E02 – SQL Review (Part 1)

Business Intelligence

Exercise

Winter Term 2025/2026

Agenda

- Introduction
  - Introduction and notes on software
- Crash course on databases
- Exercise
  - Tasks
- Credits and materials

Introduction

- The main goal of the “SQL Review” exercise is to refresh your knowledge SQL and make an gentle introduction into a practical world of SQL.

- Despite this set of exercises is dedicated to only refresh existing SQL knowledge, they also could be very useful for the ones who works with the SQL for the first time.

Notes on Software (I/IV) – Desktop Applications (**DBeaver**)

- DBeaver Community is a universal database tool. It is free multi-platform database tool for developers, database administrators, analysts and all people who need to work with databases.
- Download DBeaver Community - https://dbeaver.io/download/

- ~~The further optional tutorial explains the usage of SQLite, but you can also use more professional DBeaver Community alternative, which could be used with other databases engines as well (e.g., PostgreSQL, TimescaleDB, etc.)~~

Notes on Software (II/IV) – Online Services (**PGAdmin4 , PostgreSQL**)

- If you don't want to use any desktop applications to solve given tasks, you may want to use online services, which offers SQL Server as a web portal. Please note that in order to meet requirements of a particular database engine, you need to change provided within this assignment SQL initialization scripts.

- Provided in the course infrastructure - PGAdmin4 + PostgreSQL
  - Further details are in "E00 - Infrastructure.pdf"

- Optional service:
  - DB Fiddle - https://www.db-fiddle.com/
  - SQL Fiddle - http://sqlfiddle.com/

Notes on Software (III/IV) – SQL Validation System

- A dedicated submission system should be utilized to validate your SQL queries
- The same system must be used to produce exercise reports, which will be used later for bonus points evaluation
- The dedicated submission system is part of the course's infrastructure and required registrations

Notes on Software (IV/IV) – Working with SQL and CSV

- Preferred way to work with SQL is to directly use DBeaver
- Any text editor could be used to view and edit "**.sql**" files. Text editors to consider:
  - Notepad++
  - Sublime Text 3
  - Visual Studio Code

Crash Course on Databases

- Before you will proceed with the assignments, it's strongly recommended that you to go through the online article by Thomas Nield and the lecture on advanced SQL

- "*Get started with SQL: Plan and design a database*"* - https://www.oreilly.com/learning/get-started-with-sql-plan-and-design-a-database
- 02 - Advanced SQL (CMU Databases Systems / Fall 2019, Prof. Andy Pavlo)** - https://www.youtube.com/watch?v=6VCHuLqfmV8

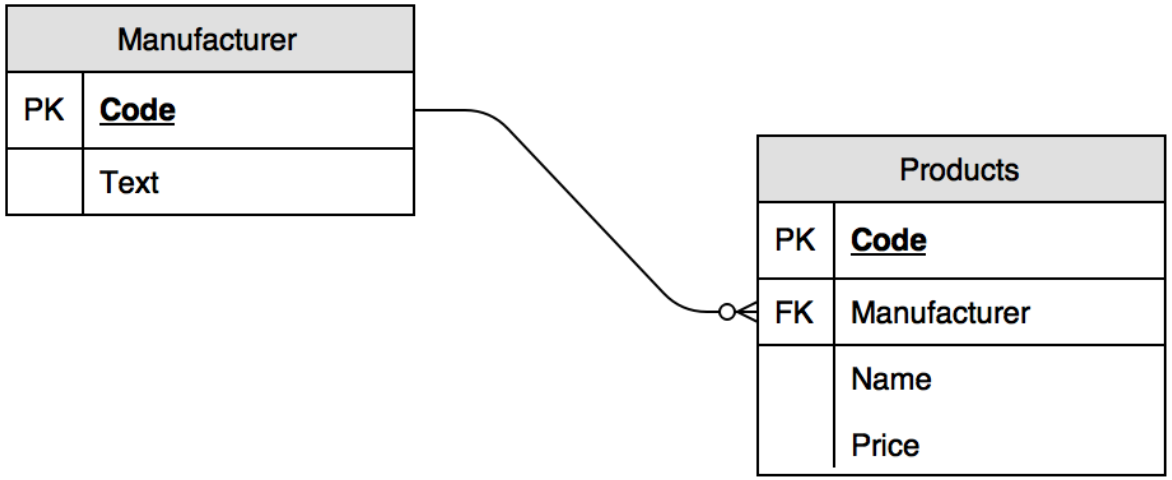
* NOTE: This is only one part of the book "Getting Started with SQL: A Hands-On Approach for Beginners" by Thomas Nield, but this should be enough for a good start

** NOTE: This is only one part of the course " Database Systems (CMU Fall 2019)" by Prof. Andy Pavlo

Exercise

Description – Computer Store Database

Assume that you are running a very small Computer Store that has its own small database. There are not much data for a moment, but you can still try out interesting queries in order to get more insights about your store.

