Retrieving Data

Dataforståelse 3

NIFR 2022

Porteføljeopgave 1

Housekeeping

- Analysere et komplekst dataset
- Læse det ind i en database
- Besvare spørgsmål vedrørende datasettet
  - Udtræk af data fra datasættet

Dataforståelse 3

Retrieving Data - Hands on

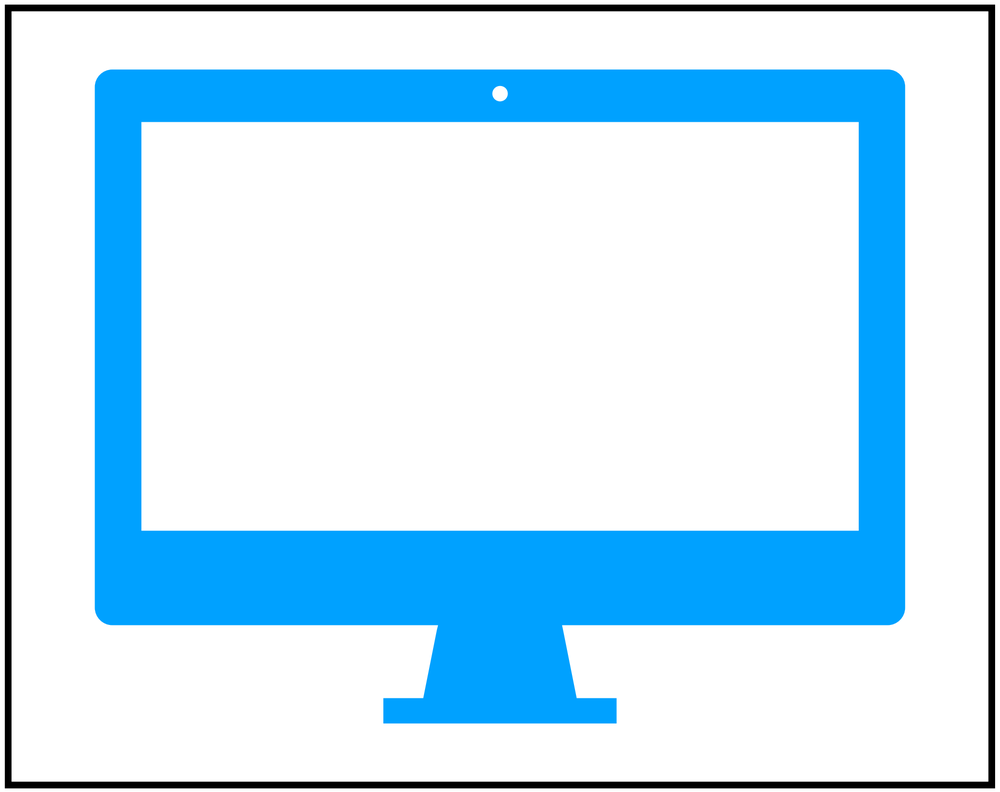
- Introduction to: Relational Database Management Systems (RDBSM) & Structured Query Language (SQL)
  - Tuppler & Relationer
- Creating a table
- Querying Data
  - SELECT
  - FROM
  - WHERE & ORDER BY

Dataforståelse 3

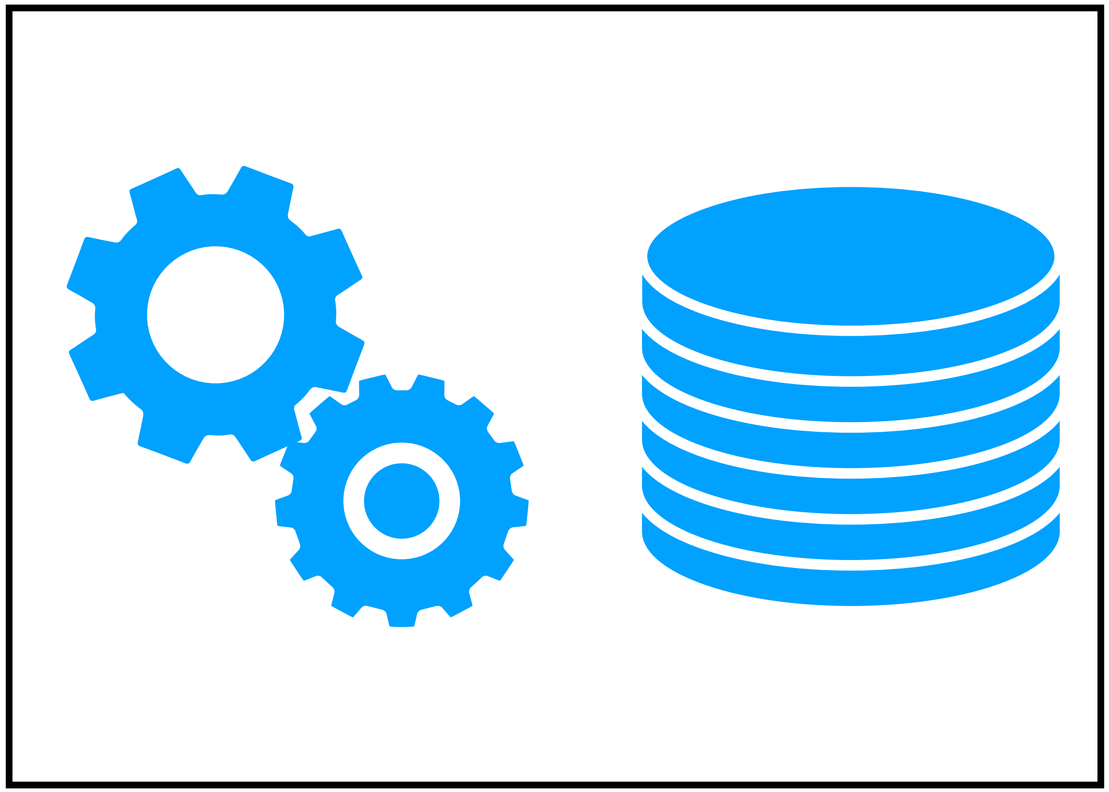
Læringsmål

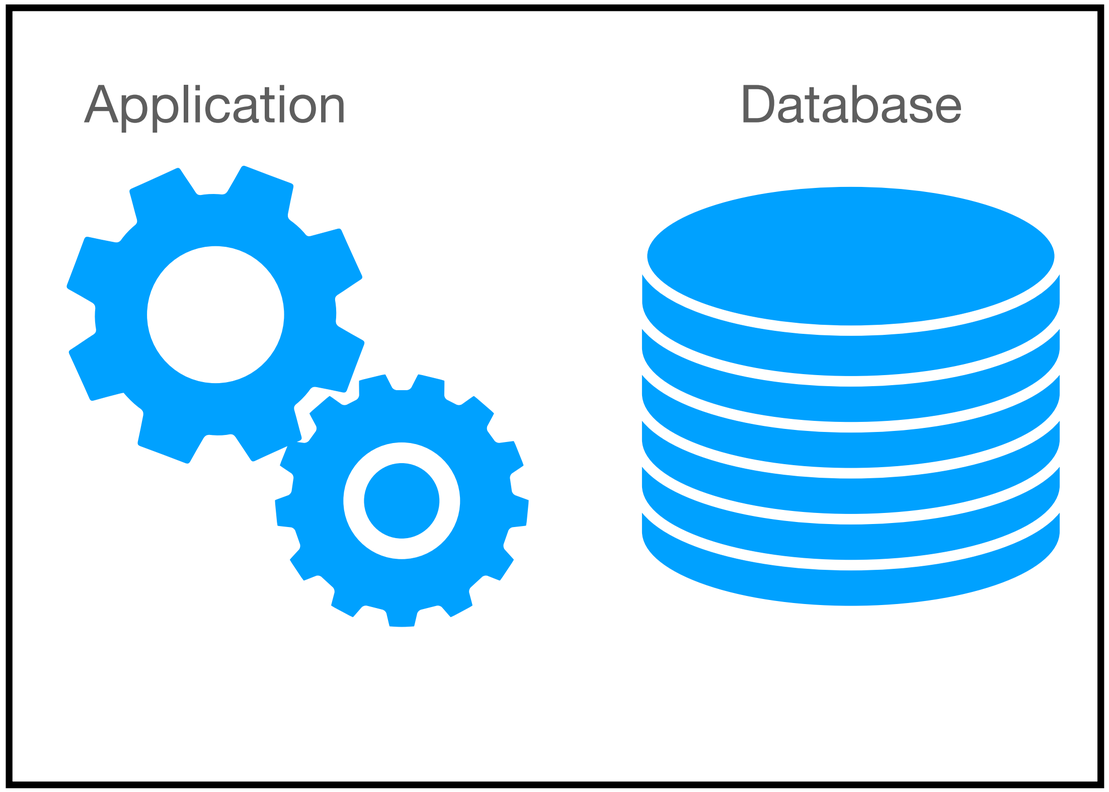
- Hvad er det relationelle i en relationel database?
  - Tabeller, Rækker (tuppler, entiteter), Kolonner (attributter)
- Hvordan udtrækkes data fra en relational database (MySQL) vha. SQL

