



OXFORD BROOKES UNIVERSITY

BACHELOR OF SCIENCE (HONOURS)

DECEMBER 2009 EXAMINATION

7th DECEMBER 2009

U08182: INFORMATION SYSTEMS DESIGN

TIME : 2 Hours + 10 Minutes Reading

NUMBER OF PAGES : 1 Cover Sheet and 5 Pages of Questions



INSTRUCTIONS :

- ☐ Answer any **THREE** questions.
- ☐ **PART A QUESTION IS COMPULSORY.**
- ☐ Choose any **TWO** questions from PART 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.

PART A

(Compulsory Question)

QUESTION 1

(a) Explain the role of validation and verification processes in Testing.

[6 marks]

(b) Test plan is required for the following pseudo-code:

```
integer a
boolean x,y,z;
a:=0;
if x OR y then
  if z then
    a:=1
  else
    a=2
  endif
endif
```

Provide suitable test plans for the following testing strategies:

- (i) statement testing
- (ii) path testing
- (iii) condition testing

[9 marks]

(c) Construct a flow graph for the following Sort procedure pseudo-code and Determine the McCabe complexity for this procedure pseudocode

```
1. Sort( a[1..n], n)
2. For i=1..n-1
3.   min := i+1
4.   for j=i+1..n
5.     if a[j]<a[min]
6.       min:=j
7.     endif
8.   endforloop
9.   if a[min]<a[i]
10.    swap(a[i], a[min])
11.  endif
12. endforloop
```

[9 marks]

- (d) The following is a description of a use case for an existing customer booking for a taxi through telephone. Detail of the customer's name, address, telephone numbers (Hand phone number and Residence phone number), the last two locations from where the taxi had been booked earlier are available with the Taxi Company.

When a customer calls the taxi company, customer is identified and taxi company checks the customers detail. Customer has to confirm his/her identity. Then taxi company check the starting point from the stored data and the customer has to confirm or give the new location. Next taxi company asks for the destination of the travel and after getting the destination, it gives the taxi number and time of arrival of the taxi.

Actor: Member	Taxi Company
Customer calls the taxi company	Verifies the Customer detail, Name address.
Customer confirms the detail	Checks the starting point available from the list
Customer confirms and chose any one of the stored locations or give the new starting point.	Taxi company records the starting point and asks for the destination
Customer gives the destination detail.	Destination is recorded and taxi number and arrival time is given to the customer.

- (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:

Example: Test data for to book a Taxi

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.

Example Concrete scenario:

Actor: Member	Taxi Company
	.

[6 marks]

[TOTAL MARKS FOR QUESTION 1: 36 MARKS]

PART B

(ANSWER ANY TWO QUESTIONS)

QUESTION 2

- (a) ABC company is a business to customer, e-commerce system. It sells products on-line to the customers. A product catalogue is available in the database of ABC company. Customers can browse the web site and search for the catalogue of ABC and order the products on-line. A bill is prepared for the order. Customers make payment-using credit card and ABC makes arrangement for door delivery.

Design the following architecture styles for the ABC company.

- (i) Pipe and filter architecture style
- (ii) Layered system architecture

[24 marks]

- (b) Compare the above two styles in terms of the nature of computation and quality concern.

[8 marks]

[TOTAL MARKS FOR QUESTION 2: 32 MARKS]

QUESTION 3

- (a) Quality Builders, a construction company, is interested in developing a computer-based information system to maintain records on selecting contractors, estimating quotation, allotting the job to the contractors and supervising the progress of a job. The company has many departments to do the above tasks

Tender Department: The Tender department of QB invites quotations to build buildings from contractors. Contractors submit quotations.

Estimation Department: An estimation department of QB checks the estimates mentioned in the quotations. Estimation department submits a report to the job allotment department.

Job Allotment Department: The job allotment department allots jobs to the contractors.

Job Supervision Department: The job supervision department monitors the progress of the each job.

Explain with suitable diagram the main program and subroutine software architecture styles.

[12 marks]

- (b) A software designer says that data centered software architecture styles is the best suited architecture styles for the above scenario of QB. You may or may not accept the above statement. Draw the data centered software architecture styles for the above scenario. Justify your view on the above statement.

You may use the following factors to support your opinion.

- o changes in the processing algorithm,
- o changes in data representation
- o enhancement to system function
- o reusability

[20 marks]

[TOTAL MARKS FOR QUESTION 3: 32 MARKS]

QUESTION 4

- (a) Explain with an example Virtual machine architecture style.

[16 marks]

- (b) Propose a Hierarchical heterogeneous architecture style (diagram) mixing with main program and subroutine architecture styles for one of the components of the Virtual machine architecture styles given in question 4.a).

[16 marks]

[TOTAL MARKS FOR QUESTION 4: 32 MARKS]

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