

# Analyzing and Building Simple Queries in SQL

## IS240 – Database Management Supplement to Chapter 4

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## Sally's Pet Store

- Chapter 4
  - ❑ Exercises 1-25 deal with the Pet Store
  - ❑ Pp 211-212 (in 4<sup>th</sup> edition PDF file)
- We will examine a way to analyze and solve query problems using SQL on the Pet Store database available from the Jerry Post Web site

Someone From Ireland Will Grow Horseradish and Onions  
SELECT FROM INNER JOIN WHERE GROUP BY HAVING ORDER BY

Mnemonic

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**Introduction to Sally's Pet Store**

Download PetStore Database 2000 Format (0.7MB)  
Download PetStore Database 1997 Format (0.7MB)

A young lady with a love for animals is starting a new type of pet store. Sally wants to match pets with owners who will take good care of the animals. One of her key objectives is to closely monitor breeders to make sure that they take good care of all of their animals and that baby animals receive proper care and attention so they will become friendly pets. A second objective is to develop long-term relationships with customers. She wants to help them choose the best type of animal for each situation and to make sure the customers have all of the support and information they need to properly care for the animals.

Sally realizes that meeting these two objectives requires her to collect and monitor a large amount of data. After taking an information systems course in an MBA program, she realizes that she needs a database to help her collect data and monitor the operations of the store.

At the moment Sally has only one store, but she dreams of expanding into additional cities. She wants to hire and train workers to be diligent, animal friends, and not salespeople. These friends will help customers choose the proper animal. They will answer questions about health, nutrition, and pet behavior. They will even be taught that some potential customers should be convinced not to buy an animal.

Because the workers will spend most of their time with the customers and animals, they will need technology to help them with their tasks. The new system will also have to be easy to use, since little time will be available for computer training.

Overview of Pet Store design.

```

    graph TD
      Supplier --> PurchaseAnimals
      Supplier --> PurchaseMerchandise
      Employee --> SellAnimals
      Employee --> SellMerchandise
      Customer --> SellAnimals
      Customer --> SellMerchandise
      PurchaseAnimals --> SellAnimals
      PurchaseMerchandise --> SellMerchandise
  
```

Pet Store Class Diagram  
Initial Pet Store Forms and Report

## Downloading Other Databases

<http://www.jerrypost.com/DBMS/Downloads/Downloads.html>

### Database Management Systems

#### Database Downloads (Microsoft Access)

| Filename                                  | Size    | Microsoft Access/zipped  |
|---|---------|--------------------------|
| Rolling Thunder 2002/2003 Format          | 19.5 MB | <a href="#">Download</a> |
| Rolling Thunder 2000 Format               | 8 MB    | <a href="#">Download</a> |
| Rolling Thunder 2000 Format/small version | 3 MB    | <a href="#">Download</a> |
| Rolling Thunder 1997 Format               | 8 MB    | <a href="#">Download</a> |
| Rolling Thunder 1997 Format/small version | 2 MB    | <a href="#">Download</a> |
| Sally's Pet Store 2000 Format             | 0.7 MB  | <a href="#">Download</a> |
| Sally's Pet Store 1997 Format             | 0.7 MB  | <a href="#">Download</a> |
| Ch. 12 Spreadsheet example 1997 Format    | 0.04 MB | <a href="#">Download</a> |

Note, the full/unzipped Rolling Thunder database requires at least 30 MB of disk space.

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**Rolling Thunder Bicycles**

Management Information Systems Textbook  
Database Management Systems Textbook

Download Rolling Thunder Files  
Updated 9/11/2002  
Office 2002/XP -- 50 MB (14 MB zipped download)  
Office 2000 -- 50 MB (14 MB zipped download)  
Office 97 -- 30 MB (8 MB exe-zipped download)  
--- Smaller version with less data ---  
Office 2002 -- 9 MB (3 MB zipped download)  
Office 2000 -- 9 MB (3 MB exe-zipped download)  
Office 97 -- 7 MB (1994 data 2 MB exe-zip)

Rolling Thunder Bicycles is an application created with Microsoft® Access that represents a small company that manufactures custom bicycles.

The application illustrates the use of information in operations, transactions, and decisions.

