Fast**National University of Computer and Emerging Sciences, Karachi  
Department of Computer Science**

**Spring 2021, Final Exam  
 June 19, 2021, 10:00 am – 01:00 pm**

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| **Course Code: CS 422** | **Course Name: Human Computer Interaction** | |
| **Instructor Name : Mr. Behraj Khan** | | |
| **Student Roll No:** | | **Section No:** |

* Return the question paper.
* Read each question completely before answering it. There are **8 questions and** **2 pages only.**
* In case of any ambiguity, you may make assumption. But your assumption should not contradict any statement in the question paper.
* Each question carries 15 points
* The paper is subjective. Write the answers only on answer sheet.

**Time**:  180 minutes.                                                                                                **Max Marks**: 120 points

* 1. As a computer scientist you are asked by your instructor to develop an application that can help blind people in learning, how will you start? How will you implement multimodality? Is cultural probe will be helpful in requirement gathering? If yes, then how? Is iconic channel will be helpful? justify

Sol: requirement gathering, by involving multiple i/o channels, yes because we have to observe their activities, No, because they are blind

* 1. Which contrast will be helpful for the above scenario in case if user is reading? Which input channel will help in reading?

Sol: Doesn’t matter because they are blind, haptic channel

* 1. Discuss about the type of channel which will be used for notifying the user about the learned listen or bookmark for the above given scenario.

Sol: Echoic

* 1. Mention the type of interaction paradigm which you have used in your semester project. Rationalize the selection criteria about chosen paradigm.

Sol: WIMP, because of immediate honesty

* 1. Discuss about the synthesizability type of your chosen interaction paradigm. Justify your argument by drawing a window screen **(except login/sign up)** of your project.

Sol: depends on student project

* 1. Which type of reasoning would be required for user during interaction with particular screen (as per **part b** constraint) of your project.

Sol: depends on student project

* 1. You are asked by your instructor to design an online media player which will be used as plugin for google chrome. How will you map this problem to Norman’s interaction model?
  + Sol: user establishes the goal
  + formulates intention
  + specifies actions at interface
  + executes action
  + perceives system state
  + interprets system state
  + evaluates system state with respect to goal
  1. How multimodality will be applied If you are implementing the download feature for the media player in (**part a**).

Sol: by showing the download icon and generating beep.

* 1. Mention the metaphors which you have used in your semester project. List down at least five. Rationalize each metaphor.

Sol: depends on student project

* 1. Differentiate between process-oriented and a structure-oriented design rationaletechnique? Would you classify psychological design rationale as process or structure oriented? Why?

Sol: The distinction between a process- and structure-oriented design rationale resides in  
what information the design rationale attempts to capture. Process-oriented design  
rationale is interested in recording an historically accurate description of a design team  
making some decision on a particular issue for the design. In this sense, process-oriented design rationale becomes an activity concurrent with the rest of the design  
process. Structure-oriented design rationale is less interested in preserving the historical evolution of the design. Rather, it is more interested in providing the conclusions of  
the design activity, so it can be done in a post hoc and reflective manner after the fact.  
The purpose of psychological design rationale is to support the task–artifact cycle. Here,  
the tasks that the users perform are changed by the systems on which they perform the  
tasks. A psychological design rationale proceeds by having the designers of the system  
record what they believe are the tasks that the system should support and then building the system to support the tasks. The designers suggest scenarios for the tasks which  
will be used to observe new users of the system. Observations of the users provide the  
information needed for the actual design rationale of that version of the system. The  
consequences of the design’s assumptions about the important tasks are then gauged  
against the actual use in an attempt to justify the design or suggest improvements.  
Psychological design rationale is mainly a process-oriented approach. The activity of  
a claims analysis is precisely about capturing what the designers assumed about the  
system at one point in time and how those assumptions compared with actual use.  
Therefore, the history of the psychological design rationale is important. The discipline  
involved in performing a psychological design rationale requires designers to perform  
the claims analysis during the actual design activity, and not as post hoc reconstruction.

* 1. Differentiate between recognition and recall. Explain how recognition and recall is applied in your semester project.

Sol: Recognition refers to our ability to “recognize” an event or piece of information as being familiar, while recall designates the retrieval of related details from memory.

* 1. Why forgetting occurs how can it be minimized. Describe about the process of moving information from sensory memory into long term memory.

Sol: Due to interference, information moved from sensor memory to long term memory by rehearsal

1. 1. Highlight the five features of direct manipulation interface from your semester project perspective.

Sol: visibility of the objects of interest  
 incremental action at the interface with rapid feedback on all actions  
 reversibility of all actions, so that users are encouraged to explore without severe  
penalties  
 syntactic correctness of all actions, so that every user action is a legal operation  
 replacement of complex command languages with actions to manipulate directly  
the visible objects (and, hence, the name direct manipulation).