Front-end



Backend

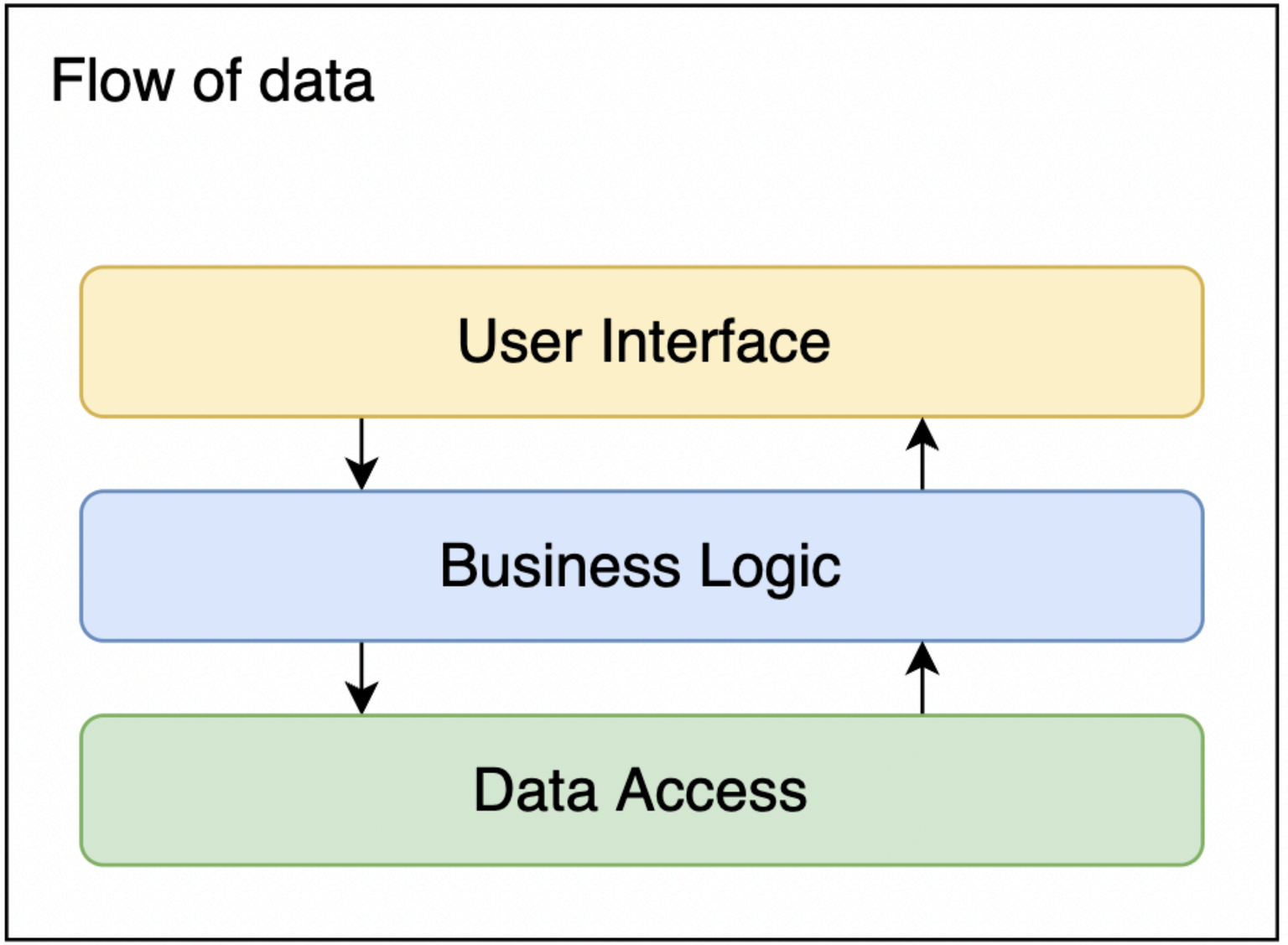



Application
Database

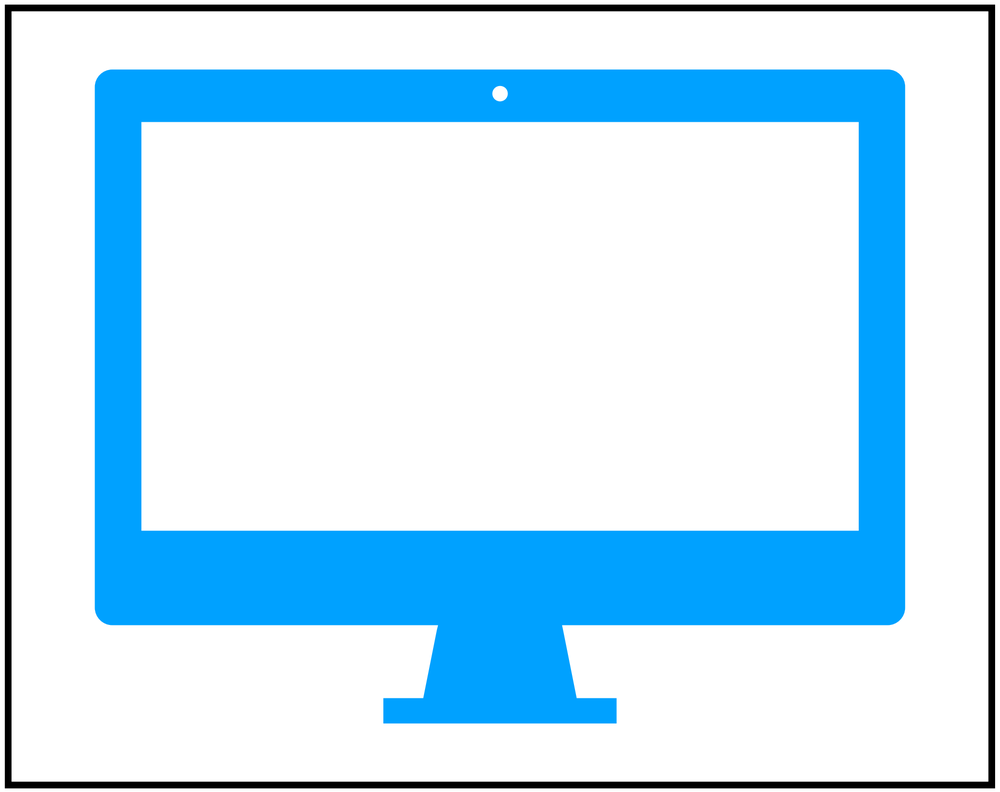
Kildemoes	01/02/2022	Mountainbike	Rød	Ikke
Kildemoes	01/02/2002	City-bike	Blå	El-drevet
Kildemoes	01/02/2005	Mountainbike	Rød	Ikke
Kildemoes	01/02/2020	City-bike	Blå	El-drevet
Kildemoes	01/02/2022	Mountainbike	Rød	Ikke

