UNIT 3 CASE STUDY: INVENTORY CONTROL SYSTEM

3.0 INTRODUCTION

Inventory control systems are used for managing the stocks of companies and big distribution organisations. In this unit we will discuss about OOM for invention control systems. We will cover class diagram design, object diagram different kind of relationships, which include generalization, association and collaboration. We will also discuss use case diagrams activities and events.

3.1 OBJECTIVES

After going through this unit, you should be able to:

•   explain class diagram and object diagram of Inventory control System;

•   describe generalization and Specialization of the system;

•   describe collaboration diagram of the system;

•   explain different activities and events of the systems, and

•   explain deployment Diagram.

3.2 CLASS DIAGRAM

You know that a class is represented in a box like figure. Here we are taking the case study of Inventory Control System.

Let us first set an idea of the Inventory Control System. It is the system in which you can manage the stock of the products that a company sells. Basically, this system is stock oriented where it makes sure that the quantity-in-stock does not reach the danger level (Qty-ordered>Qty-in-stock).

In any system when we reach this level, we place a new order. To avoid this situation, when in our system Qty-in-stock reaches a minimum level called the Reorder-level then a new order is placed. Here, in this case study, you will see various diagrams.
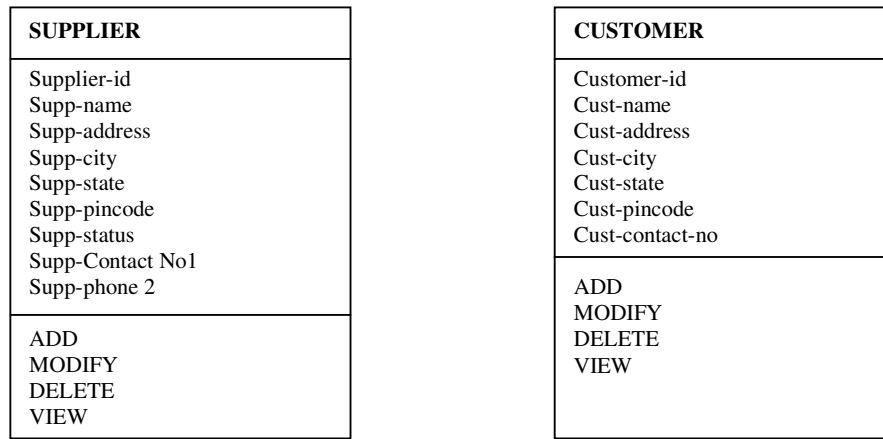
SUPPLIER
Supplier-id Supp-name Supp-address Supp-city Supp-state Supp-pincode Supp-status Supp-Contact No1 Supp-phone 2
ADD MODIFY DELETE VIEW

CUSTOMER
Customer-id Cust-name Cust-address Cust-city Cust-state Cust-pincode Cust-contact-no
ADD MODIFY DELETE VIEW

Figure 1: Class diagram represents the static structure of a System

You know that a class is represented in a box like Figure which can have at the most three regions.

- Class Name
- List of Attributes
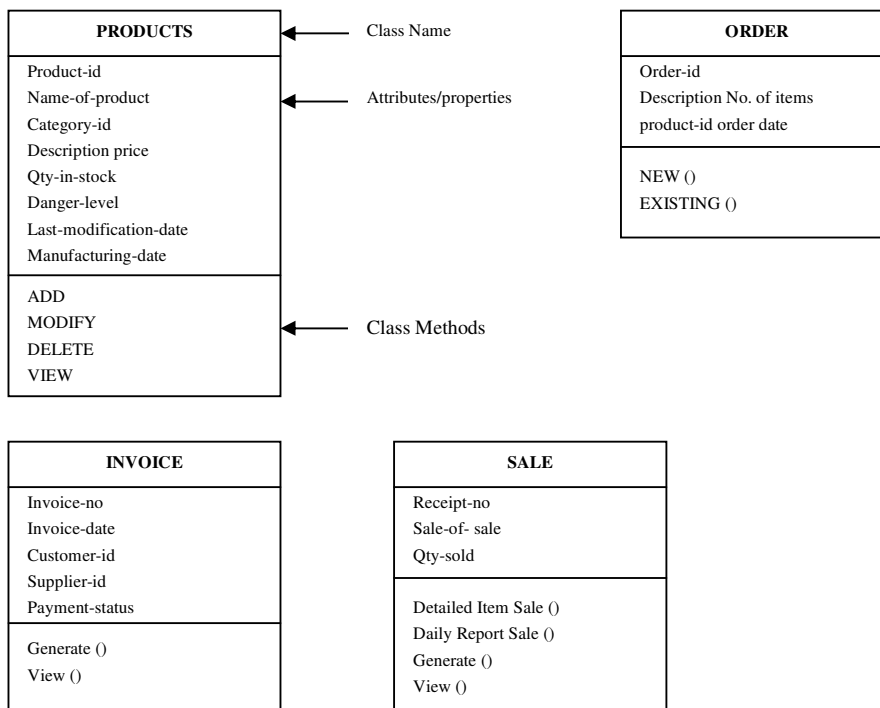- List of Operations/Methods

PRODUCTS	← Class Name
Product-id Name-of-product Category-id Description price Qty-in-stock Danger-level Last-modification-date Manufacturing-date	← Attributes/properties
ADD MODIFY DELETE VIEW	← Class Methods

