Databases

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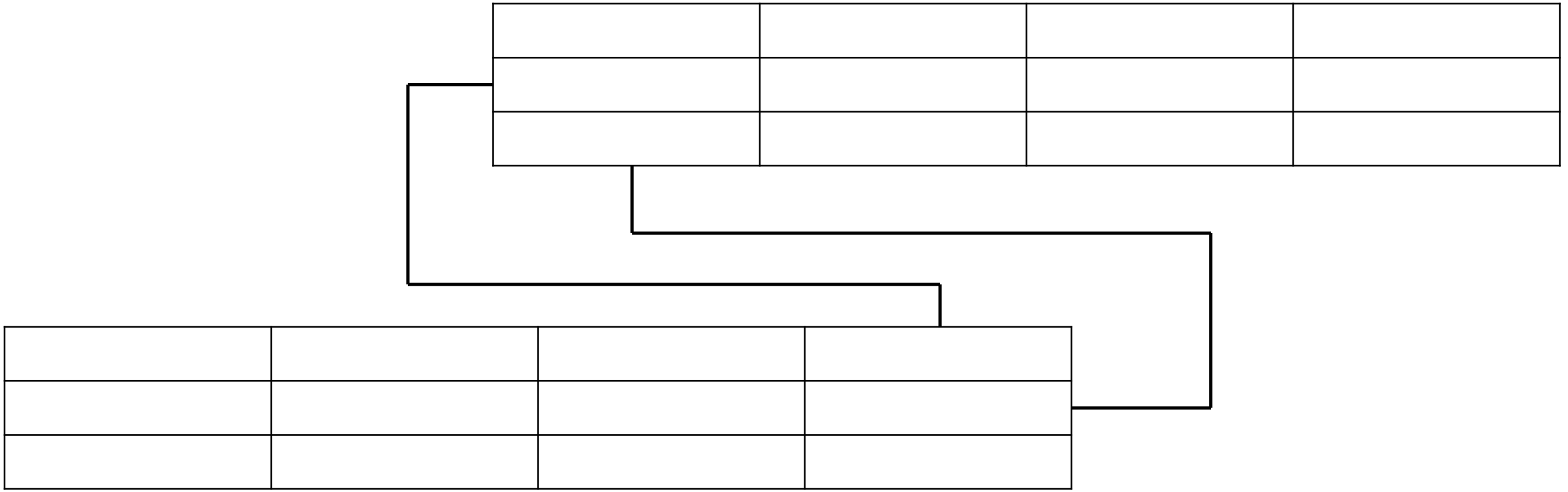
PUBLIC

THE BEST RUN SAP

Relational Databases



MySQL Datatypes

https://dev.mysql.com/doc/refman/8.0/en/data-types.html

MySQL Database Server

- As a service (long running process)
- Start – with mysqld
- Stop – with mysqladmin -u root -p shutdown
- Connect a command-line client - mysql -u <user> -p

Located in MySQL\MySQL Server <version>\bin

MySQL Users

- Getting the current user - SELECT CURRENT_USER();
- List users (as root) - SELECT USER, HOST FROM MYSQL.USER;

(here MYSQL is a database and USER is a table)

- Creating users (as root) - CREATE USER 'john'@'localhost' IDENTIFIED BY 'password';
- Granting privileges to a user over a database - GRANT ALL PRIVILEGES on <database>.* to 'john'@'localhost';

(check that the database is now visible for the user – show databases;)

- Changing password - SET PASSWORD FOR 'john'@'localhost' = 'new-password'
- Removing user - REVOKE ALL ON <database>.* FROM 'john'@'localhost';

```
DELETE FROM MYSQL.USER WHERE USER=“john" AND HOST="localhost";

FLUSH PRIVILEGES;
```

Test database

ADDRESS				
ID	COUNTRY	CITY	STREET	NUMBER

COMPANY		
ID	NAME	ADDRESS_ID

CUSTOMER			
ID	FIRST_NAME	LAST_NAME	ADDRESS_ID

PRODUCT				
ID	NAME	CATEGORY	COMPANY_ID	PRICE

PURCHASE		
ID	TIME	CUSTOMER_ID

PURCHASED_ITEMS		
PURCHASE_ID	PRODUCT_ID	QUANTITY

1:1

1:M

M:M

MySQL Queries

- Retrieve product names and categories
- Retrieve all products whose category is ‘Bakery’
- Retrieve all customers whose first name contains letter ‘t’
- Retrieve all customers whose first name is either ‘Richard’ or ‘Ivan’
- Retrieve all products that do not have a category
- Retrieve all products that are more expensive than 1.50
- Retrieve all users and show them ordered by last name ASC and DESC order
- Retrieve the first 2 address from the table

