

BITS, Pilani – Dubai, Academic City, Dubai.

IV Year First Semester 2009-2010

Degree: B.E.(Hons.). Branch: C.S.

Comprehensive Examination Question Paper

Course No : BITS C461 Course Title: Software Engineering

Date: 24/12/2009 Thursday Time: 3 hours Total marks: 80

Weightage: 40% Data provided are complete. *Closed Book*

This question paper has four pages.

Part A

Answer all Questions.

10 * 2 = 20 Marks

1. What information does a CASE REPOSITORY store in it?
2. What is Software Safety? Give an example application.
3. What is Cyclomatic Complexity? How is it computed?
4. Mention the names of the framework activities in USER INTERFACE DESIGN.
5. What is Product-line software? Mention any two examples in this category.
6. Distinguish between Incremental Model and RAD (rapid application development) Model.
7. What is *Information Hiding* in Software design?
8. Mention the names of the design notations applicable in *component* (procedural) level design.
9. Mention the General Software Test Criteria in any software testing strategy.
10. What are the benefits of Product Metrics in software?

Part B

Answer all Questions.

4*5= 20 marks

11. What are the basic guidelines in Collaborative Requirements Gathering ?
12. Explain in brief the basic design principle in the following Architectural Styles: (write two line descriptions for each).
 - Data centered.
 - Data flow.
 - Call and return.
 - Object-oriented.
 - Layered.
13. Explain the Change Control process in Software Configuration Management.
14. Write in brief a technical note on *Size-Oriented Metrics* and *Function-Oriented Metrics* for software.

P.T.O.

Part C Answer all Questions.15. **DECISION TREE** to support the Make / Buy Decision [10 M]

a) You are required to **DRAW a Decision Tree** for a Software Based System *A* and calculate the **expected cost** for each of the following paths of the **Decision Tree**:

i) *BUILD* ii) *REUSE* iii) *BUY* iv) *CONTRACT*.

You are provided with the following data related to the above four cases:

i) *BUILD*

Development Effort	Probability	Estimated Cost
SIMPLE	30%	\$380K
DIFFICULT	70%	\$450K

(Note: 1K = 1000)

ii) *REUSE*

Development Effort	Probability	Estimated Cost
MINOR CHANGES	35%	\$300K
MAJOR CHANGES	65%	\$390K

iii) *BUY*

Development Effort	Probability	Estimated Cost
MINOR CHANGES	40%	\$450K
MAJOR CHANGES	60%	\$620K

iv) *CONTRACT*

Development Effort	Probability	Estimated Cost
WITHOUT CHANGES	55%	\$450K
WITH CHANGES	45%	\$600K

b) Which one of the options [paths] gives the **Lowest Expected Cost**?

16. UML CLASS DIAGRAM for an E-LEARNING SYSTEM

A web-based learning system has the following main elements:

- i) PERSONNEL RESOURCE [student, teacher, system administrator, scheduler]
- ii) LEARNING RESOURCE [lecture notes, exam, homework, e-book, e-journal]
- iii) COMMUNICATION ENVIRONMENT [web browser, email, chat, Net-meeting]

As an **innovative** software engineer, **Draw** an UML CLASS DIAGRAM for the above system. [10 M]

P.T.O.

17. Data Flow Diagrams & Architectural Design [A rough *skeletal* Level 0 (context diagram) is given to you for information in page 4; so you need not draw level 0 diagram) Level 1 & Level 2 diagrams and Architectural Design are to be drawn] for an **ONLINE BOOKSTORE**.

It is required to draw the **Level 1** and **Level 2 DFDs** and **Architectural Design** for an *online bookstore* that allows a customer to purchase / order books **online** as well as over **telephone**.