ORDER
Order-id Description No. of items product-id order date
NEW () EXISTING ()

INVOICE
Invoice-no Invoice-date Customer-id Supplier-id Payment-status
Generate () View ()

SALE
Receipt-no Sale-of- sale Qty-sold
Detailed Item Sale () Daily Report Sale () Generate () View ()

Figure 2: Class diagram

3.3   OBJECT DIAGRAM

Object Diagram is an instance of a class. It describes the static structure of a system at a particular time and are used to test the accuracy of classes.
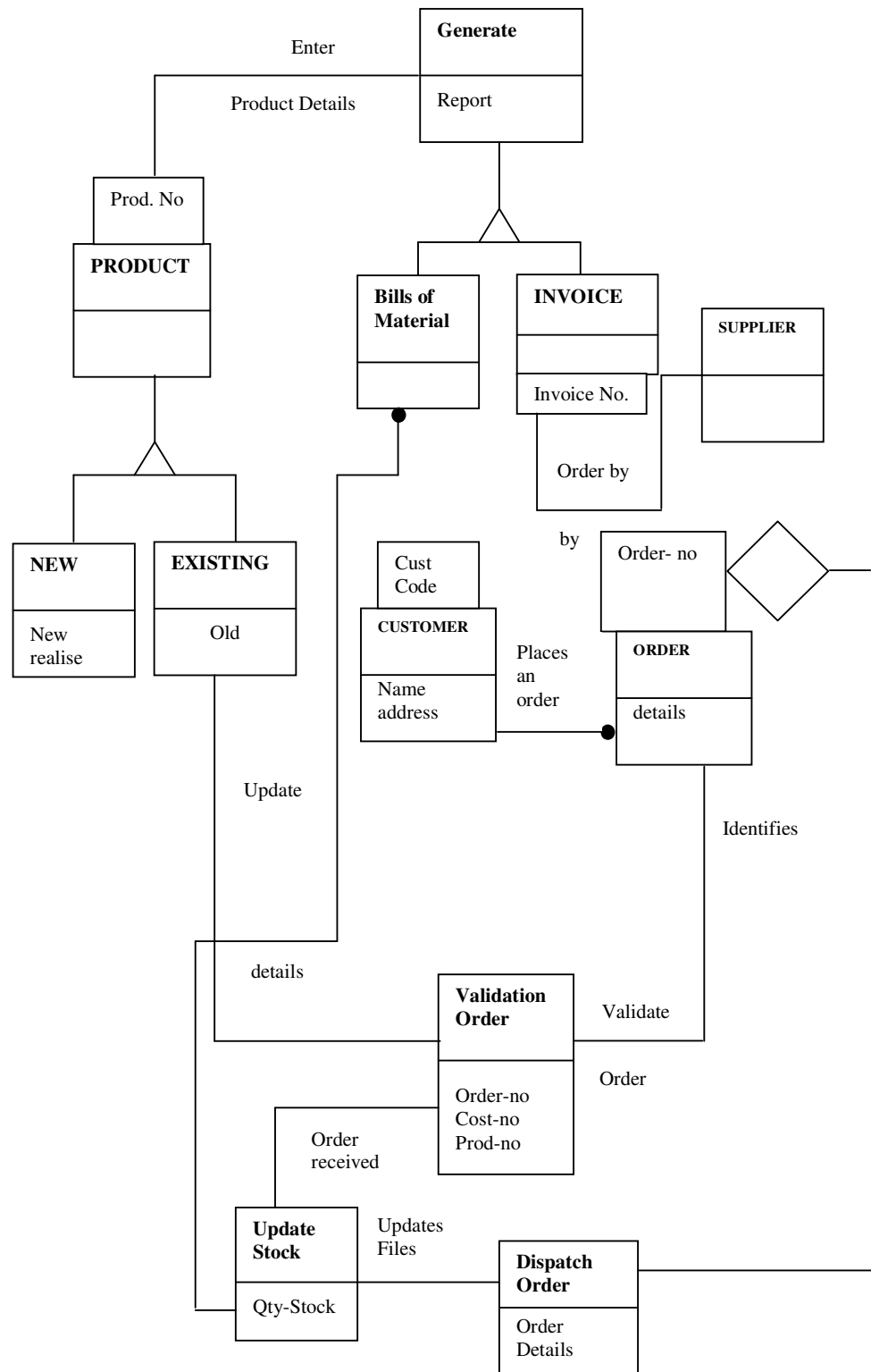
Figure 3: Object Diagram

3.4 GENERALIZATION AND ASSOCIATION DIAGRAM

Generalisation: This is another name for inheritance, or an "is a" relationship. It refers to a relationship between two classes where one class is a specialized version of another.
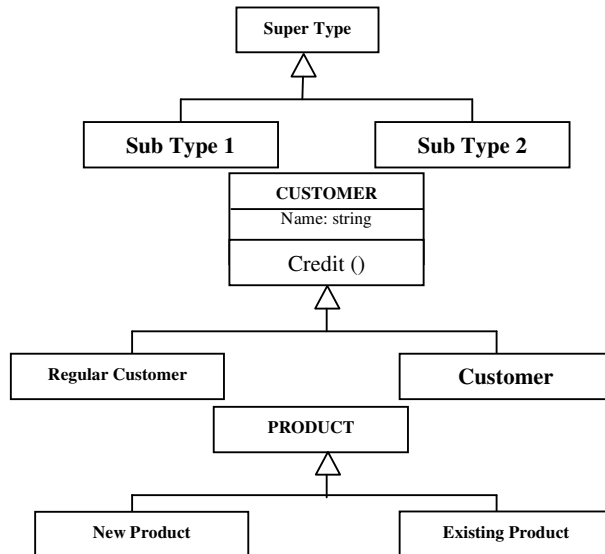
Figure 4: Generalisation of customer and product

