What is a Relational Database?

*game, **set**, match*

Overview

- Databases and data integrity
- Relational reaction to integrity issues
- Dr. Codd uses math

Table Stores Entities

- **Row in table represents entity**
  - columns describe attributes of an entity
- **Table stores one kind of entity**
  - attributes do not determine kind

Paint Can Table

Opening	Volume	Qty
3"	1qt	12
4"	1qt	9
4"	1gal	8

An Entity is Unique

- **Entity represents real world item**
  - there is only one of each
- **Identified by its attributes**

SQL Server

Entity Framework 4.0 By Example	*Beginner*	[02:18:50]	08/27/2010
Entity Framework and Data Models	*Intermediate*	[01:31:38]	11/05/2010
Introduction to Data Warehousing and Business Intelligence	*Beginner*	[01:13:19]	11/30/2010
PowerPivot for Microsoft Excel 2010	*Beginner*	[02:23:40]	11/05/2010
Reporting Services Report Development Fundamentals	*Beginner*	[04:47:28]	12/14/2010
SQL Server - TSQL	*Intermediate*	[04:46:26]	03/22/2010
SQL Server Business Integration Tools	*Beginner*	[03:32:32]	05/10/2010
SQL Server Fundame…	*Beginner*	[07:55:35]	06/15/2010
Using XML and XQue…		[05:29:07]	08/20/2010

