UNIVERSITI SAINS MALAYSIA

First Semester Examination
Academic Session 2001/2002

September 2001

CIT504 – Analysis, Design and Management of Information Systems

CSI503 – Information System Analysis and Design

Duration : 3 hours

INSTRUCTION TO CANDIDATE:

- Please ensure that this examination paper contains **FOUR** questions in **SEVEN** printed pages before you start the examination.
- Answer **ALL** questions.
- You can choose to answer either in Bahasa Malaysia or English.

ENGLISH VERSION OF THE QUESTION PAPER

1. (a) Contrast the following terms:

(i) Top-down planning and bottom-up planning

[10/100]

(ii) Methodology and technique

[10/100]

(b) Draw a context diagram and a level 0 logical data flow diagram for the following narration and state any assumptions if you think the narration is incomplete.

Prima Health Care is a supplemental health insurance company that pays claims after its policyholders' primary insurance benefits through their employer or another policy have been exhausted.

Policyholders must submit an EXPLANATION OF HEALTH CARE BENEFITS (EOHCB) along with proof that their primary health policy claim has been paid. ALL CLAIMS are mailed to the claims processing department.

CLAIMS are initially sorted by the claims screening clerk. This clerk returns all requests that do not include the EOHCB. For those requests returned, a PENDING CLAIM is created, dated, and stored by date. Once each week, the clerk deletes all tickets that are more than 45 days old and sends a letter to the policyholders notifying them that their case has been closed. Requests that include the EOHCB are then sorted according to type of claim. Requests that include an EOHCB REFERENCE NUMBER are matched with an EOHCB form, which is pulled from the OPEN CLAIMS file. At the end of each day, all these claims are forwarded to the preprocessing department.

In the preprocessing department, clerks screen the EOCHB for missing data. They complete the form if possible. Otherwise, a copy of the claim is returned to the policyholder with a letter requesting the missing data. The original EOHCB is placed in the OPEN CLAIMS file, and a PENDING CLAIM is sent to the claims screening clerk. Completed claims are assigned a claim number, and the claim is microfilmed and filed for archival purposes.

[50/100]

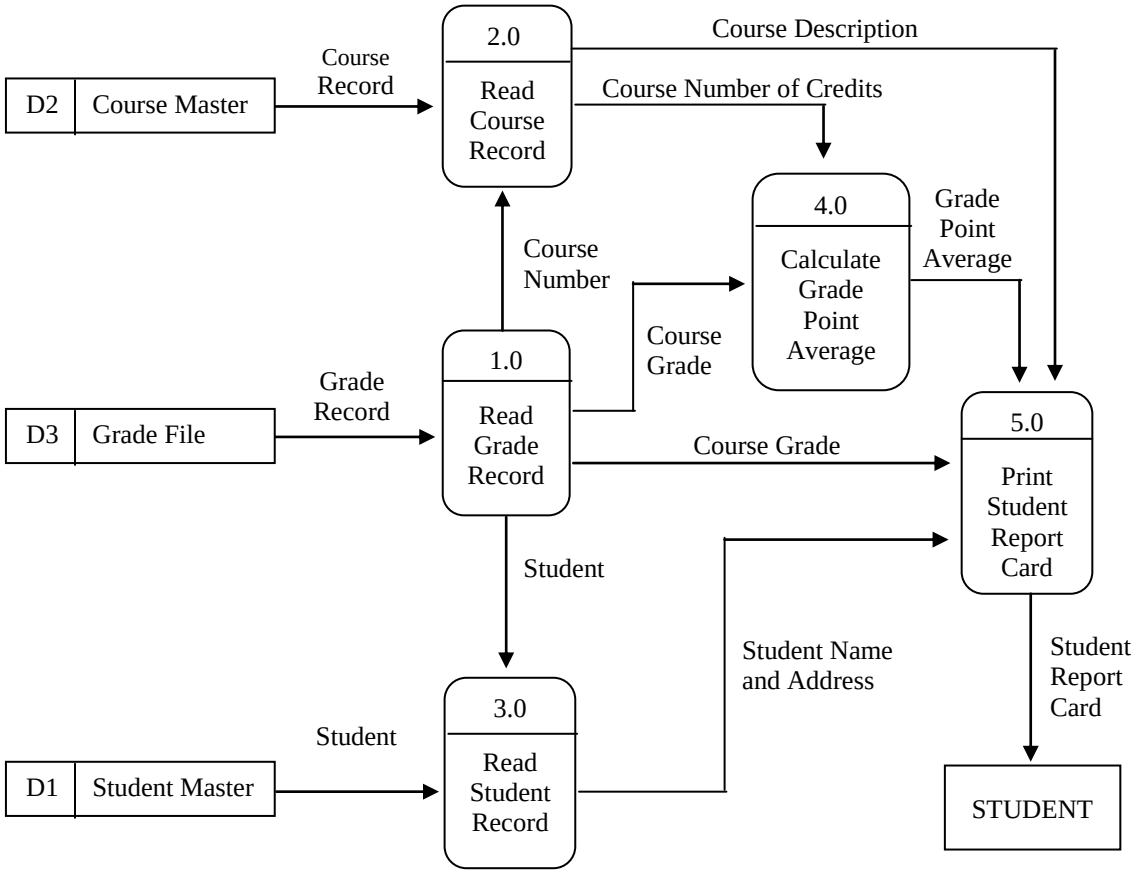
(c) Compare the three techniques used for logic modeling (Structured English, Decision Table and Decision Tree) in terms of their usage and situation which is best to use them.

