

Question Paper

Exam Date & Time: 17-Nov-2022 (09:00 AM - 12:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

SEVENTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, NOV 2022

Human Computer Interaction [ICT 4049]

Marks: 50

Duration: 180 mins.

A

Answer all the questions.

Instructions to Candidates: Answer ALL questions. Missing data may be suitably assumed.

- 1) The safe locker in most banks is operated by at least two keys held by different employees of the bank. This makes it difficult for a bank robber to obtain both keys and also protects the bank against light-fingered managers! ATMs contain a lot of cash and must be protected by similar measures. In one bank, which shall remain nameless, the ATM had an electronic locking device. The machine could not be opened to replenish or remove cash until a long key sequence had been entered. To preserve security, the bank gave half the sequence to one manager and half to another, so both managers had to be present to open the ATM. (5)
A) Observing the above case study, arrive at how an unexpected system could arise if busy bank managers gave their part of the key sequence to a secretary? Why is context important in design of technology and solutions?
- B) What can a system designer do to minimize the memory load of the user for any interactive system? Explain with a suitable example. (3)
- C) The mental models are the important requirement in user interface design. Explain with suitable application how mental models will be handled in any interactive user interface? (2)
- 2) As part of a new project, *Digital Pathways* are developing an interactive kiosk for a science museum to be used by children. The kiosk will provide learning activities and games about wind turbines. (5)
A) a. List the possible stakeholders of this system
b. Comment on why a combination of ethnography and prototyping would be useful for the requirements elicitation process
c. Explain, with examples, the difference between functional requirements and non-functional requirements in this context.
- B) Questionnaires can be used at various points in the design process. What sort of data can questionnaires capture? Critique this technique, highlighting the pros and cons for this type of evaluation method. (3)
- C) Wizards and assistants are two of many approaches to user support. With clear representative examples, highlight how each of these approaches are useful to the user. (2)
- 3) Coursera is a global online learning platform that offers anyone, anywhere, access to online courses and degrees from leading universities and companies. Coursera is an excellent example of universal design. With specific examples, explain how Coursera has addressed each of the universal design principles. (5)
A) Draw sequence diagram for following scenario using MVC architectural pattern. (3)
I. The controller accepts user input in its event-handling procedure, interprets the event, and activates a service procedure of the model.
II. The model performs the requested service. This results in a change to its internal data.
III. The model notifies all views and controllers registered with the change-propagation mechanism of the change by calling their update procedures.
IV. Each view requests the changed data from the model and redisplay itself on the screen.
V. Each registered controller retrieves data from the model to enable or disable certain user functions. For example, enabling the menu entry for saving data can be a consequence of modifications to the data of the model.
VI. The original controller regains control and returns from its event-handling procedure.
- C) Describe two problems of 'think aloud' evaluation technique with suitable examples. (2)
- 4) Analyze the following scenario and sequence of interactions using KLM. Suppose you are typing a text. Suddenly you notice a typing error, in the form of a mistyped letter. For example, instead of typing 'people', you typed 'peuple'. In order to rectify this problem, you typically need to perform following steps. (5)
A) a. Take the cursor to the place of editing using either arrow keys or mouse pointer
b. Edit the character (deleted and retype)
c. Come back to the current place of typing

d. Save the changes using either ctrl+s or go to file menu and select save option.

How much time will you take to perform the correction? Refer Card, Moran & Newell KLM data for calculation of time.

■ K	Press key	time(s)
■	Good typist (90 wpm)	0.12
■	Poor typist (40 wpm)	0.28
■	Non-typist	1.20
■ B	Mouse button press	
■	Down or up	0.10
■	Click	0.20
■ P	Point with mouse	
■	Fitts' law	$0.1 \log_2(D/S + 0.5)$
■	Average movement	1.10
■ H	Hands to/from keyboard	0.40
■ D	Drawing	Domain dependent
■ M	Mentally prepare	1.35
■ R	Response from system	Measure

- B) Choose an appropriate evaluation method for each of the following situations. In each case identify the: (i) The participants. (ii) The technique used. (iii) Representative tasks to be examined. (iv) Measurements that would be appropriate. (v) An outline plan for carrying out the evaluation. (3)
- You are at an early stage in the design of a spreadsheet package, and you wish to test what type of icons will be easiest to learn.
 - You have a prototype for a theatre booking system to be used by potential theatregoers to reduce queues at the box office.
 - You have designed and implemented a new game system and want to evaluate it before release.
- C) Differentiate between augmented reality vs. virtual reality. Customers want to try on different pairs of sunglasses or see how a sofa would fit within their home. Justify which category of the reality environment will be more suitable. (2)
- 5) 3DM Pvt. Ltd. is visualization-based company which uses various business intelligence tools for creating data visualizations for the clients. As per the observations on currently used visualization tool, the performance of the employees is degrading for the specific task. Project manager of the company wants to perform empirical evaluation on which visualization tool is better for the specific requirements and wants to analyze. Does Visualization Tool have an effect on user performance (time) for task X? Perform hypothesis testing and answer for the following questions. You can assume any two visualization tools for the analysis purpose. (5)
- A)
- What are the hypotheses for this study?
 - What are the independent variables and dependent variables?
 - In this study, they used mixed within-group (subject) design and between-group (subject) design.
 - Which part is within-subject design and which part is between-subject design?
 - Write the analysis of each design mentioned in the (iii).
- B) PowerPoint can be used to make presentations which have some visual and animated components. The latest version of PowerPoint has limited collaboration support, so in this assignment you will find out about the current capability and then think of how PowerPoint can be extended so that you can better work jointly with a colleague on a presentation. Explain the implementation challenges of CSCW in terms of following parameters: (3)
- architecture,
 - scalability management,
 - synchronization
- C) You are planning to design RFID based smart parking system for our college. Identify the suitable enablers which will make this system as an example of ubiquitous computing (2)

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