

BRAINWARE UNIVERSITY

School of Engineering

Department of Computer Science & Engineering – Cyber Security & Data Science

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Course Code: PCC - CSDTQ1 Course name: Software Tools and Techniques Lab

Experiment-1

Aim:- To design and draw a UML case diagram for using UML in draw.io software.

Software / Tools Used:-

- ① draw.io - for designing UML diagrams.
- ② Operating system: Windows / Linux.
- ③ Language: UML (Unified modeling Language).

Theory:-

A UML case diagram is a behavioral diagram of UML that shows how external entities interact with the system to achieve specific goals.

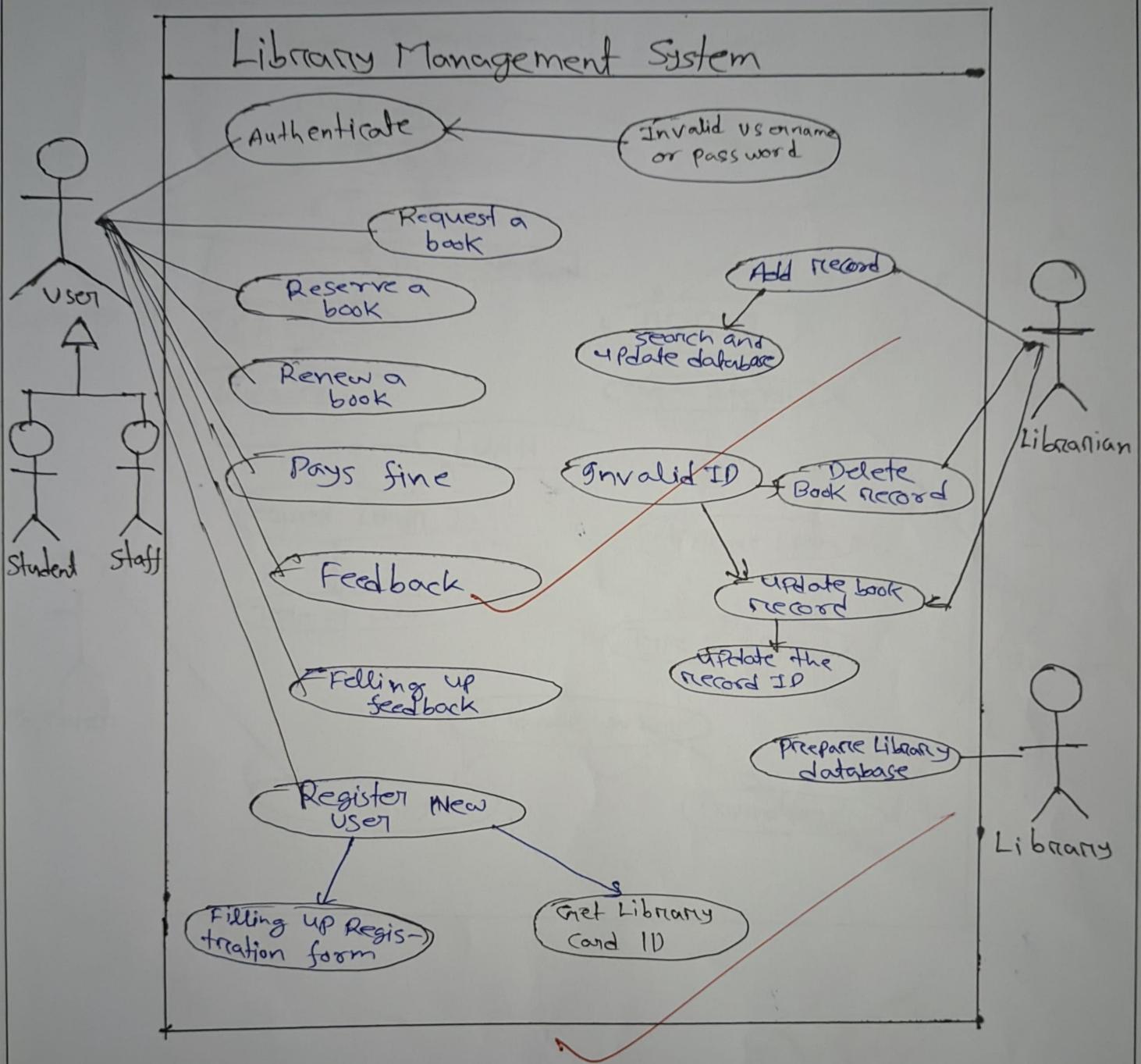
Purpose of UML Case Diagram:-

- ① To identify the functional requirements of a system.
- ② To define the system boundary.
- ③ To visualize user-system interactions.

