Week 2: SQL Notes

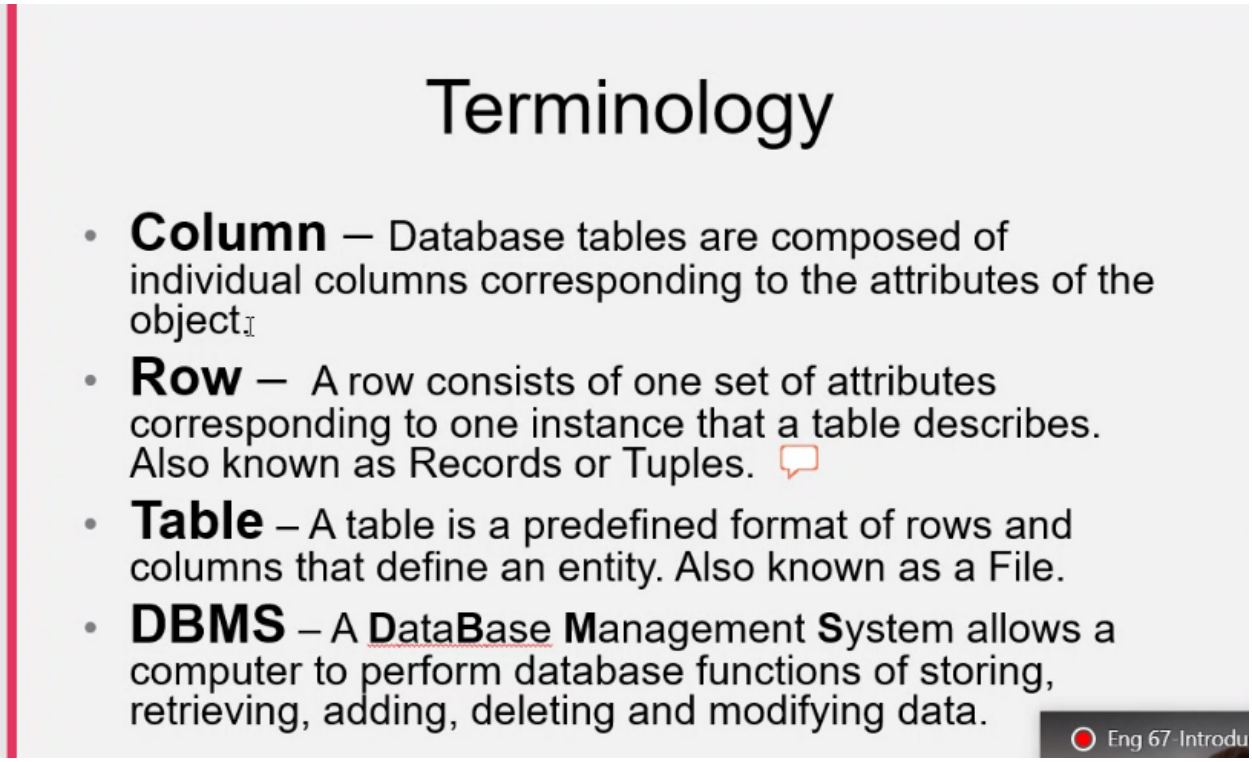
Class	
Created	@Jun 22, 2020 12:16 PM
Materials	
Reviewed	☐
Type	

What is a database?

What is a database?

A structured set of data held in a computer, especially one that is accessible in various ways.

Its good to divide names into structures with labels. This makes it easier to process.