primary key violation

http://www.pluralsight… …oft/olt/courses.aspx

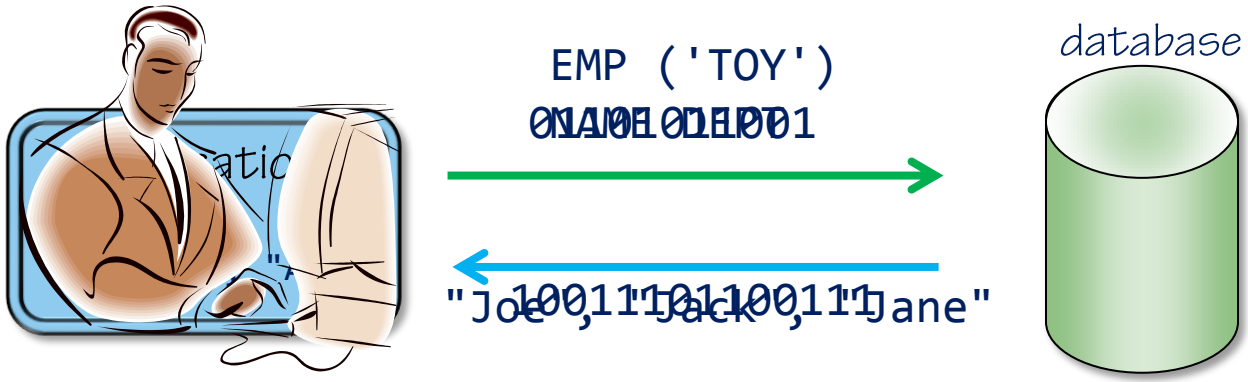
Text Based Language

- Access database with text based language
- Data in and out as text

SQL

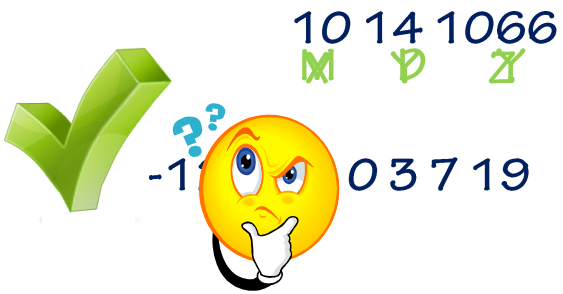
SEQUEL

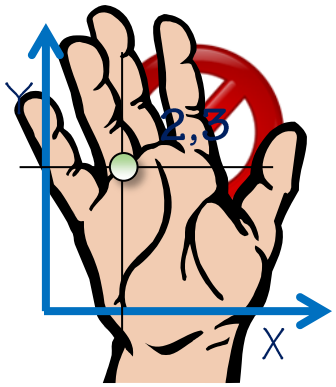
SQUARE



Scalar Values

- **Table stores scalar values**
  - non-scalars make set operations difficult

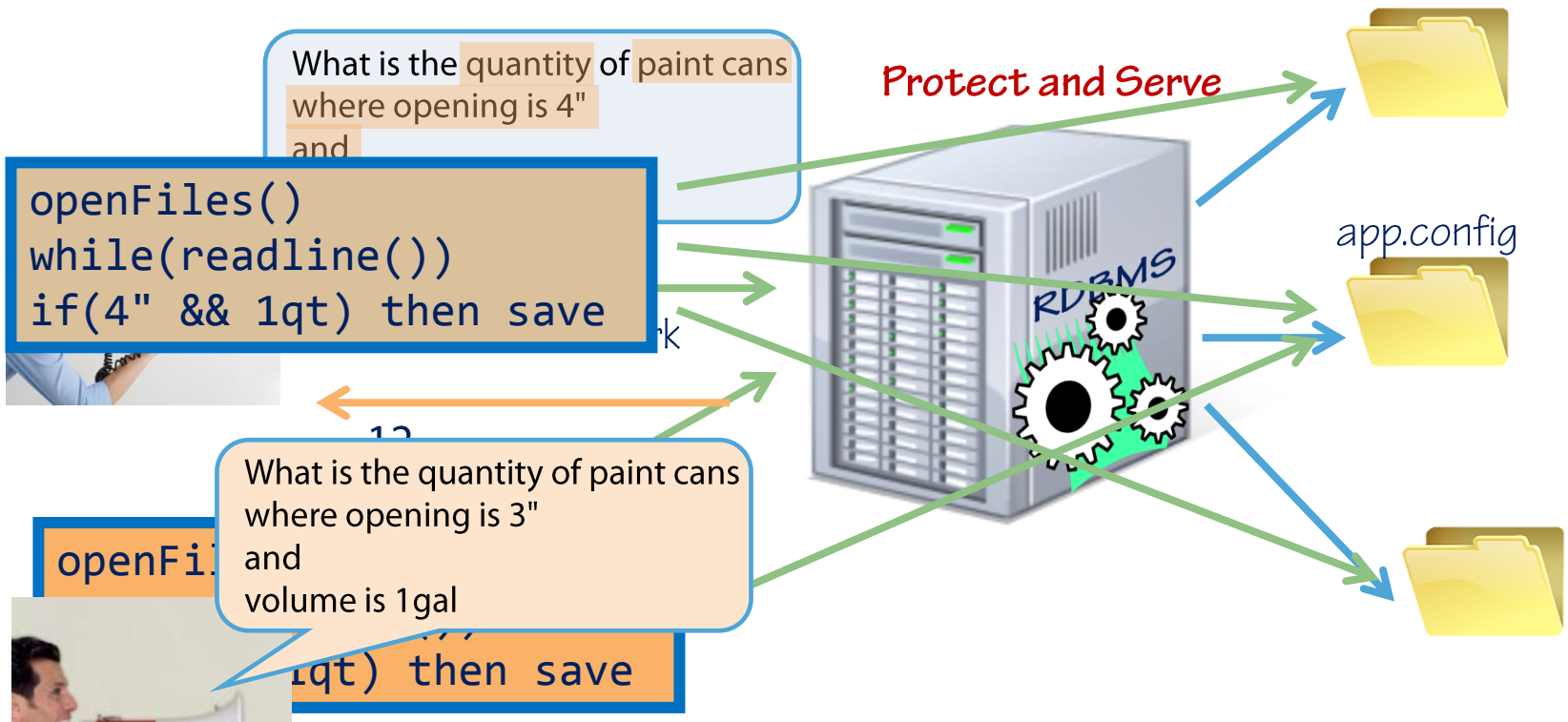




Name	X	Y
Joe	2	3

RDBMS

- Relational database management system



Summary

- **Relational databases were response to data integrity problems**
- **Relational database follows Dr. Codd's rules**
  - Table filled with entities
  - Table has Primary Key
  - Text based language
  - Scalar Values
  - RDBMS
- **Rules are meant to be broken.**