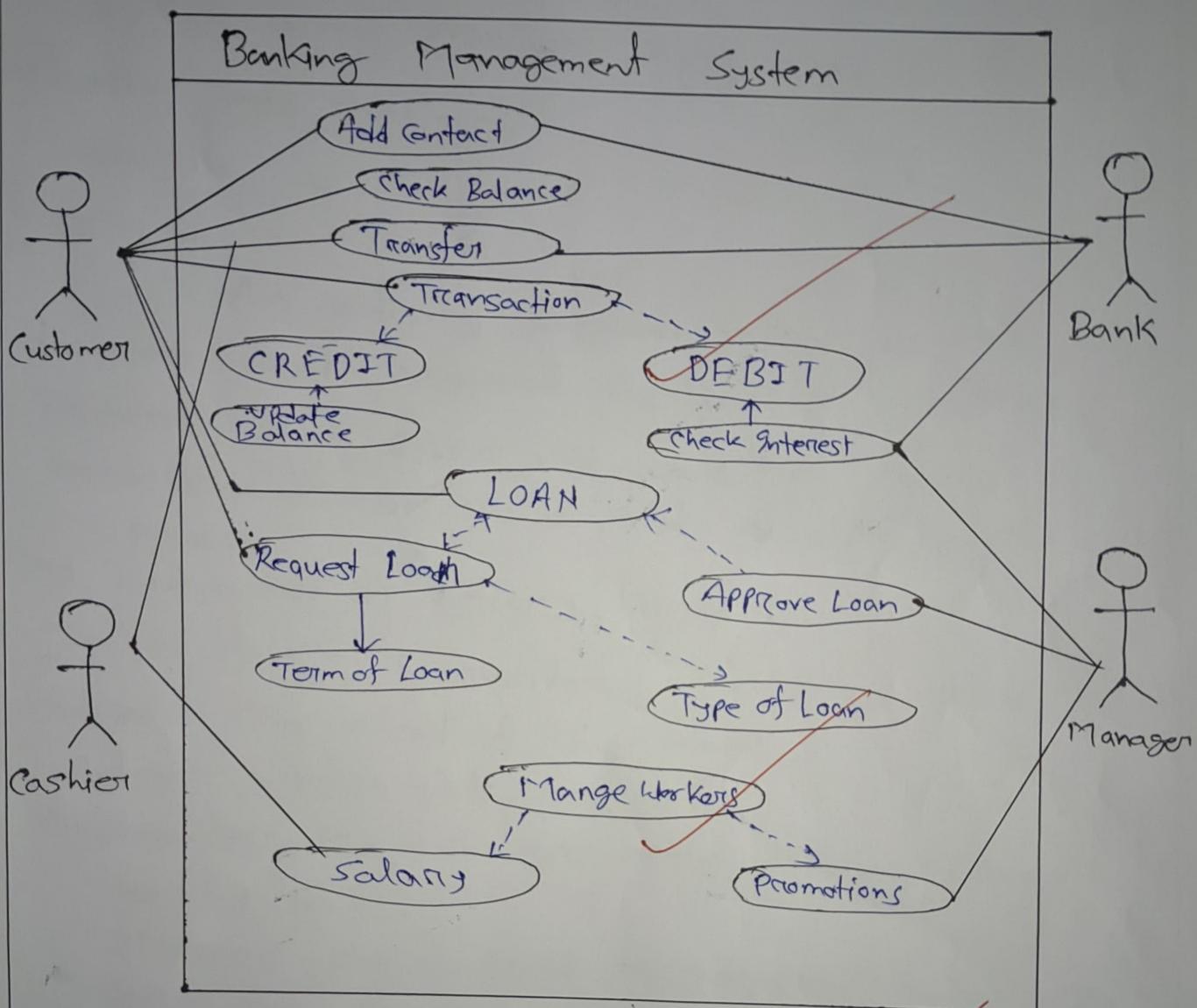
Main Components:-

1. Actors - External users or systems.
2. Use cases - Functionalities or services.
3. System boundary - Define the scope of the system.
4. Relationship - Association, Include, Extend, Generalization.

Diagram:-



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✓ Hassan
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Experiment No - 2

Aim:- To design and implement an activity Diagram for a given problem using draw.io software.

