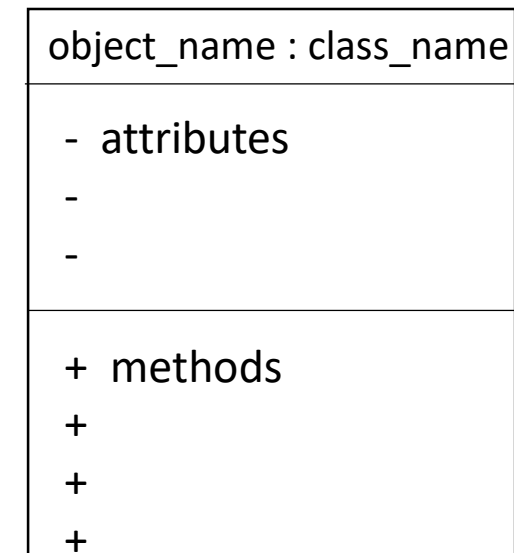# Unit – 5 – UML

Unified Modeling Language :

- Unified Modeling Language is also known as UML.

- Although the name suggest that it is a programming language, but actually it is not true.

- This is standard set of notations for specifying, visualizing, constructing and communicating.

- The application of UML diagram include software as well as non-software industries.

- UML uses set of static and dynamic visual models to capture the structure as well as behavior of the system.

- The basic goal of UML is to develop a generic modeling language that can be use to model all possible system in a simple way so that it can be easily understood.
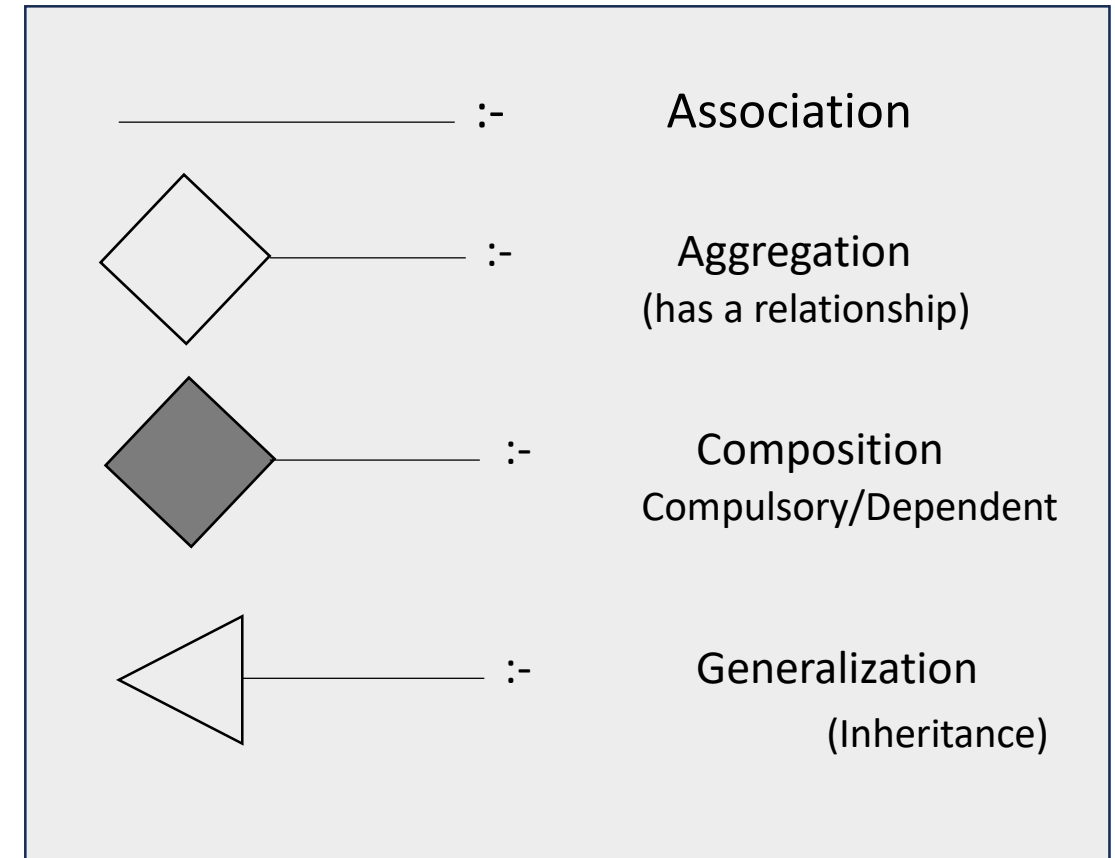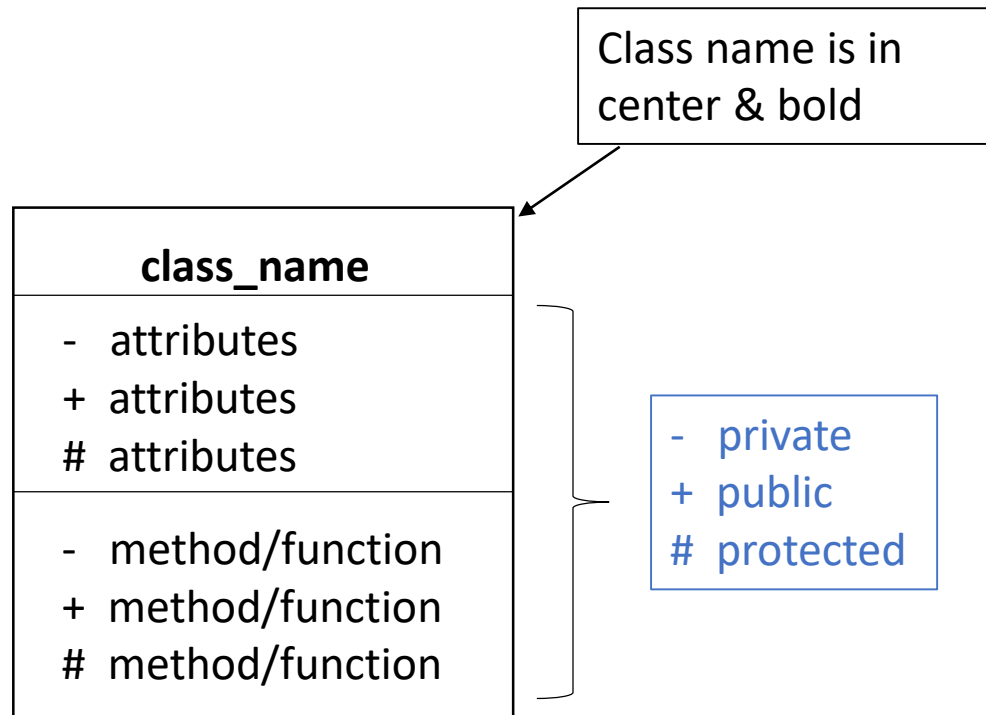
Class Diagram :