Terminology
Column – Database tables are composed of individual columns corresponding to the attributes of the object.
Row – A row consists of one set of attributes corresponding to one instance that a table describes. Also known as Records or Tuples.
Table – A table is a predefined format of rows and columns that define an entity. Also known as a File.
DBMS – A DataBase Management System allows a computer to perform database functions of storing, retrieving, adding, deleting and modifying data.
Eng 67-Introdu


Types of Database
Flat-file Database
Stores everything in one Table. Good for small numbers of records related to a single topic.
Relational Database
Gives you the ability to separate masses of data into numerous tables.
They are linked to each other through the use of keys.
Big Data
MongoDB, Vertica etc.
Used for Data Analytics and Business Intelligence
Digital Age and Internet of Things

Relationship Types

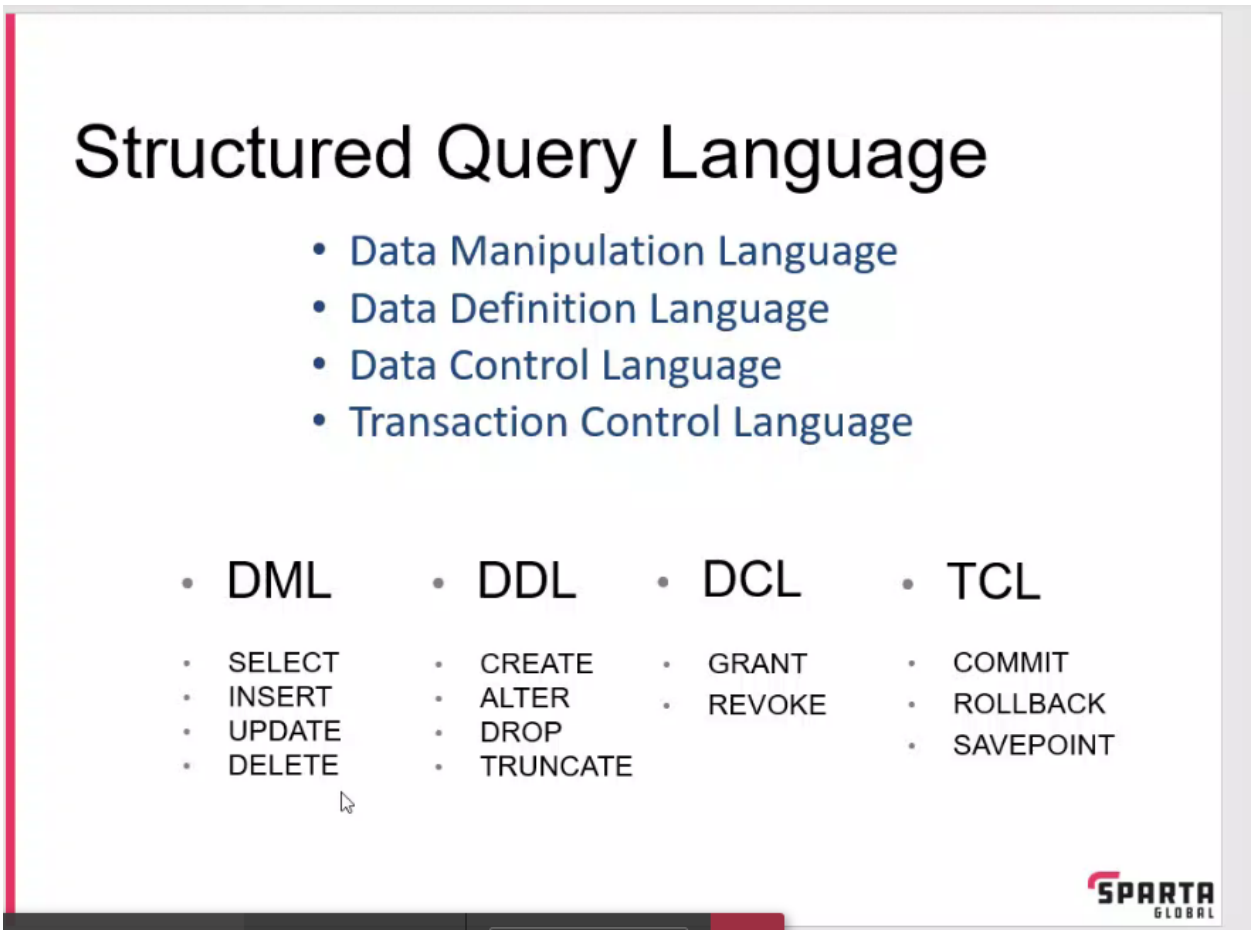
- One to One
  - Each row in Table A is linked to no more than one row in Table B. This is an attribute of the relationship not the tables. A student may have one row in the Contact_Info table.
- One to Many
  - Each row in the table can be related to many rows in the relating table.
  - This allows frequently used information to be saved only once in a table and referenced many times in all other tables.
- Many to Many
  - One or more rows in a table can be related to 0, 1 or many rows in another table.
  - A 3rd table called a mapping or link table is required in order to impl such a relationship. For example Customers can purchase many Pro

