General Description:

Supersonic Inc. is an automobile parts manufacturing company that wants to create a database management system to manage its day-to-day operations.

Most of Supersonic’s customers order raw parts from the company. For each order of a raw part the company would like to keep track of information such as the order number, quantity ordered, the date the order was requested and the date the order was shipped. A customer can only request a single part (raw or assembled) in an order. The price of the order can be determined by multiplying the cost of the part by the quantity ordered. Hence, for each part the company needs to keep track of information such as the parts’ name and cost. Some of Supersonic’s customers also order assembled parts. An assembled part is made up of many (possibly different) raw parts. The price of an assembled part is $1.2 \times$ the sum of the prices of the raw parts.

Supersonic is particularly interested in keeping track of different types of information about its small and large business customers. This is primarily because Supersonic varies the price of a product according to the type of customer and the amount that is ordered. Large business customers are given a discount of 10% on the price of each part (raw or assembled).

Vendors supply raw materials that are used by Supersonic to manufacture parts (raw). Supersonic needs to maintain information about these vendors. Supersonic distinguishes between its local and out-of-state vendors. Out-of-state vendors supply only raw materials. Some local vendors have the ability to supply assembled parts in addition to supplying raw materials. Supersonic orders assembled parts from such local vendors (who supply assembled parts) when a customer places an emergency order that it cannot fulfill. An emergency order is treated separate from a regular order by Supersonic, since it directly involves a vendor.

Supersonic Inc. is organized into several departments: sales, service, manufacturing and marketing. The manufacturing department is responsible for receiving and processing orders from customers as well as placing orders with vendors. Sales representatives and service agents work for the sales and service departments respectively. Sales representatives and service agents operate in teams of four (each team has to have a minimum of one sales or service agent), each team being assigned to customers in a particular geographical region of the country. Their commission depends on the number of new customers they are able to bring in every year. The marketing department likes to maintain a profile of all of Supersonic’s customers so that it can selectively mail marketing
brochures to them. Each customer who is in the marketing databases is assigned a
marketing representative. A marketing representative can of course be in charge of many
customers. Information, such as, type of part frequently ordered and typical quantity
ordered are stored as part of this profile.

Queries:

The managers at the company expect that your database will be able to answer the
following queries:

a) generate the list of customers who order parts above a certain frequency threshold, e.g.,
customers who place more than 3 orders in 1995.

b) generate the list of customers who have placed emergency orders and the local-vendors
who have supplied it to them directly.

c) generate the list of customers who ordered assembled parts that the company was able
to fulfill by itself, the date the parts were ordered, the assembled parts ordered and the
prices of these assembled parts.

d) generate the list of parts (raw or assembled) ordered after a particular date, e.g., 10-
Feb-1996.

e) generate and print the number and names of the new customers each sales and service
representative team was able to recruit during the year 1996.

f) generate a list of the out-of-state vendors who supply a particular type of part.

g) generate a list of sales and service teams, the names of the members of the team and the
geographic region that they operate in.

h) generate a list of all assembled parts ordered, the cost of each assembled part and the
individual parts that went into the manufacture of these assembled parts.

i) generate the list of customers who placed an emergency order for assembled parts, the
vendor who fulfilled the emergency order, the date the parts were ordered and the
assembled part requested in each order.

j) generate a list of marketing representatives who are serving customers that have placed
at least one emergency order.

k) generate a list of all employees of the sales, service and marketing department and
present the information in the order listed above.
Assignment:

Given the above description of the case study, perform the following activities:

1) Draw an (conceptual) Entity-Relationship diagram based on the information given in the case. You will find that you may need to make several assumption (including assumptions about attributes for each of the entities) about information that may be missing in the case description. Clearly state all assumptions in your individual project report.

2) Draw a more refined version of the Entity-Relationship diagram using ERWin.

3) Create a relational database that can be used by Supersonic to perform its day-to-day functions. Make sure that you specify the appropriate referential integrity constraints as part of your database schema. Populate your database with sufficient data that will enable you to show the robustness of your design and its ability to answer the queries specified below.

4) Write the SQL queries you would need to execute to provide answers to the queries listed in the requirements above (Note: For each query you are required to list at least two attributes other than the primary key for the entity in question. For example, if the question says list customers, you might want to list customer_id along with customer_lname and customer_fname).

Deliverables:

1) Clearly marked and labeled Entity-Relationship diagrams (conceptual and ERWin).

2) A paper based representation of the relational database schema.

3) A text file (on disk & a printout) that lists the SQL commands you used to create the table, the primary keys and foreign keys for the relational database schema.

4) A copy of your .dbs file containing the database and the sample data that you used to test your database design.

5) A text file (on disk & a printout) containing a list of the SQL queries that can be used to answer the queries specified in the case study.