BCA
NOTES

OBJECT ORIENTED SOFTWARE ENGINEERING

Object Oriented Approaches | Rishabh Baid

Q. What is Object oriented software engineering concepts?

Or

Q. What is Object oriented software engineering concepts & principles?

Introduction:-

Object Orientation is a software development methodology that is based on real world system. An object is the core concept involved in object orientation.

An object is the representation of a real world entity.

Object oriented view provides an abstraction that enables us to model the world in ways that help us to better understand and navigate. Therefore, software engineering follows the same concepts as conventional approaches

Analysis →identifies →object and classes (that are relevant to the problem domain)

Design --→Identifies and provide→ Architecture, Interfaces, component Level Detail

Implementation (using OO Language) →Transforms, Design→Code.

Testing→ exercise→ Object oriented architecture Interface & component.

Q. Why do we use Object oriented software engineering concepts?

- ➢ Object oriented concept & technologies lead to reuse and reduce of program component that leads to faster software development and high Quality programs.
- ➢ Object oriented software is easier to maintain because its structure is inherently decoupled (meaning that programs or software developed using OOPS or Object oriented concept are not dependent on each other such that if any changes made on one part do not reflect any changes in other part.
- ➢ Also object oriented systems are easier to adapt and easier to scale (i.e. that is layer system can be created by assembling reusable subsystem).
- ➢ Only applying Object oriented programming will not give or produce the best result in software development.
- ➢ software engineering must consider other items such as :-
  - Object Oriented Requirement Analysis (OORA).
  - Object Oriented Design (OOD).
  - Object Oriented Domain Analysis (OODA).
  - Object Oriented Database Management System (OODBMS).
  - Object Oriented Computer Aided Software Engineering (OOCASE).

What are the basic concepts of Object orientation?

Basic Object oriented concepts are as follows

1. Classes.
2. Object.
3. Abstraction.
4. Polymorphism.
5. Inheritance.
6. Encapsulation.
7. Information hiding.

   ➢ The ability to protect some components of the object from external entities. This is realized by language keywords to enable a variable to be declared as private or protected.
8. Interface.
   ➢ The ability to define the function or methods signature without implementing them.
9. Attributes.
10. Methods & service.

Object oriented Process model

➢ The Object oriented process moves through evolutionary spiral that starts with CUSTOMER COMMUNICATION. Here, the problem domain is defined and that <u>Basic problem classes are identified</u>

➢ Planning and risk analysis established a foundation for Object oriented project plan.

➢ The technical work associated with Object oriented software engineering follows alternative path as given below in the diagram.

➢ Object oriented software engineering emphasizes (concern about) reuse (reusability).

➢ Therefore, classes are "looked-up" in a library of existing classes before they are built.

➢ When a class cannot be found in the library , the software engineer applies of **Object oriented Analysis , Object oriented design , Object oriented Object oriented programming to create the classes and object derived from the class.**

➢ The new class is then put into library so that it may be reused in the future.

Object Oriented Analysis

Before we build an object oriented system, we have to define the classes(object) that represent the problem which is to be solved, the manner in which the classes related to each other and interact with one another, the inner working (attributes and operations)of object and communication method (message) that allows them to work. All of these things are accomplished during object oriented analysis (OOA).
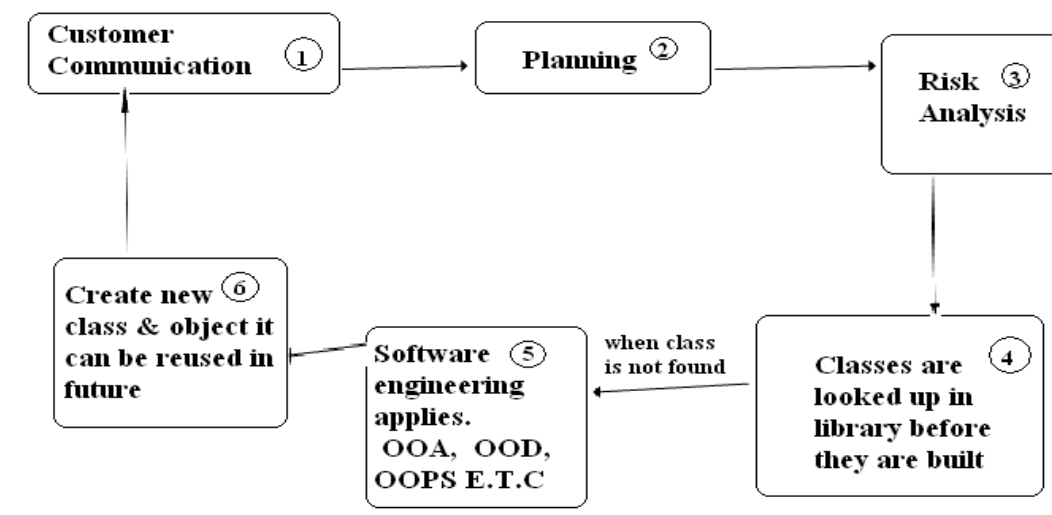
What does OOA do?

Object oriented analysis (OOA) methods enable a software engineering to model a problem by representing both static and dynamic characters tic of classes and their relationship as the primary modeling component.

Five basic principles to build Analysis modeling

- Information domain is modeled.
- Function is described.
- Behavior is represented.
- Data, functional & behavioral models are partitioned to explore greater detail.
- Early model represent the essence of the problem while later models provides implementation details.

The above principles form the foundation for the approach to OOA (Object oriented Analysis)

UML (Unified modeling Language) :-

It is a standardized general purpose modeling language in the field of Object Oriented Software Engineering. The standard is managed and was created by object management group.
UML includes a set of graphic notation technique to create visual model of Object Oriented intensive system.
UML is used to visualize, modify, construct and document the artifacts of Object Oriented Software intensive system under development. It offers a standard way to visualize system architecture blueprints, including elements. Such as:-

1. Activities
2. Actors
3. Business processes
4. Database schema
5. Logical components
6. Programming language statement.
7. Reusable software components

UML combines technique from data modeling (ERD, Business Modeling (work flow)) object modeling.

It can be used with all processes, throughout the System Development Life Cycle (SDLC).