IMIS DIPLOMA QUALIFICATIONS

Information Systems Development (D6)

Tuesday 10th December 2013 14:00hrs – 17:00hrs

DURATION: 3 HOURS

<mark>**ANSWERS**</mark>

Candidates should answer ALL the questions in Part A and THREE of the five questions in Part B. Part A carries 40% of the marks available and Part B carries 60%. Candidates should allocate their time accordingly.

No reference material of any kind may be taken into the examination.

[Turn over]

Part A: Answer all of the following 8 questions (5 marks each)

The purpose of these questions is to establish that the students understand the basic ideas that underpin the course. The answers should be largely descriptive and quite short.

1. Describe the main steps and deliverables associated with the analysis phase of systems development.

   Addresses LO1. This topic is addressed in Chapter 1 of the course text. The keys steps that must be mentioned are:

   Step 1 – Gather information from the project sponsor and users of the current system regarding its strengths and weaknesses. Use the problems identified to formulate objectives for the new system. [1 mark]

   Step 2 – Create new system concept: based on the gathered information, develop a general concept of the new system, including functions and capabilities it will have. [1 mark]

   Step 3 - Express ideas for the new system's processing and data requirements with process models and data models. [1 mark]

   The primary deliverable for the analysis phase is the system proposal, which combines the information generated during this phase into a document that expresses the initial conceptual design for the new system and the basis for the design decisions. [2 marks]

2. Describe the main steps and deliverables associated with the design phase of systems development.

   Addresses LO1. This topic is addressed in Chapter 1 of the course text. The keys steps that must be mentioned are:

   Step 1 – Design the system architecture: describe the basic hardware, software, and networking that will be used in the new system. [1 mark]

   Step 3 – Design the user interface: the overall structure of the system, the user's navigation through the system; the inputs and outputs of the system, and the appearance of the screens are designed. [1 mark]

   Step 3 – Design the database and/or files: develop specifications for the data storage structures that will be implemented for the new system. [1 mark]

   Step 4: Design the programs: develop plans and outlines for each program that will be written to implement the functions and capabilities of the new system. [1 mark]

The primary deliverable for the design phase is the system specification, combines all the design specifications mentioned above. The system specification is the basis for the construction work that will be performed by the programmers. [1 mark]

3. Explain the role that business process decomposition has in the construction of a set of Dataflow Diagrams.

   Addresses LO2. Most business processes are too complex to depict using one diagram [1]. Consequently, business processes are typically depicted with a set of DFDs, with the first diagram (Context Level) [1] showing a summary of the system, and subsequent DFDs showing processes within that system [1]. Decomposition is a method for breaking down a business process into smaller, logical processes[1] in a hierarchy of DFDs [1].

4. Explain the difference between logical process models and physical process models.

   Addresses LO2. The key point that must be made is that logical process models describe processes without suggesting how they are constructed [1]. Physical process models provide information that is needed to ultimately build the system[1]. The logical models show what needs to be achieved [1] the physical models describe how this will be done [1]. Sometimes physical models are developed of the existing system so that these can be logicalised to produce more abstract models of a new system the logical models can then be developed further before being translated into physical models of the new system [1].

5. Describe how the data model and process model should be balanced against each other.

   Addresses LO2, LO5 and LO6. The key point that must be made is that balancing DFDs and ERDs is concerned with recognizing that all system data must be accounted for on each type of diagram [1]. The ERD shows the system data 'at rest,' [1] while the DFD shows the flow and use of data in the system [1]. Generally, all of the data entities shown on the ERDs will correspond to data stores on the DFDs [1]. In addition, the attributes that are a part of the data model should be used somewhere in the flows and stores of the process models [1].