- Class diagram shows set of classes, interfaces, collaboration and their relationships.

- Class diagram is most common diagram found in modeling object-oriented system.

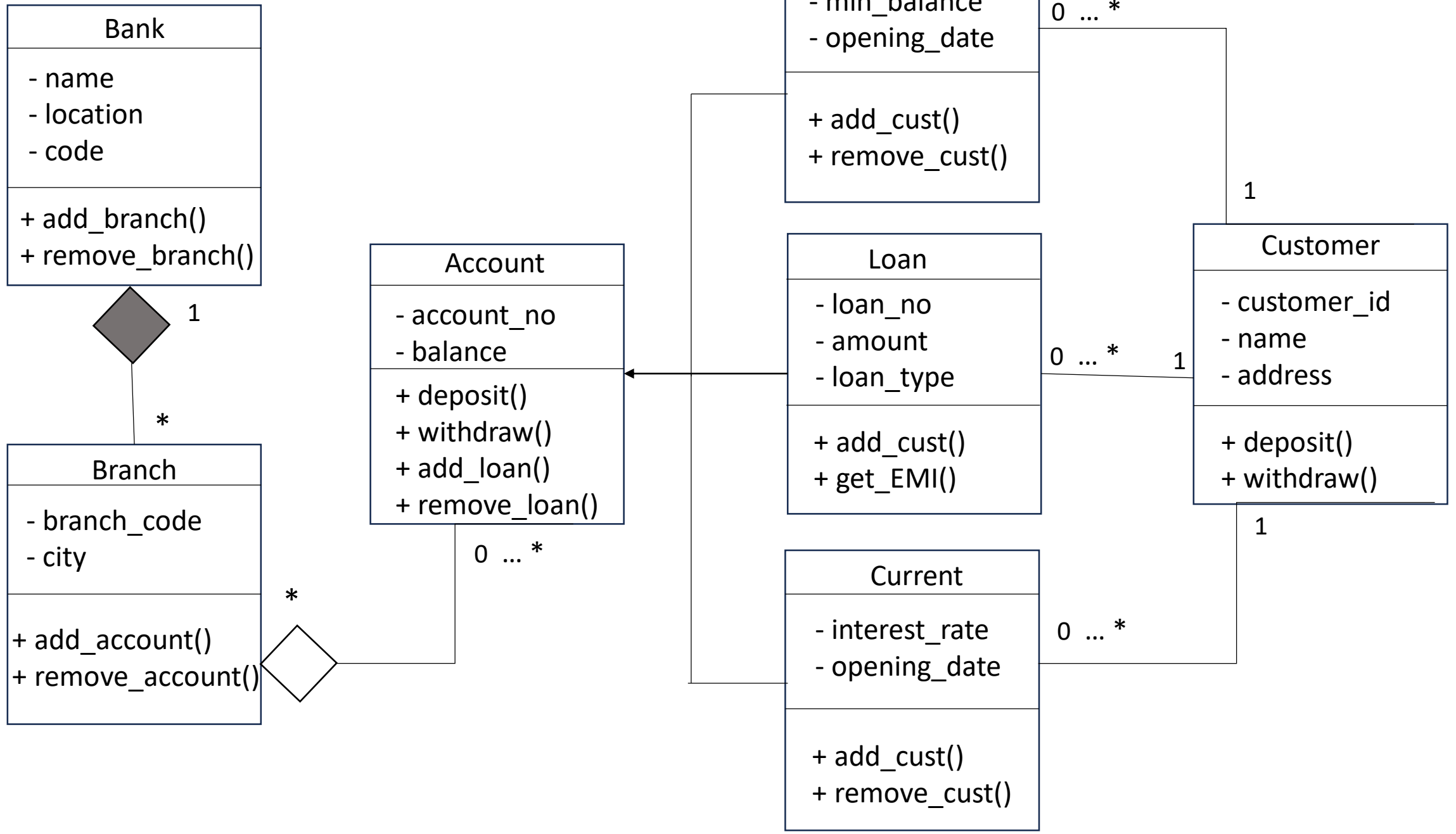- It addresses the static design view of the system.

Purpose of Class Diagram :

- Analysis and design of static view of an application.

- Describe responsibility of a system.

- It becomes base for deployment diagrams.

object_name : class_name
- attributes - -
+ methods + + +

Components of Class Diagram :

Class name is in center & bold

class_name
- attributes + attributes # attributes
- method/function + method/function # method/function

- private
+ public
# protected

——————— :- Association

◇——————— :- Aggregation
(has a relationship)

◆——————— :- Composition
Compulsory/Dependent

◁——————— :- Generalization
(Inheritance)

Bank

- name
- location
- code

+ add_branch()
+ remove_branch()

Branch

- branch_code
- city

+ add_account()
+ remove_account()

Account

- account_no
- balance

+ deposit()
+ withdraw()
+ add_loan()
+ remove_loan()

Saving

- min_balance
- opening_date

+ add_cust()
+ remove_cust()

Loan

- loan_no
- amount
- loan_type

+ add_cust()
+ get_EMI()

Current

- interest_rate
- opening_date

+ add_cust()
+ remove_cust()

Customer

- customer_id
- name
- address

+ deposit()
+ withdraw()

1

*

*

0 ... *

0 ... *

1

0 ... *

1

0 ... *

1

1

Object Diagram :

- Object diagram are closely related to the class diagram.

- Object diagram can be interpreted as the instance of a class diagram

- It is also considered as the snapshot of the system at the specific point of time.

Purpose of Object Diagram :

- Making a prototype of a system.

- Modeling complex data structure.

