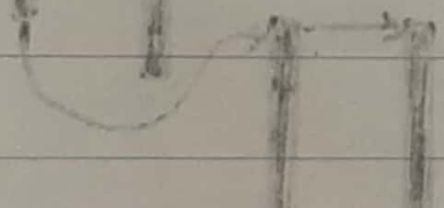
Date :..... No :.....

Gantt chart

* Gantt chart covers the entire time plan of a project with activities & dependancies. and is used to manage the team.
* This is used in all types of fields and not only in the it industry.
* Created before Starting the project.
* Gantt project software can be used to create gantt charts.



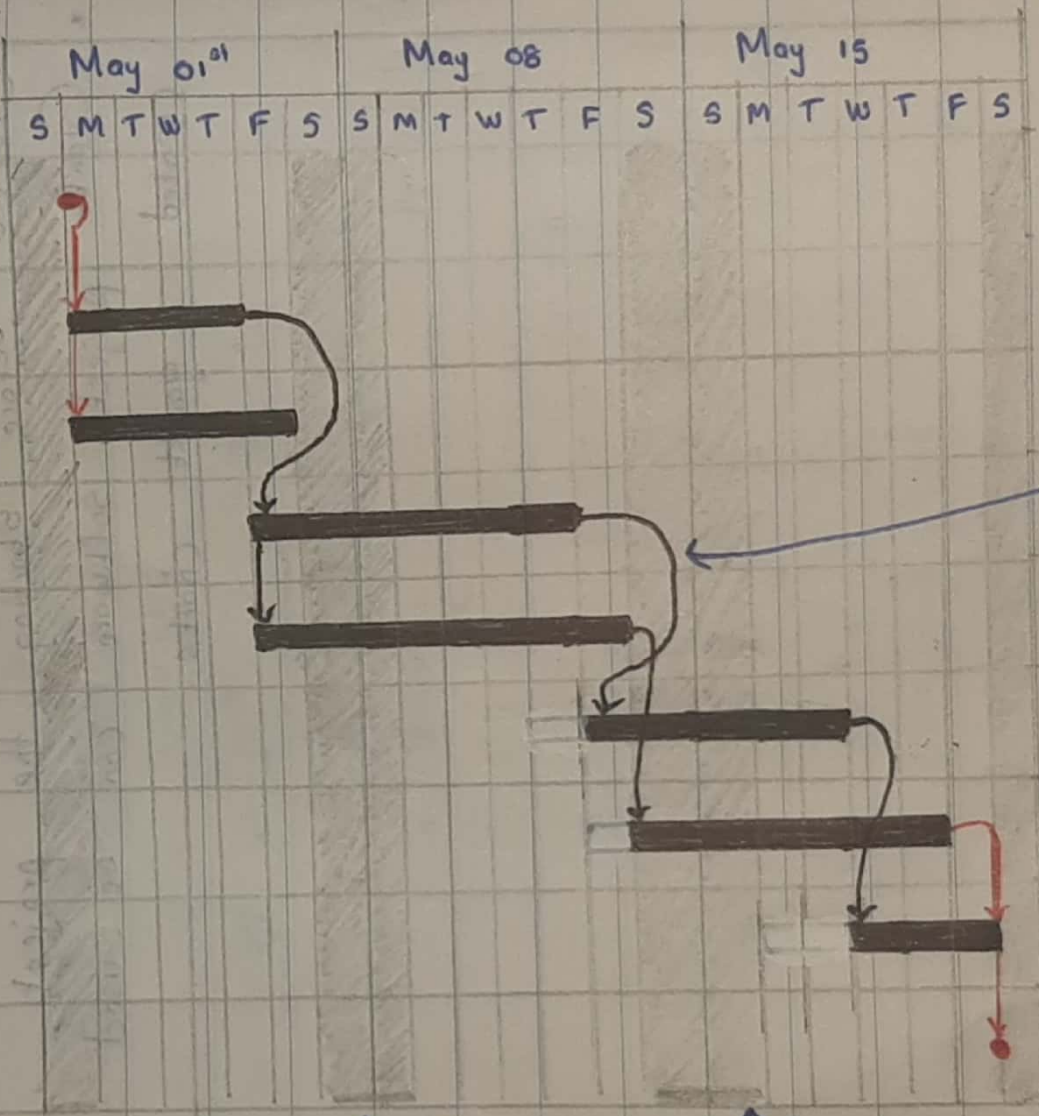
Exercise 1

- Create a Gantt chart for the project including activities in the below table.
  - The project will be started on Monday (02nd May).
  - The first day of a week in the Gantt Chart should be Sunday.
  - Saturday and Sunday should be considered as holidays.

Activity	Predecessor	Expected time(Days)
a	—	4
b	—	5
c	*a*	5
d	*a*	6
e	*b, c*	3
f	*d*	4
g	*e*	3

- Starting
  - 02nd May
- End
  - 20th May

ID	Task Name	Predecessor	Duration
1	Start	-	0
2	a	1	4
3	b	1	5
4	c	2	5
5	d	2	6
6	e	3, 4	3
7	f	5	4
8	g	6	3
9	Finish	7, 8	0



Should give an ID to each task

Should include start & finish

for the project to be completed these two tasks should be over

Saturday & Sunday are not considered as working days.

Should mark predecessors using arrows

first day of the week is Sunday

Date :..... No :.....

Requirement determination

* To perform a comprehensive analysis of the system, three main things need to be done.
  1) Collecting data
  2) Analyzing the data
  3) Coming up with initial design for product
* End deliverable of analysis phase is the system proposal.

Three main requirement types

1) Business requirements
2) User requirements
3) System requirements
   - Functional requirements
   - Non-functional requirements

1) Business requirements
   * These are the requirements that cover the entire business and are expectations of the entire business.

Date :..... No :.....

ex - . Increasing profit
. Increasing customer base.

2) User requirements
* These are the expectations of each individual user of the system.
ex - . An user expects to be able to login to the system.
. An user expects the permission to add new items to the system.

3) i) Functional requirements (features & behaviour of the system)
* These requirements are the way to facilitate user requirements and should co-relate with each other.
Ex - . Login to the system (user requirement)
↓
. Entering username & password to login. (functional requirement)

Can be data gathering needs

or

. Data needed for login validation

Date :..... No :.....

ii) Non-functional requirements

* These are the charcteristics of the system.

ex - . images used, Colors used, font types used, speed of the system, Security of the System etc.

* A System requirement is hows the system is going to meet the expectations of its user.

Exercise

Requirements for Proposed System:
The system should…

1. Serve the web users.
2. include the company logo and color scheme.
3. connect all the branches.
4. include actual and budgeted cost information.
5. provide management reports.
6. have 2-second maximum response time for predefined queries and 10-minute maximum response time for ad hoc queries.
7. display information from all company subsidiaries.
8. print subsidiary reports in the primary language of the subsidiary.
9. provide monthly rankings of salesperson performance.
10. include sales information that is updated daily.
11. increase market share
12. shorten order processing time
13. reduce customer service costs
14. lower inventory spoilage
15. improve responsiveness to customer service requests
16. schedule a client appointment
17. place a new customer order
18. re-order the inventory
19. determine available credit of clients
20. look up account balances

Categorize these requirements into business, user, functional, and non functional requirements.

Excercise

1) Business requirements
   - 1, 3, 13, 14, 15, 16, 17

2) User requirements
   - 7, 8, 9, 18, 19, 20

3) Functional requirements
   - 4, 5, 11, 12

4) Non-functional requirements
   - 2, 6, 10

Date :..... No :.....

Requirement Collection techniques (Elicitation techniques)

1) Interviews method
   - Face to face interviews
   - Remote interviews

* Discussion between two parties. Will only interview one person at a time.
* Expensive & time consuming.
* Can ask two types of questions.
  1. Close ended questions
  2. Open ended questions

2) Questionnaire method
   * Gives a set of questionnaire to be filled.
   * Can reach a large audience.
   * Can not validate facts.

3) Observation method
   * Being physically present & observing the procedure.

Date :..... No :.....

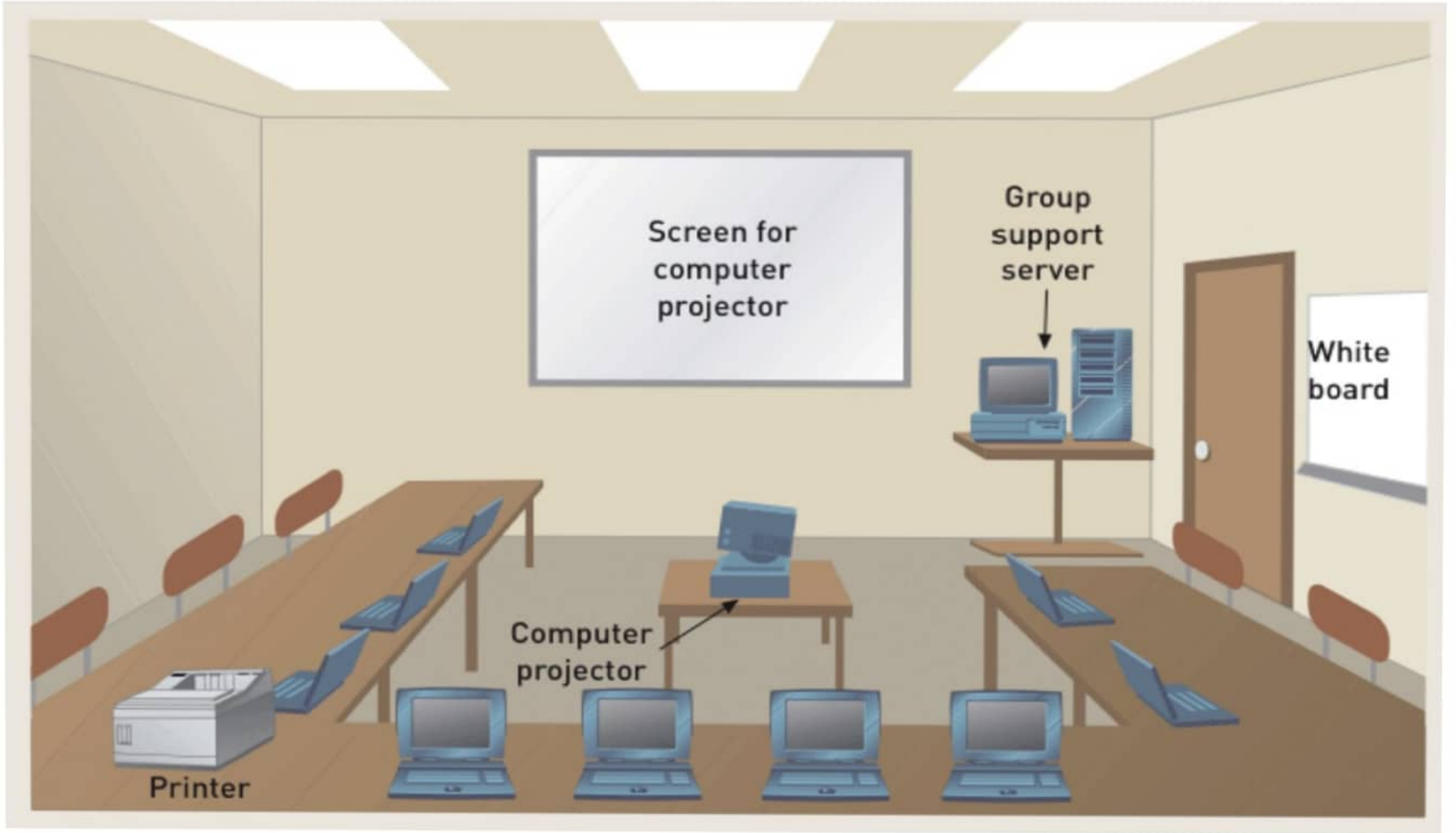
4) Document review method

* Referring existing documents like monthly reports, annual reports, bill boks etc.
* Can not clear doubts & time consuming.

5) IAD method (Joint Application Development)

* Similar to an interview but with more participants & using a specialized room.
* Two teams one from the client side and another from the IT Company.
* Third party will be the IAD facilitator who provides the IAD room.
* Can clear doubts easily but will be expensive.

JAD facility



Date :..... No :.....

Requirement analysis

* Following tasks are achieved through requirement analysis.
  1) Mapping of system
  2) Dependencies of requirements
  3) Flow of requirements (behaviour of the system)

* To analyse a system use cases and user stories are used.

* Use case
  - brief description of the requirement using technical terms.

* User stories
  - informal description that describes the behaviour of the system. Is used to communicate with the client.

Date :..... No :.....

Basic use case

1) Use case name
2) Brief description (one or two sentences)
3) Actors (people who have access to the feature)
4) Base flow (the main flow of activity an actor has to perform in order to achiere the objective)
5) Alternative flows (extentions)
6) Pre-condition (pre requirements needed to perform the user case)
7) Post-conditions (state reached by the user after performing the use case)

* Example - Login to an online shopping platform.

1) Name
   - Login
2) Brief description
   - User perform login to access the user account.
3) Actors
   - buyer, Seller

Date :.....

No :.....

4) Basic flow

① Entering phone number or email
② Enterng password
③ Clicking the login button

5) Alternate flows

① Google or facebook account based login
② Password recovery

6) Pre - Condition

. User should be a registered user of the system.

7) Post - Condition

. User should be able to successfully login to the account and should be directed to the home page.

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* A use case describes how the system must respond when an external factor (user) triggers an event.

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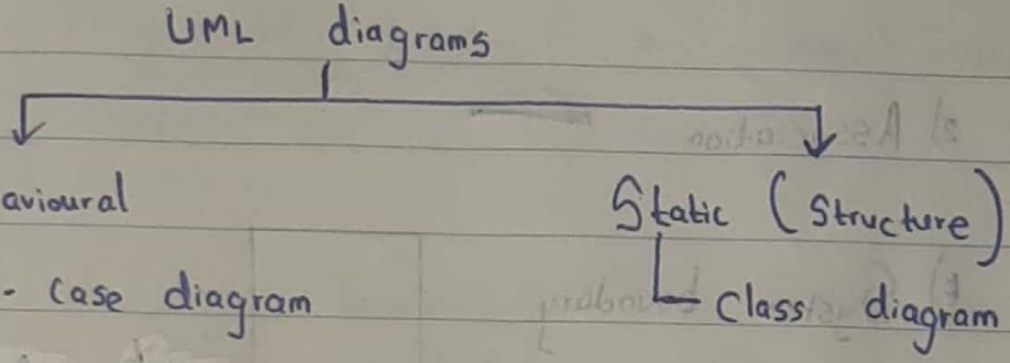
Unified Modeling language (UML)

* UML is the standard set of model constructs and notations.



* Different angles and perspectives can be shown using UML diagrams.

Use case diagram

* A use case diagram summarize all the use cases in one diagram.
* They describe the events triggered by an actor.
** Use case diagrams can be used to display how the users interact with the system.

Date :.....

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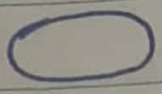
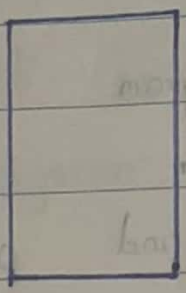
Symbols used in a use case diagram

1) Actor 

2) Use case 

3) Association

4) System boundary 

Different types of relationships

1) Include relationship

* Allways occure between two use cases.
* One use case would not be complete without performing the other use case.

Example - Login to the system would not be possible without validating the user.

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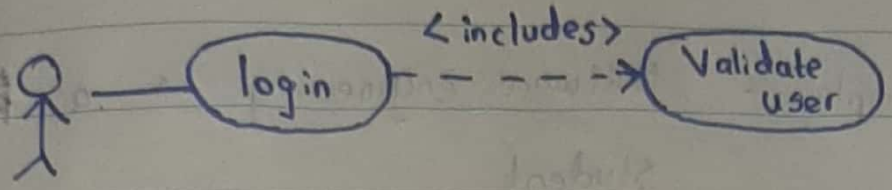
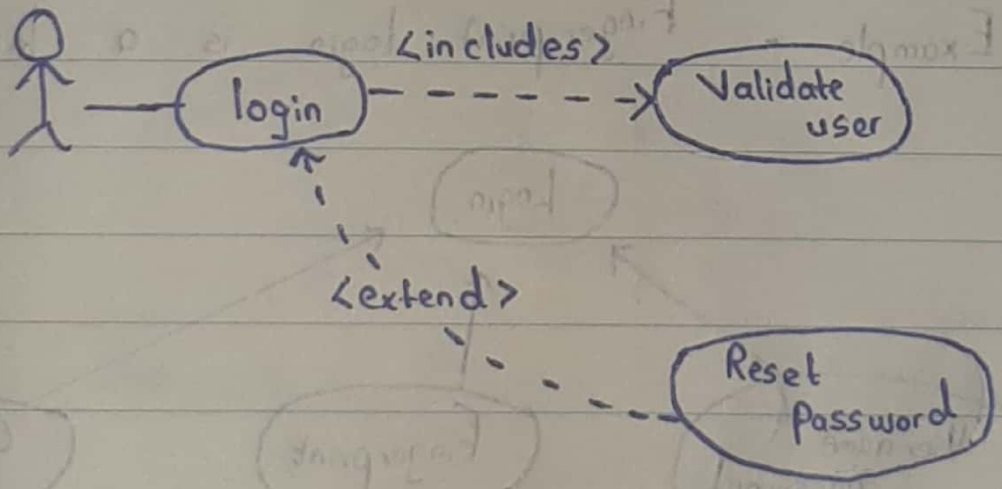


2) Extend relationship

* Certain use cases would not be mandatory to perform the base use case.

Example - Reset password use case does not affect login use case.



3) Generalization relationship / relation

* Special behaviour between base actor / use case and other actors / use cases.

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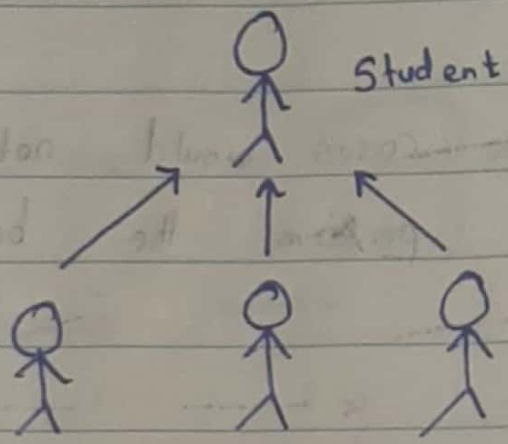
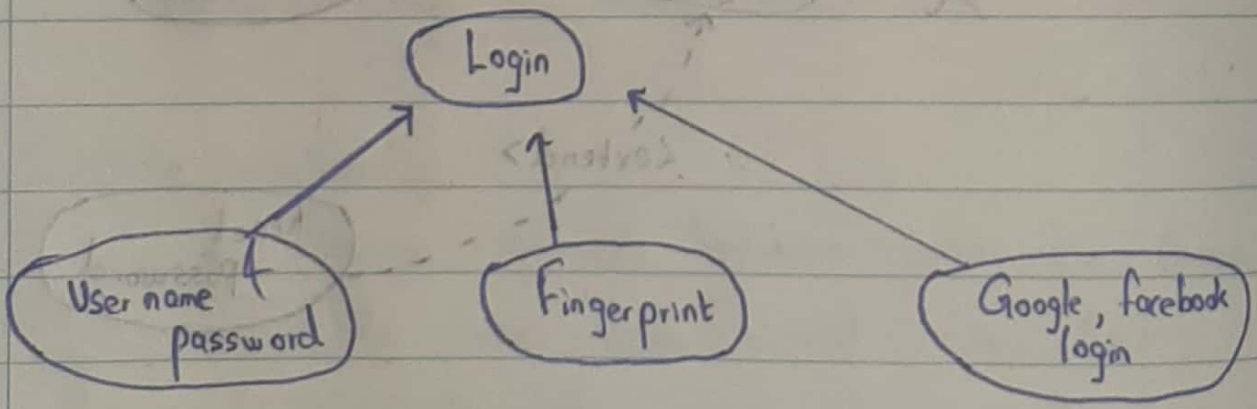
Example - Software engineering is a kind of Student.



Example - Finger print login is a kind of login.



Exercise

An automated teller machine (ATM) is a banking subsystem that provides bank customers with access to financial transactions.
Customer uses bank ATM to Check Balances of his/her bank accounts, Deposit Funds, Withdraw Cash, and Transfer Funds. ATM Technician provides Maintenance and Repairs. All these use cases also involve Bank actor whether it is related to customer transactions or to the ATM servicing.
Maintenance use case specializes by replenishing ATM with cash, ink or printer paper, upgrades of hardware, firmware or software, and remote or on-site Diagnostics. Diagnostics is also included in (shared with) Repair use case.

Date :.....

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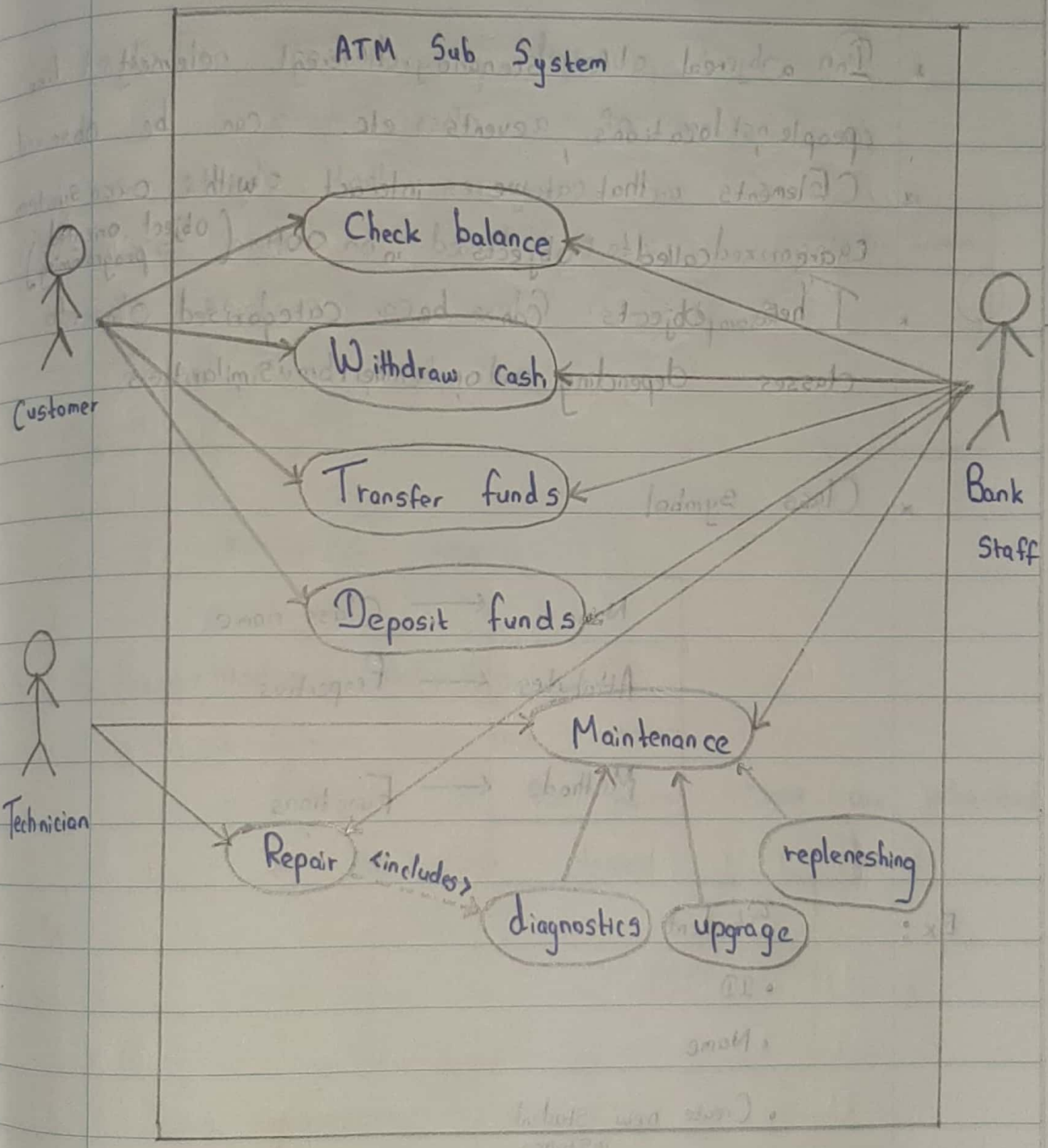
Excercise



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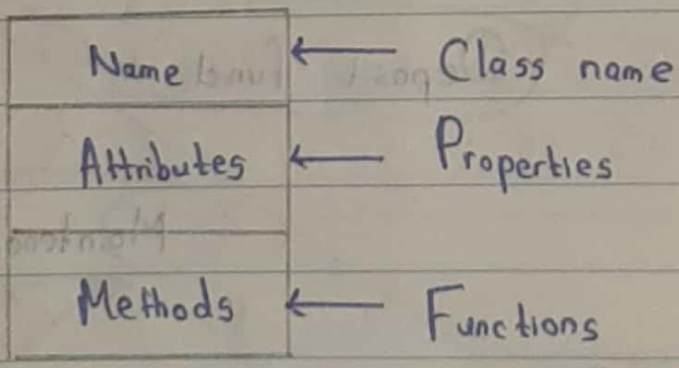
Classes and class diagrams

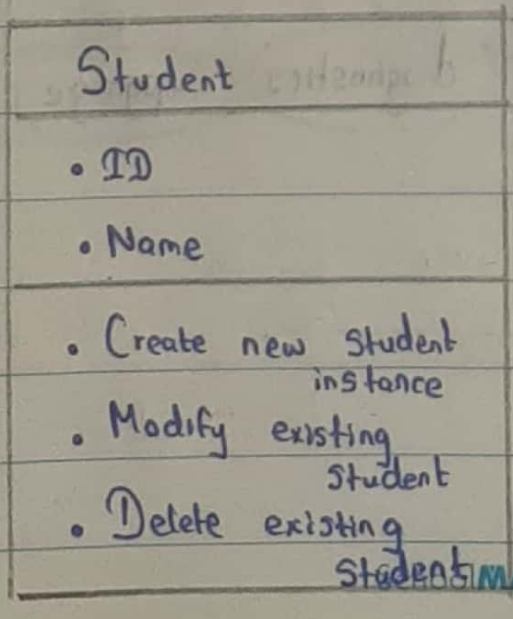
* In object oriented programming an object is an instance of a class.
* Classes are categories that objects can be categorized into based on there similarities.

Example - Class car contains objects:
audi, benz, bmw, tesla

* Class symbol



Ex :



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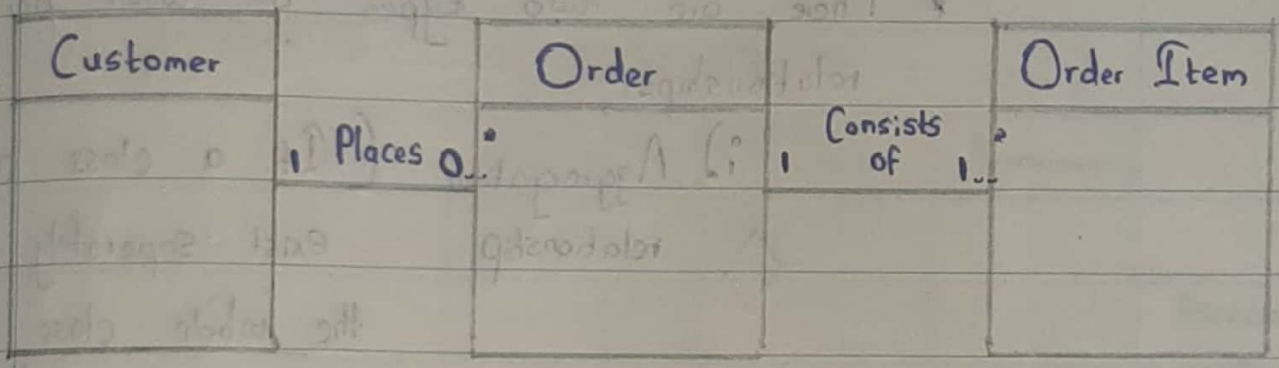
* Association Symbol ——

- Links two classes together and show their relationship.
- Need to show multiplicity.

Ex:

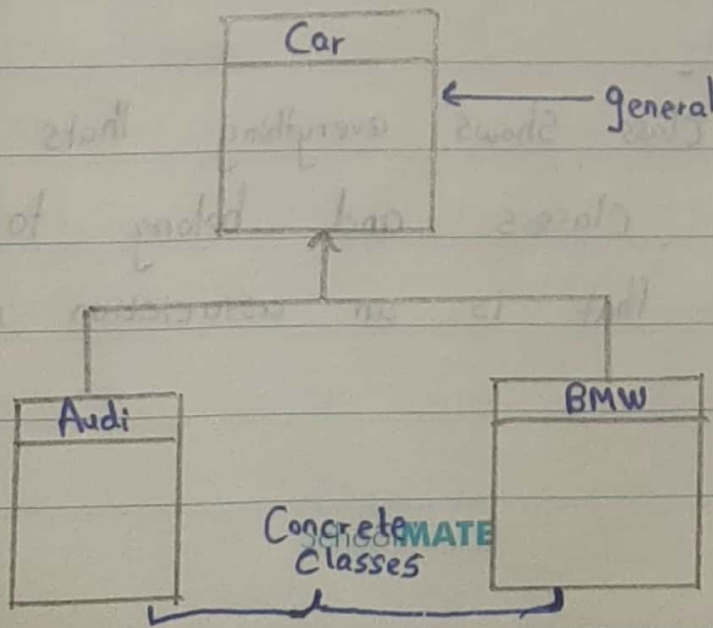


Relationship types

1) Generalization relationship

* Shows inheritance.
* Attributes of the parent class are inherited by the child classes.

Ex:



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2) Whole part relationship

* When a class in a system becomes a part of another class that is a whole part relationship.
* There are two types of whole part relationships,
  i) Aggregation relationship  (If a class can exist seperately without the whole class it is an aggregation)
  ii) Composition relationship  (If the whole class becomes useless without a certain class that is a composition)

Association Class

* If a class shows everything thats common between two classes and belong to both classes that is an association class.

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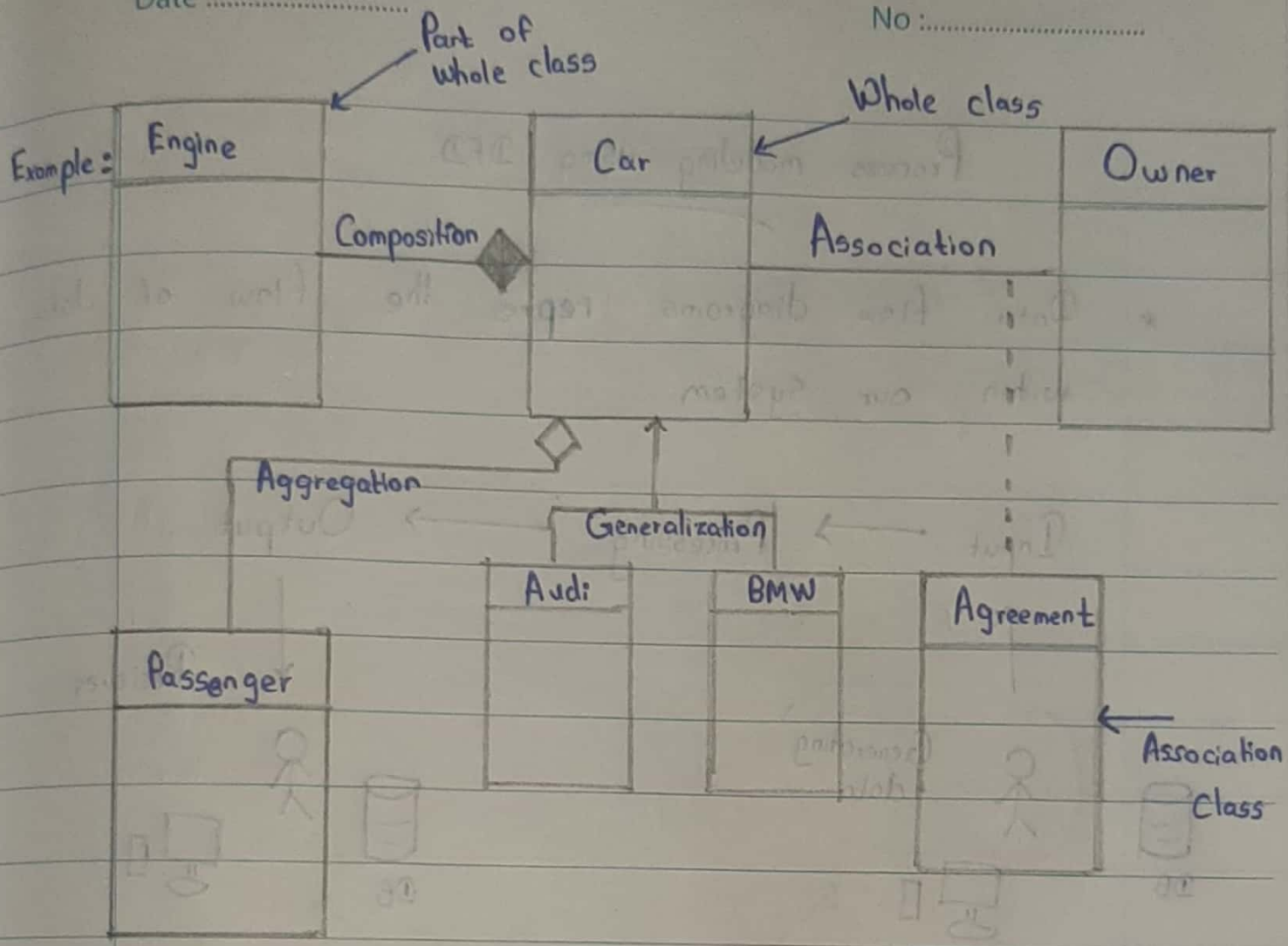

* A car can not exist without an engine.
* A passenger continues to exist without the car or car ride.
* Agreement class belongs to both car and owner classes.

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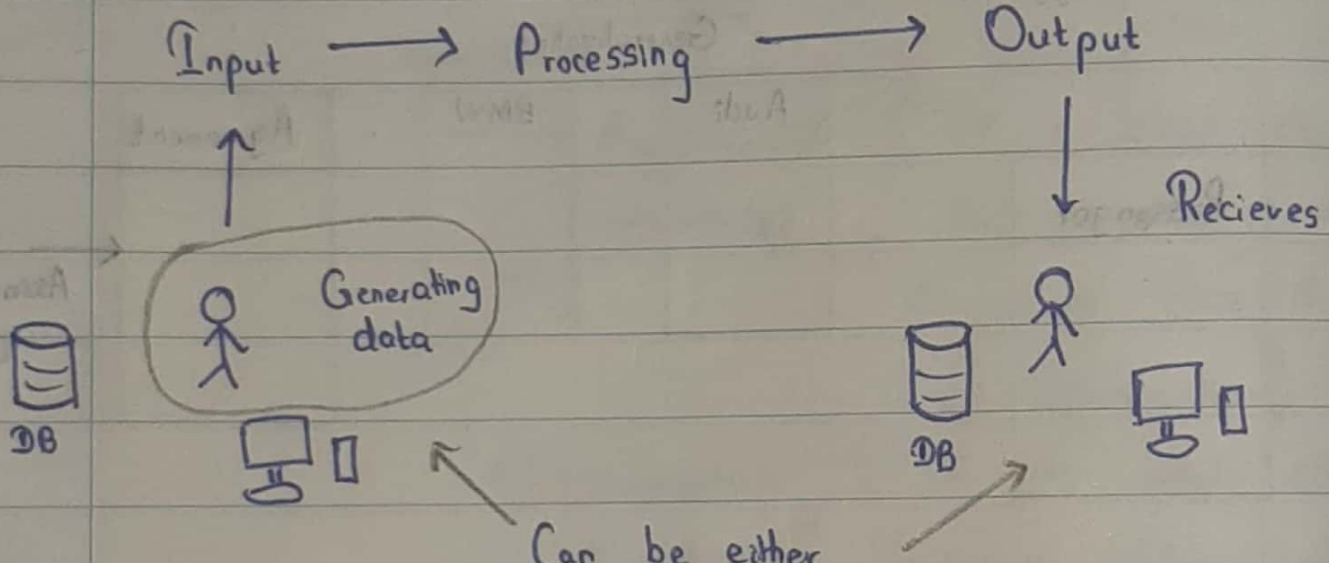
1.

Process modeling using DFD

* Data flow diagrams shows the flow of data within our system



* There are two types of DFD,
  1) Logical DFD (Conceptual way of data flow)
  2) Physical DFD (also shows physical infrastructure)

* There are two standards to create logical DFD.
  1) Gane and Sarson Standard (will use this)
  2) De Macro and Yourdan standard.

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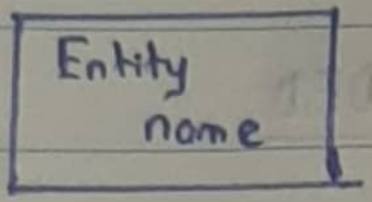
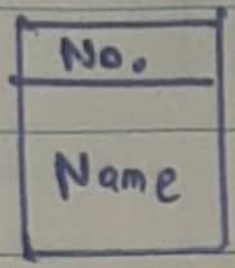
1) Generator



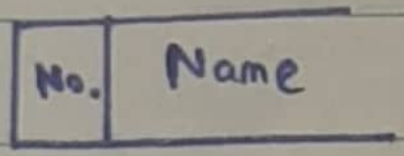
2) Processor



Process no.

Process name.

3) Database



Car Rental System

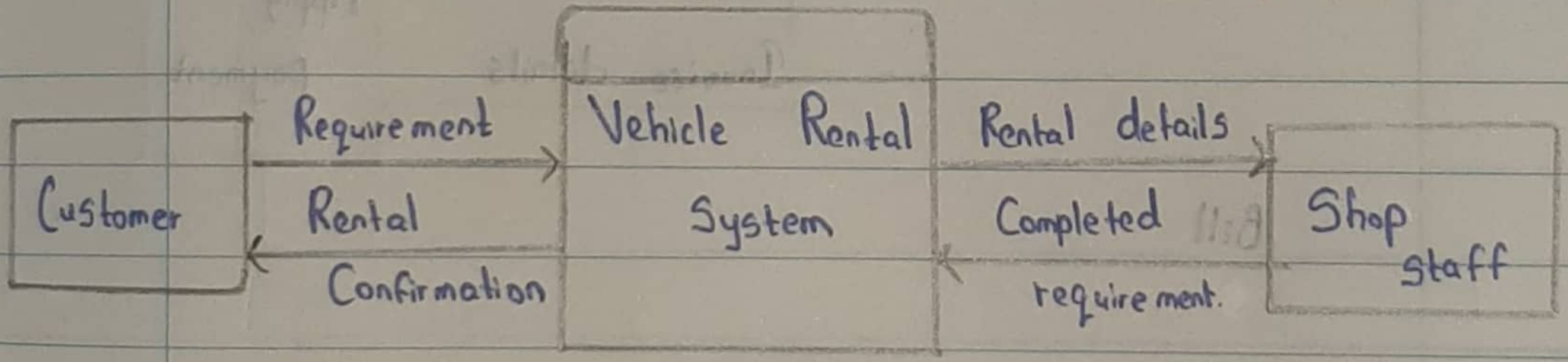
The system has three processes; Fill Form, Create Invoice, and Apply Payment. Fill Form process receives the requirement from the customer. Then, Fill form process processes the requirement and sends rental details to the shop staff and rental notice to the customer.

The shop staff forwards a completed requirement to Create Invoice process. The process generates the invoice and store it in the Accounts Receivable data store.

The Apply Payment process retrieve Invoice details from the Accounts Receivable data store and generate a bill and send it to the customer. The process also stores payment details in the Accounts Receivable data store.

Example :

Context level DFD



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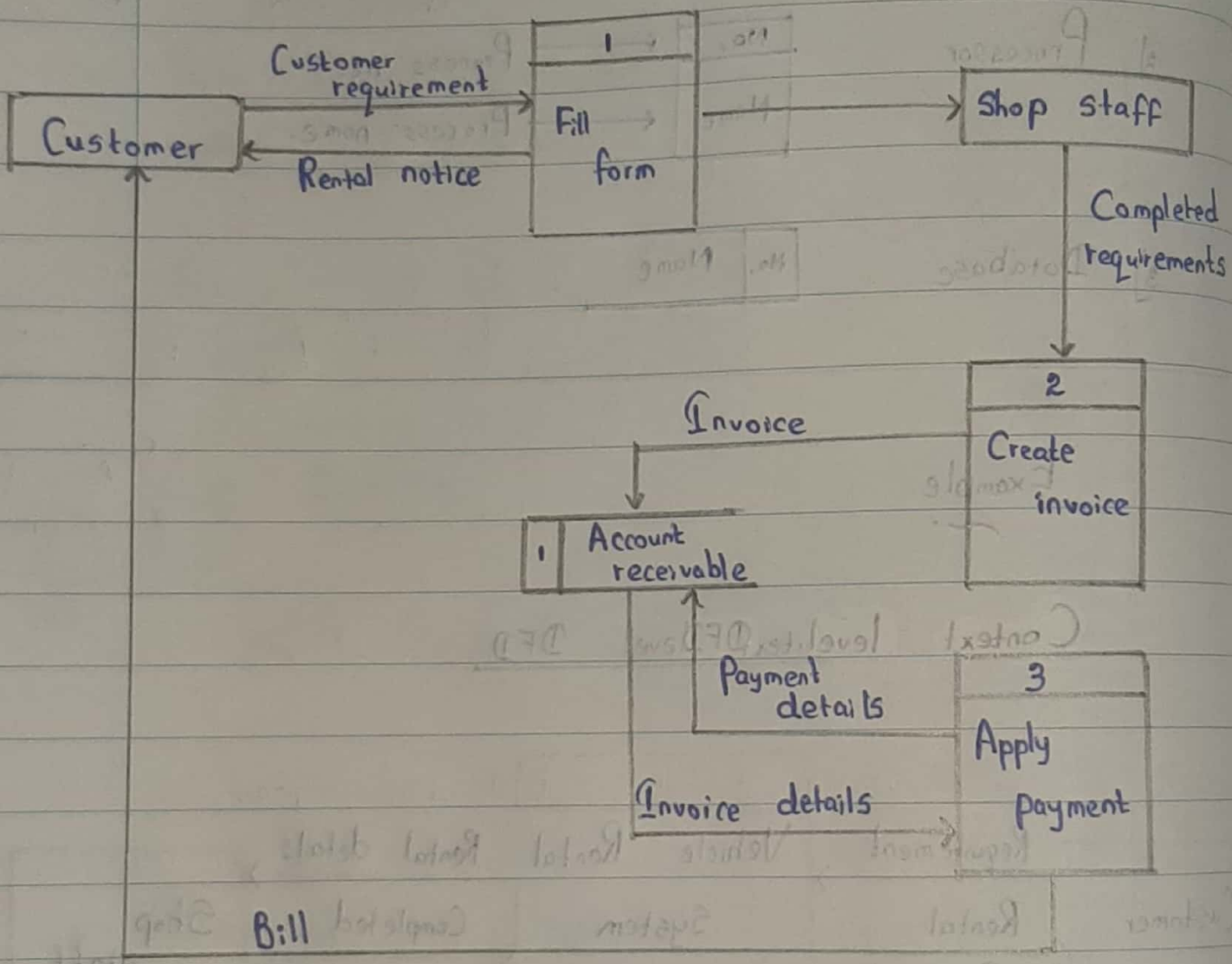
Level 0 DFD



* Input & the output can not be the same.
* Can not pass data directly between external entities.
* Can not pass data between external entities and databases.