**ASHNA SAJU**

**ILP BATCH 1**

**NORMALISATION DOCUMENT**

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 |

Check for 1st Normal Form (1NF)

* The table is already in 1NF, as there are no repeating groups, and each cell contains a single value.

Check for 2nd Normal Form (2NF)

* Removing Partial Dependency

EmployeeName, Salary, HireDate are fully dependent on employeeID so we split the table into employee table. This removes the partial dependency in the initial table.

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-Manager Mapping:

| **Department** | **ManagerID** |
| --- | --- |
| HR | 101 |
| IT | 102 |
| Sales | 101 |

Check for 3rd Normal Form (3NF)

* There is no transitive dependency in the table.

Making the tables 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 |

To make the tables more efficient create a separate table for Department with DepartmentID and Manager with ManagerName

Department :

| **DepartmentID** | **Department** |
| --- | --- |
| D101 | HR |
| D102 | IT |
| D103 | Sales |

Manager :

| **ManagerID** | **ManagerName** |
| --- | --- |
| 101 | Chris Thomas |
| 102 | Godwin James |
| 101 | Tom Sain |

**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 |

Check for 1st Normal Form (1NF)

* The table is already in 1NF, as there are no repeating groups, and each cell contains a single value.

Check for 2nd Normal Form (2NF)

* Removing partial dependency by creating a table called products

Products :

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

Check for 3rd Normal Form (3NF)

* Removing Transitive dependency

| **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 |

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

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

| **ProgramID** | **Department** | **EmployeeID** | **Date** |
| --- | --- | --- | --- |
| 1 | IT | 101 | 2022-03-01 |
| 2 | HR | 102 | 2022-03-10 |
| 3 | Sales | 103 | 2022-03-20 |

Making it more efficient

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

Employee Table: Program Table:

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

Program-employee mapping

| **ProgramID** | **DepartmentID** | **EmployeeID** | **Date** |
| --- | --- | --- | --- |
| 1 | D101 | 101 | 2022-03-01 |
| 2 | D102 | 102 | 2022-03-10 |
| 3 | D103 | 103 | 2022-03-20 |

Department Table:

| **DepartmentID** | **Department** |
| --- | --- |
| D101 | HR |
| D102 | IT |
| D103 | Sales |

**3. Customers**

| **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 |

Check for 1st Normal Form (1NF)

* The table is already in 1NF, as there are no repeating groups, and each cell contains a single value.

Check for 2nd Normal Form (2NF)

* Removing partial dependency from the table by creating a new table for Orders using the fields OrderID, CustomerName, OrderDate and a new table called OrderDetails using the fields OrderID,ProductID,ProductName,Qty,UnitPrice,TotalAmount

Orders :

| **OrderID** | **CustomerName** | **OrderDate** |
| --- | --- | --- |
| 1 | John Doe | 2022-01-15 |
| 2 | Jane Smith | 2022-02-20 |
| 3 | John Doe | 2022-03-10 |

OrderDetails :

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

Check for 3rd Normal Form (3NF)

* Removing Transitive dependency

Orders:

| **OrderID** | **CustomerName** | **OrderDate** |
| --- | --- | --- |
| 1 | John Doe | 2022-01-15 |
| 2 | Jane Smith | 2022-02-20 |
| 3 | John Doe | 2022-03-10 |

Products :

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

OrderDetails Table:

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

**4.Stress Management**

| **Employee**  **ID** | **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 |

Check for 1st Normal Form (1NF)

* The table is already in 1NF, as there are no repeating groups, and each cell contains a single value.

Check for 2nd Normal Form (2NF)

* Removing partial dependency from the initial table by removing the firstName, lastName and employeeID as employee table where firstName and lastName are fully dependent on employeeID.
* Since hoursOfWork and BreaksTaken are functionally dependent on employeID so we create a new table called EmployeeDetails.
* StressLevel, PhysicalActivity and counsellingSession are associated with employeeID. So create a new table called Stress.

Employee :

| **Employee**  **ID** | **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 |

EmployeeDetails:

| **Employee**  **ID** | **HoursOfWork** | **BreaksTaken** |
| --- | --- | --- |
| 101 | 45 | 3 |
| 102 | 50 | 2 |
| 103 | 40 | 4 |
| 104 | 48 | 1 |
| 105 | 42 | 3 |

Stress :

| **Employee**  **ID** | **StressLevel** | **PhysicalActivity** | **CounselingSessions** |
| --- | --- | --- | --- |
| 101 | Moderate | Yoga | 2 |
| 102 | High | Jogging | 1 |
| 103 | Low | Meditation | 3 |
| 104 | High | Gym | 2 |
| 105 | Moderate | Walking | 1 |

Check for 3rd Normal Form (3NF)

* There is no Transitive dependency in this table

**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 |

Check for 1st Normal Form (1NF)

* The table is already in 1NF, as there are no repeating groups, and each cell contains a single value.

