SQL 101

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HAWES 201

An Overview of SQL

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▶ SQL stands for <u>S</u>tructured <u>Q</u>uery <u>L</u>anguage.

▶ It is the most commonly used relational database language today.

▶ Some of the most popular Database Engines are Microsoft SQL Server, MySQL, MongoDB, PostgreSQL etc.

SQL is used for:

- ▶ Data Manipulation
- ▶ Data Definition
- ▶ Data Administration
- ▶ All are expressed as an SQL statement or command.

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SQL Requirements

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▶ SQL Must be embedded in a programming language like PHP

▶ SQL is a free form language so there is no limit to the the number of words per line or fixed line break.

▶ Syntax statements, words or phrases are always in lower case; keywords are in uppercase.
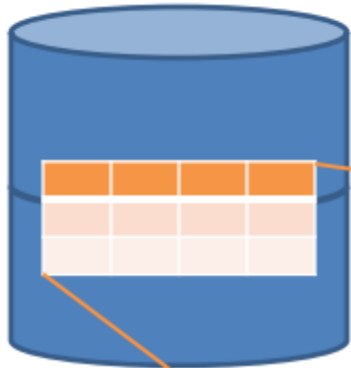
Not all versions are case sensitive!

Design

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▶ SQL represents all information (many data types) in the form of *tables*

▶ SQL is used for data manipulation, definition and administration

database

column

table

row ⟶

name	email	created_at	updated_at
Shawn	shawn@spbd.gov	2012-12-10 T 10:00 UTC	2013-02-16 T 14:00 UTC
Gus	gus@sbpd.gov	2012-12-01 T 07:00 UTC	2013-02-17 T 09:00 UTC

Table Design

Columns describe one characteristic of the entity

Rows describe the Occurrence of an Entity

Name	Address
Jane Doe	123 Main Street
John Smith	456 Second Street
Mary Poe	789 Third Ave

Brad

kowski

▶ Queries search the database, fetch info, and display it. This is done using the keyword
SELECT

```
SELECT * FROM publishers
```

pub_id	pub_name	address	state
0736	New Age Books	1 1st Street	MA
0987	Binnet & Hardley	2 2nd Street	DC
1120	Algodata Infosys	3 3rd Street	CA

- The * Operator asks for every column in the table. We can add "ORDER BY" at the end of the statement as:
```
SELECT * FROM publishers ORDER BY "pub_id" [ASC]
```

Data Retrieval (Queries)

▶ Queries can be more specific with a few more lines

```
SELECT *
from publishers
where state = 'CA'
```

1120	Algodata Infosys	3 3rd Street	CA

- Only publishers in CA are displayed

Data Input

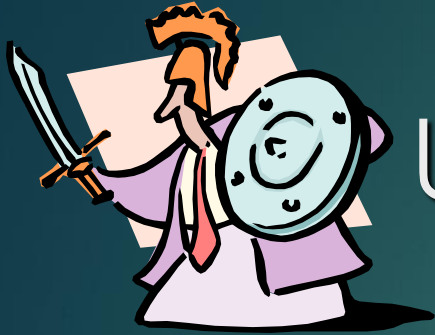▶ Putting data into a table is accomplished using the keyword

INSERT

```
INSERT INTO publishers
VALUES ('0010', 'pragmatics', '4 4th Ln', 'il')
```

Variable

Keyword

pub_id	pub_name	address	state
0010	Pragmatics	4 4th Ln	IL
0736	New Age Books	1 1st Street	MA
0987	Binnet & Hardley	2 2nd Street	DC
1120	Algodata Infosys	3 3rd Street	CA

- Table is updated with new information
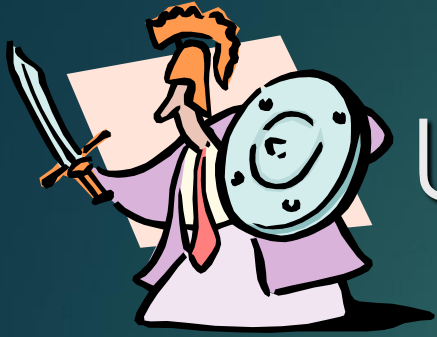
Using SQL

SQL statements can be embedded into a program (cgi or perl script, Visual Basic, MS Access)

