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ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)

ORGANISATION OF ISLAMIC COOPERATION (OIC)

Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION **SUMMER SEMESTER, 2021-2022**

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.

Answer **all 3 (three)** questions. Figures in the right margin indicate full marks of questions whereas corresponding CO and PO are written within parentheses.

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1. a) Explain how the Cognitive Computational Model, MHP can be used to compute the followings: 10 (CO2) (PO1)
   i. A user sits before a computer display terminal. Whenever any symbol appears, s/he is to press the space bar. What is the time between the stimulus and the response?
   ii. The user is presented with two symbols, one at a time. If the second symbol is identical to the first, the user is to push the key labeled 'YES', otherwise the user is to push 'NO'. What is the time between the stimulus and the response for the 'YES' case?

   b) According to KFF Health tracking poll from July 2020, many subjects reported negative impacts on their mental health and well-being over the ongoing period of COVID-19. They reported difficulties in sleeping, eating, stress related to isolation and job loss, symptoms of anxiety, depressions, suicidal attempts and so on. 15 (CO1) (PO1)
   Briefly discuss on the types of HCI applications and data domains including different technologies required to address the Mental Health issues for this scenario.

2. a) Cues related to human depth perception can be utilized for visual scene understanding in various real-life applications. Explain with example how depth cues could be effectively utilized in solving computer vision-based sign language recognition problem. 15 (CO2) (PO2)

   b) Define Fitts' Law and how it applies to user interface design. Apply your knowledge of this law to Figure 1 below and identify which target you think is the fastest to reach with the mouse starting at location *M*. Provide a brief reasoning for your choice. Assume that you can move your hand equally well in all directions, and that none of the targets are near a screen edge. Show the necessary calculations in your answer. 10 (CO2) (PO2)

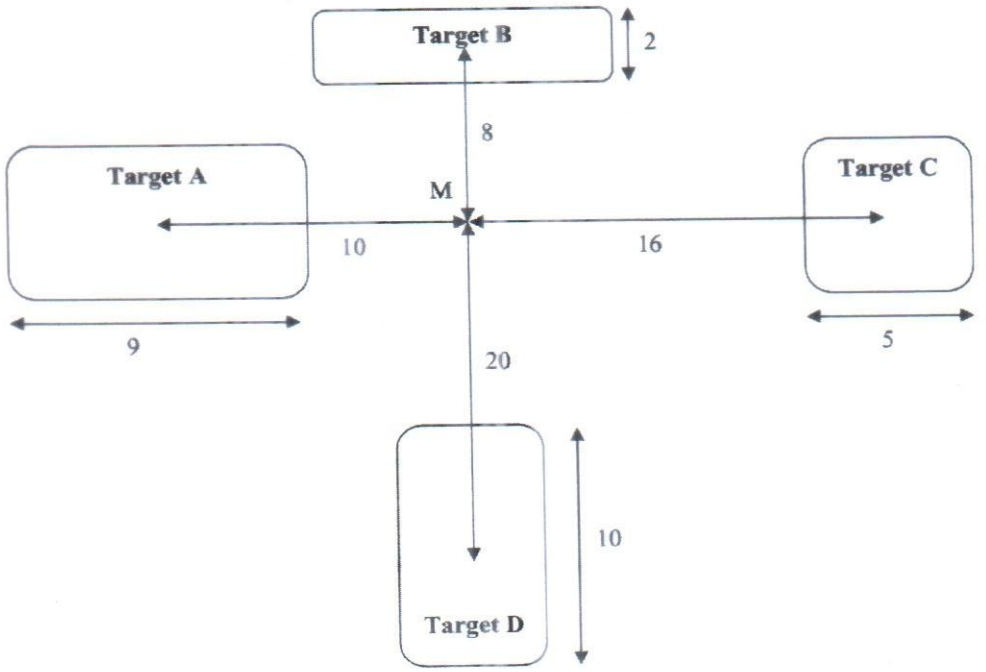

Figure 1: Design implication of Fitts' law

3. a) Consider the searching task in smartphone-based interfaces of an online courier service as shown in Figure 2 (a-d).

