

Total No. of Questions : 10]

SEAT No. :

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[Total No. of Pages : 4

B.E. (Information Technology)
SOFTWARE DESIGN AND MODELING
(2015 Pattern) (Semester - I) (414455)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Question 1 or 2, 3 or 4, 5 or 6, 7 or 8, 9 or 10.*
- 2) *Neat diagrams must be drawn whenever necessary.*
- 3) *Figures to the right indicate full marks.*

Q1) a) Enlist explain different kinds of relationships used in class diagram. **[4]**

- b) Passport automation system : Passport Automation system is used in the effective dispatch of passport to all of the applicants. This system adopts a comprehensive approach to minimize the manual work and schedule resources, time in a cogent manner. The core of the system is to get the online registration form (with details such as name, address etc.,) filled by the applicant whose testament is verified for its genuineness by the passport Automation system with respect to the already existing information in the database. This forms the first and foremost step in the processing of passport application. After the first round of verification done by the system, the information is in turn forwarded to the regional administrator's (Ministry of External Affairs) office. The application is then processed manually based on report given by the system, and any forfeiting identified can make the applicant liable to penalty as per the law. The system forwards the necessary details to the police for its separate verification whose report is then presented to the administrator. After all the necessary criteria have been met, the original information is added to the database and the passport is sent to the applicant.

Identify Actors, Use-cases and Draw Use-Case Diagram (s) for above Case study. **[6]**

OR

- Q2) a)** Elaborate the keyword class, association name, association end name and multiplicity with an example. **[4]**

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- b) Given the following problem description, produce an object oriented solution. Answer the following questions about your object-oriented solution. [6]

Design a simulation of a basketball conference. Each conference has 10 teams. Each team has 12 players. Each player has a specific height, speed, and accuracy. Players know which team they belong to. Some players are scholarship players. Scholarship players need to record their current grade-point average. Players may be transferred between teams. Teams play basketball games against other teams in the conference. The result of each game is determined using a function based on the height, strength, speed, and accuracy of the players on each team.

- i) Identify all software classes, their attributes & methods.
- ii) Draw a Software class diagram showing associations between classes and multiplicities.
- iii) Which objects contain other objects?
- iv) Which objects exhibit super-class sub-class relationship?

- Q3) a)** Assume a home telephone instrument and give the meaning of Event, State and transition. [4]

- b) Online Course Reservation System: [6]

The requirement form the customer is got and the requirements about the course registration are defined. The requirements are analyzed and defined so that is enables the student to efficiency select a course through registration system. Whenever the student comes to join the course he/she should be provided with the list of course available in the college. The system should maintain a list of professor who is teaching the course. At the end of the course the student must be provided with the certificate for the completion of the course.

Draw the sequence diagram (s) for the above case study.

OR

- Q4) a)** Explain concurrent sub-states with suitable examples. [4]

- b) Draw activity diagram for the library case study shown below. List all activities used in the diagram. [6]

Library Case study:

Following is a process to issue a book:

Every book has a barcode sticker pasted on it. Every employee has I-card on which also barcode sticker is pasted. Employee has to select a book and has to approach librarian. Librarian scans the barcode of the book with barcode scanner. Then employee has to scan barcode on I card with barcode scanner. Librarian has to ensure book details, employee details and finalize the issue transaction of the book. Librarian tells return date to an employee.

Following is the process to return the book:

Employee has to carry the book to the librarian and librarian has to initiate the return transaction. Employee has to scan barcode sticker of I-card and book with barcode scanner. System calculates fine by using fine calculation rules. Librarian asks for fine amount to employee if any. Employees pay the fine. Librarian finalizes the return transaction. Note that, in above system, if barcode scanner does not work, librarian should be able to enter data using keyboard. There should be provision of providing rules of fine calculation. Even if employee doesn't have barcode sticker on I - card, librarian should be able to input employee id manually.

- Q5)** a) Explain the process of creating an access for business Classes with Diagram. [8]
- b) Consider bank ATM database system and explain creation of object Model by giving one example each for - [8]
- Table - class mapping
 - Table Multiple classes mapping
 - Table - inherited classes mapping
 - Tables-inherited classes mapping

OR

- Q6)** a) Explain the Macro - Level process of identification of view layer classes by analyzing use case. [8]
- b) A university is having several departments. Each Department should have minimum one faculty member to maximum of 10 faculty member. Each faculty member has residential address within proximity within 2kms. Attribute of entities are. Department: department name, department type, department start date, current HOD Faculty: Facultyid, Facultyname, subject specialization, Joiningdate, DOB, Salary Address: building name, Flatno, Streetname, Landmark, Pincode, state Country. Develop the design level business layer class diagram using OCL Attribute and Method representation, and Multiplicity between business classes. [8]

Q7) a) Explain Strategy Pattern.

Suppose we have an Invoice class in a payment system in which we have to calculate total amount payable but requirement says that amount of calculation depends on member customer or non member customer. Draw a class diagram showing strategy pattern.

[8]

b) Define a Design Pattern? Explain the Classification of GOF design pattern? Name the types of Design patterns with one example of Each type. [8]

OR

Q8) a) Name the types of GRASP design Patterns with one example of each type. [8]

b) A chess game includes 2 players, 32 pieces (16 per player) and a game board with 64 squares. Draw a class diagram for Chess game showing Creator and Polymorphism GRASP Pattern. [8]

Q9) a) Explain types of Software Architectural pattern. [10]

b) Explain any two client / service software architecture pattern with deployment diagram and its example. [8]

OR

Q10) Write Short note on: [18]

a) Software Architectural Broker Pattern.

b) Control pattern for real time software architecture.

c) Software process Model for software Product line.

