

National Exams May 2015

04-Soft-B2, User Interface

3 hours duration

NOTES:

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made.
2. This is a CLOSED BOOK EXAM.
Any non-communicating calculator is permitted.
3. TEN (10) questions constitute a complete exam paper

FIVE (5) questions from PART A
FIVE (5) questions from PART B

The first ten questions as they appear in the answer book will be marked.
4. Each question is of equal value.
5. Most questions require an answer in essay format. Clarity and organization of the answer are important.

PART A: ANSWER FIVE OUT OF THE NINE QUESTIONS – EACH QUESTION IS WORTH TEN (10) MARKS

Question 1

Human information processing theory explains how cognition happens in the brain. The processes include, attention, perception, short-term/working memory, and long-term memory.

- A. What is a mental model? Why are mental models important to consider when designing user interfaces? Describe the relationships between mental models and information processing.
- B. Explain why, considering memory, it is a good practice to design a user interface that promotes recognition rather than recall? Provide **one** example to support your explanation.

Question 2

An iterative User-Centred Design (UCD) process is commonly used for interactive systems development. This process is often exemplified through lifecycle models for interaction design.

- A. Give a short description (or drawing if you prefer) of an iterative UCD process model you would use in software engineering to design user interfaces.
- B. Explain the iterative nature of the model in the development of a software application.
- C. At which design stage(s) in the model should the software engineer carry out user evaluation/usability testing?

Question 3

You have been hired by a company to design an interactive prototype (medium fidelity prototype) for a mobile application. What are the roles of *user interface design guidelines* when creating your prototype (i.e., why and how would you use user interface design guidelines).

Question 4

Your company is considering implementing User-Centered Design (UCD) into its product development process. As a software engineer experienced in this area, you have been asked to develop documentation to support the business case for UCD. Summarize **four (5) supporting arguments** you would use to convince the management team that UCD is a sound financial investment for the company.

Question 5

Selecting participants to take part in user-centered design activities is not an obvious task. Software engineers must carefully think about the recruitment process to ensure representative users and valuable feedback.

- A. How many participants should one select when conducting user testing? You may explain your answer using Nielsen's rule for participant selection.
- B. Under which circumstances should one test more users?

Question 6

Heuristic evaluation is a good approach to evaluate an existing user interface without involving its users.

- A. Describe what is meant by heuristic evaluation.
- B. Describe how, as a software engineer, you would conduct a heuristic evaluation on the user interface of an existing system.
- C. Identify **two** benefits and **two** limitations of heuristic evaluation.

Question 7

You have been hired as a software engineer to evaluate the possibilities of redesigning a user interface for an enterprise system. For each of the following groups, suggest **two** distinct concerns (worries) that might cause them to be reluctant (resist) to support the idea of redesigning the user interface.

- A. The users who currently work with the existing user interface.
- B. Their managers.

Question 8

Your company acquired software from a start-up company. The software comes with a Microsoft Windows User Interface that runs as a desktop application. After examining the software, you – the software engineer – realize that its graphical user interface does not contain any features related to **internationalization** and **localization**. Your manager asked you to prepare a report outlining the steps and work required to ensure this is corrected in future releases. Provide **five (5) steps/actions** that should be taken to implement **internationalization** and **localization** features in future releases.

Question 9

Interface Metaphors are power graphical user interface design tools.

- A. Define what is meant by an interface metaphor. Provide **one** example.
- B. Outline the **pros** and **cons** of designing a graphical user interface using a metaphor. Your answer must discuss the relationships between interface metaphors, mental models, and information processing.

PART B: ANSWER ALL QUESTIONS – EACH QUESTION IS WORTH 10 MARKS

Given the following case study, answer each of the questions below.

A Toronto medical clinic, Happy Medical Clinic, has decided to switch to an electronic health record (EHR) system to replace its current paper-based practices. Happy Medical Clinic purchased an EHR system from VisualEHR Inc. VisualEHR Inc. provides an off-the-shelf EHR system to many medical clinics in Canada. While Happy Medical Clinic is mostly satisfied with the solution proposed by VisualEHR Inc., some staff members at the clinic believe the off-the-shelf EHR software should include some level of customization to meet specific needs of Happy Medical clinic. After extensive negotiations, VisualEHR Inc. has agreed to customize their EHR solution to meet specific demands from the clinic.

Concerned about the general acceptance of the new EHR system by its staff members, Happy Medical Clinic is requesting the services of a software engineer to help them determine custom features that should be included in VisualEHR Inc.'s EHR solution. More specifically, Happy Medical Clinic needs the following services to be completed before going to back to VisualEHR Inc. with specific requests:

- 1- An assessment of the current tasks performed by the staff at the medical clinic;
- 2- An assessment of the capabilities of VisualEHR Inc.'s off-the-shelf EHR system;
- 3- A set of recommendations related to the level of customization required as well as specific features to be customized.

Answer each of the questions on the next page.

MAKE WHATEVER ASSUMPTIONS YOU NEED TO CONSTRUCT *POSSIBLE* ANSWERS. *Clearly state your assumptions.*

Question 10

Name **two** different classes of **users** relevant to this design project. For each class of stakeholders, provide the expected educational level, computer expertise, age range, and some other relevant demographics.

Question 11

Describe three different usability goals you believe are important for the design of the EHR software. For each goal, explain why you believe that particular usability goal is important.

Question 12

Describe *how* you would conduct a requirements analysis to inform your re-design of the current user interface. In your answer, include the data collection methods you would use as well as **one** advantage and **one** disadvantage of each method.

Question 13

Explain how you would create a low-fidelity prototype to show Happy Medical Clinic the proposed changes you believe should be made to the EHR software. How would you then transform your low-fidelity prototype into a high-fidelity prototype? In your answer, include all prototyping techniques used, who will be involved in the design of the prototypes, and describe the kind of prototype you would create.

Question 14

Describe *how* **observations, interviews, questionnaires, and user testing** may be used throughout the duration of your project.