ANNA UNIVERSITY :: CHENNAI

B.E (FT) END SEMESTER EXAMINATIONS - NOV/DEC 2023

Computer Science and Engineering

Fiftli Semester

CS6110 OBJECT ORIENTED ANALYSIS AND DESIGN

(Regulation 2018- RUSA)

Time: 3 Hours Max. Marks: 100

Q.

No

Answer All Questions

PART-A(1Q^2 = 2Q m^Hs)

1.

What are the benefits of object-oriented development over structure development'?

2.

How does the inception phase contribute to the overall success of a software development project?

3.

Difference between the "extend" and "include" relationships in use case diagrams.

4.

Write the key differences between composition and aggregation in object-oriented design.

5.

Given a scenario involving dynamic interactions between objects, demonstrate how a sequence diagram would be more suitable than a collaboration diagram.

6.

How the parallel activities are represented in an activity diagram?

7.

State the principles of model-view separation in software design.

8.

Why design patterns are used in software development?

9.

Name the object-oriented methodologies used in software development.

10.

Is software testing a crucial phase in the software development life cycle? Justify your answer.

PART B (8 x 4 = 32)

(Answer any 8 questions)

11. Draw the use case diagram and use case text for the following Scenario 1:

A hotel wants to develop a system to manage their take-away service. The system should maintain the menu of the day. From the customer end, the system should be able to assign tokens for the

registered orders and display the bill amount. The order should be confirmed after receiving the payment and send a notification to the customer and the hotel manager. Appending the order should be disabled after payment. From the hotel manager's end, order-wise and item-wise lists should be displayed. Orders with 3 or less than 3 items can be given higher priority. The availabilily of a food item should be updated to the manager and the customer (during ordering).
When the order is ready, a notification should be sent to the customer for collecting their order.

12.

Consider a libraiy management system where users can borrow and return books. Identity and define the conceptual classes involved in this system. Provide a detailed explanation of the attributes and behaviors associated with each class. Discuss how these classes contribute to the overall design and functionality of the librar>' management system.

13.

Consider a system designed to manage different types of vehicles. Initially, the system is designed to handle only cars. Through the process of extension retlnement, the system is extended to accommodate other types of vehicles, such as motorcycles and bicycles.

(i) Identify the base class and the extended classes in this scenario.

(ii) Explain the concept of extension refinement and how it is applied to incorporate new: types of vehicles into the system. Provide specific examples of attributes or behaviors that may be added or modified during the refinement process.

(iii) Discuss the advantages and potential challenges of using extension refinement in thiscontext.

14.

Create a clear and accurate System Sequence Diagram Ibr the given Scenario 1 (Refer Q. No: 11). Represent the interactions between actors and the system components involved in the hotel management system.

15.

Create an activity diagram with swimlanes for a simplified online order processing system. The system involves the activities of a Customer, Order Processing Team, and Inventory Team. Explain the key activities within each swimlane, detailing the tasks performed by the Customer, Order Processing Team, and Inventory Team. Also, identify decision points in the process and explain how the flow of activities is determined based on certain conditions.

16.

Consider a vending machine that dispenses beverages. Design a state diagram to model the behavior of the vending machine when a customer interacts with it. Identify and explain the key states in the state diagram, such as "Idle," "Selection," "Payment," "Dispensing," and any other relevant states. Explain the transitions between states, detailing the events or conditions that

trigger each transition. Consider events like coin insertion, product selection, and dispensing completion.

17.

Discuss and illustrate the guidelines for organizing packages in an object-oriented system. Use a practical scenario of a library management system to demonstrate the application of these guidelines.

18.

Differentiate between component and deployment diagram. Provide an illustrative example using a simplified e-commerce system to demon,strate the application of both concepts.

19.

Apply the GRASP design principles of Low Coupling, High Cohesion, and Polymorphism to design a simplified library management system. Explain the application of each principle, providing a clear rationale and impact on the overall system design.

20.

Design a simplified online shopping system and apply three different GoF creational design patterns. Provide a detailed explanation of each pattern's application, including its intent, participants, collaborations, and real-world scenarios where the pattern is beneficial.

21.

Given a class diagram for a simplified e-commerce system, map the design elements to corresponding code segments in a programming language of your choice. Explain the mapping process and discuss the considerations for translating design concepts into executable code.

22.

Discuss and elaborate on various software quality assurance activities within the software development life cycle.

PART-C(2x8 = 16Mark)

23.

Design a class diagram for a simplified university registration system. Explain the concepts and principles that guide the design of class diagram. Discuss key terms such as classes, associations, attributes, and multiplicity. Elaborate on how these elements contribute to modeling the structure of a system.

24.

Apply the GRASP design patterns to design a simplified library management system. Explain the rational behind Information Expert, Creator and Controller pattern, and its impact on the overall system design. Illustrate how each pattern is used to assign responsibilities to classes.