SQL

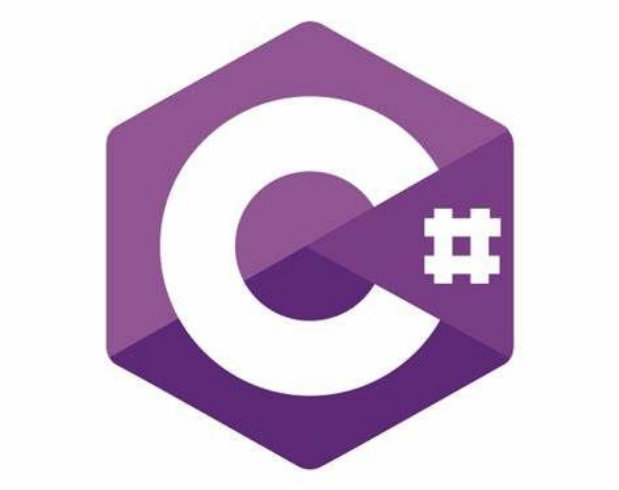
(Pronounced “Sequel”)

SQL

Structured **Q**uery **L**anguage

SQL

SQL is a secondary programming language



SQL

It is the language of databases

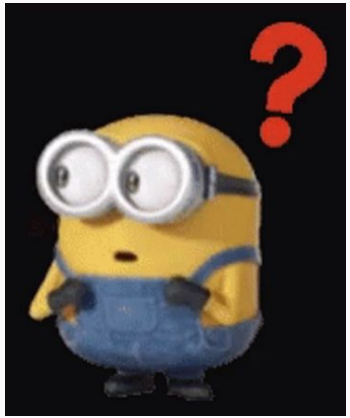
SQL

Reads a lot like English

```
SELECT * FROM Customers;
```

SQL

SQL Queries Data



History

SQL was initially **developed at IBM by Donald D. Chamberlin and Raymond F. Boyce in the early 1970s.**

History

This version, initially called SEQUEL (Structured English Query Language), was designed to **manipulate and retrieve data stored in IBM's original quasi-relational database management system,** System R, which a group at IBM San Jose Research Laboratory had developed during the 1970s. The acronym SEQUEL was later changed to SQL because "SEQUEL" was a trademark of the UK-based Hawker Siddeley aircraft company.

History

In the late 1970s, **Relational Software, Inc. (now Oracle Corporation)** saw the potential of the concepts described by Codd, Chamberlin, and Boyce, and developed their own SQL-based RDBMS with aspirations of selling it to the U.S. Navy, Central Intelligence Agency, and other U.S. government agencies. **In June 1979, Relational Software, Inc. introduced the first commercially available implementation of SQL, Oracle V2 (Version2) for VAX computers.**

What it’s for:

Managing and querying databases

Declarative Language

Unlike procedural languages where you define "how" to do something (like C#, C++, Java, or Python), SQL is a declarative language where you **specify "what" you want to do**

Data

SQL is used to interact with data stored in databases

Flavors

AKA variations of the same language with minor differences

- MySQL
- Microsoft SQL
- PostgreSQL
- SQLite
- SQL Server

Standardized

International Organization for Standardization

- SQL was standardized by ISO in 1987
- The aim was to ensure a consistent and uniform way of querying and managing relational databases, regardless of the underlying database system.

ANSI

ANSI - American National Standard Institute

Many SQL flavors comply with the ANSI standard.

ANSI

To be compliant with the ANSI standard, a flavor of SQL must support at least the major commands,:

SELECT, UPDATE, DELETE, and INSERT

Portable Base Knowledge

Most popular SQL-based database systems supports ANSI standard.

This is the skillset we'll be focusing on so that you'll have the most portable base of knowledge across all platforms and be able to pick up new ones with ease.

CRUD

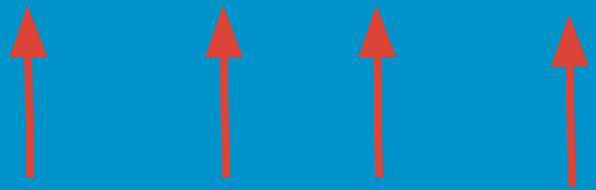
Is an Acronym

CRUD

Create **R**ead **U**pdate **D**elete

CRUD

Create **R**ead **U**pdate **D**elete



Everything you can do with Data!

CRUD

- **Create:** The act of **writing** new data
- **Read:** The act of **reading** existing data
- **Update:** The act of **modifying** existing data
- **Delete:** The act of **removing** existing data

