Databases

Introduction to databases

What is a database?

What is a database?

An **organized** collection of data that is **saved**
and can be retrieved from a database management system

RDBMS

Relational DataBase Management System

Intro

Microsoft SQL Server

Microsoft SQL Server Management Studio

Microsoft SQL Database

Why a database?

Why not simple textfile?

```
MyCustomers.txt

1, Alma Hanssonn, Storgatan 3A 3tr, Göteborg
2, Håkon Johansen, Fiskevei 12, Oslo
3, Tiril Olsen, Vegagate 5, Bergen
```

Solidity

Standard

Security

Performance

ACID

Atomicity
Consistency
Isolation
Durability

SQL

SQL

What can you do?

SQL

A standard

Intro

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden

int
decimal
varchar(50)
datetime

Intro

Here is an example of a SQL-command which get all rows in the Customer-table:

```
SELECT * from Customers
```

Another example which only get two columns:

```
SELECT CustomerName, City
FROM Customers;
```

Only get the rows for customers living in Mexico:

```
SELECT * FROM Customers
WHERE Country='Mexico';
```

Intro

Get customers who lives in another country than Germany and USA:

```
SELECT * FROM Customers
WHERE NOT Country='Germany' AND NOT Country='USA';
```

First sort the customer by country. Then sort by name:

```
SELECT * FROM Customers
ORDER BY Country, CustomerName;
```

There are also command for inserting a single row in a table:

```
INSERT INTO Customers (CustomerName, ContactName, Address, City,
PostalCode, Country)
VALUES ('Cardinal', 'Tom B. Erichsen', 'Skagen 21', 'Stavanger',
'4006', 'Norway');
```

Intro

...and update:

```
UPDATE Customers
SET ContactName = 'Alfred Schmidt', City= 'Frankfurt'
WHERE CustomerID = 1;
```

...and removing:

```
DELETE FROM Customers
WHERE CustomerName='Alfreds Futterkiste';
```

Intro

You can even create a whole new table with SQL:

```sql
CREATE TABLE Persons (
    PersonID int,
    LastName varchar(255),
    FirstName varchar(255),
    Address varchar(255),
    City varchar(255)
);
```
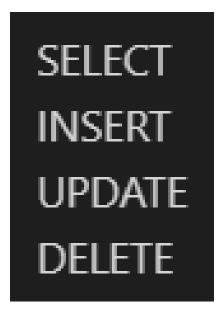
Data Definition Language

Data Definition Language

Create a table

```
CREATE TABLE employees (
    id              INTEGER      PRIMARY KEY,
    first_name      VARCHAR(50)  not null,
    last_name       VARCHAR(75)  not null,
    fname           VARCHAR(50)  not null,
    dateofbirth     DATE         not null
);
```

Remove a table

```
DROP TABLE employees;
```

Change a table

```
ALTER TABLE sink ADD bubbles INTEGER;
```

Delete all data in a table (faster than DELETE)

```
TRUNCATE TABLE Employees;

RENAME
```

Data Manipulation Language

Data Manipulation Language

Transaction Control Language

Transaction Control Language

Data Control Language

Data Control Language