Association: This represents static relationship between classes.
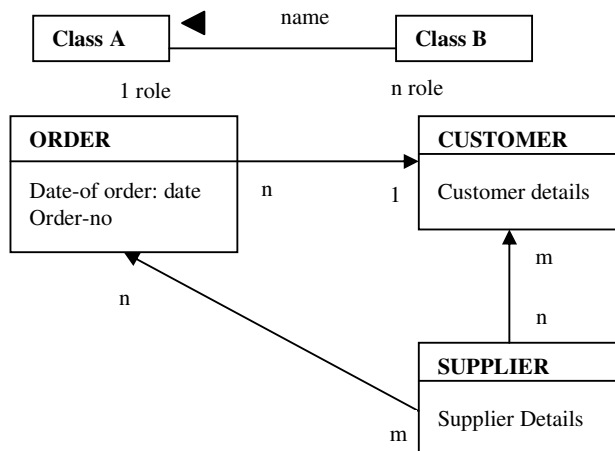
Roles represent the way the two classes see each other.

Figure 5: Association of Order and customer

Aggregation: This denotes a strong ownership between class A, the whole, and class B, and its part.

Hollow Diamond   Simple Aggregation

Filled Diamond   Strong Aggregation
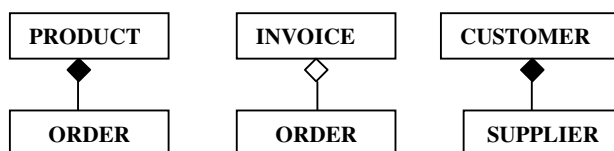
Figure 6: Aggregation

Ternary Association for Customer Supplier
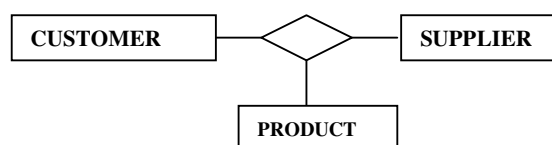
Figure 7: Ternary association

3.5   COLLABORATION DIAGRAM

This represents the interactions between objects as a series of sequenced messages. Collaboration diagrams describe both the static structure and the dynamic behaviour of a system.

Representation
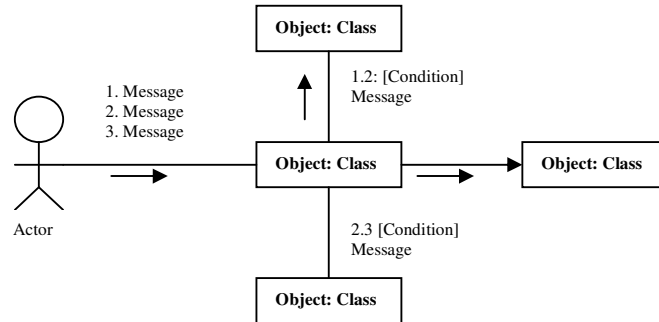
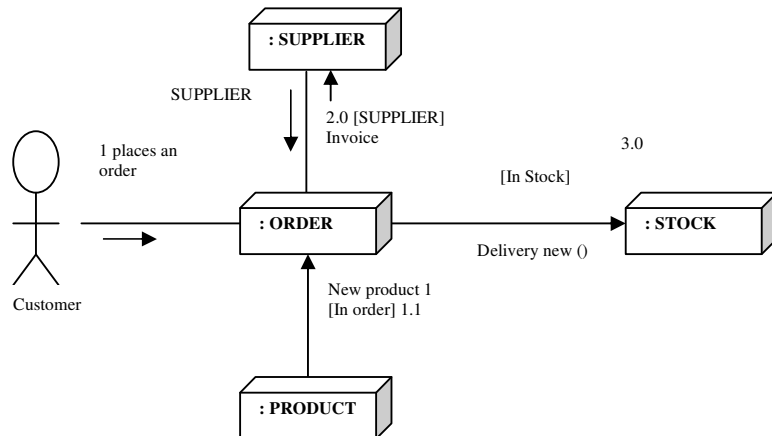**Figure 8 a: Collaboration diagram for inventory control system**

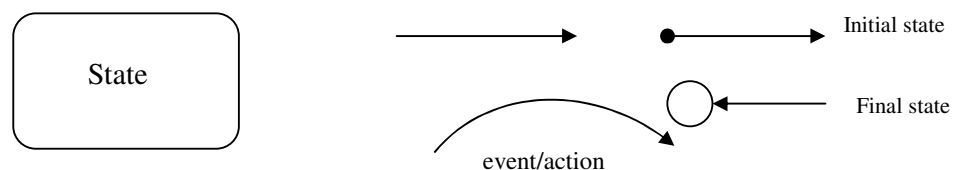**Figure 8 b: Collaboration diagram for the inventory control system**

3.6   ACTIVITY DIAGRAM AND EVENTS

STATECHART DIAGRAM

This describes the dynamic behaviour of a system in response to external stimuli

• Basically, states are triggered by specific events.

