



**OXFORD BROOKES UNIVERSITY**  
**BACHELOR OF SCIENCE (HONOURS)**

**AUGUST 2007 EXAMINATION**

**15<sup>th</sup> AUGUST 2007**

**U08182: INFORMATION SYSTEMS DESIGN**

**TIME : 2 Hours + 10 Minutes Reading**

**NUMBER OF PAGES : 1 Cover Sheet and 5 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

(Answer ALL questions in this section)

### QUESTION 1

- a) Discuss the advantages and disadvantages of Black box and White box testing. [4 marks]

- b) A test plan is required for the following pseudocode: [9 marks]

```
integer x
boolean p,q,r
x:=0;
if p OR q then
  if r then
    x:=1
  else
    x=2
  endif
endif
```

Provide suitable test plans for the following testing strategies:

- i) statement testing
  - ii) path testing
  - iii) condition testing
- c) Explain dynamic Module testing. What are the elements of dynamic testing? [10 marks]
- d) For the given program codes, draw the flow graph and determine the McCabe Cyclomatic number. [8 marks]

```
1 int x = anX;
2 int y = aY;
3 while( !( x == y) ) {
4   if( x > y )
5     x = x - y;
6   else
7     y = y - x;
8 }
9 println( x );
```

- e) Define the following
  - i) Design for Testability
  - ii) Controllability
  - iii) Observability

**[3 marks]**

**[TOTAL MARKS FOR QUESTION 1: 34 MARKS]**

**[TOTAL MARKS FOR SECTION A: 34 MARKS]**

## SECTION B

(Answer Any TWO Questions)

### QUESTION 2

Happy Travel Agency HTA, arranges holiday trips for customers. Bookings are made directly by customers. When a customer makes an approach, the reservations clerk selects appropriate flight details and hotel details from lists, which are regularly updated. The details are entered onto a Provisional Booking file. The customer must confirm this booking within three days by sending a deposit of 10% of the costs. On receipt of the deposit, Reservations transfer the details from the Provisional Bookings file to the Full Bookings file. Four weeks before the flight is due, Accounts send an invoice to the customer for the remaining costs. Accounts notify Customer services when the full payment is received, and Customer Services then send tickets and joining instructions to the customer.

- a) Draw the Class/Object Diagram for the above Happy Travel Agency [12 marks]
- b) Identify the Use Cases, Actors, Inputs and Output required to draw the Use Case diagram for the Happy Travel Agency [12 marks]
- c) Design a Test plan using the Use Case diagram developed in (b) for the functions booking and confirmation [9 marks]

[TOTAL MARKS FOR QUESTION 2: 33 MARKS]

### QUESTION 3

- a) Discuss the Layered architecture style in terms of its components, connectors, advantages and disadvantages

**[8 marks]**

- b) Draw the Layered Style for one of the basic functions of a Bank. The bank prints the monthly statement for all the customers. The bank makes use of its letterhead to print the account statements in addition to the bank logo, disclaimer and regulations. The printing makes use of the customer particulars and the account.

**[12 marks]**

- c) List and explain Software Architecture notations used in the architecture style diagrams.

**[5 marks]**

- d) Explain the following Software Design Objectives

- i) Modularity
- ii) Portability
- iii) Malleability
- iv) Conceptual integrity

**[8 marks]**

**[TOTAL MARKS FOR QUESTION 3: 33 MARKS]**

#### QUESTION 4

- a) A text file consists of several lines and each line consists of a sequence of words. It is required to develop software to list all words in the given text file and to determine the frequency of appearance of each word. There is no need to list the words “a”, “the”, “is”, “are”, “has”, have and “it”.

It has been proposed to use the following architecture styles. Draw the diagram for each of the two styles.

- i) Implicit invocation
- ii) Pipe – and – filter

**[18 marks]**

- b) Compare the above two architectures with reference to the following factors

- i) changes in the processing algorithm,
- ii) changes in data representation
- iii) enhancement to system function and
- iv) reusability

**[6 marks]**

- c) Propose a heterogeneous architecture style (diagram) mixing Pipe-and-filter and any one of the data - centered architecture styles.

**[9 marks]**

**[TOTAL MARKS FOR QUESTION 4: 33 MARKS]**

**[TOTAL MARKS FOR SECTION B: 66 MARKS]**

**- END OF PAPER -**