Software/ Tools Used:-

- draw.io

Theory:-

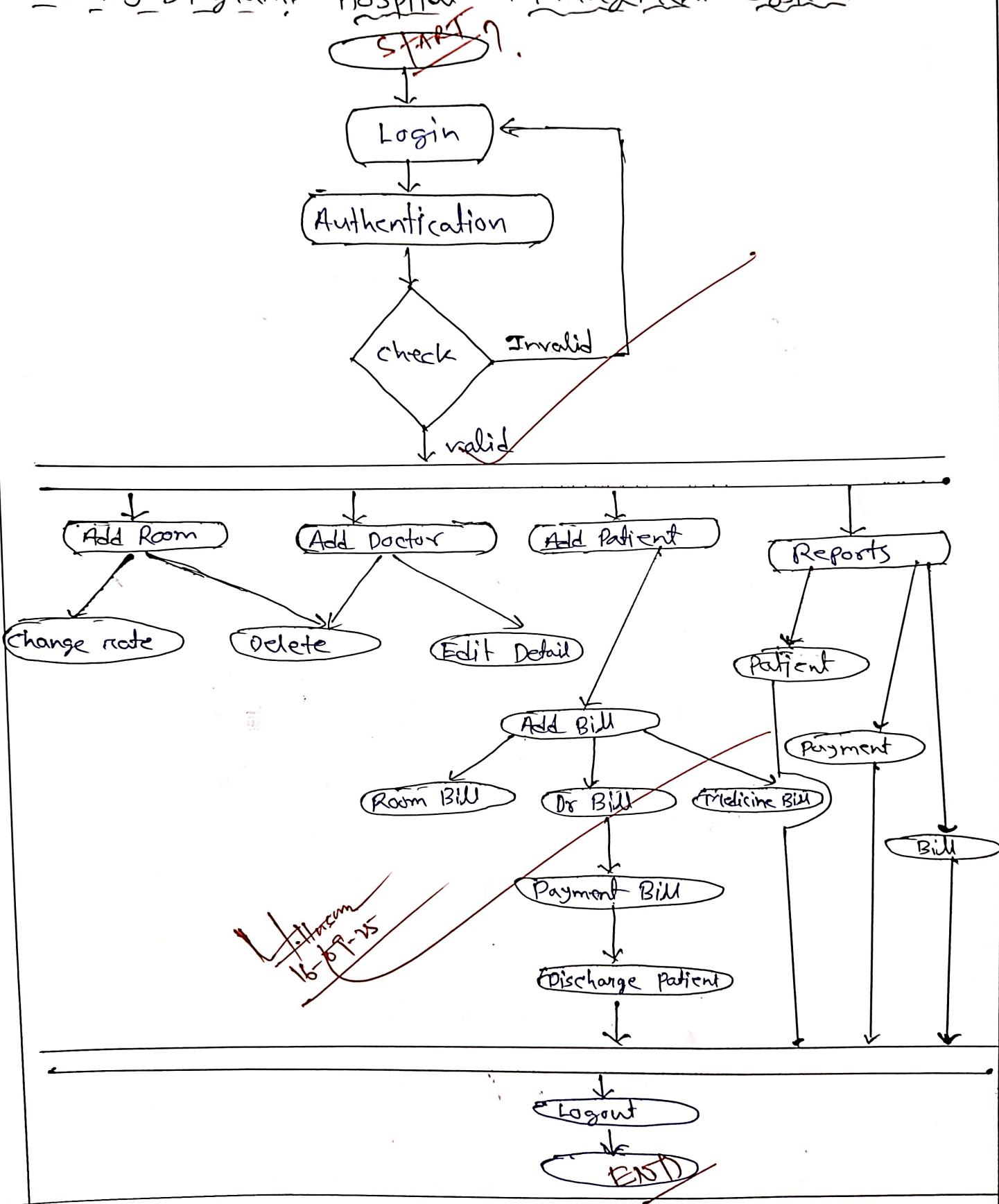
An activity diagram is a type of UML diagram that represent the flow of activities or processes in a system. It shows the sequence of activities, decision point, and parallel flow in a process.

Key Components of Activity Diagram:

1. Initial Node:- Represented by a filled circle, indicates the start of the process.
2. Activity Action state:- Represented the task or action to be performed.
3. Decision Node:- Diamond shape used to represent conditions or branching of flow.
4. Merge Node:- used to bring together different paths.
5. Fork / Join Node:- Represent parallel execution.
6. Final Node:- Represented by a filled circle with an outer boundary indicates the end of the process.

Diagram:-

Activity Diagram:- Hospital Management System.



Experiment -03

AIM:-

To draw a business use case diagram for a restaurant using Rational unified process notation.

Software / Tools used:-

- ① draw.io - for designing UML diagrams.
- ② Operating system: window/Linux.
- ③ Language: UML (Unified modeling Language)

Theory:-

A use case diagram shows how different actors (like customers, waiters, and managers) interact with the restaurant system.

Purpose of use case Diagram:-

- ① To identify the functional requirements of a system.
- ② To define the system boundary.
- ③ To visualize user-system interactions.

