**Steps to Create an ER Diagram Using MySQL Workbench for Global Super Store**

1. **Understand the Data**
   * Review the company’s Excel file thoroughly.
   * Identify key data fields and entities such as Customers, Orders, Products, Categories, Suppliers, Regions, and Employees.
   * Note all important attributes for each entity.
2. **Identify Entities and Relationships**
   * Determine which entities need their own tables.
   * Define the relationships between entities (one-to-one, one-to-many, many-to-many).
   * Identify primary keys (PK) for each entity.
   * Determine foreign keys (FK) to link related entities.
3. **Open MySQL Workbench and Create a New Model**
   * Launch MySQL Workbench.
   * Go to **File > New Model**.
   * Add a new EER Diagram by clicking **Add Diagram**.
4. **Create Tables for Each Entity**
   * Add a table for each entity in the diagram.
   * Add columns with appropriate data types (INT, VARCHAR, DATE, DECIMAL, etc.).
   * Set the primary key for each table.
   * Define constraints such as NOT NULL as needed.
5. **Define Relationships and Foreign Keys**
   * Use the relationship tools in MySQL Workbench:
     + Create one-to-many relationships (e.g., Customer to Orders).
     + For many-to-many relationships, create a junction table (e.g., OrderDetails between Orders and Products).
   * Set foreign keys correctly.
   * Define delete and update rules (CASCADE, RESTRICT) where necessary.
6. **Normalize Tables to 3rd Normal Form (3NF)**
   * Ensure each table meets:
     + **1NF:** Atomic data in each column.
     + **2NF:** No partial dependency on a part of a composite key.
     + **3NF:** No transitive dependencies between non-key columns.
   * Split tables if you detect data redundancy or derived data.
   * Add new tables as needed to achieve normalization.
7. **Review the ER Diagram**
   * Check clarity and organization.
   * Verify correctness of keys and relationships.
   * Ensure consistent and meaningful naming conventions.
8. **Save and Export the Diagram**
   * Save your MySQL Workbench model.
   * Export the ER diagram as PNG or PDF for submission via **File > Export > Export as PNG/PDF**.

**Step 2: Implement the Data Model**

After creating the ER diagram, you need to implement (deploy) the physical data model into the MySQL server using the **Forward Engineer** feature in MySQL Workbench.

**Follow these steps:**

1. **Open Your EER Diagram**
   * In MySQL Workbench, open the model you created in Step 1.
2. **Click on the "Database" Menu**
   * From the top menu, go to **Database > Forward Engineer**.
3. **Configure Forward Engineering Options**
   * A wizard will open. In the first screen, make sure the correct options are selected:
     + **Generate DROP Statements** (optional, removes existing tables before creating new ones)
     + **Generate INSERT Statements** (only if you added default data)
     + Click **Next**.
4. **Select the Tables to Export**
   * Ensure all tables and objects are selected to be included in the forward engineering process.
   * Click **Next**.
5. **Connect to MySQL Server**
   * Choose or configure your connection to the MySQL server.
   * If prompted, enter your MySQL username and password.
   * Select the target schema (or create a new one if needed).
6. **Execute the Forward Engineering**
   * Review the generated SQL script (optional).
   * Click **Execute** to run the script and create the tables in your MySQL database.
7. **Verify in MySQL Server**
   * After execution, open your MySQL connection and run:

sql

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SHOW TABLES;

* + Confirm that all tables from your ER diagram have been created successfully.

**Commit Progress and Confirm Schema Creation**

After completing all the steps in the Forward Engineer wizard, you need to complete the final **Commit Progress** step to ensure that all tasks were successfully executed.

**Follow these steps:**

1. **Review the Execution Summary**
   * The wizard will display a list of actions that were performed (e.g., creating tables, foreign keys, indexes).
   * Check that each task shows a status like **“Success”** or **“Finished”** with no errors.
2. **Click on the "Close" Button**
   * Once you confirm that everything has been executed correctly, click the **Close** button at the bottom of the wizard.
3. **Verify Database Schema Creation**
   * In the **SCHEMAS** panel on the left side of MySQL Workbench, you should now see your new schema (database) listed.
   * You can also verify the schema by running this SQL command in a new query tab:

sql

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SHOW TABLES;

* + This will display a list of all the tables that were created based on your data model.

