30/9/25 Task-8 - Normalizing database using functional dependencies upto BCNF (Tool: GUI Table normalization tool, ACM, jigsaw)

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

Mobilephone Database:-

Identify Mobile phone attributes: Phone-ID, Mobile-Name, Mobile-Price, Date.

Define relational schema: Mobile (phone-ID, Mobile-Name, Mobile-Name, Mobile-Date, Mobile-Price.

Determine functional dependencies (FDs) b/w attributes.
: Mobile-Name, phone-ID, Mobile-Price, Mobile-Date.

convert to INF:

No repeating groups or arrays
All attributes are atomic
This Schema in INF

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 2 NF

Convert to 3NF:

Eliminate Transitive dependencies

product-ID → category-ID → category-Name

move category-Name to separate Categories mobile table

User_ID → Name ; Email, Address, phone

Already in users table

Phone_ID → User → User details

No redundous, as only user ID is stored in phones

All transitive dependencies removed.

Convert to BCNF:

check if every determinant is candidate key user_ID, product_ID; payment_ID; mobile_Name are all Unique keys for their tables foreign keys like category_ID; user_ID <x ... do not violate BCNF rules.

Using Griffth tool:

input relational schema and functional dependencies Griffth tool generates a dependency graph analyze the graph to identify normalization issues.

Apply normalization rules to transform the schema

verify the resulting schema meets BCNF

Griffth tool steps:

Create a new project in Griffth

Define the relational schema and FDS

Run the "Dependency Graph" tool

Analyze the graph for normalization issues Apply transformations using normalize tool.

verify BCNF compliance Using "BCNF check" tool.

Normalized schema:

User (user-ID, Name, email, address)

Categories (category-ID, Name of category)

-Mobile (phone-ID, Name category-ID, price)

Mobile Details (phone-ID, Quality, price-P, payment-ID

total amount)

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PERFORMANCE (5)	5
RESULT AND ANALYSIS (5)	5
VIVA VOCE (5)	4
RECORD (5)	
TOTAL (20)	14
SIGN WITH DATE	

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Result: Thus, the implementation of normalization database upto BCNF based on given dependencies was expected Successfully.