There are **seven** aspects to the bookstore:

1. User Interface (can be web interface / phone interface)
2. Publishers / Suppliers
3. Shippers / Shipping Facilities
4. BOOKSTORE's MAIN OFFICE
5. PAYMENT PROCESSING
6. CUSTOMER HISTORY
7. BOOKS INVENTORY

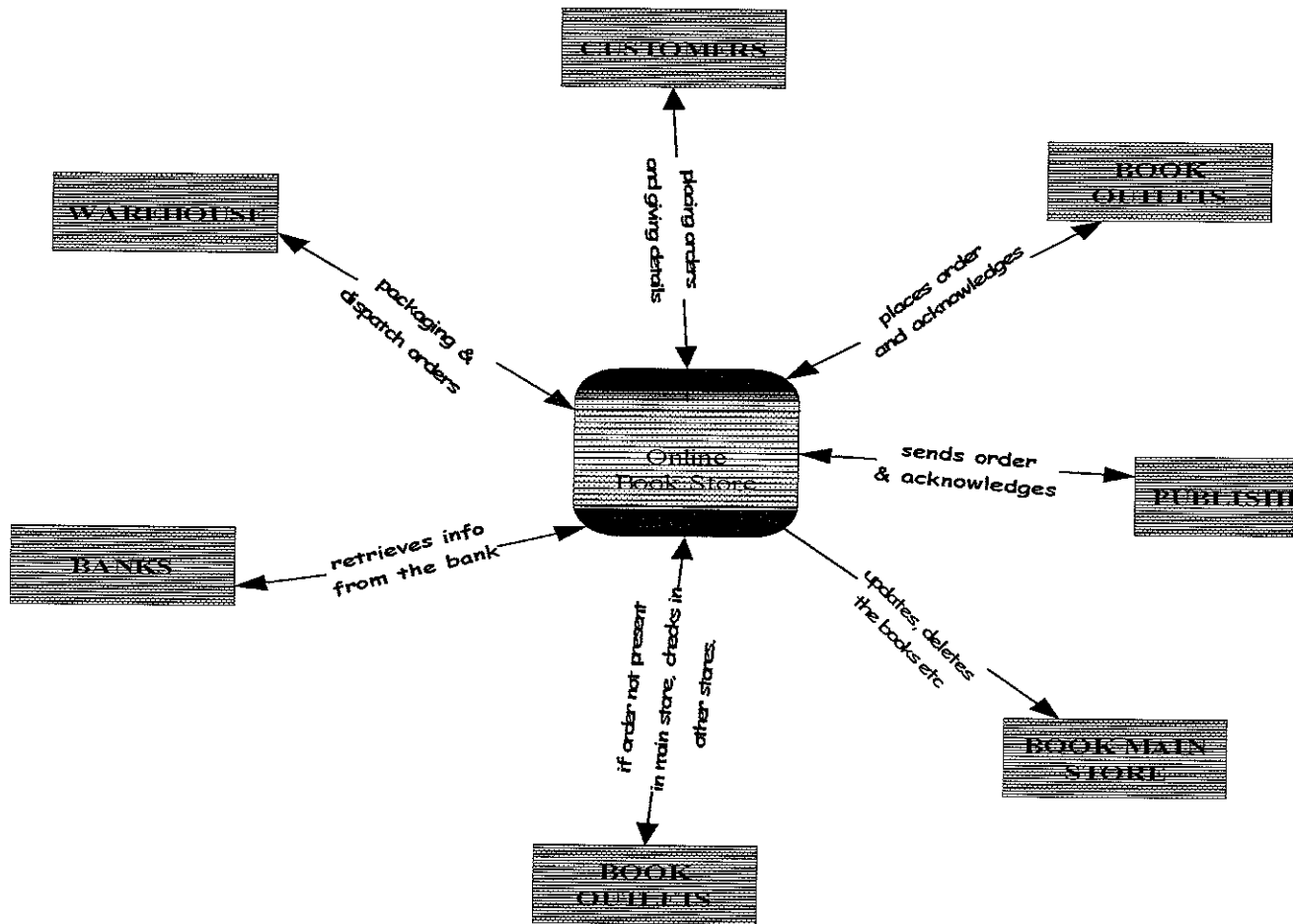
As a Software Engineer, You are required to perform the following functions:

- **Draw Level 1 DFD.** [5]
- **Draw Level 2 DFD.** [10]
- **Draw the Software Architectural Design** (mention which architecture you would prefer) [5]

(You must do the *Analysis & Design* innovatively and in a **professional** way.)

P. T. O.

LEVEL 0: DATA FLOW DIAGRAM



BITS, Pilani – Dubai, Dubai Int. Academic City, Dubai.

IV Year FIRST SEMESTER 2009-2010

Degree: B.E. (Hons.) Branch: C.S.

TEST II Question Paper

Course No : BITS C461 Course Title: Software Engineering

Date: 06/12/2009 Sunday Time: 50 min. Total marks: 20

Data provided are complete. *This qn paper has 2 pages.*

OPEN Book (TEXT/REF books Students handwritten class notes permitted).

Answer all Questions

1. Draw a **DECISION TABLE** for the following problem:

A marketing company wishes to construct a decision table to decide how to treat clients according to three characteristics:

Gender,

City Dweller,

and *age group*: A (under 30), B (between 30 and 60), C (over 60).

The company has four products (W, X, Y and Z) to test market.

Product W will appeal to female city dwellers. Product X will appeal to young females.

Product Y will appeal to Male middle aged shoppers who do not live in cities.

Product Z will appeal to all but not the older females. [5 marks]

2. **UML SEQUENCE DIAGRAM** for **WEATHER MAPPING SYSTEM**

A weather mapping system is required to generate weather maps on a regular basis using data collected from remote, unattended weather stations and other data sources such as *weather observers, balloons and satellites*. Weather stations transmit their data to the area computer in response to a request from that machine.

The area computer system validates the collected data and integrates the data from different sources. The integrated data is archived and using data from this archive and a digitized map database, a set of local weather maps is created. Maps may be printed for distribution using a special-purpose map printer or may be displayed in a number of different formats.

Draw a **sequence diagram** describing the interactions over time between the objects in the above system. [5 marks]

P.T.O.

3. UML CLASS DIAGRAM

Elevator Problem

A product is to be installed to control elevators in a building with m floors. The problem concerns the logic required to move elevators between floors according to the following constraints:

- Each elevator has a set of m buttons, one for each floor. These illuminate when pressed and cause the elevator to visit the corresponding floor. The illumination is canceled when the elevator visits the corresponding floor.
- Each floor, except the first floor and top floor has two buttons, one to request and up-elevator and one to request a down-elevator. These buttons illuminate when pressed. The illumination is canceled when an elevator visits the floor and then moves in the desired direction.
- When an elevator has no requests, it remains at its current floor with its doors closed. [5 marks]

You are required to draw a UML class diagram for the above system.

4. USER INTERFACE DESIGN

BITS Pilani, Dubai is interested in developing an **Internet Based Examination Results Enquiry System**. This system will help all its authorized students to know their Grades in all the courses in which they have appeared for the current examination and current CGPA. The system will also help them to see at any point of time, the grades in all courses in previous examinations and also the CGPA obtained by the students at the end of every Semester. For simplicity, consider only the WEB ADMINISTRATOR and STUDENT as main people who are going to manage/use the system.

As a innovative Software Engineer, you are required to design an **USER INTERFACE** (showing necessary screens and menus). [5 marks]

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IV Year FIRST SEMESTER 2009-2010

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TEST I Question Paper

Course No : BITS C461 Course Title: Software Engineering

Date: 11, Oct., 2009 Sunday Time: 8.00 a.m.- 8.50 a.m. Total marks: 25

Data provided are complete. **Closed Book.**

This question paper has one page.

Answer all Questions.

1. What is Ubiquitous Computing? [2]
2. Draw a rough sketch of the Failure Curves (Failure Rate vs Time) for software. [2]
3. Mention the names of the umbrella activities in software engineering. [4]
4. Draw a diagram (rough sketch) corresponding to the SPIRAL MODEL. [4]
5. What are the main functions of Quality Function Deployment (QFD) in requirements engineering? [4]
6. Distinguish between Procedural Abstraction and Data Abstraction in Software Design. [2]
7. Draw the **CONTEXT-LEVEL (LEVEL 0) DFD** and **LEVEL 1 DFD** for the following problem:

BPD ADMISSIONS SYSTEM

It is proposed to develop a computer based Information System for keeping track of the whole admission procedure for candidates seeking admission to BITS PILANI-DUBAI [BPD] in first degree engineering stream. The branches offered include: CS, EEE, EIE, ECE, Chemical Engg., BioTechnology and Mechanical Engg. Selection is based on candidates' merit and preferences. The normal input for admission is a pass in 10+2 from a recognized board/university with Physics, Chemistry, Mathematics and adequate proficiency in English and at least 60% aggregate of all marks in the subjects of the qualifying examination. The Admissions Committee looks after admissions process.

