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INSY6112

EXAM

Question 2

Q.2.1

Step 1:

Find the composite Primary keys

* PharmacyID and PharmacistID

Step 2:

Find functional dependencies

* + PharmacyID - PharmacyName, GroupID
  + GroupID - GroupName
  + PharmacistID - PharmacistName
  + (PharmacyID, PharmacistID) - All attributes

Step 3:

Remove partial dependencies

* + PharmacyName, GroupID – depends on PharmacyID
  + GroupName – depends on GroupID
  + PharmacistName – depends on PharmacistID

Step 4:

Make the 2NF tables

Pharmacy table

|  |  |  |
| --- | --- | --- |
| **PharmacyID** | **PharmacyName** | **GroupID** |
| 1 | Dischem Sandton | 1 |
| 2 | Dischem Soweto | 1 |
| 3 | Fourways Klinicare | 2 |
| 4 | Clicks Sandton | 3 |
| 5 | Clicks Soweto | 3 |
| 6 | Clicks | 4 |
| 7 | Randburg Pharmacare | 5 |
| 8 | Fourways Pharmacare | 5 |

Group table

|  |  |
| --- | --- |
| **GroupID** | **GroupName** |
| 1 | Dischem |
| 2 | Klinicare |
| 3 | Clicks |
| 4 | Clicks |
| 5 | Pharmacare |

Pharmacist table

|  |  |
| --- | --- |
| **PharmacistID** | **PharmacistName** |
| 1 | Sarah Coetzee |
| 2 | Steve da Costa |
| 3 | Thandi Siko |
| 4 | John Makalima |
| 5 | Bongi Mbete |
| 6 | Jake Oliver |
| 7 | |  | | --- | | Steve van Rooyen | |
| 8 | |  | | --- | | Jane Makalima | |

Pharmacy Pharmacist table

|  |  |
| --- | --- |
| **PharmacyID** | **PharmacistID** |
| 1 | 3 |
| 2 | 6 |
| 3 | 2 |
| 4 | 4 |
| 5 | 8 |
| 6 | 7 |
| 7 | 1 |
| 8 | 5 |

Step 4:

Dependency Diagram

Group

GroupID (PK)

GroupName

Pharmacy

PharmacyID (PK)

PharmacyName

GroupID (FK)

Pharmacist

PharmacistID (PK)

PharmacistName

PharmacyPharmacist

PharmacyID (PK and FK from pharmacy table)

PharmacistID (PK and FK from pharmacist table)

Q.2.2

Step 1:

Find transitive dependencies

* + PharmacyID – GroupID – GroupName

Step 2:

* + PharmacyID – GroupID (remains as its direct dependency)
  + GroupID – GroupName (separate table)

Step 3:

Final dependency diagram

Group

GroupID (PK)

GroupName

Pharmacy

PharmacyID (PK)

PharmacyName

GroupID (FK)

Pharmacist

PharmacistID (PK)

PharmacistName

PharmacyPharmacist

PharmacyID (PK and FK from pharmacy table)

PharmacistID (PK and FK from pharmacist table)

Question 3

Q.3.1

CREATE TABLE Student (

StudentID INT PRIMARY KEY,

StudentName VARCHAR(100),

StudentSurname VARCHAR(100),

StudentNumber VARCHAR(20)

);

Q3.2

CREATE TABLE Lecturer (

LecturerID INT PRIMARY KEY,

LecturerName VARCHAR(100),

LecturerSurname VARCHAR(100)

);

Q.3.3

CREATE TABLE Tutorial (

TutorialID INT PRIMARY KEY,

TutorialDate DATE,

TutorialTime TIME,

TutorialDuration INT,

LecturerID INT,

StudentID INT,

FOREIGN KEY (LecturerID) REFERENCES Lecturer(LecturerID),

FOREIGN KEY (StudentID) REFERENCES Student(StudentID)

);

Q.3.4

INSERT INTO Student (StudentID, StudentName, StudentSurname, StudentNumber) VALUES

(1, 'Debbie', 'Theart', '123456'),

(2, 'Thomas', 'Duncan', '654321');

INSERT INTO Lecturer (LecturerID, LecturerName, LecturerSurname) VALUES

(1, 'Zintle', 'Nukani'),

(2, 'Ravi', 'Maharaj');

INSERT INTO Tutorial (TutorialID, TutorialDate, TutorialTime, TutorialDuration, LecturerID, StudentID) VALUES

(1, '2025-01-15', '09:00:00', 180, 2, 1),

(2, '2025-01-18', '15:00:00', 240, 2, 2),

(3, '2025-01-20', '10:00:00', 180, 1, 1),

(4, '2025-01-21', '11:00:00', 180, 1, 2);

Q.3.5

SELECT \*

FROM Tutorial

WHERE TutorialDate BETWEEN '2025-01-16' AND '2025-01-20';

Q.3.6

SELECT

S.StudentName,

S.StudentSurname,

COUNT(T.TutorialID) AS TotalTutorials

FROM

Student S

JOIN

Tutorial T ON S.StudentID = T.StudentID

GROUP BY

S.StudentID, S.StudentName, S.StudentSurname

ORDER BY

TotalTutorials DESC;

Q.3.7

CREATE VIEW StudentsBookedWithLecturer2 AS

SELECT

S.StudentName,

S.StudentSurname

FROM

Student S

JOIN

Tutorial T ON S.StudentID = T.StudentID

WHERE

T.LecturerID = 2

ORDER BY

S.StudentSurname ASC;

Question 4

Q.4.1

javascript

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use clients\_10250201

Q.4.2

javascript

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db.clients.insertMany([

{

ClientName: "Debbie",

ClientSurname: "Theart",

ClientDOB: Date("1980-03-17")

},

{

ClientName: "Thomas",

ClientSurname: "Duncan",

ClientDOB: Date("1976-08-12")

}

])

Q.4.3

javascript

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db.clients.find()

Q.4.4

javascript

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db.clients.find({

ClientDOB: { $gt: ISODate("1979-01-12") }

})