[30/100]

2. (a) List the types of tests that will be performed during alpha testing and then explain briefly one of the tests that you have identified.

[10/100]

(b) The following questions refers to the data flow diagram as shown below:



(i) Identify a process in this data flow diagram that will become the central transform for a structure chart.

[5/100]

(ii) Identify the processes in this data flow diagram that will make up the afferent and efferent modules for a structure chart.

[5/100]

(iii) Convert this data flow diagram into a top level structure chart using transform analysis.

[20/100]

(c) (i) Describe each of the four kinds of organizational change that can be promoted with information technology.

[20/100]

(ii) How can enterprise analysis and critical success factors be used to establish organization-wide information system requirements? Explain.

[10/100]

(d) What is the relationship between information and productivity in organizations? Explain.

[15/100]

(e) Explain briefly the major management issues in developing international information systems.

[15/100]

3. (a) Explain the UML notations indicated below:

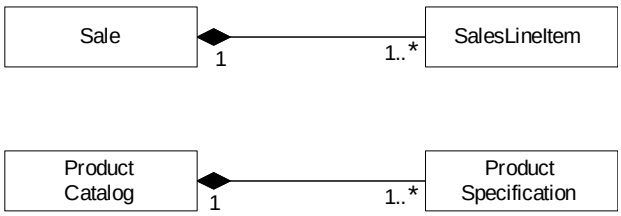


Figure 3.1: Relationships between concepts

[10/100]

(b) The object-oriented technology has been used successfully for some years by the vendors. It is mainly used for control systems, graphical interfaces, operating environments, computer-aided graphic designs, and document-oriented systems. In terms of human resources, tools, processes and notation(s), do you think the technology is now mature enough for use by the problem-domain software developers?

[20/100]

(c) The term ‘responsibilities’ refers to the obligations of an object in terms of its behaviors. Name and explain two types of responsibilities.

[20/100]

(d) The diagram below shows a sequence diagram for the components of a three-tier architecture interacting in a generic scenario. Complete the unknown (?) messages and explain the interactions among the elements in the sequence diagram.

