





# Announcements

- Project 3B
  - \* Build the queries
  - \* Answer the questions
  - \* Due Tuesday, June 10, before Noon
    - Save database and queries, and upload to Collect It
    - Submit quiz





## Demo

- querySailorAge

- \* current age:

- ```
DateDiff("yyyy",[tableSailors]![birthdate],Now())
```



# Announcements

- Free copy of Access, Vista, etc., for educational/academic use:
  - \* Links on Computing page on Course Web site
    - Search for CSE or INFO to find the link on the page
    - Username is your full UW email address
    - Password is different!
      - Click on "send a reminder"
      - Check wherever your email forwards to



# Announcements

- Rubrics for Quick Writes will be available this week



# Designing and Querying the Database

*Hands on in Access*



# Animation

- A natural join



# Student Athletes

- **The Area being Modeled is:**
  - \* Athletes and Teams in High School.
- **User Requirements:**
  - \* A Database for an athletics department
  - \* Storing details of
    - Teams, with division, gender, coach
    - (Student) Athletes data file.





## Student Athletes

- Individuals are selected for a team.
- Track points awarded to each student for participating in a sport for the awarding of school letters.
- The Database tracks student Athletes over five years with any given Athlete participating in multiple sports in a given year.



# Student Athletes

- THINGS of Interest, include :
  - \* Athletes
  - \* Events
  - \* Points earned for success
  - \* Teams
- These THINGS are **related** as follows:
  - A Student Athlete can participate in zero, one or many TEAMS.



