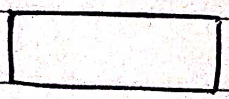
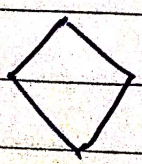
Assignment -1

1) Draw entity relationship diagram

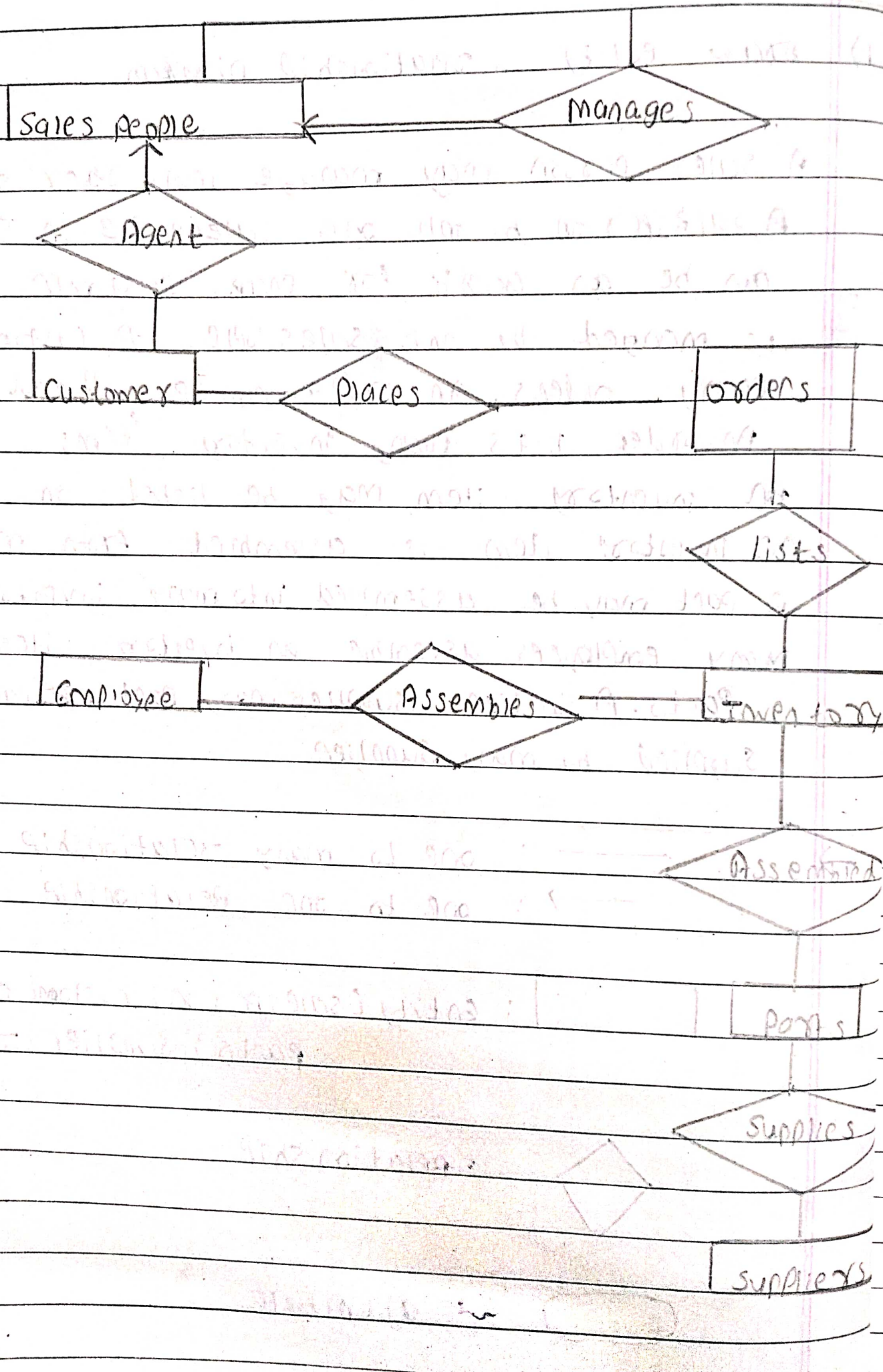
A sales person may manage many other salespeople, A salesperson by only one salespeople. A salesperson can be an agent for many customer. A customer is manged by one salespoic. A customer can place many orders. An order can be placed by one customer. An order lists many inventory items.
An inventory item may be listed on many order. An inventory item is assembled from many parts. A part may be assembled into many inventory items. Many employees assembles an inventory item from many parts. A supplier supplies many parts. A part may be supplied by many supplier.

→ ——— : one to many relationship
⟶ : one to one Relationship

 : Entity (salesperson; customer; order; parts; supplier; inventory; employee.

 : Relationship

 : attribute.


Sales People
Manages
Agent
Customer
Places
Orders
Lists
Employee
Assembles
Inventory
Assembled
Parts
Supplies
Suppliers

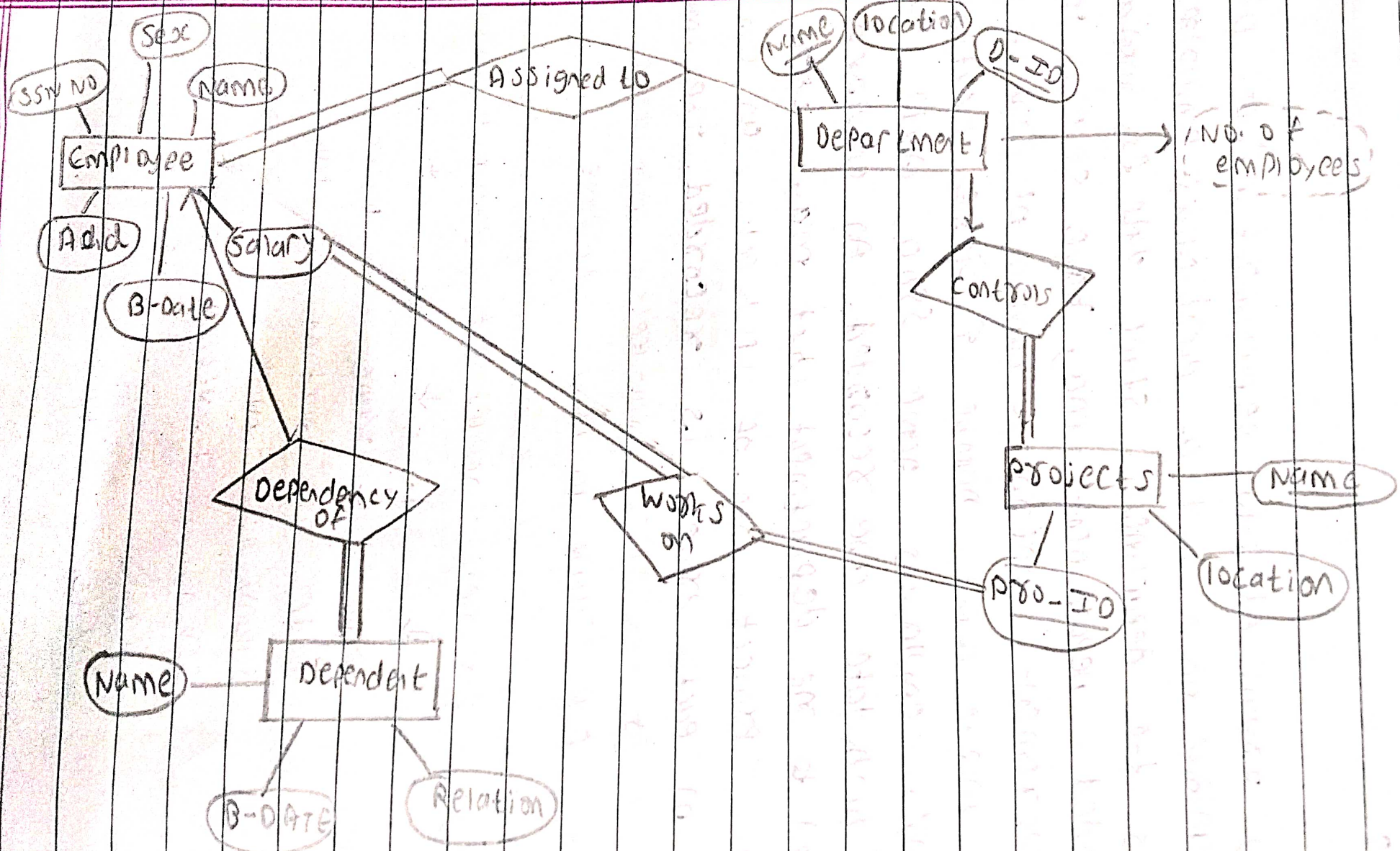
2) Construct an ER diagram for company having following details

→ Company organised into department. Each department has unique name and a particular employee who manges the department. Start date for manager is recorded. Department may have several location. A department controls a number of project. Project have a unique name, number & single location. Company's employees name, SSNO, Addr, Salary, Sex & birthdate are recorded. An employee is assigned to one department, but may work for several project. No. of hrs/week an employee work on each project is recorded. The immediate supervisor for employee. Employee's dependent are tracked for health insurance purpose.

→

Entity :- Employee, Department, Project, Dependent

	↓	↓	↓	↓
Attributes :-	Name	Name	Name	Name
	Addr	location	No.	Bdate
	Salary	No.	location	Relation
	SSN no	No. of emp		
	Sex			
	Bdate			


Sex
SSN NO
Name
Assigned to
Name
location
D-ID
Employee
Department
No. of employees
Add
Salary
B-Date
controls
Dependency of
works on
projects
Name
location
pro-ID
Name
Dependent
B-DATE
Relation

Q3 (B) i) Explain Purpose of Rename operation with example.

→ • It allows us to name, and therefore to refer to, the results of relational algebra expressions.
• Allows us to refer to a relation by more than one name.

→ Notation : $\rho_x(E)$

• It will returns the expression 'E' under the name 'x'.
• If $\rho_{x(A_1, A_2, \ldots, A_N)}(E)$ then it returns result of expression 'E' under name 'x' & with arity renamed to $A_1, A_2, \ldots, A_N$.

Example :- Query to rename table name "project" to "pro" & its attributes to p, q.

$\Rightarrow \rho_{pro(p,q)}(project)$

ii) Illustrate & compare natural join with cartesian product.

→ Natural join :- It will joins two tables based on same attribute & datatypes. The resulting will contain all attribute of both table but one copy of each common column

Notation :- $r \bowtie s$

→ Cartesian Product :- If there is no condition specified, the resulting table will contain all attributes of both table including duplicate or common.

Notation :- $r \times s = \{ tq \mid t \in r \text{ and } q \in s \}$

Syntax :- select * from table 1 CROSS JOIN table2

Syntax :- select * from table 1 natural join table2

E.g :-

Roll no	Name
1	A
2	B
3	C

Table 1

Roll no	Marks
2	70
3	50
4	85

Table 2

* cartesian product :-

Roll no	Name	Roll no	Marks
1	A	2	70
1	A	3	50
1	A	4	85
2	B	2	70
2	B	3	50
2	B	4	85
3	C	2	70
3	C	3	50
3	C	4	85

* Natural join :-

Roll no	name	Marks
2	B	70
3	C	50

OR

B) Queries for relation schema

1) Customer (customer_name, cust_street, cust_city)
Account (Acc_no, branch_name, balance)
loan (loan_no, branch_name, Amount)
depositor (cust_name, Acc_no)
Borrower (cust_name, loan_no)

a) Find all customer names whose acc_balance > 500
→ $\Pi_{cust\_name}(\sigma_{balance > 500}(Account \times depositor))$;

b) Find all customer names whose loan at down town branch.
→ $\Pi_{cust\_name}(\sigma_{branch = "downtown"}(Borrower \times loan))$;

c) Find all customer names who have loan & account both.
→ $\Pi_{cust\_name}(depositor \times Borrower)$

2) Explain in details union, set difference & selection operation.

→ i) Union operation :- This operation will combine all the table without repeating the same tuple.

Notation :- $r \cup s$

$$r \cup s = \{ t / t \in r \text{ or } t \in s \}$$

For $r \cup s$ to be valid,

i) r & s must have same arity.

ii) Set difference (minus)

→ notation :- $A - S$

→ The set difference operator takes the two set and return the value in first set but not the values in second set.

Notation : $r - s$

$$r - s = \{ t / t \in r \text{ and } t \notin s \}$$

ii) Selection operation: The selection operation is used for a selecting a subset of tuples according to a given selection condition.

4 Table 1 → library

Rno	Book
1	Python
3	Java

Table 2 → game

2	Cricket

→ union :-

RollNo	union
1	Python
2	Cricket
3	Java

→ set difference :-

RollNo	Book
2	Python
3	Java

→ selection :- $\sigma_{rno=1}$ (library)

Rno	Book
1	Python

5 E-R diagram

Q-3) Analyze entity, arity & cardinalities for following req. & Draw ERD. Each department has a unique name & no. & a particular employee who manages department. We keep track of start date when that employee began managing department. A department have a several location. A depart Contra a no. of projects, each of which has a unique name, unique no & a single location. We store each employee name, SSN, Add, salary, sex, B.date. An emplo assigned to one department but work in a many projects.

P.T.O

continue...

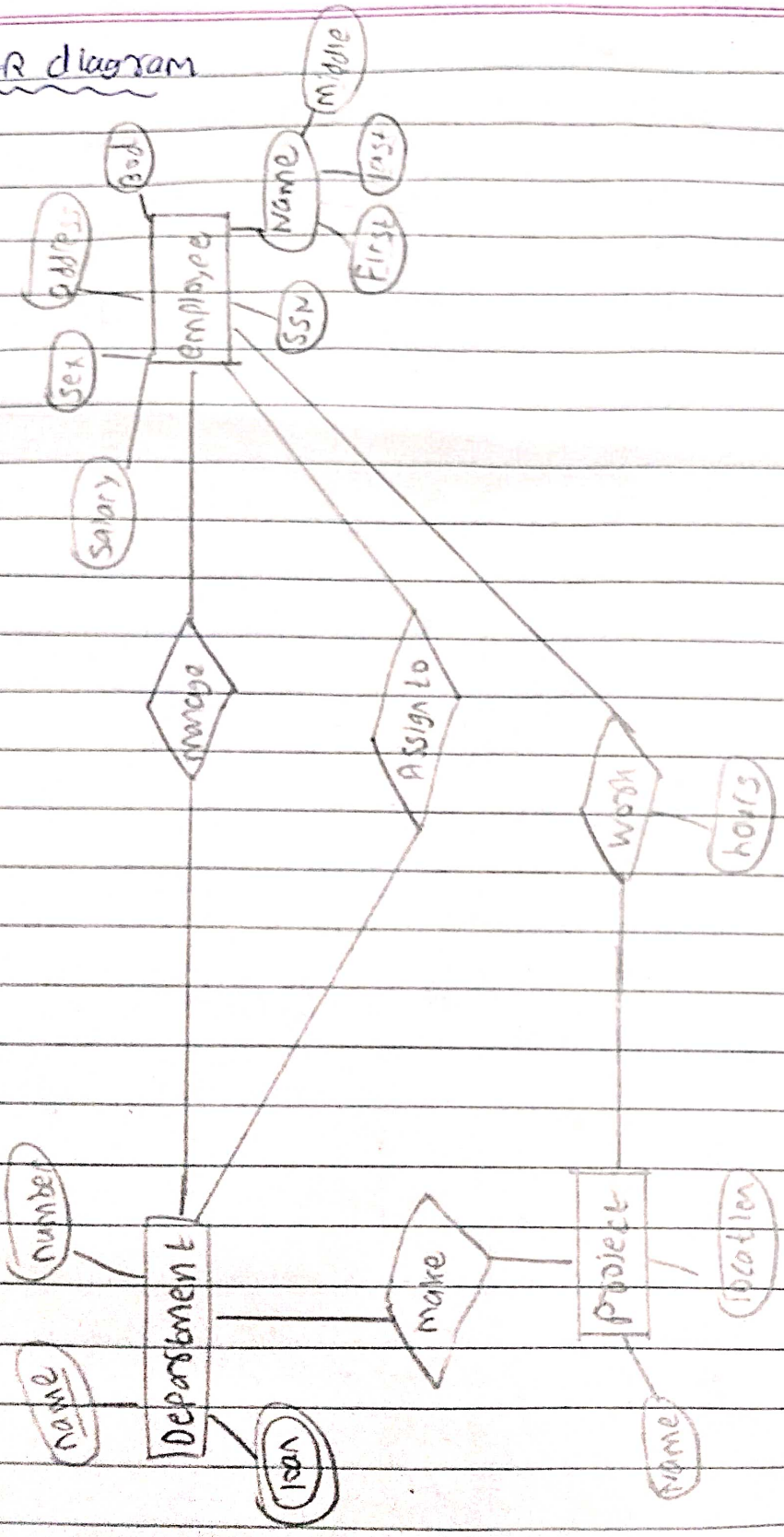
→ we keep track of current no. of hr/week that an employee works on each project. We also keep track of direct supervisor of each employee.

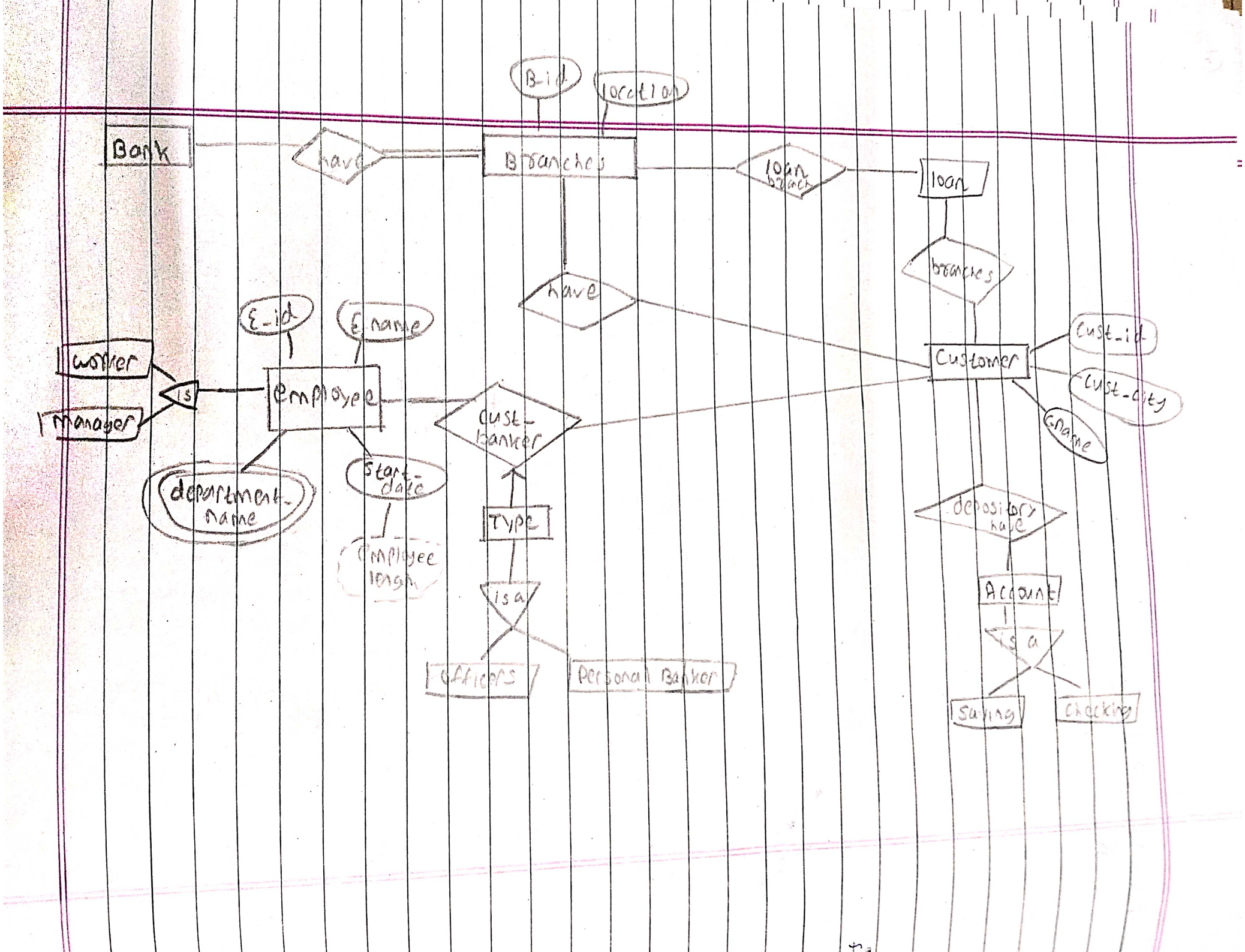
2-4) The bank is organized into branches each branch is located in particular city and is identified by a unique name. The bank monitors the assest of each branch.

→ Bank customer are identified by their customer_id values, the bank stores each customers name the street & city where customer lives. Customer may have account & can take out loans. A customer may be associate with a particular banker, who may act as a loan officer or personal banker for that customer. Bank employees are identified by their employee-id values. The bank administration stores ~~the~~ the name & telephone no. of each employee, the name of employee's departments & the emp_id of employee's manager. The bank also keeps track employee start date. The bank offers two type of account Saving & Checking account. Accounts can be held by one or more customer, and a customer can have a more than one account.

Answer ER diagram

Q-3)




B_id
location
Bank
have
Branches
loan_branch
loan
branches
have
E_id
E_name
worker
is
Employee
manager
cust_banker
Customer
Cust_id
Cust_city
Cname
department_name
start_date
Employee length
Type
is a
Officers
Personal Banker
depository_type
Account
is a
Saving
Checking