

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

SEMESTER FINAL EXAMINATION

WINTER SEMESTER, 2017-2018

DURATION: 3 Hours

FULL MARKS: 150

CSE 4739: Human Computer Interaction

Programmable calculators are not allowed. Do not write anything on the question paper.

There are 8 (eight) questions. Answer any 6 (six) of them.

Figures in the right margin indicate marks.

-
- ✱ 1. a) What do you mean by multimodal interaction? Describe the aspects of human-computer interaction (HCI) in designing a multimodal system with an example. 15
- b) High-quality printers generate output with 600 dots per inch (dpi). How many dots are there per degree of visual angle, assuming a reading distance of 12 inches? 5
- c) Two symbols appear on the computer terminal. If the second symbol matches the first, the user presses "Yes" and presses "No" otherwise. What is the time between the second signal and response? 5
2. a) Read carefully the text below: 10
- "A Windows typical user is exposed to a Unix environment for the first time. He has to type a document on Emacs as opposed to his favorite windows text editor. The user makes a typo and without hesitating presses, his fingers on the 'Control' and the 'Z' buttons since these are the keys he always used as a keyboard shortcut for UNDO command. The user gets frustrated as the Emacs editor completely disappears from the screen and he got back to the Unix prompt with no single notification message."*
- Answer the followings:
- i. Decide if this type of user error is a mistake or a slip. Justify your answer.
- ii. Find a possible way to fix this situation and specify the interaction style that you intend to use for this remedy. *frustration*
- b) Suppose you want to design an Augmented Reality (AR)/Virtual Reality (VR)-based educational software for the children (age group, 7-14). Explain how you are going to analyze the translation problems to minimize 'gulf of execution' and 'gulf of evaluation' which is basically the translation problem between human and machine. 15
3. a) Do the use of different colors in Microsoft office word ribbon menu will increase user experience (UX)? If yes, then how would you use colors for better UX. If no, then why? 8
- b) Write the definition of interaction design. Explain the following usability goals with examples: 7
- i. Effective to use
- ii. Efficient to use
- iii. Safe to use
- c) Describe the conceptual models based on activities and explain how a mental model is communicated to the user with example. 10
4. a) What do you mean by persona? Why do you need to create personas? Explain the relationships among persona, scenario, and goals with a real-life example. 12
- b) What is affinity diagram? Describe the process of creating affinity diagram. 8
- c) Do you need to apply card sorting algorithm to create affinity diagram? Explain. 5

- X5. a) To support the design of interfaces, Star lifecycle model was proposed by Hartson and Hix that follows the user-centered design principle. Elaborate how you will use this model to design the system described in Question 6. 15
- b) Briefly explain the four basic activities of interaction design. How are the interaction design and user-centered design related to each other? 10

6. Children with Down Syndrome (DS) may suffer from the intellectual disability as well as physical and social disability. Physical disability falls into two categories, fine motor skill (e.g. picking, grasping, holding small objects - that use the small muscles of the fingers, toes, wrists, lips, and tongue) and gross motor skill (e.g. walking, kicking, jumping, and climbing stairs - that use the large muscles in the arms, legs, torso, and feet) deficiency.

Research shows that Game Therapy has a positive effect on improving motor skills of children with DS. Suppose you have to conduct research and design a game therapy system for the children with DS to improve gross motor skills.

- a) Describe how you are going to identify the list of requirements of the system. Which technique will you follow? Give example. 8
- b) Describe different types of requirement for the system. *Functional & Non-functional* 10
- c) How will you represent those requirements to your teammates for analysis? Give example. 7
7. a) Write the differences between sketching and prototyping with an example. 6
- b) Suppose you have to construct prototypes for the system described in Question 6. Which prototyping technique will you follow? Explain with example prototypes considering at least two alternative design. *high fidelity* 13
- c) Write the differences between "evolutionary" prototyping and "throw-away" prototyping. Under what conditions might one be preferred over the other? 6
8. a) What is experimental design? Identify the independent, dependent, random, control, and confounding variables to evaluate the system described in Question 6. List the variables including proper justifications. 12
- b) Suppose you have to perform the cognitive walkthrough to evaluate your designed system as described in Question 6. Answer the followings: 13
- What are the usability attributes/test conditions/tasks that you will focus on the evaluation?
 - Who will be involved in the evaluation process? Explain.
 - How will you perform the cognitive walkthrough? Give example for any one of the selected tasks.

is action available

is it apparent

is it leading to desired system state