Task No: 8 Normalizing database using functional dependencies upto BCNF.

Date: 30/09/25

Tools (Mysql Table, Normalization tool, AMLJ jigsaw).

Aim: To perform normalization upto BCNF based on given dependencies.

Banking database:

1. Identify Banking attributes: customer, Account, Branch Banker info loan, credit-card.
2. Relational schema: Banking(customer, Account, Branch, Banker info, loan, credit-card).
3. Functional dependecies (FD's between Attributes):

Customer_ID → Name, Address, ph-no.

Account-number → Account-name, Category.

Branch-ID → Branch Name, location, ifse-code.

Banker_ID → Banker-name, ph-no.

customer_ID → Account number

loan-ID → loan_Amount

Customer-ID → loan_ID.

Step1: Convert to INF:

* No repeating groups or Arrays.
* All attributes are ~~atomic~~

The schema is in INF.

Step 3: Convert to 2NF

* All primary keys are single-column keys, so no partial dependencies exists.

* However, we ensure foreign key attributes are manged 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 loan table.

* customer_ID → Name, Address, Ph_no

→ Already in 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 do not 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 relational schema and FD's
3. Run the "dependency Graph" tool.
4. Analyze the graph for normalization issues.
5. Apply transformations using the 'Normalize' tool.
6. Verify BCNF compilance using "BCNF Clack" tool.

Normalization schema:

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

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

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

Bankerinfo (Banker-ID, Name, ph-no).

loan (loanID, 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.