References

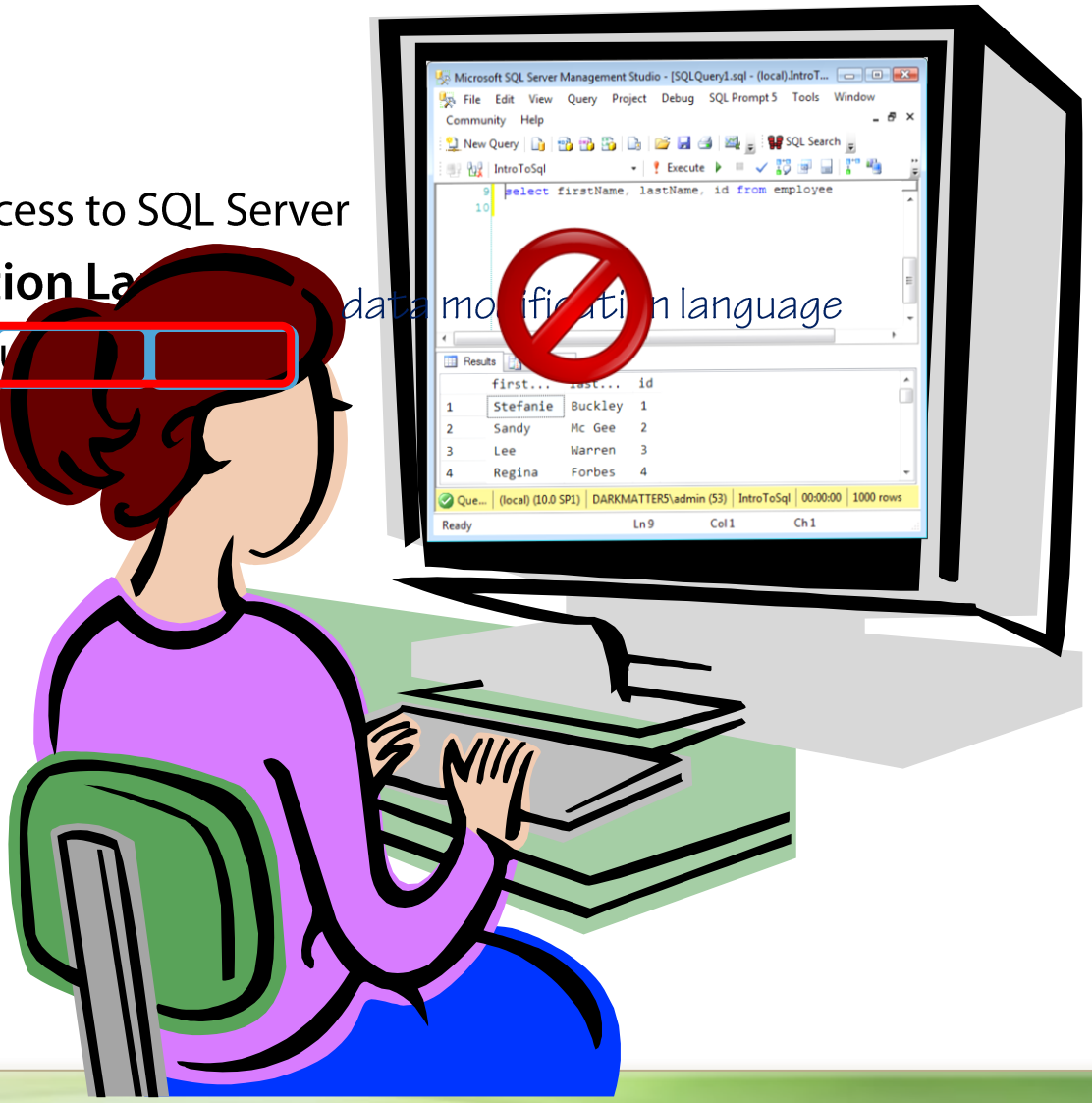
- Search for "Codd's Rules"
- A Relational model of data for large shared databanks
  - http://portal.acm.org/citation.cfm?id=358007
- SQUARE
  - http://portal.acm.org/citation.cfm?id=361219.361221
- SEQUEL — What started it all
  - www.almaden.ibm.com/cs/people/chamberlin/sequel-1974.pdf

