

III B.Tech I Semester Regular Examinations, November 2005
OBJECT ORIENTED ANALYSIS AND DESIGN THROUGH UML
(Common to Computer Science & Engineering and Information
Technology)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What are the salient features of object orientation? Explain briefly.
(b) How does object orientation facilitate software reuse? Illustrate.
(c) How are classes and objects identified from a given problem description?
[8+4+4]
2. (a) What are the aims of modeling? What are the principles of modeling.
(b) What are the application areas of UML? Give any five.
(c) What is software architecture? Define stakeholder. [8+5+3]
3. (a) What is meant by importing and exporting with regard to packages? Explain.
(b) Enumerate the steps to model groups of elements.
(c) What are the visibility specifiers for classes and packages? Explain. [6+5+5]
4. (a) Consider railway reservation system and draw class diagram.
(b) What are the properties of a well-structured diagram. [8+8]
5. (a) Enumerate the steps to model flows of control by organization.
(b) Explain forward engineering and reverse engineering in respect of interaction diagrams. [8+8]
6. (a) Define interaction. What is the significance of context in interactions?
(b) What are the various adornments to ends of links denoted as standard stereotypes? Explain about objects and roles. [4+12]
7. (a) Give the sketch of a state machine for the controller in a home security system, which is responsible for monitoring various sensors around the perimeter of the house. Briefly explain.
(b) Explain the following parts of a transition
 - i. Event trigger.
 - ii. Guard condition.[12+4]
8. (a) Define component. What are the differences between components and classes? How are component and interface related?
(b) What are the properties of components?
(c) What are standard stereotypes UML defines that apply to components. [8+4+4]

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1. (a) Contrast: data model Vs. object model.
(b) Consider any three object oriented programming languages. Enumerate any six contrasting features comparatively.
(c) What are the basic features of object orientation? Explain briefly. [5+6+5]
2. Define the following:
 - (a) software architecture
 - (b) Active class and its UML notation
 - (c) Usecase and its UML notation
 - (d) Liskov's substitution principle
 - (e) Using relationship
 - (f) Runtime polymorphism
 - (g) UML
 - (h) Role. [16]
3. (a) Explain the following stereotypes related to objects with reference to dependency relationships and messages and transitions.
 - i. instance of
 - ii. instantiate
 - iii. become
 - iv. copy
(b) Enumerate the steps to model prototypical instances.
(c) What is the significance of importing and exporting with regard to packages? [6+6+4]
4. (a) Enumerate the steps to reverse engineer a class diagram.
(b) Enumerate the steps to model object structures. [6+10]
5. (a) How is recursion represented in a sequence diagram?
(b) Explain the following with regard to interaction diagrams.
 - i. Object life line
 - ii. <<create>> and <<destroy>> messages

- iii. Focus of control
 - iv. Dewey decimal numbering
 - v. Nesting of tours of control
 - vi. Semantic equivalence. [4+12]
6. (a) Explain the following standard stereotypes that adorn the ends of links.
- i. association
 - ii. self
 - iii. global
 - iv. local
 - v. parameter.
- (b) Briefly write about messages and sequencing with an illustrative diagram. [10+6]
7. (a) Enumerate the steps to model the lifetime of an object.
- (b) Compare: substates, nested states, composite state. [14+2]
8. (a) Enumerate the steps to model an executable release.
- (b) What are the contents, common properties and common uses of component diagrams? Explain briefly. [4+12]

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(b) How does object orientation facilitate software reuse? Illustrate.
(c) How are classes and objects identified from a given problem description?
[8+4+4]
2. (a) Explain briefly the classification of things with UML notation.
(b) Why is UML used? Explain the various relationships with UML notation.
[10+6]
3. (a) Enumerate the steps involved in modeling the seams of in a system.
(b) Enumerate the steps involved in modeling static and dynamic types.
(c) Give an example diagram that captures all the relationships in UML.
(d) How do you inter relate type, interface and roles?
[6+4+3+3]
4. Enumerate the steps to model object structures. Illustrate with an object diagram.
[16]
5. (a) Consider modeling a railway reservation system. Consider the use case “specify ticket details” and draw a sequence diagram. Explain briefly.
(b) Consider modeling a railway reservation system. Consider the use case “buy ticket” and draw a collaboration diagram. Explain briefly.
[8+8]
6. (a) What are sequencing and delegation? How is nested flow of control rendered in UML notation? Illustrate.
(b) “C++ is statically typed where as Small talk is dynamically typed.” Justify the validity or invalidity of the statement, whatever is appropriate.
(c) Enumerate the steps to model a flow of control.
[7+3+6]
7. (a) Contrast action with activity. Define state and event. What are the various parts of a state? Explain briefly.
(b) Define signal.
[14+2]
8. (a) Define component. What are the differences between components and classes? How are component and interface related?
(b) What are the properties of components?

(c) What are standard stereotypes UML defines that apply to components.[8+4+4]

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(c) What are the basic features of object orientation? Explain briefly. [5+6+5]
2. (a) How is association modeled as a class?
(b) Explain the antisymmetric and transitive properties of aggregation.
(c) How is generalization/specialization contrasted with more code reuse? State Liskov's substitution principle.
(d) What are the principles of modeling? [4x4=16]
3. (a) Give examples for how named, anonymous, multiple and orphan instances are depicted in UML notation?
(b) What are the various elements in UML that may have instances. How do you denote object state in UML? Give example.
(c) Enumerate the steps to model concrete instance. [6+6+4]
4. (a) Illustrate the following modeling issues with class diagrams.
 - i. Modeling simple collaborations
 - ii. Modeling logical database schema.
(b) What are the contents in class diagrams? [12+4]
5. (a) Create an instance sequence diagram that shows what happens when you successfully send a fax. That is, model the object interactions in the best-case scenario of the "send fax" use case of a fax machine. Include objects for the sending machine, the receiving machine, and a central exchange that routes faxes and phone calls.
(b) What are the contents and common uses of interaction diagrams? Define synchronous and asynchronous message. [10+6]
6. (a) Define interaction. Briefly explain about links in interactions.
(b) Enumerate the steps to model flow of control in interactions.
(c) Briefly explain about use cases. Enumerate the steps to model the behavior of an element. [5+5+6]

7. (a) Enumerate the steps to model the following:
- i. family of signals
 - ii. exceptions
- (b) Explain the four kinds of events modeled by UML. [6+10]
8. Enumerate the steps to model the following. Illustrate UML diagrams and explain briefly.
- (a) Modeling processes and devices.
 - (b) Modeling distribution of components. [16]