Representation:

Activity Diagram

This illustrates the dynamic nature of a system by modeling the flow of control from activity to activity, or you can say operation on some class that results in a change in the state of the system.

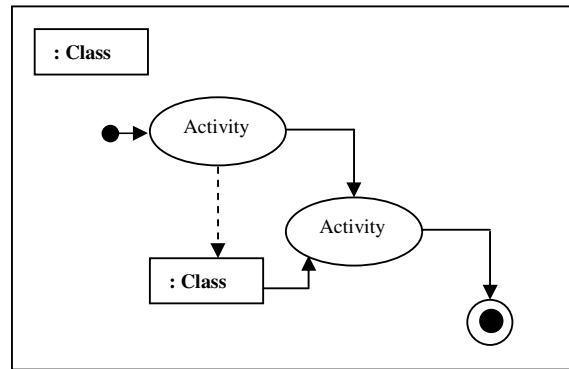- Basically, this shows the workflow model, or business process and the internal operation

Figure 9: Activity flow

Synchronization and Splitting of Control

- A short heavy bar with two transitions entering it represents a synchronization of Control.
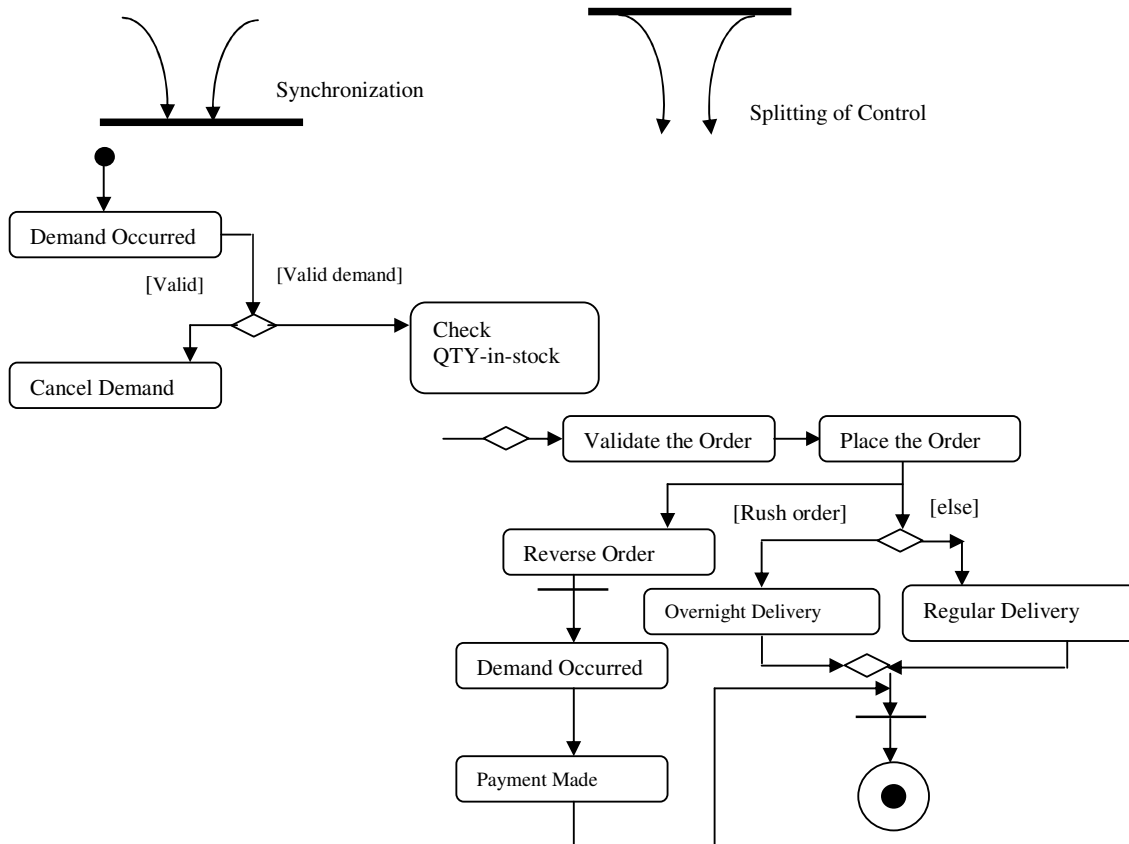- Splitting of Control that creates multiple states.

Figure 10: Activity diagram

Events

Actions taken in Inventory Control System:

1) Order is placed by the CUSTOMER
2) Order is received by the SUPPLIER
3) Checking of Quantity-in-Stock and Reorder-level
4) Checking of Inventory Status
5) Generating Bills of Material