The Admissions Committee is mainly concerned with the issue of advertisement for admission [in newspapers and website], Receiving applications from interested candidates, scrutiny of applications, shortlisting of the deserving candidates, rejection of invalid applications [due to incomplete data], maintenance of a waiting list and sending admission confirmation letters to selected candidates.

As a creative software engineer, you are required to draw **CONTEXT-LEVEL (LEVEL 0) DFD** [data flow diagram] and **LEVEL 1 DFD**.

[2+5]

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QUIZ II

Course No : BITS C461 Course Title: Software Engineering

Date: 14, Oct., 2009 Monday Time: 20 min. Total marks: 07

Weightage: 7% Venue : As per seating arrangement **Closed Book.**

This question paper has 2 pages [use backside for rough work only]

Set I

IDNO:

Name:

Write answers in the space provided in question paper. Answer all questions.

1. What are UPPER CASE TOOLS ? [1 M]

2. What is REGRESSION TESTING ? [1 M]

3. What is BETA TEST ? [1 M]

4. What is STRESS TESTING ? [1 M]

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set I

IDNO:

Name:

5. What is WHITE BOX Testing ?

[1 M]

6. Briefly specify the actions of Equivalence Partitioning in software testing. [2 M]

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set II

IDNO:

Name:

Write answers in the space provided in question paper. Answer all questions.

1. What are LOWER CASE TOOLS ? [1 M]

2. What is SMOKE TESTING ? [1 M]

3. What is ALPHA TEST ? [1 M]

4. What is RECOVERY TESTING ? [1 M]

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Set II

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5. What is BLACK BOX Testing ?

[1 M]

6. Briefly specify the actions of BOUNDARY VALUE ANALYSIS in software testing.

[2 M]

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QUIZ I

Course No : BITS C461 Course Title: Software Engineering

Date: 26, Oct., 2009 Monday Time: 20 min. Total marks: 08

Weightage: 8% Venue : As per seating arrangement *Closed Book*.

This question paper has 2 pages [use backside for rough work only]

IDNO:

Name:

5. Mention any four design principles that are applicable to “Place the User in Control” in user interface. [2 M]

6. *Complete* the following description (*you have to write down the remaining 4 steps*) relating to *Transform Mapping*. [2 M]

1. Review fundamental system model
2. Review and refine data flow diagrams for the software
3. Determine whether the DFD has transform or transaction characteristics

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QUIZ I

Course No : BITS C461 Course Title: Software Engineering

Date: 26, Oct., 2009 Monday Time: 20 min. Total marks: 08

Weightage: 8% Venue : As per seating arrangement ***Closed Book.***

This question paper has 2 pages [use backside for rough work only]

IDNO:

Name:

Write answers in the space provided in question paper. Answer all questions.

1. What are the framework activities in the analysis & design process for an User Interface? [1 M]

2. In what way(s), software architecture will be helpful to a software engineer? [1 M]

3. Distinguish between a Database and a Data Warehouse. [1 M]

4. What is the basic principle in CALL & RETURN architectural style? [1 M]

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QUIZ I

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Date: 26, Oct., 2009 Monday Time: 20 min. Total marks: 08

Weightage: 8% Venue : As per seating arrangement **Closed Book.**

This question paper has 2 pages [use backside for rough work only]

IDNO:

Name:

5. Mention any four design principles that are applicable to “Reduce User Memory Load” in user interface. [2 M]

6. Complete the following description (*you have to write down the remaining 4 steps*) relating to *Transaction Mapping*. [2 M]

1. Review fundamental system model
2. Review and refine data flow diagrams for the software
3. Determine whether the DFD has transform or transaction characteristics