Intermediate SQL

Dr. John Artz

Outline

- Nested Queries
- Built-in Functions
- Group By
- Views

Nested Queries

- Last Week We Saw Some Queries That Would Allow Us To Provide a List of Values in the Selection Criteria
- This Week We Will Extend That Idea into Nested Queries

Recall: In Example

Select Weather from Days
Where DoY in (1,8,9,12);

Note1: This is Just a List

Note2: This Query is Just Another Way of Doing an Intersection

Not In

Select Distinct(Weather) from Days
Where DoY Not in (1,8,9,12);

Note: This is Query is Just Another Way of Doing a Difference

Semantics and Justification

- In Order to Really Understand an SQL Query, You Should be Able to Provide a Context for the Query and Explain What the Results Mean Within the Semantics of the Domain
- And You Should Always Be Able to Translate From a Question to a Query, or From a Query (or Result) to What It Means in That Domain

In and Not In

Select Weather from Days
Where DoY in (1,8,9,12);

Select Distinct(Weather) from Days
Where DoY Not in (1,8,9,12);

Why Would These Questions Be Asked?

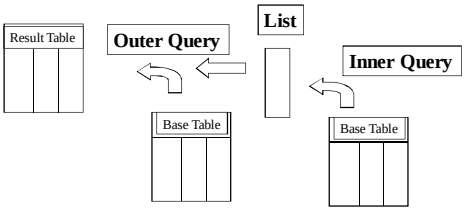
Nested Query

Select Weather from Days
Where DoY in
(Select DoY from Days
where Holiday = 1);

Select Weather from Days
Where DoY in
(Select DoY from Days
where DoW = “Fri”);

Note: These Inner Queries Produce Lists

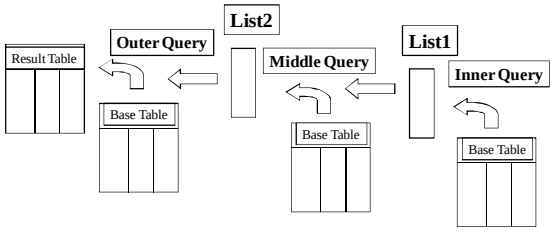
Nested Query, Pictorially



Nesting Deeper & Different Tables

```
Select * from Sales where StoreId in
(Select StoreId from Stores where MgrId in
(Select MgrId from Managers where Years > 10))
And DoY < 7
And SoupId = 1
And PromoId = 1;
```

Deeper Nesting



Built In Functions

- Built-in Functions:
  - Count - Number of Values in a Column
  - Sum - Sum of Values in a Column
  - Avg - Avg of Values in a Column
  - Max - Largest Value in a Column
  - Min - Smallest Value in a Column

Count Built-in Function

Count all Stores

```
.headers on
select count(*) from Stores;
```

Count all Basic Stores

```
select count(*) from Stores
Where size = “Basic”;
```

Renaming Expressions

Count All Basic Stores

```
select count(*) as BasicStores
from Stores
Where size = “Basic”;
```

Avg Built-in Function

What was the average Sales
On Day 1, For Store 1, Soup 1

```
select avg(Sales) from Sales
Where DoY = 1
And StoreId = 1
And SoupId = 1;
```

Sum Built-in Function

What was the Total Sales
On Day 1, For Store 1, Soup 1

```
select sum(Sales) from Sales
Where DoY = 1
And StoreId = 1
And SoupId = 1;
```

Using Count and Sum For Avg

```
select sum(Sales)/Count(Sales)
from Sales
Where DoY = 1
And StoreId = 1
And SoupId = 1;
```

Max and Min

```
Select max(Years) from Managers;

Select min(Years) from Managers;

Select max(Years) – min(Years)
From Managers;

Select max(Years) – min(Years)
As Range From Managers;
```

Aggregates and Nested Lists

```
Select Location from Stores
Where StoreId in
(Select StoreId
From Sales
Where sales >=
(Select Max(sales)
From Sales));
```

Counting Occurrences

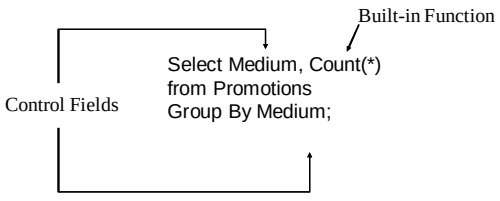
```
Select Count(*)
From Promotions
Where Medium = "Radio";

Select Count(*)
From Promotions
Where Medium = "Instore";
```

This Wouldn't Be Too Bad If We Only Has a Few Mediums

But, What If There Were Dozens or Hundreds?

Summarizing Using Group By

How Often is Each Medium Used?



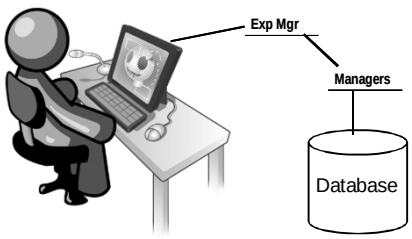
Multiple Control Fields

```
Select Vendor, Mode, Count(*)
from Soups
Group By Vendor, Mode;
```

Views

- Views Are Virtual Tables That Are Used to Provide a Layer of Data Independence Between the User and the Database
- They Can Be Used to Simplify Queries, or Restrict Access to Sensitive Data

Views, Pictorially



Creating a View

```
Create View ExpMgrs as
Select * from Managers
Where Years > 5
```

Using a View

```
Select * from ExpMgrs
```

Views are Referred to as a Queries In Microsoft Access

From the Users Perspective There is no Difference Between A View and a Table, Except Possibly in Performance

Better Than Average Managers

```
Create View BTAMgrs as
Select * from Managers
Where Years >=
(Select avg(Years) from Managers);

Select * from BTAMgrs;
```

Summary

- Nested Queries
- Built-in Functions
- Group By
- Views