Task No:-8

Date : 30/09/25

Normalising database using functional dependencies upto BCNF

[Tools (: GUI Table, Normalization-tool : AML : Figlaw)

Aim : To perform normalization upto BCNF Based on given dependencies

Banking database :-

1. Identity Banking attributes : customer, account, Branch, Banker infor, loan, credit-card.

2. Relational schema : Banking (customer, Account, Branch) Banker info, loan, Credit-card).

3. functional dependencies (FD's between attributes) :

customer ID → Name, address, ph-no

Account-number → Account name, category

Branch-ID → BranchName, location, IFSC-code

Banker-ID → Banker-name, ph-no

customer-ID → Account-number

loan ID → loan-Amount

customer-ID → loan-ID.

Step-2 :- convert to 1NF:

* NO repeating groups or Arrays
* All attributes are atomic

The schema is in 1NF

Step-3 : convert to 2NF

* All primary keys are single-column keys, so no partial dependencies exist.
* However, we ensure foreign key attributes are managed correctly

Output: the schema is already in 2NF

Step-4 :- convert it to 3NF

Eliminate transitive dependencies.

* customer-ID → Account-number → loan ID
→ move-loan-ID to a separate users table
* Account-number → customer-ID → Branch-ID
→ NO redundancy

All transitive dependencies removed.

Step 5 :- convert to BCNF

check if every determinant is a candidate key :

* customer-ID, Account-number, Branch-ID, loan-ID are all are unique keys for their respective tables.
* foreign keys like customer-ID. donot violate BCNF rules.

All FD's comply with BCNF - no-further decomposition needed.

Using Griffith Tool :-

1. Input relational schema and functional dependencies.
2. Griffith tool generates a dependency graph
3. Analyze the graph to identify Normalization issues
4. Apply normalization to transform schema.
5. Verify the resulting schema meets BCNF criteria.

Griffith tool steps :-

1. create a new project in Griffith
2. Define the realtional schema and FD's
3. Run the dependency Graph " tool.
4. Analyse the group for normalization issues
5. Apply transformations using the "normalize" tool
6. Verify BCNF compilance using " BCNF duck " tool.

Normalization schema :-

customer (customer-ID, Name, ph-no)

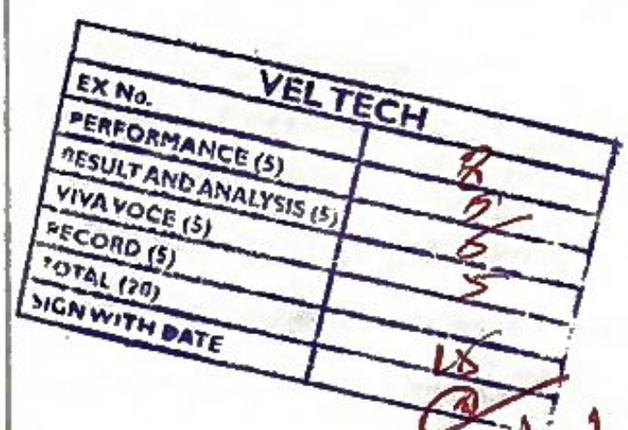
Account (Account-number, Account-name, category)

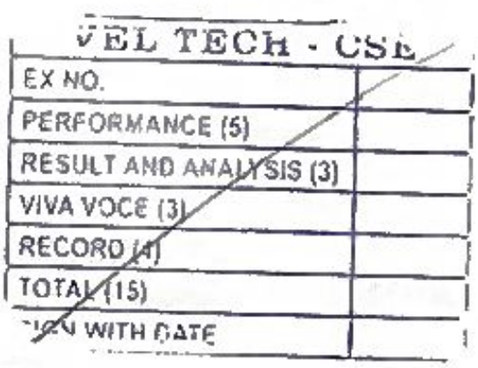
Branch (Branch-ID) . Branch-name, location, ifsc-code)

Branch info (Brancher-ID, Name, ph-no)

loan (loan-ID, customer-ID, Amount).

Credit-card (credit-card-Number, customer-ID, limit)





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Result :-

Thus, the implementation of normalizing the database upto BCNF based on given dependencies was successfully executed.