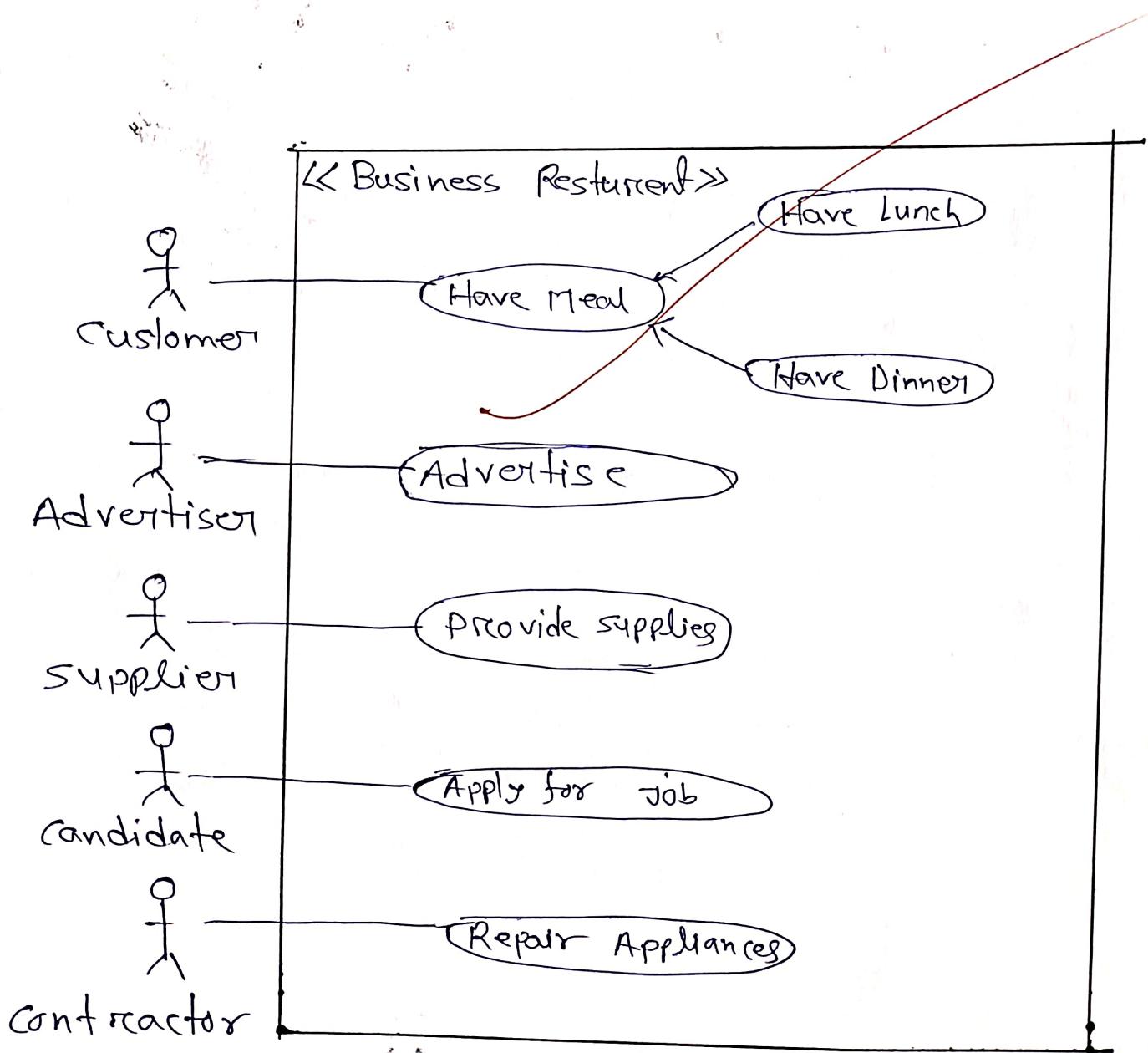
Main Components:-

1. Actors - External users or systems.
2. Use-cases - Functionalities or services.

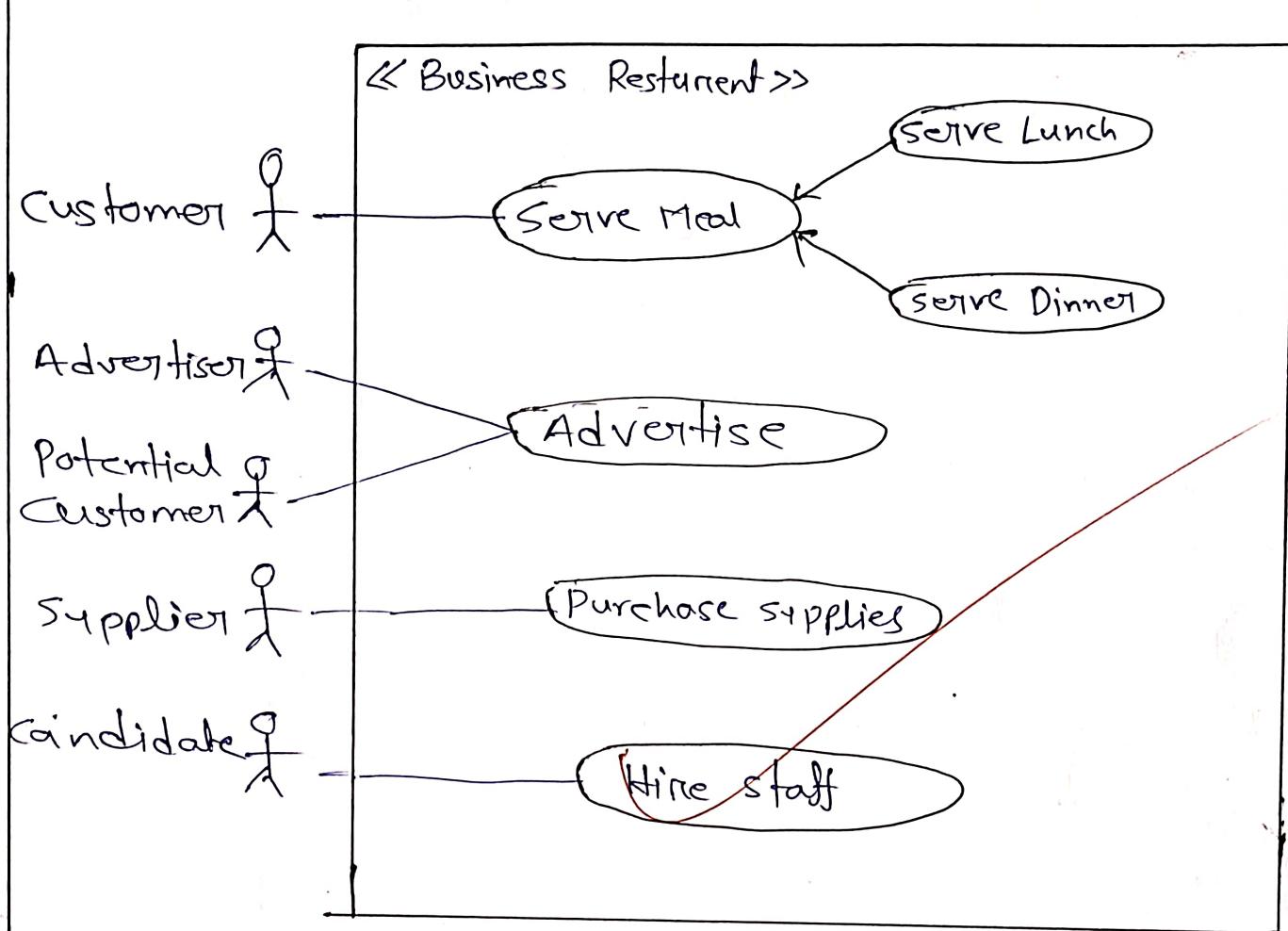
3. System boundary - defines the scope of the system.
4. Relationship - Association, include, Extend, Generalization.