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6)   Generating the INVOICE VOUCHER
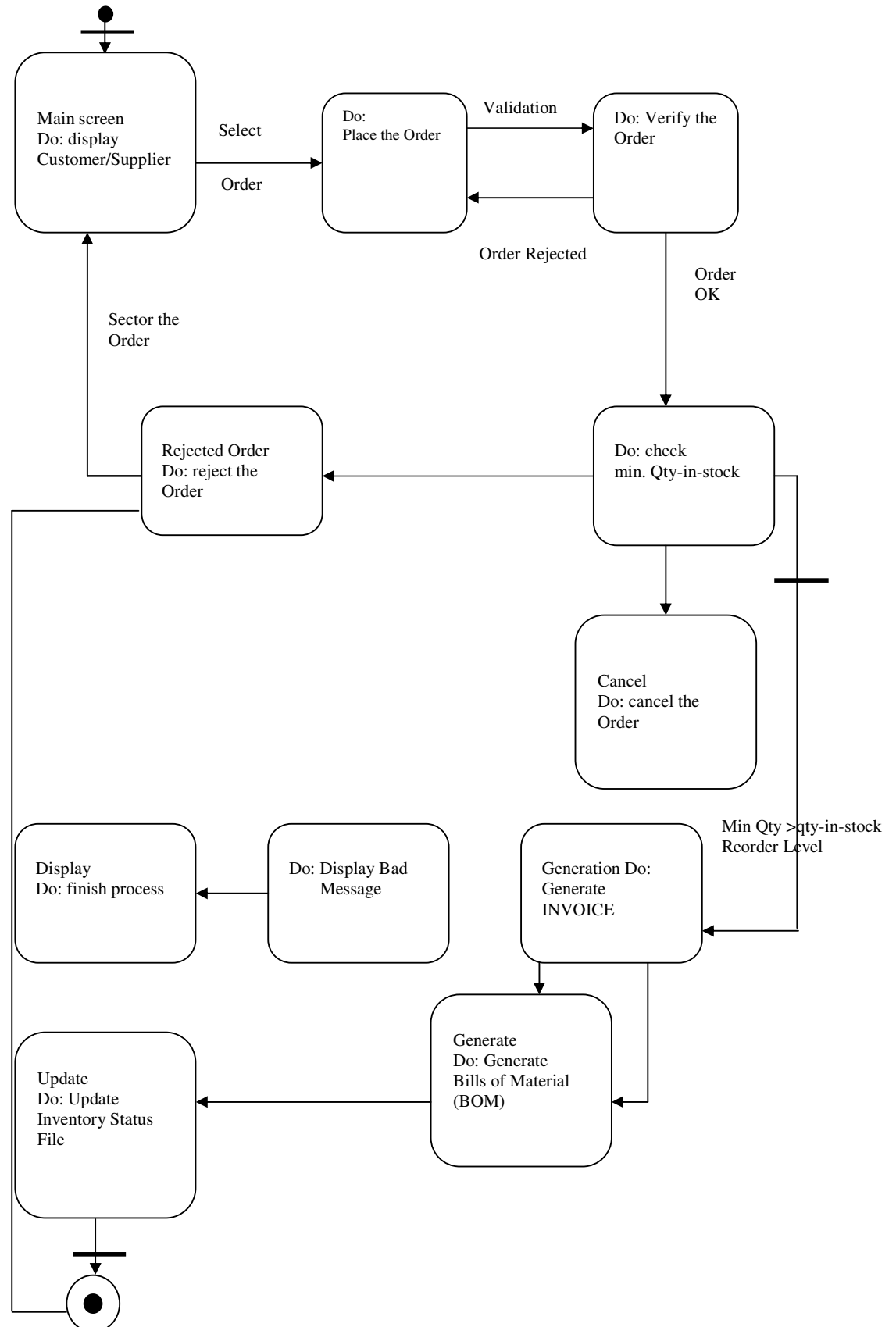
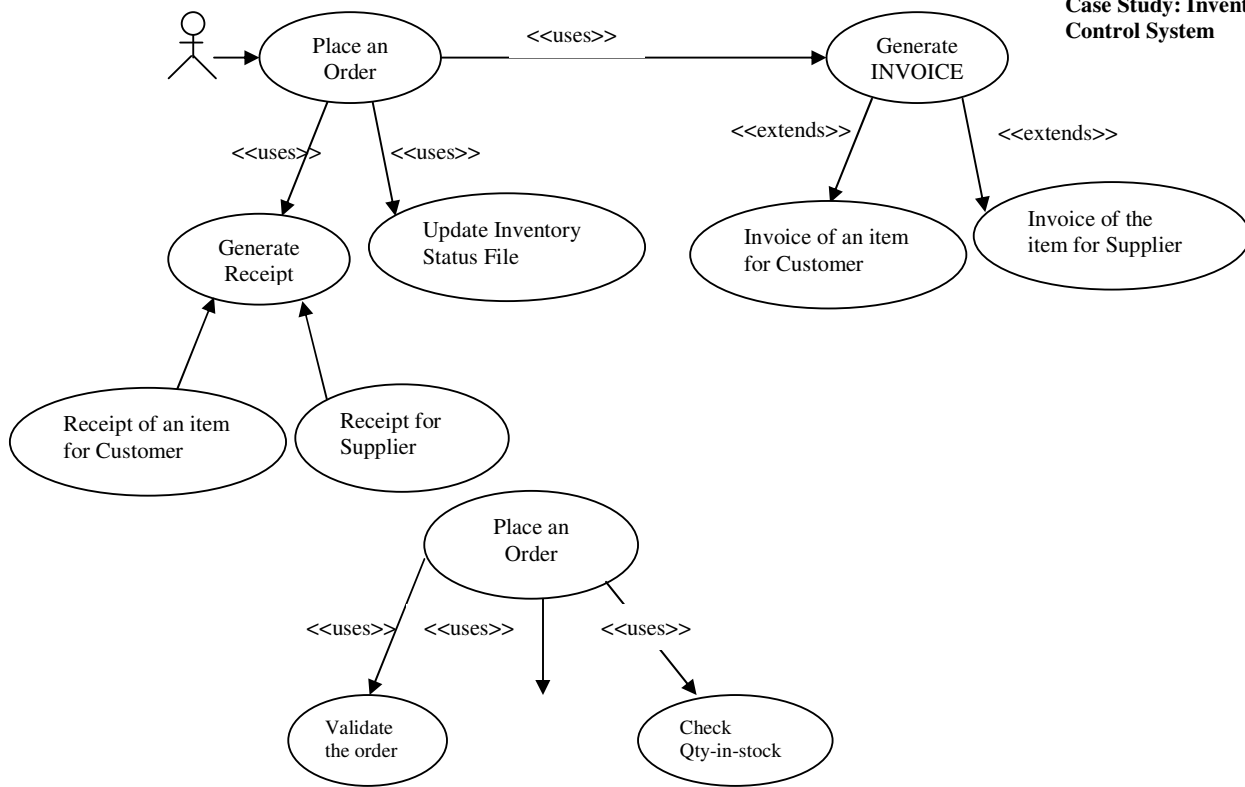7)   Updating Inventory Status File

