Normalization Assignment-DBMS

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

- It is currently in 1NF.
- To convert it into 2NF we need to remove the partial dependency and have to split it into 2 tables.

Employee_details

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

employee_department_details

Department	ManagerID
HR	101
IT	102
Sales	101

- To convert it into 3NF we need to create a new table with department_id and department_name. Also create a new table with employee_id, department_id and manager_id.

employee_details

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_details

Department_Id	Department_Name
D1	HR
D2	IT

Department_Id	Department_Name
D3	Sales

employee_department_relationship

EmployeeID	Department_id	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

- It is already in 1NF.
- To convert it into 2NF we split it into two tables.

employee_details

EmployeeID	EmployeeName	Department
101	Alice Brown	IT
102	Bob Green	HR
103	Charlie Black	Sales

program_details

ProgramID	ProgramName	Trainer	EmployeeID	Date
1	Java Fundamentals	John Smith	101	2022-03-01
2	Project Management	Sarah White	102	2022-03-10
3	Sales Techniques	Mark Johnson	103	2022-03-20

- To make it into 3NF we split program_details into two.

employee_details

EmployeeID	EmployeeName	Department
101	Alice Brown	IT
102	Bob Green	HR
103	Charlie Black	Sales

department_details

DepartmentID	Department
D1	IT
D2	HR
D3	Sales

Program_trainer_details

ProgramID	ProgramName	Trainer
1	Java Fundamentals	John Smith
2	Project Management	Sarah White
3	Sales Techniques	Mark Johnson

program_employee_relationship

ProgramID	DepartmentID	EmployeeID	Date
1	D1	101	2022-03-01
2	D2	102	2022-03-10
3	D3	103	2022-03-20

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

- To convert it into 2NF we divide customerOrders into customer_details, product_details and customer_order tables.

customer_details

CustomerID	CustomerName
C1	John Doe
C2	Jane Smith

product_details

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

customer_order

OrderID	CustomerId	ProductID	Qty	TotalAmount	OrderDate

1	C1	101	2	1600	2022-01-15
2	C2	102	1	500	2022-02-20
3	C1	103	1	200	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

- It is already in 1NF.
- To make it into 2NF make the employee details into a separate table.

employee_details

EmployeeID	FirstName	LastName	HoursOfWork	BreaksTaken
101	Sarah	White	45	3
102	Bob	Green	50	2
103	Charlie	Black	40	4
104	David	Miller	48	1
105	Jane	Doe	42	3

employee_stress_management

EmployeeID	StressLevel	PhysicalActivity	CounselingSessions
101	Moderate	Yoga	2
102	High	Jogging	1
103	Low	Meditation	3
104	High	Gym	2
105	Moderate	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

ItemID	SellerName	ItemName	Category	Price	Quantity	Description	Condition	Location	DateListed
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

- It is already in 1NF.
- To normalize the table, divide it into Item_details and seller_details.

item_details

ItemID	ItemName	Category	Price	Quantity	Description	Description	Condition
101	Vintage Chair	Furniture	50.00	2	Beautiful vintage chair	excellent condition	Like New
102	Antique Clock	Home Decor	80.00	1	Authentic antique clock with Roman numerals	null	Good
103	Vinyl Records	Music	15.00	10	Various artists and genres	in good condition	Used
104	Vintage Jewelry	Accessories	35.00	5	Assorted vintage jewelry pieces	unique designs	Excellent
105	Retro Camera	Electronics	60.00	1	Vintage Polaroid camera with original case	null	Good

seller_details

ItemID	SellerName	Location	Location_Section	DateListed
101	John's Treasures	Booth 15	Section A	2022-01-15
102	Alice's Finds	Stall 8	Section B	2022-02-20
103	Mark's Collectibles	Booth 20	Section C	2022-03-10
104	Emma's Treasures	Stall 12	Section D	2022-04-05
105	Robert's Finds	Booth 5	Section A	2022-05-15

6. Learning Management System

CID	CourseName	Instructor	Department	Credits	Enrolled Students	Start Date	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

CID	CourseName	Instructor	Department	Credits	Enrolled Students	Start Date	EndDate	Location	Availability
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

- Table is in 1NF.
- Since there is no partial dependency it is in 2NF.

course_details

CID	CourseName	Department	Credits	Availability
101	Introduction to Biology	Science	3	Open
102	Programming in Python	Computer Science	4	Closed
103	Financial Accounting	Finance	3	Open
104	English Literature	Humanities	3	Open
105	Web Development Fundamentals	IT	4	Closed

instructor_details

InstructorID	Instructor
I1	Prof. Smith
I2	Prof. Brown
I3	Prof. Green
I4	Prof. White
I5	Prof. Black

learning_management

CID	InstructorID	Enrolled Students	Start Date	EndDate	Location	Location_Lab
101	I1	25	2022-01-15	2022-05-10	Room 101	null
102	I2	30	2022-02-20	2022-06-15	Building B	Lab 3
103	I3	20	2022-03-10	2022-07-05	Room 201	null
104	I4	22	2022-04-05	2022-08-20	Room 301	null
105	I5	28	2022-05-15	2022-09-25	Building A	Lab2