Experion ILP-Batch 1

Task 1

Normalize the following tables

1. Employee Information

EmployeeID	EmployeeName	Department	ManagerID	Salary	HireDate
1	John Smith	HR	101	50000	2022-01-15
2	Alice Brown	IT	102	60000	2022-02-20
3	Mark Johnson	Sales	101	55000	2022-03-10

- The table is already in 1NF
- Create separate tables for sets of values that apply to multiple records.
- Relate these tables with a foreign key.
- 2NF

EmployeeID	EmployeeName	Salary	HireDate
1	John Smith	50000	2022-01-15
2	Alice Brown	60000	2022-02-20
3	Mark Johnson	55000	2022-03-10

- Eliminate fields that don't depend on the key.
- Deparment is not dependent on employeeID, so we create a separate field, DepartmentID.
- 3NF

DepartmentID	Department
D1	HR
D2	IT
D3	Sales

EmployeeID	DepartmentID	ManagerID
1	D1	101
2	D2	102
3	D3	101

- Making it more efficient

Employee

EmployeeID	EmployeeName	Salary	HireDate
1	John Smith	50000	2022-01-15
2	Alice Brown	60000	2022-02-20
3	Mark Johnson	55000	2022-03-10

Department

DepartmentID	Department
D1	HR
D2	IT
D3	Sales

Employee-Department-Manager mapping

EmployeeID	DepartmentID	ManagerID
1	D1	101
2	D2	102
3	D3	101

2. Training Programs

ProgramID	ProgramName	Trainer	Department	EmployeeID	EmployeeName	Date
1	Java Fundamentals	John Smith	IT	101	Alice Brown	2022-03-01
2	Project Management	Sarah White	HR	102	Bob Green	2022-03-10
3	Sales Techniques	Mark Johnson	Sales	103	Charlie Black	2022-03-20

- Make the main table as Program that consists of ProgramID as the primary key.
- Separate the table from the fields that is fully dependent

Program

ProgramID	ProgramName	Trainer	Date
1	Java Fundamentals	John Smith	2022-03-01
2	Project Management	Sarah White	2022-03-10
3	Sales Techniques	Mark Johnson	2022-03-20

Department-Employee mapping

DepartmentID	EmployeeID
D1	101
D2	102
D3	103

Employee

EmployeeID	EmployeeName
101	Alice Brown
102	Bob Green
103	Charlie Black

Department

DepartmentID	Department
D1	IT
D2	HR
D3	Sales

Program-Employee mapping

ProgramID	EmployeeID
1	101
2	102
3	103

3. Customer orders

OrderID	CustomerName	ProductID	ProductName	Qty	UnitPrice	TotalAmount	OrderDate
1	John Doe	101	Laptop	2	800	1600	2022-01-15
2	Jane Smith	102	Smartphone	1	500	500	2022-02-20
3	John Doe	103	Printer	1	200	200	2022-03-10

- Make the customer table the main table.
- All the fields present in the table are atomic and the table is fully dependent.
- The table is already in 2NF.
- Transitive dependency is present for ProductID, so we create another table for product

Product

ProductID	ProductName	UnitPrice
101	Laptop	800
102	Smartphone	500
103	Printer	200

Order-Product mapping

OrderID	ProductID
1	101
2	102
3	103

Order

OrderID	CustomerName	TotalAmount	Qty	OrderDate
1	John Doe	1600	2	2022-02-15
2	Jane Smith	500	1	2022-02-20
3	John Doe	200	1	2022-03-10

4. Stress management

EmployeeID	FirstName	LastName	StressLevel	HoursOfWork	BreaksTaken	PhysicalActivity	CounselingSessions
101	Sarah	White	Moderate	45	3	Yoga	2
102	Bob	Green	High	50	2	Jogging	1
103	Charlie	Black	Low	40	4	Meditation	3
104	David	Miller	High	48	1	Gym	2
105	Jane	Doe	Moderate	42	3	Walking	1

- Make the Employee table the main table.
- EmployeeID is the primary key.
- All the fields in the table are dependent on the primary key, so we can say that the table is already in 2NF.

