Session 16 - Revision

All quizzes, lectures of chapters 5-9.

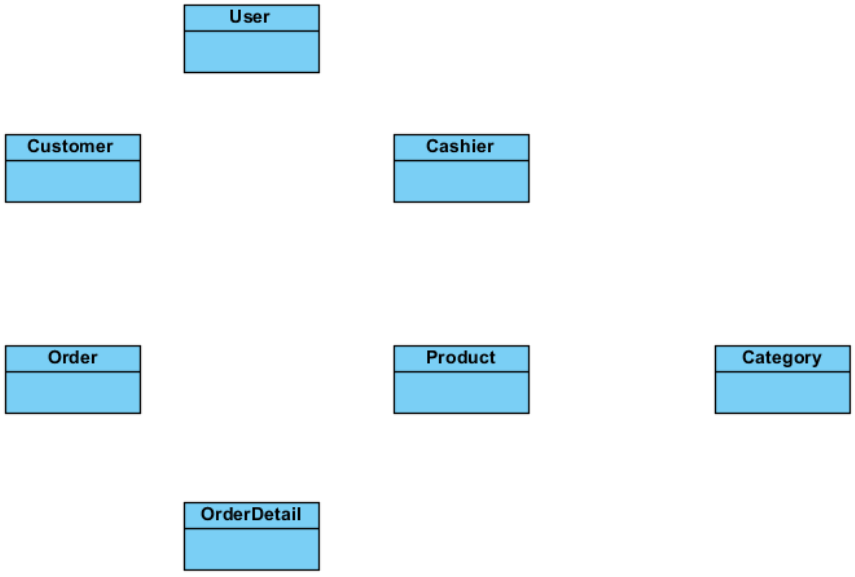
➔ Class diagrams, System architecture patterns, use cases → Object classes, Software testing, Evolution, legacy system assessment

Final exam: 90' – closed book, allowing 2 A4 papers for notes

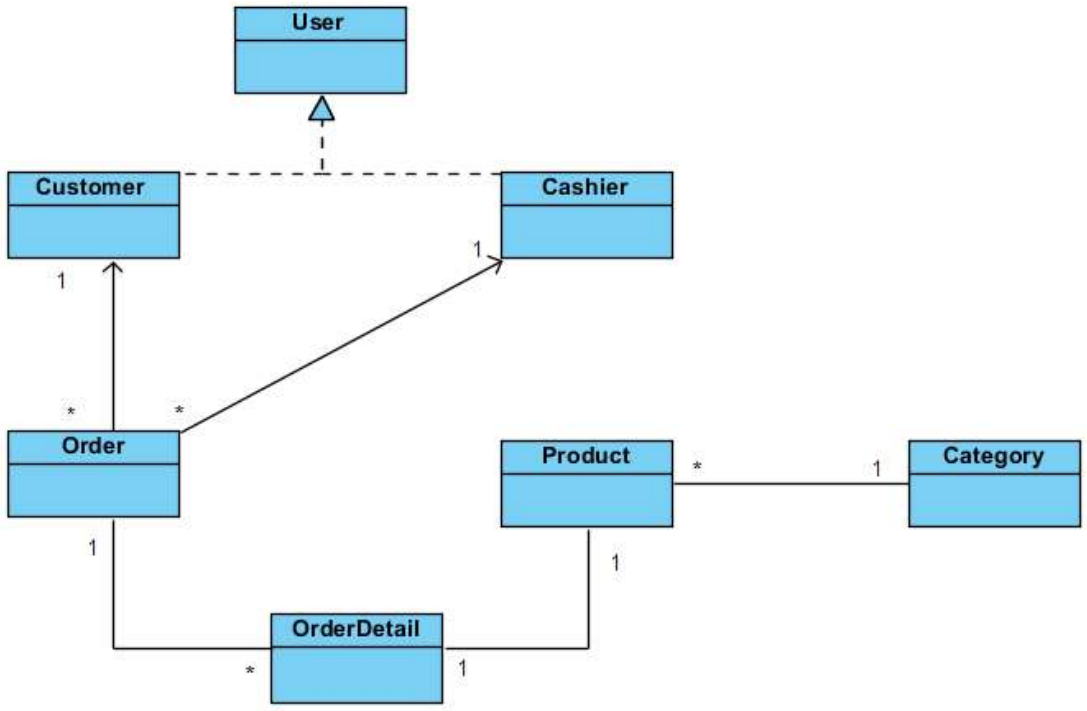
- MC Qs
- Short answer Qs
- Case studies: Software testing, class diagrams

