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

MID SEMESTER EXAMINATION WINTER SEMESTER, 2017-2018
DURATION: 1 Hour 30 Minutes FULL MARKS: 75

CSE 6391: Advanced 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 you have a requirement to design a word-processing software for an amputee (i.e. a person having no upper-limb, e.g. hand). It has to support the standard set of word-processing tasks. Which combination of input and output devices would be suitable to support the intended interaction? You need to describe typical users' characteristics and identify how the devices are chosen to support these people in their tasks. Explain the major problems that the input and output devices solve. Describe your answer based on different aspects of Human-Computer Interaction (HCI). 10

   b) Consider that a user is texting a friend and is entering the word 'hello' on a mobile phone using predictive text entry (T9). After entering 4 (GHI), 3 (DEF), 5 (JKL), 6 (MNO), a word appears on the display. There are two possible responses. If the word is 'hello', it matches the word in the user's mind and the user presses 0 (space) to accept the word. This is the YES response. If the display shows some other word, a collision has occurred, meaning there are multiple responses in the key sequence. The user presses * (next) to display the next word in the ambiguous set. This is due to NO response.

      i. Model this scenario using Model Human Processor to find out the Reaction time by two type of users, 'slow-typer' and 'fast-typer'. 8

      ii. Map this scenario with human information processing steps and write your comments. 4

      iii. Explain how human performance may vary if this text-entry task in interleaved with another task (e.g. spell check) in the mobile phone. 3

2. a) One of the most important factors of Fitts' law is the distance between where the mouse pointer currently is and where it needs to be. Consider the interface in Figure 1, where interface elements are grouped based on similar elements. Comments on the button 'New Invoice' based on Fitts' law in action. 8
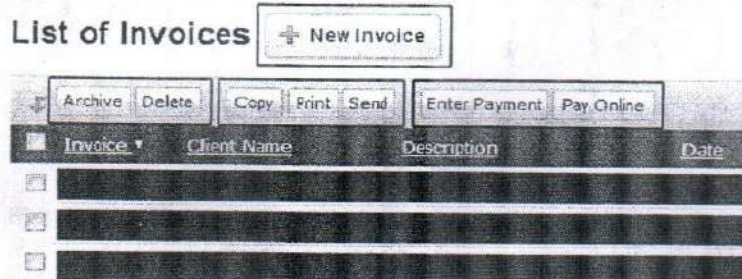

Figure 1: An interface

   b) In an interface, some UI elements are interactive (buttons, input fields, scrolling) and some are non-interactive. The visual cues including depth cues should be properly utilized to differentiate between two. Such visual features can resolve the ambiguity while performing the interaction. Explain how the visual cues can be applied to improve the visibility, affordance, feedback, constraints of the UI elements. 10

   c) Suppose you want to count voting by the attendees in a classroom to evaluate the class performance. You have to track different color amount with intensities and transfer them in a system that will perform data visualization. How do you apply different color for interaction? 7

3. a) What do you mean by 'gulf of execution' and 'gulf of evaluation' while doing interaction through computers? Consider the interaction framework in Figure 2. 8
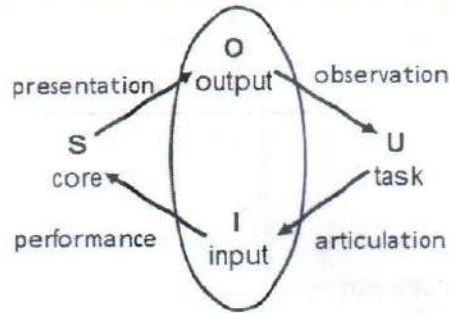

Figure 2: An interaction framework

Answer the followings:
   i. Redraw the framework indicating two gulfs (show in the figure) in a user interface.
   ii. In windows paint software, mention some poor mappings of articulation, performance, presentation, and observation.

b) 'Recognition is better than recall' – is the principle to reduce memory load. However, in few of the cases, the interaction designer needs to consider both of them. An example of such case could be to remember passwords to access the phone-banking system by the rural users. Propose an idea to merge memory recall and memory recognition techniques to remember passwords by the rural users. 12

c) Briefly explain human ergonomic factors with an example. 5

4. You are asked to design interaction dialogs using the right hand gesture. Deliberate pointing movement through finger can be considered as an input modality. Your design should utilize a set of gestures to control menu-driven interface. There are different types of menu such as selection menu, pop-up/pop-in menu, pull-down menu, pie menu, etc.
   a) What are the design considerations for menu-driven interface? 8
   b) Suggest a set of gesture-based interaction dialogue to control such menu-driven interface. 12
   c) Comments on the usability issues if you merge mouse-pointer-based menu and gesture-based menu to support multimodality as input. 5