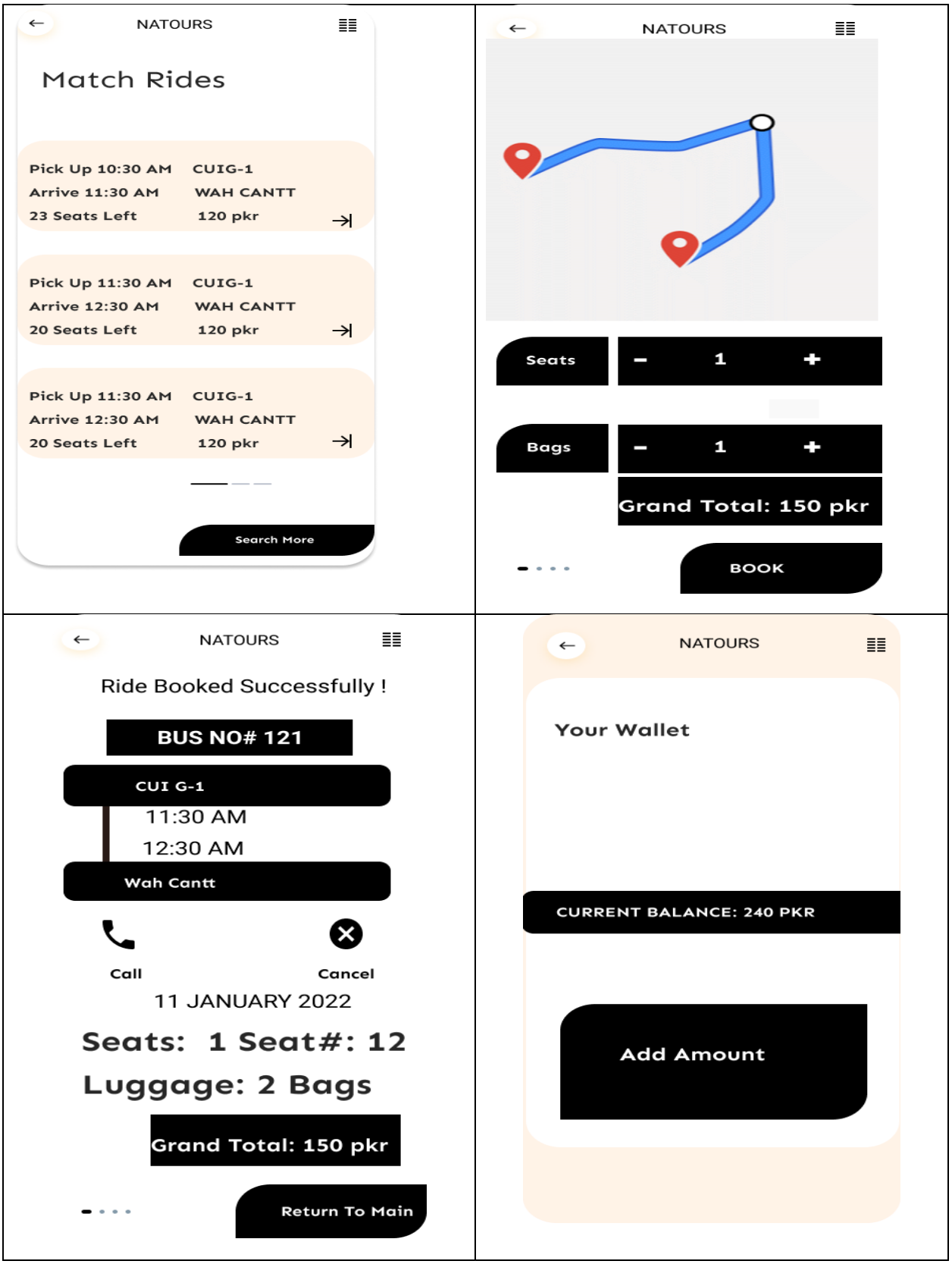


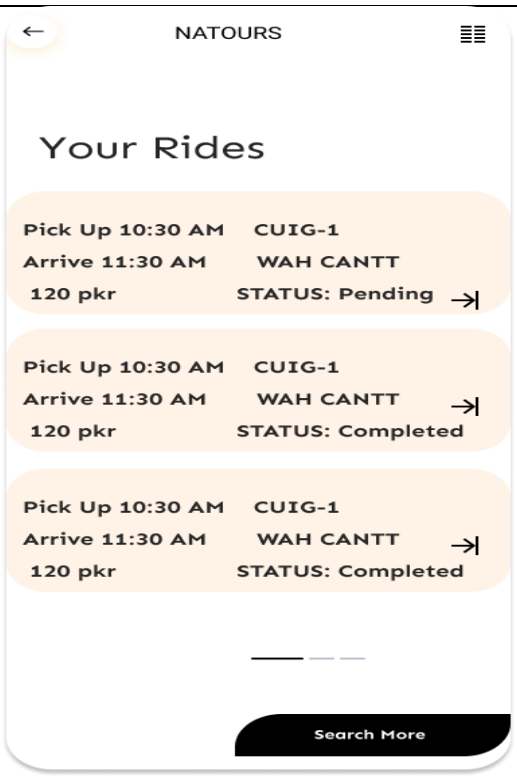
Your Destination and Current Location Settled

Set Drop Off

NATOURS

Please Wait until we find a ride for you!


NATOURS
Match Rides
Pick Up 10:30 AM CUIG-1
Arrive 11:30 AM WAH CANTT
23 Seats Left 120 pkr
Pick Up 11:30 AM CUIG-1
Arrive 12:30 AM WAH CANTT
20 Seats Left 120 pkr
Pick Up 11:30 AM CUIG-1
Arrive 12:30 AM WAH CANTT
20 Seats Left 120 pkr
Search More
NATOURS
Seats - 1 +
Bags - 1 +
Grand Total: 150 pkr
BOOK
NATOURS
Ride Booked Successfully !
BUS NO# 121
CUI G-1
11:30 AM
12:30 AM
Wah Cantt
Call
Cancel
11 JANUARY 2022
Seats: 1 Seat#: 12
Luggage: 2 Bags
Grand Total: 150 pkr
Return To Main
NATOURS
Your Wallet
CURRENT BALANCE: 240 PKR
Add Amount



3) Graded Lab Tasks

Note: The instructor can design graded lab activities according to the level of difficulty and complexity of the solved lab activities. The lab tasks assigned by the instructor should be evaluated in the same lab.

Lab Task 1:

You are creating a new and improved CUOnline. Create mood board for your application.

Lab Task 2:

Draw high fidelity prototypes for the same application. Create protoptypes to cover the following aspects

- *Home Screen*
- *Course Registeration*
- *Course performance (Quizzes assignments marks etc)*
- *Attendance*

Lab 12

User Evaluation

Objective:

This lab will make students learn the technique of evaluating interactive system's design through user participation where the actual users are asked to interact with the system.

Activity Outcomes:

The activities provide hands - on practice with the following topics

- How to evaluate design with users.
- What are the different steps involved?
- When to evaluate design with users.
- Benefits and drawbacks of evaluation with users