6. Describe the role of iteration in the development of Use Cases.

   Addresses LO3 and LO5. The examinee needs to explain that it would be difficult to get every detail right the first time through a use case, so we cycle through the steps iteratively until the use case is complete [1]. It is best to develop the major

*use cases and their basic information first [1] so that no major events are
forgotten [1]. Then, the inputs and outputs are added [1] and the detailed st...
are outlined [1]. As the inputs and outputs associated with each step are
identified, more details may be identified [1].*

7. Describe the basic process of User Interface Design.

   *Addresses LO4. We should expect examinees to refer to the basic process described in
   the course text. First, this involves identifying 'use cases' that describe commonly
   used patterns of actions that users will perform. [1]. Second, develop an interface
   structure diagram, defining the basic structure of the interface (screens, forms,
   and reports) and how the interface components connect.[1]. Third, develop
   interface standards, the basic design elements that will be used throughout the
   interface.[1]. Fourth, create prototypes of the various interface components
   (navigation controls, input screens, output screens, forms, and reports).[1].
   Finally, evaluate the prototypes and make changes as needed.[1].*

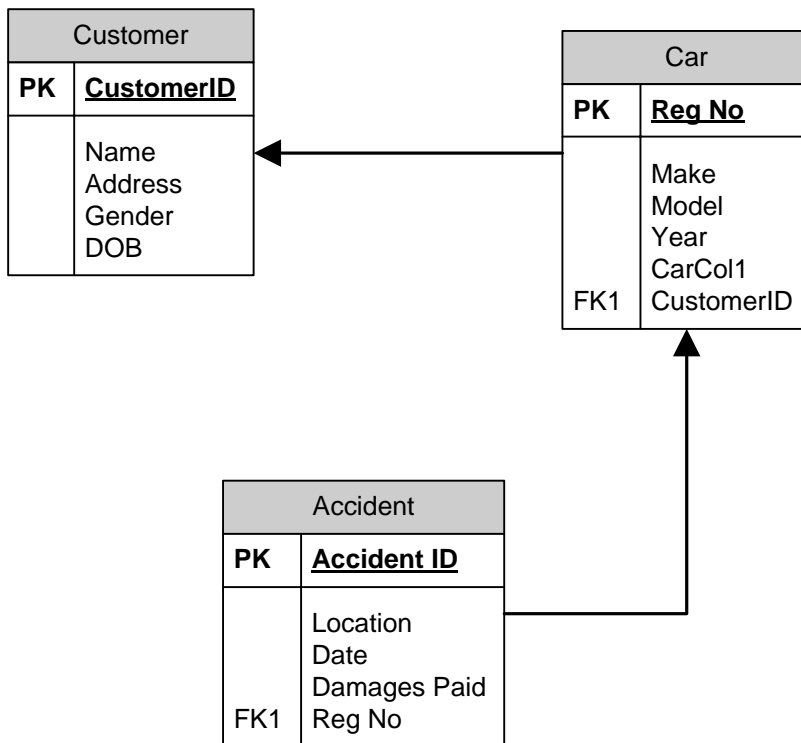8. Explain why standards are important in User Interface Design.

   *Addresses LO4. The examinee will need to show an appreciation of the way that
   standard interface elements have arisen that users have become familiar with [1]
   and are able to use effectively without training [1]. They should provide at least
   one example [1]. These standards help define the basic, common design
   elements in the system[1]. These standards help ensure consistency throughout
   the system [1].*

Part B: Answer 3 of the following 5 questions (20 marks each)

1. Develop an entity relationship model from the following information about a car
   insurance company:

   The company's customers own one or more cars each. We need to store each
   customer's name, age and gender and the make, model and age of each car. Each
   car has associated with it zero to any number of recorded accidents. We need to
   store the date and location of any accident along with the amount of damages paid.

   Model answer =

Customer	
PK	**CustomerID**
	Name Address Gender DOB

Car	
PK	**Reg No**
	Make Model Year CarCol1
FK1	CustomerID

Accident	
PK	**Accident ID**
	Location Date Damages Paid
FK1	Reg No

Addresses LO1. This topic is addressed in Chapter 7 of the course text.

2. The following questions relate to the use of a CRUD matrix in structured analysis and design.

   i)   Use a suitable example to explain the relationship between dataflow diagrams and entity relationship diagrams. (10 marks)

   ii)   Explain how the CRUD matrix can help to improve the quality of these diagrams. (10 marks).

Addresses LO3. This topic is covered thoroughly in Chapter 6 of the course text.

  I.   The examinee should explain that the data items used in the dataflow diagram must all be accounted for in the entity relationship diagram [2]. The illustrative example should present at least one dataflow and datastore [4] in a DFD fragment and show where the data items in these would be positioned in an ERM [4].