Manipulating Data with T-SQL

DML, *not DHL*

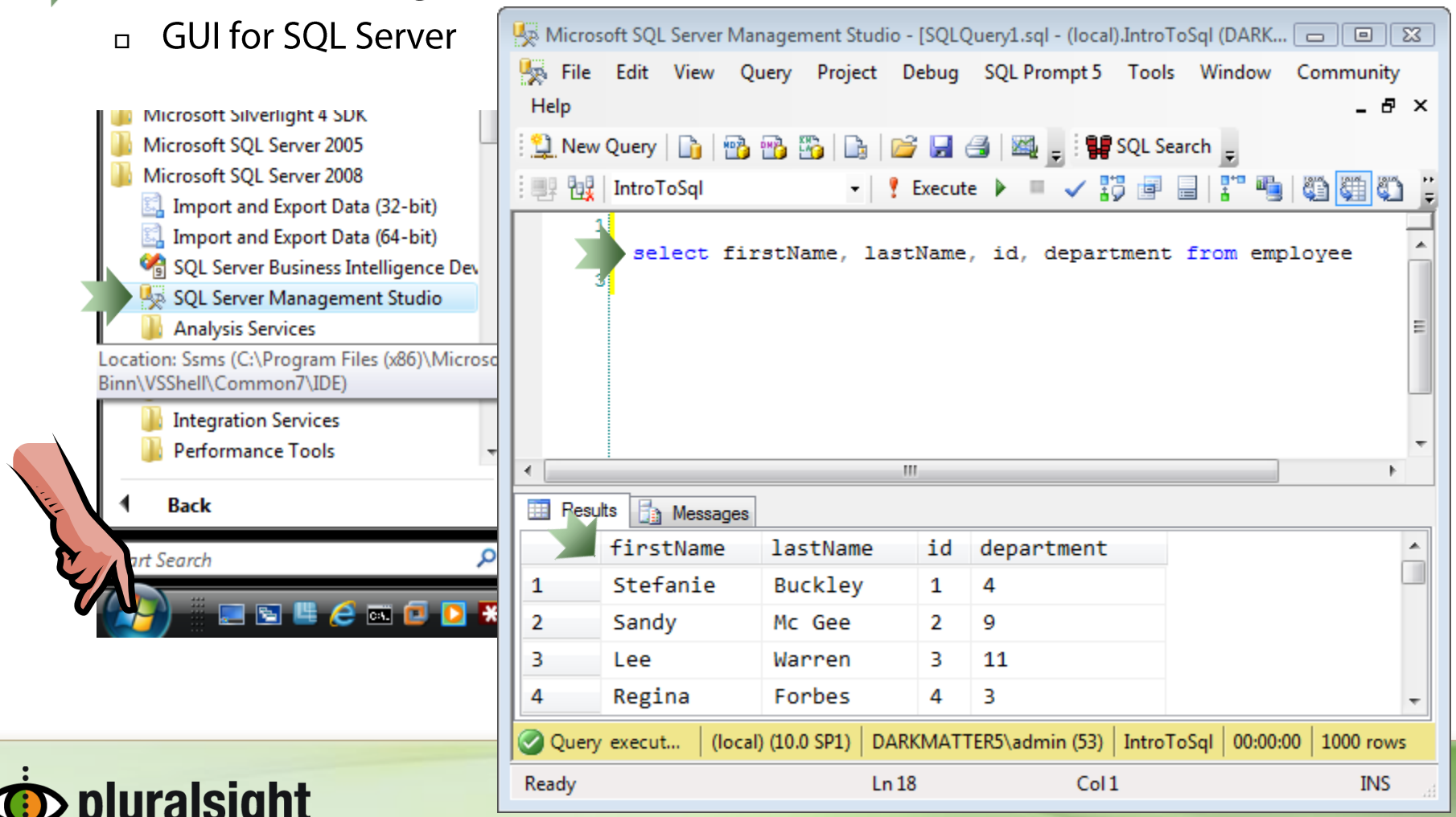
Overview

- **SSMS**
  - text based access to SQL Server
- **Data Manipulation La** *data mo ifi ati n language*
  - select, insert,