Instructor Note:

Please refer to lecture notes.

1) Useful Concepts

Formative Evaluation: The main concept is to provide a prototype to the user (it can be either low or high fidelity or even finished product). Give a task to the user, watch the user perform the task while thinking out loud. Record the observations.

2) Solved Lab Activites

Sr.No	*Allocated Time*	*Level of Complexity*	*CLO Mapping*
Activity 1	***15 mins***	***High***	***CLO-6***

Activity 1

Formative Evaluation

- *https://www.youtube.com/watch?v=9wQkLthhHKA&list=PLctSiTSKouvc6oESBymSehv186AgQh4M3*

watch the above video for a complete demonstration of formative evaluation.

3) Graded Lab Tasks

Note: The instructor can design graded lab activities according to the level of difficulty and complexity of the solved lab activities. The lab tasks assigned by the instructor should be evaluated in the same lab.

Lab Task 1:

Perform formative evaluation for the prototypes you developed in the previous labs. Exchange prototypes, so the person sitting next to you would be evaluation your prototype and you would be evaluating theirs. Write a complete report of your observations and also provide the video of the user performing the task. Make sure you get permission first. Also you only need to record video of the hands and prototype rather then face.

Lab 13
Controlled Experiments

Objective:

The objective of this lab is to give hands of experience to the students on planning, executing and then analyzing the results of a controlled experiment.

Activity Outcomes:

The activities provide hands - on practice with the following topics

- Designing a controlled experiment
- Executing an experiment.
- Performing a t-test on the results.

Instructor Note:

Please refer to lecture notes.

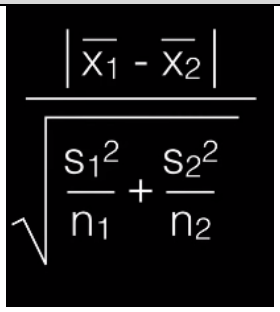
1) Useful Concepts

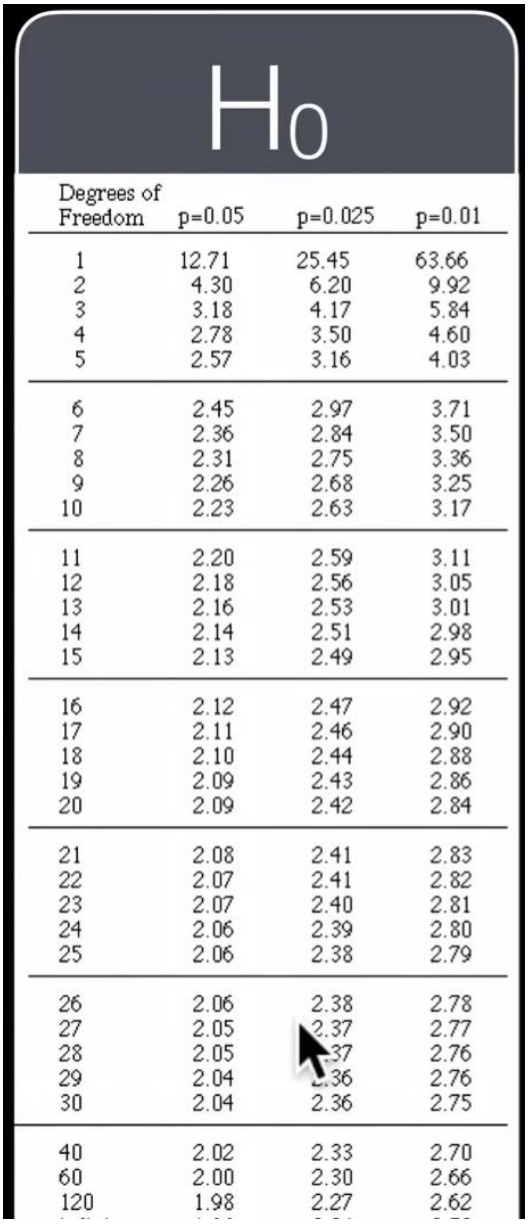
Executing Controlled Experiments: You start by stating a clear, testable hypothesis. By testable, we mean that the hypothesis must be quantifiable and measurable. Here's an example of a hypothesis that we might want to test: that the Macintosh menu bar, which is anchored to the top of the screen, is faster to access than the Windows menu bar, which is separated from the top of the screen by a window title bar.

You then choose your independent variables - the variables you're going to manipulate in order to test the hypothesis. In our example, the independent variable is the kind of interface: Mac menubar or Windows menubar. In fact, we can make it very specific: the independent variable is the y-position of the menubar (either y = 0 or y = 16, or whatever the height of the title bar is). Other independent variables may also be useful. For example, you may want to test your hypothesis on different user classes (novices and experts, or Windows users and Mac users). You may also want to test it on certain kinds of tasks. For example, in one kind of task, the menus might have an alphabetized list of names; in another, they might have functionally-grouped commands.

You also have to choose the dependent variables, the variables you'll actually measure in the experiment to test the hypothesis. Typical dependent variables in user testing are time, error rate, event count (for events other than errors - e.g., how many times the user used a particular command), and subjective satisfaction (usually measured by numerical ratings on a questionnaire).

Finally, you use statistical techniques to analyze how your changes in the independent variables affected the dependent variables, and whether those effects are significant (indicating a genuine cause-and-effect) or not (merely the result of chance or noise).

t-value




H_0

Degrees of Freedom	p=0.05	p=0.025	p=0.01
1	12.71	25.45	63.66
2	4.30	6.20	9.92
3	3.18	4.17	5.84
4	2.78	3.50	4.60
5	2.57	3.16	4.03
6	2.45	2.97	3.71
7	2.36	2.84	3.50
8	2.31	2.75	3.36
9	2.26	2.68	3.25
10	2.23	2.63	3.17
11	2.20	2.59	3.11
12	2.18	2.56	3.05
13	2.16	2.53	3.01
14	2.14	2.51	2.98
15	2.13	2.49	2.95
16	2.12	2.47	2.92
17	2.11	2.46	2.90
18	2.10	2.44	2.88
19	2.09	2.43	2.86
20	2.09	2.42	2.84
21	2.08	2.41	2.83
22	2.07	2.41	2.82
23	2.07	2.40	2.81
24	2.06	2.39	2.80
25	2.06	2.38	2.79
26	2.06	2.38	2.78
27	2.05	2.37	2.77
28	2.05	2.37	2.76
29	2.04	2.36	2.76
30	2.04	2.36	2.75
40	2.02	2.33	2.70
60	2.00	2.30	2.66
120	1.98	2.27	2.62

