

For Assignment 4 choose one question from below.

For Assignment 5 choose another question from below.

Note the last question is complex and by itself counts as both assignment 4 and assignment 5.

1. Consider a case where multi-valued dimensions arise: health care diagnoses. Create a star schema design for a health care situation where a patient may have multiple diagnoses. You could view the article *Design Tip #166 Potential Bridge (Table) Detours* (<https://www.kimballgroup.com/2014/05/design-tip-166-potential-bridge-table-detours/>) for more background. Populate the database with realistic diagnoses and provide queries that demonstrate the usefulness of a bridge table. You must provide DDL/SQL to create & populate the tables  
SQL for the queries (Comments could be included to explain purpose of the query)
2. Create SQL (perhaps a CTE) that would generate the data (the data for the rows) that are ultimately inserted into a bridge table for hierarchies. Your SQL code would access the standard OLTP design with a parent FK, and would list the rows (data) that belong in the hierarchy bridge table. You must provide  
  
The OLTP table with a recursive relationship implemented via a parent FK  
The SQL script(s) to generate the bridge table row/data.
3. Like the above but this time for the nested sets implementation of a hierarchy.
4. Figure 9-10 shows a bridge table used for a case where there is a multivalued attribute: industry. Consider the case of employees who have skills – obviously skill is multivalued for employees. Create an employee dimension, a skills dimension, and an employee-skill bridge. Note the bridge table in this case just needs two fields: a group key and a skill key. The skills dimension must have a skill key and a skill description. If you choose technical employees you could have skills such as DDL, SQL, C#, Java, ... Consider that someone may want to find all employees who can program in Java and C#, or, to find all employees who can program in Java or C#. You must provide  
  
DDL/SQL to create your tables  
SQL for an AND query and for an OR query.
5. Create the Base Star and one of the Aggregate stars in Figure 15-2. Populate your database and create two queries that answer the same question (one uses the aggregate and the other does not). You must provide  
  
DDL and SQL to create the Base tables  
DDL and SQL used to create the aggregate schema  
SQL for the queries

6. Implement the schema in Figure 11-1. Using SQL determine the account balance at the end of the day (Feb 9) for account 7922-3002. Do the same for Figure 11-2. You must provide  
  
DDL/SQL for tables used in the queries  
SQL for the queries
  
7. Implement the schemas in figure 14-2. This exercise requires that you first implement the schema in the top half of the figure, and then populate the schema in the lower half using the necessary DDL/SQL. Create two queries to generate the types of reports shown on page 336. You must provide  
  
The DDL/SQL to create the tables  
SQL for the queries
  
8. 'Create a source student table (presumably in some SIS) and a corresponding Type 2 student dimension. Create ETL to update the student dimension. To simplify you are concerned with updates to one attribute of the student dimension. You must provide  
  
DDL to create the tables and other mechanisms (e.g. trigger)  
DML to populate the tables  
SQL to migrate changes from the student table to the student dimension.
  
9. Consider an ACS-3902 student who has studied entity-relationship modeling, relational databases and normalization (up to BCNF). Create a presentation (PPT file) that describes dimensional modeling to a 3902 student at the end of their 3902 term. Note that examples are necessary. In a way consider that you are summarizing 4904 into a single lecture.

The following are some terms/concepts to consider.

Analytic database vs OLTP database

Star

Primary Key

Dimensions

degenerate

Facts

ETL

Derived data

Metrics

Normalization

SCDs

star schema variations ... such as snowflakes, outriggers, mini-dimension, ...