BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 5 Diploma in IT

SYSTEMS ANALYSIS AND DESIGN

Monday 26th September 2011 - Morning
Answer FOUR questions out of SIX. All questions carry equal marks

Answer any Section A questions you attempt in Answer Book A.
Answer any Section B questions you attempt in Answer Book B.

*The marks given in brackets are **indicative** of the weight given to each part of the question.*

Calculators are **NOT** allowed in this examination.

Section A
Answer Section A in Answer Book A

A1. Compu-Fix is a computer repair company operating out of a small workshop. The owner, Lee, is the only person working in the company but he hopes to expand and employ one or two other engineers in the near future. At present Lee holds much of the information about repair jobs in a filing cabinet but this is rather disorganised. He realises that a computer system would be a better method especially as any new members of staff would also need access to this information.

When a customer brings in a faulty computer Lee logs the fault and the customer's details giving him/her an estimated date for the repair to be completed. Every day he checks the list of repairs and selects the jobs to be done that day. If he finds he doesn't have the required parts in stock for a repair he places a purchase order with his supplier and reschedules the job to a later date. When a repair is complete and the customer comes to collect the computer, Lee gives them an invoice and the customer pays immediately.

Once a week Lee checks his stock, and orders any parts that are getting low from his supplier.

a) Produce a top level data flow diagram of the Compu-Fix company.

(20 marks)

b) Compare a data flow model with another process model of your choice (for example a business activity model). There is no need to model the Compu-Fix scenario again but you should describe the notation of the process model you have chosen as part of your comparison.

(5 marks)

A2. a) Describe the Waterfall system development model and discuss the disadvantages of developing a system using this approach.

(10 marks)

b) Compare the life cycle of an agile method with the Waterfall life cycle you described in part (a). You should answer this question using an agile method of your choosing (for example: DSDM, eXtreme Programming, Scrum). Explain how the agile method you have chosen addresses the disadvantages you identified in part (a).

(15 marks)

A3. a) Identify the functional requirements of a new system for Compu-Fix (described in Question A1) representing them in a use case diagram. You must also identify the actor for each use case.

(11 marks)

b) Demonstrate how the construction of a CRUD (create, read, update, delete) matrix can help the analyst ensure all the functional requirements (or use cases) have been identified. This should include the use cases identified in part (a) and TWO entity types from the scenario. You do not need to produce an entity-relationship diagram.

(14 marks)

Section B

Answer Section B in Answer Book B

B4. The table below shows an example of a list of repair jobs in the Compu-Fix company described in Question A1.

Job code: C28	**Start date: 15/10/2009**	**End date: 19/10/2009**	**Customer name: A Smith**	**Customer tel. no.: 6071213**
	Part code: CPUInt	**Part details:** INTEL Dual Core E7600	**Supplier name:** CompParts	**Supplier tel. no.:** 6224546
	Part code: RAM	**Part details:** 2GB Samsung DDR3	**Supplier name:** Electronix	**Supplier tel. no.:** 5121314
Job code: M13	**Start date: 20/10/2009**	**End date: 23/10/2009**	**Customer name: P Jones**	**Customer tel .no.: 5081214**
	Part code: FuseM	**Part details:** Fuse FX3	**Supplier name:** Electronix	**Supplier tel. no.:** 5121314
	.....	**.....**	**.....**	**.....**

a) Normalise the table to produce a set of relations in the Third Normal Form. You must show all of your working explaining each step.

(18 marks)

b) Explain briefly how you would map an inheritance hierarchy in a class diagram to relational database tables. Consider TWO possible approaches.

(7 marks)

B5. a) Consider the following extra information about the Compu-Fix system described in Question A1:

"Compu-Fix plan to introduce two types of customers: individual customers and companies. This will allow Compu-Fix to carry out regular computer servicing jobs for various companies. The following data should be stored about each customer: *Customer number, Address, Tel number.* For individual customers *First name* and *Surname* are also stored, while for companies *Company name* and *Number of computers* are stored. "

"An object of class Computer consists of a System unit, a Keyboard, and a Monitor."

Explain the following relationships between classes using examples from the Compu-Fix company system to illustrate your answers:

i) Association,

ii) Aggregation or Composition, and

iii) Generalisation/Inheritance.

(15 marks)

b) There are many characteristics/attributes of a good software design. List FIVE of them and provide a brief explanation of each.

(10 marks)

B6. a) What is the difference between the dialogue and direct manipulation metaphors that are widely used to represent the user interface?

(6 marks)

b) i) Give a brief explanation of the role sequence diagrams play in systems modelling with the emphasis on designing the interaction between the user and the system

(6 marks)

ii) Produce a sequence diagram for the use case 'Create a new repair job' in the Compu-Fix system described in Question A1. A brief description of this use case is given below.

"The details of a customer and a computer's fault are entered by a manager. When the customer is 'new' then his/her record is created, otherwise the existing customer's record is updated. The system responds with an estimated end date of the job".

(13 marks)