OR

SQL statements can be entered directly at the command prompt of the SQL software being used (such as mySQL)

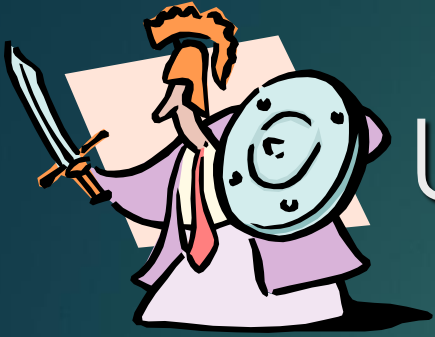Brad Lupo & Michelle Zukowski

Using SQL

To begin, you must first CREATE a database using the following SQL statement:

```
CREATE DATABASE database_name
```

Depending on the version of SQL being used the following statement is needed to begin using the database:
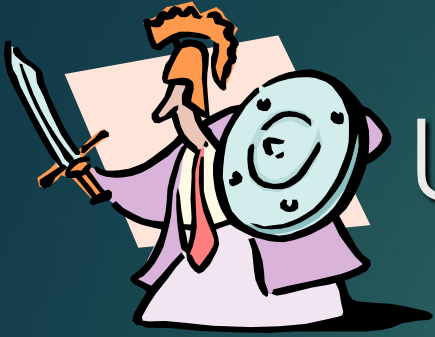
```
USE database_name
```

Using SQL

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▶ To create a table in the current database, use the CREATE TABLE keyword

```
CREATE TABLE authors
(auth_id int(9) not null,
auth_name char(40) not null)
```

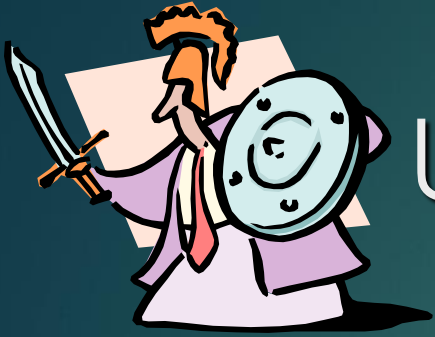| auth_id	auth_name
(9 digit int)	(40 char string)

Using SQL

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▶ To insert data in the current table, use the keyword INSERT INTO

```
INSERT INTO authors
values('000000001', 'John Smith')
```

- Then issue the statement

```
SELECT * FROM authors
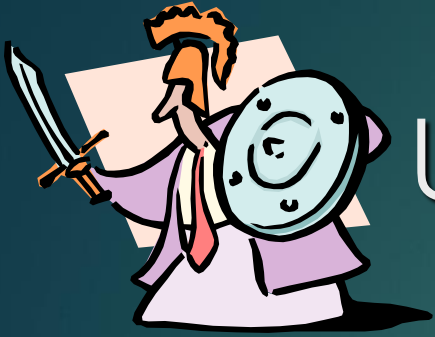```

| auth_id | auth_name |
|---|---|
| 000000001 | John Smith |

If you only want to display the author's name and city from the following table:

| auth_id | auth_name | auth_city | auth_state |
|---------|-----------|-----------|------------|
| 123456789 | Jane Doe | Dearborn | MI |
| 000000001 | John Smith | Taylor | MI |

```
SELECT auth_name, auth_city
FROM publishers
```

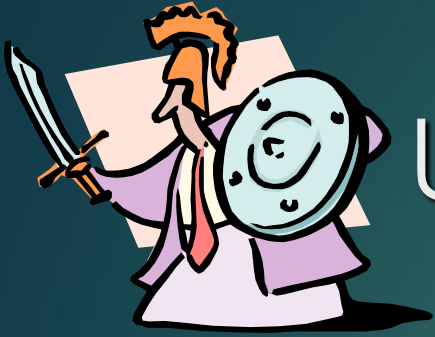| auth_name	auth_city
Jane Doe	Dearborn
John Smith	Taylor

Using SQL

To delete data from a table, use the DELETE statement:

