DBMS PROJECT

Title: Online Pharmeasy Application

Content:

- BCNF prove or disprove

Group No: 1

Team_ID: G1-T3

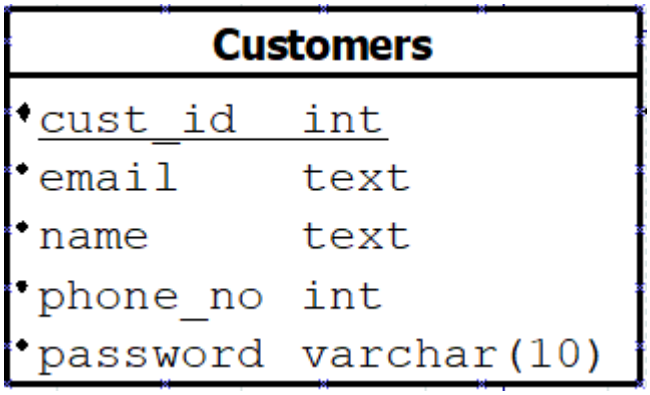
Instructor: PM Jat

Group Members:

1. Shivam Patel (202301033)
2. Kartik Vyas (202301003)
3. Viraj Mehta (202301008)
4. Tirth Patel (202301023)
5. Krishna Kanodia (202301038)

Functional Dependencies (FDs), Minimal set & BCNF prove or disprove for each relation in database

1. Customers:



Functional Dependencies (FDs):

cust_id → email
cust_id → name
cust_id → phone_no
cust_id → password
phone_no → email
phone_no → password
phone_no → name

Minimal FD Set:

cust_id → phone_no
phone_no → email, password, name

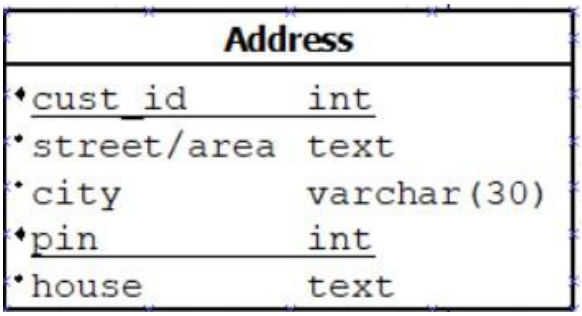
KEY: cust_id

BCNF Analysis:

The relation is not in BCNF, as cust_id is a key, but there exists a non-trivial dependency in minimal set (phone_no → email, password, name) where phone_no is not a key.

Decomposition is not feasible in this case without losing important functional dependencies.

2. Address:



Functional Dependencies (FDs):

cust_id, pin → street

cust_id, pin → city

cust_id, pin → pin

cust_id, pin → house

Minimal Set of FDs:

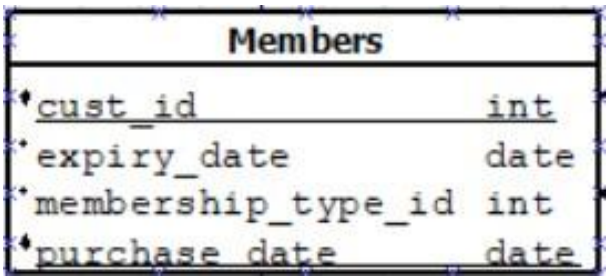
cust_id, pin → city, street, house

KEY: {cust_id, pin}

BCNF Analysis:

The relation Address is in BCNF.