The data generator enables instructors to create additional data to highlight specific problems.

Exercises in the textbook are used to show students how the database information system will help them solve problems in their jobs.

Introductory object-oriented analysis of the Rolling Thunder Bicycle Company. [Download Word Document](#)

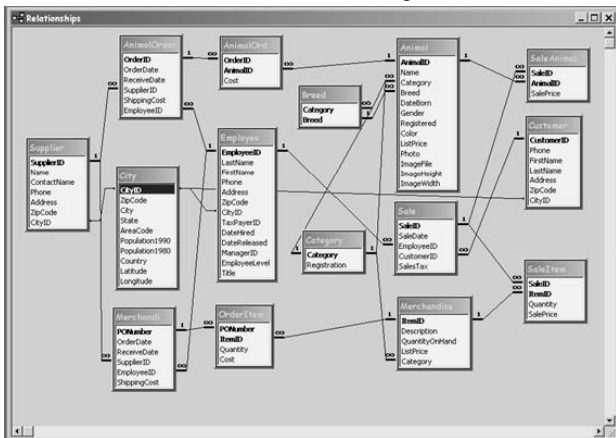
[Rolling Thunder Home Page](#)  
[Management Information Systems Textbook](#)  
[Database Management Textbook](#)

## How to LEARN about SQL

- In the following slides, we will dissect SQL queries into very small slices
  - ❑ This approach is useful when you are learning SQL
  - ❑ But it is very tedious
- It is *not* the normal approach to creating queries
  - ❑ As you become familiar with SQL, you will be able to skip intermediate steps
  - ❑ It is nonetheless useful to break up complex queries into subqueries
  - ❑ Can test each step to be sure you are getting the records you expect
  - ❑ Avoids the confusing debugging problem caused when a complex query is created all at once and gives the wrong answer

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## Sample Problem 1: Pet Store Animals born in May



## Sample Problem 1 (cont'd)



**Animals born in May**

- Which fields do we need?
  - AnimalID
  - DateBorn
- Where are they?
  - Animal dataset
- Do we need any other datasets to answer this question?
  - No
- Which records do we need?
  - The ones where the month part of the date is equal to the code for May or where the date is between the start and end of the May.

```
Someone
From Ireland
Will
Grow
Horseradish and Onions
SELECT
FROM INNER JOIN
WHERE
GROUP BY
HAVING
ORDER BY
```

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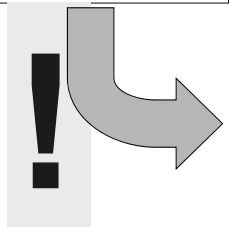
## Sample Problem 1 (cont'd)



**Animals born in May**

- Start with the simplest query (no condition):

```
SELECT Animal.AnimalID,
Animal.DateBorn
FROM Animal;
```



| AnimalID | DateBorn   |
|----------|------------|
| 3        | 2004-05-05 |
| 4        | 2004-03-02 |
| 5        | 2004-01-01 |
| 6        | 2004-08-02 |
| 7        | 2004-01-25 |
| 8        | 2004-05-04 |
| 9        | 2004-03-10 |
| 10       | 2004-09-13 |

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## Sample Problem 1 (cont'd)



| Task            | Access                                |
|-----------------|---------------------------------------|
| Strings         |                                       |
| Concatenation   | FName & " " & LName                   |
| Length          | Len(LName)                            |
| Upper case      | UCase(LName)                          |
| Lower case      | LCause(LName)                         |
| Partial string  | MID(LName,2,3)                        |
| Dates           |                                       |
| Today           | Date( ), Time( ), Now( )              |
| Month           | Month(myDate)                         |
| Day             | Day(myDate)                           |
| Year            | Year(myDate)                          |
| Date arithmetic | DateAdd<br>DateDiff                   |
| Formatting      | Format(item, format)                  |
| Numbers         |                                       |
| Math functions  | Cos, Sin, Tan, Sqrt                   |
| Exponentiation  | 2 ^ 3                                 |
| Aggregation     | Min, Max, Sum, Count, Avg, StDev, Var |
| Statistics      |                                       |

