TASK-8 Normalizing databases using functional
Dt: 30/09/25 dependencies upto BCNF

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 dependencies (FD's between Attribute):

Customer_ID →
Account_number →
Branch_ID →
Banker_ID →
Customer_ID →
Loan_ID →
Customer_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 BNF

Eliminate Transitive dependencies.

* Customer_ID → Account_number → Loan ID
  → move Loan_ID to a seperate loan table

* Customer_ID → name, address, ph_no
  → Already in seperate 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 unique keys for their respective table

* Foregin keys like Customer_ID do not violate BCNF rules

All FD's compile 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 criterial.

1. Create a new project in griffith.
2. Define the relational schema and FD's
3. Define 'Run the 'dependency' graph'.
4. Analyze the graph for normalization process
5. Apply transformations using the 'Normalization' tool
6. Verify BCNF compilance using 'BCNF' tool

Normalization schema:-

Customer(Customer_ID, Name, ph_no)
Account (Account_number, Account_name, category)
Branch(Branch_ID, Branch_name, Location, ifsc_code)
Banker info(Banker_ID, Name, ph_no)
Loan(Loan_ID, Customer_ID, Amount)
Credit_card(credit_card_Number, Customer_ID, Limit)

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ERFORMANCE (5)	5
RESULT AND ANALYSIS (3)	5
/IVA VOCE (3)	4
RECORD (4)	4
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15/10

Result :-

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