**Steps to Create the Star Schema:**

1. **Identify the Fact Table**
   * Name: FactSales
   * Purpose: Stores measurable business metrics related to sales.
   * Example Attributes:
     + Sales\_ID (Primary Key, INT)
     + Product\_ID (Foreign Key, INT)
     + Location\_ID (Foreign Key, INT)
     + Time\_ID (Foreign Key, INT)
     + Quantity\_Sold (INT)
     + Sales\_Amount (DECIMAL)
     + Discount (DECIMAL)
2. **Create the Product Dimension Table**
   * Name: DimProduct
   * Example Attributes:
     + Product\_ID (Primary Key, INT)
     + Product\_Name (VARCHAR)
     + Category (VARCHAR)
     + Sub\_Category (VARCHAR)
3. **Create the Location Dimension Table**
   * Name: DimLocation
   * Example Attributes:
     + Location\_ID (Primary Key, INT)
     + City (VARCHAR)
     + State (VARCHAR)
     + Country (VARCHAR)
4. **Create the Time Dimension Table**
   * Name: DimTime
   * Example Attributes:
     + Time\_ID (Primary Key, INT)
     + Order\_Date (DATE)
     + Month (VARCHAR)
     + Quarter (VARCHAR)
     + Year (INT)
5. **Define Data Types Appropriately**
   * Use INT for identifiers and year values.
   * Use VARCHAR for text fields (e.g., names, states, categories).
   * Use DECIMAL for monetary values like sales and discounts.
   * Use DATE for date fields.
6. **Establish Foreign Key Relationships**
   * Link FactSales to each dimension table using foreign keys:
     + Product\_ID → DimProduct.Product\_ID
     + Location\_ID → DimLocation.Location\_ID
     + Time\_ID → DimTime.Time\_ID
7. **Review the Star Schema Diagram**
   * Confirm that the **Fact Table** is at the center.
   * All **Dimension Tables** are directly connected to it (star layout).
   * No direct connections between dimension tables.

**Step 4: Create a Map Chart**

Use **Tableau** to analyze **Global Super Store’s sales in the USA**.

**Task:**

Create a **Map Chart** showing sales across different states.

**Instructions:**

1. Open Tableau and connect it to the Global Super Store dataset.
2. Drag **"State"** to the **Rows** or **Location** shelf.
3. Drag **"Sales"** to the **Color** or **Size** shelf.
4. Tableau will automatically generate a **Map Chart**.
5. Format the tooltip so that when you hover over a state, it displays:
   * State name
   * Sales amount

**Output:**

A colored map of the USA where each state shows sales data when hovered over.

**Step 5: Create a Bubble Chart**

The company wants to **review profits** across the USA.

**Task:**

Create a **Bubble Chart** in Tableau and title it **“USA Profits”**.

**Instructions:**

1. In a new worksheet, drag **"State"** to **Rows** or **Columns**.
2. Drag **"Profit"** to **Size**.
3. Drag **"State"** to **Label** to display state names.
4. Drag the following to the **Tooltip** shelf:
   * State name
   * Quantity sold
   * Profit
   * Shipping cost
5. Adjust the chart type to **Circle** (bubble chart style).
6. Format the size and color for better readability.

**Output:**

A bubble chart where hovering over a bubble shows state name, quantity sold, profit, and shipping cost.

**Step 6: Create a Line Chart**

The company wants to visualize **sales trends over the last four years** for states with sales over **$40,000**.

**Task:**

Create a **Line Chart** in Tableau titled **“USA Sales Trends”**.

**Instructions:**

1. Filter the data to include only:
   * **USA states**
   * States where **Total Sales > $40,000**
2. Drag **"Order Date" (Year)** to the **Columns** shelf.
3. Drag **"Sales"** to the **Rows** shelf.
4. Drag **"State"** to the **Color** shelf to show individual trends.
5. Use a **Line Chart** visualization.
6. Format the chart with appropriate labels, axis titles, and tooltips.

**Output:**

A line chart showing yearly sales trends per state (for states with over $40,000 in sales).

**Step 7: Create an Interactive Dashboard**

Combine all charts into one interactive dashboard titled **“USA Sales and Profits”**.

**Instructions:**

1. Click on **Dashboard > New Dashboard** in Tableau.
2. Name the dashboard: **USA Sales and Profits**.
3. Drag and drop the following worksheets into the dashboard:
   * Map Chart (Step 4)
   * Bubble Chart (Step 5)
   * Line Chart (Step 6)
4. Enable **filter actions**:
   * When you click on a **state** in the **Map Chart**, it should update the **Bubble** and **Line** charts to show data for that state.
5. Adjust the layout, size, and formatting to ensure readability and interactivity.

**Output:**

An interactive dashboard where selecting a state filters all visualizations to show that state’s data.