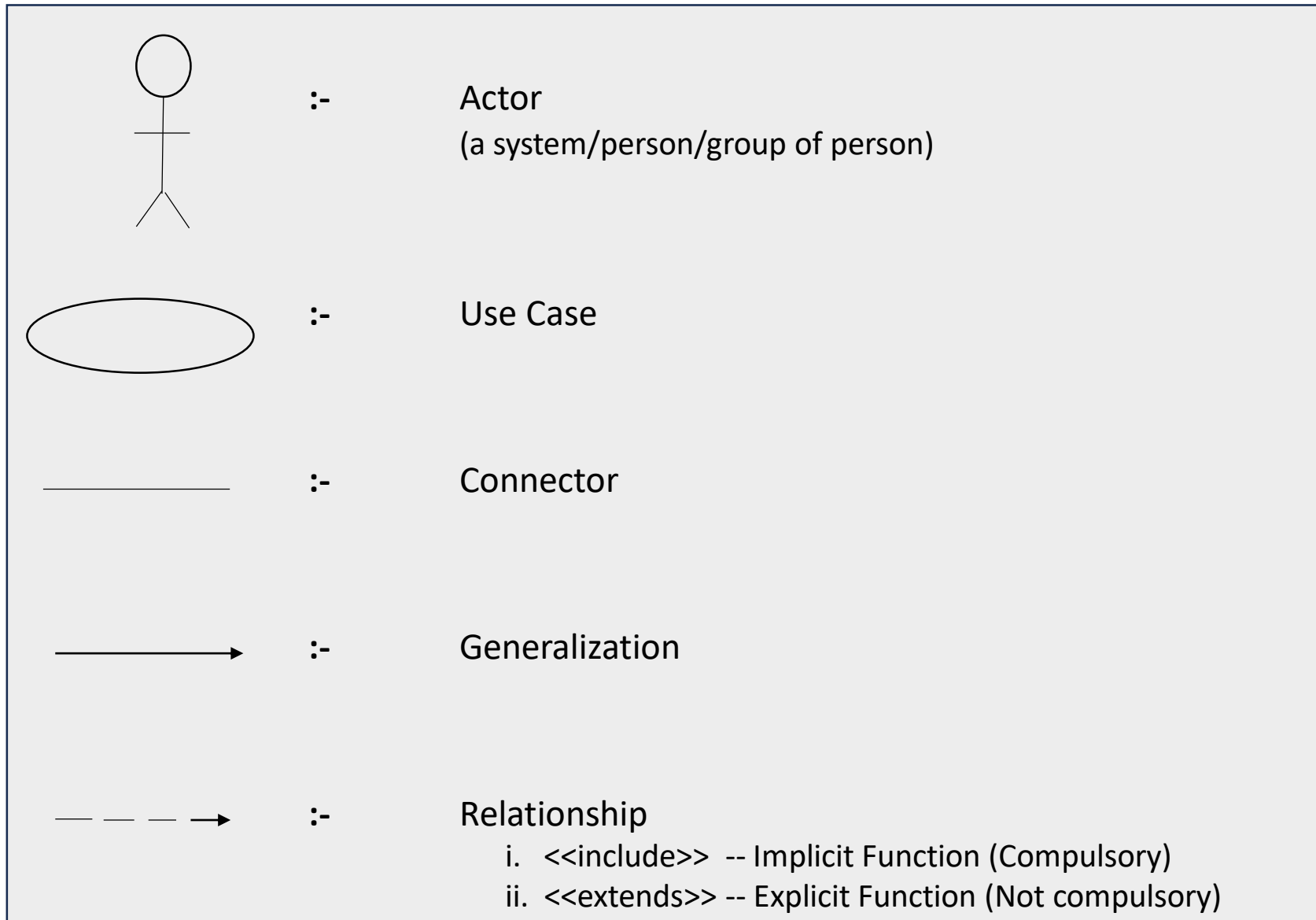- Understanding the system from practical