Primary Key Constraints

- A Primary Key must be unique
- Must always have an entry
  - cannot be blank or Null
- The value must never change
- Each table may have a maximum of one Primary Key

Foreign Key

- Natural relationships exist between tables in most database structures, foreign keys are used to create solid relationships.
- Foreign keys ensure that the row of information in Table A corresponds to the correct row of information in Table B.
- The constraint is used to prevent actions that would destroy links between tables.
- It prevents invalid data from being inserted into the foreign key column, because it has to be one of the values contained in the table it points to.
- There is no Uniqueness Constraint for Foreign Keys.
- A table can have any number of Foreign Keys.
- A row cannot be deleted from a reference table if it is in use via a foreign key.


Structured Query Language
Data Manipulation Language
Data Definition Language
Data Control Language
Transaction Control Language
DML
SELECT
INSERT
UPDATE
DELETE
DDL
CREATE
ALTER
DROP
TRUNCATE
DCL
GRANT
REVOKE
TCL
COMMIT
ROLLBACK
SAVEPOINT
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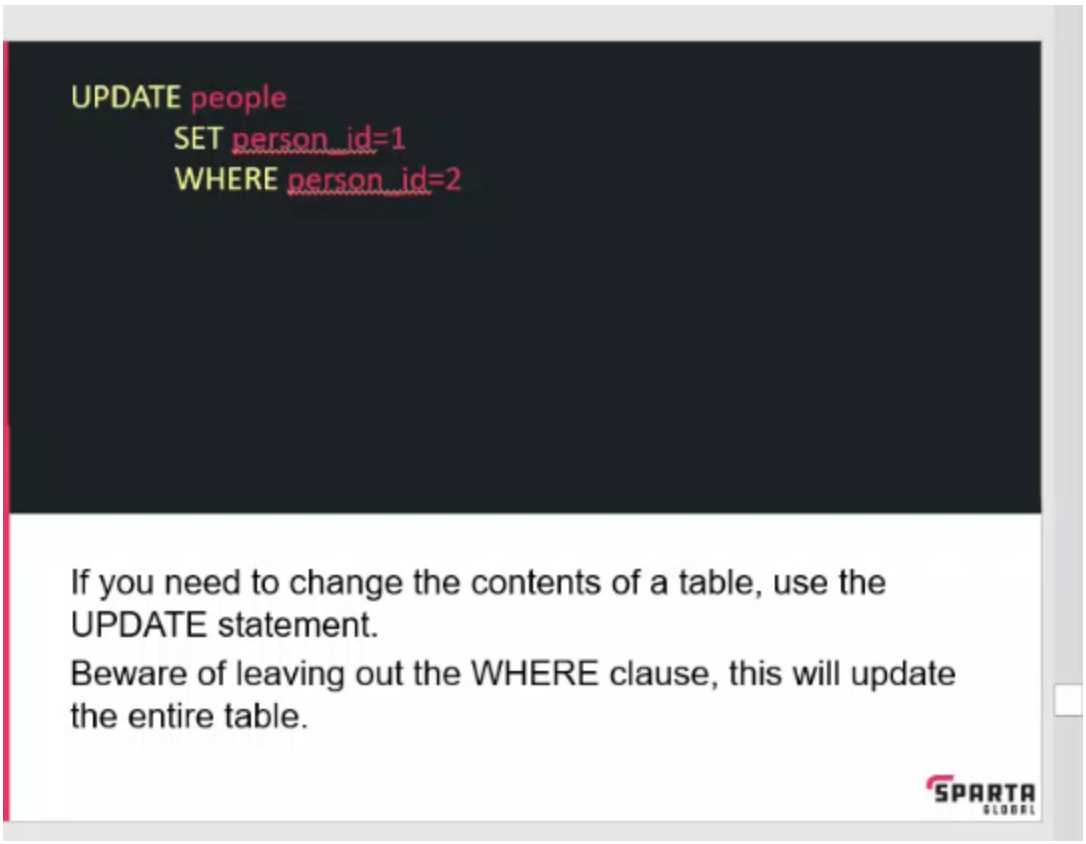
```
INSERT INTO your_table
(
    column_name1, column_name2, ...
)
VALUES
(
    'value1', 'value2', ...
);
```


