COMP23420

One & half hours

QUESTION PAPER MUST NOT BE REMOVED FROM THE EXAM ROOM

UNIVERSITY OF MANCHESTER
SCHOOL OF COMPUTER SCIENCE

Software Engineering

Date: Tuesday 22nd January 2013

Time: 14:00 - 15:30

Answer ALL the multiple choice questions in Section A

and

answer ONE Question from Section B

This is a CLOSED book examination

The use of electronic calculators is NOT permitted

[PTO]

Section A is restricted and cannot be published

Section B

Answer one of the two questions in this part.

2. The José Jones Engineering company undertakes bespoke, small scale engineering jobs, such as small bridges, sea defences, harbours and tunnels for private clients. They wish to put their company's business process on-line so that clients can submit job specifications more efficiently and reduce the currently lengthy process of finalising a job contract from 90 working days to 30 working days.

   The company's overall business process includes processing requests, gathering clients, settling accounts and setting up contracts with clients. The software engineering project to be undertaken is to do with processing engineering job requests from submission of the request to the signing of the job contract; other parts of the overall business process are supported by other systems within José Jones Engineering.

   In the system to be built, the client will sign on to the secure system so that both client and the job they want remain private. The client gives their customer details and describes their job request, which is put into the job request database. A separate system is used by clients to become a client of José Jones Engineering.

   Once submitted, the request is checked by a contracts manager to make sure the request is within the scope of the existing contract. If it is out of scope, it leaves the process and is given to the contracts department for further negotiation.

   Once it has passed the contract check, it is classified to type of job by one of the company's trained engineers as to whether it is civil, aeronautical, mechanical or other type of engineering. The request is then passed to one of the specialist engineers, who will write a job specification in engineering terms, liaising with the client outside the system to clarify points as necessary. Aeronautical engineering jobs are treated separately as José Jones Engineering works with another company to write a specification, the system to be built must interact with this third party company's system to support that part of the business process.

   Once specified, the specification is entered into the system and then costed by the José Jones Engineering accounts department; the costing is attached to the job specification. The job package is then passed back to the client via the system. The client then checks and approves the specification, negotiating any amendments as necessary with the José Jones Engineer and the accounts department; an audit trail is kept of any amendments made. This step can be repeated many times until a satisfactory specification is reached. Once approved by both client and José Jones Engineering, the job is signed off and passed out of the system to the operations department.

The whole process should take 30 working days or fewer, with the client contract checking taking 3 working days or fewer, the specification stage taking fewer than five working days and the accounting taking five working days or fewer. All jobs must comply with the José Jones Engineering code of ethics and the UK government's various regulations in the area.

a) give two of the non-functional requirements in the scenario above? (2 marks)

b) give two of the functional requirements in the scenario above? (2 marks)

c) Draw an activity diagram for the system outlined in the scenario above; state any assumptions made. (6 marks)

d) List the actors within the system scenario above; state any assumptions you have made. (4 marks)

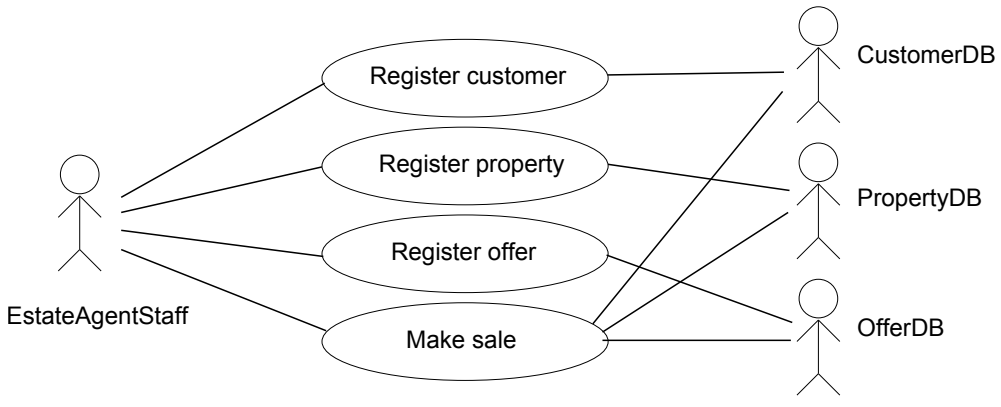
e) List each of the use cases and their actors (with primary actor underlined) for the system outlined in the scenario above; state any assumptions made. (6 marks)

3. a) i) Briefly explain what a structural model is. (2 marks)

ii) Briefly explain what a behavioural model is. (3 marks)

b) Consider the following scenario:

An estate agent is planning a computer system to manage its property selling operation. The use case diagram for the system is as follows:



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The system should allow the estate agent staff to register new customers, register properties for sale, register offers for properties, and make sales. All new customers have to present themselves in person to the estate agent, whose staff then register the customers.

Prospective sellers have to provide relevant information, such as property details and asking price, to the estate agent in person. Estate agent staff then register the property, along with the information.

Prospective buyers can make an offer on a property. They also have to do this in person at the estate agent. Estate agent staff then register the offer.

To make a sale, estate agent staff must pass on an offer on a property made by a buyer to the appropriate seller. If the seller agrees to the offer price, then the sale is made. Otherwise, the sale is not made.

i) Identify domain classes that realise the use cases, and draw the class diagram for the domain model. Explain and justify your answer. (5 marks)

ii) Suggest suitable system classes that refine the domain classes. Draw a class diagram for the system classes. (5 marks)

iii) Draw a sequence diagram to show how the use case 'Make sale' is realised by your system classes. (5 marks)

END OF EXAMINATION