

2006 Paper 2 Question 7

Software Design

The William Gates Building has a centrally managed security system, dividing the building into zones to which different classes of user can gain access. All building users are issued with security cards that let them pass through doors into permitted zones.

(a) Imagine you are designing the security system from scratch. Draw *two* diagrams suitable for discussing the operation of the system with

(i) future building users;

(ii) client engineering staff who will approve and manage the data model.

[4 marks each]

(b) Outline a project plan suitable for the management of this project, including a brief explanation of the kind of activity to be carried out in each phase.

[6 marks]

(c) The glass front doors to the building, originally conventional manual swing doors that required card access outside working hours, were inappropriate for wheelchair access. It was decided to replace them with automatic doors that slide open as you approach.

Draw *two* statechart diagrams showing the behaviour of the doors

(i) before this change;

(ii) after this change, when the door operation state must be combined with the operation of the access-control system.

[2 marks each]

(d) If the software to control the sliding doors were to be implemented as an additional component of the security system, what earlier design precautions might have made such a change more straightforward? [2 marks]