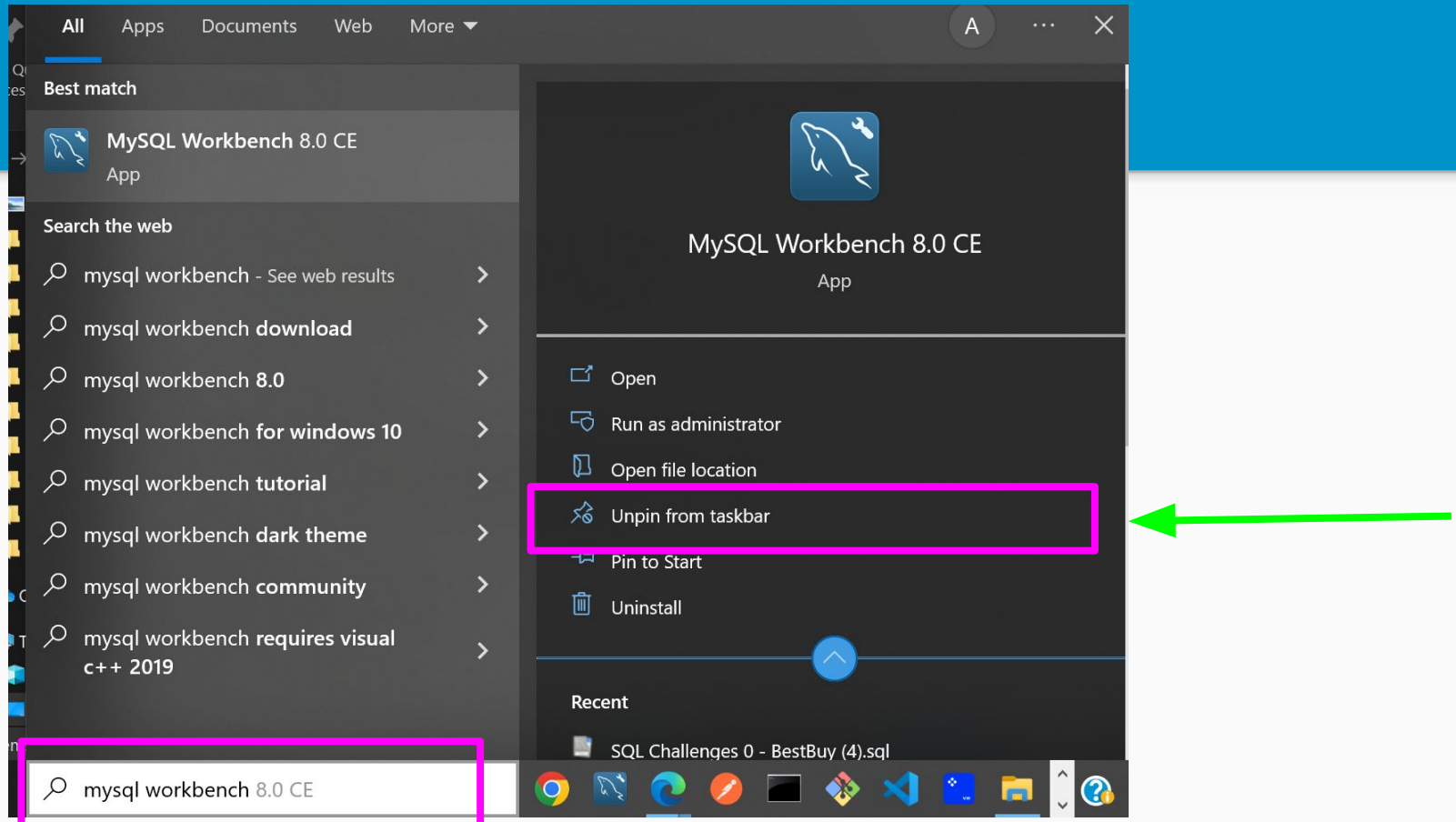
Crud Commands

Create → **Insert**
Read → **Select**
Update → **Update**
Delete → **Delete**

Crud Commands

Create → **Insert**
Read → **Select**
Update → Update
Delete → Delete

Pin Workbench to TaskBar



Line Comment

Also known as single-line comment, line comment syntax is prepended with `--`

```
-- Example line comment
```

Block Comment

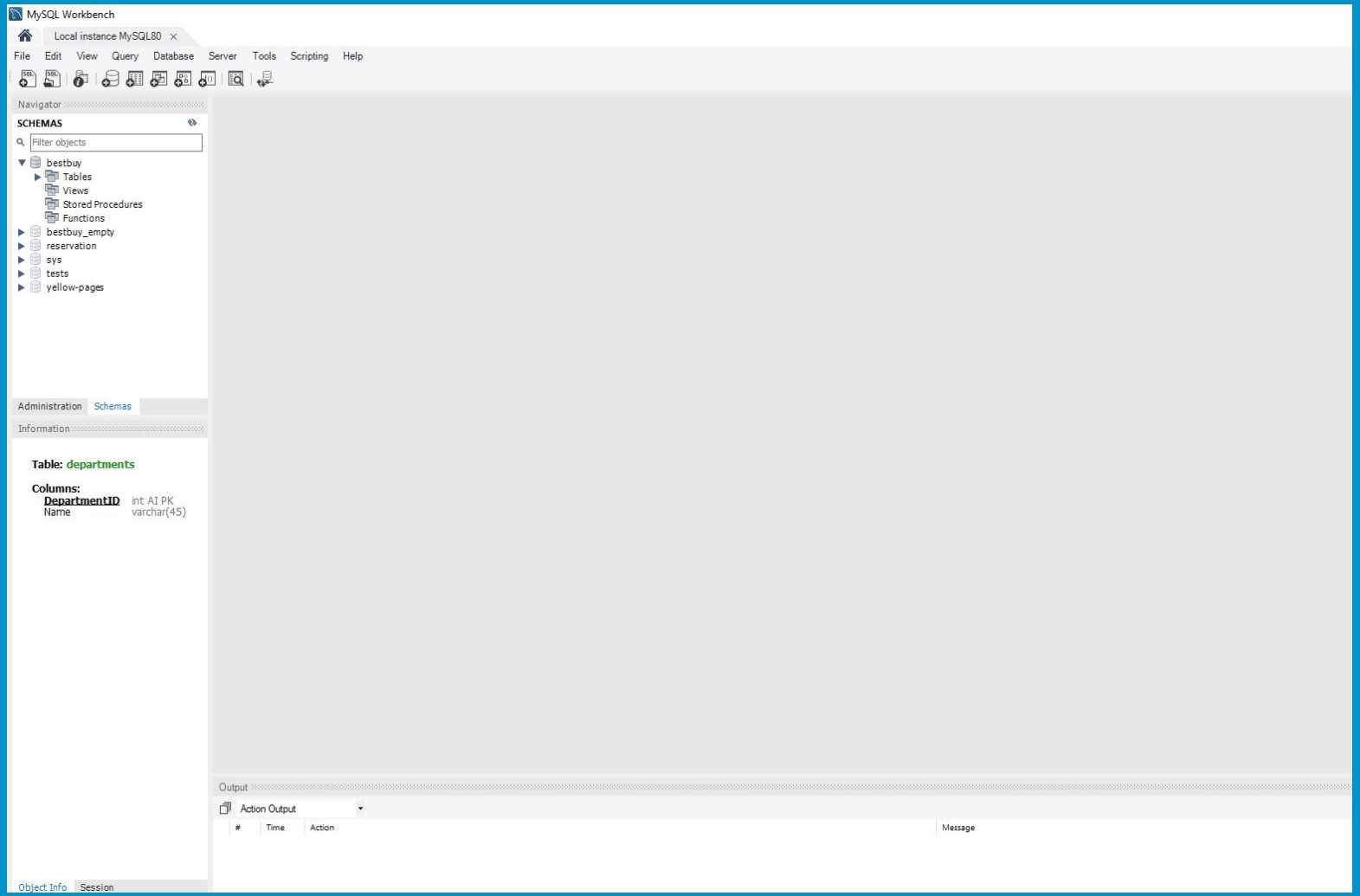
Also known as multi-line comment, block comment syntax is surrounded with `/* */`

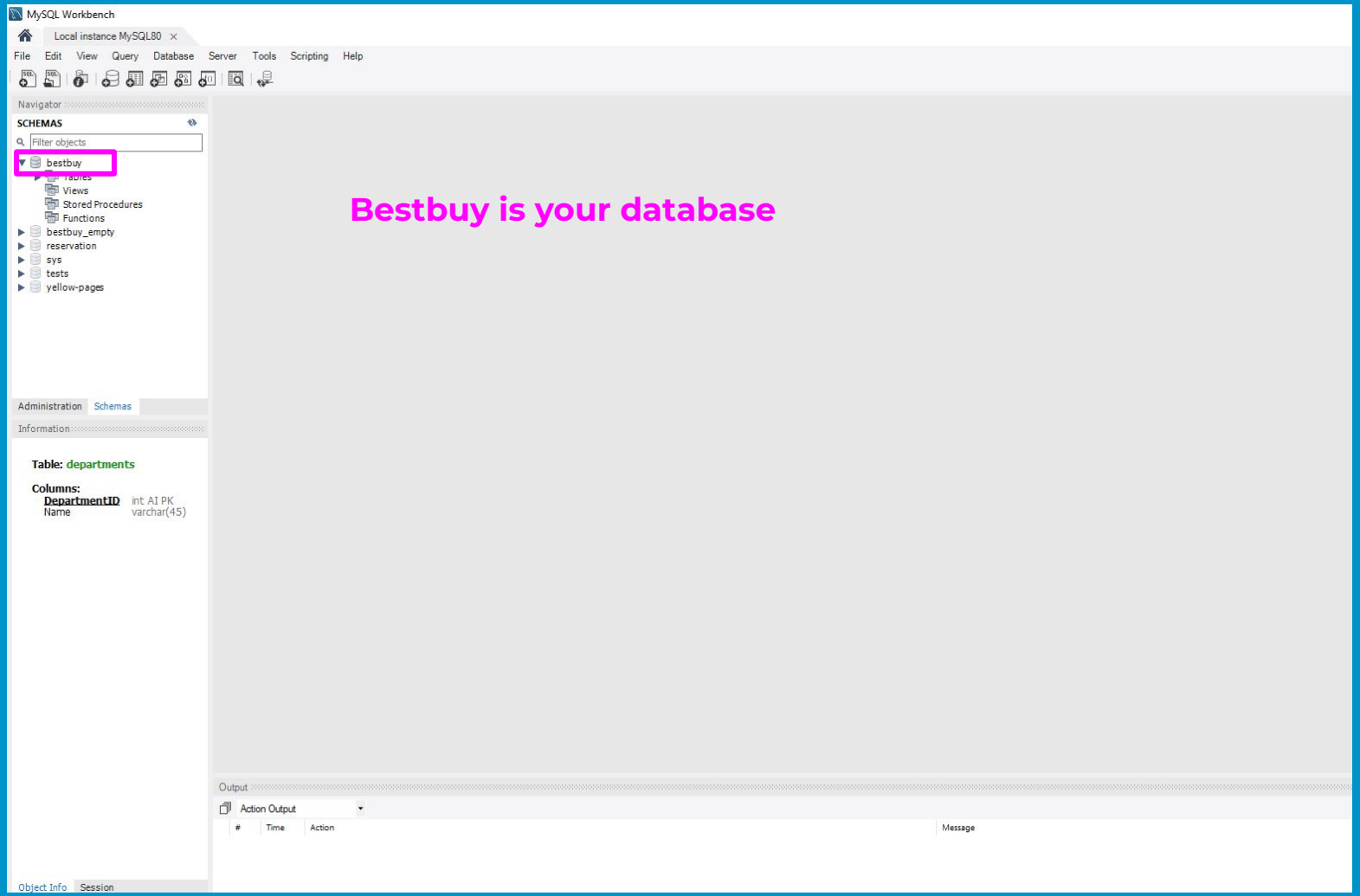
```
/* Example
block
comment
*/
```

Source Code Line Termination

Unless otherwise specified, each line of source code, called a statement, must be terminated with a ;

```
-- Here is a select statement
SELECT * FROM Customers;
```


