

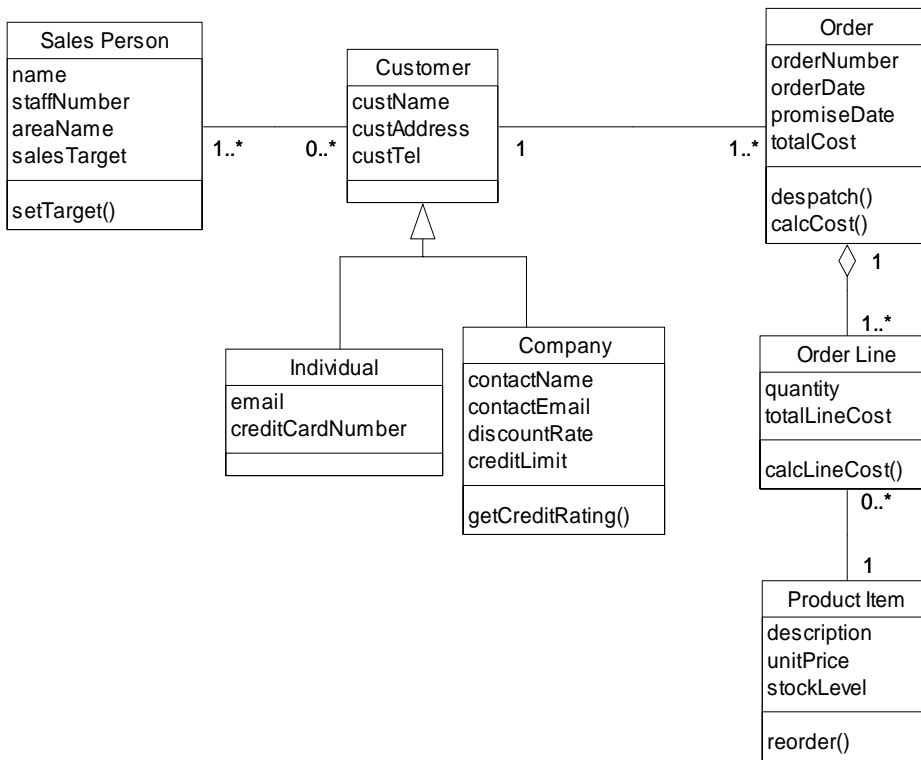
THE BRITISH COMPUTER SOCIETY
THE BCS PROFESSIONAL EXAMINATION
 Diploma
SYSTEMS DESIGN

26th April 2004, 2.30 p.m.-4.30 p.m.
 Answer FOUR questions out of SIX. All questions carry equal marks.

Time: TWO hours

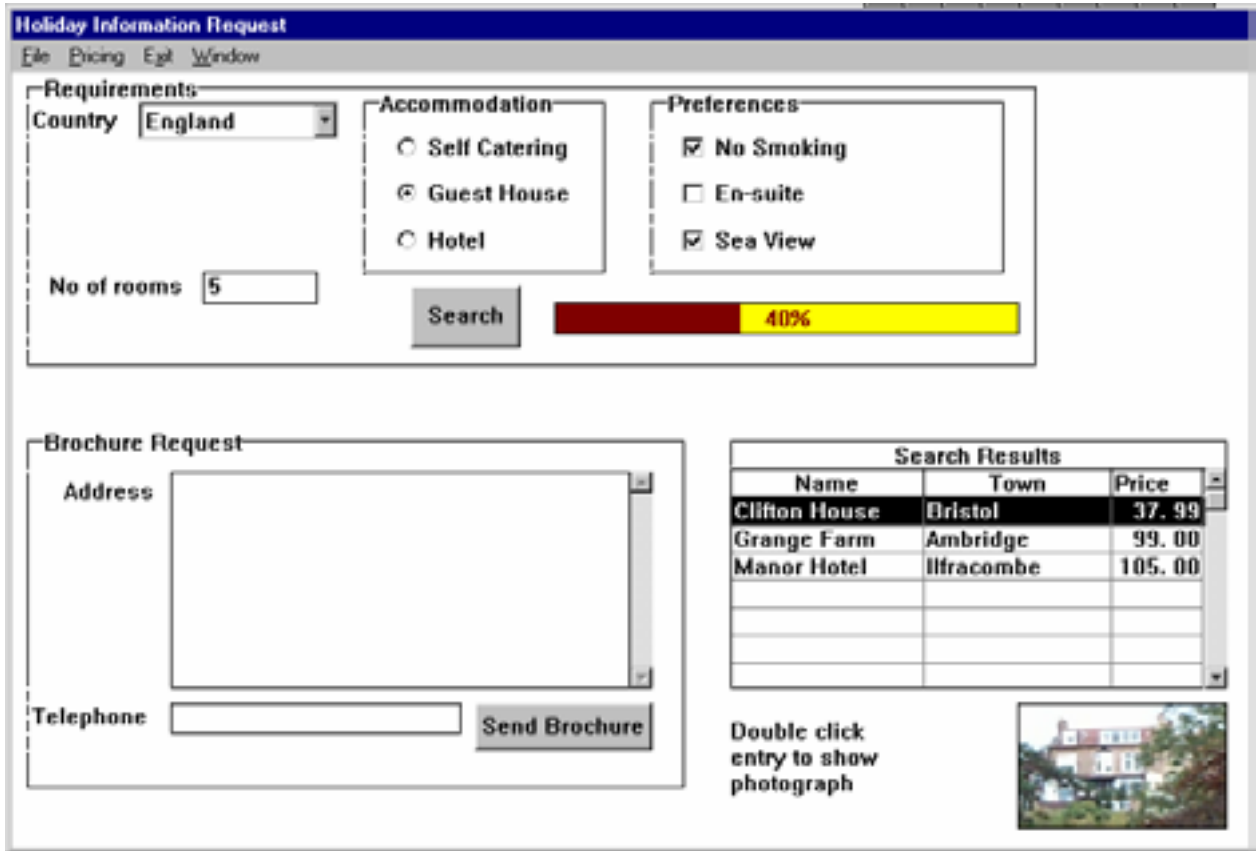
*The marks given in brackets are **indicative** of the weight given to each part of the question.*