Råmateriale

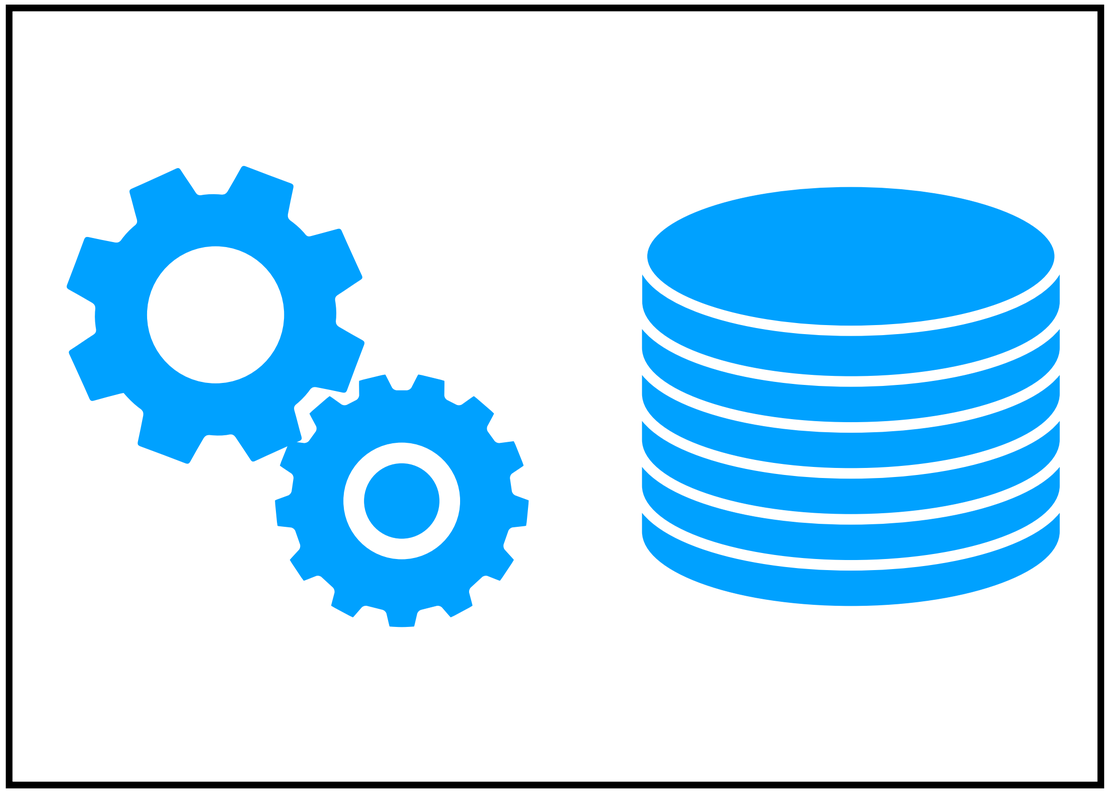
DATA


Flow of data
User Interface
Business Logic
Data Access

Front-end

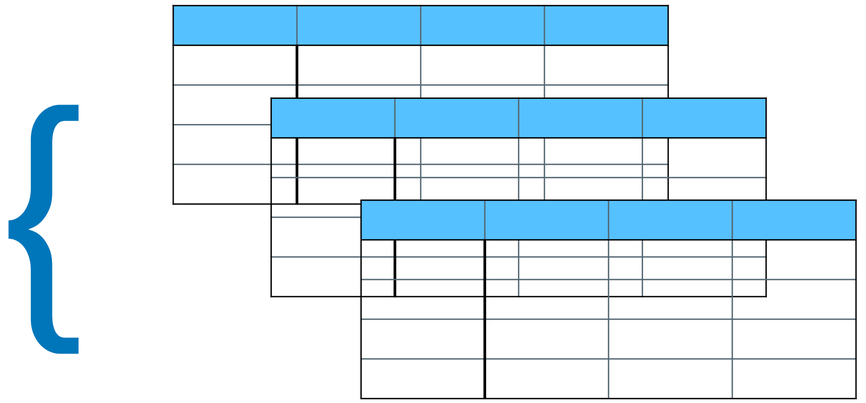


Backend



Database / Schema

Tables



Rows and columns (data)

