Phase I – Database Redesign and Extension and Reloading

The main task of Phase I is to expand and redesign the Northwind database with extended capabilities and use this as a basis to migrate the current Northwind database tables and instances into the new schema. This will occur in both this phase with the version that your team develops as well as a Part of Phase II using a provided solution Northwind EER. In both phases, an updated version of the Northwind DB with the new capabilities thereby migrating Northwind to a revised set of tables. The intent is to extend the Northwind ER from MySQL Workbench given in Figure 1 (http://www.engr.uconn.edu/~steve/Cse4701/northwind.mwb) with the following capabilities:

1. Extend Shippers to also include attributes ContactName, ContactTitle, ShipmentType (Ground, Air, Sea), DeliveryType (Overnight, Two-Day, Other). For ShipmentType and DeliveryType, you probably want to define tables similar in concept to Categories to store these values so that they can be referenced in Shippers.

2. Abstract common information from Suppliers and the Extended Shippers entity into a new Company Entity. Introduce a new CompanyID for this class, but still keep the SupplierID and ShipperID in those classes.

3. Reformulate Categories as a set of entities in an inheritance hierarchy. Categories has the following data:

   1. Beverages: Soft drinks, coffees, teas, beers, and ales
   2. Condiments: Sweet and savory sauces, relishes, spreads, and seasonings
   3. Confections: Desserts, candies, and sweet breads
   4. Dairy Products: Cheeses
   5. Grains/Cereals: Breads, crackers, pasta, and cereal
   6. Meat/Poultry: Prepared meats
   7. Produce: Dried fruit and bean curd
   8. Seafood: Seaweed and fish

   You need to do some design to see the way that you could categorize these broad categories into separate entities and then think about the that data that would be common for all entities (Name, Description, Weight, etc.) and those that might have new data that are different for some categories (e.g., fresh, frozen, dried for Meat/Poultry, Farm raised/will for Seafood, etc.) You need to come up with an inheritance hierarchy of entities to replace Categories and then link this to Products. You should be able to reuse the CategoryID. This reformulation should also include links to web sites and/or articles on nutrition information related to the products. Be creative to come up with a good set of entities to track products.

4. Extend and/or reformulate Orders, and Order Details to allow the shipment of an order (multiple combinations of OrderID, ProductID) to be able to be split to send to different addresses. For example, the following order has three rows in OrderDetails:

<table>
<thead>
<tr>
<th>OrderID</th>
<th>ProductID</th>
<th>UnitPrice</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>10248</td>
<td>11</td>
<td>14.0000</td>
<td>12</td>
</tr>
<tr>
<td>10248</td>
<td>42</td>
<td>9.8000</td>
<td>10</td>
</tr>
<tr>
<td>10248</td>
<td>72</td>
<td>34.8000</td>
<td>5</td>
</tr>
</tbody>
</table>

   Each of the OrderID/ProductID combinations may be shipped to a different address. This will require you to change Orders in order to support multiple addresses. This could be accomplished by splitting off a subset of the address information (from RequiredDate through Ship Country) into a separate entity so that multiple Shippers can be referenced.

5. Extend Northwind with appropriate entities for Payment Capabilities (Paypal, Applepay, Google Pay, credit cards, etc.) off of the Orders Entity and utilize inheritance to organize the different payment options.

6. Migrate the current Northwind schema to the new schema by a process that includes: defining new relational tables that correspond to added entities from items 1 to 5 of your redesigned Northwind schema using the CREATE TABLE SQL Command. This would be for your new entities for Company (item 2) and also for the Category hierarchy (item 3). You will also need to transition existing data from Shippers/Suppliers into Company from utilizing the INSERT INTO SQL (see slide 4.72 of the chapter 4
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PPTs on the course web site) and also do a similar process if Orders is split into two tables. Additionally, you will need to add and/or drop from existing Northwind tables (see slide 4.30 of the chapter 4 PTPs on the course web site).

When you have completed all of your design work that has modified the Northwind.mwb file with new entities, store your design in: GroupZNorthwind.mwb where Z is your group.

For item 1 regarding the new table for Company, you need to both create the table and migrate the data from the Suppliers/Shippers tables into Company by modifying the existing Northwind schema and database:

- Create new tables in the Northwind schema using the CREATE TABLE Command for the new Company table and for Category tables you create and for any new table from splitting Orders (see slide 4.22 of the chapter 4 PPTs on the course web site).
- You should be able to utilize INSERT INTO SQL (see slide 4.72 of the chapter 4 PPTs on the course web site) in order to retrieve a subset of the information from Shippers/Suppliers that can then be inserted into Company. This may also be true to migrate current Categories information into the new set of entities (item 3). In the process of the retrieval and insertion, you have to generate new values for the keys of the new tables you define. You may also need to be in new values for columns for Shippers that didn’t previously exist.
- Once you have migrated Shippers/Suppliers tuples into the new Shippers/Suppliers table, you can then remove the common columns that formed the basis of the new company table. This can be accomplished using the ALTER TABLE command (see slide 4.30 of the chapter 4 PPT on the web site). This may also be needed if you split Orders into two tables so that you can delete the columns from Orders that are now in the new table.

For items 2 to 5, the new tables can be created using the CREATE TABLE Command (see slide 4.22 of the chapter 4 PPTs on the course web site). You should also insert some sample data into all of these tables for one customer using SQL INSERT. The final step in Phase I after you have created new tables, migrated data, inserted new data into the modified Northwind schema is to then generate a .sql file to submit. In MySQL Workbench, Select Server/Data Export, and as given in Figure 2, check off your database and choose the option to generate a .sql file (GroupZNorthwind.sql where Z is your Group Letter). This will generate a loadable database for David to do Phase I grading. Figure 3 shows the success screen.

Figure 1: The Northwind ER Diagram.
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Figure 2: The Export Option in Workbench

Figure 3: Result of Export Operation.