SQL - Summary

SQL-Basics

- DDL - Data Defenition Language
- DML - Data Manipulation Language
- DRL - Data Retrieval Language
- DCL - Data Controll Language

SQL-Commands

Data Retrieval

SELECT

```
-- Return all entries from table `customers`
SELECT * FROM customers
```

```
-- Return only the `orders`-column from table `customers`
SELECT orders FROM customers
```

SELECT DISTINCT

```
-- Return every unique entry of the column `zipCode` from table `customers`
SELECT DISTINCT zipCode FROM customers
```

WHERE

```
-- Return all entries from table `customers` where columnn `zipCode` is set to `4840`
SELECT * FROM customers WHERE zipCode = 4840
```

HAVING

```
-- Use the `HAVING`-keyword, when using aggregate functions like `COUNT()` in what would be
-- the `WHERE` statement
SELECT * FROM customers HAVING COUNT(orders) > 1
```

AND / OR / NOT

```
-- Default AND (&&), OR (||) and NOT (!) operators.
-- use brackets when needed!
-- e.g. `... WHERE (col1 = case1 AND col2 = case2) OR col3 = case3`
SELECT * FROM customers WHERE paid = 1 AND inProgress = 1
```

```
SELECT * FROM customers WHERE zipCode = 4840 OR zipCode = 4850
```

```
SELECT * FROM customers WHERE country = 'AUT' AND NOT city = 'VIE'
```

NULL / NOT NULL

```
-- To check if the cell-value is or is not `null`, use the following commands
SELECT * FROM orders WHERE orderDate IS NULL
```

```
SELECT * FROM orders WHERE orderDate IS NOT NULL
```

AS / Aliases

```
-- Assign the column `id` the name `customerNumber` in the current query.
-- Can be used in WHERE-clauses, JOINS, etc.
SELECT id AS customerNumber FROM customers
```

```
-- Special case: parent-table and 2 ids in 2 columns that belong to 1 other table.
-- To differentiate between the two columns, aliases can be used.
-- ...
LEFT JOIN typeTable AS typeA ON creatures.typeID1 = typeA.id
LEFT JOIN typeTable AS typeB ON creatures.typeID2 = typeB.id
-- ...
```

```
-- Creating a new column with a calculated result
SELECT workers, hours, workers*workhours AS hoursTotal FROM employees
```

GROUP

```
-- Similar to `SELECT DISTINCT`, however, the `GROUP`-keyword returns the
-- entire row of the result, while `SELECT DISTINCT` only returns the one column
-- that is provided in `SELECT DISTINCT searchColumn`
SELECT * FROM customers GROUP BY age
```

ORDER BY

```
-- Returns all entries from the table `customers` and orders it
-- ascending (A-Z, 0-9) by age
SELECT * FROM customers ORDER BY age ASC
```

```
-- Returns all entries from the table `customers` and orders it
-- descending (Z-A, 9-0) by age
SELECT * FROM customers ORDER BY age DESC
```

LIMIT / TOP

```
-- Returns the first 10 results of the result-set
-- SQLServer, MS-Access
SELECT TOP 10 FROM customers
```

```
-- MySQL
SELECT * FROM customers LIMIT 10
```

LIKE & Wildcards

```
-- To search for patterns, use `LIKE` instead of `=`
-- Returns all customers where the column `name` starts with `A`
SELECT * FROM customers WHERE name LIKE 'A%'
```

```
-- Returns all customers where the column `name` doesn't end with `A`
SELECT * FROM customers WHERE name NOT LIKE '%A'
```

```
-- Returns all customers where the column `name` contains `A`
SELECT * FROM customers WHERE name LIKE '%A%'
```

```
-- Returns all customers where the column `name` contains a `d` at the third position
SELECT * FROM customers WHERE name LIKE '%__d'
```

IN

```
-- Same as:
--`... WHERE zipCode = 4840 OR zipCode = 4850 OR zipCode = 4860`
```

```
SELECT * FROM customers WHERE zipCode IN (4840,4850,4860)
```

EXISTS

```
-- Tests if a fitting entry is found in a sub-query
SELECT SupplierName FROM Suppliers
WHERE  EXISTS (
    SELECT ProductName FROM  Products
    WHERE Products.SupplierID = Suppliers.supplierID AND Price < 20);
```

BETWEEN

```
-- Return all entries from table `customers` where the age is between 18 and 21
SELECT * FROM customers WHERE age BETWEEN 18 AND 21
```

CASE

```
-- Advanced usage. Set a new columns value depending on the tested columns value
SELECT orderID, quantity,
CASE
    WHEN quantity > 30  THEN  "The quantity is greater than 30"
    WHEN quantity = 30  THEN  "The quantity is 30"
    ELSE  "The quantity is under 30"
END AS quantityText
FROM orderDetails;
```

INNER JOIN

```
-- Returns the table `customers` linked to the table `countries`.
-- Only returns a result, if value in joined column exist
SELECT * FROM customers
INNER JOIN countries ON customers.countryID = countries.id
```

LEFT JOIN

```
-- Returns the table `customers` linked to the table `orders`.
-- Returns a result, even if the value in the joined column does not exist
SELECT * FROM customers
LEFT JOIN orders ON customers.id = orders.customerID
```

RIGHT JOIN

```
-- Returns the table `customers` linked to the table `orders`.
-- Returns a result, even if the value in the joined column does not exist
-- Same as `LEFT JOIN` with flipped assignments
SELECT * FROM customers
RIGHT JOIN orders ON orders.customerID = customers.id
```

FULL OUTER JOIN

```
-- Returns all entries from both the `customers`-table as well as the `orders`-table
-- Joins them if possible, otherwise leaves the un-joinable parts blank
SELECT * FROM customers
FULL OUTER JOIN orders ON customers.id = orders.customerID
```