Check for 2nd Normal Form (2NF)

* Removing Partial dependencies by creating the "Items" table containing information about items, and the "ItemDetails" table contains details about each item.

Items:

| **ItemID** | **SellerName** |
| --- | --- |
| 101 | John's Treasures |
| 102 | Alice's Finds |
| 103 | Mark's Collectibles |
| 104 | Emma's Treasures |
| 105 | Robert's Finds |

ItemDetails:

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

Check for 3rd Normal Form (3NF)

* transitive dependencies are observed .
* Price and Quantity are transitively dependent on ItemID in the itemDetails table so create a separate table called priceDetails.

priceDetails:

| **ItemID** | **Price** | **Quantity** |
| --- | --- | --- |
| 101 | 50.00 | 2 |
| 102 | 80.00 | 1 |
| 103 | 15.00 | 10 |
| 104 | 35.00 | 5 |
| 105 | 60.00 | 1 |

Items:

| **ItemID** | **SellerName** |
| --- | --- |
| 101 | John's Treasures |
| 102 | Alice's Finds |
| 103 | Mark's Collectibles |
| 104 | Emma's Treasures |
| 105 | Robert's Finds |

ItemDetails:

| **ItemID** | **ItemName** | **Category** | **Description** | **Condition** | **Location** | **DateListed** |
| --- | --- | --- | --- | --- | --- | --- |
| 101 | Vintage Chair | Furniture | Beautiful vintage chair, excellent condition | Like New | Booth 15, Section A | 2022-01-15 |
| 102 | Antique Clock | Home Decor | Authentic antique clock with Roman numerals | Good | Stall 8, Section B | 2022-02-20 |
| 103 | Vinyl Records | Music | Various artists and genres, in good condition | Used | Booth 20, Section C | 2022-03-10 |
| 104 | Vintage Jewelry | Accessories | Assorted vintage jewelry pieces, unique designs | Excellent | Stall 12, Section D | 2022-04-05 |
| 105 | Retro Camera | Electronics | Vintage Polaroid camera with original case | Good | Booth 5, Section A | 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 |

Check for 1st Normal Form (1NF)

* The table is already in 1NF, as there are no repeating groups, and each cell contains a single value.

Check for 2nd Normal Form (2NF)

* Removing partial dependency. Creating a Course table where courseName and credits are fully dependent on CID.

Course:

| **CID** | **CourseName** | **Credits** |
| --- | --- | --- |
| 101 | Introduction to Biology | 3 |
| 102 | Programming in Python | 4 |
| 103 | Financial Accounting | 3 |
| 104 | English Literature | 3 |
| 105 | Web Development Fundamentals | 4 |

Check for 3rd Normal Form (3NF)

* Removing transitive dependency, that is instructor is functionally dependent on courseName and courseName is fully dependent on CID. So we are creating another table for instructor to remove the transitive dependency.

Instructor:

| **InstructorID** | **Instructor** |
| --- | --- |
| I101 | Prof. Smith |
| I102 | Prof. Brown |
| I103 | Prof. Green |
| I104 | Prof. White |
| I105 | Prof. Black |

* Removing transitive dependency, that is department is functionally dependent on instructorID and instructorID is fully dependent on CID. So we are creating another table for department to remove the partial dependency.

Department:

| **DepartmentID** | **Department** |
| --- | --- |
| D101 | Science |
| D102 | Computer Science |
| D103 | Finance |
| D104 | Humanities |
| D105 | IT |

| **CID** | **CourseName** | **Credits** | **Enrolled**  **Students** | **StartDate** | **EndDate** | **Location** | **Availability** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 101 | Introduction to Biology | 3 | 25 | 2022-01-15 | 2022-05-10 | Room 101 | Open |
| 102 | Programming in Python | 4 | 30 | 2022-02-20 | 2022-06-15 | Lab 3, Building B | Closed |
| 103 | Financial Accounting | 3 | 20 | 2022-03-10 | 2022-07-05 | Room 201 | Open |
| 104 | English Literature | 3 | 22 | 2022-04-05 | 2022-08-20 | Room 301 | Open |
| 105 | Web Development Fundamentals | 4 | 28 | 2022-05-15 | 2022-09-25 | Lab 2, Building A | Closed |