  II.   The examinee should provide an example of a CRUD (create, read, update, delete) matrix explaining that this will show how data is used by the processes within the system [4]. It should be explained that in the design phase, the matrix helps analysts ensure that all of the data stores used by the processes have been created [2]. This is a tangible way to link the processes from the process models and the data stores from the data model [1], ensuring that no data required by the processes has been

omitted from the data model [1]. It will also depict data from the data model that is not used by any processes [1], and should therefore be considered for elimination from the data model [1].

3. The following questions relate to the role of Use Cases in systems development.

   i)   Briefly explain how Use Cases are employed in user interviews or Joint Application Development (JAD) sessions. (6 marks)

   ii)   Explain why the event-response list is such an important part of the Use Case description. (8 marks)

   iii) Describe the best way to validate the contents of a Use Case Model. (6 marks)

   Addresses LO3, LO5 and LO6:

   i)   *A key point to be made here is that high-level Use Cases are relatively easy to understand (easier than DFDs for example) and prioritise [2]. In a JAD session simple descriptions might be posted on a wall with users being encouraged to rate the Use Case's relative importance so that the most significant Use Cases can be developed further first [2]. Most users can verbalize the content of a use case more easily than they can grasp drawing DFDs [1]. Use cases are easier to start with than DFDs for most users [1].*

   ii)   *The examinee must explain that the purpose of an event-response list is to provide an intermediate step between the requirements definition and use cases [2]. An example [4] should be provided of the way this leads to the identification of an interaction between the user and the system that can drive interface design and prototyping [2].*

   iii) *The contents of the Use Case Model can be validated through the use of storyboard or throwaway prototype interfaces [3]. At an earlier stage role-playing can be useful in confirming the validity of the use case. If the users execute the steps of the use cases using the written steps of the use cases as a "script" for actions to take, they will be able to find errors or confirm the correctness of the use cases [3].*

4. Suppose that a Veterinary Practice was interested in creating a new software system to allow customers to book appointments for their pets over the Internet.

    i)   What should the practice consider when deciding on whether to invest in a custom, packaged or outsourced system solution? (10 marks)

    ii)   What is an alternative matrix? How could it be used to help the practice decide on the most appropriate design strategy? (10 marks)

Addresses LO1. This topic is covered in Chapter 3 of the course text.

    I)   Need to describe each of the alternative design strategies with the strengths and weaknesses of each. These can be explained in a generic way.
    II)   Example matrix would be needed to be provided to show how alternative approaches could be evaluated for this specific project. There are examples of this type of matrix in the course text.

5. The following questions relate to User Interface Design.

    i)   Explain three important user interface design principles. (6 marks).
    ii)   Use a suitable example to explain how the process of user interface design can be driven by Use Case analysis. (10 marks)
    iii)   Explain how a system can be designed to be used by both experienced and first time users. (4 marks).

Addresses LO4. This topic is covered in Chapter 10 of the course text.

i)   The course text lists six principles of user interface design. The examinee should provide any three of these – 2 marks for each that is identified.

- *Layout - the interface should be a series of areas on the screen that are used consistently for different purposes.*
- *Content Awareness - the user is always aware of where they are in the system and what information is being displayed.*
- *Aesthetics - interfaces should look inviting and should be easy to use.*
- *User Experience - experiences users prefer ease of use, while inexperienced users prefer ease of learning.*
- *Consistency - users can predict what will happen before a function is performed.*
- *Minimize Effort - interface should be simple to use.*

ii) An example Use Case should be presented that describes how users will interact with the system using the primary path technique [6]. The point should be made that Use cases are developed for the most common ways of working through the system [2] and can be used as the basis for

identifying an interaction between the user and the system that will
supported through the design of the interface [2]. These use cases w
valuable in ensuring that the interface permits the users to enact these
cases quickly and smoothly.

iii) Experienced users prefer systems that focus on ease of use, while novice
users prefer systems that are easy to learn [2]. These two goals are not
necessarily mutually exclusive. Generally, systems should be set up so
that the commonly used functions can be accessed quickly, pleasing the
experienced users [1]. To assist the novice users, guidance should be
readily available, perhaps through the "show me" functions that
demonstrate menus and buttons [1].

A Questions	LO1	LO2	LO3	LO4	LO5	LO6
1	√					
2	√					
3		√				
4		√				
5		√			√	√
6			√		√	
7				√		
8				√		√
B Questions						
1	√		√			√
2		√			√	√
3	√					
4	√					
5				√		