UPDATE people
SET person_id=1
WHERE person_id=2
If you need to change the contents of a table, use the UPDATE statement.
Beware of leaving out the WHERE clause, this will update the entire table.
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Database Considerations
Data Security
Data Recovery
Data Integrity
Normal Form
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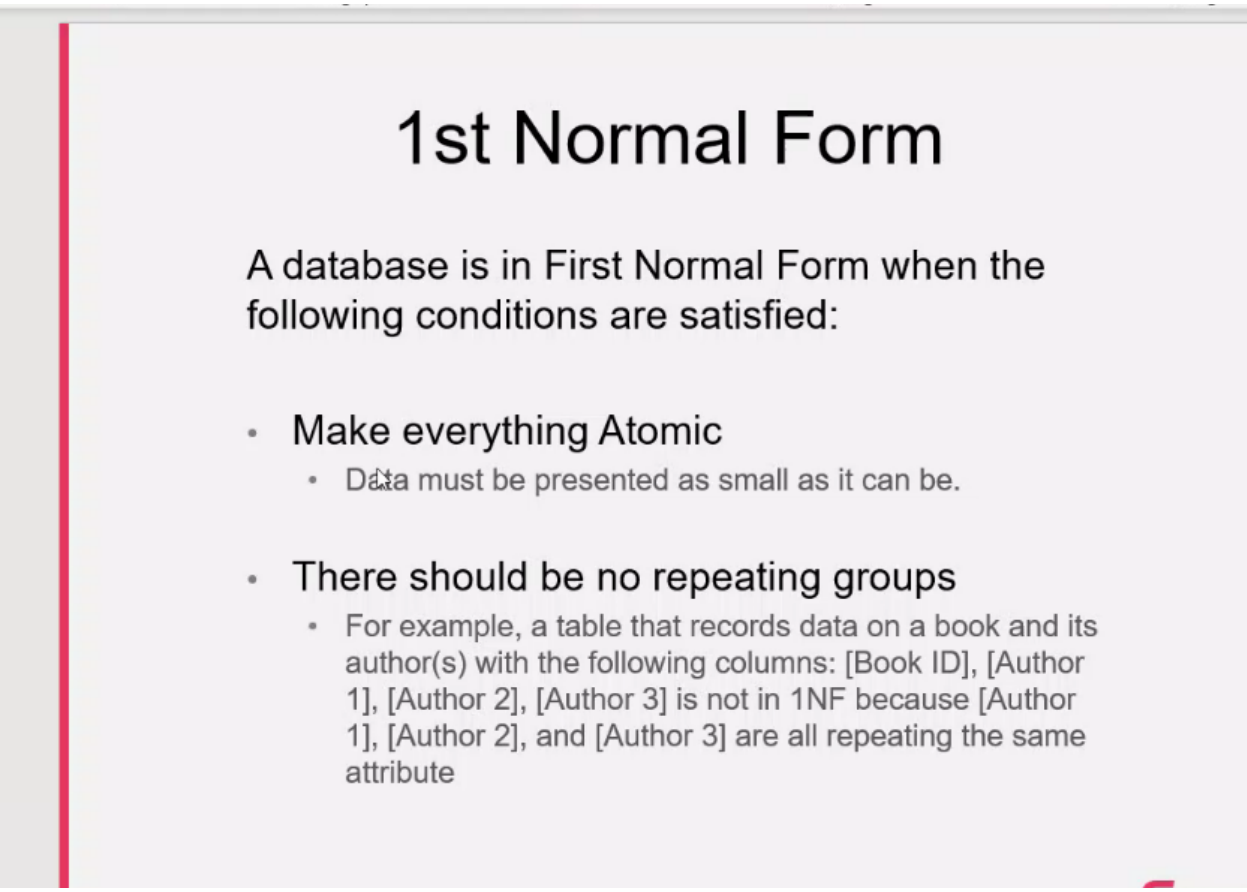
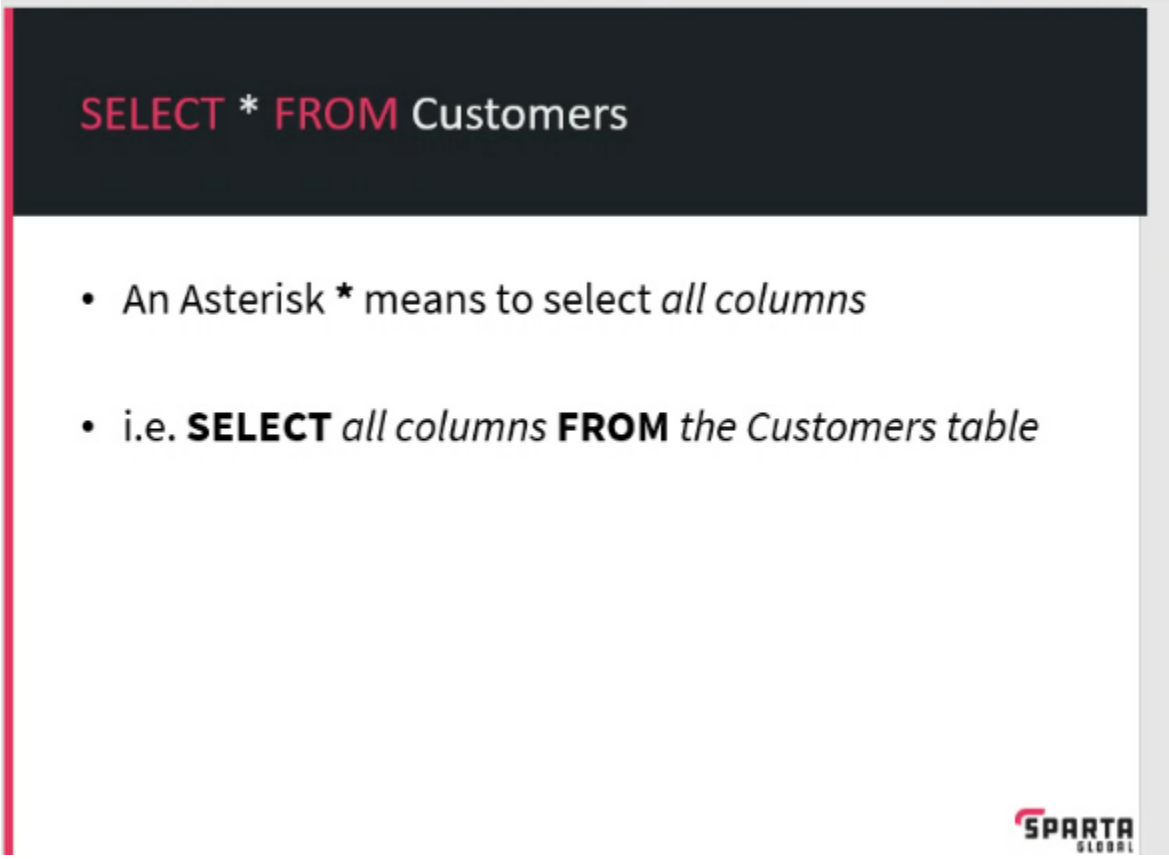