Figure 14.1 t-value table

2) Solved Lab Activites

Sr.No	*Allocated Time*	*Level of Complexity*	*CLO Mapping*
Activity 1	***20 min***	***High***	***CLO-6***
Activity 2	***30 min***	***High***	***CLO-6***

Activity 1

Designing a Controlled Experiment

We want to compare the typing speed of kindle and ipad keyboard

Hypothesis: "University students (population) type (task) faster (measurement) using iPad's keyboard (feature) than using Kindle's keyboard"

One tailed hypothesis

Null Hypothesis: "There is no difference in speed when university students type using kindle or ipad"

IV: Type of keyboard

DV: time

Experimental Design: We would take 20 university students from different departments and then randomly assign them to one of the experimental conditions

Condition A: Type the given paragraph using ipad

Condition B: Type another paragrapgh of the same length using kindle.

Activity 2

Applying t-test

The following data was gathered after executing the above experiment

Subj	Kindle Time (s)	iPad Time (s)
1	43	34
2		33
3	43	36
4	35	31
5	36	41
6	39	39
7	42	5
8	43	29
9	41	30
10	39	41

Now we will apply t-test on this data
First we calculate the t-value as given in the formula above.

Kindle	ipad
43	34

	37	33
	43	36
	35	31
	36	41
	39	39
	42	37
	43	29
	41	30
	39	41
Mean	39.8	35.1
Standard deviation	3.047768	4.408325
Variance	9.288889	19.43333
Count	10	10

X1-x2 = 1.360558

variance/count= 0.928889

Adding= 2.872222
Sqrt= 1.694763
t-value= 0.802801
df= n1+n2-2 =18
critical value is 1.73

Our t-value is 0.8 which is less then critical value so we cannot reject null hypothesis
You can do all these calculations in excel

3) Graded Lab Tasks

Note: The instructor can design graded lab activities according to the level of difficult and complexity of the solved lab activities. The lab tasks assigned by the instructor should be evaluated in the same lab.

Lab Task 1

Design a controlled experiment to test whether its faster to upload assignment on CUOnline or Teams. I have created dummy assignments on both platforms for you so you can test it. You have to submit individually but must collaborate with your entire class to collect data.

Write the hypothesis, IV, DV, is it one tailed or two tailed. Also design the protocol and use t-test to accept or reject your hypothesis.

You can use the following table

one-tail	0.50	0.25	0.20	0.15	0.10	0.05	0.025	0.01	0.005	0.001	0.0005
two-tails	1.00	0.50	0.40	0.30	0.20	0.10	0.05	0.02	0.01	0.002	0.001
df											
1	0.000	1.000	1.376	1.963	3.078	6.314	12.71	31.82	63.66	318.31	636.62
2	0.000	0.816	1.061	1.386	1.886	2.920	4.303	6.965	9.925	22.327	31.599
3	0.000	0.765	0.978	1.250	1.638	2.353	3.182	4.541	5.841	10.215	12.924
4	0.000	0.741	0.941	1.190	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	0.000	0.727	0.920	1.156	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	0.000	0.718	0.906	1.134	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	0.000	0.711	0.896	1.119	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	0.000	0.706	0.889	1.108	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	0.000	0.703	0.883	1.100	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	0.000	0.700	0.879	1.093	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	0.000	0.697	0.876	1.088	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	0.000	0.695	0.873	1.083	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	0.000	0.694	0.870	1.079	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	0.000	0.692	0.868	1.076	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	0.000	0.691	0.866	1.074	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	0.000	0.690	0.865	1.071	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	0.000	0.689	0.863	1.069	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	0.000	0.688	0.862	1.067	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	0.000	0.688	0.861	1.066	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	0.000	0.687	0.860	1.064	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	0.000	0.686	0.859	1.063	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	0.000	0.686	0.858	1.061	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	0.000	0.685	0.858	1.060	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	0.000	0.685	0.857	1.059	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	0.000	0.684	0.856	1.058	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	0.000	0.684	0.856	1.058	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	0.000	0.684	0.855	1.057	1.314	1.703	2.052	2.473	2.771	3.421	3.690