B.Sc. TE (1-Yr) 2nd Semester
B.Sc. TE (2-Yr) 4th Semester

23 October 2019

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

SEMESTER FINAL EXAMINATION **SUMMER SEMESTER, 2018-2019**

DURATION: 3 Hours **FULL MARKS: 150**

CSE 4885: 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.

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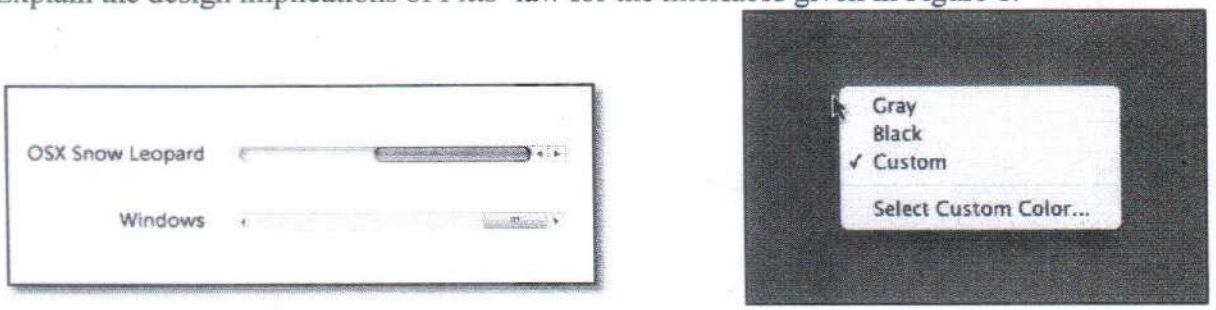
1. a) What is Model Human Processor (MHP)? Give two examples of how this model can be applied in designing a user interface. 5+8
   b) Explain the HCI issues while designing a system for the users with disabilities. 12

2. a) Explain the design implications of Fitts' law for the interfaces given in Figure 1. 8



(a) (b)

Figure 1: (a) Interface for scrollbar of Mac vs Windows; (b) Pop-up menu

   b) What is conversational interaction? Write the pros and cons of conversational interaction. 7
   c) Define conceptual model. Describe the components of the conceptual model present in the interfaces of Question no. 5 (a). 10

3. **Case study A:**

Audiary is an emotion diary platform with AI friend to overcome the negative feelings. It will respond to every message you make, and help you to overcome your negative emotions anxiety or depression, and cheers you up. This is a kind of voice journal and emotion diary. You can record your feelings for up to 30 seconds by choosing your emotion from Excited, Happy, Calm, Sad, and Angry. AI assistant will reply to you based on Motivational Interview and it will help you to get organized.

   a) Describe how you are going to identify the list of requirements of the system. Which data gathering technique will you follow? Give example. 8
   b) Write at least two measurable usability requirements for each of the following usability goals: 10
      i. Having good utility
      ii. Effectiveness
      iii. Efficient
   c) How will you represent those requirements to your teammates for analysis? Give example. 7

4. **Case study B:**

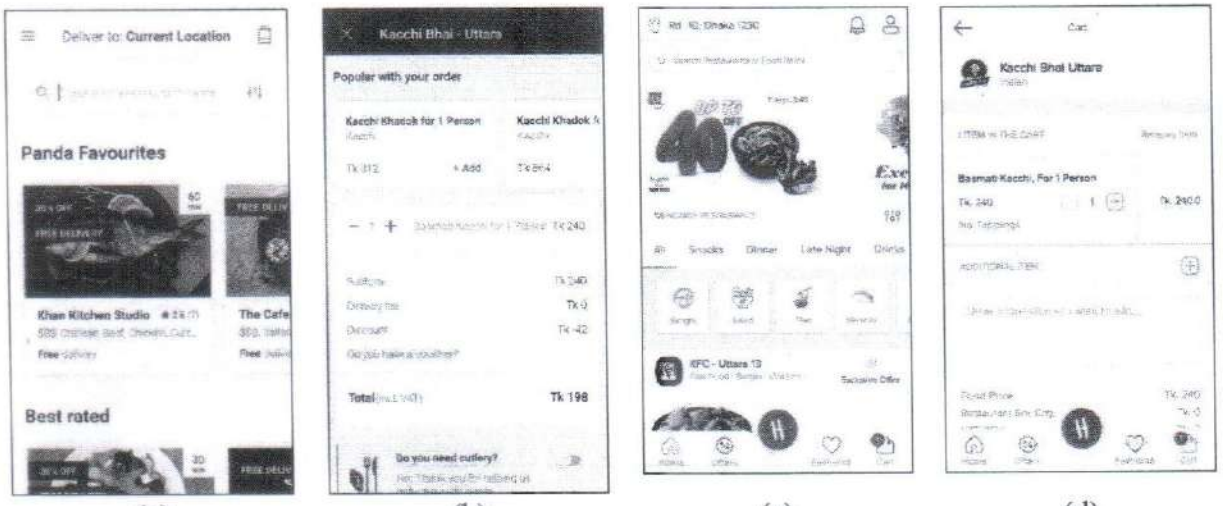
Over the last century, people's eating habits have changed a lot. Technology has also contributed to the changes in consumer preference as their dependence on technology has moved them to do everything online including getting cooked meals delivered to their doorstep.

