Unit – 1 Introduction to Software Engineering and Object-Oriented Concepts

SHORT QUESTIONS:

1. What is software?
2. Which documents are prepared during software development?
3. What is the use of operating procedure manuals?
4. Name of some operating procedure manuals.
5. List out characteristics of software.
6. Define encapsulation.
7. List the phases of object-oriented software development life cycle.
8. Software does not wear out. Justify this.
9. Define the term program.
10. List the documents that are prepared during the software development process.
11. State difference between traditional approach and object-oriented approach.
12. List out name of an object-oriented methodology.

LONG QUESTIONS:

1. Explain parts of software.
2. Explain Coad and Yourdon methodology.
3. Explain micro process of Booch methodology.
4. "Encapsulation is also known as information hiding concept". Justify this statement.
5. Give a brief explanation of macro and micro process of the Booch methodology.
6. Mention the models in the analysis phase of the Rumbaugh methodology and explain their roles for describing the system.
7. Differentiate between traditional approach and object-oriented approach.
8. Consider a library management system. List out classes, objects, attributes and methods of it.
9. Explain macro process of Booch methodology.
10. Explain the models of Jacobson methodology.
11. “Software becomes outdated.” Justify your answer with valid reasons.

Unit 2 : Software development life cycle models

SHORT QUESTIONS:

1. What is mean by an agile?
2. Give the full form of RUP and XP.
3. List out phases of dynamic structure of RUP.
4. Write down a scenario in which you can use iterative enhancement model?
5. Which software development model requires higher user participation?
7. Define extreme programming.
8. OMG stand for __________.
9. Which software development model requires higher user participation?
10. Under which situation would you choose to use iterative enhancement model?
11. List any four artefacts produced during elaboration phase of RUP model.
12. List the five phases used for software development when using waterfall model approach.
13. Write down advantages of prototyping model.
14. What do you mean by build and fix model?
15. List out any four rule of extreme programming.
16. What are the two disadvantages of waterfall model?
17. List all the phases of spiral model.
18. What is RUP?

LONG QUESTIONS:

1. Explain release planning phase of XP.
2. Explain user stories with respect to XP.
3. Explain in detail the inception and elaboration phase of dynamic structure of rational unified process.
4. Draw the diagram of XP life cycle. Explain any two phases in detail.
5. Explain waterfall model in detail.
6. Explain static structure of RUP.
7. What is agile process? Explain its features.
8. Explain inception and elaboration phase of dynamic structure of RUP.
9. What are the agile processes? Explain the key features of agile methodology.
10. Write a short note on prototyping model along with a diagram. State where is it used?
12. Explain in detail the static structure of rational unified process.
14. What is the use of Facilitated Application Specification Technique? Which activities are carried out during FAST session?

Unit – 3 : Software Requirement Elicitation and Analysis

SHORT QUESTIONS:

1. What is functional requirement? Give an example of it.
2. Define stakeholder. State what do you understand by the term stakeholder?
3. List the possible actors in a web based Student Information System.
4. What is the role of facilitator in brainstorming session?
5. What is FAST elicitation technique?
6. What is actor in the context of use case diagram?
7. What does use case describes?
8. Which kinds of relationships are used between use cases?
9. How to represent actor in the use case diagram?
10. Write any four stakeholders of Hospital Management System.
11. State any two differences between formal interview and informal interview.
12. What the use is of include and extend clause in use case diagram?
13. List out different categories of stakeholders.
14. What are functional requirement non-functional requirement?
15. Write guidelines for the creation of use cases.
LONG QUESTIONS:

