Databases & SQL Basics

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Databases

RDBMS	**NoSQL**
● relationships ● primary keys ● data integrity (no duplicates)	● scalability ● key/value store ● not only sql ● large datasets
● Oracle ● MySQL ● MSSQL	● Cassandra ● CouchDB ● MongoDB

What to use?!?!

Toad - Free

Toad for SQL Server

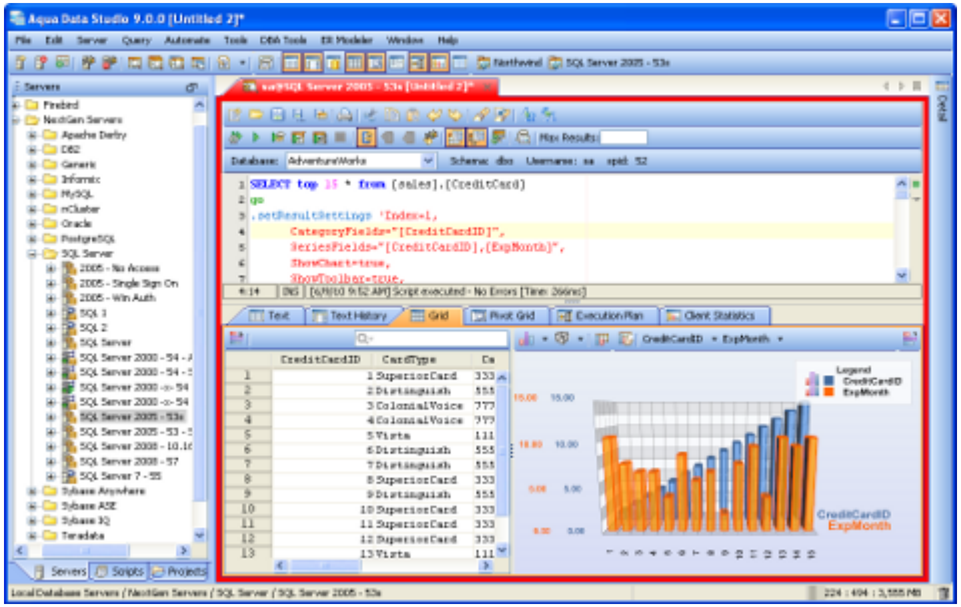
DbVis - Free (limited)

DbVis Software

Aqua Data Studio (14 Day Trial)

AQUAFOLD

There are many clients out there, these are the ones we have ran into and found nice to use.



Database: AdventureWorks Schema: dbo Username: sa spid: 52

```
SELECT top 15 * from [sales].[CreditCard]
go
.setResultSettings 'Index=1,
      CategoryFields="[CreditCardID]",
      SeriesFields="[CreditCardID],[ExpMonth]",
      ShowChart=true,
      ShowToolbar=true,
```

[6/9/10 9:52 AM] Script executed - No Errors [Time: 266ms]

	CreditCardID	CardType	Ca
1	1	SuperiorCard	333
2	2	Distinguish	555
3	3	ColonialVoice	777
4	4	ColonialVoice	777
5	5	Vista	111
6	6	Distinguish	555
7	7	Distinguish	555
8	8	SuperiorCard	333
9	9	Distinguish	555
10	10	SuperiorCard	333
11	11	SuperiorCard	333
12	12	SuperiorCard	333
13	13	Vista	111

Local Database Servers / NextGen Servers / SQL Server / SQL Server 2005 - 53s

Download & Connect

x = the number you are assigned

Server: 205.125.117.5
Username: summit_x
Password: techsummit2013
Database: summit_x
Port: 3306

Tables

- A **table** is a set of data elements (values) that is organized using a model of vertical columns (which are identified by their name) and horizontal rows, the cell being the unit where a row and column intersect.
- A table has a specified number of columns, but can have any number of rows.

What is this SQL?

SQL stands for `Structured Query Language`

Used in RDBMS, although each database type (oracle, mysql, mssql…) vary in syntax when using specific keywords in the SQL.

Example:

```
SELECT name FROM users;
```

More Examples?

```sql
SELECT name FROM users WHERE name = "scott"

SELECT name, gender FROM users WHERE name = "scott" or gender = "m"
```

Differences in SQL Syntax and Keywords

MySQL	**MSSQL**	**Oracle**
Limit = 1	SELECT TOP 10	ROWNUM > 1
DATE_FORMAT (posted_date,'%m-%d-%Y')	convert(varchar, posted_date, 103)	TO_CHAR(posted_date, 'YYYY/MM/DD')

http://www.dba-oracle.com/oracle_news/2005_12_16_sql_syntax_differences.htm

SELECT Syntax

A Basic Select

SELECT (fields) FROM (tablename)

SELECT * FROM users

SELECT firstname, phone FROM users

Conditions

Adding Conditions

```
SELECT first_name FROM employees
WHERE first_name = "susanna" OR
first_name = "susanne"
```

LIKE Condition

```
WHERE first_name LIKE "sus%" AND
last_name LIKE "%range%"

WHERE firstname LIKE "%s%"
```

ORDER BY

SELECT (fields) FROM (tablename) ORDER BY [field] [asc desc]

Problem:

Boss needs all the users whose last name start with the letter B.