SSMS

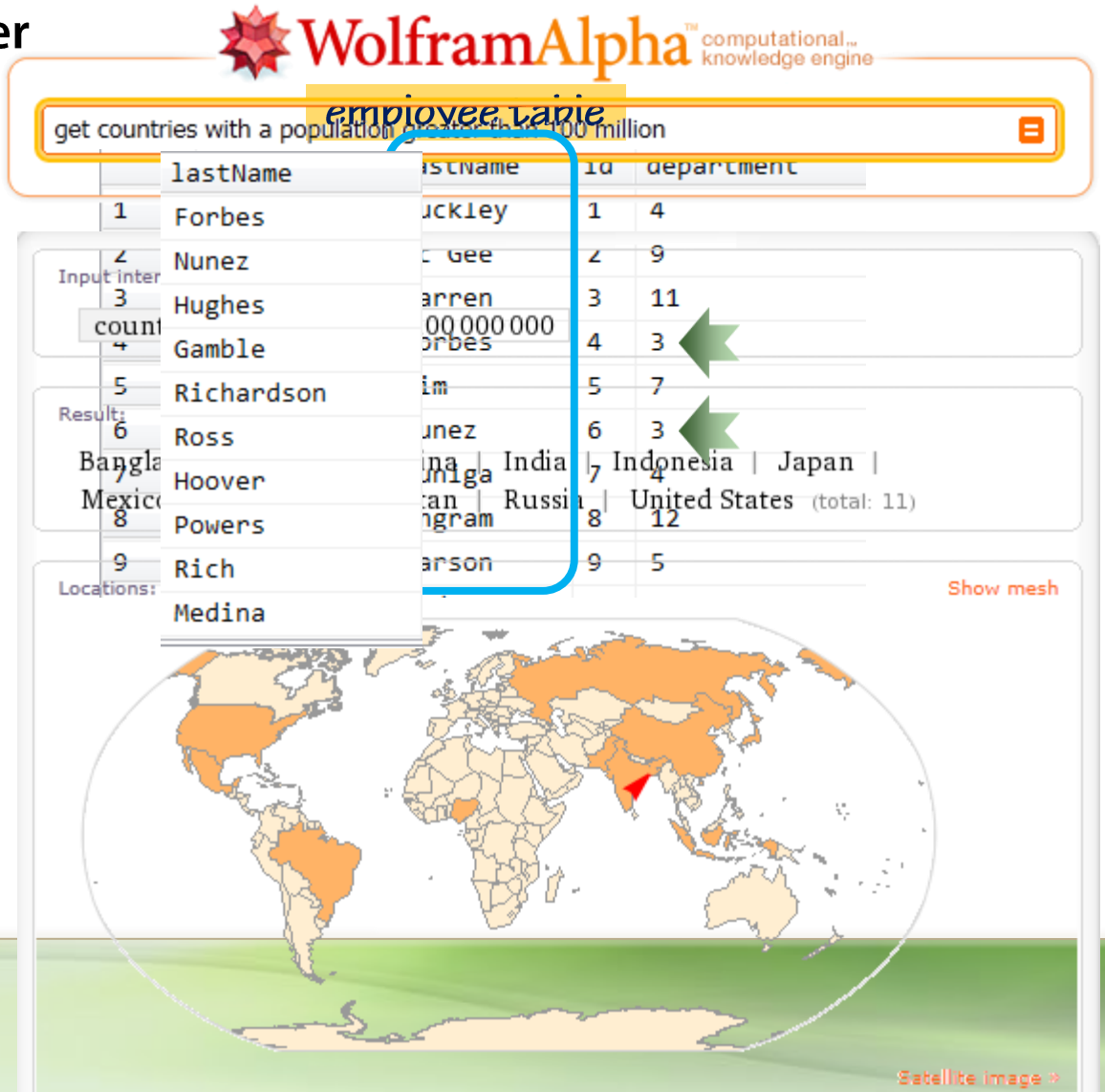
- **SQL Server Management Studio**
  - GUI for SQL Server



Select

- **Gets data from SQL Server**
  - declare not steps

```
select
lastName
from employee
where department = 3
```



Insert

- **Add data to a table**
  - table is a set of entities
- **Missing data**
- **Default data**

```
insert into people values ('Herman', 'Adkins', 'DarkSlateGrey')
```