1. Explain walkthrough and inspection process.
2. Explain types of actor.
3. Explain formal interview.
4. Explain various categories of stakeholders in software project.
5. Explain an interview as a requirement elicitation technique.
6. Write a short note on brainstorming session.
7. What is brainstorming session? Write a short note on its features, advantages and disadvantages if any.
8. Which activities are carried out during FAST session?
9. Explain components of use case diagram.
10. Explain characteristics of a good requirement in detail.
11. Explain include and extend relationship with example.
12. Explain brainstorming and FAST session as the requirement elicitation techniques.
13. Create the use case diagram for online shopping system. Assume that there are different types of payment systems involved. And the customer can select n number of items in shopping cart.
14. Create the use case diagram for online hotel room booking system. There are different categories of room available to the customers.
15. Draw a use case diagram for the following scenario.
   An automated teller machine (ATM) or the automatic banking machine (ABM) is banking subsystem that provides bank customers with access to financial transactions in a public space without the need for a cashier, clerk or bank teller. Customer uses bank ATM to check balances of his/her bank accounts, deposit funds, withdraw cash and/or transfer funds. ATM Technician provides maintenance and repairs. All these activities involve Bank whether it is related to customer transactions or to the ATM servicing.
16. How will you conduct an interview for the purpose of requirement elicitation?
17. Draw a use case diagram for the scenario given below.
   Mega super market has three checkout counters. In order to improve the checkout process a PC has been set up at each of these counters along with the printer. Each item in the super market is packed & each packet carries on it a price tag on which are printed its item code and price. Each customer picks out the desired packet from the shelves place them in the standard shopping basket supplied by the super market and carries the basket to one of the checkout counters. The counter operator takes out each of the packets from the basket, keys in the 12 digit item code. The amount is collected from the customer and a bill is printed and issued to the customer.
18. List the types of relationships used in a use case diagram. Explain any two along with examples for each relationship.
20. Consider the following scenario and draw the use case diagram accordingly.
   The Hotel Management System allows receptionist to do reservation for the hotel guests. Receptionist can insert, update, delete and search guest details, search available rooms, making the reservation and payment process and cancel reservation. Administrator is allowed to manage room details and view guest details.
21. Consider the following bookshop automation system (BAS) software.
   I) BAS should enable the shop clerk to enter the details of various books the shop deals with and change the inventory level of various books when new stocks arrive.
   II) BAS should help the customers query whether a book is in stock. The users can query the availability to a book either by using the book's title or by using a partial name of the author. If a book is in stock, the exact number of copies available and the rack number in which the book is located should be displayed. If a book is not in stock, the query for the book is used to increment a request field for the book. The manager can periodically view the request field of the books to roughly estimate the current demand for different out-of-stock books.
III) BAS should maintain the price of various books. As soon as a customer selects a book to purchase, the sales clerk would enter the ISBN number of the book. BAS should decrement the stock to reflect the book sale and generate the sales receipt for the book.

IV) Upon request, BAS should generate sales statistics (viz. book name, publisher, ISBN number, number of copies sold and the sales revenue) for any period. BAS should enable the manager to view publisher-wise sales (e.g. sale of all books of any given publishing house) over a period.

V) Do following:
   a. Identify actors and use cases.
   b. Draw the use case diagram for the BAS software.
   c. Write use case description of any two use cases.

18. Air ticket reservation (ATR) system is software required to automate the reservation system for airline at an airport or elsewhere. The primary task deals with the following functionalities:
   I) Maintenance of user account
   II) Maintenance of flight database, i.e. flight number, timing, number of seats, etc.
   III) Reservation of air tickets
   IV) Cancelling of air tickets
   V) Enquiry about flight schedules, timings, etc.
   VI) Reports regarding day-to-day bookings, ticket availability, passengers’ database, etc.
      a. Air ticket may be issued on demand for any flight to and from any destination for any date and in any class as desired by the passenger depending on the availability.
      b. After any issue or cancellation of the ticket, the corresponding information has to be updated so that the ticket availability shows the status of the seats actually available/unavailable. Enquiries made by the passengers also need to be furnished disclosing the timing and availability of flight and air tickets in particular classes for the dates provided by the enquirer.
   VII) For the sale of an air ticket or for its cancellation, money will be paid or refunded and thus there will be a need for account maintenance, which may include ledger, sale book receipt, etc.
   VIII) There will also be a detailed account of all the passenger list for all flights, thus aiding in cross checking any information that may be of use to the airline or any other authorities.
      a. Identify actors and use cases.
      b. Draw the use case diagram for the ATR software.
      c. Write the use case description of reservation of airlines.

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**Unit – 4 : Object-Oriented Analysis**

**SHORT QUESTIONS:**

1. State difference between controller class and interface class?
2. Draw the notations used for aggregation and generalization.
3. What is the importance of generalization relationship in context of object oriented analysis?
4. What do you understand by attributes and operations of a class?
5. What are the properties of control class?
6. List the possible actors in a web based Leave Management System.
7. Define a controller class with its UML notation.
8. Draw UML notations for aggregation and generalization.
9. What are attributes and operations of a class in terms of OOSE?
10. What do you understand by the term guard condition?
11. Define a interface class with its UML notation.
12. Draw UML notations for state and transition in a state diagram.
13. What do you mean by methods in a class in terms of OOSE?
14. Who are primary actors? Give an example.
15. When composition relationship is used among classes?
16. How to represent object in sequence diagram?
17. What is an object composition? Give an example.
18. State any two benefits of inheritance
19. Define entity class with suitable example.
20. State difference between dependency and generalization with example.
21. Draw the diagram for modelling relationship between classes in “Login” use case.
22. Departments belong to only the specific university. Identify and draw the relationship for this scenario.
23. Identified entity, interface and controller classes for “issue book” use case of LMS.
24. Define relationship between objects. List out any four relationships.
25. State any two benefits of inheritance.

LONG QUESTIONS:

1. Explain association with example.
2. List out various relationship among objects. Explain any one in detail with appropriate example.
3. Define multiplicity with example.
4. Model the relationship between objects of “registration” use case of College management system.
5. Explain various types of classes along with their notations.
6. Explain composition and aggregation with example.
7. Consider a banking information system. List out classes, objects, attributes and methods of it.
8. What is the difference between OOA and structured system analysis? In recent years, to develop the web application, which analysis is most suitable?
9. Draw a class diagram for the above described scenario of online railway reservation.
10. List all the types of classes in OOSE. Explain in detail any two with examples and UML notations.
11. Explain in detail association with its various types and examples.
12. Explain equivalence class partitioning technique. How it is different than boundary value analysis?
13. Create three classes linked by associations to represent a student taking courses in a school. Specify appropriate multiplicity as well as association names for the association. If there is more than one alternative, explain the advantages and disadvantages of each.
14. For a university, course and its professor association, indicate whether it should be an ordinary association, an aggregation or a composition.
15. Consider the following case study of Medicine Shop Automation (MSA) software to be used by the owner of a retail shop of medicine.

   The medicine shop consists of various types of medicines purchased from different vendors. These medicines are kept in numbered racks in the shop. The software should be able to maintain the vendor name and address. The inventory is maintained by the owner of the shop. The shop owner faces a problem of placing order as soon as the number of medicines starts reducing in the inventory below a threshold limit. The medicine shop owner wants to maintain inventory of medicines for about one week for each of the medicine. The limiting value must be calculated by the software by analyzing the average sales per one week for each medicine. The software must be able to generate the items ordered at the end of each day. The items must consist of the number of items to be ordered along with the vendor name. The software must be able to maintain the description about each item with item no, name, vendor no, quantity, expiry date etc. The software should be able to maintain the items sold to each customer, and should print a cash receipt. At the end of the day, the software should be able to generate a list of expired items. For implementing the MSA software, identify the classes and their relationships and represent them using the class diagram.

16. Consider the following Bookshop Automation System (BAS) software:

   The BAS should enable the shop clerk to enter the details of the various books the shop deals with and change the inventory level of the various books when new stock arrive. The BAS should help the customers query whether a book is in stock. The users can query the availability of a book either by using the book title or by using a partial name of the
If a book is in stock, the exact number of copies available and the rack number in which the book is located should be displayed. If a book is not in stock, the query for the books is used to increment a request field for the book. The manager can periodically view the request field of the books to roughly estimate the current demand for different out-of-stock books. The BAS should maintain the price of various books. As soon as a customer selects a book to purchase, the sales clerk would enter the ISBN number of the book. The BAS should decrement the stock to reflect the book sale and generate the sales receipt for the book. Upon request, the BAS should generate sales statistics (viz. book name, publisher, ISBN number, number of copies sold and sales revenue) for any period. The BAS should enable the manager to view publisher wise sales (e.g. sale of all books of any given publishing house) over a period. For implementing the BAS software, identify the classes and interrelationships and represent them using the class diagram.

**Short QUESTIONS:**

1. State any two differences between OOA and OOD.
2. What is the difference between lifeline and focus of control in sequence diagram?
3. Which symbol is used to destroy an object in sequence diagram?
   - 1. What is guard condition? What do you understand by the term event?
   - 2. What are the purposes of activity diagram? Brief any two.
4. Which two special states are used in activity diagram?
5. What are test cases?
6. What is the use of fork and join?
7. How to represent object in sequence diagram?
8. Consider the scenario of online railway reservation system. This system checks the train and ticket availability and then processes the passenger's data for booking. Create the sequence diagram to represent this case.
9. Describe the steps that are performed while converting an entity into a database tables?
10. State difference between synchronous message and asynchronous message.
11. Define interaction diagram. List out its types.
12. State difference between sequence diagram and collaboration diagram.
13. Define synchronous type of message with example.
14. Define asynchronous type of message with example.
15. What is the use of branching in activity diagram? Give an example.

**LONG QUESTIONS:**

1. Which are the types of control structures of sequence diagram? Explain any one of them in detail.
2. Consider railway reservation system. Draw the sequence diagram of “Ticket Reservation” use case.
3. Draw and explain with example the format of detailed design of class.
4. Explain the elements (notations) of sequence diagram with example.
5. What are object, lifeline and focus of control with respect to sequence diagram? Explain with example.
6. List out different types of messages. Explain any four with example.
7. List and explain symbols used in activity diagram with example.
8. Explain join and fork in activity diagram with example.
9. Explain following terms with example with respect to statechart diagram.
   - a. State
   - b. Event
   - c. Action
d. Guard condition

10. Which are the steps followed when converting entity into database tables?

11. Draw an activity diagram for the following scenario.
   An online railway reservation consists of the following activities. A Passenger can reserve a ticket, cancel a ticket and enquiry. Each train has limited number of reserved seats. Once a passenger cancels a ticket, required amount is deducted and the waiting list passenger is allotted the seat. Passenger may also book a ticket in ticket scheme by paying additional amount. Passenger who booked the ticket under ticket scheme can’t get any refund if the ticket is cancelled. The chart is prepared two hours before the departure of the train.

12. Draw a sequence diagram for the above described scenario of online railway reservation.

13. Draw a state chart diagram for the above described scenario of online railway reservation.

14. Draw a sequence diagram for the following scenario. The ABC Institute of Computer Applications operates international business programs in 10 locations throughout India. The institute keeps a track of each graduate student. In order to maintain strong ties to its alumni; the school holds various events around the world. The institute needs to keep track of which graduates have attended which events. For an attendance by a graduate at an event, a comment is recorded about information. A report is produced showing the latest information about that graduate.

15. Draw an activity diagram for the above scenario.

16. Draw state chart diagram for the scenario given below. OTOS’s pharmacy is the distributor of various pharmaceuticals products. They have a huge network of customers. The registered customers can only book orders for the specified product. If the specified product is available the required quantity is checked against the quantity on hand (QOH). If the required quantity is less than QOH a deliver challan is prepared. After the delivery of the product an Invoice is prepared by accountant who contains the cost of ordered items, deductions if any (in case of damaged or lost goods) and previous outstanding balance. Then the invoice is sent to the customer.

17. Draw an activity diagram for the above scenario.

18. What are sequence diagram? How are sequence diagrams different from that of a collaboration diagram?

19. Draw the sequence diagram of Room Reservation in Hotel Management System.

20. Draw the sequence diagram for the Withdraw Money from the ATM.

21. Which are the different types of messages used in sequence diagram to represent interaction among objects? Explain any three with proper example.

7. Explain reflexive message with example.

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Unit – 6 : Software Testing

**SHORT QUESTIONS:**

1. What is the difference between alpha and beta testing?
2. What are test cases? Give an example.
3. Define the term Software testing.
4. What is software testing?
5. State difference between software verification and software validation.
6. Which are the techniques of software verification?
7. List out software validation techniques.
8. Why functional testing is also called blackbox testing?
9. What do you mean by integration testing?
10. What do you mean by system testing?
11. What do you mean by acceptance testing?
12. What is mutation testing?
13. List any two static unit testing tool.
14. What are test cases? Give an example.
15. Define the term validation.
16. What is the purpose of testing?
17. List any two ways to find the cyclomatic complexity. Give an example of any one of them.
1. What are verification and validation?
2. State the difference between peer reviews and walkthroughs verification techniques.
3. What is the difference between functional testing and structural testing?
4. List out levels of testing. Explain unit testing.
### LONG QUESTIONS:

1. Explain walkthroughs as verification technique in detail.
2. Explain inspection as a verification technique in detail.
3. Explain boundary value analysis in detail.
4. Explain equivalence class testing in detail.
5. List out structural testing techniques. Explain any one of them in detail.
6. Explain path testing with example.
7. Explain levels of testing in detail.
8. What is the difference between verification and validation? Which activity comes first in software development?
9. Explain generalization and association as object oriented relationship.
10. What are the levels of testing? In each level of testing which activities are carried out? Explain in detail.
11. What is functional testing? How it is different than the structural testing?
12. What is a path? Write a detailed note on path testing with an example.
13. What is structural testing? List all the techniques available under structural testing. Explain any one of them in detail with the help of an example.