Tabular Data - data in tables

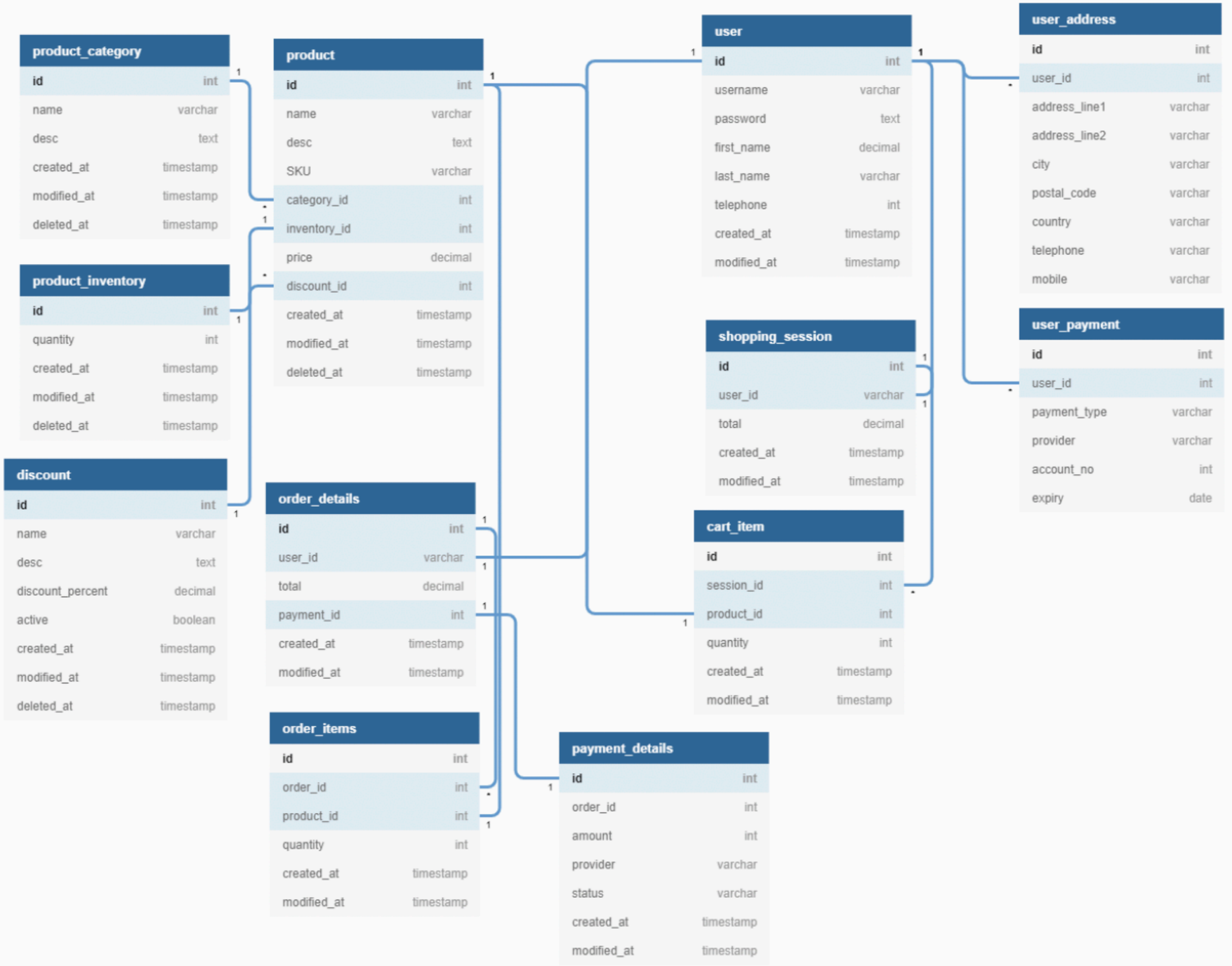
pokedex_number	name	speed	special_defence	special_attack	defence	attack	hp	primary_type	secondary_type
1	Bulbasaur	45	65	65	49	49	45	Grass	Poison
2	Ivysaur	60	80	80	63	62	60	Grass	Poison
3	Venusaur	80	100	100	83	82	80	Grass	Poison
4	Charmander	65	50	60	43	52	39	Fire	null
5	Charmeleon	80	65	80	58	64	58	Fire	null
6	Charizard	100	85	109	78	84	78	Fire	Flying
7	Squirtle	43	64	50	65	48	44	Water	null
8	Wartortle	58	80	65	80	63	59	Water	null
9	Blastoise	78	105	85	100	83	79	Water	null
10	Caterpie	45	20	20	35	30	45	Bug	null
11	Metapod	30	25	25	55	20	50	Bug	null