MySQL Workbench
Local instance MySQL80
File Edit View Query Database Server Tools Scripting Help
Navigator
SCHEMAS
Filter objects
bestbuy
Tables
Views
Stored Procedures
Functions
bestbuy_empty
reservation
sys
tests
yellow-pages
Administration Schemas
Information
Table: departments
Columns:
DepartmentID int AI PK
Name varchar(45)
Object Info Session
Output
Action Output
Time Action Message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Information
Table: departments
Columns:
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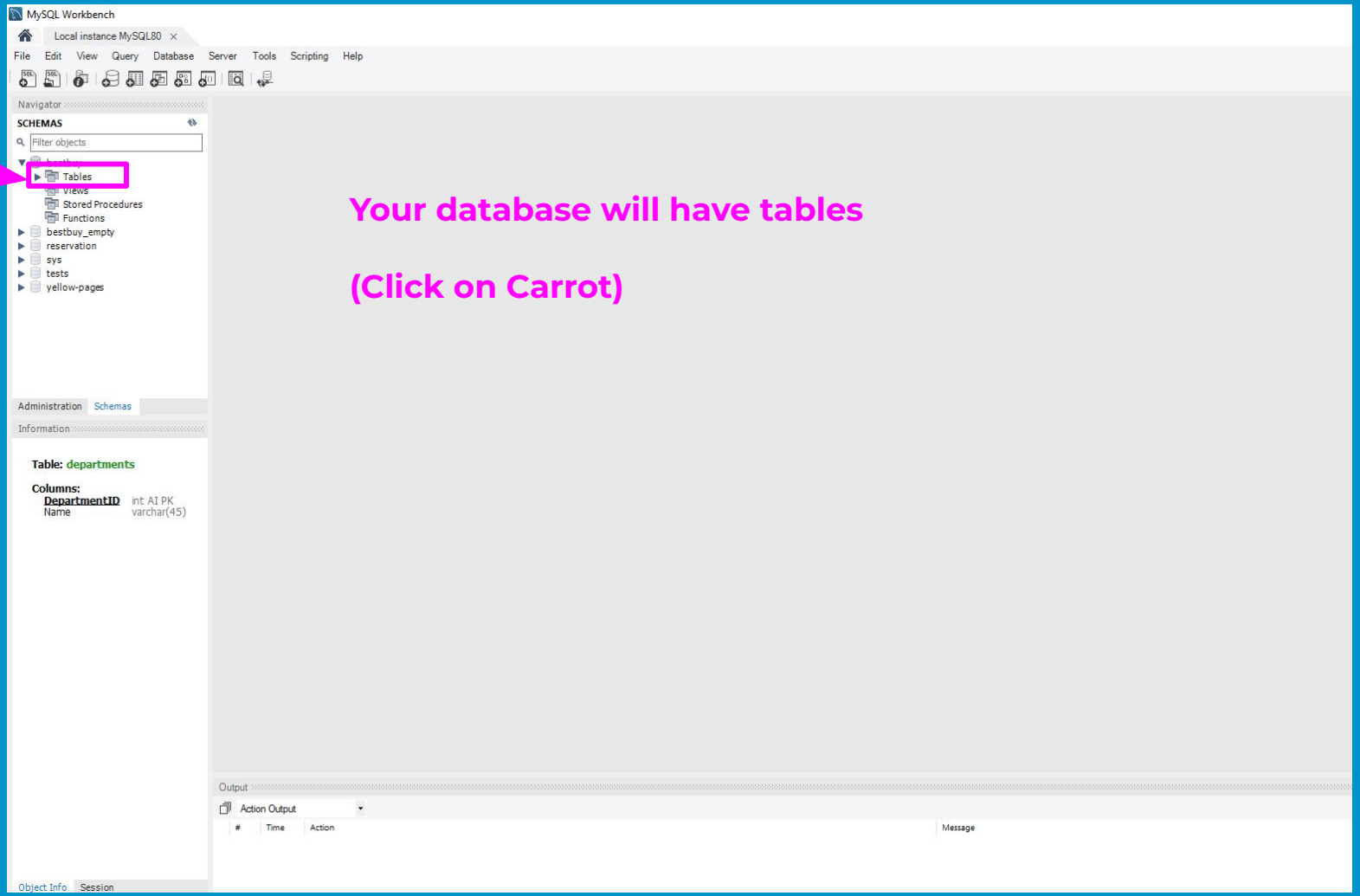
Name varchar(45)
Object Info Session
Bestbuy is your database
Output
Action Output
Time Action Message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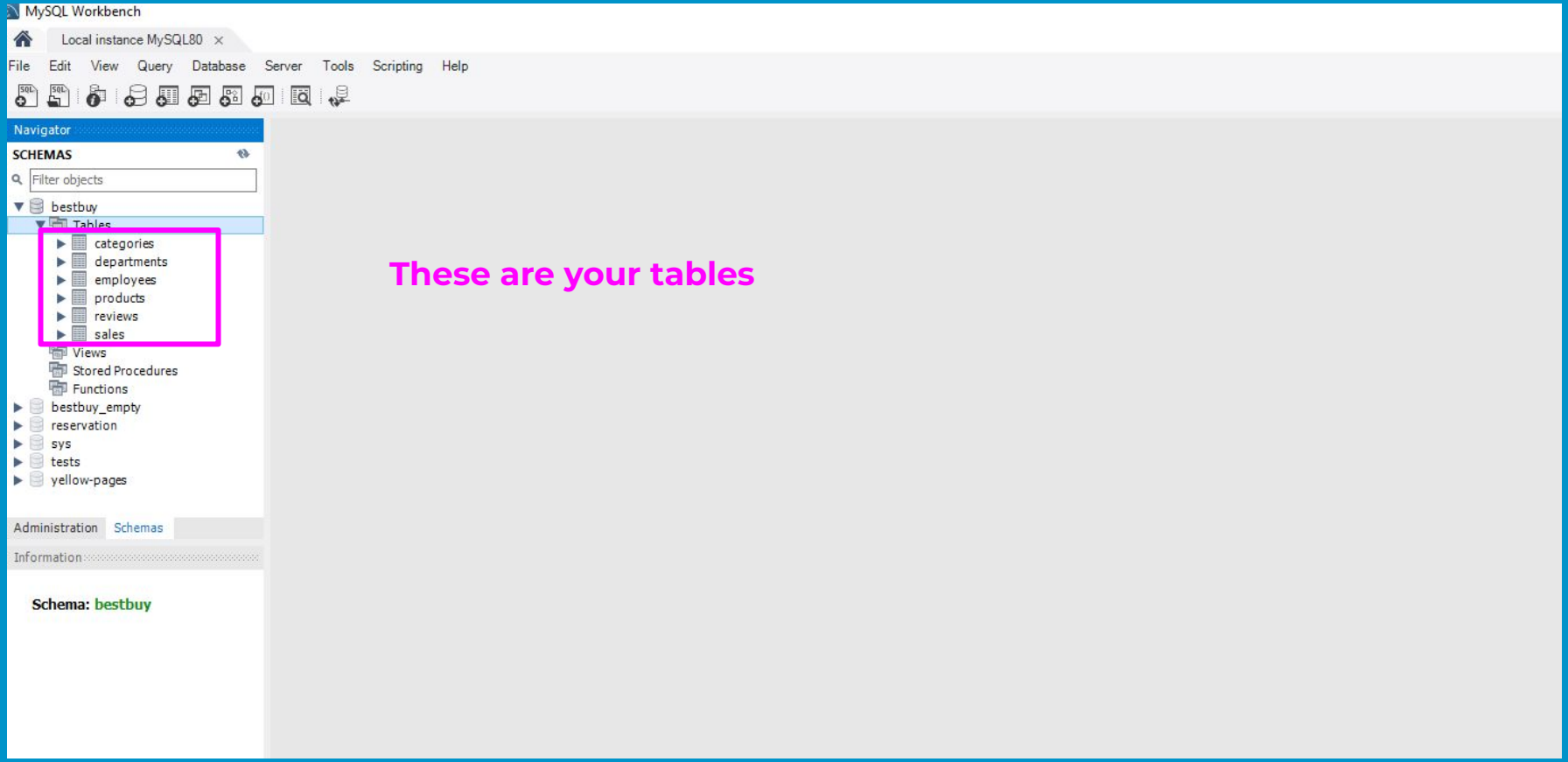
yellow-pages
Administration Schemas
Information
Table: departments
Columns:
DepartmentID int AI PK
Name varchar(45)
Object Info Session
Your database will have tables
(Click on Carrot)
Output
Action Output
Time Action Message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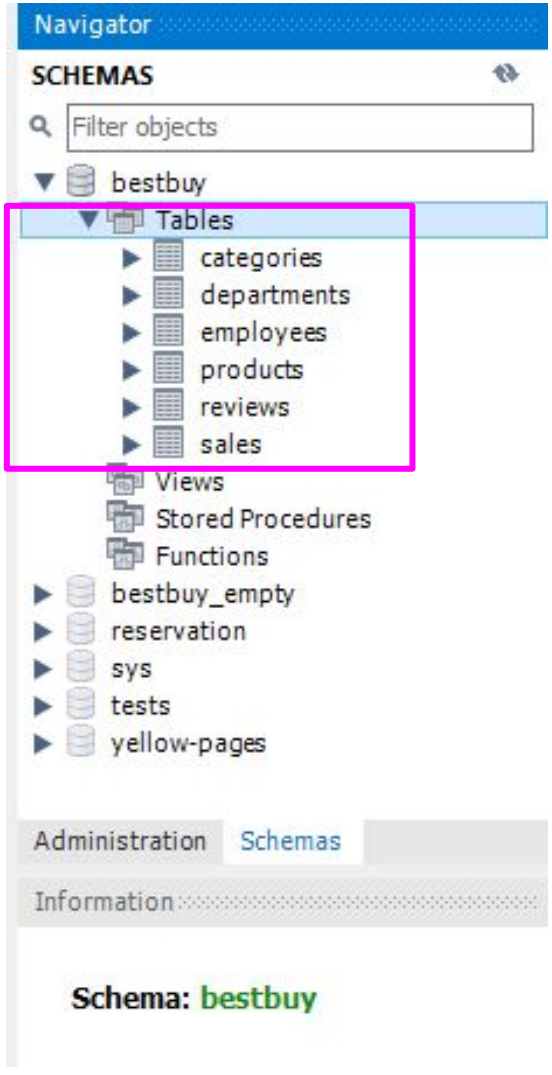
Tables
categories
departments
employees
products
reviews
sales
Views
Stored Procedures
Functions
bestbuy_empty
reservation
sys
tests
yellow-pages
Administration Schemas
Information
Schema: bestbuy
These are your tables


