Answer ALL of Part I and TWO questions from Part II

You are advised to spend not more than 1 hour on Part I.

Part I

1. Consider the following informal outline specification:

"A program is required to run the controller of a burglar alarm system. A typical system consists of a number of sensors connected by individual circuits to a central control box containing the controller. The control box has a simple keypad and display. Sensors include switches, heat detectors and motion detectors. Each sensor has an identification code which can be read by the controller to identify the sensor. The controller allows an operator to select which sensors are active and turn on or off the system. If a sensor is triggered when the system is active, the controller must activate the alarms (a siren and a bell) and display a message on the display panel indicating which sensor is involved. The operator must enter a security code before the system is turned on or off."

a) Identify a set of classes which might be used to model the system from an object-oriented point of view. Use the classes to construct a class diagram to show the structure of the system. Show the key attributes and methods of each class on the diagram.

[20 marks]

b) Construct a State Chart model of the system.

[20 marks]

c) Explain, in the context of the models you have produced, what is meant by saying: "a good specification should be correct, consistent and complete".

[10 marks]
[Total 50 marks]

Part II

(Answer two of the following questions.)

2.   Describe each of the following, including examples:
   Cohesion and Coupling
   Requirements Traceability
   Design Pattern
   Life Cycle Model
   Methodology

[5 marks each]
[Total 25 marks]

3.   a) What makes software design hard?

[6 marks]

   b) "Structured development is fundamentally flawed." — is this a fair statement? Discuss the merits of the claim.

[9 marks]

   c) Outline the CMU-SEI process maturity framework. Describe the process improvement actions required in order to move from each level to the next.

[10 marks]
[Total 25 marks]

4. a) Construct a network based on the following restriction list.

Activity	Duration	Restriction
A	3	A<E,F
B	5	B<C,D,E,F
C	3	C<H
D	4	D<G,H
E	6	E<G,H
F	7	
G	4	
H	5	

From the given durations calculate the boundary times. If the ES for the first event is 23, what is the LF of the last event?

[20 marks]

b) The double maintenance, shared data and simultaneous update problems are characteristic problems of configuration management. Briefly describe them.

[5 marks]
[Total 25 marks]

END OF PAPER