#### Introduction to SQL

Leif Harald Karlsen leifhka@ifi.uio.no

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- Made in 1974, but first standard appeared in 1986

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  - "Which elements have a name starting with 'P'?"
  - "Let 'Parents' be all elements having a 'hasChild'-related element"
  - "How many employees have a boss which earn more than 1000000 KR?"

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- An SQL-query tells the computer what to compute,
- and its up to the database to decide how to find the answers

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We will only focus on SELECT.

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• (Simple) SELECT-queries have the form:

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- <tables> is a list of table names

The result of such a query is a new table consisting of:

- the columns listed in <columns>,
- based on the rows from the tables in <tables>

# Select single column

#### Query retrieving all names in Patient-table

```
SELECT Name FROM Patient;
```

#### **Answers**

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- We will use DBFiddle to interact with SQL
- DBFiddle is a webpage giving SQL-access to a database
- Mostly used for small examples or illustrating a point
- Database created on the fly when you access webpage
- Supports all of SQL (queries are executed over real RDBMSs)
- However, no security, no users, does not scale, etc.

# Exmples SELECT

https://dbfiddle.uk/Wu5i\_q6E?hide=2

Find all observations in observation-table

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Find genus and common name for all species

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SELECT genus, common_name
FROM species;
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- <condition> is an expression than can be true or false for each row
- The result is now same as before, but contains only the rows where <condition> holds.

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```

#### **Answers**

Name
Anna Consuma
Sam Penny

## Select with multiple restrictions

# Query for birth dates and names of patients which have between 4 and 10 treatments

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SELECT Birthdate, Name
FROM Patient
WHERE NrTreatments > 4 AND
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Query for Birthdate and number of treatments for patients which have less than or equal to 8 treatments and is born before 01.01.1988

```
SELECT Birthdate, NrTreatments
FROM Patient
WHERE NrTreatments <= 8 AND
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Query for names of patients who have less than or equal to 5 treatments or greater than or equal to 15 treatments

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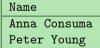
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https://dbfiddle.uk/Wu5i\_q6E?hide=2

Find date of all observations in Oslo

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### Find date of all observations in Oslo

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SELECT observed_time
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Find common name for all species that are blacklisted or have a global conservation between 3 and 5.

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FROM Patients;
```

How old is each patient that have taken more than 10 pills?

```
SELECT Name, current_date - Birthdate AS Age
FROM Patients
WHERE NrTreatments * 4 > 10;
```

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```
SELECT count(*) AS avg_nr_treatments
FROM Patients
WHERE Birthdate > '1990-01-01';
```

https://dbfiddle.uk/Wu5i\_q6E?hide=2

How old are the observations in Oslo?

# Exmples WHERE

https://dbfiddle.uk/Wu5i\_q6E?hide=2

#### How old are the observations in Oslo?

```
SELECT current_date - observed_time AS age
FROM observation
WHERE location = 'Oslo';
```

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#### How old are the observations in Oslo?

```
SELECT current_date - observed_time AS age
FROM observation
WHERE location = 'Oslo';
```

#### What is the average local conservation for non-blacklisted species?

```
SELECT avg(local_conservation) AS avg_local
  FROM species
WHERE NOT blacklisted;
```

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  - ◆ Can use aggregates (min, max, avg, sum and count)

```
SELECT Birthdate
  FROM Patients
WHERE NrTreatments > 5;
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are all allowed and represents the same query.
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- So
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#### are equivalent queries

- However, SQL is case-sensitive for all values
  - so 'Anna' and 'anna' are two different values
- Use -- (two dashes) to write a comment (ignored by the database), e.g.

```
SELECT Name -- This is a comment FROM Patients
```

"What are the names of the patients that have more than 5 treatments?"

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SELECT Name FROM Patients WHERE 5 < NrTreatments;

(See SQL Queries for Mere Mortals for more examples)

If one goes to http://finn.no's "Bolig til salgs" and put:

and click on "Søk"

It will generate an SQL-query looking something like this:

SELECT \*

```
FROM boliger£\pause£
WHERE (sted = 'Oslo'
OR sted = 'Akershus')
£\pause£AND pris <= 50
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- Makspris: 5,000,000,-

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```

 $£\pause£AND pris >= 30$ 

£\pause£AND ant rom >=

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and click on "Søk"

It will generate an SQL-query looking something like this:

£\pause£AND pris >= 30

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# CREATE and INSERT (not part of curriculum)

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- ◆ To create a table, we use the CREATE-command
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CREATE TABLE Patients(
    PatientID int, Name text, Birthdate date, NrTreatments int
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- E.g. to add the data into the Patients-table, we can write:

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- E.g. to add the data into the Patients-table, we can write:

```
INSERT INTO Patients VALUES
(0, 'Anna Consuma', '1978-10-09', 19),
(1, 'Peter Young', '2009-03-01', 1),
(2, 'Carla Smith', '1986-06-14', 8),
(3, 'Sam Penny', '1961-01-09', 14),
(4, 'John Mill', '1989-11-16', 8),
(5, 'Yvonne Potter', '1971-04-12', 6);
```