Navigator
SCHEMAS
Filter objects
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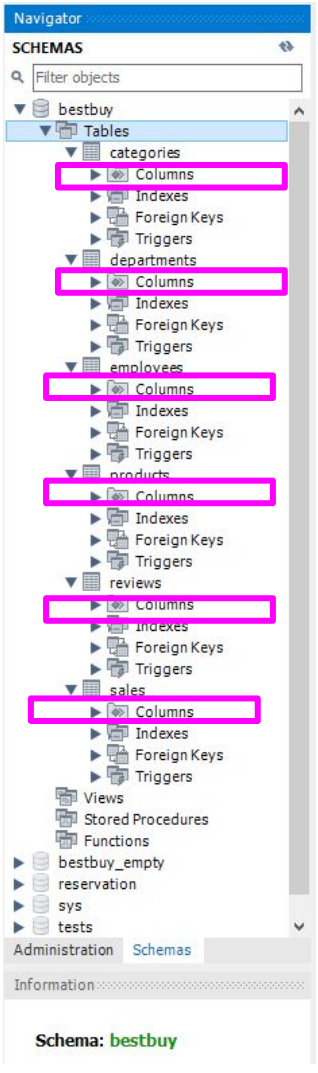
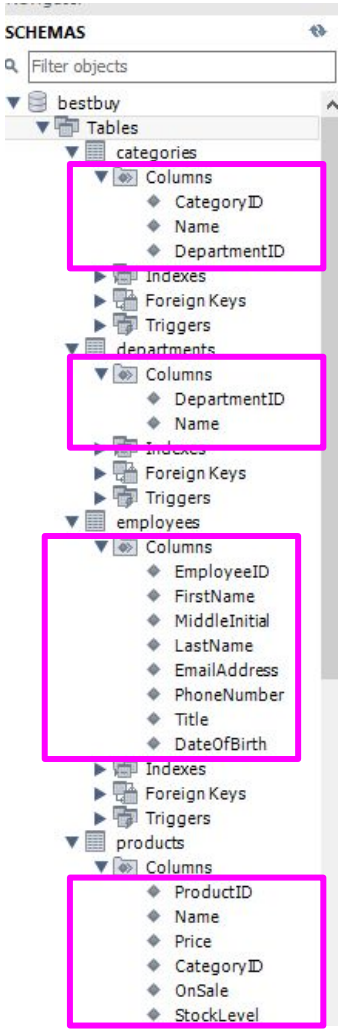
Schema: bestbuy

