



Practical No:- 6

Aim:- Normalization (1NF, 2NF, 3NF, BCNF) in database.

Theory:-

Normalization:-

Normalization is process to eliminate data redundancy & enhance data integrity in the table. Normalization also helps to organize the data in database. It is a multi-step process that sets the data into tabular form & removes the duplicates data from the relational tables.

Types:-

1NF:-

- 1] The relation will be in first normal form if it contains all atomic values, an attributes of a table cannot hold multiple values, it must hold single value attribute.
- 2] 1st normal form does not allow multivalued attribute Composite attribute & their combination.

Ex:- Employee :-

eid	ename	mobile
1	aaa	9421840369 2212689423
2	bbb	9422334421

So remove it make separate tables



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[eid] [ename]

[eid] [mobile]

2NF :-

1] 1NF does not eliminate redundancy but eliminating repeating values.

2] 2NF is based on the concept of full functional dependency, the relation is in 2NF

 1] If it is in 1NF

 2] It should not contain partial dependency if the proper subset of candidate key determines the non-prime attribute then it is called as partial dependencies.

3] The normalization of 1NF to 2NF involve removal of partial dependency, if partial dependency exist, we remove the partial dependent attribute from the relation placing them in new relation

Ex:-

Student	Courses	Fees.
1	C1	1000
2	C2	1000
1	C4	2000
4	C3	2000
4	C1	3000

functional dependency:-

{ { Student, Courses } } \rightarrow fee, Courses \rightarrow fee }

Candidate Key = { Student, Courses }



Prime attribute = {studno, courseno}.

NPA = {Fee} (Non-Prime- attribute)

Convert into 2 tables.

Table1 = {studno, courseno}

Table2 = {courseno, Fee}

3NF :-

1] A relation is in 3NF if it is in 2NF and does not contain any transitive dependency.

2] If there is no transitive partial dependency, attributes then relation must be in 3NF

3] A relation is in 3NF if it holds one of the following condition for every non-trivial functional dependency.

Condition:-

1] X is a Superkey.

2] Y is prime attributes (each element of Y is part of some candidate key)

Example:

studno	name	State	Country	age
1	aaa	Punjab	India	20
2	bbb	Maharashtra	India	19
3	ccc	Maharashtra	India	20

Functional dependency = {studno} \rightarrow {name, State, Country, age}

State \rightarrow {Country}

Superkey = studno



To convert this relation into 3NF we will decompose the relation in 2 tables. Table 1-

Table 1

Student	name	state	age
1	John	California	22

Table 2

State	Country
California	USA

Boyce-Codd Normal Form (BCNF):-

- 1) It is advanced version of 3NF, the relation is in BCNF if it is in 3NF and for non-trivial functional dependency $x \rightarrow y$
- 2) x must be super key.

$R(A, B, C)$

functional dependency:

$$\{A \rightarrow B, B \rightarrow C, C \rightarrow A\}.$$

(Remove multivalued dependency)

$$A^+ = \{A, B, C\}$$

Super key = A^+, B^+, C^+ .

Candidate key = $\{A, B, C\}$.

Prime attribute = $\{A, B, C\}$

Non-prime attribute $\{\}$.

$$A \rightarrow B$$

This dependency is $\not\rightarrow$ BCNF.

$$B \rightarrow C$$

$$C \rightarrow A$$



Practical NO : 7.

Aim:- Implementing Transaction in SQL

Theory:-

Transaction:-

A transaction is an action or series of actions that are being performed by a single user or application program, which reads or update the contents of the database.

A transaction can be defined as a logical unit of work on the database. This may be an entire program, a piece of program, or a single command (like SQL commands, such as INSERT & UPDATE).

Properties of Transaction:-

1. Atomacity:- It states that all operations of the transaction take place at once if not, the transaction is aborted.

There is no midway, i.e. the transaction cannot occurs partially. Each transaction is treated as one unit and either run to completion or is executed at all.



Consistency:-

- 1] The integrity constraints are maintained so that the database is consistent before and after the transaction.
- 2] The execution of transaction will leave a database in either its prior stable state or a new stable state.
- 3] The consistent property of database states that every transaction sees a consistent database instance.
- 4] The transaction is used to transform the database from one consistent state to another consistent state.

for ex -

$$\text{Total before T occurs} = 600 + 300 = 900$$

$$\text{Total After T occurs} = 500 + 400 = 900$$

Isolation:

It shows that the data which is used at the time of execution of a transaction cannot be used by second transaction until the first one is completed.

Durability:-

The durability property is used to indicate the performance of the database. consistent state It states that the transaction made the permanent changes. Recovery is responsibility of durability.



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Commands of Transaction in SQL:-

The commands that used to control transaction -

Commit:- It is used to save change.

Syntax:- commit;

Example:-

ID	Name	age	address	Salary
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1.	Han	23	Australia	34000
2.	Wainer	30	china	22000

delete records from the table having age=30
& commit change in database.

Begin Tran

DELETE FROM Employee.

where Age=30

COMMIT

ROLLBACK Command:-

Rollback is transactional command used to undo transactions that have not already been saved to the database. Rollback command is used to undo the transactions.

Syntax:-

Rollback



Example:-

ID	Name	Age	Address	Salary
1	Han	23	Australia	34000
2	Warner	20	china	22000

follow delete records from table having age=20
& then rollback changes in database.

Ex-

Begin Tran

DELETE FROM EMPLOYEE

WHERE AGE=20;

ROLLBACK

The delete operation have no effect on the result or table.

