

One and a half hours

QUESTION PAPER MUST NOT BE REMOVED FROM
THE EXAM ROOM AND MUST BE RETURNED

**UNIVERSITY OF MANCHESTER
SCHOOL OF COMPUTER SCIENCE**

Software Engineering

Date: Tuesday 21st January 2014

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 of
this
examination is
restricted***

Section B

Answer one of the two questions in this part.

2. Consider the following scenario:

The University of Understanding (UOU) wishes to automate the application process for potential PhD students. A candidate applies using a third party Web application used by many universities. The candidate's details are sent to the UOU's admissions department and stored in the admissions database.

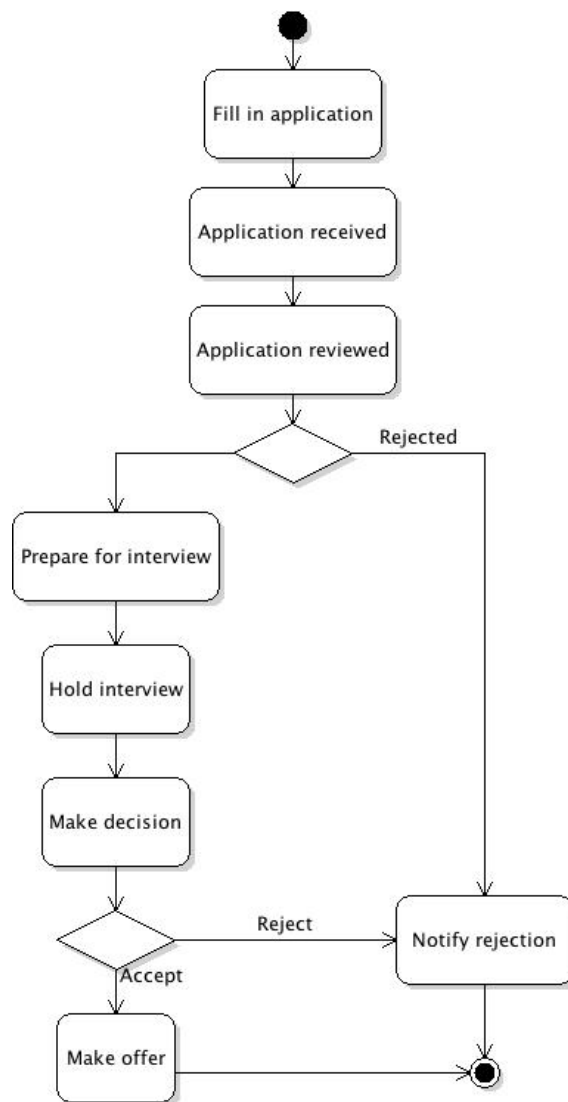
UOU's admissions process 'as is' is as follows:

An admissions tutor reviews the application and decides whether to interview the candidate, flagging the decision in the admissions database. If a candidate is not being asked for interview he or she is notified by a member of academic support staff. Successful candidates are invited to an interview on a given date. If a response is not received in three days, a prompt is sent; this happens three times. If still no response is received, the candidate is flagged as not responding in the admissions database.

While this is happening, the academic named on the form as a potential supervisor is sent information about the interviewee.

After the interview, the academic makes a decision, which is stored in the admissions database. Candidates are given an offer, or notified of rejection.

The activity diagram below has been drawn to represent UOU's admissions system 'as is' using the information in this scenario.



Inspect the activity diagram and answer the following questions, using the information in the scenario:

- Are there any activities in the diagram that should not be included? Give your reasons, stating any assumptions you make. (4 marks)
- Are any activities missing? For each activity, illustrate your answer by quoting the relevant portion of text. State any assumptions you make. (4 marks)
- Is the flow through the diagram appropriate? Describe any elements that are missing or included without justification. Illustrate your answer by quoting the relevant

portion of text. State any assumptions you make. (4 marks)

d) Is any information missing from the scenario? Describe any further questions it might be necessary to ask the customer, stating any assumptions you make. (2 marks)

e) Name three of the possible use cases for the UOU admissions system. For each use case, identify their participating actors. State any assumptions you make. (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:

A village library is run by a group of part-time librarians, under the supervision of a full-time chief librarian, using a manual paper-based system.

The chief librarian has decided to install a software system to computerise the library's operations. Apart from issuing books for lending, and accepting returned books, the library staff also catalogue newly acquired books and issue fines on late returns.

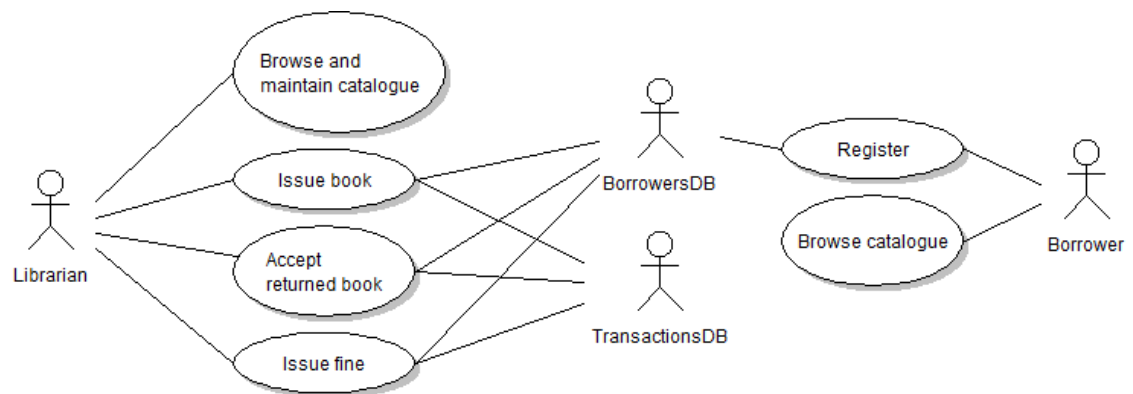
With the new computer system, the staff have to set up the catalogue from scratch, and maintain it as new acquisitions arrive and old items get deleted. They also have to maintain a database for the lending and returning transactions.

For fines on overdue books, different rates apply to different categories of borrowers. There are three main categories: children, adults and old-age pensioners.

Borrowers must be registered with the new system; they can use the system to register themselves.

Registered borrowers can use the system to browse the catalogue. However, they can only borrow books from, and return books to, the librarians.

The use case diagram is as follows:



- i) Identify domain classes that realise the use cases, and outline the class diagram for the domain model. Explain and justify your answer. (5 marks)
- ii) Suggest suitable system classes that refine the domain classes. Outline a class diagram for the system classes. (5 marks)
- iii) Draw a sequence diagram to show how the use case 'Issue fine' is realised by your system classes. (5 marks)