(Close-Up)



Each table has columns

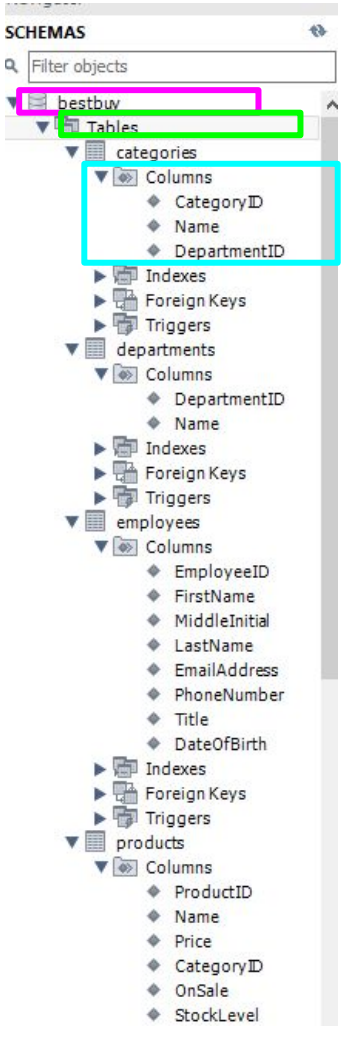


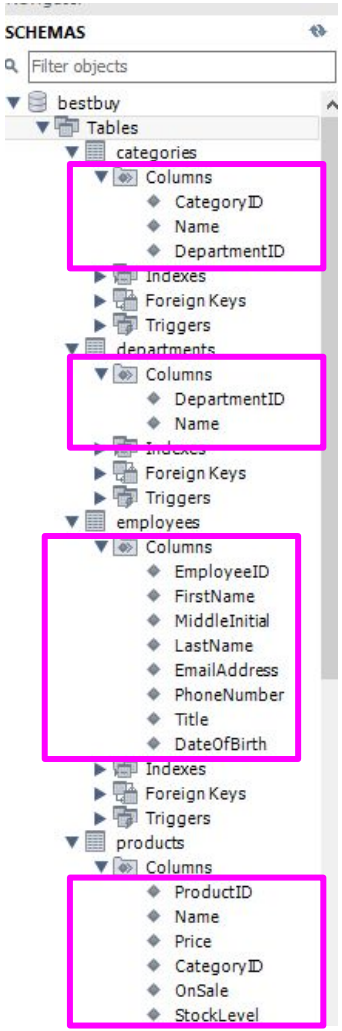
Column Names

Database

Tables

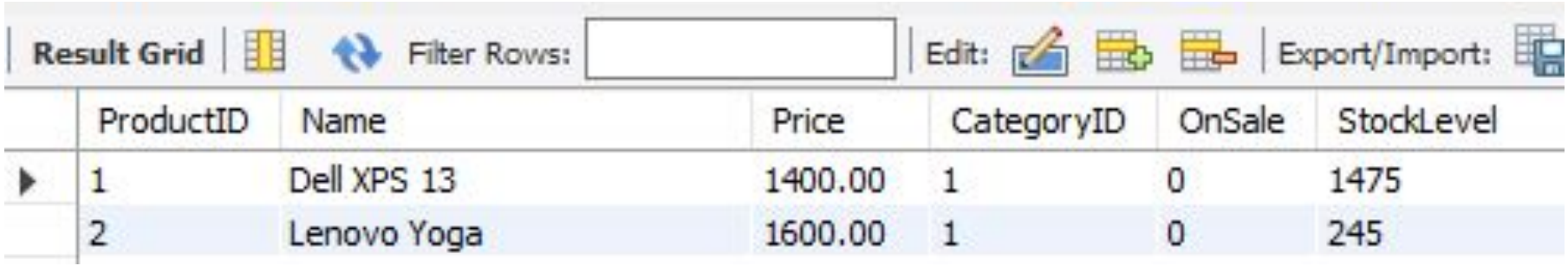
Columns





Column Names

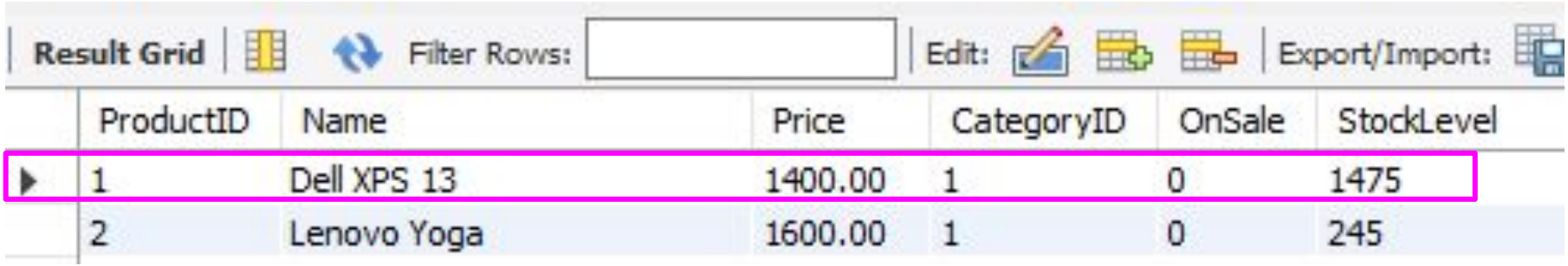
Results of a Query:



