

B. M. S. College of Engineering, Bengaluru - 560019

Autonomous Institute Affiliated to VTU
June 2019 Semester End Make Up Examinations

Programme: B.E.

Branch : Computer Science And Engineering

Course Code: 16CS6DCOOM

Course: Object Oriented Modeling and Design

Semester : VI

Duration: 3 hrs.

Max Marks: 100

Date: 27.06.2019

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
 2. Missing data, if any, may suitably assumed.

UNIT - I

1. a) Describe the role of link and association among objects and classes 05
 b) Evaluate and model a state transition diagram for the following scenario. 10

Here is what happens in a microwave oven :

- The oven is initially in an idle state with door open, where the light is turned ON.
- When the door is closed it is now in idle but the light is turned OFF.
- If a button is pressed, then it moves to initial cooking stage, where the timer is set and lights are ON and heating starts
- At any moment the door may be opened, the cooking is interrupted, the timer is cleared and heating stops.
- Also while cooking, another button can be pushed and extended cooking state starts, where the timer gets more minutes. At any moment door can be opened here also.

- c) Explain Qualified Association with a suitable example 05

OR

2. a) Categorize the following relationships into generalization, aggregation or association. 05

- i. A country has a capital city
- ii. A dining philosopher uses a fork
- iii. A file is an ordinary file or a directory file
- iv. Files contains record
- v. A polygon is composed of an ordered set of points

- b) Prepare a class diagram for group of classes given below 10
 School, playground, principal, school board, classroom, book, student, teacher, cafeteria, restroom, computer, desk, chair, ruler, door, swing
 Add at least 10 relationships (association and generalization) to the diagram. Use association names and association end names where needed. Also use qualified associations and show multiplicity. Explain your diagram

- c) Discuss the significance of multiplicity in modeling and its UML notation 05

3. a) Explain <<include>> and <<extend>> relationships in use case diagram with an example. 05

- b) Consider a software system for supporting checkout of materials at a public library 10
- List four actors. Explain the relevance of each actor
 - One use case is to borrow a library item. List three additional use cases at a comparable level of abstraction. Summarize the purpose of each use case within a sentence
 - Prepare a use case diagram for a library checkout system
- c) Explain substate in state diagram and its importance with an example. 05
- OR**
4. a) Consider an online frequent flyer program. Some use cases are listed below. Prepare a use case diagram and include the appropriate relationships for the use cases. You can add an abstract parent for each use case generalization 08
- View credits : View the frequent flyer points currently available in the account
 - Submit missing credit : Request credit for a activity that was not credited
 - Change address: Submit a new mailing address
 - Change user name: Change the user name for the account
 - Change Password: Change the password for the account
 - Book a free flight: Use frequent flyer credits to obtain a free flight
 - Book a free hotel: Use frequent flyer credits to obtain a free hotel
 - Book a free rental car: Use frequent flyer credits to obtain a free rental car
 - Request a frequent flyer credit card: Fill out an application for a credit card that gives frequent flyer points as a bonus for purchases
 - Check prices and routes : Find possible routings and corresponding prices for a paid flight
 - Check availability for a free flight: Check a availability of free travel for a specified flight
- b) Prepare Sequence diagram for ATM session of withdraw money 07
- c) Explain swimlanes in activity diagram with an example 05
- UNIT - III**
5. a) Discuss the list of criteria to discard unnecessary and incorrect classes while constructing domain class model with an example 08
- b) Consider a new antilock braking system for crash avoidance in an automobile. Elaborate the following high-level questions and explain your answers 08
- Who is the application for? Who are the stakeholders? Estimate how many persons in your country are potential customers
 - Identify three features that should be included and three features that should be omitted
 - Identify three systems with which it must work
 - What are two of the largest risks?
- c) Explain the purpose of boundary classes in the application model 04
- UNIT - IV**
6. a) Explain the different steps involved in design optimization 07

- b) For each of the following systems, list and justify the applicable style(s) of system architecture: 08

Batch transformation,
Continuous transformation,
Interactive interface,
Dynamic simulation,
Real time system,
Transaction manager,

i. Electronic Chess Companion System

The system consists of a chess board with a built-in computer, lights, and membrane switches. The human player registers move by pressing chess pieces on the board, activating membrane switches mounted under each square. The computer indicates moves through lights also mounted under each square. The human moves the chess pieces for the computer. The computer should make only legal moves, should reject attempted illegal human moves, and should try to win

ii. An Airplane flight simulator for a video game system

The video game system has already been implemented and consists of a computer with joystick and pushbutton inputs and an output interface or a color television. Your job is to develop the software for the computer to display the view from the cockpit of an airplane. The joystick and pushbutton control the airplane. The display should be based on terrain description stored in memory. When your program is complete, it will be sold on cartridge that plug into the video game system

- c) Identify the responsibilities of following use cases in the ATM System to realize the use case 05
- Withdraw
 - Transfer

UNIT - V

7. a) Describe propagation of operation with diagram and example 05
b) Explain most common signal events with an example 07
c) Discuss various ways to realize association in implementation modeling 08