3. Members:



Functional Dependencies (FDs):

cust_id, purchase_date → type
cust_id, purchase_date → expiry_date
cust_id, purchase_date → membership_type_id

Minimal FD Set:

{cust_id, purchase_date} → type, expiry_date, membership_type_id

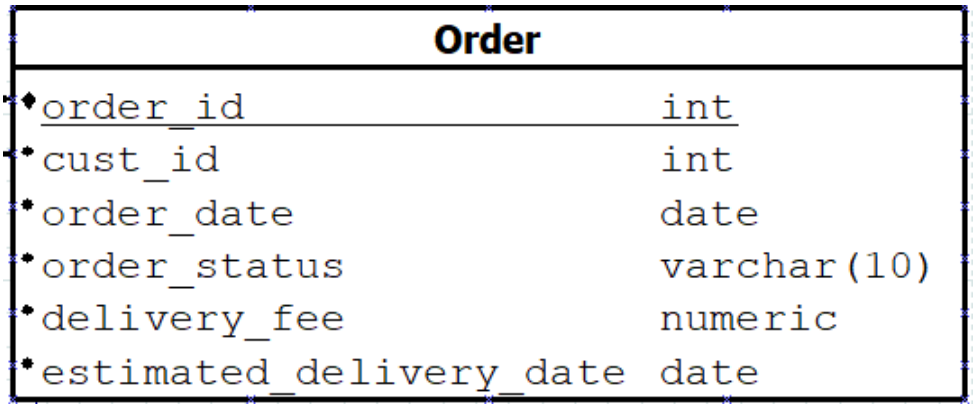
Key:

{cust_id,purchase_date}

BCNF Analysis:

- The relation Members is in **BCNF**.

4. Order:



Functional Dependencies (FDs):

order_id → cust_id
order_id → order_date

order_id → order_status
order_id → delivery_fees
order_id → estimated_delivery_date

Minimal FD Set:

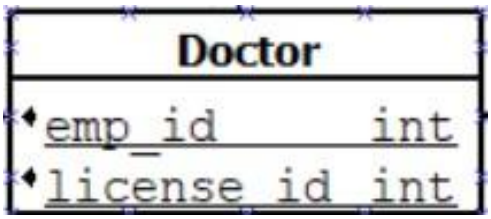
order_id → {cust_id, order_date, order_status, delivery_fees, estimated_delivery_date}

KEY: order_id

BCNF Analysis:

The relation Order is in **BCNF.**

5. Doctor:



Functional Dependencies (FDs):

emp_id → license_id
license_id → emp_id

Minimal FD Set:

emp_id → license_id

license_id → emp_id

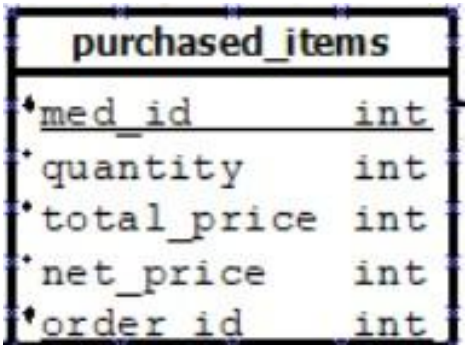
KEY:

emp_id or license_id

BCNF Analysis:

The relation Doctor is in BCNF.

6. Purchased items:



Functional Dependencies (FDs):

order_id, med_id → quantity
order_id, med_id → total_price
order_id, med_id → net_price

Minimal FD Set:

order_id, med_id → quantity, total_price, net_price

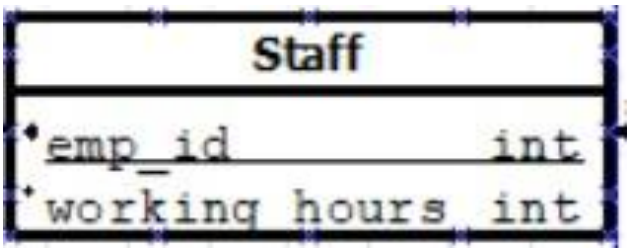
KEY:

{order_id,med_id}

BCNF Analysis:

The relation purchased_items is in BCNF.