Diagram:-

↑ Business Use case diagram for Resturent External view:-



Business use case diagram for Restaurant -
internal view :-



Result

successfully drawn two business use case diagrams for a restaurant using rational unified process notation.

Experiment no - 04

Aim:-

To design a UML Use Case Diagram for an online shopping system showing interaction between users and system functionalities such as browsing products, placing orders, managing inventory, and handling payments using draw.io software.

• Software / Tools used:-

- draw.io — for designing UML diagrams.
- operating system: windows / Linux.
- Language : UML

Theory:- A UML use case diagram represents the relationship between actors and use cases. It helps in understanding system requirements and user interactions.

Purpose of use case Diagram:-

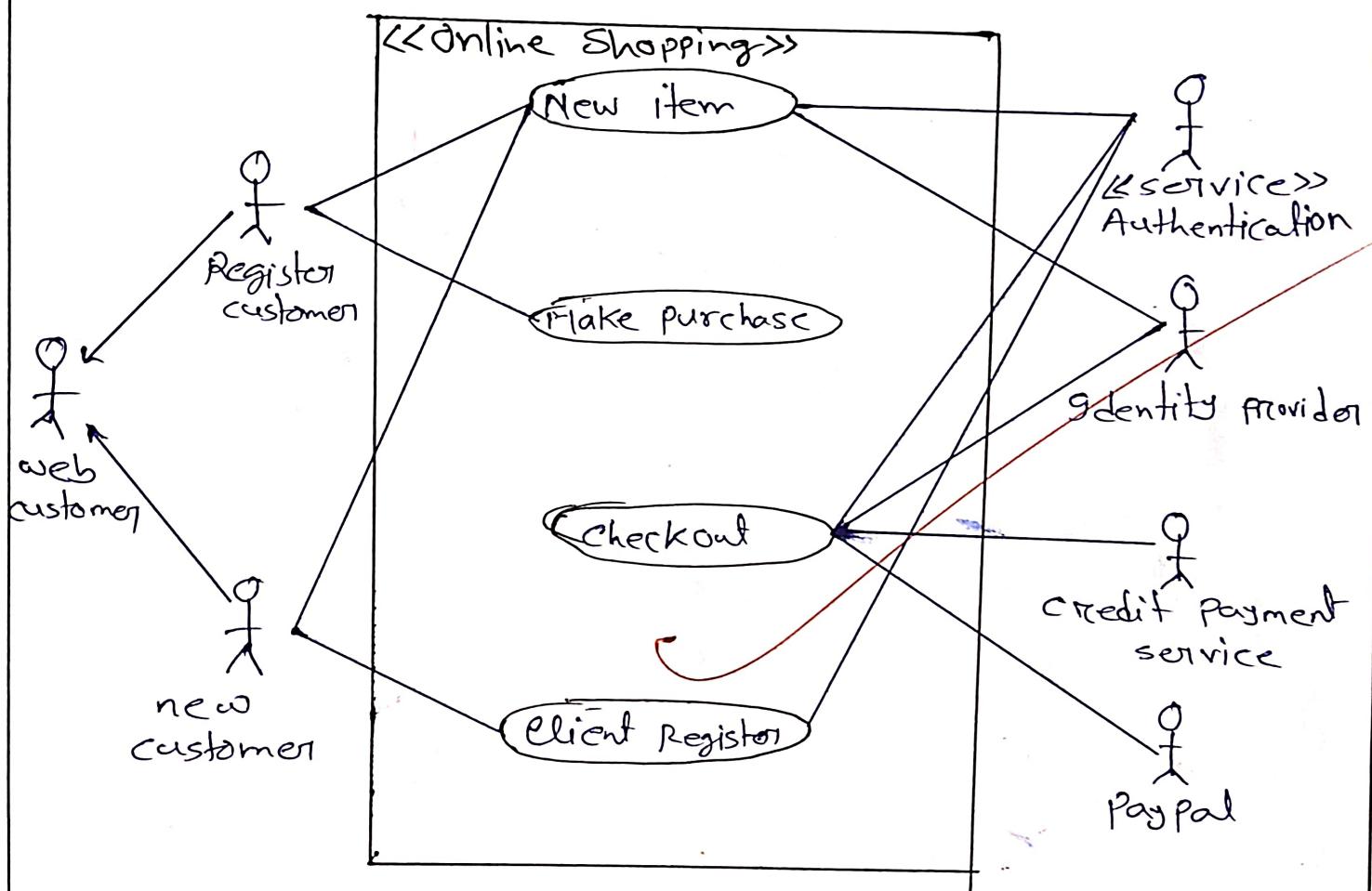
- To identify the functional requirements of a system.
- To define the system boundary.
- To visualize user - system interactions.

Actors:-

- Customer — browses products, places orders, and makes payments.

- ① Admin - manages inventory and updates product details.
- ② Payment Gateway - processes payments.

Diagram:-



Result:- successfully designed a UML use case diagram for an online shopping system using draw.io software.

Experiment -05

AIM:- To show the step by step interaction between System entities in a specific scenario Using a sequence diagram.

Software / Tools used:-

- ① draw.io - for designing UML diagrams.
- ② Operating system : window / Linux.
- ③ Language : UML

Theory:- A sequence diagram shows how different parts interact with each other step by step. It shows messages between them in time order - time moves from top to bottom. Each part is shown as a vertical line called a lifeline. Arrows show the flow of messages.

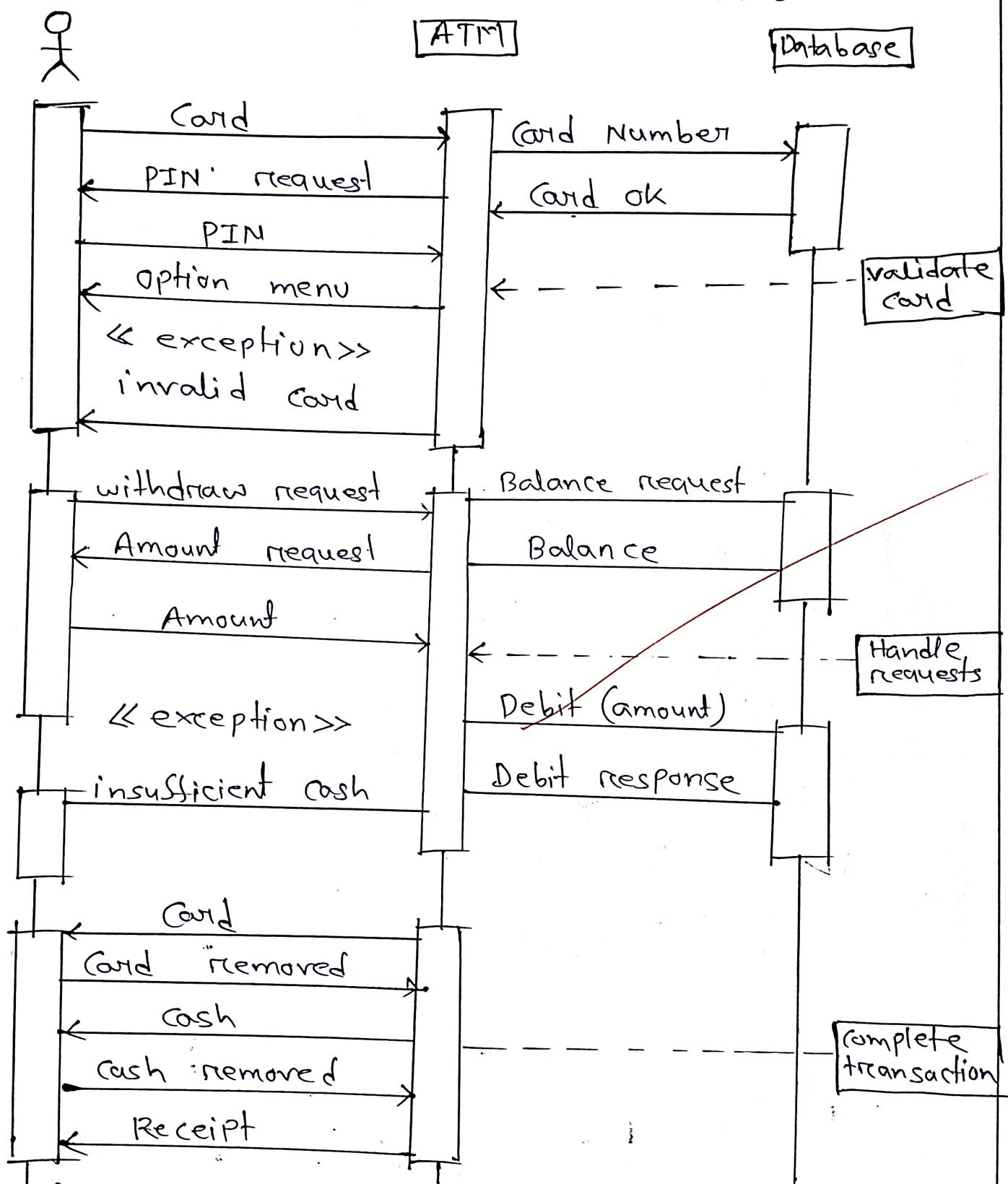
Purpose of Sequence Diagram:-

The main purpose of a sequence diagram is to show how different system components or objects interact step by step to complete a specific task. It helps to:

- ④ Understand the flow of message between objects over time.
- ⑤ Visualize the order of operations in a scenario.
- ⑥ Design and analyze system behaviour before coding.
- ⑦ Find errors or missing steps in communication between components.

