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OO Analysis & Design (O A & D)

- ① Domain Analysis
- ② Components of OO Analysis model
- ③ OOA process, Design for object oriented system
- ④ The system design process
- ⑤ Object
- ⑥ Design pattern.

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Domain Analysis

- ⇒ Domain means a specific subject area or field where a software system operates.
- ⇒ Domain Analysis can be defined as the process of understanding, knowing, searching and studying about a domain where the software system works or has to work.
- ⇒ Domain Analysis is done when an organization creates sets of reusable classes and components which are applicable for other applications. Domain Analysis involves analysis a subject area, its scope, some positive and negative impact that it can bring on the software application which is going to be developed or already developed.

So, based on these knowledge, we can define some of the

OBJECTIVE OF DOMAIN ANALYSIS

- ① Understanding the problem domain.
- ② Guiding the software development.
- ③ Defining the domain specific terminologies.

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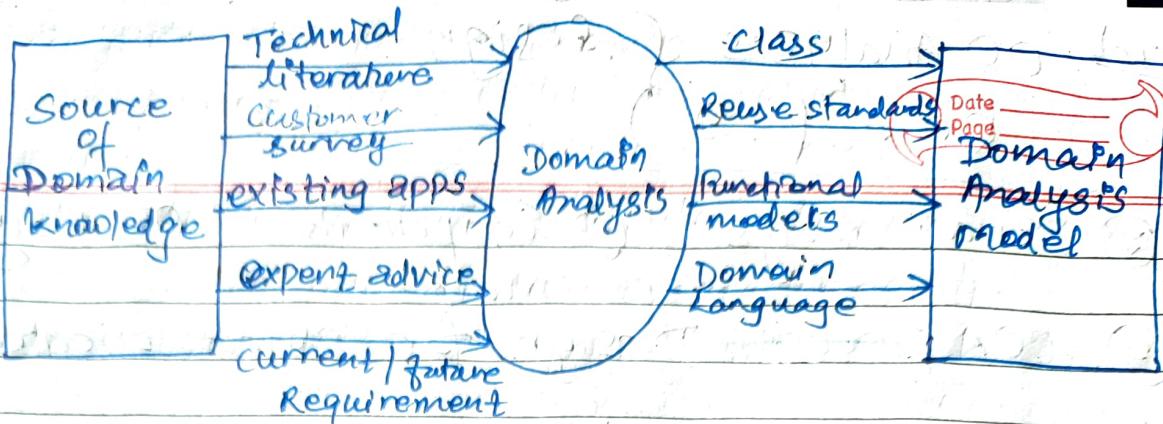
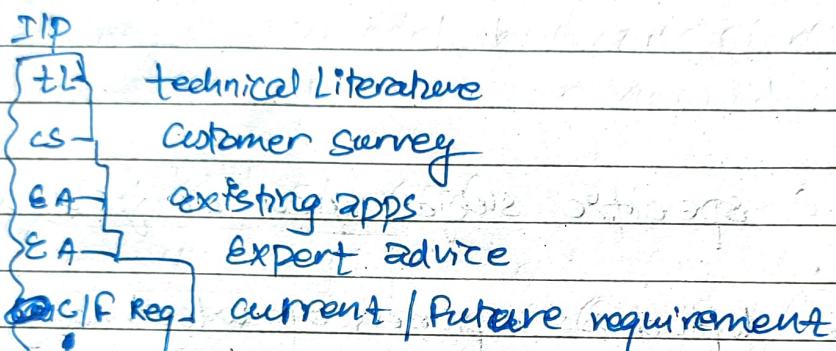


Fig: Input and output of domain Analysis

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- Why Domain Analysis may be viewed as an umbrella activity?
- ↳ Domain analysis may be viewed as an umbrella-activity since domain analysis is not only connected for ISW project. Instead the main objective of domain analysis is to create a component which will be reusable and applicable for the other SW development process.

Components of Object Oriented Analysis Model (OOA)

- ↳ Analysis model can be defined as the process of creating a precise, accurate, understandable model of real world. The above definition is also for object oriented analysis model.
- Object oriented Analysis is the first technical Activity that is done in object oriented SW engineering.

Q) Object oriented Analysis is concerned with the objects, fields, classes, attributes and methods of the classes.

→ There are 2 Component Object Oriented Analysis
(or Object oriented Analysis Model)

→ Static Component

As the name suggests, static component are the one that are constant in nature and whose characteristic holds throughout the operational life of the application.

⇒ Some of the static components are:

- (a) Static view of semantic classes.
- (b) Static view of attribute (obj)
- (c) " " " " relationship
- (d) " " " " behaviour (functions)

→ Dynamic Components

As the name suggests, they are the another type of component of OO Analysis model which shows the dynamic property and whose functionality changes throughout the life cycle of an application. In real time application say News apps, the breaking news come to time on the front menu of the apps.

Object Oriented Analysis Process

→ OOA P is the systematic and structural way of defining the requirements, scope, and its use cases for the development of any object oriented software system.

Key points of OOA P is:

the overall structure.