Column/Attribute/Property

pokedex_number	name	speed	special_defence	special_attack	defence	attack	hp	primary_type	secondary_type
1	Bulbasaur	45	65	65	49	49	45	Grass	Poison
2	Ivysaur	60	80	80	63	62	60	Grass	Poison
3	Venusaur	80	100	100	83	82	80	Grass	Poison
4	Charmander	65	50	60	43	52	39	Fire	null
5	Charmeleon	80	65	80	58	64	58	Fire	null
6	Charizard	100	85	109	78	84	78	Fire	Flying
7	Squirtle	43	64	50	65	48	44	Water	null
8	Wartortle	58	80	65	80	63	59	Water	null
9	Blastoise	78	105	85	100	83	79	Water	null
10	Caterpie	45	20	20	35	30	45	Bug	null
11	Metapod	30	25	25	55	20	50	Bug	null

Row/
Tupple/
Entity/

Relational Database Management System



```
1 SELECT *
2 FROM employees;
```

id	employee_name	job	manager	hiredate	salary	commission	department_number
7369	SMITH	CLERK	7902	1980-12-17	800	NULL	20
7499	ALLEN	SALESMAN	7698	1981-02-20	1600	300	30
7521	WARD	SALESMAN	7698	1981-02-22	1250	500	30
7566	JONES	MANAGER	7839	1981-04-02	2975	NULL	20
7654	MARTIN	SALESMAN	7698	1981-09-28	1250	1400	30
7698	BLAKE	MANAGER	7839	1981-05-01	2850	NULL	30
7782	CLARK	MANAGER	7839	1981-06-09	2450	NULL	10
7788	SCOTT	ANALYST	7566	1987-04-19	3000	NULL	20
7839	KING	PRESIDENT	NULL	1981-11-17	5000	NULL	10
7844	TURNER	SALESMAN	7698	1981-09-08	1500	0	30
7876	ADAMS	CLERK	7788	1987-05-23	1100	NULL	20
7900	JAMES	CLERK	7698	1981-12-03	950	NULL	30
7902	FORD	ANALYST	7566	1981-12-03	3000	NULL	20
7934	MILLER	CLERK	7782	1982-01-23	1300	NULL	10

```
1 SELECT *
2 FROM departments;
```

department_number	department_name	location
10	ACCOUNTING	NEW YORK
20	RESEARCH	DALLAS
30	SALES	CHICAGO
40	OPERATIONS	BOSTON

Relationship

id	employee_name	job	manager	hiredate	salary	commission	department_number
7369	SMITH	CLERK	7902	1980-12-17	800	NULL	20
7499	ALLEN	SALESMAN	7698	1981-02-20	1600	300	30
7521	WARD	SALESMAN	7698	1981-02-22	1250	500	30
7566	JONES	MANAGER	7839	1981-04-02	2975	NULL	20
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7698	BLAKE	MANAGER	7839	1981-05-01	2850	NULL	30
7782	CLARK	MANAGER	7839	1981-06-09	2450	NULL	10
7788	SCOTT	ANALYST	7566	1987-04-19	3000	NULL	20
7839	KING	PRESIDENT	NULL	1981-11-17	5000	NULL	10
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7876	ADAMS	CLERK	7788	1987-05-23	1100	NULL	20
7900	JAMES	CLERK	7698	1981-12-03	950	NULL	30
7902	FORD	ANALYST	7566	1981-12-03	3000	NULL	20
7934	MILLER	CLERK	7782	1982-01-23	1300	NULL	10

department_number	department_name	location
10	ACCOUNTING	NEW YORK
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30	SALES	CHICAGO
40	OPERATIONS	BOSTON