1st Normal Form
A database is in First Normal Form when the following conditions are satisfied:
Make everything Atomic
Data must be presented as small as it can be.
There should be no repeating groups
For example, a table that records data on a book and its author(s) with the following columns: [Book ID], [Author 1], [Author 2], [Author 3] is not in 1NF because [Author 1], [Author 2], and [Author 3] are all repeating the same attribute


SELECT * FROM Customers
• An Asterisk * means to select all columns
• i.e. SELECT all columns FROM the Customers table
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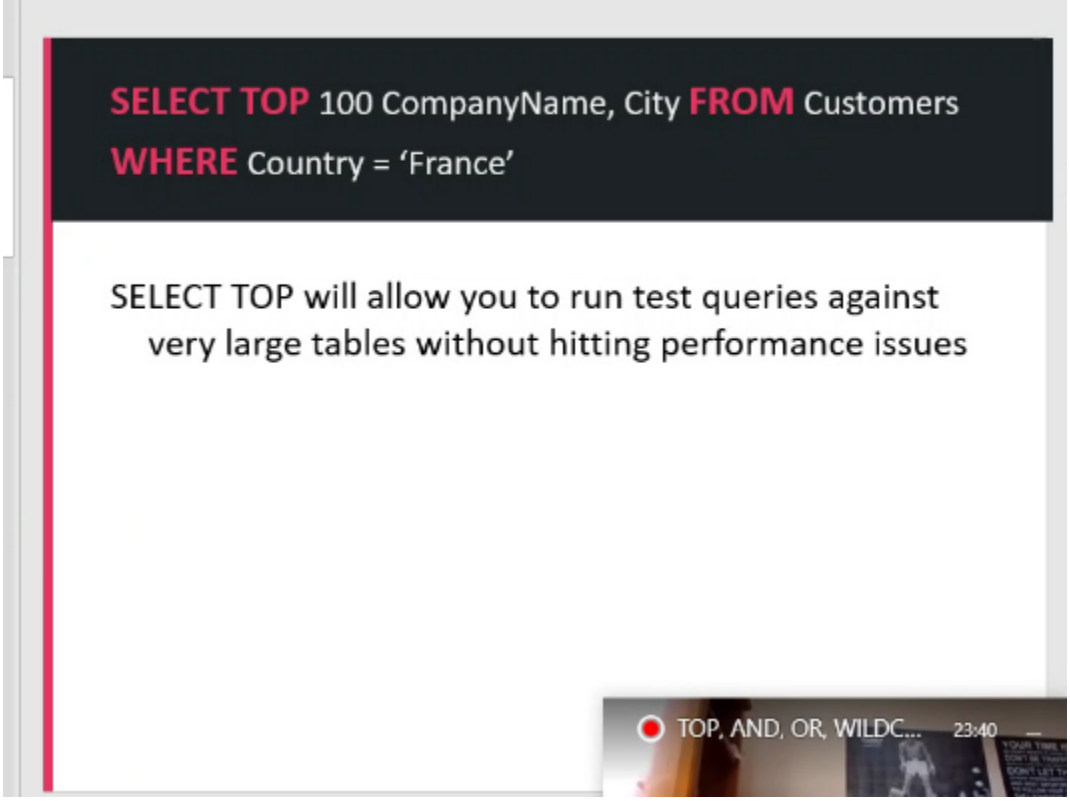
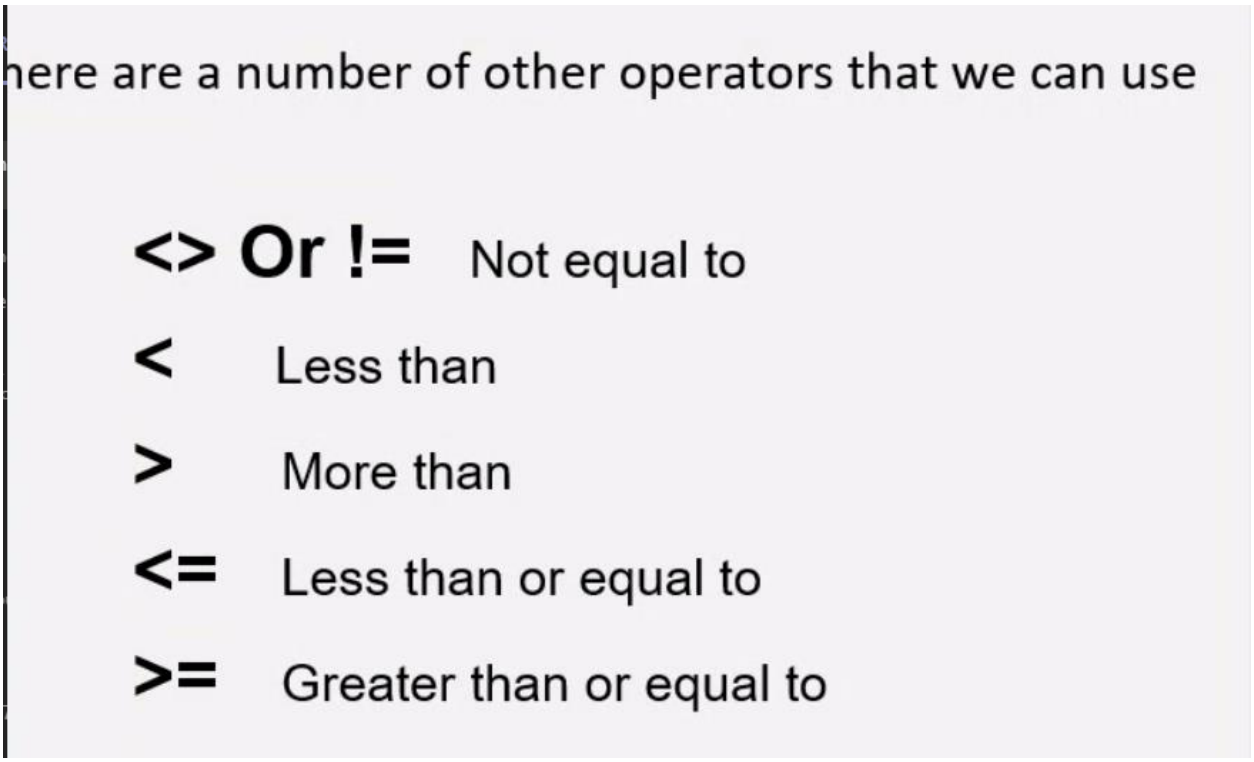
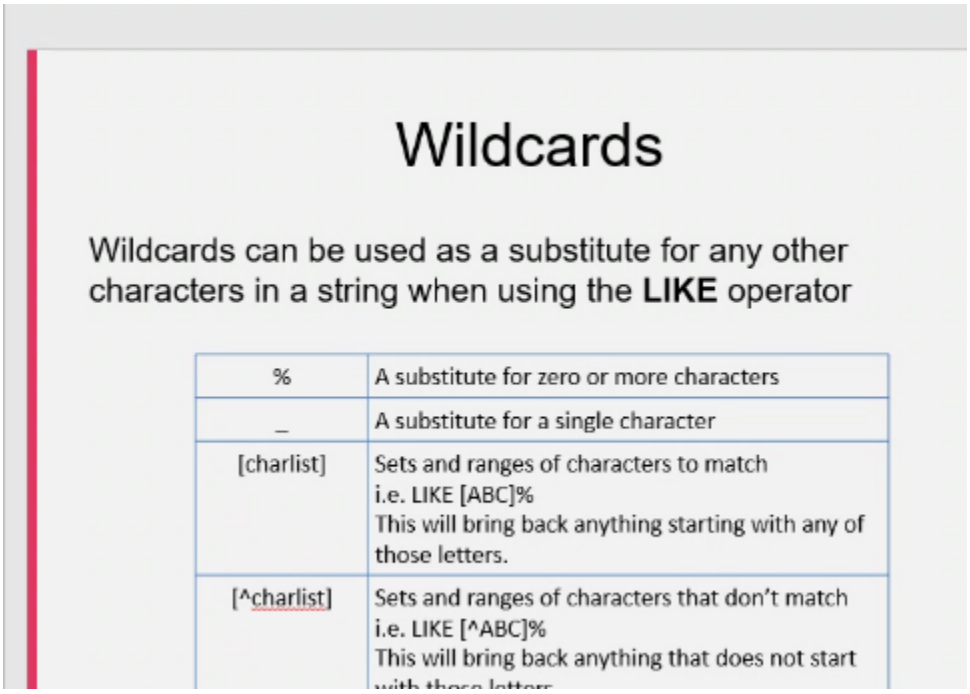
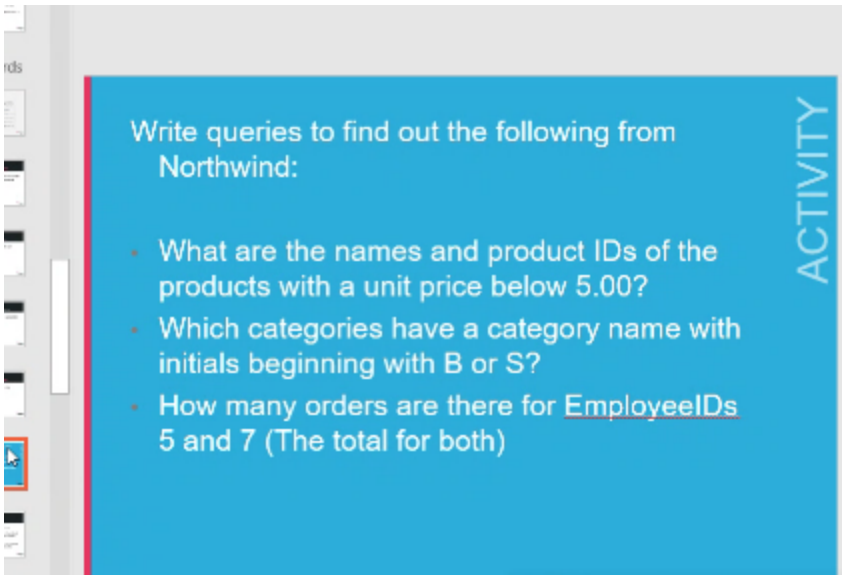

