

THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATIONS Diploma

SYSTEMS ANALYSIS

20th October 2005, 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.*

1. Top Speed Garage

Top Speed Garage carries out the repair and servicing of motor cars. An information system is required to hold details of cars, their owners, and of the repair and servicing jobs that the garage undertakes. A car has one owner, although some owners have more than one car. A record of the names of mechanics working for the garage together with their unique employee number will also need to be kept.

When a client contacts the garage, the clerk taking the call first checks whether it is an existing client. If it is not an existing client, the details of the new client are added to the system. The car is then booked in for service or repair; the registration number, make, model, year and approximate mileage of the car are taken and a note is made of whether the client needs a repair or a service. The clerk also makes a note of any faults described by the client. After checking the records of cars that have already been booked in, a day and time for the repair or service (called a 'job' by the garage, and given a unique job number) is agreed.

The garage manager is responsible for allocating mechanics to carry out each job. Sometimes a team of mechanics is required; in this case, one of them is designated the 'chief mechanic'. For more straightforward jobs, a single 'chief mechanic' is allocated. Each job might require the use of one or more standard parts (although some jobs do not require any parts). A standard part has a part number, description and a unit price.

The chief mechanic is responsible for recording the parts used for a particular job, the quantity of each part used and the time taken to fit them (for example there might be complications in removing the old part from the car). The chief mechanic is also responsible for recording the time spent by each mechanic on each job. When the job is complete the clerk prepares a bill for the client. On payment of the bill, the clerk updates the job record to show that it has been paid for.

- 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. You **DO NOT** need to show evidence of the normalisation process. **(20 marks)**
- c)
 - i) Define what is meant by the concept of an 'Actor' on a Use Case Diagram. **(3 marks)**
 - ii) Identify the Use Cases carried out by the **CLERK** at Top Speed Garage. Draw a Use Case Diagram *showing these Use Cases only*. You should have at least one example each of the <<include>> and <<extend>> stereotypes. **(12 marks)**

Turn over]

2. a) Explain the purpose of a Feasibility Study and identify the areas of feasibility that are normally considered in such a study. **(10 marks)**
- b) Describe and justify the contents of a Feasibility Study Report. **(15 marks)**
3. a) What does 'Quality' mean in information systems development? **(5 marks)**
- b) Propose, explain and justify TWO quality assurance procedures that could be used to support the systems analysis stage of a development project. **(20 marks)**
4. a) List FIVE criticisms of the Systems Development Life Cycle approach that you feel the management of Top Speed Garage should be aware of before their system is developed using this approach. **(5 marks)**
- b) Identify the stages of the Systems Development Life Cycle that may be used in developing the Top Speed Garage system and describe the activities that would take place in each stage. **(20 marks)**
5. Briefly explain, with a UML example of usage, any FIVE of the following terms as used in systems analysis:
- a) Inheritance
 - b) Aggregation
 - c) Composition
 - d) Activity diagram
 - e) Association class
 - f) Collaboration diagram
- (5 x 5 marks)**