The Learning House
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Relational Databases Unit

Lesson 2 - Structured Query Language (SQL)

Objectives

- Use basic SQL statements for data manipulation:
  - Select
  - Where
  - Insert
  - Update
  - Delete
  - Join

Objectives (2)

- Brief introduction to basic SQL statements for database definition:
  - Create
  - Unique
  - Not Null
  - Keys

Quick Intro

- SQL is the standard language used to create, read, update, and delete data in relational databases
- Main components:
    - INSERT (create)
    - SELECT (read)
    - UPDATE (update)
    - DELETE (delete)

SELECT Example

```
SELECT
    CustomerName
FROM
    Customers
```

- Retrieves all customer names from the Customers table

The WHERE Clause

- You can filter results with the where clause:

```
SELECT
    CustomerName
FROM
    Customers
WHERE
    City = ‘Akron’;
```

Logical Operators

- You can use logical operators:

```
SELECT
    CustomerName
FROM
    Customers
WHERE
    City=‘Akron’ AND
PostCode=‘44311’
```

UPDATE

```
UPDATE
  table_name
SET
  column1=value1, column2_value2,...
WHERE
     some_column=some_value;
```

DELETE

```
DELETE FROM table_name
WHERE some_column = some_value;
```

Dangers

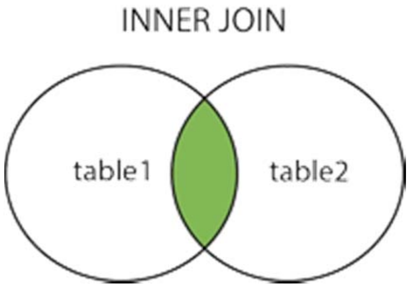
SQL Injection vulnerabilities allow users to run SQL statements against your database via web page input.

SQL Joins

Joins allow you to combine rows from two or more tables based on criteria that you choose.

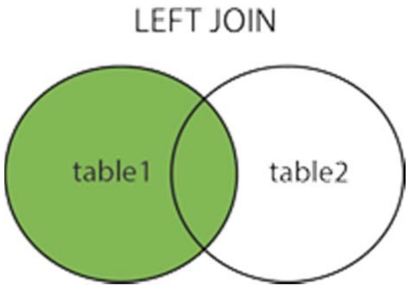
Inner Join (or just Join)

```
SELECT column_name(s)
FROM table1
INNER JOIN table2
ON table1.column_name = table2.column_name;
```



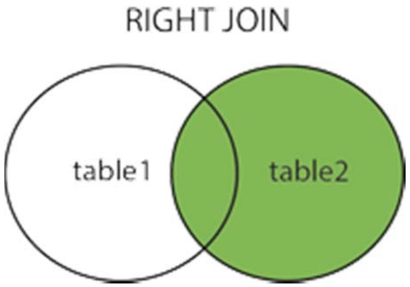
Left Outer Join (Left Join)

```
SELECT column_name(s)
FROM table1
LEFT OUTER JOIN table2
ON table1.column_name=table2.column_name;
```



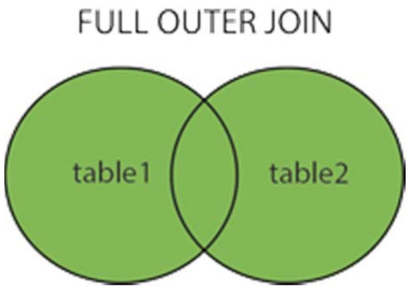
Right Outer Join (Right Join)

```
SELECT column_name(s)
FROM table1
RIGHT OUTER JOIN table2
ON table1.column_name=table2.column_name;
```



Full Outer Join

```
SELECT column_name(s)
FROM table1
FULL OUTER JOIN table2
ON table1.column_name=table2.column_name;
```



Data Definition Language

We can also use SQL to create and manipulate the database and tables themselves.

CREATE

```
CREATE DATABASE my_database;

CREATE TABLE my_table {
column1_name data_type(size),
column2_name data_type(size),
...
};
```

Constraints

```
NOT NULL
UNIQUE
PRIMARY KEY
FOREIGN KEY
```

Functions

There are several built in functions that allow you to perform calculations on data:

```
AVG()
COUNT()
MAX()
MIN()
SUM()
UCASE()
LCASE()
...
```

Resources

Good, quick reference at W3Schools

Homework

W3Schools:

- SQL Basics
- SQL Advanced
- SQL Functions

- Do all of these exercises against your local Northwinds database.