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

MID SEMESTER EXAMINATION SUMMER SEMESTER, 2018-2019
DURATION: 1 Hour 30 Minutes FULL MARKS: 75

CSE 4849: Human Computer Interaction

Programmable calculators are not allowed. Do not write anything on the question paper.
There are **4 (four)** questions. Answer any **3 (three)** of them.
Figures in the right margin indicate marks.

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1. a) Suppose an ATM cash machine has several information which it displays trough a set of user interfaces. For any operation the first page in the UI allows the user to enter their PIN (Personal Identification Number). If this is correct for the customer's card, the machine shows the next page which allows the user to select one of several functionalities. If they select the withdraw cash service they are presented with a page from which they can select a predetermined amount of cash, or can select an option to allow them to determine how much they want. If they select this option they are then presented with a page which allows them to enter a value up to 20000 Taka in BDT. Once the amount of money has been entered (either by selecting a predetermined amount or entering their own amount) the machine returns the card and then the cash to the customer. Answer the followings:
   i. Explain the relationship between GOMS model and MHP for the scenario. 5
   ii. Construct a GOMS model of a customer withdrawing money from an ATM cash machine. 10
   iii. How can you measure human performance based on MHP for this task? Explain. 5

   b) Consider that a user has perceptual processing time $\tau_p = 150\ ms$, cognitive processing time $\tau_c = 50\ ms$, and motor processing time $\tau_m = 50\ ms$. Two symbols appear on the computer terminal. If the second symbol matches the first, the user presses "Y" and presses "N" otherwise. What is the time between the second signal and response? 5

2. a) How do we perceive color? Considering the design implications of color in UI design, give justification of the following statements: 7
   i. We should avoid Green and Red in the periphery
   ii. Older users required brighter color
   iii. Blue color should be avoided for text, lines, and small shapes.

   b) Suppose you want to design a text-based interaction where the font size will be changed according to the distance from the user to display screen. If the screen resolution is 120 dpi, distance is 15 inch, and the visual angle is 30 minutes of the arc then what will be the font size of the text? 6

   c) What are binocular and monocular depth cues of visual perception? Explain with example. 12

3. a) Consider the musical note signal in Figure 1. 6

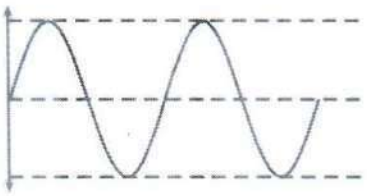


Figure 1: A musical note

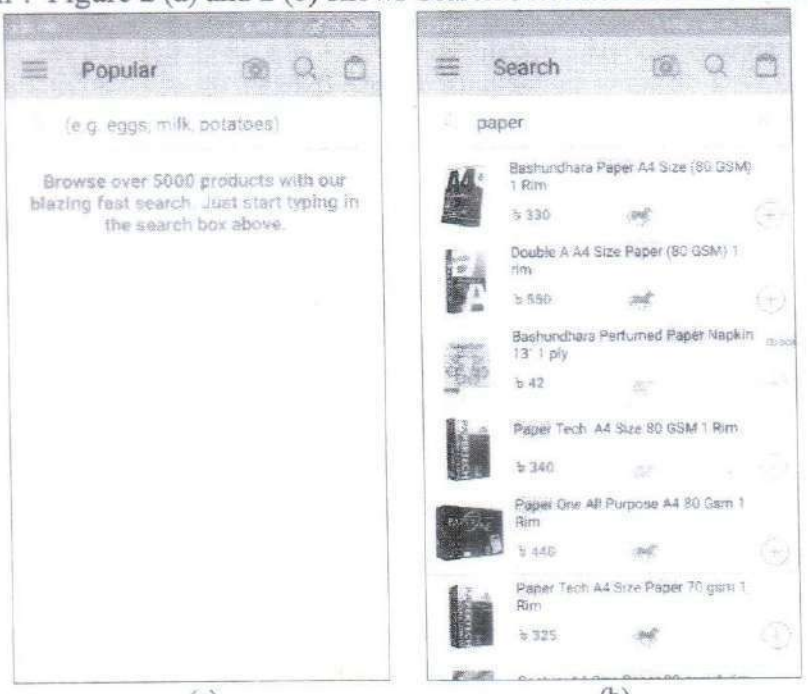
Redraw the diagram for a note:
   i. With higher pitch
   ii. That is louder
   iii. That is softer

b) What is Fitts' law? According to Fitts' law, answer the followings: 7

i. Microsoft Toolbars offer the user the option of displaying a label below each tool. Name at least one reason why labeled tools can be accessed faster. (Assume, for this, that the user knows the tool and does not need the label just simply to identify the tool.)

ii. What is the bottleneck in hierarchical menus and what techniques could make that bottleneck less of a problem?

c) Humans are capable of retaining 7±2 items in the short-term memory. This phenomenon raises design implications to many user interface considering the design principle, 'Recognition is better than recall'. Figure 2 (a) and 2 (b) shows Search box interfaces in a mobile application.



(a) (b)

Figure 2: Search interfaces in a mobile application

Answer the followings:

i. For Figure 2(a) and 2(b), identify the tasks related to memory recall and recognition and list at least two problems related to concept of information retrieval. 6

ii. Redesign the interfaces of Figure 2(a) and 2(b) by drawing hand sketches. 6

4. a) Consider the searching task in the interface shown in Figure 2 (a) and 2 (b). You are given a choice to select two interaction styles for the task. One is writing query string in the search box and another one is giving voice commands using natural language. Use interaction framework to analyze interaction problems involved for the task. 15

Describe different gulfs with examples in each stage of the interactions for these two styles of interaction and justify which interaction style will give better user experience.

b) Micro-interaction is a kind of interaction that gives user experience of using an application far more involved and personalized. An example of a micro-interaction is the little thumbs-up hand icon within the Facebook Messenger app which grows larger the longer you hold your thumb on it. App developers have realized that their users simply adore these novel little features. 10

For the both of the interaction styles (Writing search strings and giving voice commands) in the interface of Figure 2(a), design two micro-interactions for each considering the interaction design issues with proper explanation. [Illustrate using hand sketches if required].