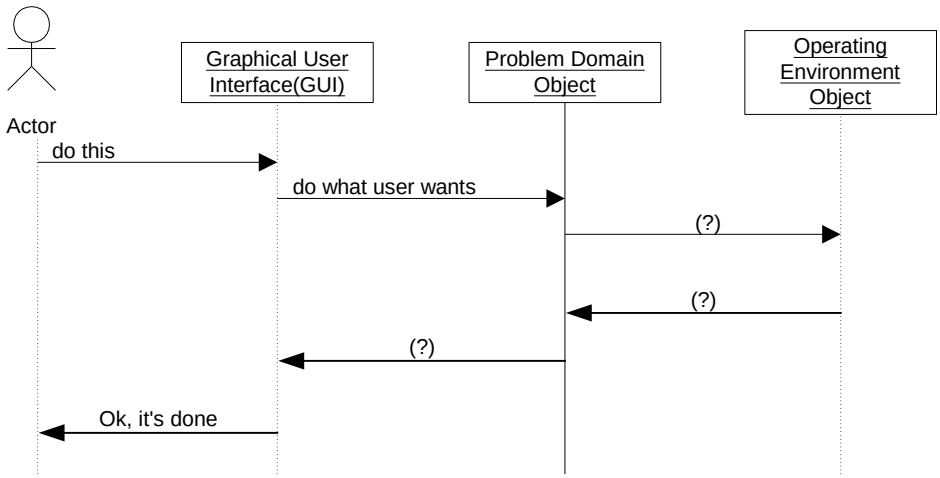


Figure 3.2: Sequence diagram for the components of a three-tier architecture

[20/100]

(e) In a point-of-sales system, illustrate and explain how the Expert Pattern could assist in calculating the grand total of a sale.

[30/100]

4. (a) The user interface and operating environment objects appear to know things and know how to do things. For a class of 'car' objects, use the 'object think' approach to express what the following car objects could possibly speak to themselves:

(i) I am an actual car.

[10/100]

(ii) I am a car object in the work context of a professional car repairer.

[10/100]

(b) Given a use case diagram for a point-of-sales system below, briefly describe each of the elements and how you would proceed with the rest of the activities of a development life cycle using the object-oriented approach.

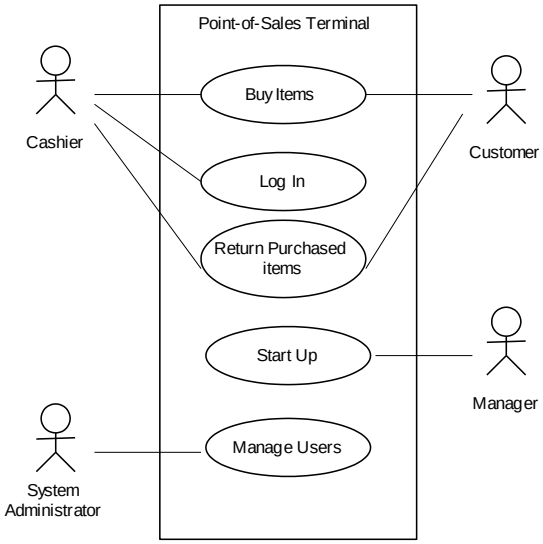


Figure 4.1: Use case diagram for a point-of-sales system

[30/100]

(c) A taxi dispatching system is required to help a human controller to dispatch a fleet of radio-controlled taxis in response to calls from customers. Some of the basic requirements of the system are to record details of all the drivers and their current locations, and control the allocation of taxis to new jobs. Whenever the controller receives a request, the system should automatically allocate a taxi to service the request. Other than responding to immediate calls for taxis, the system should also be able to handle prebooked calls.

Based on the information provided above:

(i) Compile a list of possible use cases.

[5/100]

(ii) Draw a use case diagram.

[5/100]

(iii) Prioritise the use cases, and describe a scenario for the most important use case.

[5/100]

(iv) Identify the major concepts and convert them into classes.

[5/100]

(v) Draw a class diagram.

[10/100]

(d) Explain with an appropriate example how a designer could resolve the problem of supporting low dependency and increased reuse.

[20/100]

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