Figure 4.23 P. 196

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**Animals born in May**

- How do we determine the month in the date field?
  - We can use the Month() function
- Functions can save enormous trouble
  - Avoid having to define complex conditions
  - E.g., setting ranges such as "date between the first and last day of a particular month" which requires hand-coding

## Sample Problem 1 (cont'd)



**Animals born in May**

- Now select the particular month:

```
Animal Query : Select...
SELECT Animal.AnimalID, Animal.DateBorn
FROM Animal
WHERE Month(DateBorn)=5;
```

| AnimalID | DateBorn     |
|----------|--------------|
| 0        | 2004-05-04   |
| 19       | 2004-05-11   |
| 33       | 2004-05-30   |
| 37       | 2004-05-04   |
| 42       | 2004-05-19   |
| 50       | 2004-05-18   |
| 59       | 2004-05-10   |
| 60       | 2004-05-20   |
| 91       | 2004-05-23   |
| 118      | 2004-05-05   |
| 124      | 2004-05-25   |
| 138      | 2004-05-21   |
| 143      | 2004-05-20   |
| 144      | 2004-05-07   |
| 161      | 2004-05-11   |
| 162      | 2004-05-08   |
| 176      | 2004-05-14   |
| 178      | 2004-05-26   |
| 182      | 2004-05-28   |
| 184      | 2004-05-21   |
| 187      | 2004-05-15   |
| *        | (AutoNumber) |

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## Sample Problem 2



- During the 3<sup>rd</sup> quarter, which item was sold in the largest quantity greater than 5 units?

- Which fields are involved?

- ItemID
- Description
- Quantity
- OrderDate
- PONumber

- What datasets are involved?

- OrderItem
- Order
- Merchandise

```
Someone
From Ireland
Will
Grow
Horseradish and Onions
SELECT
FROM INNER JOIN
WHERE
GROUP BY
HAVING
ORDER BY
```

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## Sample Problem 2 (cont'd)

- During the 3<sup>rd</sup> quarter, which item was sold in the largest quantity greater than 5 units in a single order?
- How shall we break down the problem?

- OrderItem
  - ❑ First figure out how to see all the items sold
  - ❑ Next determine how to find only the items sold more than 5 units at a time (makes code general)
- MerchandiseOrder
  - ❑ Next determine how to locate the qualifying item sold in the largest quantity in a single order
  - ❑ Then figure out how to see all the items sold in the 3<sup>rd</sup> quarter (don't use range of days – use months)
- Merchandise
  - ❑ Then combine the conditions to locate the record that fits the problem requirements
  - ❑ Finally link the chosen record to the Merchandise Description field to get the name of the item

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## First figure out how to see all the items sold

**Complete problem:**  
During the 3<sup>rd</sup> quarter, which item was sold in the largest quantity greater than 5 units in a single order?

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## Next determine how to find only the items sold more than 5 units at a time

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## Next determine the qualifying item sold in the largest quantity in a single order

**Complete problem:**  
During the 3<sup>rd</sup> quarter, which item was sold in the largest quantity greater than 5 units in a single order?

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## Then figure out how to see all the items sold in the 3<sup>rd</sup> quarter

First we get all the data we need, then we reduce them to the 3<sup>rd</sup> quarter (MONTH 7, 8, or 9)

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## Then combine the conditions to locate the record that fits the problem requirements

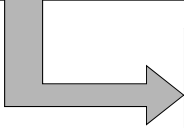
Since we don't actually need all this info about the item, we use this simpler query for ItemID:

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**Finally link the chosen record to the *Merchandise* Description field to see the name of the item**



```
MerchandiseOrder Query : Select Query
SELECT Merchandise.Description
FROM Merchandise
Where Merchandise.ItemID IN
(SELECT TOP 1
 OrderItem.ItemID
 FROM MerchandiseOrder INNER JOIN OrderItem
 ON MerchandiseOrder.PONumber = OrderItem.PONumber
 WHERE (MONTH(MerchandiseOrder.OrderDate) IN (7, 8, 9)
 AND OrderItem.Quantity >5))
ORDER BY OrderItem.Quantity DESC;
```



| Description          |
|----------------------|
| Cat Food-Can-Regular |

Record: 1 of



# END