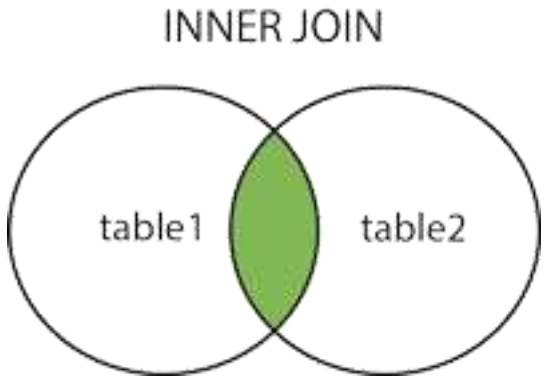
MySQL Queries

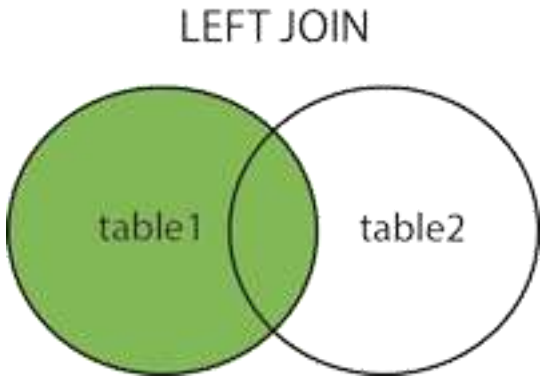
- Retrieve all customers and their countries
- Retrieve all customers that are from Bulgaria (JOIN / Nested SELECT)
- Retrieve all products and the company that produces them
- Retrieve all products of company with name ‘FR Bakery’
- Retrieve all purchased goods, their respective quantities and dates of purchase
- Retrieve all purchased in year 2017 goods, their respective quantities and dates of purchase

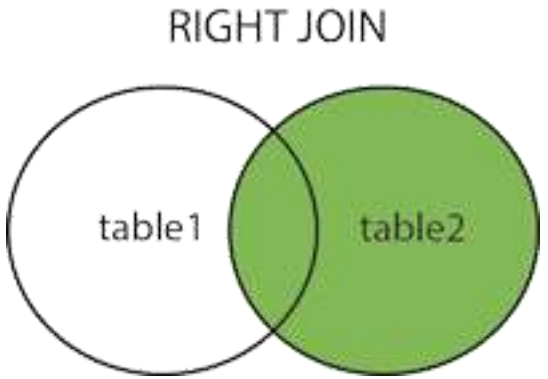
MySQL Queries – Outer Join

CREATE TABLE ARTIST(ID INTEGER NOT NULL AUTO_INCREMENT, PRIMARY KEY(ID), NAME VARCHAR(255) NOT NULL);

INSERT INTO ARTIST VALUES(NULL, 'Gims'), (NULL, 'David Guetta'), (NULL, 'Beyonce');







CREATE TABLE SONG(NAME VARCHAR(255) NOT NULL, ARTIST_ID INTEGER, FOREIGN KEY(ARTIST_ID) REFERENCES ARTIST(ID));

INSERT INTO SONG VALUES('Titanium', 2), ('Halo', 3);

Misc

- Aggregate functions – MIN, MAX, AVG, COUNT, SUM
- Indices
- Transactions
- Stored Procedures

```
CREATE PROCEDURE MY_PROC()
BEGIN
  SELECT ...
  INSERT INTO ...
  DELETE FROM ...
  SELECT ...
END
```

Misc

- ON DELETE
  - RESTRICT (default)
  - SET NULL (sets the foreign key to NULL)
  - CASCADE

JDBC

- Careful for possible SQL injections

Homework

Моделирайте база данни на приложение за университети, което трябва да може да добавя, изтрива и извежда списък от студенти.

- Всеки студент има факултетен номер, първо име, фамилия.
- *(Бонус 1)* Всеки студент може да записва много курсове. Всеки курс има име, описание и кредити, които носи. Добавете възможност за добавяне, изтриване и извеждане на списък с курсове (както отделно така и за всеки студент).
- *(Бонус 2)* Всеки студент е записан точно в един факултет. Един факултет може да има много студенти. Добавете възможност за добавяне, изтриване и извеждане на списък с факултети, както и списък на студентите, записани в даден факлутет.
- *(Бонус 3)* Направете така, че когато изтриете даден факултет всички студенти записани в него също да бъдат изтрити.
- (*Бонус 4)* Използвайте JDBC за да манипулирате данните в таблиците.