SELECT TOP 100 CompanyName, City FROM Customers
WHERE Country = 'France'
SELECT TOP will allow you to run test queries against very large tables without hitting performance issues
TOP, AND, OR, WILDC... 23:40


here are a number of other operators that we can use
<> Or != Not equal to
< Less than
> More than
<= Less than or equal to
>= Greater than or equal to




```
142  FROM Customers c WHERE COUNTRY LIKE '[UAM]%'
143
144  /*Countries either ending with U or A or M in descending orde
145  SELECT DISTINCT c.Country
146  FROM Customers c WHERE COUNTRY LIKE '%[UAM]'
147  ORDER BY c.Country DESC
148
149  /*Countries either ending with U or A or M in ascending order
150  SELECT DISTINCT c.Country
151  FROM Customers c WHERE COUNTRY LIKE '%[UAM]'
152  ORDER BY c.Country
153
154  /*Countries not starting with U or A or M*/
155  SELECT DISTINCT c.Country
156  FROM Customers c WHERE COUNTRY LIKE '[UAM]%'
157
158
159
```



Arithmetic Operators

The following arithmetic operators can be used to perform calculations in the SELECT clause:

+	Add (can be used on DATETIME columns)
-	Subtract (can be used on DATETIME columns)
*	Multiply
/	Divide
%	Percentage (Modulo) Returns the integer remainder of a division. For example, 12 % 5 = 2 because the remainder of 12 divided by 5 is 2.

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