perspective.
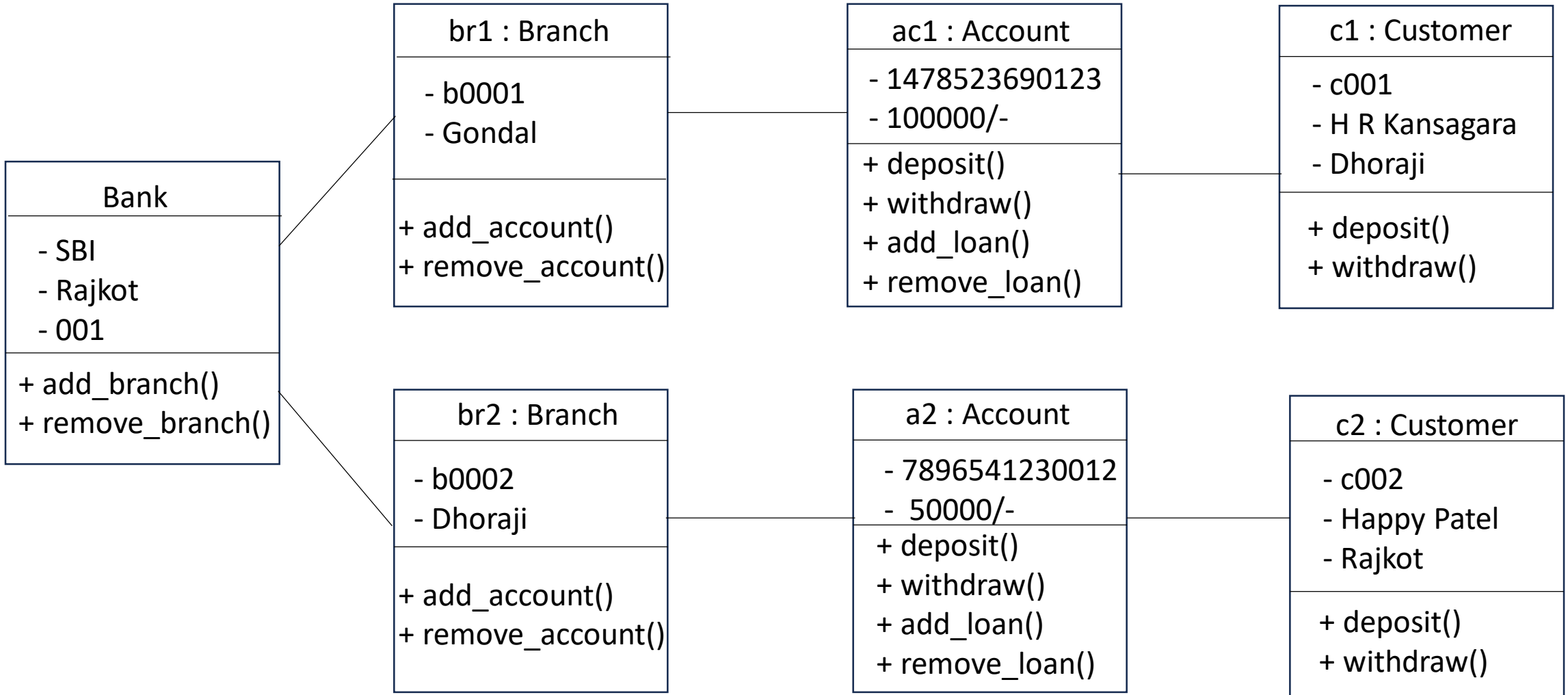
Use Case Diagram :

- Only static behavior is not sufficient to develop a system.

- It is necessary to have dynamic view of the system, and use case diagram is one of the UML which helps to do so.

- Use case diagram is considered for high-level requirement analysis of a system.

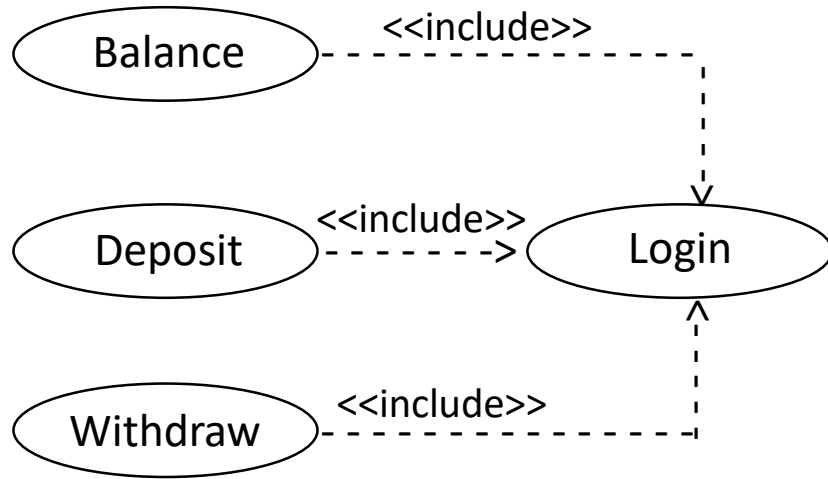- Use case diagram is used to capture the functionality.

Guidelines :

1. The name of the component must be chosen in such a way that it's functionality can be determine easily.

2. Show relationships and dependencies clearly in the diagram.

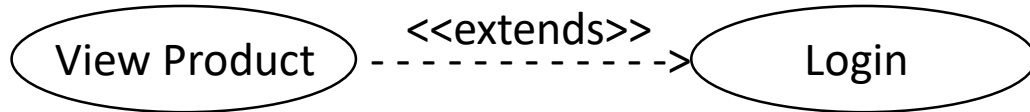3. Use notes whenever required to clarify some points.

Components of Use Case Diagram :
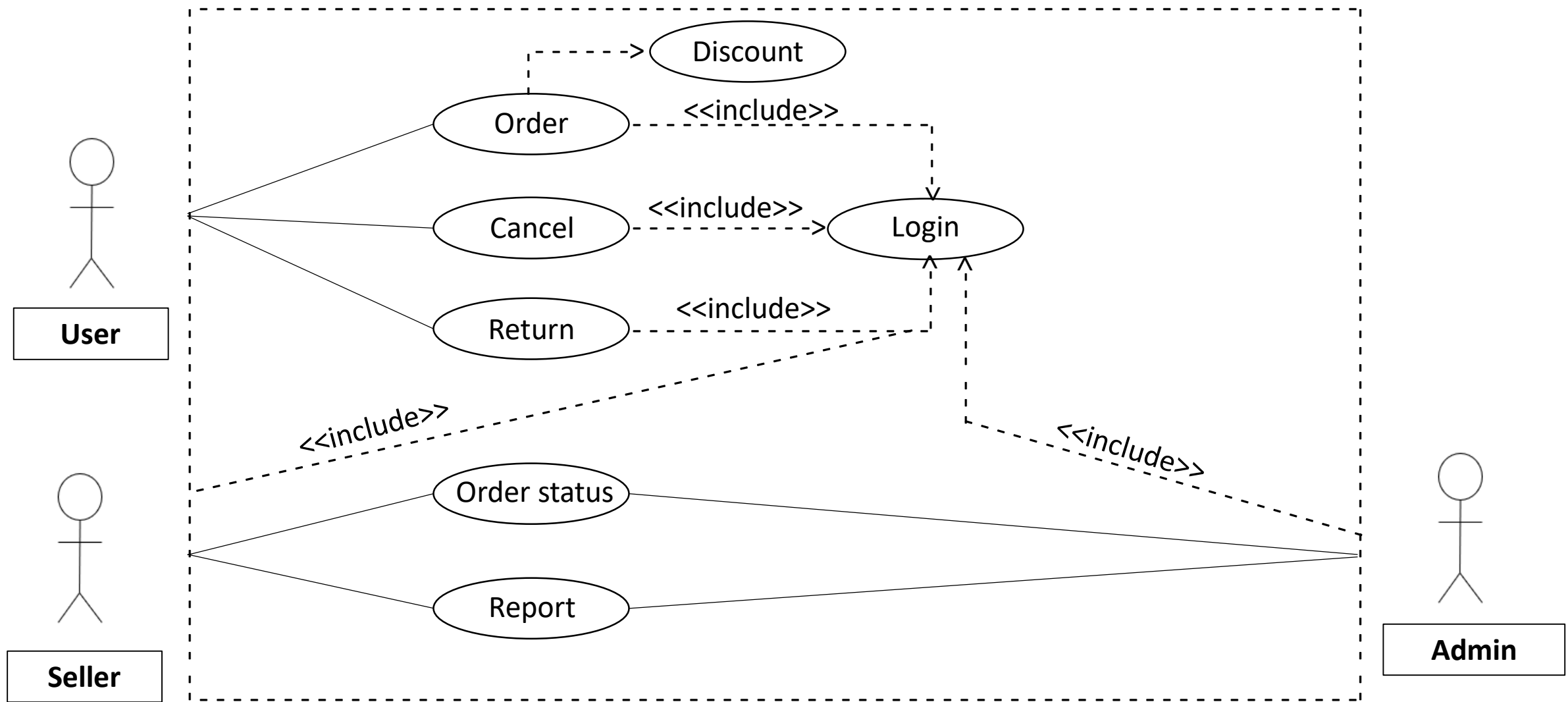
:- Actor
(a system/person/group of person)

:- Use Case

:- Connector

:- Generalization

:- Relationship
    i. <<include>> -- Implicit Function (Compulsory)
    ii. <<extends>> -- Explicit Function (Not compulsory)

i. <<include>>

Balance ---- <<include>> ----┐
                               │
                               ▼
Deposit ---- <<include>> ----> Login
                               ▲
                               │
Withdraw ---- <<include>> ---┘

ii. <<extends>>

View Product ---- <<extends>> ----> Login

Use Case Diagram for online shopping system :-

Activity Diagram :

- Activity diagram are graphical representation of step wise activities and action with support for choice iteration.

- An activity diagram depicts particular operation of the system.