* 1. Discuss the ways in which a full-page word processor is or is not a direct manipulation interface for editing a document using Shneiderman’s criteria. What features of a modern word processor break the metaphor of composition with pen (or typewriter) and paper?

Sol: We will answer the first point by evaluating the word processor relative to the criteria  
for direct manipulation given by Shneiderman.  
Visibility of the objects of interestThe most important objects of interest in a word processor are the words themselves.  
Indeed, the visibility of the text on a continual basis was one of the major usability  
advances in moving from line-oriented to display-oriented editors. Depending on the  
user’s application, there may be other objects of interest in word processing that may  
or may not be visible. For example, are the margins for the text on screen similar to  
the ones which would eventually be printed? Is the spacing within a line and the line  
breaks similar? Are the different fonts and formatting characteristics of the text visible  
(without altering the spacing)? Expressed in this way, we can see the visibility criterion  
for direct manipulation as very similar to the criteria for a WYSIWYG interface.  
Incremental action at the interface with rapid feedback on all actionsWe expect from a word processor that characters appear in the text as we type them  
in at the keyboard, with little delay. If we are inserting text on a page, we might also  
expect that the format of the page adjust immediately to accommodate the new changes.  
Various word processors do this reformatting immediately, whereas with others  
changes in page breaks may take some time to be reflected. One of the other important actions which requires incremental and rapid feedback is movement of the window  
using the scroll button. If there is a significant delay between the input command to  
move the window down and the actual movement of the window on screen, it is quite  
possible that the user will ‘overshoot’ the target when using the scrollbar button.

* 1. Write down the two principles of **appropriate intelligence** followed by ***Context-aware*** applications.

Sol: 1. Be right as often as possible, and useful when acting on these correct predictions.  
2. Do not cause inordinate problems in the event of an action resulting from a  
wrong prediction.

1. 1. Justify, how human and computer are considered as obvious materials in Human-Computer Interaction.

Sol: interactive systems made for users that’s why.

* 1. Draw a window screen of your semester project where you have applied the **“*knowing what you can do*”** design golden rule.

Sol: Depends on student’s project

* 1. how you considered the minimization of errors during interaction with your deployed semester project application from user perspective.

Sol: By providing tutorials

* 1. How you applied the concept of **“affordance”** in your semester project.

Sol: Depends on student’s project

* 1. Differentiate between **“task conformance”** and **“task adequacy”**. How these concepts applied in your semester project?

Sol: Depends on student’s project

* 1. Differentiate between **“user pre-emptive”** and **“system pre-emptive”** dialogues. How these concepts applied in your semester project?

Sol: Depends on student’s project

* 1. How **“*adaptability”*** and **“adaptivity”** enhance user satisfaction? draw a window screen of your semester project where you have applied any of the mentioned term.

Sol: Depends on student’s project

* 1. How **“Guessability”** principle will provide a usability specification for an electronic meetings diary or calendar. First identify some of the tasks that would be performed by a user trying to keep track of future meetings, and then complete the usability specification assuming that the electronic system will be replacing a paper-based system. What assumptions do you have to make about the user and the electronic diary in order to create a reasonable usability specification?

Sol: This exercise could be easily extended to a small project which would involve the design  
of such an electronic diary or calendar. The purpose of this smaller usability engineering exercise is to show how usability goals can be formulated early on to drive the  
design activity. We will select two of the usability principles from this chapter, which  
will serve as attributes for separate usability specifications.  
In the first example, we will consider the interaction principle of guessability, which concerns how easy it is for new users to perform tasks initially. The measuring concept will  
be how long it takes a new user, without any instruction on the new system, to enter  
his first appointment in the diary. A sample usability specification is given below.

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| Attribute:  Measuring concept:  Measuring method:  Now level:  Worst case:  Planned level:  Best case: | Guessability Ease of first use of system without training Time to create first entry in diary 30 seconds on paper-based system 1 minute 45 seconds 30 seconds (equivalent to now) |

The values in this usability specification might seem a little surprising at first, since we  
are saying that the best case is only equivalent to the currently achievable now level.  
The point in this example is that the new system is replacing a very familiar paper and  
pencil system which requires very little training. The objective of this system is not so  
much to improve guessability but to preserve it. Earlier, we discussed that the worst  
case level should not usually be worse than the now level, but we are hoping for this  
product to improve overall functionality of the system. The user will be able to do more  
things with the electronic diary than he could with the conventional system. As a result,  
we worry less about improving its guessability. Perhaps we could have been more ambitious in setting the best case value by considering the potential for voice input or other  
exotic input techniques that would make entry faster than writing.

* 1. What was the problem with the synthesis example comparing a command language interface with a visual interface? Can you suggest a fix to make a visual interface really immediately honest?

Sol: Immediate honesty

Good Luck