7. Staff:



Functional Dependencies (FDs):

emp_id → working_hours

Minimal FD Set:

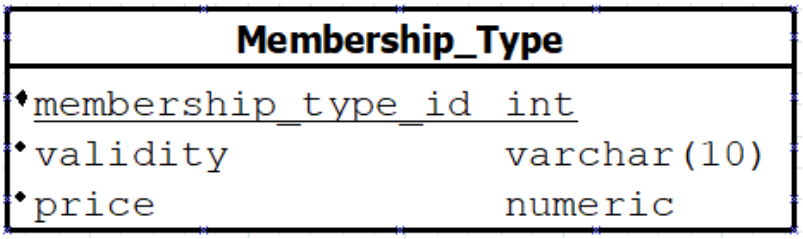
emp_id → working_hours

KEY: emp_id

BCNF Analysis:

The relation Staff is in BCNF.

8. Membership_Type:



Functional Dependencies (FDs):

membership_type_id → validity
membership_type_id → price

Minimal FD Set:

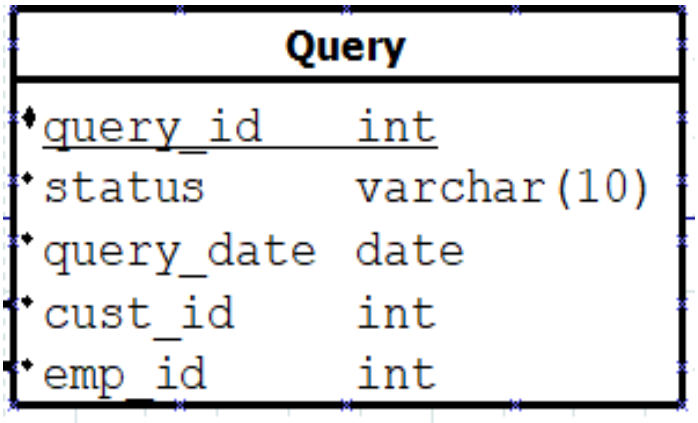
membership_type_id → validity, price

KEY: membership_type_id

BCNF Status:

The relation membership_type is in BCNF.

9. Query:



Functional Dependencies (FDs):

query_id → status
query_id → query_date
query_id → cust_id
query_id → emp_id

Minimal FD Set:

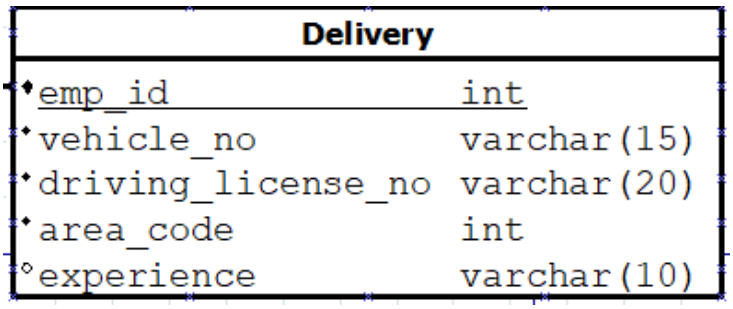
query_id → status, query_date, cust_id, emp_id

KEY: query_id

BCNF Analysis:

The relation Query is in BCNF.

10. Delivery:



Functional Dependencies (FDs):

emp_id → driving_license_no
emp_id → area_code
emp_id → vehicle_no
emp_id → experience

Minimal FD Set:

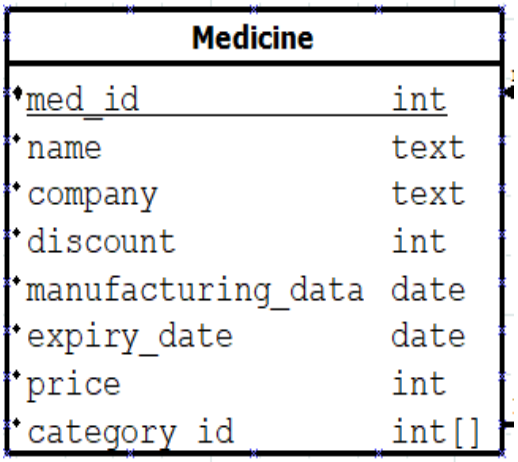
emp_id → driving_license_no, area_code, vehicle_no, experience