- An activity diagram are used to construct the executable system.

Guidelines :

1. To draw and determine to activity flow of system.

2. Describe the sequence from one activity to another.

3. Describe the parallel and branched flow of the system.

Use of Activity Diagram :

- Modeling the work flow by using activities.

- High level understanding of the system functionality.

- Investigating business requirements.

Components of Activity Diagram :

|		
⬤	:-	Start
Activity Name	:-	Activity
◇ yes / no	:-	Condition
▬	:-	Parallel Activity
◉	:-	End

Activity Diagram for Online Shopping System :-
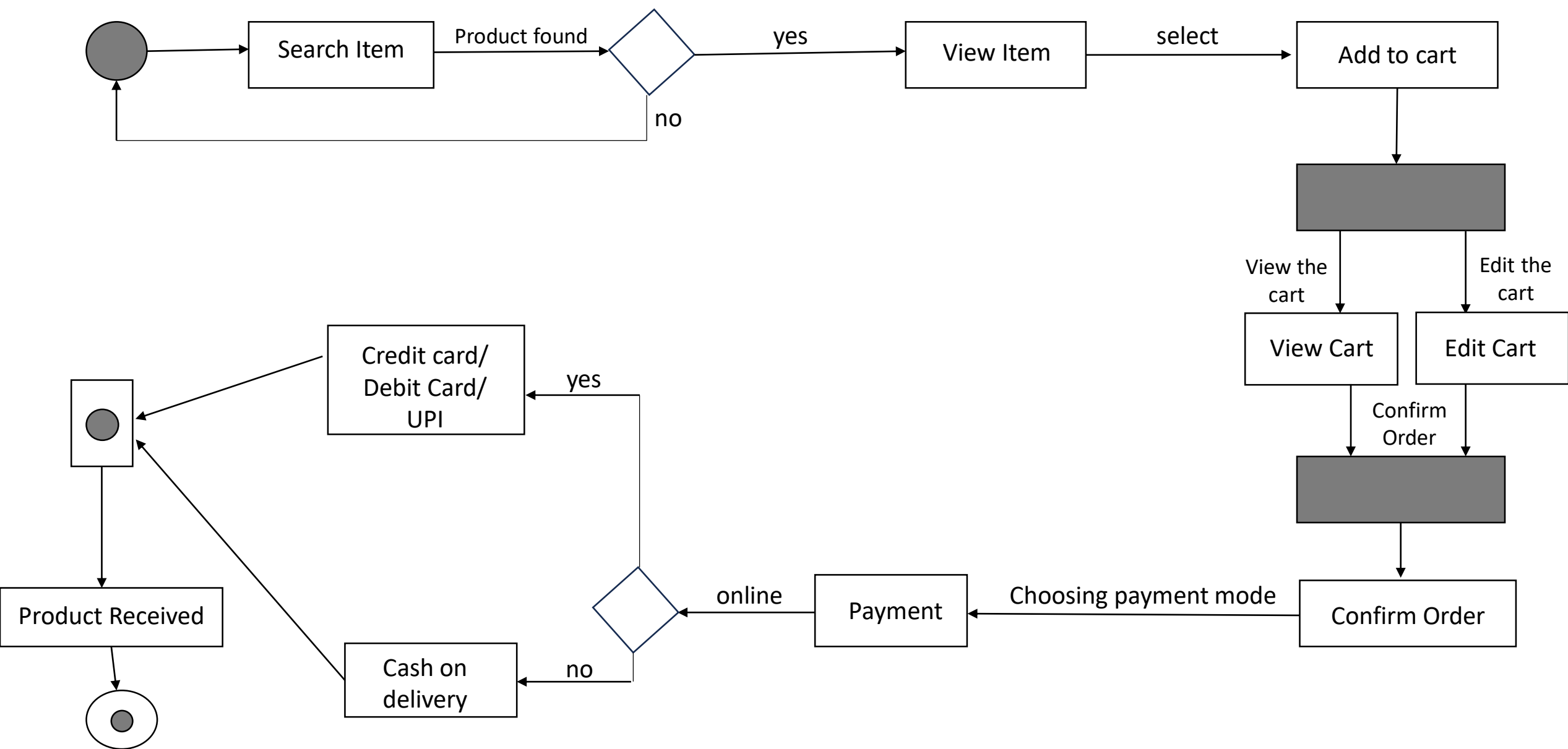
Sequence Diagram :

- The main purpose of a Sequence diagram is to define event sequence that result into some desired outcome.