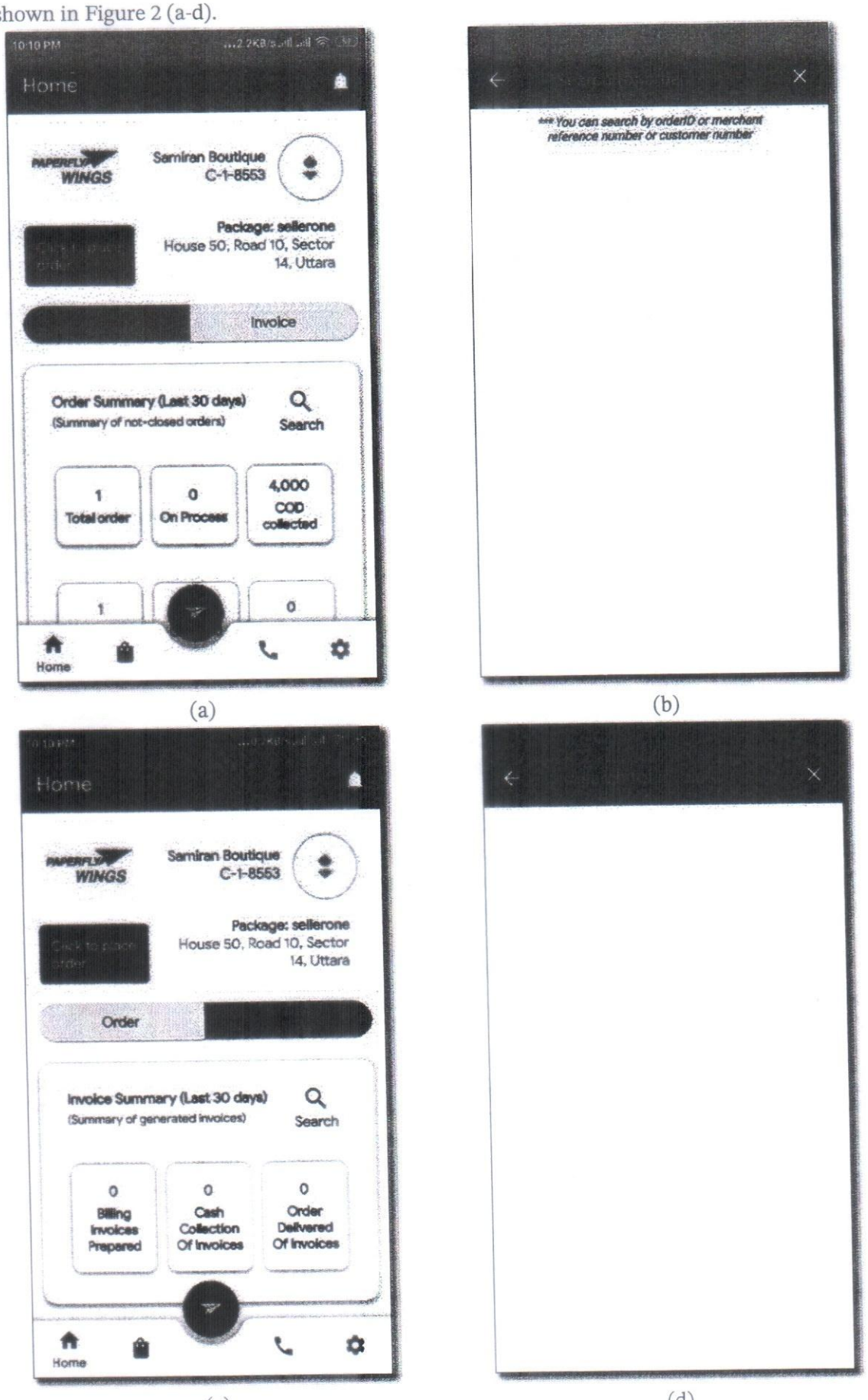

Figure 2: Example smartphone-based interfaces of an online courier service

You are given a choice to select two interaction styles for the task. One is writing a query string in the search box and another one is giving voice commands using natural language. You are asked to use the interaction model to analyze interaction problems involved in the task. Answer the followings:

i. Describe different gulfs with examples in each stage of the interactions for these two styles of interaction and justify which interaction style will give a better user experience. 6 (CO3) (PO1)

ii. How can you assess the mappings of different translation languages through the interaction model for the searching task through the interfaces of Figure 2 (a-d)? Explain your answer. 6 (CO3) (PO2)

iii. Identify the tasks related to memory recall and recognition and list at least three problems related to concept of information retrieval in the search interfaces of Figure 2 (a-d) 5 (CO3) (PO2)

b) Visibility, feedback, constrains, consistency, affordance are the design principles used by interaction designers to aid their thinking when designing for the user experiences. Give one example of each of the design principles mentioned with their design implications. 8 (CO3) (PO2)