FoodZone is a new restaurant app with over 300 restaurants and cafés in Dhaka. The task is to assess and improve the home screen to help users efficiently discover restaurants to go to. Target users are local people not the travelers. One of the main business goals of this app is to make the app more dynamic to incentivize user to open the app more often.

a) You are asked to apply User-Centered Design (UCD) approach to the project described in the case study B of Question 4. Answer the followings:
   i. Define UCD. 5
   ii. Describe how you will follow each stage of the UCD approach. 12

b) Which interaction design lifecycle model would be appropriate to follow for the development of the system described in case study B. 8

5. a) Explain Don Norman's six principles of designing interactions that are followed in the interfaces shown in Figure 2. Find at least one problem related to those principles. Problem must illustrate a violation of one of the design principles. 10+5



(a) (b) (c) (d)

Figure 2 (a) Home interface and (b) order interface of FoodPanda app; (c) home interface and (d) order interface of Hungynaki app.

b) What is affinity diagram? Explain the affinity diagramming process with an example. 10

6. a) Using the data gathered in the Question 3 (a) for case study A, identify different kinds of requirements for interaction design (IxD). 10

b) Write the persona(s) for the case study A of Question 3. Give reasons behind choosing the persona. 8

c) Write one main scenario capturing how the user is expected to interact with the system. 7

7. a) Which prototyping technique will you follow for the system described in case study B? Explain why. 7

b) Construct a prototype for the system using the prototyping technique you have chosen for case study B. 8

c) Design an HCI experiment for the prototype you have designed for case study B. Identify the independent, dependent, random, control, and confounding variables (if any) to evaluate the system. List the variables with proper justifications. 10

8. a) Physical analogies and metaphors are examples of the more general concept of mental models, known as conceptual models. The use of clock metaphor for numeric value entry with a stylus is shown in Figure 3. 15

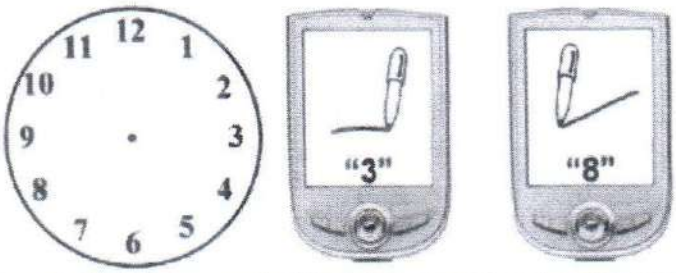


Figure 3: Metaphor example: Clock face, numeric entry with a stylus

Instead of scripting numbers using Roman characters in a smart phone, the number are entered using straight-line strokes. In a study, it has found that, numeric entry is about 24 percent faster using straight-line strokes compared to handwritten digits. The 12 o'clock position was used for '0'.

Consider that, you want to use this metaphor in a system to assist blind people to navigate inside a building. Suggest the interactions including how you would use the clock metaphor effectively. You can consider other metaphor analogies required in your conceptual design

b) The fact that paper-based prototypes do not look as good as prototypes made with a computer hurts the kinds of feedback developers can get from users, but they can be made so much faster that they are worth it. Do you agree with the fact? Justify your answer. 10