People Table

	first name	last name	favorite color
1	Sara	Abbott	WhiteSmoke
2	Lance	Acevedo	SeaShell
3	Tiffany	Acosta	Bisque
4	Ruby	Adams	PaleGreen

null value

default favorite color

Update

- Update is applied to set
- Need to be able to find it to update it
  - primary key

```
update
where [first name] = 'Sara' and [last name] = 'Abbott'
```

Delete

- Delete is applied to a set
- Need to be able to find entity to delete it
  - primary key

```
delete
where [first name] = 'Sara' and [last name] = 'Abbott'
```

remove these entities
primary key

JOIN

Combines two sets of data

- used to answer questions that involve more than one table

first name	last name	favorite color	brand	model	color	vin	price
Herman	Adkins	DarkSlateGrey	Buick	sports	DarkSlateGrey	0I2LZ2JO2BDZGWYMX	717.6994
Herman	Adkins	DarkSlateGrey	Fairlane	muscle	DarkSlateGrey	19OHH9S762WF0BS74	1493.5998
Herman	Adkins	DarkSlateGrey	Toyota	muscle	DarkSlateGrey	3V3QYZJP5Q21I6Q0O	840.5828
Herman	Adkins	DarkSlateGrey	Hyundai	sports	DarkSlateGrey	46533U9FN3I2J1ROK	1396.2827
Herman	Adkins	DarkSlateGrey	Buick	station wagon	DarkSlateGrey	4B3XP48HX2XWWBI4I	939.9062
Herman	Adkins	DarkSlateGrey	Toyota	cabriolet	DarkSlateGrey	4U6QCQPJS4NT19K33	1358.936
Herman	Adkins	DarkSlateGrey	Hyundai	suv	DarkSlateGrey	SED6SK6DXQ100UPQA	1147.2572
H[illegible]	Ad[illegible]	Dark[illegible]	[illegible]ota	[illegible]usc[illegible]	Da[illegible]Slat[illegible]ey	[illegible]R9L[illegible]FOA1[illegible]5N	[illegible]6.0[illegible]
K[illegible]stie	A[illegible]rson	Gold	[illegible].ck	spo[illegible]	G[illegible]	8BS[illegible]12Z[illegible]+E9	[illegible].6.6
Kristie	Anderson	Gold	Hyundai	sedan	Gold	LYDXG3UVPXDV8HJG1	910.9316
Kristie	Anderson	Gold	Fairlane	sports	Gold	HREN5NZZXX8EANWSC	760.4061
Kristie	Anderson	Gold	Fairlane	station wagon	Gold	I2CZBPVSZS3P5YP73	1258.2411
Kristie	Anderson	Gold	Buick	suv	Gold	ICD6ZDON47K7FDIRN	1460.7933
Kristie	Anderson	Gold	Cheverolet	sports	Gold	J3BF9F6AN2KL1ES9U	1442.3852
Kristie	Anderson	Gold	Jagurar	cabriolet	Gold	FEO8TLH1SWYG94G51	1045.2486
K[illegible]stie	A[illegible]rson	Gold	[illegible]ick	seda[illegible]	G[illegible]	[illegible]T8L[illegible]NI3K[illegible]XEO	[illegible]239.[illegible]9