- The focus is on message sequence.

- Most Sequence diagram will communicate what messages are sent between a systems objects as well as the order in which they occur.

- The Sequence diagram is commonly used interaction diagram.

- Sequence diagram simply depicts interaction between objects in a sequential order.

Components of Sequence Diagram :

| obj : class1 | :- | Lifeline |

:- Guard

| User | | Bank |

deposit > 0

:- Activation Period
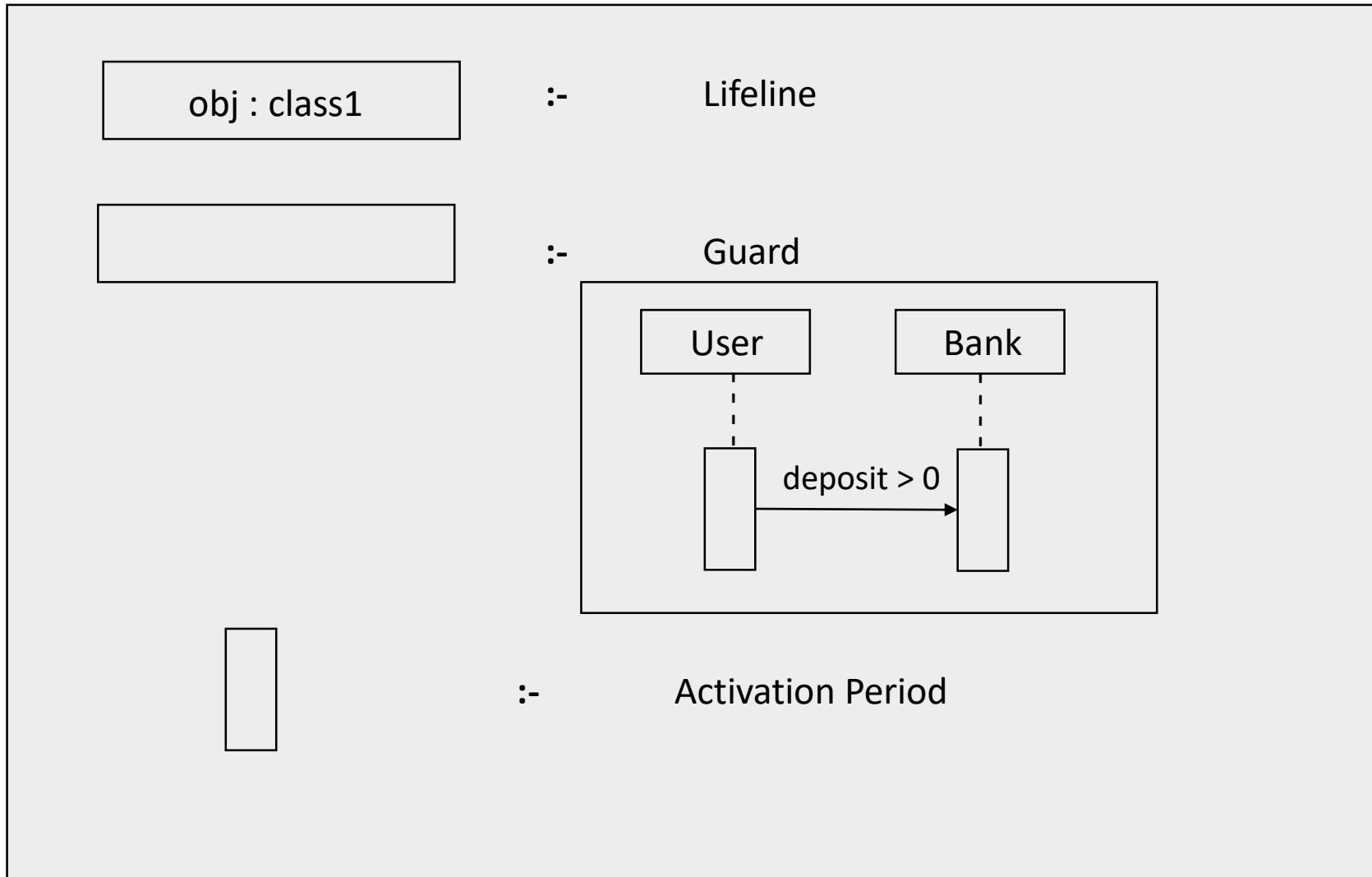
Sequence Diagram for Login Process :