Figure 11: State diagram

Figure 12: Adding details

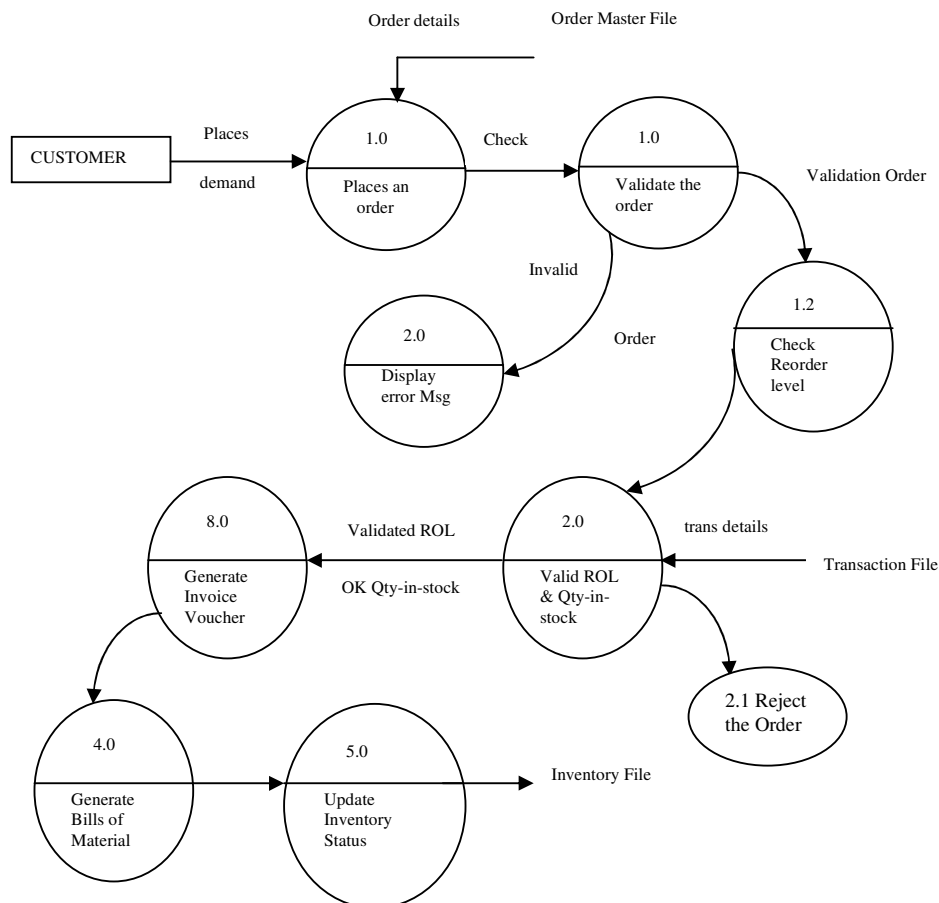## Data Flow Diagram for System

Figure 13: Data flow diagram

3.7   USE CASE DIAGRAM

A "uses" relationship indicates that the use case is needed by another in order to perform a task

- An "extends" relationship indicates alternative options under a certain use case.

- Use case diagrams model the functionality of a system using actors and use cases.

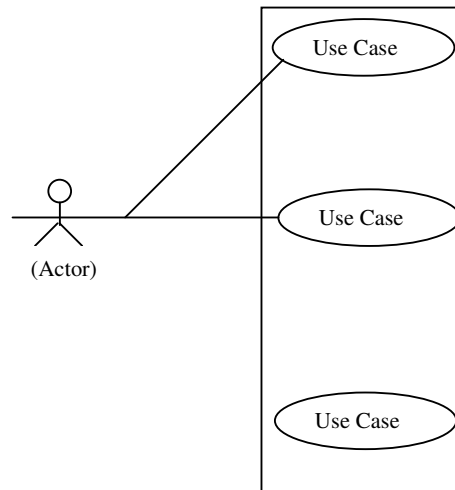- Use cases are services or functions provided by the system to its users.