Summary

- SSMS
- Select
- Insert
- Update
- Delete

References

- http://www.wolframalpha.com

Using SELECT

Asking questions of your data

Overview

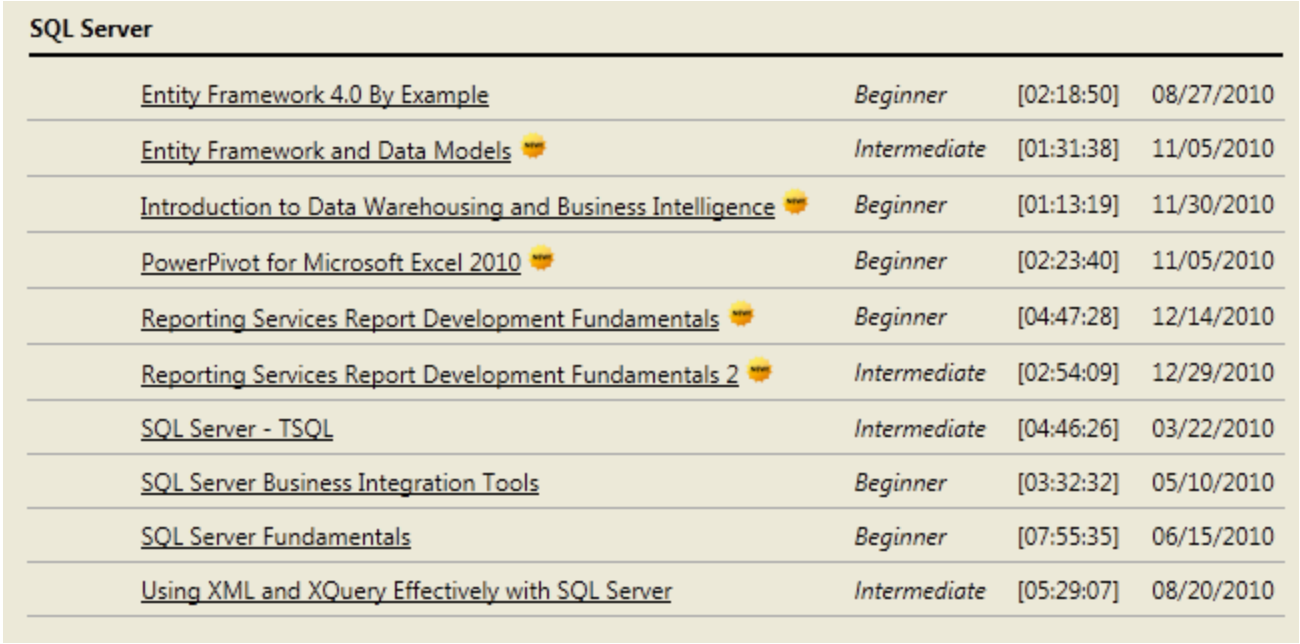
- People
- Car Stock
- Inspection
- Queries
- Aggregates
- Join

Summary

- Select returns set
- Specify columns
- Where filters set
- Null treated specially
- Aggregate function
- Join

References

- **Redgate SQL Prompt**
  - http://www.red-gate.com/products/sql-development/sql-prompt
- **http://www.pluralsight-training.net/microsoft/olt/courses.aspx**



SQL Server

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Using XML and XQuery Effectively with SQL Server	*Intermediate*	[05:29:07]	08/20/2010

Using Insert, Update, and Delete

Making changes

Overview

- Insert
- Update
- Delete

Insert

- **Insert adds entities**
  - entity defined by it's attribute values
- **null value**
- **default value**

Update

- Update changes value of attribute
- Applied to a set of entities

Delete

- Delete removes entities
- Applied to a set

Summary

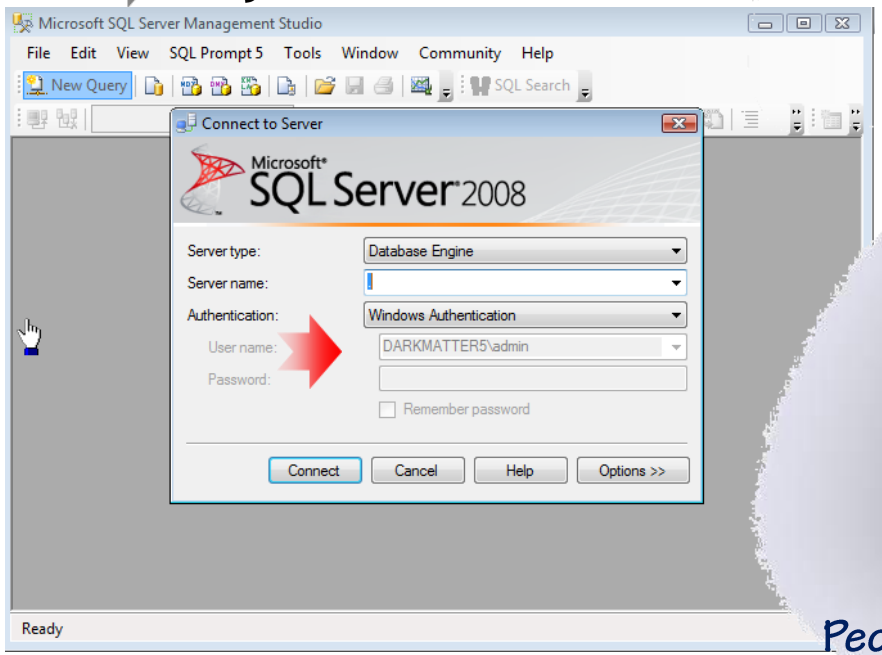
- **Insert add data**
  - can be used to create a table
- **Update changes data**
  - can be combined with select
- **Delete removes data**

