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 as there are no multivalued attributes

We split the table to make it 2NF.

Employee Table

|  |  |  |  |
| --- | --- | --- | --- |
| **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 |

Manager Table

|  |  |  |
| --- | --- | --- |
| **EmployeeID** | **Department** | **ManagerID** |
| 1 | HR | 101 |
| 2 | IT | 102 |
| 3 | Sales | 101 |

We split the table again to make it 3NF.

After Normalization,

Employee Table

|  |  |  |  |
| --- | --- | --- | --- |
| **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 Table

|  |  |
| --- | --- |
| **DepartmentID** | **Department** |
| D01 | HR |
| D02 | IT |
| D03 | Sales |

Employee-Manager-Department Mapping

|  |  |  |
| --- | --- | --- |
| **EmployeeID** | **ManagerID** | **DepartmentID** |
| 1 | 101 | D01 |
| 2 | 102 | D02 |
| 3 | 101 | D03 |

1. 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 |

The table is already in 1NF as there are no multivalued attributes

We split the table to make it 2NF.

Program Table

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

Program-Employee Mapping

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ProgramID** | **Department** | **EmployeeID** | **EmployeeName** | **Date** |
| 1 | IT | 101 | Alice Brown | 2022-03-01 |
| 2 | HR | 102 | Bob Green | 2022-03-10 |
| 3 | Sales | 103 | Charlie Black | 2022-03-20 |

We split the table again to make it 3NF.

After Normalization

Program Table

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

Employee Table

|  |  |
| --- | --- |
| **EmployeeID** | **EmployeeName** |
| 101 | Alice Brown |
| 102 | Bob Green |
| 103 | Charlie Black |

Department Table

|  |  |
| --- | --- |
| **DepartmentID** | **Department** |
| D01 | IT |
| D02 | HR |
| D03 | Sales |

Program-Employee Mapping

|  |  |  |  |
| --- | --- | --- | --- |
| **ProgramID** | **DepartmentID** | **EmployeeID** | **Date** |
| 1 | D01 | 101 | 2022-03-01 |
| 2 | D02 | 102 | 2022-03-10 |
| 3 | D03 | 103 | 2022-03-20 |

1. 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 |

The table is already in 1NF.

There is partial dependency. So, we split the table to make it 2NF.

Customer Table

|  |  |
| --- | --- |
| **CustomerID** | **CustomerName** |
| C01 | John Doe |
| C02 | Jane Smith |

Order Table

|  |  |  |
| --- | --- | --- |
| **OrderID** | **CustomerID** | **OrderDate** |
| 1 | C01 | 2022-01-15 |
| 2 | C02 | 2022-02-20 |
| 3 | C01 | 2022-03-10 |

Order-Product Mapping

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **OrderID** | **ProductID** | **ProductName** | **Qty** | **UnitPrice** | **TotalAmount** |
| 1 | 101 | Laptop | 2 | 800 | 1600 |
| 2 | 102 | Smartphone | 1 | 500 | 500 |
| 3 | 103 | Printer | 1 | 200 | 200 |

In order-product mapping table there is transitive dependency. So, we split the table further to make it 3NF

After Normalization

Order Table

|  |  |  |
| --- | --- | --- |
| **OrderID** | **CustomerID** | **OrderDate** |
| 1 | C01 | 2022-01-15 |
| 2 | C02 | 2022-02-20 |
| 3 | C01 | 2022-03-10 |

Product Table

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

Order-Product-Mapping

|  |  |  |  |
| --- | --- | --- | --- |
| **OrderID** | **ProductID** | **Qty** | **TotalAmount** |
| 1 | 101 | 2 | 1600 |
| 2 | 102 | 1 | 500 |
| 3 | 103 | 1 | 200 |

1. 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 |

This table is already normalized. But we can split the tables if we want, to increase efficiency.