UNION ALL

```
-- Returns a combined result set of the tables `customers` and `suppliers`.
-- Both tables in the UNION must have the same column amount and names (Use aliases if needed)
-- Returns all values with duplicate entries
SELECT city FROM customers
UNION ALL
SELECT city FROM suppliers
```

UNION DISTINCT

```sql
-- Returns all values without duplicate entries
SELECT city FROM customers
UNION DISTINCT
SELECT city FROM suppliers
```

Data Manipulation

INSERT

```sql
-- Add a new entry to the table `customers`
INSERT INTO customers (firstname, lastname) VALUES ('Tom','Hamston')
```

UPDATE

```sql
-- Changes one or more cells/rows in the table
UPDATE cusomters SET age = 20 WHERE id = 652
```

```sql
-- Change multiple cells at once
UPDATE cusomters SET age = 20, lastname = 'Orthwild' WHERE id = 652
```

DELETE

```sql
-- Delete a row from the table
DELETE FROM customers WHERE id = 54
```

SELECT INTO

```sql
-- Copies the table `customers` into the table `customersBackUp`
SELECT * INTO customersBackUp FROM customers
```

INSERT INTO SELECT

```sql
-- Copies all entries from the table `customers` into the table `customersUnderAge`,
-- where the column `age` is lower than 18
INSERT INTO customersUnderAge
SELECT * FROM customers WHERE age < 18
```

Data Definition

CREATE

```sql
-- Creates a new table with 3 columns (numeric, text, text)
CREATE TABLE customers (
    id int,
    firstname varchar(100),
    lastname varchar(100)
)
```

DROP

```sql
-- Deletes the table `customers`
DROP TABLE customers
```

TRUNCATE

```sql
-- Clears the table `customers`
TRUNCATE TABLE customers
```

ALTER

```
-- Adds an extra column to the table `customers`
ALTER TABLE customers ADD email varchar(200)
```

```
-- Removes the column `email` from table `customers`
ALTER TABLE customers DROP COLUMN email
```

```
-- Change the datatype of column `email` from table `customers`
ALTER TABLE customers ALTER COLUMN email varchar(250)
```

BACKUP

```
-- Saves the database
BACKUP DATABASE dbName TO DISK = 'filepath'
```

```
-- Saves only the changes since the last full backup
BACKUP DATABASE dbName TO DISK = 'filepath' WITH DIFFERENTIAL
```

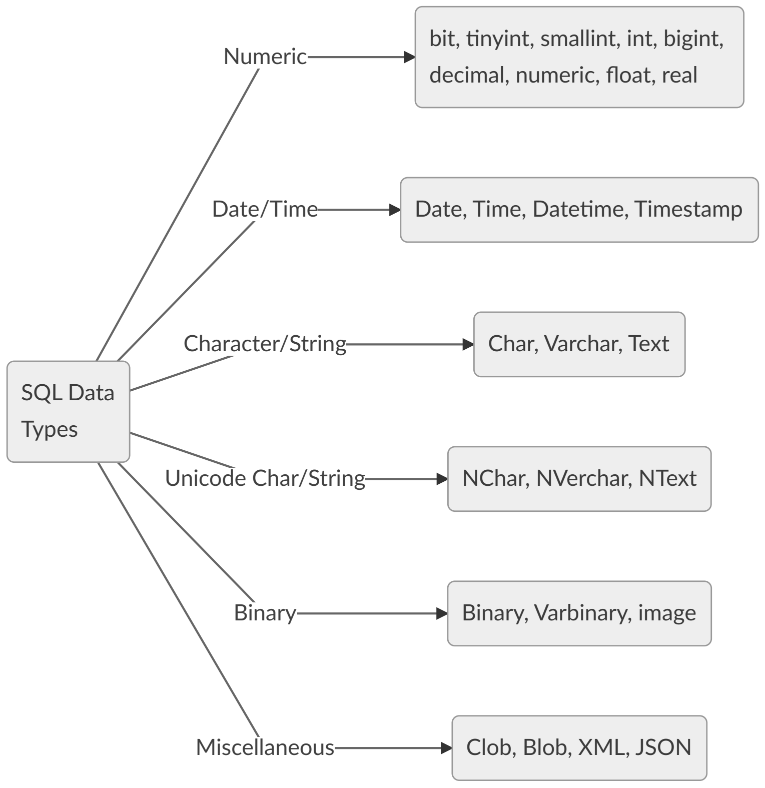
CONSTRAINTS

```
-- Adding constraints (= regulations, conditions, ...) to the columns
-- when creating a new table
CREATE TABLE customers (
    id int PRIMARY KEY,
    firstname varchar(100) NOT NULL,
    lastname varchar(100) NOT NULL,
    email varchar(150) UNIQUE
    age int CHECK(age > 0)
    active boolean DEFAULT 1
)
```

```
NOT NULL    -- Can not save a `null` value
UNIQUE      -- Inserted value must be unique within the column
PRIMARY KEY -- Setting primary key of the table
FOREIGN KEY -- Setting foreign key
CHECK       -- Adds a condition to the column
DEFAULT     -- Sets the default-value when inserting into table (if not specified at insert)
INDEX       -- Created an index on the column
```

SQL Datatypes

Main Datatypes in SQL:



SQL Formats

Date Formats

- DATE: `YYYY-MM-DD`
- DATETIME: `YYYY-MM-DD HH:NN:SS

Date Inserts in MS-Access

MS-Access can’t auto-convert text to dates. To work with dates in MS-Access, use the following syntax:

Date: 1999-11-16 2:25:53
In MS-Access: `#1999-11-16 2:25:53#` (or `#'1999-11-16 2:25:53'#`)