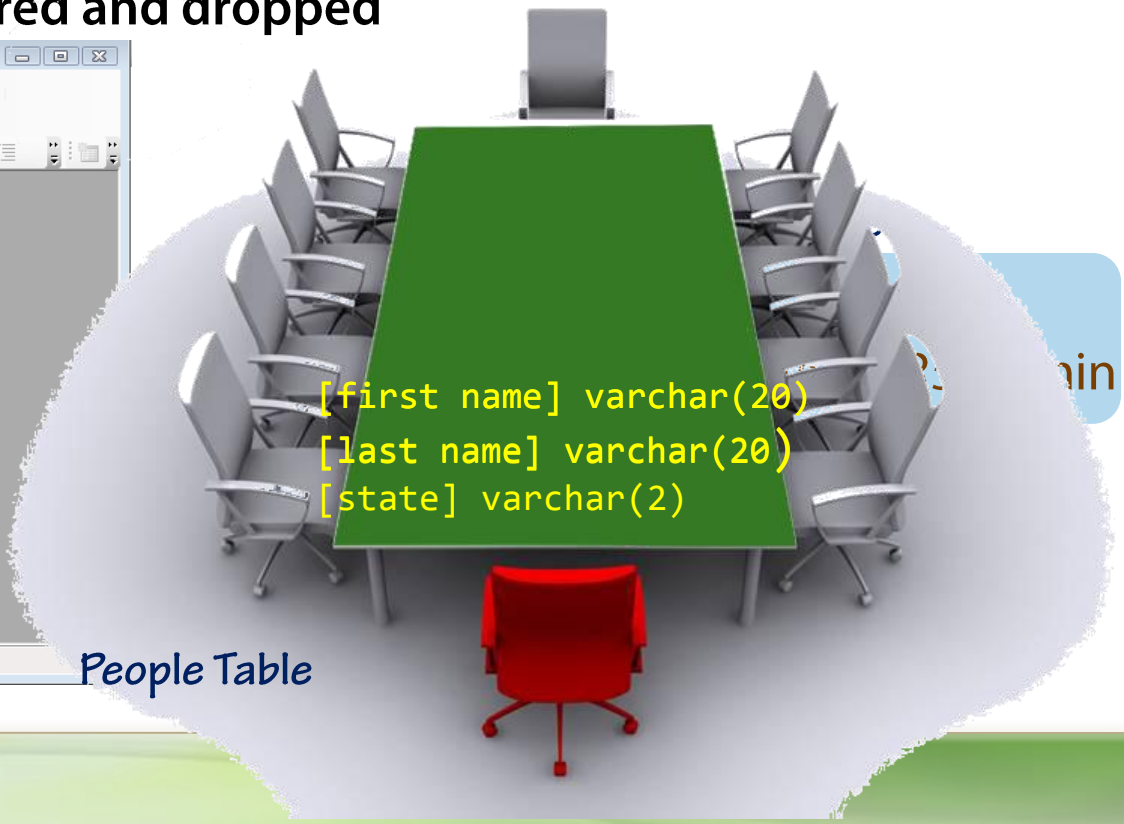
Data Definition Language

Defining your data

Overview

- Everything is done with SQL
- DDL is used to create object
  - a table is an object
- Objects are created, altered and dropped





Create Table

- Makes a new table by defining its columns
- Default, null, primary key

Alter Table

- **Definition of table can change**
  - don't use '*'

Drop Table

- **Throw away table**
  - and all its data!

Summary

- DDL is the text based language for managing SQL Server
- Create adds objects, like tables
- Alter changes the definition of an object
- Drop throws away an object