# Introduction to SQL

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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`.

# SELECT-queries

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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

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SELECT Name
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## Answers

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## Query retrieving all names and date of birth pairs in `Patient`-table

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- 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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- The result is now same as before, but contains only the rows where `<condition>` holds.

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SELECT Birthdate, NrTreatments
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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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**Query for names of patients who have between 5 and 15 treatments and is born after '2000-01-01'**

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# Exmples

## WHERE

https://dbfiddle.uk/Wu5i_q6E?hide=2

Find date of all observations in Oslo

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

- `current_date` is a constant holding the current date

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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;
```

# Translating a question into SQL

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(See *SQL Queries for Mere Mortals* for more examples)

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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:

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- To create a table, we use the `CREATE`-command
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# Joins (not part of curriculum)

- Remember that be often use many tables (e.g. to avoid data duplicatin)
- Often want information that come from multiple tables
- E.g.: *When and where was blacklisted species observed?*
- Can use `JOIN` to combine two tables into one
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- To answer the above question, we can write the following query:

```
SELECT observed_time, observed_lat, observed_lon, location
  FROM species JOIN observation ON sid = species
 WHERE blacklisted;

-- OR, equivalently:

SELECT observed_time, observed_lat, observed_lon, location
  FROM species, observation
 WHERE sid = species AND blacklisted;
```