ProductID	Name	Price	CategoryID	OnSale	StockLevel
1	Dell XPS 13	1400.00	1	0	1475
2	Lenovo Yoga	1600.00	1	0	245

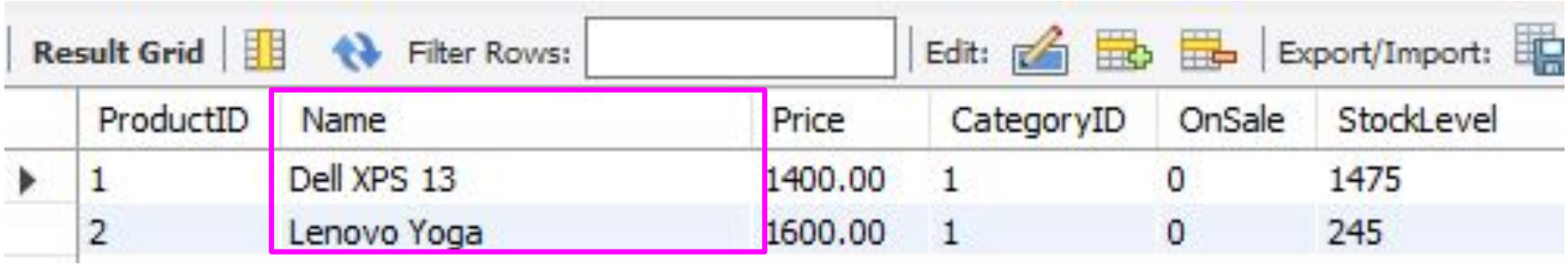
Each row is an **entry**

Also might be called a “record”



ProductID	Name	Price	CategoryID	OnSale	StockLevel
1	Dell XPS 13	1400.00	1	0	1475
2	Lenovo Yoga	1600.00	1	0	245

The column represents what the entry is about



ProductID	Name	Price	CategoryID	OnSale	StockLevel
1	Dell XPS 13	1400.00	1	0	1475
2	Lenovo Yoga	1600.00	1	0	245

Language Notes:

% sign is a **wildcard** and not modulus sign like in C#

```
SELECT * FROM products

WHERE Name LIKE '%iPhone%';
```

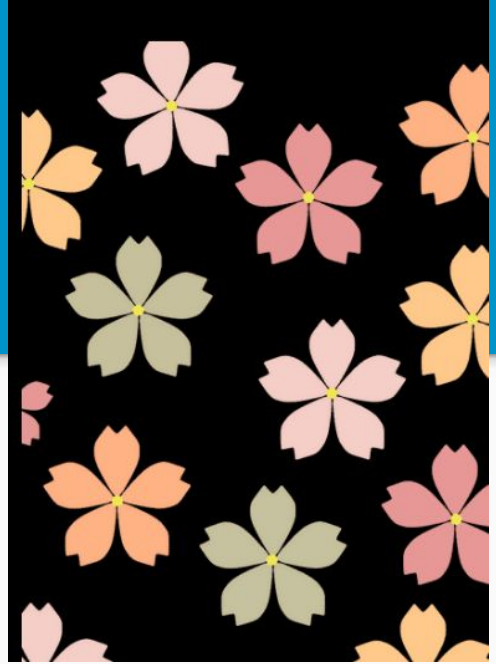
Operators

In SQL, there are several operators that are used:

Operator	Definition
`=`	Equal
`<>` or `!=`	Not equal
`>`	Greater than
`<`	Less than
`>=`	Greater than or equal
`<=`	Less than or equal
`%`	Wildcard that represents zero, one, or multiple characters
`_` or `?`	Wildcard that represents a single character

> Note: Choose the operator wisely based on the SQL implementation you're using.

Language Notes



- Need **LIKE keyword** when searching for a pattern

```
SELECT * FROM products

WHERE Name LIKE '%iPhone%';
```

Language Notes

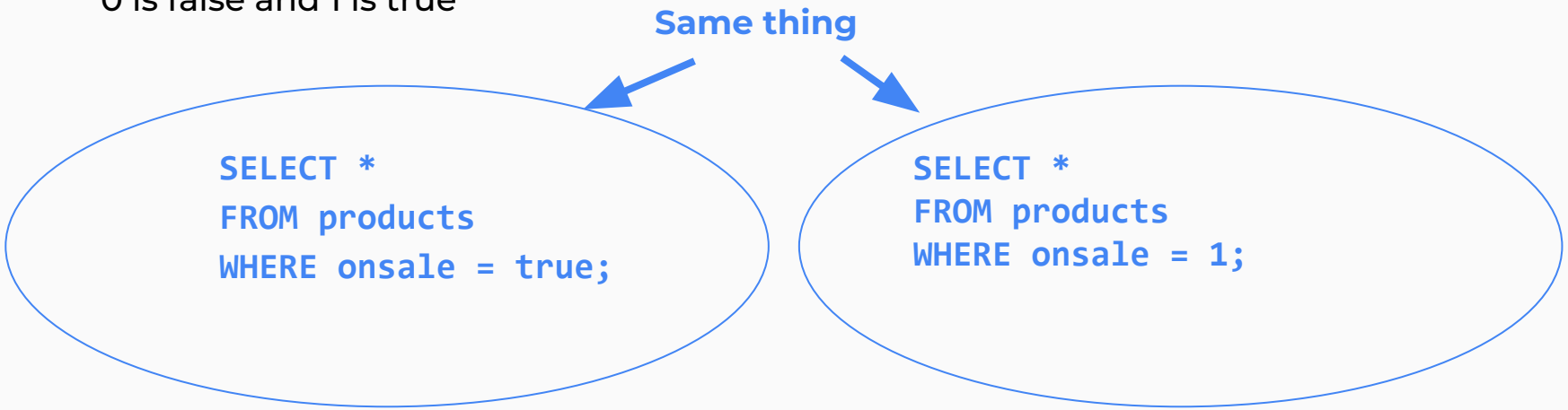
- Single or double quotes both work for strings

```
SELECT * FROM products

WHERE Name LIKE '%iPhone%';
```

```
SELECT * FROM products

WHERE Name LIKE “%iPhone%”;
```

