

ASSIGNMENT → 2

Ques 1. Explain the interaction diagram.

Ans Interaction Diagram :-

An interaction diagram is defined as a behaviour that consists of a group of messages exchanged among elements of accomplishing a specific task in the system.

Interaction diagram captures the dynamic behaviour of any system. This interactive behaviour is represented in UML by two diagrams:-

i) Sequence Diagram.

ii) Collaboration Diagram or Communication Diagram

Interaction diagrams commonly contains,

- a) Objects
- b) Links
- c) Messages.

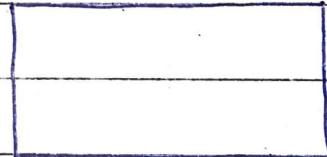
1) Sequence Diagram

A sequence diagram simply depicts interaction between objects in a sequential order.

The purpose of a sequence diagram in UML is to visualize the sequence of a message flow in the system.

Basic Sequence Diagram Notation

i) Object Symbol :-



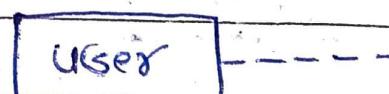
ii) Activation Box :-



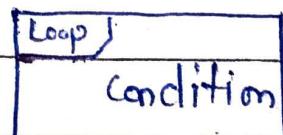
iii) Actor Symbol :-



iv) Lifeline Symbol :-



v) Option Loop Symbol :-



vii) Alternative Symbol :-

<u>ifthen-></u>	(condition)
	(else)

viii) Synchronous Message Symbol :- → → →

ix) Reply Message Symbol :- ← ← ←

x) Asynchronous Message :- → → →

x) Reflexive Message Symbol :- Object


xii) Asynchronous Create Message :- ← ← ← → →

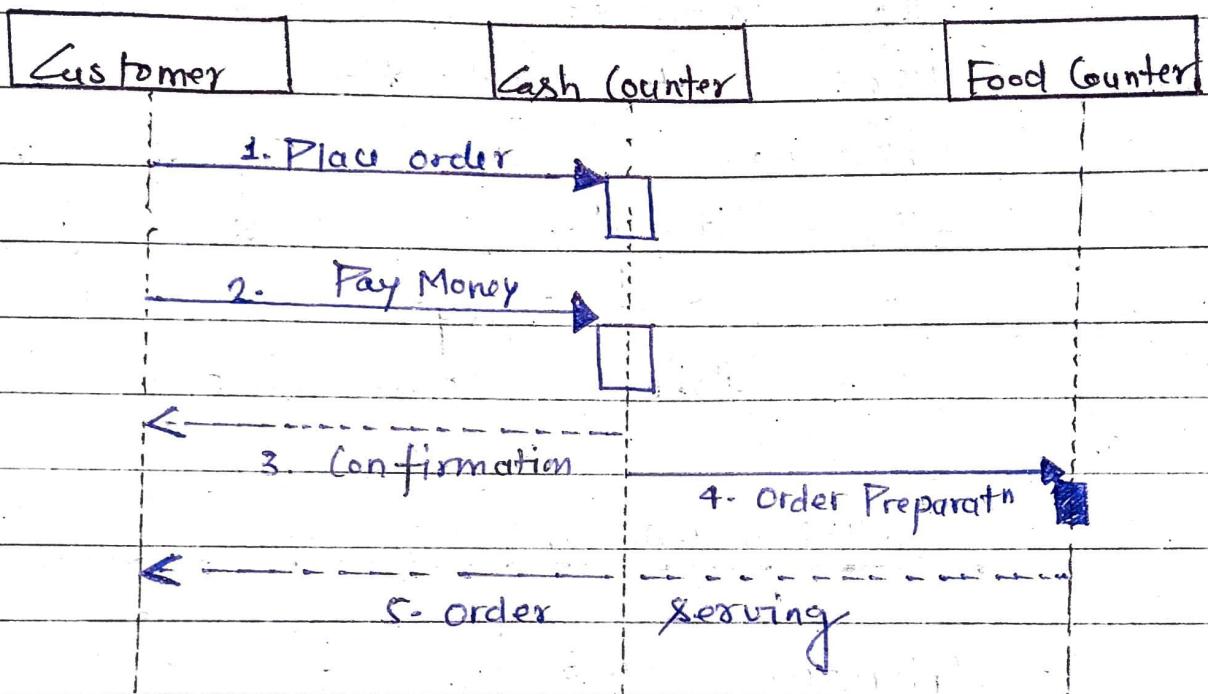
xiii) Delete Message :- *

xiv) Found Message :- ← ○

xv) Lost Message :- → ○

Sequence Diagram Example:

Interact n Food Order System



The ordered sequence of events in a given sequence diagram is as follows:-

- i) Place an Order
- ii) Pay for Order
- iii) Order Confirmation
- iv) Order Preparation
- v) Order Serving

If one changes the order of operations, then it may result in crashing the program.

Collaboration Diagram :-

It depicts the relationships among the software objects. They are used to understand the object architecture within a system rather than the flow of a message. They are also known as collabor communication diagram.

Collaboration Diagram Example -

Interaction SMS

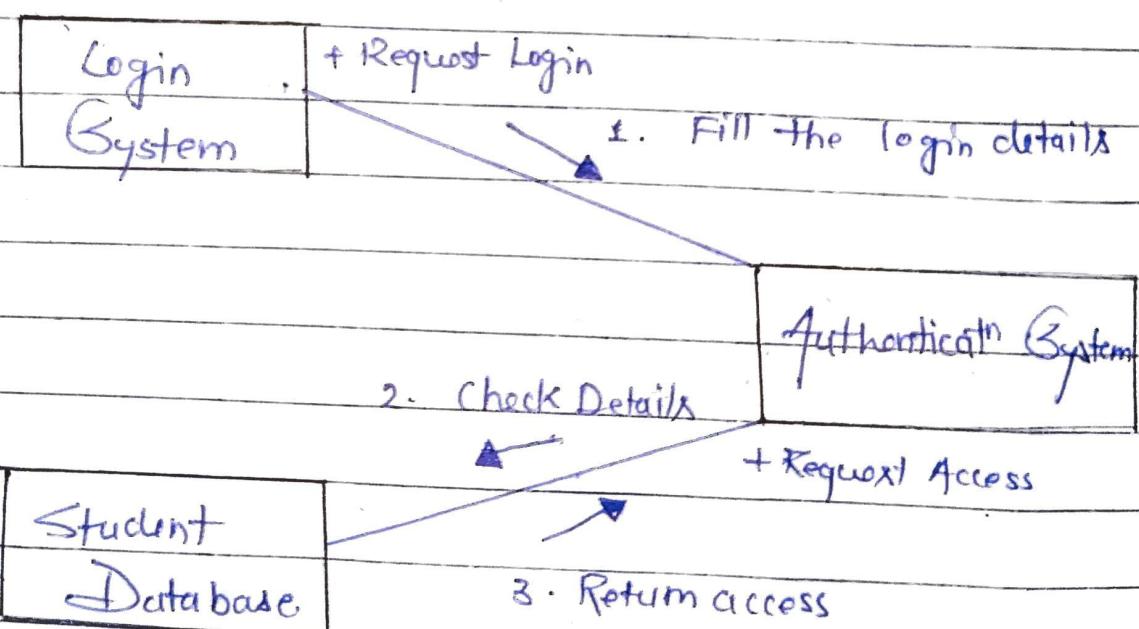


fig. Collaboration Diagram for Sms
(Student Management System.)

The flow of communication in the above diagram is given by -

- i) A student requests a login through the login system.
- ii) An authentication mechanism checks the request.
- iii) If student entry exists, then access is allowed otherwise error returned.

Timing Diagram:

It is a waveform diagram or a graph that is used to describe the state of a lifeline at any instance of time.

It does not contain any such notation as used in Sequence and collaboration diagram.

Example:-

Mail Server

Transmitting

Authenticated

Idle

Disconn.

Send Mail

Login

Ques 2. Draw the State Diagram for ATM System.

Ans.

State Diagram for ATM System.

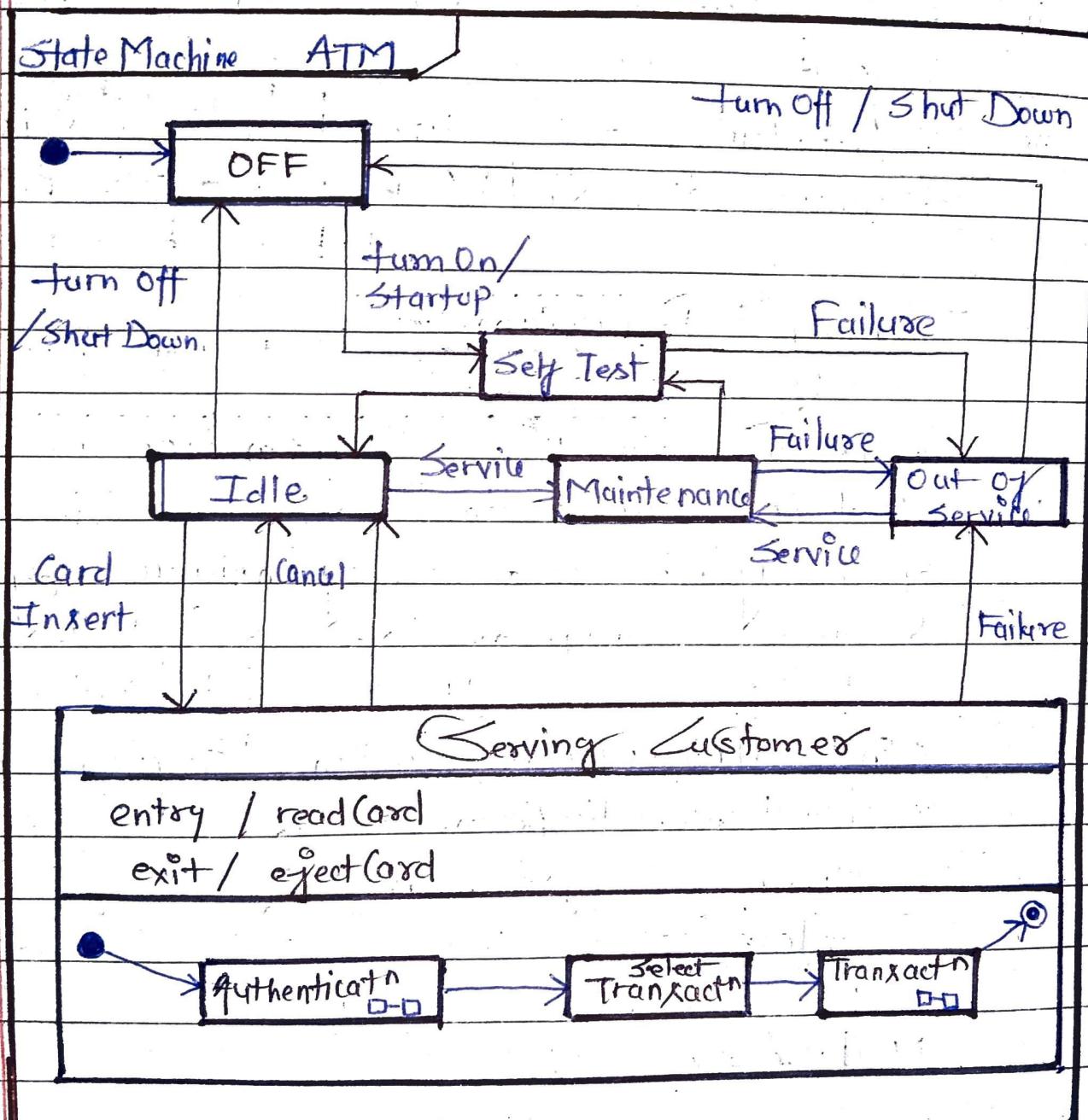


fig. State Diagram for ATM system.

Ques 3. What is Component diagram ? Explain.

Ans Component Diagram :-

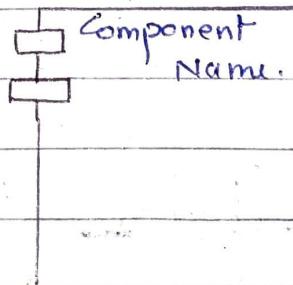
UML component diagrams are used for modelling large systems into smaller sub-systems which can be easily managed.

A component is a replaceable and executable piece of a system whose implementation details are hidden.

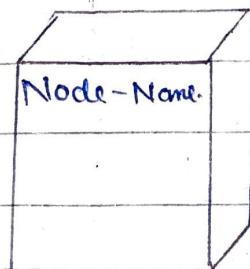
UML component diagrams are used to represent different components of a system.

Notations

i) A Component :-

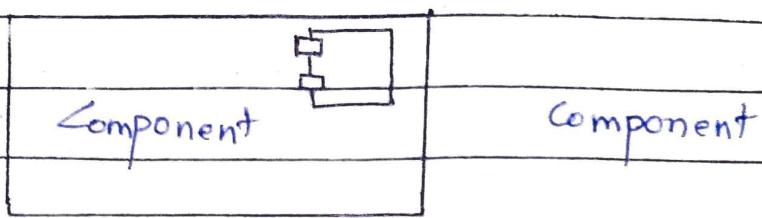


ii) A Node :-

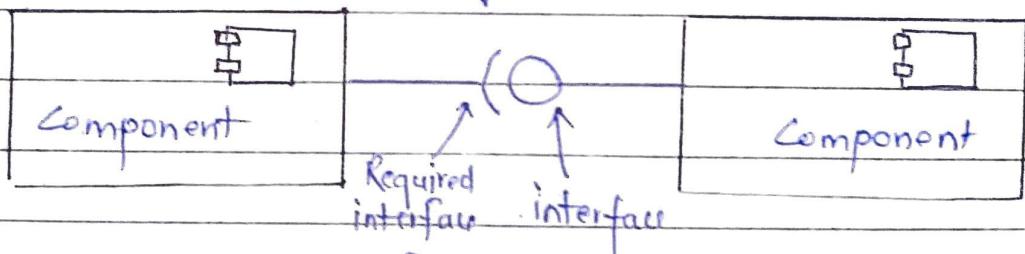


Basic Components

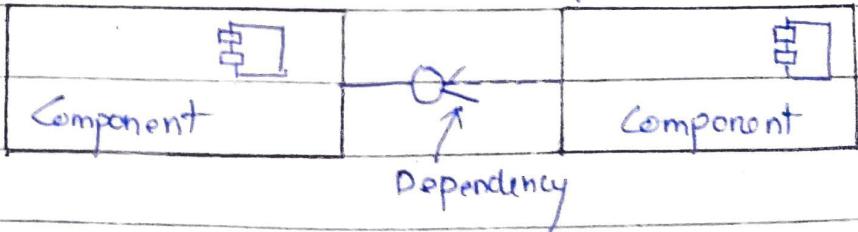
- i) Components :- It is a replaceable and executable piece of a system whose implementation details are hidden.



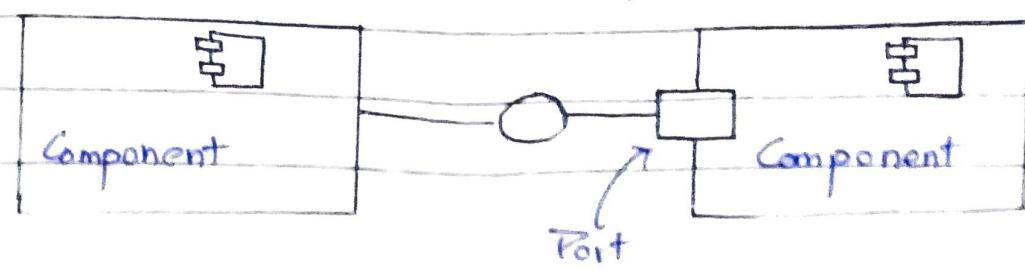
- ii) Interface :- An interface (small circle or semi-circle) describes a group of operations used or created by components.



- iii) Dependencies :- Draw a dependency among components using dashed arrows.

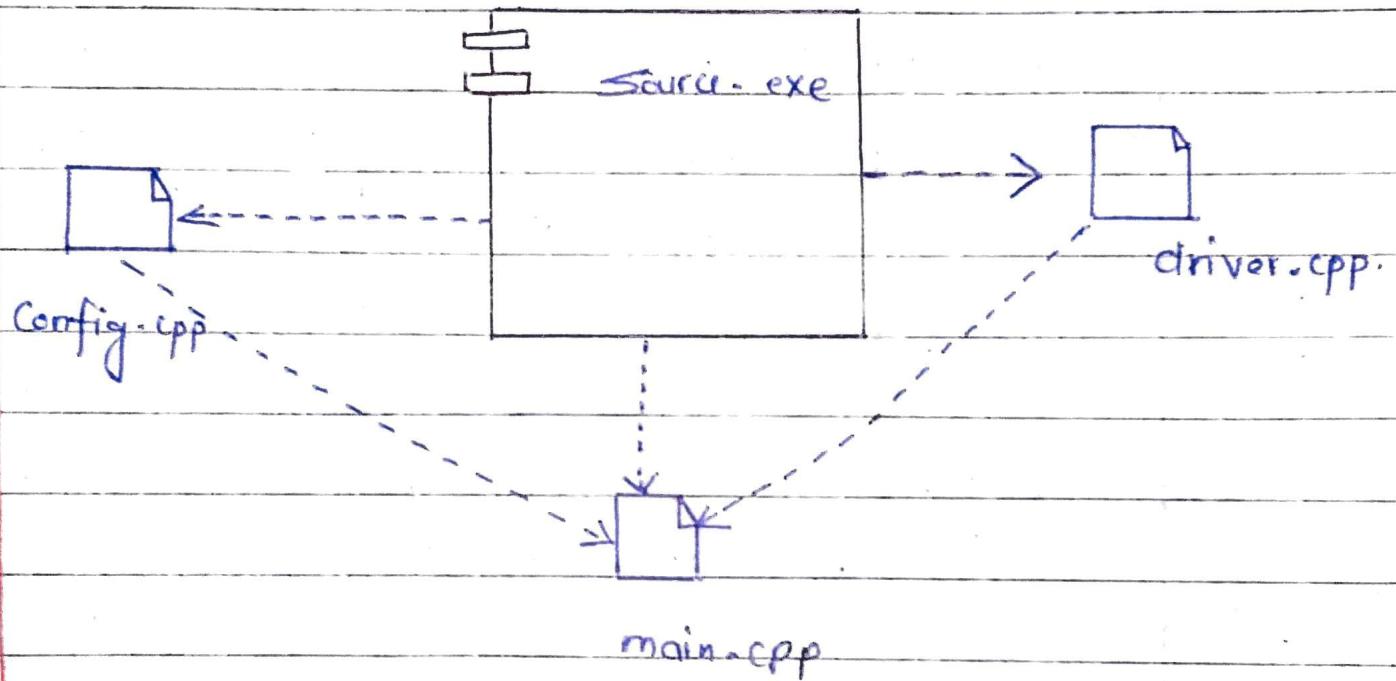


- iv) Port :- Ports are represented using a square along the edge of the system or component.



Component Diagram Example

The relationship among various artifacts, libraries, and files are the essential things required during the modelling of a component diagram.



Ques & Difference between aggregation and composition with example.

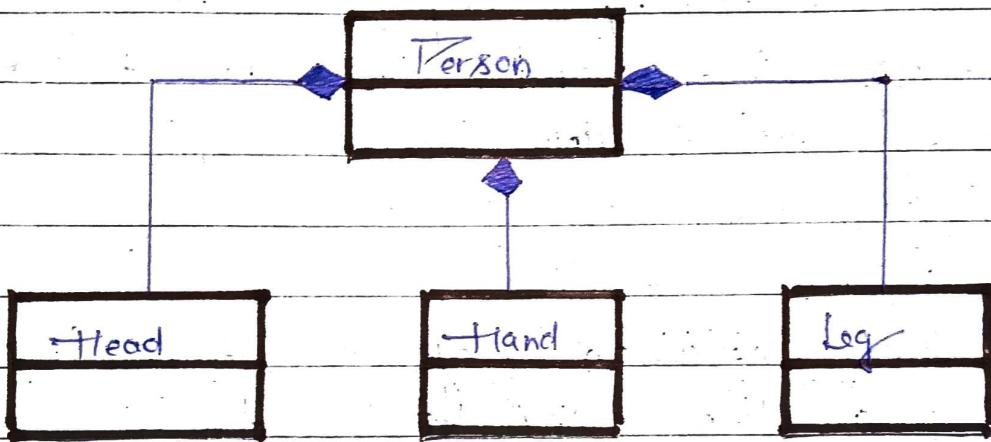
Ans -

Difference b/w Aggregation and Composition

Key	Composition	Aggregation
Basic	Composite is a way to wrap simple things or data types into a single unit.	Aggregation does not imply ownership
Relationship	Parent's entity owns the child	Parent has a relationship with child entity
Notation	It is denoted by filled diamond	It is denoted by an empty diamond
Life cycle	Child doesn't have their own lifetime	Child can have their own lifetime
Association	It is a strong association	It is a weak association

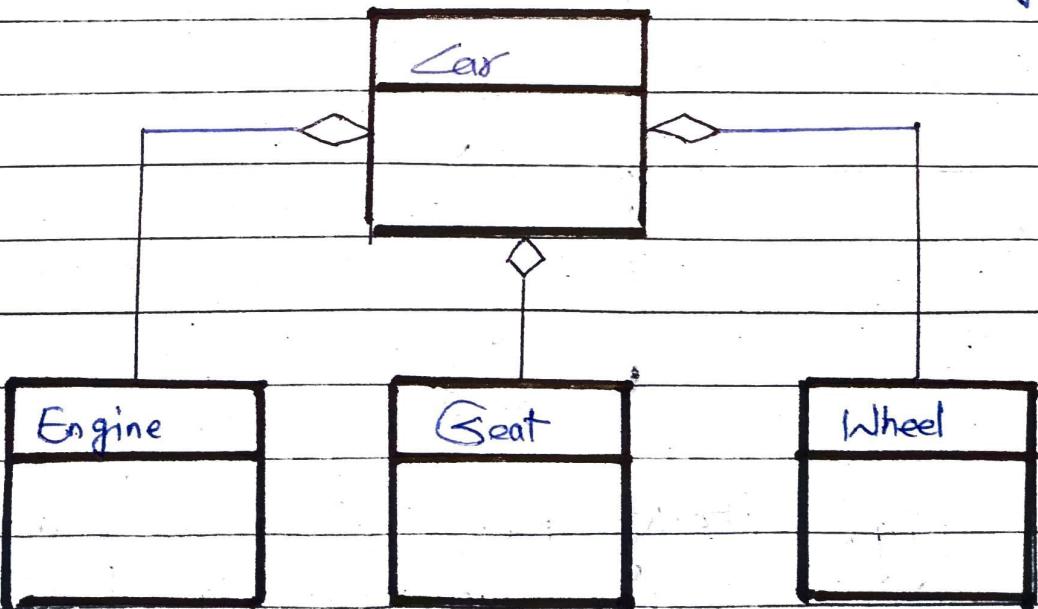
Composition Example :-

Human class is a composition of several body parts. When human object dies, all its body parts ceased to exist meaningfully, this is an example of composition.



Aggregation Example :-

A car object is an aggregation of engine, seat, wheels and other objects.



Ques 5 What is the difference b/w join and fork component notations?

Ans :- Fork Node :-

Fork node is a control node that has one incoming edge and multiple outgoing edges and is used to split incoming flow into multiple concurrent flows.

The notation of a fork node is a line segment with a single activity edge entering it and two or more edges leaving it.

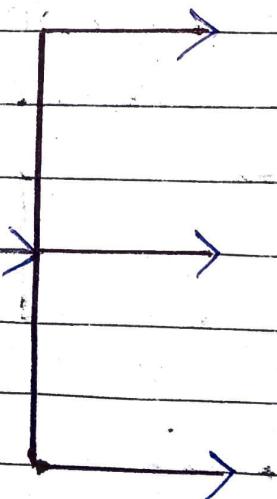


fig. Fork node with a single activity edge entering and three edges leaving it.

Join Node

Join node has multiple incoming edges and one outgoing edge and is used to synchronize incoming concurrent flow.

Join nodes are introduced in UML to support parallelism in activities.

The notation for a join node is a line segment with several activity edges entering it and only one edge leaving it.

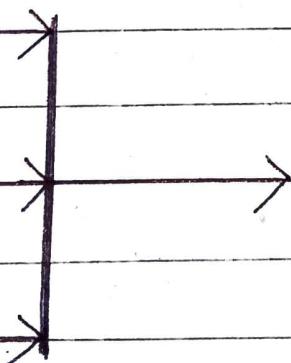


fig. Join Node.