Exercises

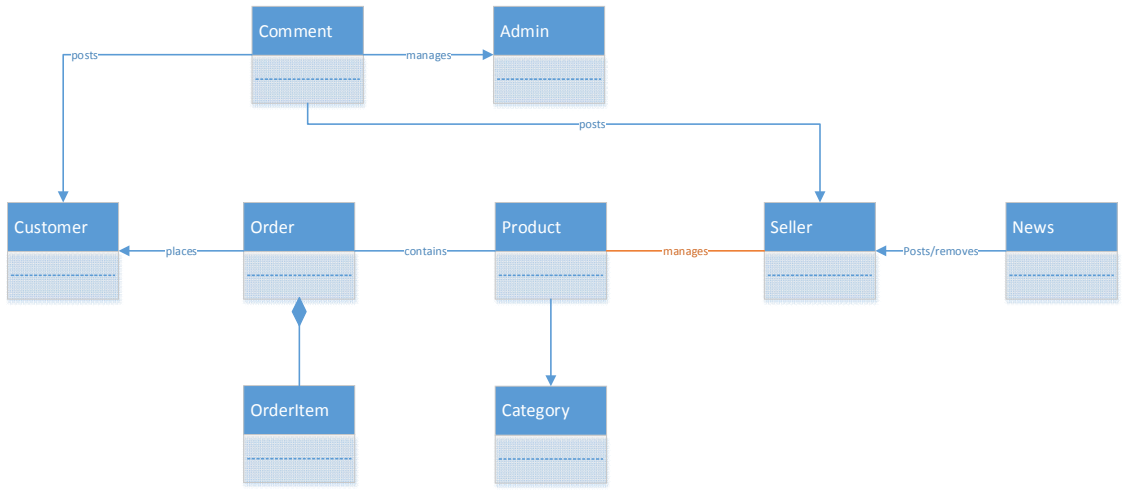
1. Complete the class diagrams given the following scenarios, you might specify some more business constraints.
   a. In a supermarket, a customer can buy a number of products, each of which belongs to a category. When the customer comes to a counter, the cashier will scan products and print an order with the cashier name and customer name if the customer have a membership card.



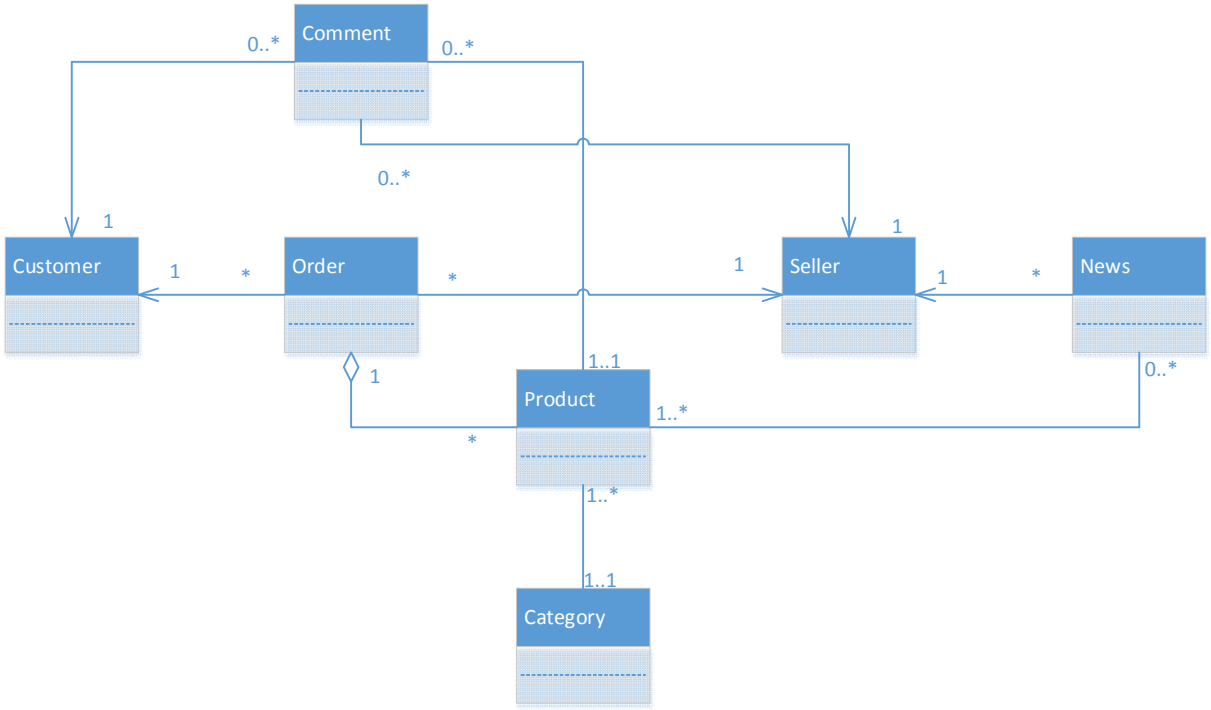
Ans:



b. Correct and complete the following class diagram for an online shopping system



Ans:



2. When describing a system, explain why you may have to design the system architecture before the requirements specification is complete.