# Athletes and Teams

student\_id

student\_result\_at\_event

student\_points\_to\_date

student\_points\_at\_event

student\_first\_name

letters\_sport\_code

student\_middle\_name

letters\_awarded\_date

student\_last\_name

team\_gender

student\_date\_of\_birth

event\_location

team\_name

student\_gender

team\_description

student\_address

coach\_name

student\_other\_details

team\_other\_details

division\_description

sport\_description

event\_name

event\_start\_date

event\_end\_date

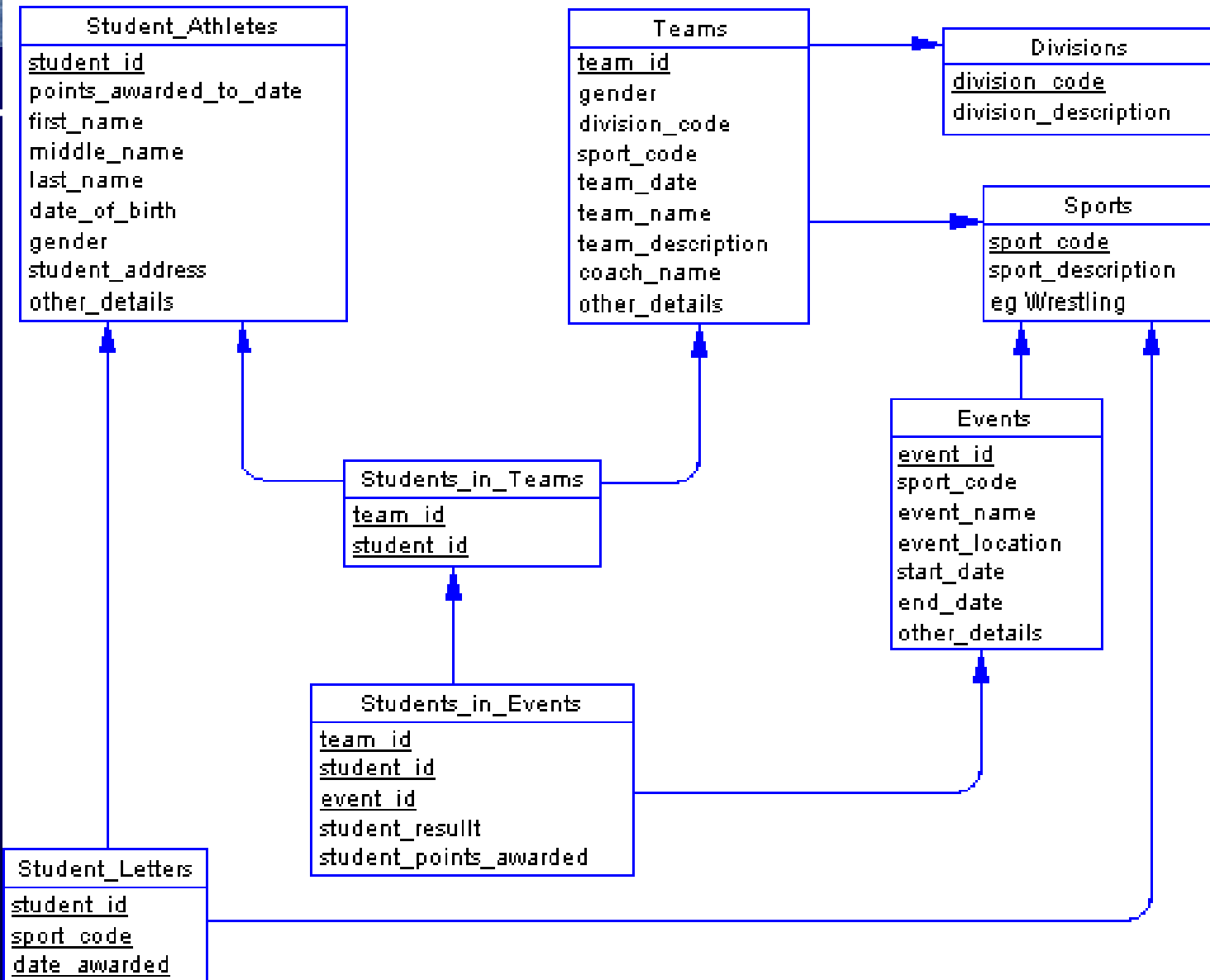
event\_other\_details



## Exercise

- Build the Student Athletes database
  - \* Work in teams of 2 or 3
  - \* You have 15 minutes

Data Model for Student Athletes and Teams  
 Barry Williams - 13th. September 2004  
 Database Answers