Figure 14: Use Case diagram

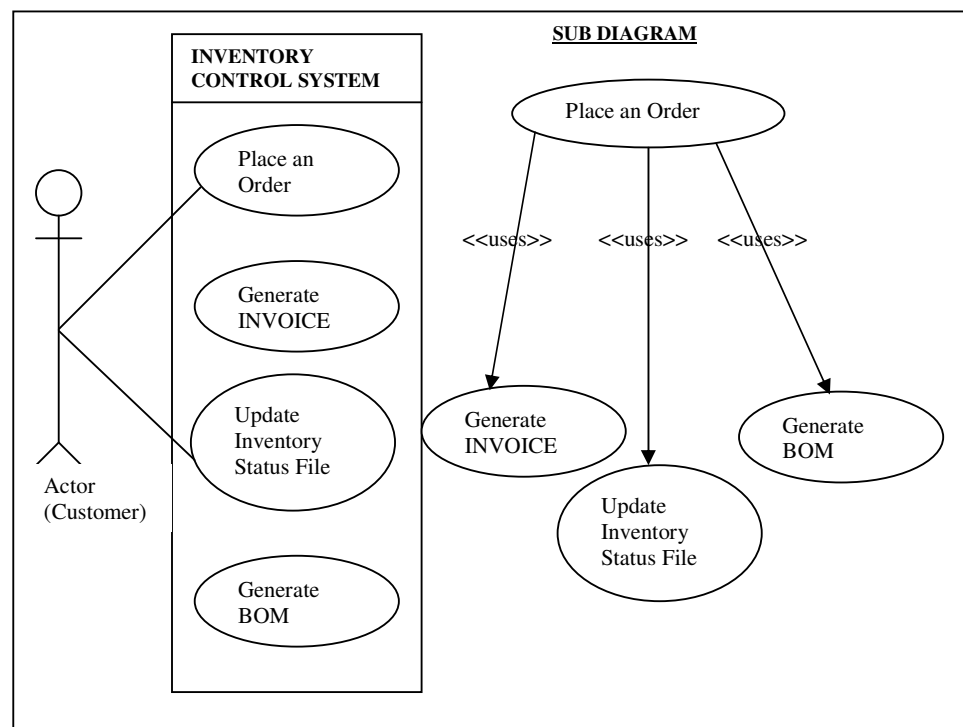For Inventory Control System the initial design is:

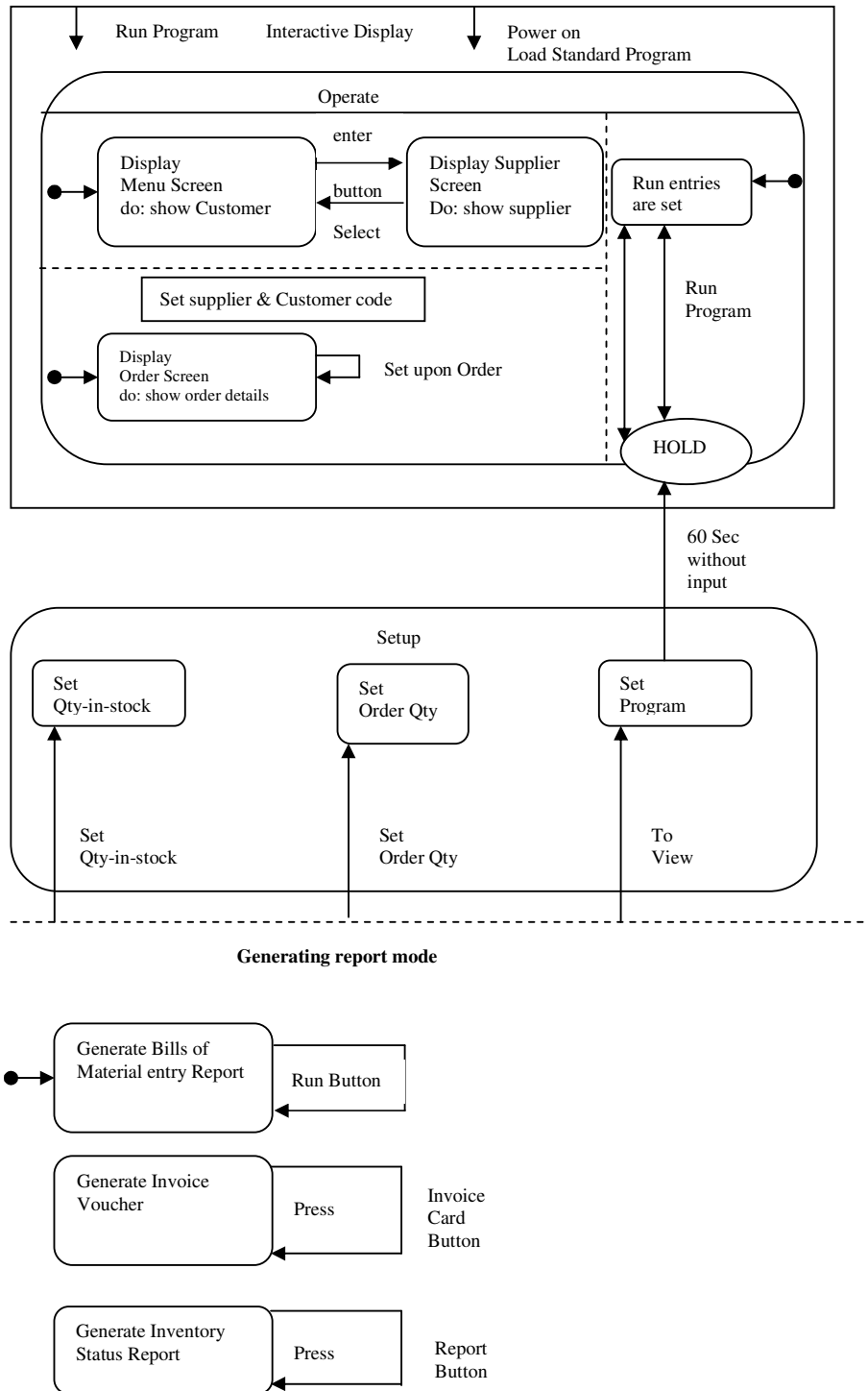**Figure 15: Initial design of the Inventory Control system**