Structured Query Language

Database: MySQL

Language: SQL

Declarative nature of SQL

What I want - not how

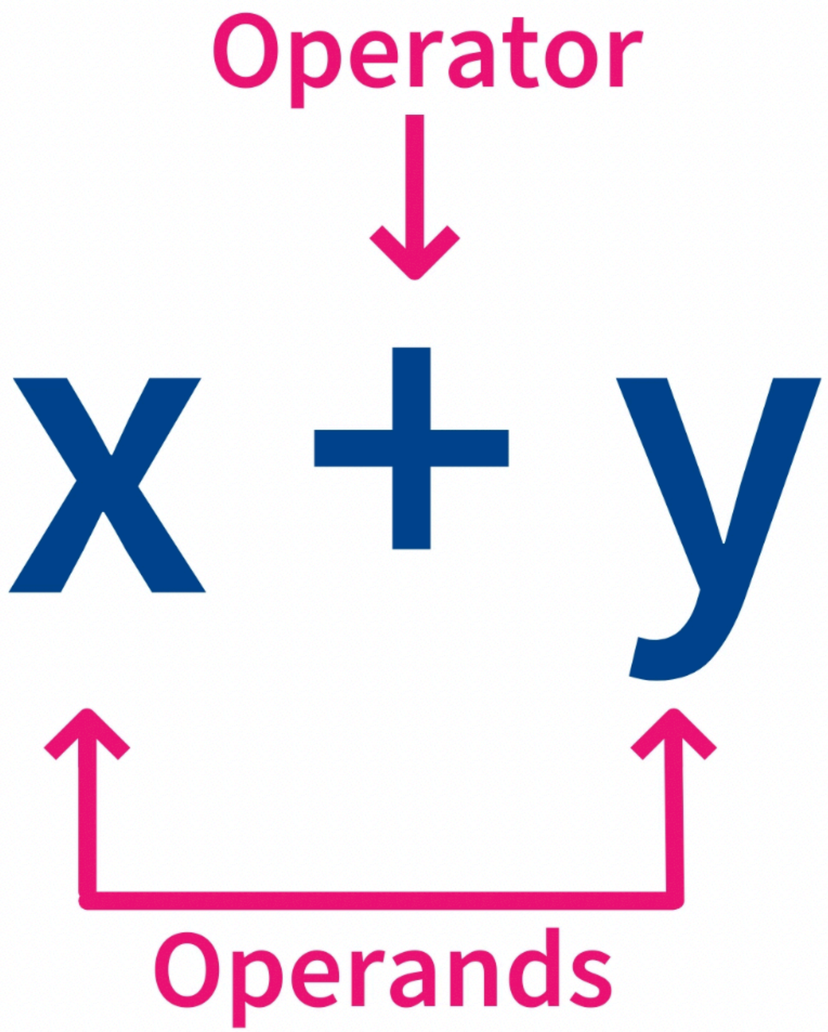
Loading data . . .

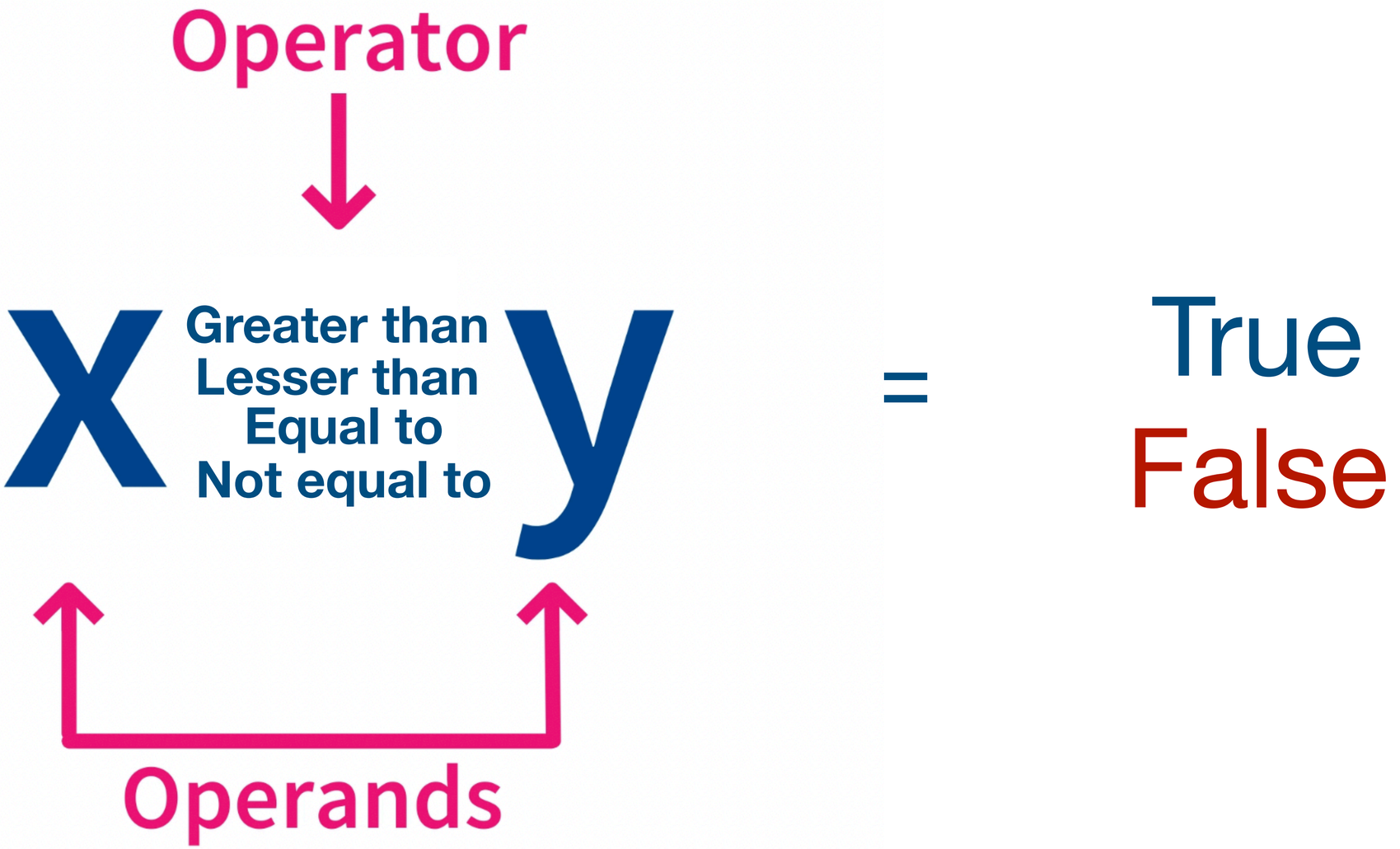
- Creating a database
- Creating a table
- Inserting data