- [G] (i) Identifying the problem domain
(ii) defining the classes along with its objects
(iii) knowing about the components of classes like: fields, methods, attribute etc.
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- (iv) Defining the relationship about the blueprint.
(v) creating the class diagram

Object Oriented Design

→ Object oriented design transforms the object oriented Analysis model to the design model by means of Object oriented analysis

There are 2 kind of OOD

① System Design

It considers 3 function: ① UI ② Data management
③ Task management

② Object design

→ It focuses on internal design of classes like:
method and its defn, fields initialization
declaration

Designing the object oriented system

→ For the object oriented system or for the design of object oriented system, we can define a design pyramid which consists of 4 layers of design that is:

- ① Sub System design
② Class and object design → ③ Message design
④ Responsibility design



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Responsibility design

Message design

classes and object
design

SubSystem Design

Fig:- 00.0 D Pyramid

Here the SubSystem design layer represents the customer requirement, and implements those requirements into technical infrastructures.

classes and object layer design contains the class hierarchies and representation of each object. It is derived from the description of classes - component like attribute, methods and collaborations contained in CRC model.

message design (layer) contains the external and internal design for the system. message design is derived from ORM (Object Relational model).

SubSystem design

Responsibility design contains the Data structure and Algo for the whole system derived from different modules.

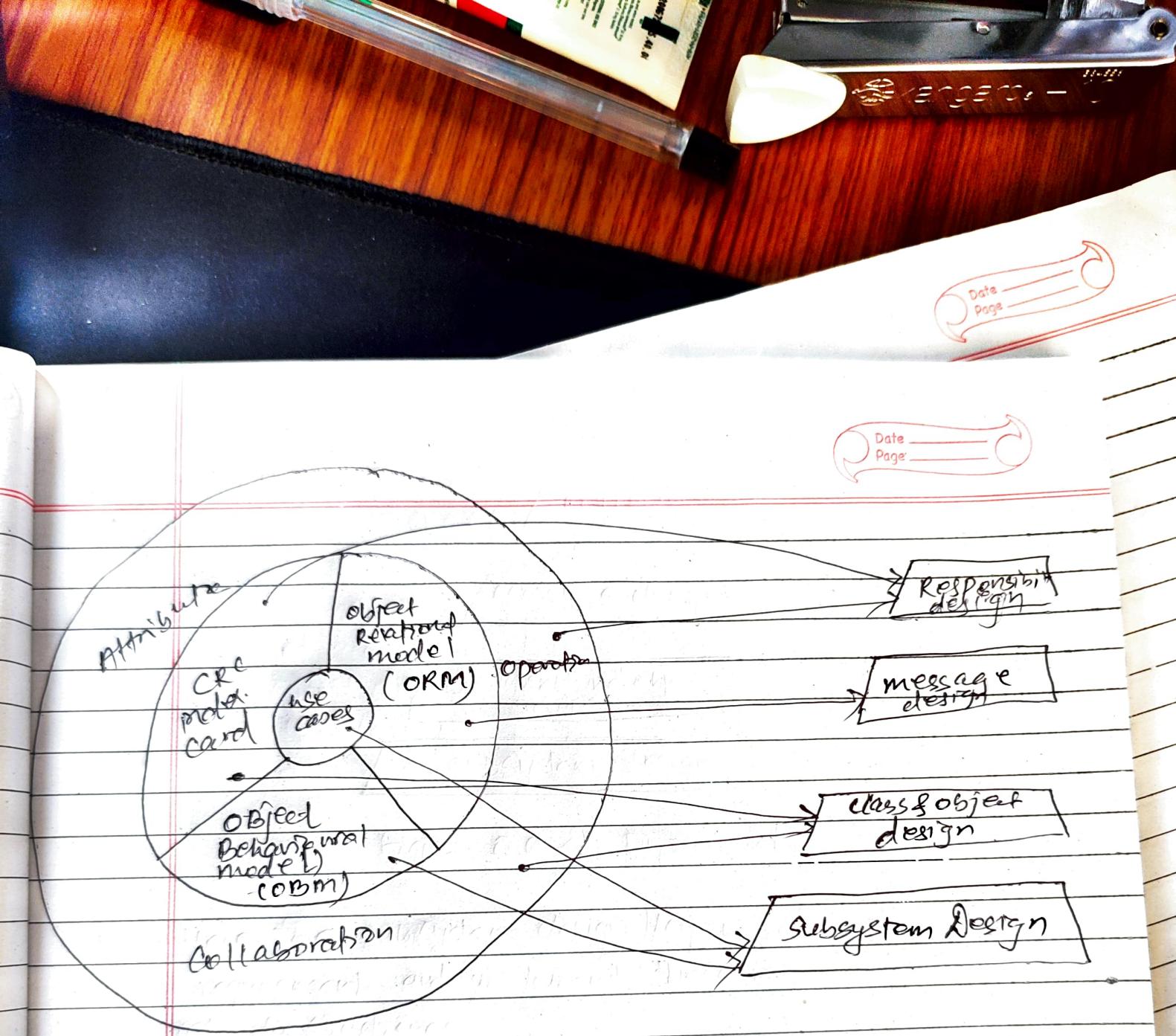


Fig:- Translation of OOA to OOD

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the overall structure.

[6] Design Patterns

↳ Basically in the design pattern in OO Analysis
and design

Each design describes a problem which occurs in our environment over and over again and then describes the ^{core} solution to that problem. In such a way that it can be used million times, without doing ever it the same "way".

That means rather than making the same solution multiple times, a common core solution for a similar kind of problem which can be applied any number of times.

(*) Some of the essential elements of patterns

(a) Pattern name: It describes the OOD problem, its solution and consequences for a single or smaller number of words

(b) Intent

(c) Design forces that motivate pattern

(d) Cross references to related design pattern

Generally design patterns are implemented using two different mechanism.

(a) Inheritance

(b) Composition: