DBMS -2 Assignment.

① Discuss the different types of update operations on relational database, explain how basic eoperations deals with constaint violation

→ The Insert operation :-

- The INSERT operation provides a list of attributs values for new tuple 't' that is to be insorted on relation 'R'

- INSERT Command :

```
INSERT   INTO , EMPLOYEE
VALUES (-'Richard', 'K', 'Marini', '65329853');
```

INSERT can violate with 4 types of constraint :-

i) Domain Constrain :-

- This can be violated if an attribute value is given that does not appear in the corresponding domain.

(ii) Key constraint :-

- This can be violated if a key value in the tuple 't' already exists in another tuple in relation 'R'

(iii) Entity Integrity :-

- This can be violated if any part of the primary key of the new tuple 't' is NULL

(iv) Referencial Intigrity :-

- It can be violated if the value of any foreign key in 't' refers to tuple that does not exit in referencial relation.

Eg:- Insert into EMPLOYEE, here insertion violates entity integrity constraint, so it is rejected.

● → The Delete operation

DELETE command.

DELETE FROM EMPLOYEE WHERE LNAME = Brown;

DELETE many violate only on referencial integrity.

i) If the primary key value of the tuple being deleted is referenced from other tuple in the database

→ This can be remedied by the seneral actions RESTR-ICT, CASCADE, SETNULL options.

RESTRICT → reject the deletion.

CASCADE → propagates the new primary key value into foreign keys of the referencing tuples.

SETNULL → set the foregin keys of referencing tuples to null.

Eg:- Delete the Employee tuple with SSN = '123693', not acceptable

The Update operation

→ Used to update set of values in the DATABASE

UPDATE Command :-

UPDATE DROJECT

SET PLOCATION = Bellari, DNUM = 5

where PNUMBER = 10;

② Explain Unary relational operations with example

i) Unary relational operations :-

• SELECT (symbol : σ (sigmaà))

(b).

- PROJECT (symbol : π (pi))
- RENAME (symbol : ρ (rho)).

② Relational Adgebra operations from set theory

- UNION (∪), Intersection (∩), Difference (−), CARTESAIN PRODUT (×).

③ Binary Relational operations :-

- JOIN (several variation of JOIN exist).
- DIVISION.

④ Additional Relational operations :-

- OUTER JOINS, OUTER UNION
- AGGREGATE Functions

Unary Relational operations

I) SELECT.

i) The select operation (denoted by σ (sigma)) is used to select the subset of tuples from a relation based on selection condition.

- Selection condition acts as filter
- Keeps only those tuples that satisfy the qualifying conditions.
- Tuples satisfying the condition are selected where as the other tuples are discarded.

II) Project.

- Project operation is denoted by π (pi)
- This operation keeps certain columns (attributes) from a relation & discard the other columns.
- Project creates a vertical partitioning.
- The List of specified colums (attributes) kept in tuple.

→ The other attributes in each tuple are discarded

→ General form of project operation is

π <attribute list> (R)

→ π (Pi) is the symbol used to represent the project operation

→ <attribute list> is the desired list of attributes from relation R.

→ The project operation rename any duplicate tuples.

III <u>Rename</u> :.

· This operator is denoted by ρ (rho)

• In some cases, me may meant to rename the attribute of a relation or the relation name or both,

* Useful when a query requires multiple operations.

* Necessary in some cases.

→ The general RENAME Operation (ρ) can be expressed by any of the following forms.

→ $\rho_S(B_1, B_2 \ldots B_n)(R)$ changes both :-

* The relation name to S &

* The column (attribute) names to $B_1, B_2 \ldots B_n$.

→ $\rho_S(R)$ changes:-

* The relation name, only to S.

→ $\rho(B_1, B_2 \ldots B_n)(R)$ changes:-

* The column (attribute) name only to $B_1, B_2 \ldots B_n$

→ For conviences, ~~use~~ we also uses a shorthand for renaming attributes

(5) ~~Q~~ Define the following.

(i) Relation state (ii) Relation schema

(iii) Domain

(i) Relation state :-

→ The relation state is a subset of the cartesian product of the domains of its attributes.

→ Each domain contains the set of all possible values the attribute can take

Eg :- Attribute cust name is defined over domains of character string of maximum length 25

→ dom (cust - name) is varchar (25)

→ The role of these string play in the CUSTOMER relation is that of the name of a customer.

(ii) Relation schema.

→ The schema (or description) of relation :-

* Denoted by $(A_1, A_2, \dots A_n)$

* R is the name of relation.

* The attributes of the relation are $A_1, A_2 \dots A_n$.

Eg :- CUSTOMER is the relation name defined over the four attributes

cust_id , cust_name , Address , Phone #

→ Each attributes has domain

(iii) Domain :-

* A domain has logical defination.

Eg :- "USA - phon - numbers" are set of 10 digits phone numbers valid in US.

→ A domain also has a data type or the format :- (ddd) ddd - ddd where each 'd' is a decimal digit

* Dates have various formate such as year, month, date formatted as yyyy - mm - dd or dd - mm - yyyy.

(k) Discuss the characteristics of relations.

→ * Ordering of tuples in a relation r(R):

* The tuples are not considered to be ordered, even though they appear to be in the tabular form

→ ordering of attributes in a relation schema R. (and of values within each tuple):

* We will consider the attributes in $R(A_1, A_2 \ldots A_n)$ and the values in $t<v_1, v_2, \ldots v_n>$ to be ordered.

* Values in a tuple:

→ All values are considered atomic (indivisible).

→ Each value in a tuple must be from the domain of the attribute for that column.

* If tuple $t<v_1, v_2, \ldots v_n>$ is a tuple (row) in the relation state r of $R(A_1, A_2 \ldots A_n)$

* Then each v_i must be a value from dom(A_i).

→ A special null value is used to represent values that are unkown. or not available or inapplicable in certain tuples.

Notation:

→ A relation schema R of degree n is denoted by $R(A_1 A_2, \ldots A_n)$

→ The uppercase letter Q, R S, denote relation names.

Notation:-

→ We refer to component values of a tuple t by:

- $t[A_i]$ or $t.A_i$
- This is the value v_i of attribut A_i for tuple t

(4)

(5.) What is meant by integrity constraint ? Explain the importance of referential integrity contraint. How referential integrity containty constraint is implemented in SQL

→ The entity integrity constraint states that no primary key value can be null

→ Referential integrity constraint is specified b/w 2 relations and is used to maintain the consistency among tuples of 2 relations.

→ Referential integrity contraint states that a tuple in one relation that refers to another relation must refer to an existing tuple in that relation

→ Foreign key. - The set of attributes FR in relation schema R_1 is a foreign key of R_1 that references relation R_2 if it satisfies the rules