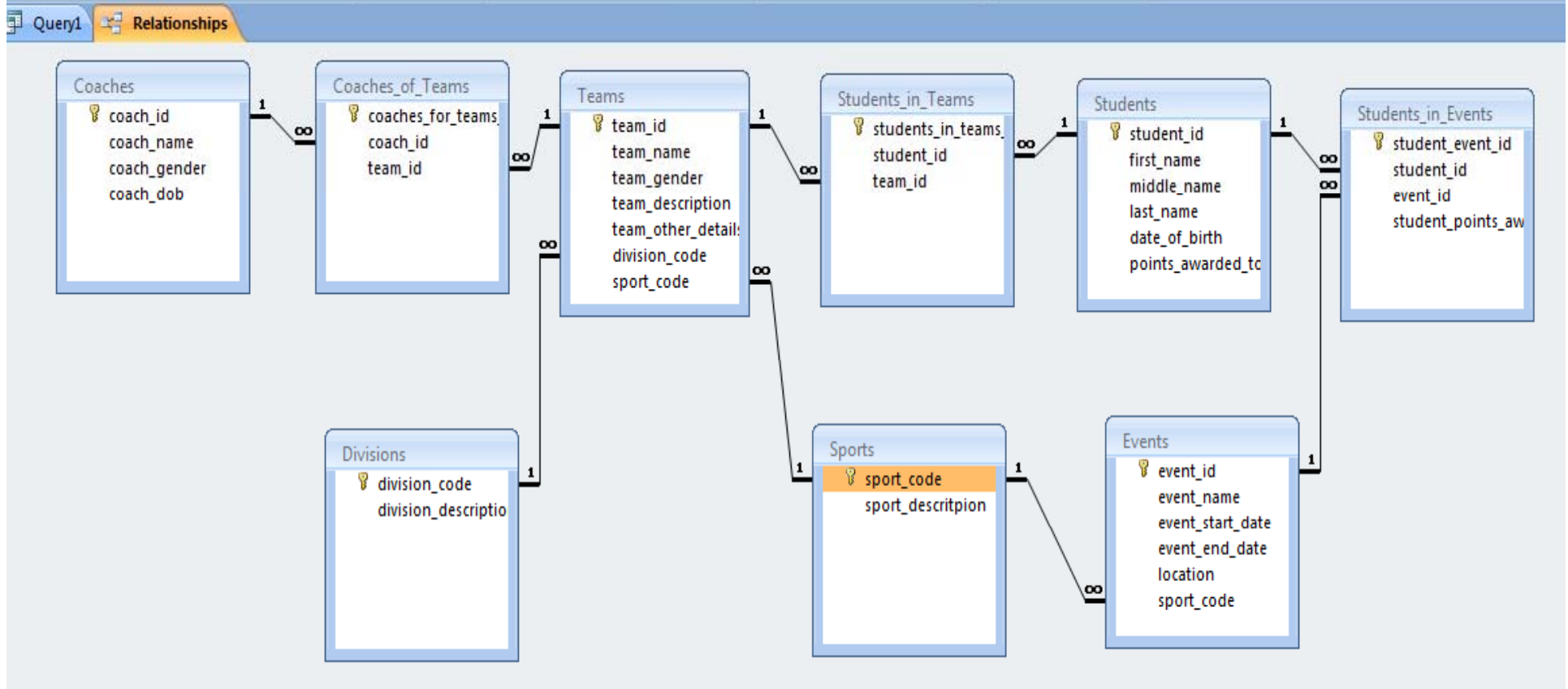
## Demo

- Relationships in Access
  - \* Database Tools > Relationships
  - \* Right-Click > Show Tables
    - Add tables needed for Query
  - \* Double-click on fields needed for query
  - \* Checkbox is checked for columns that will show



# Access

- Entity Relationship Diagram (ERD)





# DB Design Questions

- Bridge tables
  - \* Transform many:many into one:many
    - Students\_in\_Teams
    - Students\_in\_Events
    - Coaches\_of\_Teams
- Lookup Tables
  - \* Helps data entry
    - Division
    - Sport
    - State abbreviations





From simple to complicated

# QUERY EXAMPLES



# Queries

- List all student athletes
  1. **SELECT \* FROM Student\_Athletes**
    - Wild card \* selects ALL fields
  2. **SELECT \* FROM Student\_Athletes  
ORDER BY student\_name ASC**
    - Sorts on specified field in ascending order (A-Z, 0-9)
  3. **SELECT \* FROM Student\_Athletes  
ORDER BY student\_name DESC**
    - Sorts on specified field in descending order (Z-A, 9-0)



## Queries

4. Which students' last names begin with 'Smith'?

```
SELECT last_name, first_name  
FROM Student_Athletes  
WHERE last_name LIKE "Smith*"
```

- \* is the wildcard that replaces any number of characters



## Queries

5. How many students have last names beginning with 'Sm'?

```
SELECT COUNT(student_id)
FROM Student_Athletes
WHERE last_name LIKE "Sm*"
ORDER BY last_name
```

- Use LIKE and the wildcard (\*)



# Queries

5. How many students have last names beginning with 'Sm'?

```
SELECT COUNT(student_id)
FROM Student_Athletes
WHERE last_name LIKE "Sm*"
ORDER BY last_name
```

- Use LIKE and the wildcard (\*)

The screenshot shows the Microsoft Access interface. At the top, a window titled 'Student\_Athletes' displays the table structure with fields: student\_id (primary key), first\_name, middle\_name, last\_name, gender, and date\_of\_birth. Below this, a query window shows the following SQL query:

```
SELECT COUNT(student_id)
FROM Student_Athletes
WHERE last_name LIKE "Sm*"
ORDER BY last_name
```

The results table at the bottom is as follows:

| Field:    | student_id                          | last_name                |
|-----------|-------------------------------------|--------------------------|
| Table:    | Student_Athletes                    | Student_Athletes         |
| Total:    | Count                               | First                    |
| Sort:     |                                     |                          |
| Show:     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Criteria: |                                     | Like "Sm*"               |
| or:       |                                     |                          |



## Queries

6. Which students have last names with 'nn' somewhere in the middle?

```
SELECT COUNT(last_name)  
FROM Student_Athletes  
WHERE last_name LIKE "*nn*"
```

- Use wildcard (\*) at both ends



## Queries

7. What are the average points won by student athletes?

```
SELECT AVG(student_points_awarded) FROM  
Student_Athletes
```



## Queries

8. Show a listing of events sorted by starting date.

```
SELECT *  
FROM Events  
ORDER BY event_start_date
```





## Queries

9. How many students were born between 7/21/91 and 7/20/95 and have earned over 8 points?

```
SELECT last_name, first_name, points_earned
FROM Student_Athletes
WHERE
    date_of_birth > #7/21/1991# AND
    date_of_birth < #7/20/1995# AND
    points_earned > 8
```