DIAGRAM:-

ATM cash withdraw sequence - Diagram



① Conclusion:- sequence diagram helps to understand how systems communicate step by step in a process.

Experiment -06

AIM:- To model and analyze system workflows using UML activity diagram.

Software / Tools used:-

- ① draw.io - for designing UML diagrams.
- ② Operating system: Windows / Linux.
- ③ Language:- UML (Unified modeling Language)

Theory:- An Activity Diagram is a type of UML diagram that represents the flow of activities or processes in a system. It shows the sequence of activities, decision point, and parallel flow in a process.

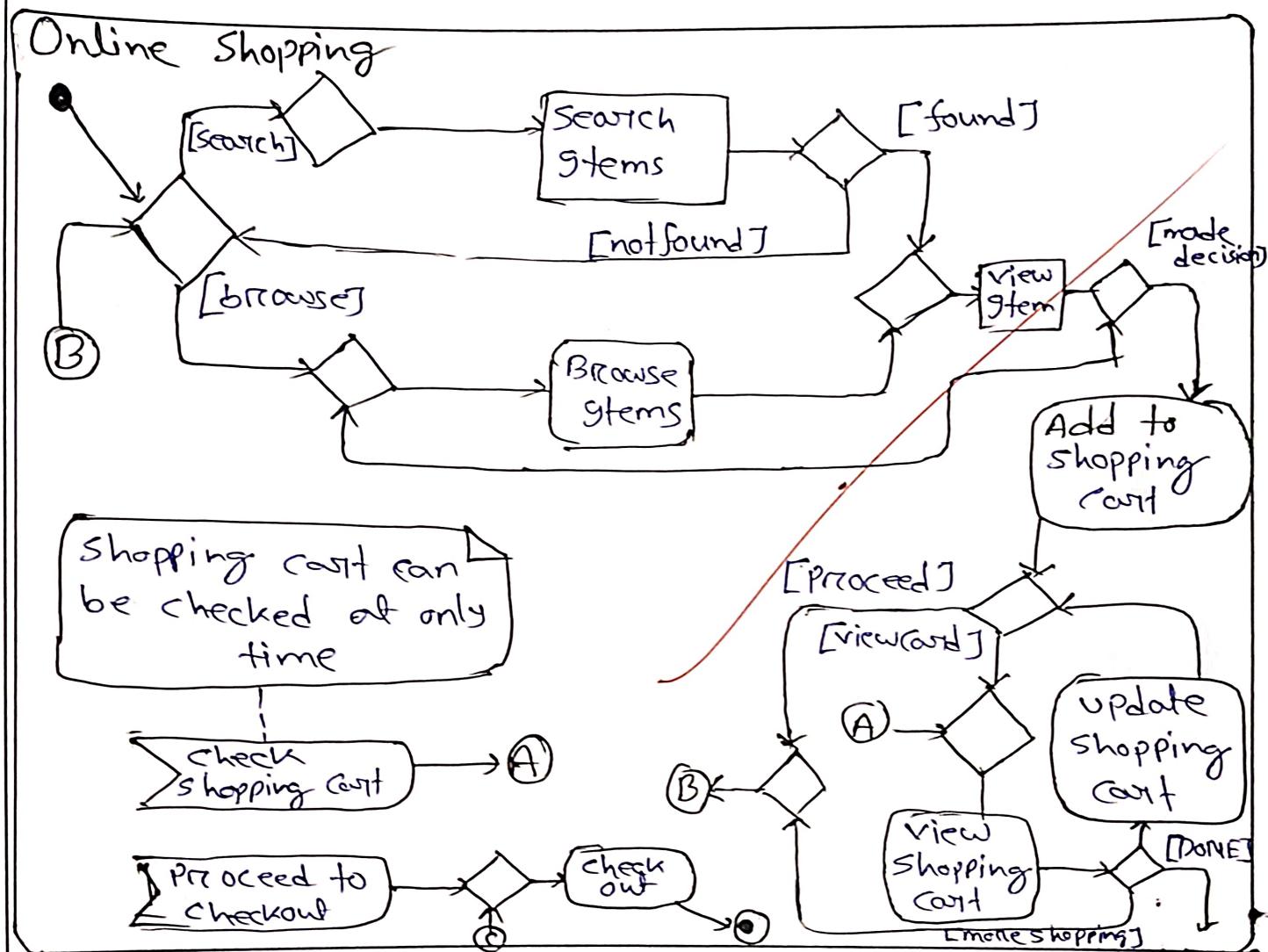
Key Components of Activity Diagram:-

- ① Initial Node:- Represented by a filled circle, indicates the start of the process.
- ② Activity, Action state:- Represents the tasks or action to be performed.
- ③ Decision Node:- Diamond shape used to represent conditions or branching of flow.
- ④ Merge Node:- Used to bring together different paths.
- ⑤ Fork / Join Node:- Represents parallel execution.