Case Statements

```
CASE case_value
    WHEN when_value THEN statement_list
    [WHEN when_value THEN statement_list]
[ELSE statement_list]
END
```

```
CASE username_status
     WHEN 0 THEN "inactive"
ELSE "active"
END AS "User_Status"
```

Problem:

Boss needs all the users whose last name start with the letter B and their Gender. He wants to make their gender say Male or Female, not M or F.

Updating Data

UPDATE tablename SET field=value, field2=value WHERE field=value

You can be creative with updating data as you learn more syntax and become more advanced.

Always use a SELECT statement before the UPDATE. Make sure you have the correct WHERE conditions before UPDATING. There is no undo.

MySQL Operators:

Arithmetic Operators	
+ - * / DIV MOD	
Comparison operators	
= <> = << = >> =	Correctly returns 1, the error returns 0
<=>	NULL security equal, unlike = NULL can also be used to compare
BETWEEN	a BETWEEN min AND max
IN	a IN (value1, value2, ..., valuen)
IS NULL	
IS NOT NULL	
Like (wildcard)	a LIKE% 123%

MySQL Operators:

REGEXP (regular expressions)	STR RegExp str_part are
IN	a IN (value1, value2, ..., valuen)
IS NULL	
IS NOT NULL	
Like (wildcard)	a LIKE% 123%
REGEXP (regular expressions)	STR RegExp str_part are
Logical Operators	
NOT!	not null return value is null
AND &&	
OR | |	
XOR	

Problem:

Your boss approaches you with a request. An employee was upset that his department was not labeled correctly in the database.

You need to change the department name for dept_no d004 from Production to Warehouse.

Unfortunately, he hasn't stopped talking to you. He also wants you to lower the salaries of everyone that is above 50,000 to be 5,000 less. He stresses that it's necessary and the board is making him and reminded you of the announcement last meeting about it.

Insert Data

INSERT INTO tablename VALUES (value,value,value)

or

INSERT INTO tablename (firstname, lastname) VALUES (value,value)

Problem:

Your boss approaches you with a request. He said he was running reports on the database and you are not in the employees table. He wants you to add yourself into the employee table.

He mentioned you should make a title for yourself in the titles table, using your new employee id.

Remove Data

DELETE FROM tablename WHERE field=value AND field=value

Problem:

Your boss approaches you with a request. You notice his black eye. He said he had a employee rage on him after being told about the $5,000 salary reduction. The employee was fired. His name is Mario Straney.

He wants you to remove that employee from the database.

- Select the employee from the employees table. (get the employee id)
- go in each table and remove the employee based on the employee id.

Dates

This is a constant use in records. It varies in SQL syntax depending on your database type (oracle, mssql, mysql).

Between two dates:

```
BETWEEN str_to_date("2013-04-00", '%Y-%m-%d') AND str_to_date("2013-08-00", '%Y-%m-%d')
```

Greater than equal to a date:

```
date.value >= str_to_date("2013-04-00", '%Y-%m-%d')
```

Difference in days between two dates:

```
DATEDIFF('2007-12-31 23:59:59','2007-12-30');
```

https://dev.mysql.com/doc/refman/5.5/en/date-and-time-functions.html

Table Data Types

There are the most common there are many others data types.

Int	Whole Numbers
Double	Decimal Points
VarChar	specified length of text
TEXT	65,535 length
DATETIME	Date and Timestamp
TIMESTAMP	a timestamp (YYYYMMDDhhmmss)

http://dev.mysql.com/doc/refman/5.0/en/data-types.html
http://kimbriggs.com/computers/computer-notes/mysql-notes/mysql-data-types-50.file

Primary Keys and Foreign Keys

Primary Key: A unique identifier for each row in a table. In our database it is the emp_no for employee number.

A table can only have one PK but it can have a unique key to assist the primary key.

Primary Keys and Unique Keys can combine multiple columns to have a grouped key. Such as a social security number and drivers license.

Primary Keys and Foreign Keys

Foreign Key: A foreign key is an id that points to another tables primary key. In our problems we had a emp_no in the titles table that was coming from the employees table. Because we use systems that use Relationships, foreign keys is what creates those relationships.

What is cool about foreign keys is, if the database tables are setup correctly. You can add constraints to the tables. We could then try and delete an employee. It would fail because of all the fks in the other tables. You must first delete those entries in the other tables to allow the deletion of the employee. It keeps our data clean.