Language Notes

0 is false and 1 is true



Language Notes

For SQL —-> IS NULL

C# —---------> == NULL

```
SELECT *
FROM employees
WHERE middleInitial IS null;
```

Language Notes

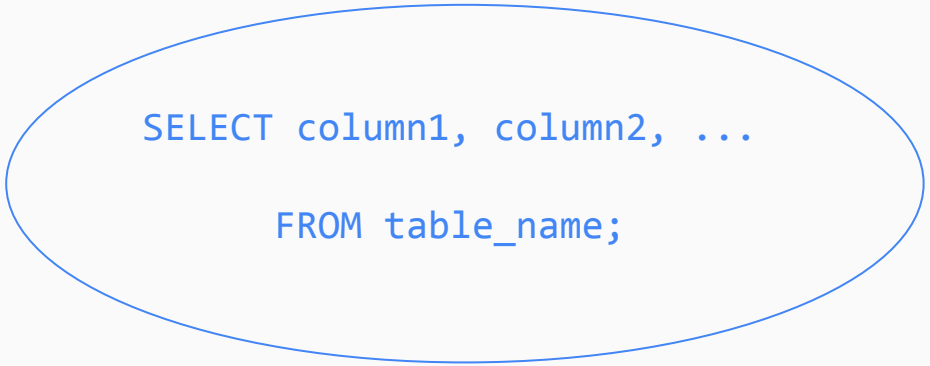
- **SQL IS NOT case sensitive**

Language Notes

- **Best Practice: Keywords in ALL CAPS**

Select

- Read, or query, existing records in your database. Format below:



Select

- Read, or query, existing records in your database.

Select

- Read, or query, existing records in your database.

Insert

The INSERT statement in SQL is used to create a new record to your database.

Format below:

```
INSERT INTO table_name (column1, column2, column3, ...)

VALUES (value1, value2, value3, ...);
```

Insert

The INSERT statement in SQL is used to create a new record to your database.

```
INSERT INTO products (Name, Price, OnSale)

VALUES ('Elf Movie', 25.99, 1);
```

- 1 means true

Update

- The UPDATE statement in SQL is used to modify existing records in your database. Format below:

```
UPDATE table_name
SET column1 = value1, column2 = value2, ...
WHERE condition;
```

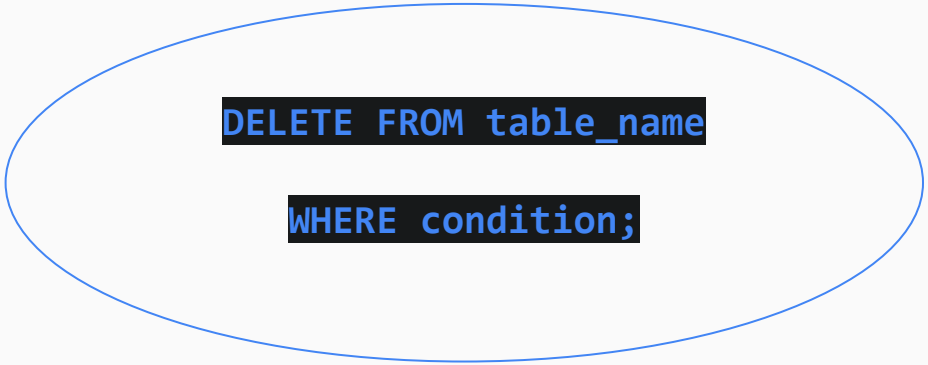
Update

- The UPDATE statement in SQL is used to modify existing records in your database. Format below:

```
UPDATE products
SET Name = ‘Elf Movie 2003’, Price = 29.99
WHERE Name LIKE ‘%Elf%’;
```

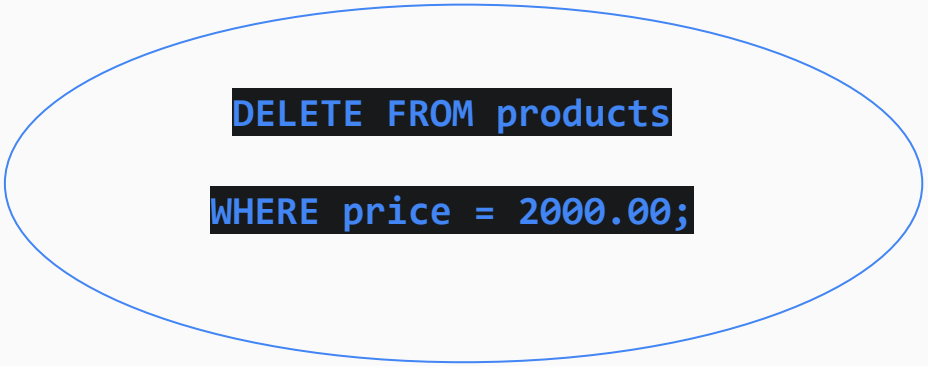
Delete

- The DELETE statement in SQL is used to remove existing records in your database. Format below:



Delete

- The DELETE statement in SQL is used to remove existing records in your database.



More Keywords & Topics

- WHERE
- AND, OR, NOT
- ORDER BY
- SELECT DISTINCT
- COUNT, SUM, AVG
- ALIASES

More Keywords & Topics

- **WHERE -** filter based on condition(s)
- **AND, OR, NOT -** Logical Operations
- **ORDER BY -** Sort result set
- **SELECT DISTINCT -** return only the distinct values
- **Aggregate functions -** used to perform calculations on a set of values
  - **COUNT() -** number of items
  - **SUM() -** adds values
  - **AVG() -** calculates average
- **ALIASES -** Give a temporary name to a table or column