# Queries

## 9. Design View:

The screenshot shows the Design View of a query named "Student\_Athletes". The query is based on the "Student\_Athletes" table. The design grid below shows the fields and criteria for the query.

| Field:    | last_name                           | first_name                          | date_of_birth                       | points_awarded_to_d                 |
|-----------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| Table:    | Student_Athletes                    | Student_Athletes                    | Student_Athletes                    | Student_Athletes                    |
| Sort:     |                                     |                                     |                                     |                                     |
| Show:     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Criteria: |                                     |                                     | >#7/21/1991# And <#7/20/1995#       | >8                                  |
| or:       |                                     |                                     |                                     |                                     |



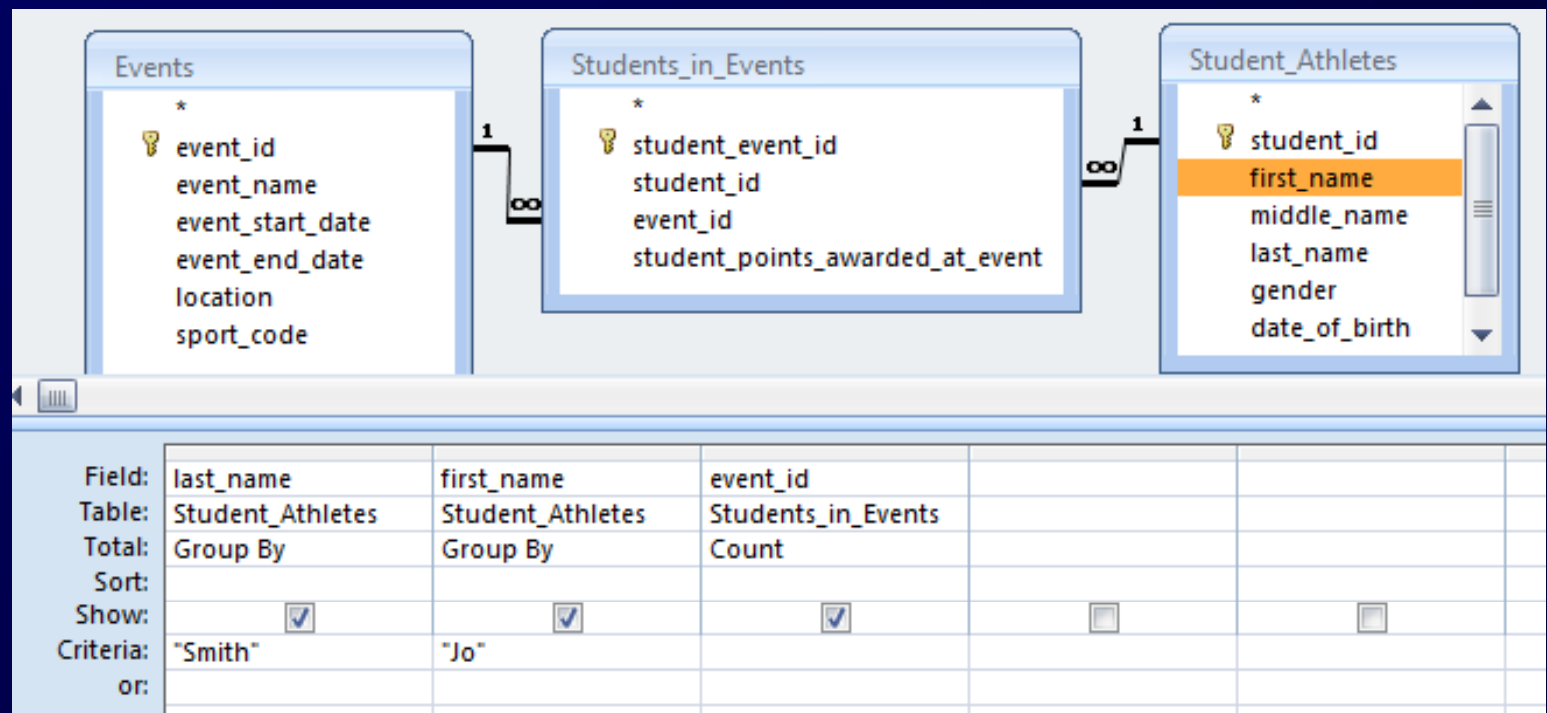
## Queries

10. How many times has Jo Smith competed?



# Queries

10. How many times has Jo Smith competed?





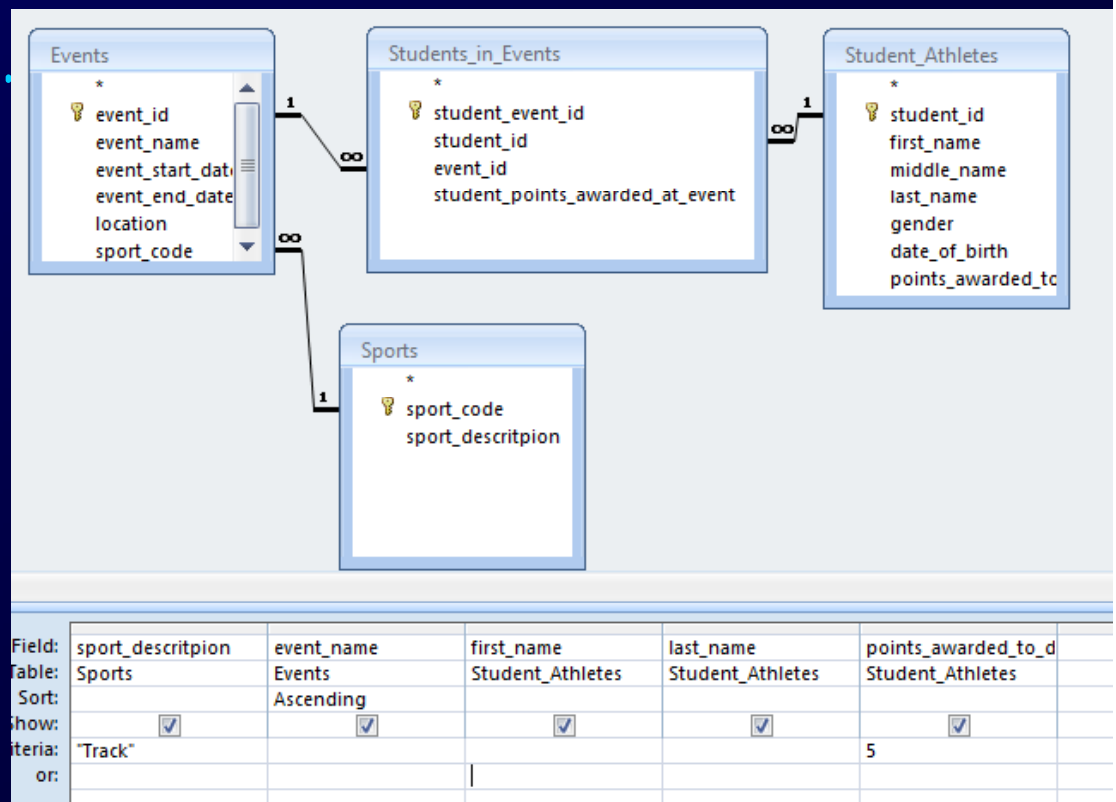
## Queries

11. List all the events involving track and students who have earned at least 5 points.



# Queries

11. List all the events involving track and students who have earned at least 5 points.





## Queries

12. List all students who have earned between 5 and 8 points sorted with highest points first.



# Queries

12. List all students who have earned between 5 and 8 points with highest points listed first.

Student\_Athletes

- \*
  - student\_id
  - first\_name
  - middle\_name
  - last\_name
  - gender
  - date\_of\_birth
  - points\_awarded\_to\_date

|           |                                     |                                     |                                     |
|-----------|-------------------------------------|-------------------------------------|-------------------------------------|
| Field:    | last_name                           | first_name                          | points_awarded_to_d                 |
| Table:    | Student_Athletes                    | Student_Athletes                    | Student_Athletes                    |
| Sort:     |                                     |                                     | Descending                          |
| Show:     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Criteria: |                                     |                                     | >2 And <9                           |
| or:       |                                     |                                     |                                     |





## Queries

13. Show a listing of the average number of points won by students in each sport.



For more information

- **sum, avg, max, min, count, etc.**
- **W3 Schools: SQL Tutorial**
  - \* **Search for Aggregate Functions**
  - \* [http://www.w3schools.com/sql/sql\\_groupby.asp](http://www.w3schools.com/sql/sql_groupby.asp)