Ans:

The architecture may have to be designed before specifications are written to provide a **means** of **structuring** the specification and developing different subsystem specifications concurrently, to allow manufacture of hardware by subcontractors and to provide a model for system costing.

3. Using the basic model of an information system as presented in Figure 6.16, suggest the components that might be part of an app for a mobile device that displays information about flights arriving and departing from a particular airport.

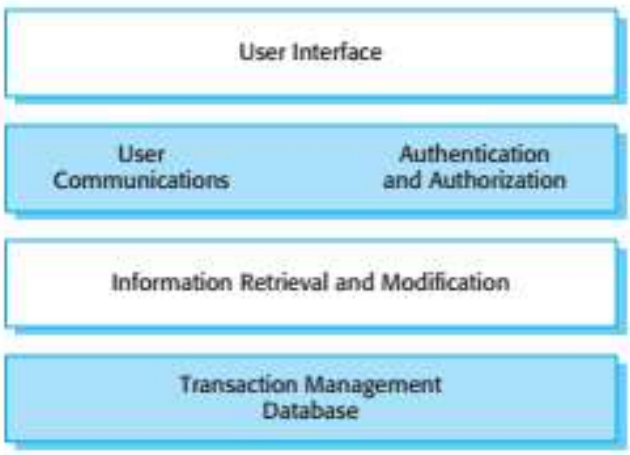


Figure 6.16 Layered information system architecture

Ans:

This is a hybrid system with some elements of the system hosted on a remote server and some elements in the app itself.
You need to consider the levels in the information system and should identify components that might be included at each level. Examples of these components might be:
Level 1 (Database level)
Flight database; Flight status database; Airport information;
Level 2: (Information retrieval level)
Status management; Flight management; Search;
Level 3: (User interaction level)
Authentication; session management; forms processing ()
Level 4 (User interface)
App UI

You then need to decide which of the information system elements should be hosted on the mobile device and which should be remotely hosted.
1. Database level
It obviously does not make sense to try to host major database components on the app so on the app, these are replaced by a database query component that provides access to these databases.
2. The information retrieval level
There needs to be a search component in the app but this should really be a frontend to a more extensive database search that runs on the server. Information on flights of interest to the user and their status has to be collected and managed locally in the app.
3. User interaction level
This also has to be handled mostly in the app although it is based on stored information e.g. authentication relies on storing the user's credentials and authenticating automatically when the app is invoked.
4. User interface level
Exclusively implemented in the app

4. You have been asked to test a method called 'catWhiteSpace' in a 'Paragraph' object that, within the paragraph, replaces sequences of blank characters with a single blank character. Identify testing partitions for this example and derive a set of tests for the 'catWhiteSpace' method.

Ans:

Testing partitions are:

Strings with only single blank characters

Strings with sequences of blank characters in the middle of the string

Strings with sequences of blank characters at the beginning/end of string

Examples of tests:

The quick brown fox jumped over the lazy dog (only single blanks)

The quick brown fox jumped over the lazy dog (different numbers of blanks in the sequence)

The quick brown fox jumped over the lazy dog (1st blank is a sequence)

The quick brown fox jumped over the lazy dog (Last blank is a sequence)

The quick brown fox jumped over the lazy dog (2 blanks at beginning)

The quick brown fox jumped over the lazy dog (several blanks at beginning)

The quick brown fox jumped over the lazy dog (2 blanks at end)

The quick brown fox jumped over the lazy dog (several blanks at end)

Etc.

5. Explain why a software system that is used in a real-world environment must change or become progressively less useful.

Ans:

Systems must change or become progressively less useful for a number of reasons:

1. The presence of the system **changes** the ways of working in its **environment** and this generates new requirements. If these are not satisfied, the usefulness of the system declines.

2. The **business** in which the system is used changes in response to market forces and this also generates new system requirements.

3. The **external legal and political environment** for the system changes and generates new requirements.

4. **New technologies** become available that offer significant benefits and the system must change to take advantage of them.