



OXFORD BROOKES UNIVERSITY
BACHELOR OF SCIENCE (HONOURS)

DECEMBER 2008 EXAMINATION

11th DECEMBER 2008

U08182 INFORMATION SYSTEMS DESIGN

TIME : 2 Hours + 10 Minutes Reading

NUMBER OF PAGES : 1 Cover Sheet and 4 Pages of Questions

☞ INSTRUCTIONS:

- ☐ **SECTION A QUESTION IS COMPULSORY.**
- ☐ **Answer any TWO questions from SECTION B.**
- ☐ **Please start every question on a new page.**
- ☐ **Answers will not be marked if they are illegible.**
- ☐ **Enter the question numbers (in the order you have attempted) in the boxes provided in the answer script.**
- ☐ **Write your INDEX NUMBER and MODULE NUMBER on the cover page of the answer script.**

SECTION A
(This Question is COMPULSORY)

Question 1:

- a) What do you mean by Testing adequacy.
[3 marks]
- b) Explain with an example the use of McCabe Cyclomatic Complexity.
[5 marks]
- c) Discuss how Fagan inspection method meets the requirements of review /structured walkthrough testing techniques. Also explain the stages of Fagan inspection method.
[10 marks]
- d) Draw the control structure for the pseudocode.
[6 marks]

Pseudocode - procedure: sort

```
1:   while records remain do
2:       read record
3:       if record field 1 = 0 then
4:           process record
5:           store in buffer and
             increment counter
6:       else
             if record field 2 = 0 then
7:                 reset counter
8:             else
                 process record
                 store in file
9:         end if
10:    end if
11: end while
```

- e) The following is a description of a use case for students to select to modules for semester 3 from the list of modules offered in that semester.

Actor: Lecturer	The system
Student enters his/her student id and name.	The system verifies whether the student id and student name are valid registered student information with the database of registered students. If valid, the system prompts the student to select a semester.
Student enters semester number.	The system prompts the student to select from a list of modules offered in that semester.
Student enters his/her module selection.	The system notifies the student that the modules selected are recorded.

- i) Identify the input and output variables of the system, and the data to be stored in the system using a table of the following form:

Test data for the select Module use case

Variables		Test data
Input		
Output		
Stored data		

[6 marks]

- ii) Make a concrete scenario from the above use case description, and then derive test data from the scenario and fill the second column of the table above.

[6 marks]

[TOTAL MARKS FOR QUESTION 1: 36 MARKS]

SECTION B
(Answer Any TWO Questions)

Question 2:

- a) Give a definition of the notion of software architecture.

[6 marks]

- b) What is in an architecture style? What do you mean by ambiguous in a style?

[8 marks]

- c) A supermarket issues invoices to customers. Every week the supermarket check the payment received against the invoices issued. If the invoice is not paid with the payment time, a reminder is issued.

The system will receive input from two files one containing the invoices issued and another file containing the payments made.

It has to create an output file, one containing the name of the customers containing the name of the customers whom will receive a reminder.

Design a suitable architecture for the billing system described above.

- i) Describe the functions and properties of each component and connector in your design.
- ii) Present your design of the architectural structure using Software Architectural Visual Notation.
- iii) Justify your selection.

[18 marks]

[TOTAL MARKS FOR QUESTION 2: 32 MARKS]

Question 3:

A software development team has to develop a system for the following requirements:

- The software needs a graphical user interface (GUI) of Students' Grade Book
- The GUI provides a facility to enter the student information as input and to send the information to a database where it will be stored.
- The user will also be able to view the information that is being stored in the database through the interface.

- When the user wants to print a report, students' information will be sent to a function that will perform the calculations and send the results to the database. (Note: only printing is done – no need to store the calculated data.)
 - Finally the information will be retrieved from the database and put into a report format for the user to view.
- a) Develop the following architecture styles taking into account the two factors namely nature of computation and quality concerns.
- i) Layered architecture.
 - ii) Main program and subroutine.
- [20 marks]**
- b) Discuss the strength and weakness of the above architecture styles.
- [8 marks]**
- c) If you are allowed to use any one of the above styles, what will be your choice? Give the reasons why your choice is appropriate.
- [4 marks]**

[TOTAL MARKS FOR QUESTION 3: 32 MARKS]

Question 4:

- a) Discuss the Virtual machine architecture style (rule based) in terms of its components, connectors, advantages and disadvantages.
- [12 marks]**
- b) The design of a software system may need to combine different styles to solve the design problem. Explain any two heterogeneous styles that you are familiar with.
- [20 marks]**

[TOTAL MARKS FOR QUESTION 4: 32 MARKS]

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