Savepoint Command:-

Savepoint is the point in a transaction when we roll the transaction back to a certain point without rolling the entire operation.

Syntax:-

Save transaction SAVEPOINT NAME -

In order serves the creation of Savepoint between transaction statements.



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In ex. we delete three different records from the employee table. Then create a Savepoint before each delete so that we can load Savepoint at the time to return the data into its original state.

Ex:-

ID	Name	Age	Address	Salary
1	Han	23	Australia	34000
2	Warner	34	England	22000
3	Martin	28	China	5000
4	Twinkle	30	Nepal	6000

Steps -

Begin Tran

SAVE Transaction SP1

Save-point created

DELETE FROM EMPLOYEES WHERE ID=1.

1 row deleted.

SAVE Transaction SP2.

Save Point created.

Delete from Employee where ID = ?



We have decided to Rollback the savepoint, which is recognized as SP2. Because SP2 was created after 1 deletion, and 2 last deletion have not been done.

Rollback Transaction SP2.

Rollback has been completed.

SET Transaction Command:-

The set transmission command will be used to initiate database transactions. The command is used to initiate database transaction. The command is used to generate the characteristics of transaction which is given as following:

Syntax:-

SET TRANSACTION ISOLATION LEVEL <level-name>



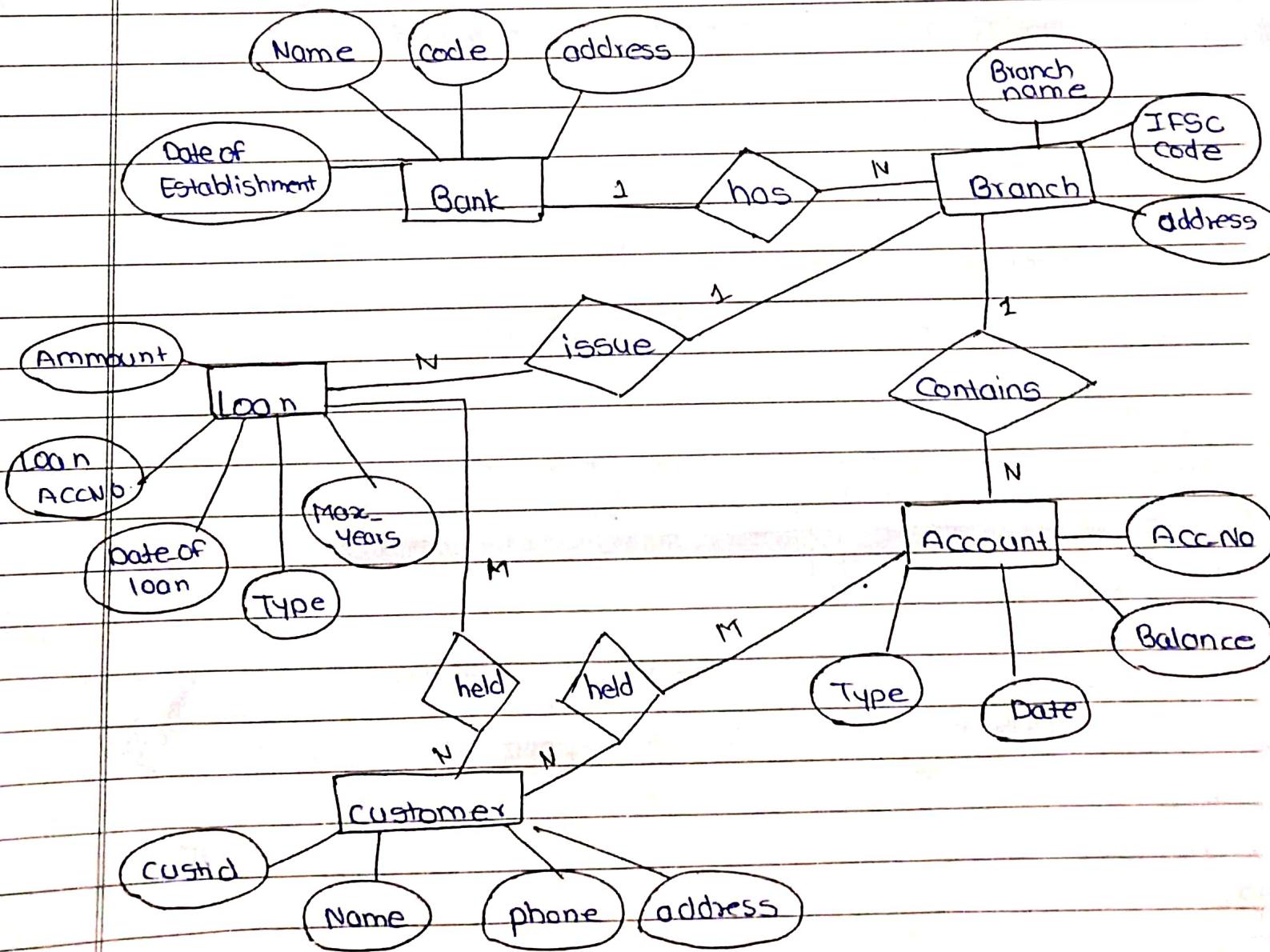
Assignment NO :- 8.

Aim:- Design database for Bank Management System.

Out

Theory :-

ER diagram :-





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Schema :-

Bank -

Dateofestablish	Name	<u>Code</u>	address
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Branch -

BranchName	<u>IFSCcode</u>	address
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Loan :-

loanAccNo	Ammount	dateofloan	Type	Max.years

Account :-

AccNo	Balance	Type	Date

Customer :-

custid	Name	Phone	address