THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATIONS
BCS Level 5 Diploma in IT

SYSTEMS ANALYSIS

30th April 2008, 2.30 p.m.-4.30 p.m.
QUESTION 1 is mandatory and receives 50% of the total marks available for this paper.
Candidates may select TWO of the remaining FOUR questions.
Time: TWO hours

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

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

1.	Cycle rickshaws are now a common sight on the streets of London. Imported from Asia, this form of transport is quickly becoming a lucrative and highly competitive business. Bangsar Cycle Rickshaws is a new company determined to be successful through the use of information and communications technology and they want a system that supports the following functions:

   A. Process a new booking by getting from the potential customer their requirements, checking that a rickshaw operator (RO) is available and that they are in the right area using the GPS function built into the handheld computer that RO's use. If we have someone available and in the right area, we accept the booking, record it, allocate it to an RO and advise the customer of the booking number and the estimated time of arrival of the rickshaw. Booking are communicated to our RO's via their hand-held computers.
   B. Using hand-held computers, RO's record details of all 'hires' and bookings they undertake during a shift. Details recorded include start and end time, start location, destination and total amount charged for the hire or booking. This information is automatically transmitted back to base in real time.
   C. The system will record details of a shift once it's over. This includes details of the RO, the rickshaw used, total number of hires and bookings, the total time 'hired' and the time spent waiting during the shift.
   D. Each Thursday night (or as requested by the Manager) the system should run a process that calculates RO wages. Currently we do this by adding up the total number of hours worked, multiplying it by the RO hourly pay rate and then calculating 10% of the overall income earned by the particular RO in the given week. We then store these details in the 'pay file' and produce a print out for the Manager.

   In supporting these processes we need to store details of:
   * The thirty eight licensed RO's the company employs. We record their name, address, email address, telephone number, hourly pay rate, RO's license number and its expiry date.

- The fifteen rickshaws that the company own, each of which is identified by a given number between 1 and 15. We need to store details of when it was purchased, details of any visible damage and when it was last serviced.
- Which RO the Manager allocates to which rickshaw for their 10 hour shift (i.e. a period of work) and the details of which hand-held computer they are issued with.
- All bookings made and to which RO they are allocated.

a) Draw a Top Level Current Logical Data Flow Diagram for the above scenario.

(15 marks)

b) Produce an Entity Relationship Diagram (Logical Data Structure) and a set of normalised tables for the above scenario. DO NOT show evidence of the normalisation process.

(20 marks)

c) The third view of systems in structured systems analysis is often the Entity Life History (ELH). Using an entity from the scenario outlined above produce an ELH diagram that shows the main constructs used in this form of systems modelling and explain the role of ELH in checking the process and data models.

(15 marks)

2. Agile and Rapid Application Development (RAD) approaches aim to deliver business solutions within a shorter timeframe than more traditional approaches.

a) Identify the advantages and disadvantages of adopting an Agile or RAD approach.

(9 marks)

b) Describe TWO techniques that are used in Agile or RAD approaches to help achieve the rapid delivery of an information system. Explain how each technique helps to achieve the aim of rapid delivery.

(16 marks)

3. a) Explain, using examples, the difference between 'functional' and 'non-functional' requirements.

(12 marks)

b) Describe what you would expect to find in a User Requirements Specification.

(13 marks)

4. Avison and Fitzgerald (2006) define 'tools' as 'software packages that support the analysts and users in particular aspects of the application development process'.

   a) Describe THREE different types of software tool that can be used in the Systems Analysis phase of a project.

   (9 marks)

   b) For EACH of the three types of tool you have identified in your answer to 4 a), explain the benefits they can bring to the Systems Analysis phase of a project.

   (16 marks)

5. Identify TWO models built during the Systems Analysis phase of a project using an Object-Oriented approach to systems development, and for EACH one:

   a) Explain its purpose;

   (10 marks)

   b) Sketch an example to demonstrate the notation.

   (15 marks)