```
DELETE from authors
WHERE auth_name='John Smith'
```

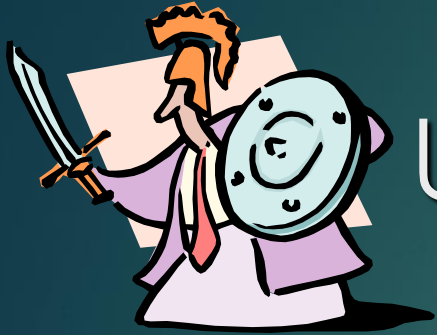| auth_id	auth_name	auth_city	auth_state
123456789	Jane Doe	Dearborn	MI

Using SQL

To Update information in a database use the UPDATE keyword

```
UPDATE authors
SET auth_name='hello'
```

auth_id	auth_name	auth_city	auth_state
123456789	Hello	Dearborn	MI
000000001	Hello	Taylor	MI

Sets all auth_name fields to hello

To change a table in a database use ALTER TABLE. ADD adds a characteristic.

```
ALTER TABLE authors
ADD birth_date datetime null
```
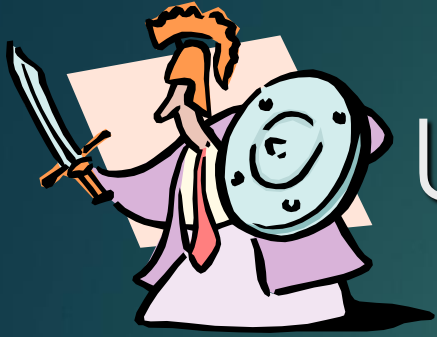
Type

Initializer

auth_id	auth_name	auth_city	auth_state	birth_date
123456789	Jane Doe	Dearborn	MI	
000000001	John Smith	Taylor	MI	

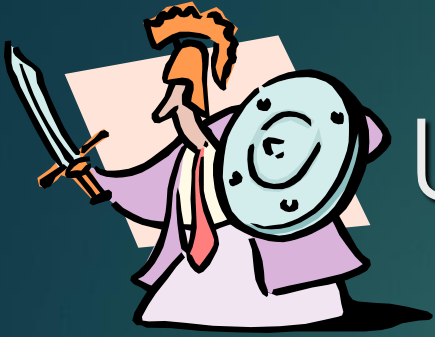ADD puts a new column in the table called birth_date

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Using SQL

To delete a column or row, use the keyword DROP

```
ALTER TABLE authors
DROP birth_date
```

auth_id	auth_name	auth_city	auth_state	
123456789	Jane Doe	Dearborn	MI	
000000001	John Smith	Taylor	MI	

DROP removed the birth_date characteristic from the table
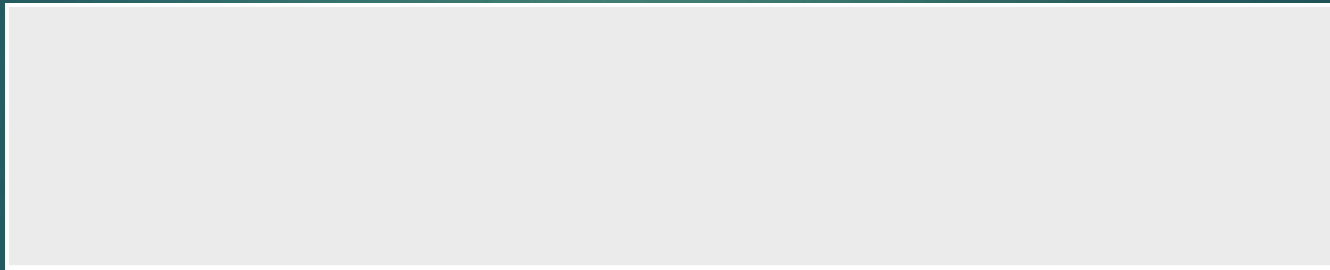
Using SQL

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The DROP statement is also used to delete an entire database.

`DROP DATABASE authors`

DROP removed the database and returned the memory to system

Conclusion

- ► SQL is a versatile language that can integrate with numerous 4GL languages and applications

- ► SQL simplifies data manipulation by reducing the amount of code required.

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Questions?

THANK YOU FOR COMING!

References

▶ "The Practical SQL Handbook", Third Edition, Bowman.

▶ Brad Lloyd and Michelle Zukowski
http://slideplayer.com/slide/5725404/

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