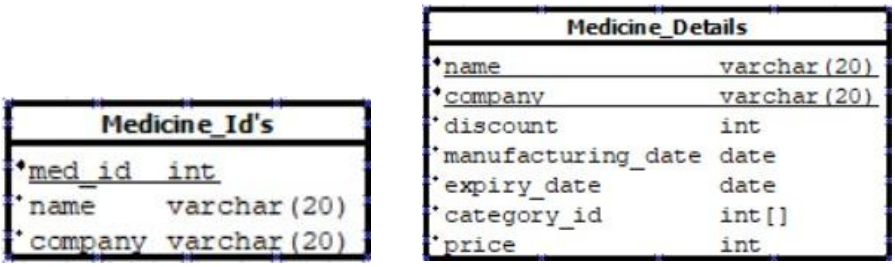
KEY: emp_id

BCNF Analysis:

The relation Delivery is in BCNF.

11. Medicine:





Functional Dependencies (FDs):

med_id → name

med_id → company

med_id → discount

med_id → manufacturing_date

med_id → expiry_date

med_id → price

med_id → category_id

name, company → discount

name, company → manufacturing_date

name, company → expiry_date

name, company → price

name, company → category_id

Minimal FD Set:

med_id → name, company
name, company → discount, manufacturing_date, expiry_date, price, category_id

KEY: med_id

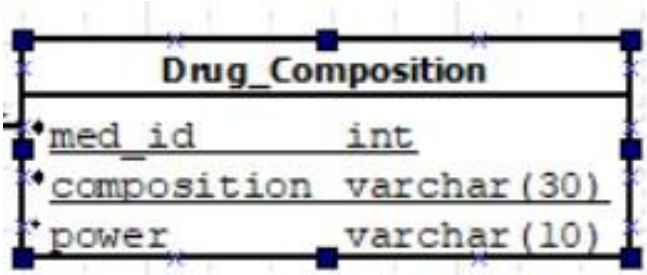
BCNF Analysis:

The relation Medicine is not in BCNF, as {name, company} form a determinant that is not a key.

So, we need to decompose in order to make BCNF, the relation Medicine should be decomposed into two relations:

1. (med_id, name, company)
2. (name, company, discount, manufacturing_date, expiry_date, price, category_id)

12. Drug Composition:



Functional Dependencies (FDs):

med_id,composition → power

Minimal FD Set:

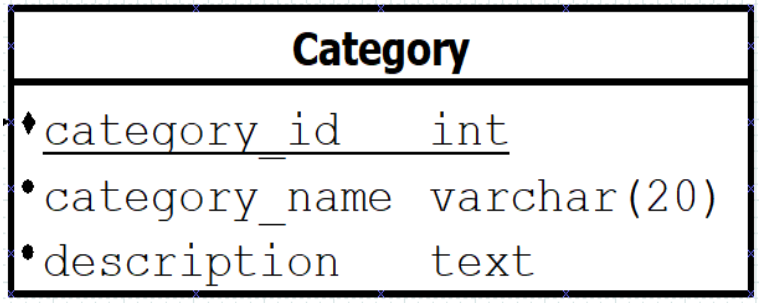
med_id, composition → power

KEY: {med_id, composition}

BCNF Analysis:

The relation Drug_composition is in BCNF.

13. Category:



Functional Dependencies (FDs):

category_id → category_name

category_id → description

Minimal FD Set:

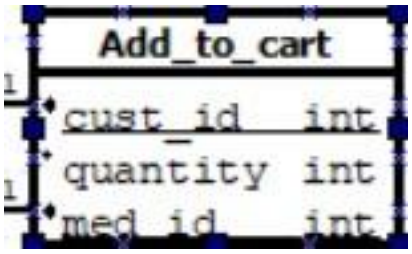
category_id → category_name, description

KEY: category_id

BCNF Analysis:

The relation Category is in BCNF.