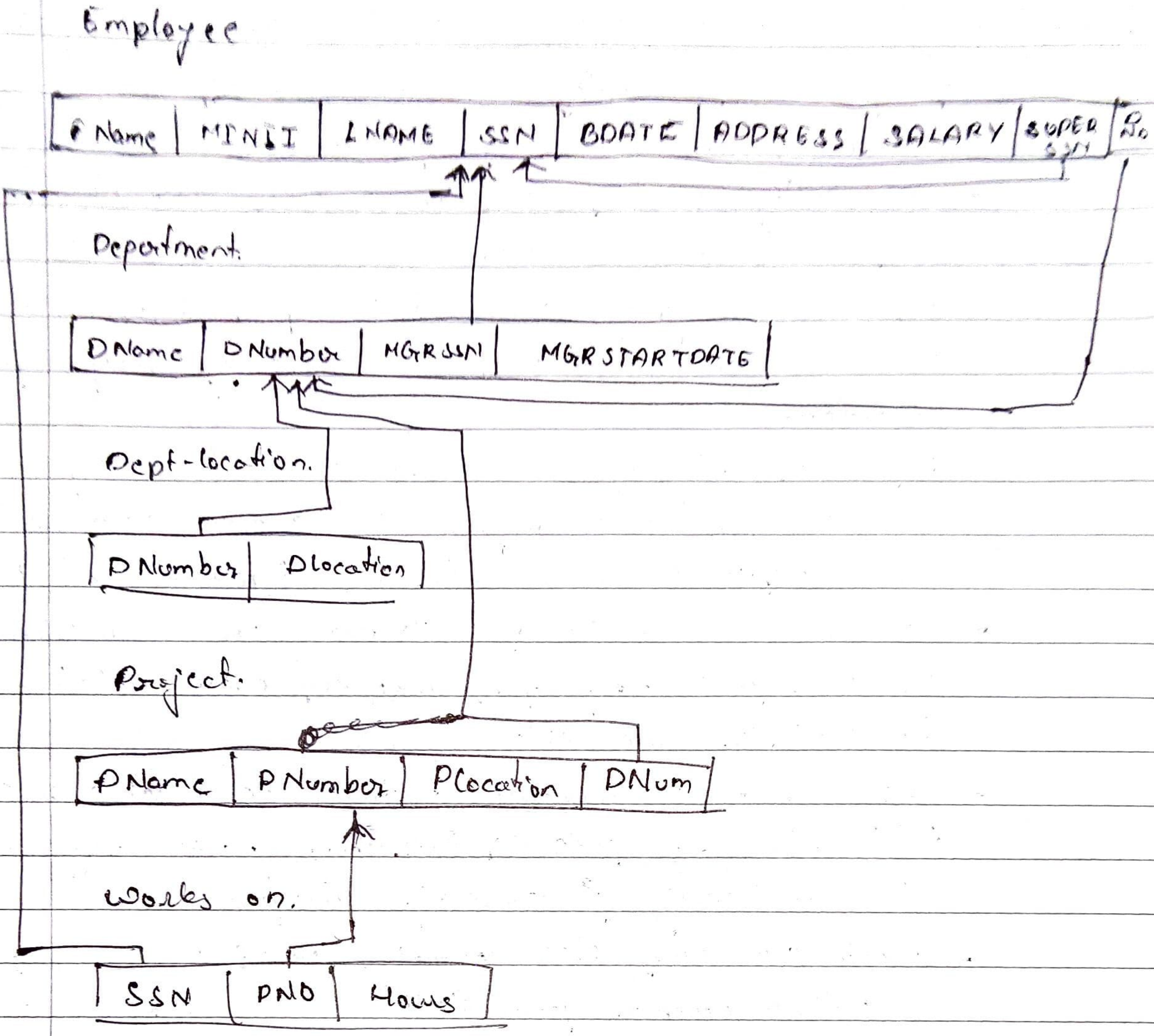
→ The goal of normalization is to create a set of relational tables that are free of redundant data and that can be consistently & correctly modified.

→ Most commonly used normal forms:-

* First normal form (1NF)
* Second normal form (2NF)
* Third normal form (3NF)
* Boyce - Codd normal

→ Form other normal forms

* Fourth normal forms
* Fifty normal forms
* Fifth normal forms.
* Domain key normal form.



Employee

FName	MINIT	LNAME	SSN	BDATE	ADDRESS	SALARY	SUPER SSN	Do

Department.

DName	DNumber	MGRSSN	MGR STARTDATE

Dept-location.

DNumber	Dlocation

Project.

PName	PNumber	PLocation	DNum

Works on.

SSN	PNO	Hours

(E). Explain the data types available for attribute specification in SQL.

Data type.

→ Bit string data type.

- Fixed length
- character string or bit string.
- varying length : BIT varying (n).
- BLOB (Binary long object), specified using kilobits (k), megabits (M), or gigabits (G).

→ Boolean data types :-

(5)

- values of TRUE or FALSE or NULL.

→ Data data type:-

- Ten positions
- Multiple mapping functions available in RDBMS's to change data formats.
- Components are Year, Month & Day in the form YYYY-MM-DD.

→ TIME DATA Type -

Has atleast 8 positions with the components HOUR MINUTE & SECOND in the forms HH:MM:SS.

→ Attribute Data types & Domain in SQL.

- Additional data types.
- Timestamp data types.

Includes the DATE & TIME fields.

- Plus a minimum of six positions for decimal ~~funsec~~ functions of seconds
- Optional with time zone qualifies.
- Literal : TIME STAMP '2004-08-27' 10:13:50.

- Data, time, time stamp, INTERVAL data type can be cast or converted to string formats for comp.