① Final Node:-

Represented by a filled circle with an outer boundary, indicates the end of the process.

DIAGRAM:-



- Activity Diagram of online shopping! -

Conclusion:- The activity diagram of the online shopping system was created using draw.io.gf. It shows the flow of actions from login to order confirmation and helps to understand the system process clearly.

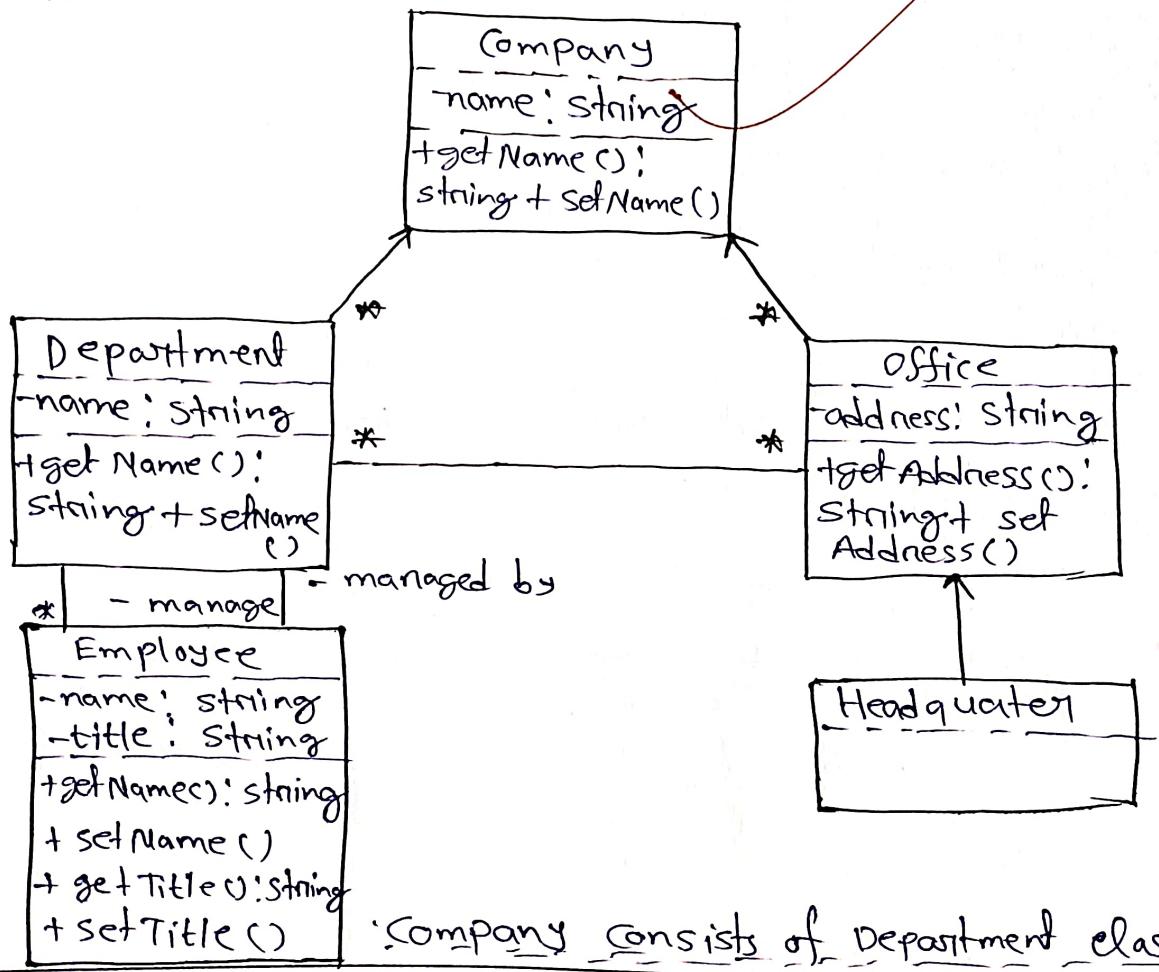
Experiment - 07

Class Diagram

Question no 1:- A Company consists of departments. Departments are located in one more offices. One office acts as a headquarter. Each department has a manager who is recruited from the set of employees. Your task is to model the system for the company.

Task:- Draw a class diagram which consists of all classes in your system their attributes and operations, relationships between the classes, multiplicity elements that you find appropriate.

Solution:-



Question 2)-

A token-ring based local-area-network (LAN) is a network consisting of nodes, in which network packets are sent around. Every node has a unique name within the network and refers to its next node.

Different kinds of nodes exists:-

Workstation are originators of messages; servers and printers are network nodes that receive messages. Packets contain an originator, a destination and content, and are sent around on a network. A LAN is a circular configuration of nodes.

Solution:-