Employee

EmployeeID	FirstName	LastName	StressID
101	Sarah	White	S1
102	Bob	Green	S2
103	Charlie	Black	S3
104	David	Miller	S4
105	Jane	Doe	S5

Stress

StressID	StressLevel	HoursOfWork	BreaksTaken	ActivityID
S1	Moderate	45	3	R1
S2	High	50	2	R2
S3	Low	40	4	R3
S4	High	48	1	R4
S5	Moderate	42	3	R5

Activity

ActiviyID	PhysicalActivity	CounslingService

R1	Yoga	2
R2	Jogging	1
R3	Meditation	3
R4	Gym	2
R5	Walking	1

5. Flee Market

ItemID	SellerName	ItemName	Category	Price	Quantity	Description	Condition	Location	DateListed
101	John's Treasures	Vintage Chair	Furniture	50.00	2	Beautiful vintage chair, excellent condition	Like New	Booth 15, Section A	2022-01-15
102	Alice's Finds	Antique Clock	Home Decor	80.00	1	Authentic antique clock with Roman numerals	Good	Stall 8, Section B	2022-02-20
103	Mark's Collectibles	Vinyl Records	Music	15.00	10	Various artists and genres, in good condition	Used	Booth 20, Section C	2022-03-10
104	Emma's Treasures	Vintage Jewelry	Accessories	35.00	5	Assorted vintage jewelry pieces, unique designs	Excellent	Stall 12, Section D	2022-04-05
105	Robert's Finds	Retro Camera	Electronics	60.00	1	Vintage Polaroid camera with original case	Good	Booth 5, Section A	2022-05-15

- The table is already fully dependent.
- The table is already in 2NF form.
- We can separate the table into Item and Seller.
- We will add SellerID as the primary key for the Seller table and ItemID will be the primary key of Item table.
- There will be another table to map between these two tables.

Item

ItemID	ItemName	Category	Price	Description	Condition
101	Vintage Chair	Furniture	50.00	Beautiful vintage chair, excellent condition	Like New
102	Antique Clock	Home Decor	80.00	Authentic antique clock with Roman numerals	Good

103	Vinyl Records	Music	15.00	Various artists and genres, in good condition	Used
104	VIntage Jewelry	Accessories	35.00	Assorted vintage jewelry pieces, unique design	Excellent
105	Retro Camera	Electronics	60.00	Vintage polaroid camera with original case	Good

Seller

SellerID	SellerName	Location
S1	John's Treasures	Booth 15, Section A
S1	Alice's Finds	Stall 8, Section B
S3	Mark's Collectible	Booth 20, Section C
S4	Emma's Treasures	Stall 12, Section D
S5	Robert's Finds	Booth 5, Section A

Item-Seller mapping

ItemID	SellerID	Qty	DateListed
101	S1	2	2022-01-15
102	S1	1	2022-02-20
103	S3	10	2022-03-10
104	S4	5	2022-04-05
105	S5	1	2022-05-15

6. Learning Management System

CID	CourseName	Instructor	Department	Credits	Enrolled Students	StartDate	EndDate	Location	Availability
101	Introduction to Biology	Prof. Smith	Science	3	25	2022-01-15	2022-05-10	Room 101	Open
102	Programming in Python	Prof. Brown	Computer Science	4	30	2022-02-20	2022-06-15	Lab 3, Building B	Closed
103	Financial Accounting	Prof. Green	Finance	3	20	2022-03-10	2022-07-05	Room 201	Open
104	English Literature	Prof. White	Humanities	3	22	2022-04-05	2022-08-20	Room 301	Open
105	Web Development Fundamentals	Prof. Black	IT	4	28	2022-05-15	2022-09-25	Lab 2, Building A	Closed

Course

CID	CourseName	Credits	InsructorID
101	Intrduction to Biology	3	IN01
102	Programming in Python	4	IN02
103	Financial Accounting	3	IN03
104	English Literature	3	IN04
105	Web Development Fundamentals	4	IN05

Instructor

InsructorID	Instructor	Department
IN01	Prof.Smith	Science
IN02	Prof.Brown	Computer Science
IN03	Prof.Green	Finance

IN04	Prof.White	Humanities
IN05	Prof.Black	IT

Enrollment

CID	Enrolled Students	StartDate	EndDate	Location	Availability
101	25	2022-01-15	2022-05-10	Room 101	Open
102	30	2022-02-20	2022-06-15	Lab 3, Building B	Closed
103	20	2022-03-10	2022-07-05	Room 201	Open
104	22	2022-04-05	2022-08-20	Room 301	Open
105	28	2022-05-15	2022-09-25	Lab 2, Building A	Closed