14. Add to Cart:



Functional Dependencies (FDs):

cust_id, med_id → quantity

Minimal FD Set:

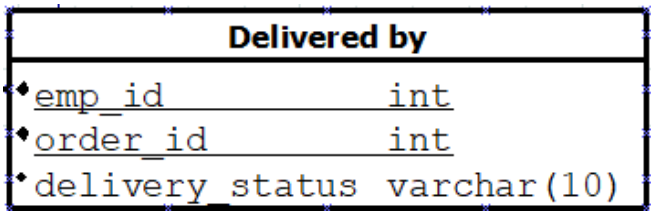
cust_id, med_id → quantity

KEY: {cust_id, med_id}

BCNF Analysis:

The relation Add_to_cart is in BCNF.

15. Delivered by:



Functional Dependencies (FDs):

emp_id, order_id → delivery_status

Minimal FD Set:

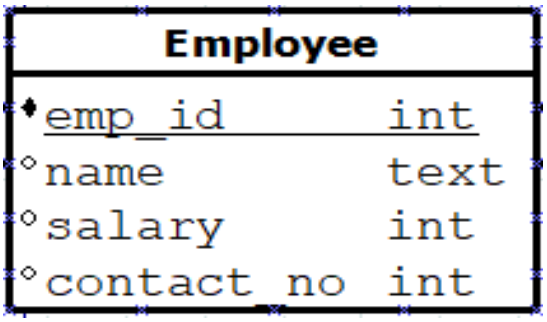
emp_id, order_id → delivery_status

KEY: {emp_id, order_id}

BCNF Analysis:

The relation Delivered_By is in BCNF.

16. Employee:



Functional Dependencies (FDs):

emp_id → name

emp_id → salary

emp_id → contact_no
contact_no → name

Minimal FD Set:

emp_id → contact_no,salary
contact_no → name

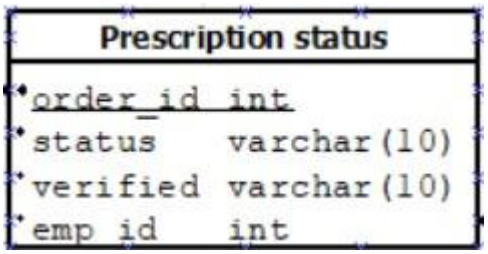
KEY: emp_id

BCNF Analysis:

The relation Employee is not in BCNF, as contact_no is a determinant but not a key.

Decomposition is not feasible without losing essential dependencies, so the relation is in Second Normal Form (2NF).

17. Prescription Status:



Functional Dependencies (FDs):

order_id → status
order_id → verified
order_id → emp_id

Minimal FD Set:

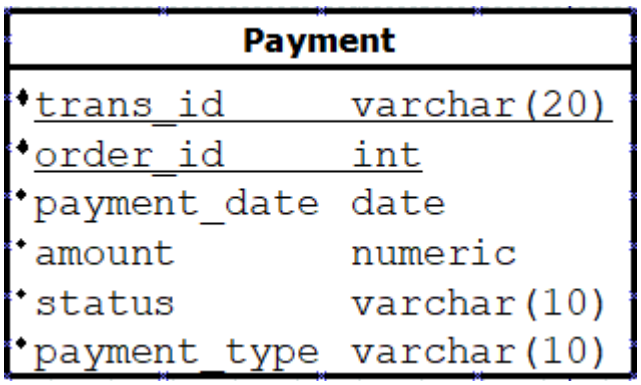
order_id → status, verified, emp_id

KEY: order_id

BCNF Analysis:

The relation Prescription_Status is in BCNF.

18. Payment:



Functional Dependencies (FDs):

trans_id → amount

trans_id → status

trans_id → payment_type

trans_id → order_id

trans_id → payment_date

order_id → trans_id

order_id → payment_date

order_id → amount

order_id → status

order_id → payment_type

Minimal FD Set:

order_id → trans_id, payment_date, amount, status, payment_type

trans_id → order_id

KEY: trans_id or order_id can serve as keys under the given conditions

BCNF Analysis:

The relation Payment is in BCNF.

Assumptions:

There are no partial or multiple payments associated with a single order.
In case of a payment failure, the order is cancelled and a new order ID is generated for any subsequent payment attempt.