1. The following class diagram fragment is part of a design for an order processing system. It is to be mapped to a Relational Database Management System (RDBMS).



- a) Briefly explain how each of the following elements of the class diagram may be mapped:
- i) class **(2 marks)**
 - ii) a one to many association **(2 marks)**
 - iii) a many to many association **(2 marks)**
 - iv) the 'Customer' inheritance hierarchy **(5 marks)**
 - v) the 'Order-Order Line' aggregation **(4 marks)**
- b) Produce a suitable relational schema (set of normalized tables) for the above class diagram. **(10 marks)**

2. The GUI window illustrated below contains various different components, including Menus, Drop-down list, Radio-buttons, Check boxes, Command Buttons, Text and Number Fields, Groups, a Picture and a Thermometer.



Draw an object class (inheritance) hierarchy showing the various component classes illustrated.

You should use either the general format illustrated below or another notation with which you are familiar.

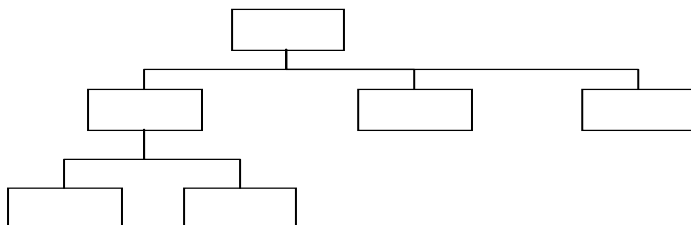
Each box should show the class name and one or more attributes appropriate to that class.

The top class should be called "all screen objects" and show some attributes appropriate to all screen objects.

You should show AT LEAST NINE different classes (9 marks)

AT LEAST EIGHT Subclass:Superclass relations (8 marks)

and AT LEAST EIGHT different attributes. (8 marks)



3. Write a **BRIEF** explanation of **FIVE** of the following terms as used in Object-Oriented systems design. You should illustrate your answer with an example and/or diagram, as appropriate:
- i)* encapsulation (5 marks)
 - ii)* sequence diagram (5 marks)
 - iii)* software reuse (5 marks)
 - iv)* package diagram (5 marks)
 - v)* statechart (state diagram) (5 marks)
 - vi)* coupling and cohesion (5 marks)
 - vii)* deployment diagram (5 marks)
- (5 x 5 marks)**
4. *a)* With the aid of a diagram, briefly describe each of the following System Development Life Cycles (SDLCs):
- i)* The Traditional Waterfall Approach
 - ii)* Rapid Application Development (RAD) (15 marks)
- b)* Outline the way in which logical and physical design activities are organised within each of the two above SDLCs. (10 marks)
5. *a)* Describe FIVE different mechanisms by which a user can navigate from one window to another within a GUI based system. (5 x 2 marks)
- b)* Briefly explain the issues to be considered when designing the navigation between windows in a multi-window interface. (15 marks)
6. *a)* Briefly explain FIVE different types of on-line help that may be provided within a system. (5 x 2 marks)
- b)* Explain FIVE principles that should be applied to the design of effective on-line help.
- Include both general design considerations, as well as those specific to a 'help' system. (5 x 3 marks)