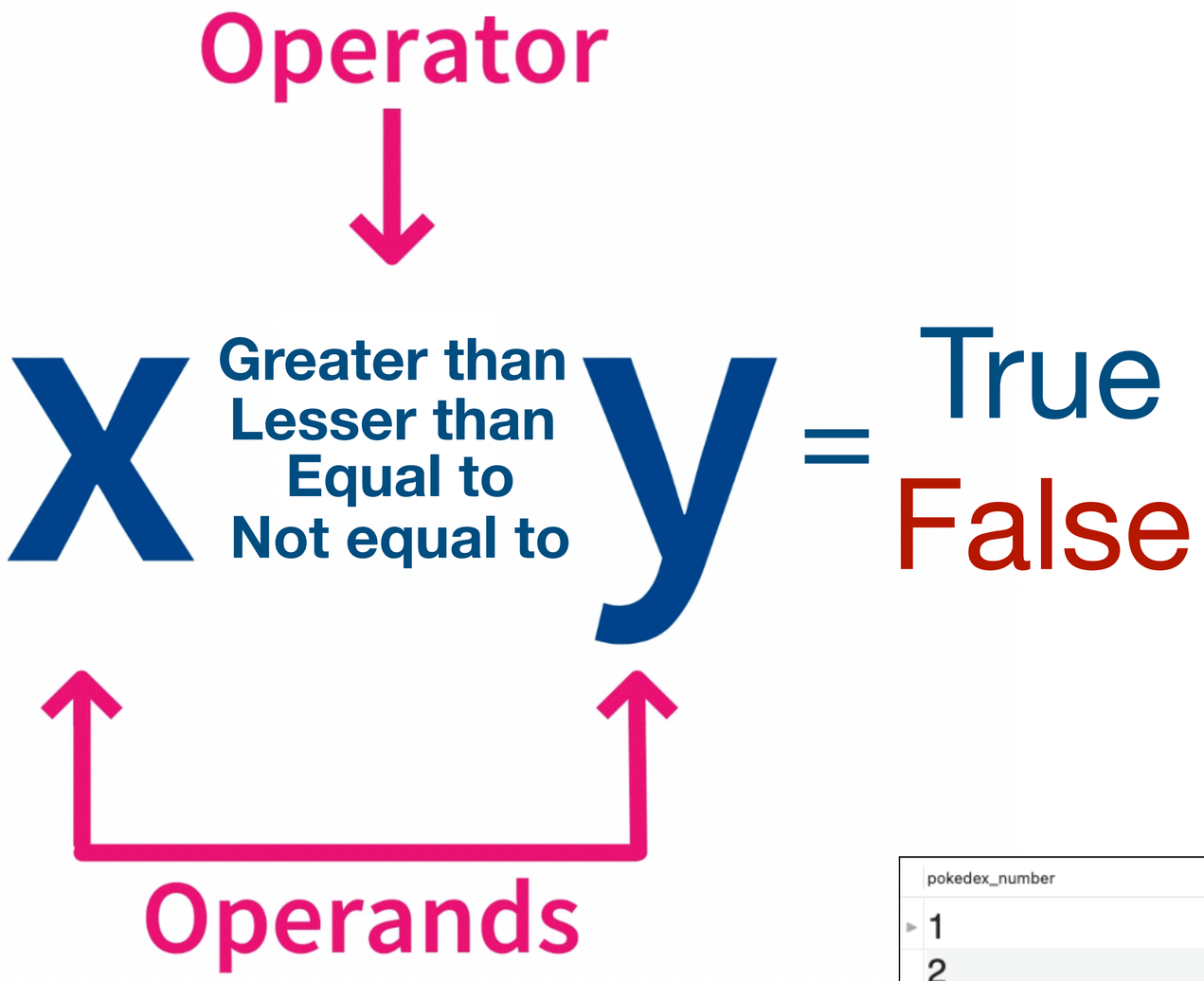
```
SELECT [Columns]
FROM [Table Name];
```

```
SELECT [Columns]
FROM [Table Name]
WHERE [Filter Expression]
```

Filter / Boolean Expression


Operator
x + y
Operands


Operator
x
Greater than
Lesser than
Equal to
Not equal to
y
Operands
=
True
False




```
SELECT *
FROM pokemon
WHERE attack > 50
```

pokedex_number	name	speed	special_defence	special_attack	defence	attack
1	Bulbasaur	45	65	65	49	49
2	Ivysaur	60	80	80	63	62
3	Venusaur	80	100	100	83	82

Retrieving Data

MySQL Examples

- All Pokémon
- All Ground Pokemon
- Exercises

Læsevejledning:
Data Quality at A Glance