Figure 16: User interface

3.8 DEPLOYMENT DIAGRAM

Deployment diagram: This shows the hardware for your system, the software that is installed on that hardware, and the middleware that is used to connect the machines to one another.

- Deployment diagrams depicts the physical resources in a system including nodes, components and connections, where a node is a physical resource that executes code components.
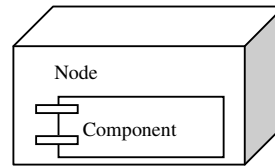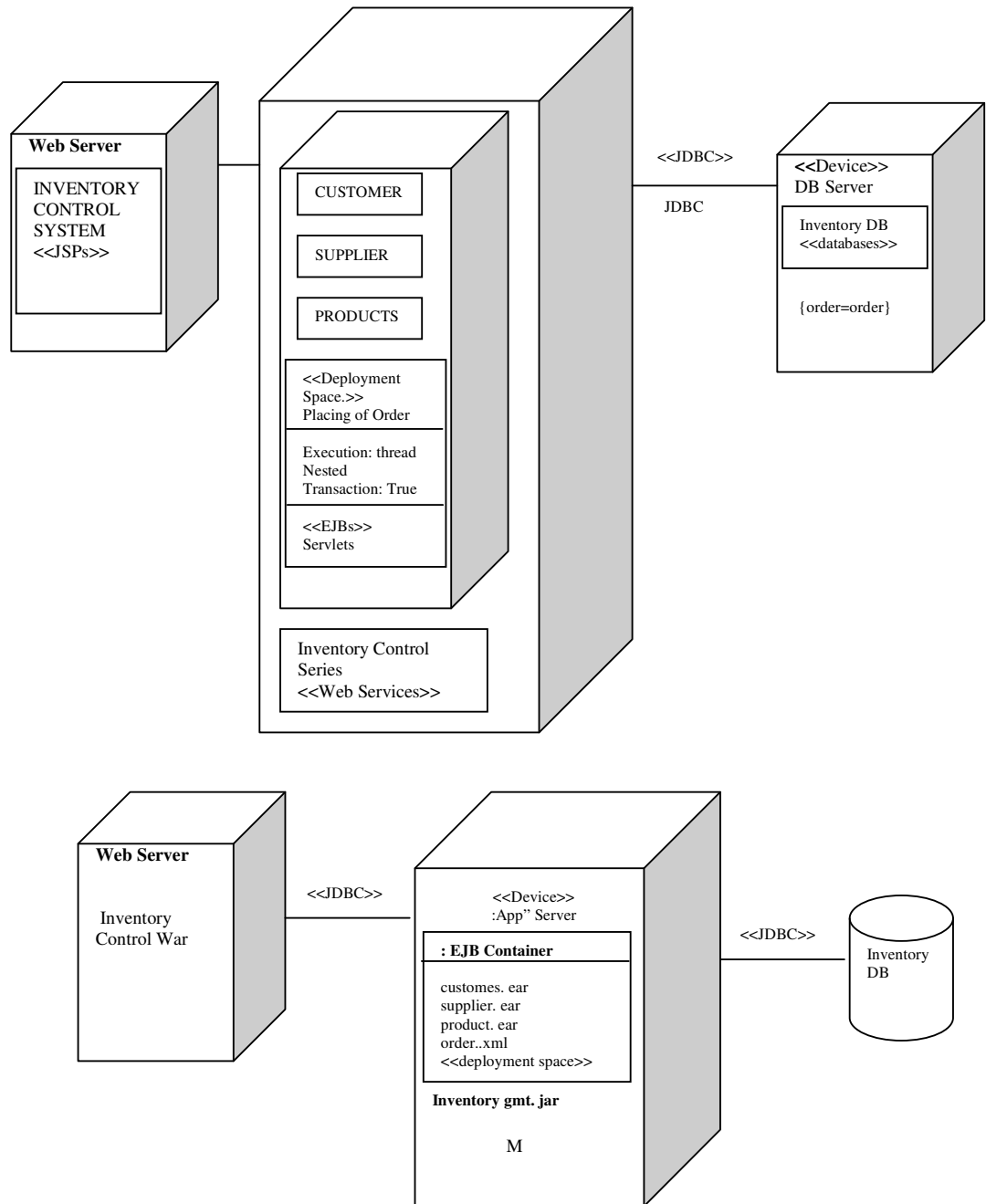

Figure 17: Deployment

Figure 18: Deployment diagram

3.9   SUMMARY

In this unit different diagram are design to represent OOM of inventory control system. These diagrams are:

•   Class diagram

•   Object diagram

•   Generalization and association

•   Collaboration diagram

•   Activity diagram

•   State diagram

•   Dataflow diagram

•   Use case diagram

•   Use Interface and Deployment Diagram.