

SUMMARY of Module 9

1. Complex systems are designed by breaking down such systems into a number of cooperating subsystems which are reasonably independent and self-contained.
2. One method of design is to use what are known as objects as subsystems.
3. The main motivation for using object oriented modelling is the realisation that individual objects may be modified without affecting the other parts of the system.
4. Objects also promote their reuse in many systems.
5. An object is an entity which is uniquely identifiable and is permanent relative to the life time scale of an application. All objects have attributes and state. A set of operations are defined for each object which determines their behaviour.
6. Objects collaborate by responding to requests from other objects to carry out specified operations.
7. Objects having similar meaning and purpose may be grouped together to form a class. A class may be considered as a template for objects of a particular type.
8. Special properties of objects are encapsulation, inheritance and polymorphism.
9. Encapsulation is the hiding of implementation details of an object from the clients who use the services provided by an object.
10. A class A may have attributes and operations which are identical to another class B in addition to its own attributes and operations. In such a case class A is said to inherit operations and attributes of class B.
11. Using inheritance a hierarchy of classes may be constructed where children inherit some of the properties of their parents in addition to their own properties

12. An important concept in modelling using objects is polymorphism. Polymorphism is the ability to manipulate objects of different distinct classes using only knowledge of their common property.
13. To model an information system using objects the requirements specification is examined and all nouns in it are picked as potential objects.
14. From among potential objects the relevant ones appropriate for modelling are the ones which have specific responsibilities and essential for the functioning of the system.
15. Having identified objects and their responsibilities the next step is to find the objects with whom they collaborate
16. A documents is prepared for each class giving its own responsibilities, its collaborators and their responsibilities.
17. A graph showing pictorially the classes and their mutual collaboration completes object oriented modeling.

Question Bank – Module 9

- 13.1 What is object oriented modelling?
- 13.2 Why is object oriented modelling used in practice?
- 13.3 When is object oriented modelling particularly useful
- 13.4 Define an object
- 13.5 What is the difference between a class and an object
- 13.6 What are subclasses and superclasses. Give examples of each of these.
- 13.7 What do you understand by information hiding? Why is it resorted to in designing information systems? How is it achieved?
- 13.8 What do you mean by inheritance in object oriented systems? Why is it useful? Give an example of inheritance.
- 13.9 What do you understand by the term polymorphism in object oriented system? Why is it useful? Give an example of polymorphism.
- 13.1 How do you select objects from a requirement specification. Given the following requirement statement, select potential objects.

A list of employers with their basic pay is sent to a clerk. He calculates the gross pay using standard allowances which are known for each pay slab. Deduction statements such as loan repayment, subscription to association etc., are also sent to another clerk who matches these slips with the slips of gross pay and calculates net pay. This step is used by another clerk to write out pay cheques for each employee and sent to respective employees. The total pay bills computed is also computed".

- 13.1 Pick objects and model the following requirements statement using objects. "A magazine is printed monthly and posted to its subscribers. Two months before the expiry of subscription, a reminder is sent to the subscribers. If subscription is not received within a month, another reminder is sent . If renewal subscription is not received upto two weeks before the expiry of the subscription, the subscriber's name is removed from the mailing list and the subscriber informed".
- 13.1 Give a brief requirements specification for a bus ticket reservation system. Model it using objects.

References

1. Most of the material in this module has been taken from the book “Analysis and Design of Information Systems”, 2nd Edition, V.Rajaraman, Prentice Hall of India, New Delhi, 2003. Chapter 13, Object Oriented System Modelling (pp.180-199)
2. There are several standard books on object oriented modeling for those who want to dwell deeper. Some of these are:
 - (i) I.Jacobson *et.al* “Object Oriented Software Engineering”, Pearson Education Asia, 1998
 - (ii) David Coleman *et.al* “Object Oriented Development”, Prentice Hall, Inc., N.J., WA,1999
 - (iii) J.Rumbaugh *et.al* “Object Oriented Design and Applications”, Benjamin Cumming, U.S.A., 1991