Employee Table

|  |  |  |
| --- | --- | --- |
| **EmployeeID** | **FirstName** | **LastName** |
| 101 | Sarah | White |
| 102 | Bob | Green |
| 103 | Charlie | Black |
| 104 | David | Miller |
| 105 | Jane | Doe |

Stress Table

|  |  |  |  |
| --- | --- | --- | --- |
| **StressType** | **StressLevel** | **HoursOfWork** | **BreaksTaken** |
| S01 | Moderate | 45 | 3 |
| S02 | High | 50 | 2 |
| S03 | Low | 40 | 4 |
| S04 | High | 48 | 1 |
| S05 | Moderate | 42 | 3 |

Employee Stress Mapping

|  |  |  |  |
| --- | --- | --- | --- |
| **EmployeeID** | **StressType** | **PhysicalActivity** | **CounselingSessions** |
| 101 | S01 | Yoga | 2 |
| 102 | S02 | Jogging | 1 |
| 103 | S03 | Meditation | 3 |
| 104 | S04 | Gym | 2 |
| 105 | S05 | Walking | 1 |

1. 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 in 1NF. We split the table to remove partial dependency to make it 2NF.

Item Table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **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 designs | Excellent |
| 105 | Retro Camera | Electronics | 60.00 | Vintage Polaroid camera with original case | Good |

Item Seller Mapping

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ItemID** | **SellerName** | **Quantity** | **Location** | **DateListed** |
| 101 | John's Treasures | 2 | Booth 15, Section A | 2022-01-15 |
| 102 | Alice's Finds | 1 | Stall 8, Section B | 2022-02-20 |
| 103 | Mark's Collectibles | 10 | Booth 20, Section C | 2022-03-10 |
| 104 | Emma's Treasures | 5 | Stall 12, Section D | 2022-04-05 |
| 105 | Robert's Finds | 1 | Booth 5, Section A | 2022-05-15 |

In item seller mapping table there is transitive dependency. So, we split the table further to make it 3NF.

After normalization

Item Table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **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 designs | Excellent |
| 105 | Retro Camera | Electronics | 60.00 | Vintage Polaroid camera with original case | Good |

Seller Table

|  |  |  |
| --- | --- | --- |
| **SellerID** | **SellerName** | **Location** |
| S101 | John's Treasures | Booth 15, Section A |
| S102 | Alice's Finds | Stall 8, Section B |
| S103 | Mark's Collectibles | Booth 20, Section C |
| S104 | Emma's Treasures | Stall 12, Section D |
| S105 | Robert's Finds | Booth 5, Section A |

Item Seller Mapping

|  |  |  |  |
| --- | --- | --- | --- |
| **ItemID** | **SellerID** | **Quantity** | **DateListed** |
| 101 | S101 | 2 | 2022-01-15 |
| 102 | S102 | 1 | 2022-02-20 |
| 103 | S103 | 10 | 2022-03-10 |
| 104 | S104 | 5 | 2022-04-05 |
| 105 | S105 | 1 | 2022-05-15 |

1. 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 |

After normalization

Course Table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **CourseName** | **Credits** | **Enrolled**  **Students** | **StartDate** | **EndDate** |
| 101 | Introduction to Biology | 3 | 25 | 2022-01-15 | 2022-05-10 |
| 102 | Programming in Python | 4 | 30 | 2022-02-20 | 2022-06-15 |
| 103 | Financial Accounting | 3 | 20 | 2022-03-10 | 2022-07-05 |
| 104 | English Literature | 3 | 22 | 2022-04-05 | 2022-08-20 |
| 105 | Web Development Fundamentals | 4 | 28 | 2022-05-15 | 2022-09-25 |

Department Table

|  |  |
| --- | --- |
| **DeptID** | **Department** |
| D01 | Science |
| D02 | Computer Science |
| D03 | Finance |
| D04 | Humanities |
| D05 | IT |

Instructor Table

|  |  |
| --- | --- |
| **InstructorID** | **Instructor** |
| I01 | Prof. Smith |
| I02 | Prof. Brown |
| I03 | Prof. Green |
| I04 | Prof. White |
| I05 | Prof. Black |

Course-Dept-Instructor Mapping

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **InstructorID** | **DeptID** | **Location** | **Availability** |
| 101 | I01 | D01 | Room 101 | Open |
| 102 | I02 | D02 | Lab 3, Building B | Closed |
| 103 | I03 | D03 | Room 201 | Open |
| 104 | I04 | D04 | Room 301 | Open |
| 105 | I05 | D05 | Lab 2, Building A | Closed |