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The British Computer Society  
1 Sanford Street  
Swindon  
Wiltshire  
United Kingdom  
SN1 1HJ

# THE BRITISH COMPUTER SOCIETY

## THE BCS PROFESSIONAL EXAMINATION Diploma

### OBJECT ORIENTED PROGRAMMING

28<sup>th</sup> April 2000 - 2:30p.m. - 4:30p.m.

Answer FOUR questions out of SIX. All questions carry equal marks.

Time: TWO hours.

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

1. An online retail company wishes to implement a Web-based marketing system with facilities to aid their purchasing and stock control. The outline requirements for the system are as follows:

All customers must be registered with the system. There should be a screen that allows them to do this on a fill-in-the-form basis. If they fill in all the details required and a valid email address they will be issued with a customer registration number. Registered customers may purchase online. Typically they will browse through details of the goods available and select one or more items. If an item is out of stock it will not be displayed whilst a customer is browsing. When they have selected all the items they require they can then move to a screen which enables them to enter their customer number and complete the purchase. Once ordered, goods are sent to a customer by a dispatcher. Every morning the dispatcher requests a list of goods that are to be sent out. The list contains the names and addresses of all the customers who have made an order on the previous day and the items they have ordered. A buyer determines the range of items that are for sale. A buyer can add new items to the online catalogue and discontinue the sale of existing items. Each morning the buyer requests a list of those items for which the quantity in stock is lower than their re-order level. Items on this list are re-ordered. When new stocks arrive they are received by a warehouseman who records the new stock levels on the computer system.

- a) Draw a use case diagram for this system. **(10 marks)**
- b) Develop a use case description of the way a customer orders goods. Your answer should show a normal sequence and also list some alternate sequences. **(15 marks)**
2. You have taken over the job as Test Team Leader for a project which is just completing the requirements phase. The development will be undertaken by three teams of six people. The project is using object-oriented techniques. There will be five increments of two months each, followed by a three-month integration and system test period.
- a) Provide a brief description of the testing approach you would use. **(5 marks)**
- b) Develop an outline test plan and test schedule. **(15 marks)**
- c) Describe what inputs you would expect to use to develop the plan. **(5 marks)**

3. Methods and attributes of a class have the following visibility scopes: private, protected, and public.
- a) Explain the meaning of each term. **(9 marks)**
  - b) Describe how to use each visibility scope for both an attribute and a method to meet the rules of good programming practice. **(12 marks)**
  - c) State what the effects of your answers, to the previous part of this question, have on maintainability and run-time performance. **(4 marks)**
- 4.
- a) Explain what is meant by the term *pattern* in the context of object-oriented development. **(5 marks)**
  - b) Describe **FOUR** patterns with which you are familiar, stating the problem they address and the basis of the solution they offer. **(20 marks)**
5. Describe the following features of an object-oriented language. Illustrate each with an example code fragment or diagram.
- a) single inheritance **(5 marks)**
  - b) multiple inheritance **(5 marks)**
  - c) polymorphism **(5 marks)**
  - d) abstraction **(5 marks)**
  - e) specialisation **(5 marks)**
- 6.
- a) Explain the process of *iterative and incremental development*. **(8 marks)**
  - b) How does incremental development help contain the risks inherent in system development? **(7 marks)**
  - c) Discuss the suitability of the use of object technology in an iterative development process. **(10 marks)**