Software Engineering

UNIT 3

What is UML?

- The Unified Modelling Language is a standard graphical language for modelling object oriented software

  - It was developed in the mid – 1990s by James Rambaugh, Grady Booch and Ivar Jacobson.
  - The ‘U’ in UML stands for “unified”, since its three developers.
  - UML standard is the Object Management Group (OMG)
  - In 2004, OMG approved version 2.0 of UML.

UML diagrams

- Class diagrams
  - describe classes and their relationships
- Interaction diagrams
  - show the behaviour of systems in terms of how objects interact with each other
- State diagrams and activity diagrams
  - show how systems behave internally
- Component and deployment diagrams
  - show how the various components of systems are arranged logically and physically

UML features

- It has detailed *semantics* - describe mathematically its notations.
- It has *extension* mechanisms – allow s/w designers to represent concepts
- It has an associated textual language
  - *Object Constraint Language* (OCL) – elements of the diagram.

- The objective of UML is to assist in software development
  - It is not a *methodology*

Advantages

- A model should
  - use a standard notation
  - be understandable by clients and users
  - lead software engineers to have insights about the system
  - provide abstraction

- Models are used:
  - to help create designs
  - to permit analysis and review of those designs.
  - as the core documentation describing the system.

Essentials of UML Class Diagrams

- *The main symbols shown on class diagrams are:*
  - *Classes*
    - represent the types of data themselves
  - *Associations*
    - how instances of classes reference instances of other classes
  - *Attributes*
    - are simple data found in instances
  - *Operations*
    - represent the functions performed by the instances
  - *Generalizations*
    - arrange classes into inheritance hierarchies

Classes

- A class is simply represented as a box with the name of the class inside
  - The diagram may also show the attributes and operations
  - The complete signature of an operation is:

    operationName(parameterName: parameterType …): returnType