# Abschlussklausur Modul „SQL“

Anwendungsbezogene Bioinformatik und Biostatistik 2022-1  
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## General Questions

What does SQL stand for? /1,5

**Structured Query Language** (SQL) A standard language lets access for storing, manipulating and retrieving data in database.

SQL can:

* execute and retrieve data , insert, update and delete records from a database
* create new databases and delete databases
* create and delete tables in a database …..

Name two Python Modules that work with SQL. /2

# SQLlite - module - gives access to a way to communicate with the database,

# MySQL (mysql-connectorpython)

## SQL Tables

Which two methods do you know to create tables in SQL? Give an example command for each of them.

# integer, varchar(250), real are – datatypes

Method1:

Create table table\_name (column1 integer, column2 varchar(250), column3 real);

insert into table\_name (column1, column2, column3) values (1, "word1", 1.11);

insert into table\_name (column1, column2, column3) values (2, "word2", 1.22);

insert into table\_name (column1, column2, column3) values (3, "word3", 1.33);

or

insert into table\_name values

(1, "word1", 1.11),

(2, "word2", 1.22),

(3, "word3", 1.33);

select \* from table\_name;

Method2: Create Table Using another Table

CREATE TABLE new\_table\_name AS

SELECT column1, column2,...

FROM existing\_table\_name

Ex:

CREATE TABLE TestTable AS

SELECT customername, contactname

FROM customers;

/4

How can you enter data into a table in SQL?

INSERT INTO table\_name (column1, column2, column3, ...)

VALUES (value1, value2, value3, ...);

or

INSERT INTO table\_name

VALUES (value1, value2, value3, ...); /2

How can you change data in your table?

UPDATE *table\_name*  
SET *column1*=*value1*,*column2*=*value2*, ...  
WHERE *condition*;

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

UPDATE Customers  
SET PostalCode = 00000  
WHERE Country = 'Mexico';

If omit the WHERE clause, ALL records will be updated! /2

Name and describe 4 Constraints you can add to columns in SQL. Give an example for all of them. /8

Column constraints include:

# NOT NULL - Specifies that this column cannot hold NULL

CREATE TABLE Persons (

ID int NOT NULL,

LastName varchar(255) NOT NULL,

FirstName varchar(255) NOT NULL,

Age int

);

ALTER TABLE Persons

MODIFY Age int NOT NULL;

# UNIQUE - Specifies that values in the column must be unique.

it requires that all of a column's values be distinct from one another (except for NULL values).

CREATE TABLE Persons (

ID int NOT NULL,

LastName varchar(255) NOT NULL,

FirstName varchar(255),

Age int, UNIQUE (ID)

);

ALTER TABLE Persons

ADD UNIQUE (ID);

# PRIMARY KEY - Specifies the column that uniquely identifies a row in the table. The identified columns must be defined as NOT NULL.

CREATE TABLE Persons (

ID int NOT NULL,

LastName varchar(255) NOT NULL,

FirstName varchar(255),

Age int,

PRIMARY KEY (ID)

);

ALTER TABLE Persons

ADD PRIMARY KEY (ID);

# FOREIGN KEY - Specifies that the values in the column must correspond to values in a referenced primary key or unique key column or that they

CREATE TABLE Orders (

OrderID int NOT NULL,

OrderNumber int NOT NULL,

PersonID int,

PRIMARY KEY (OrderID),

FOREIGN KEY (PersonID) REFERENCES Persons(PersonID)

);

ALTER TABLE Orders

ADD FOREIGN KEY (PersonID) REFERENCES

Persons(PersonID);

# CHECK - Specifies rules for values in the column.

CREATE TABLE Persons (

ID int NOT NULL,

LastName varchar(255) NOT NULL,

FirstName varchar(255),

Age int,

CHECK (Age>=18)

);

ALTER TABLE Persons

ADD CHECK (Age>=18);

## Selections

How can you select all entries in a table in SQL?

SELECT \* from table\_name

Or select an individual columns /1

SELECT column1, column2, ...

FROM table\_name;

What are the meanings of NOT NULL, ORDER BY and WHERE in SQL? Give an example for all three of them. /6

# NOT NULL- The NOT NULL operator is used to test for non-empty values (NOT NULL values).

SELECT column\_namesFROM table\_name  
WHERE column\_name IS NOT NULL;

Ex:

SELECT CustomerName, ContactName, Address  
FROM Customers  
WHERE Address IS NOT NULL;

# ORDER BY - is used to sort the result-set in ascending or descending order.

SELECT \* from table\_name

Order by column\_name

Ex: SELECT \* FROM Customers

ORDER BY Country;

# WHERE - is used to filter records.

UPDATE *table\_name*  
SET *column1*=*value1*,*column2*=*value2*, ...  
WHERE *condition*;

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

UPDATE Customers  
SET PostalCode = 00000  
WHERE Country = 'Mexico';

If omit the WHERE clause, ALL records will be updated!

/26,5 ==> % ==> Note: