

Question Paper

Exam Date & Time: 16-Nov-2018 (02:00 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES

III SEMESTER B.Sc. APPLIED SCIENCES THEORY EXAMINATION-NOVEMBER 2018

SOFTWARE DESIGN USING OBJECT ORIENTED PARADIGM [ICS 233]

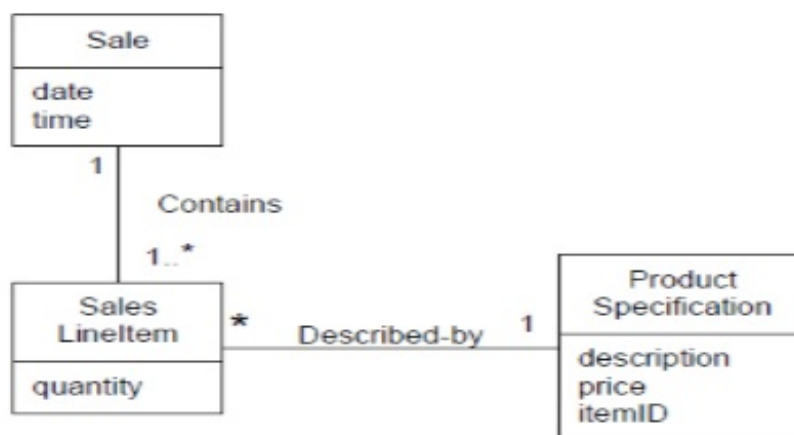
Marks: 100

Duration: 180 mins.

Answer 5 out of 8 questions.

- 1) What is the Rational Unified Process? Explain the benefits of Iterative development along with a neat diagram. (10)
 - A)
 - B) Classify and list all the UML diagrams. (5)
 - C) Write the geometrical notations for Aggregation, Composition, Dependency, Generalization and interface realization. (5)
- 2) What is a class diagram and for what purpose it is used? (10)
 - A) What are the three perspectives you can use in writing the class diagram? Identify the correct relationships in the following cases
 - a) A has an instance of B
 - b) A owns an instance of B
 - c) A is extended by class B
 - d) B realizes/implements A (or A is realized by B)
 - B) Explain different interaction diagrams and their differences along with an example and with a diagram. (10)
- 3) Explain the architecture layer of a typical object-oriented information system. (8)
 - A)
 - B) Explain the include, extend and generalization relationship w.r.t ProcessSale use case of NextGen POS system with a neat diagram. (8)
 - C) What are domain models and why they are important in software development? (4)
- 4) *I want to play the dicegame with two dices* is a requirement of the customer. Clearly write the specification (8)

- A) class diagram, show the responsibilities and write the interaction diagram between all the objects involved in this design.
- B) Identify all the classes and write the refined domain model of POS system. (10)
- C) What is the elaboration phase in software engineering? Explain briefly (2)
- 5) Write at least five differences between a use case diagram and a sequence diagram? (5)
- A)
- B) Consider the POS system as three layers of software architecture. Show the interaction between the objects by considering the ProcessSale use case. Note that objects representation in the sequence diagram is part of each layer. (10)
- C) What is a design pattern? What problem does it try to solve? What are the three basic categories of design pattern? (5)
- 6) Explain the concept of responsibility and methods in designing objects with responsibilities. (6)
- A)
- B) Write the program in the object-oriented programming language of your convenience for the following class diagram. Clearly show where the instances of the classes are created. (8)



- C) Explain the concept of low coupling and high cohesion along with an example. (6)
- 7) A use case demands the creation of a family of related objects where the instance of related objects is referred to by its base class. The case study is "I want to create a (10)
- A)

collection of cars from a factory based on the user wish/choice." Write the factory pattern class diagram and write the implementation class along with the object creation logic in the programming language of your choice.

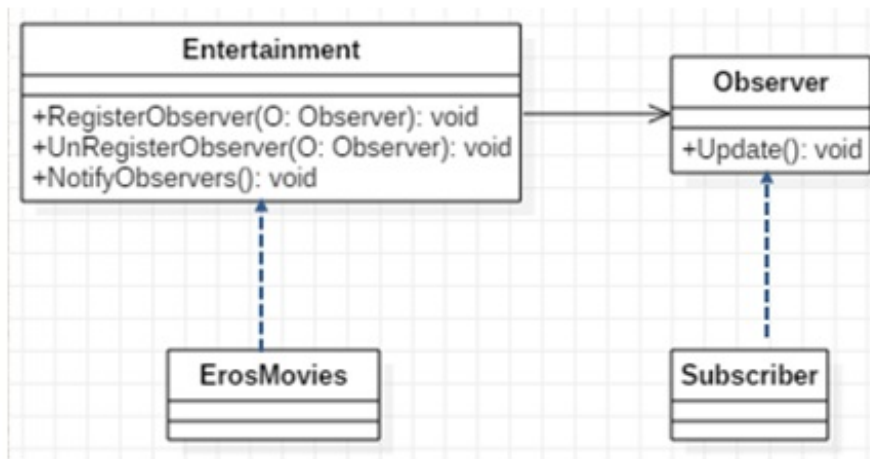
B) **Case study: Hotel Automation Software (HAS):** (10)

A hotel has 20 rooms. Five rooms are of a double type, and 15 are of a single type and may be AC or Non-AC type. The rooms have different rates depending on whether they are of single or double, AC or Non-AC types. Guests can reserve rooms in advance or can reserve rooms on the spot depending upon availability of rooms. The receptionist would enter data about guests such as their arrival time, advance paid, approximate duration of stay, and the type of the room required. Depending on this data and subject to the availability of a suitable room, the computer would allot a room number to the guest and assign a unique token number to each guest. If the guest cannot be accommodated, the computer generates an apology message. The hotel catering services manager would input the quantity and type of food items as and when consumed by the guest, the token number of the guest, and the corresponding date and time. When a customer prepares to check-out, the hotel automation software should generate the entire bill for the customer and also print the balance amount payable by him. Frequent guests should be issued an identity number which helps them to get special discounts on their bills.

Write the complete class diagram for the above case study.

8) You have been given the following domain class diagram. (12)

A) Identify which design pattern it is and write the complete program by considering ErosNow as the case study (Expected: the realization of Entertainment and observer interface and how the users get notifications through subscription and un subscription).



- B) Explain different testing methods along with the order in which they are executed. (8)

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