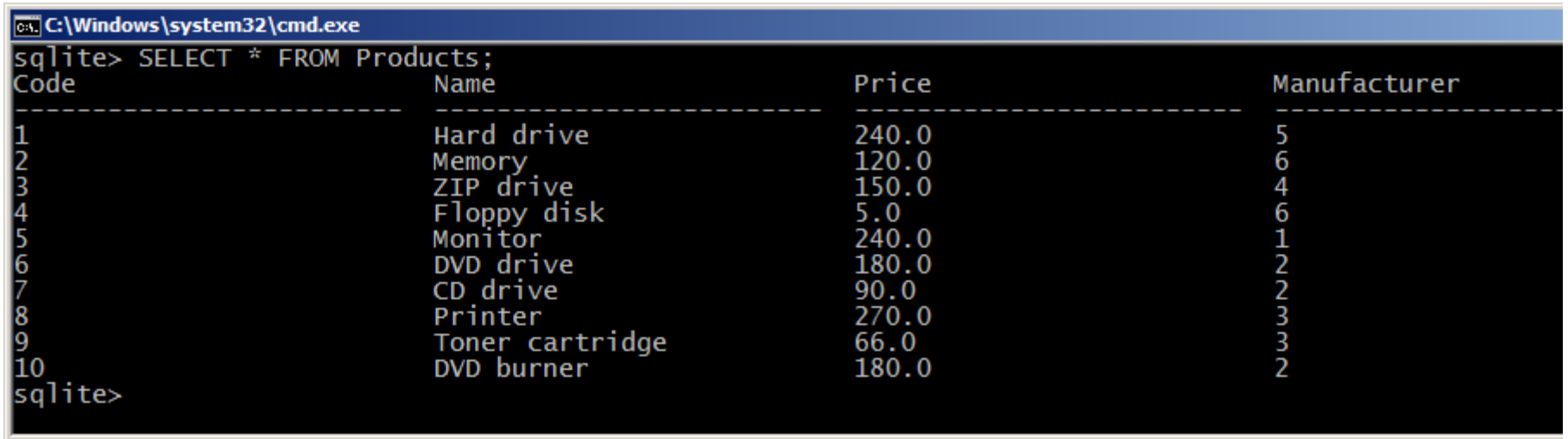


- **Load the data into SQLite database.** Write (or copy/paste) following command into SQLite's command prompt (instead you can also use SQLiteStudio)

```
.read computerstoredb.sql
```

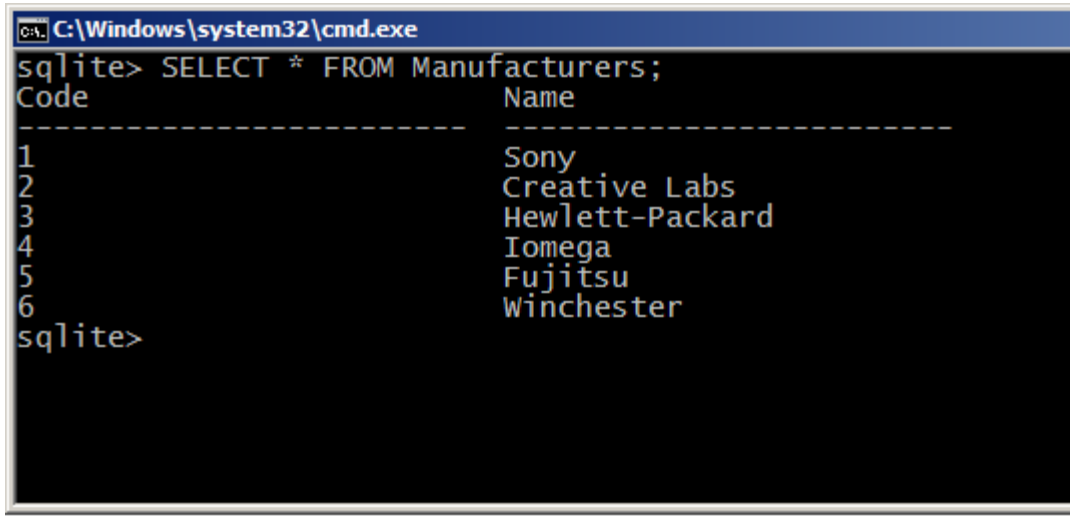
Database Description (I/II) – Table “Products”

- Table name:
  - **Products**
- Columns:
  - **Code, Name, Price, Manufacturer**
- Description:
  - ***Table with products located in computer store.***
- Table Data
  - ***SELECT * FROM Products;***



Database Description (II/II) – Table “Manufacturers”

- Table name:
  - **Manufacturers**
- Columns:
  - **Code, Name**
- Description:
  - ***Table with manufactured information.***
- Table Data
  - ***SELECT * FROM Manufacturers;***



Tasks – Part I (I/III)

1. Select the names of all the products in the store.
2. Select the names and the prices of all the products in the store.
3. Select the name of the products with a price less than or equal to $200.
4. Select all the products with a price between $60 and $120.
5. Select the name and price in cents (i.e., the price must be multiplied by 100).
6. Compute the average price of all the products.
7. Compute the average price of all products with manufacturer code equal to 2.
8. Select the name and price of all products with a price larger than or equal to $180, and sort first by price (in descending order), and then by name (in ascending order).
9. Select all the data from the products, including all the data for each product's manufacturer.
10. Select the product name, price, and manufacturer name of all the products.

Tasks – Part I (II/III)

11. Select the average price of each manufacturer's products, showing only average price the manufacturer's code.
12. Select the average price of each manufacturer's products, showing only average price and the manufacturer's name.
13. Select the names of manufacturer whose products have an average price larger than or equal to $150. Display average price and manufacturer's name.
14. Select the name and price of the cheapest product.
15. Select the name of each manufacturer along with the name and price of its most expensive product.

Tasks – Part I (III/III)

Inserts/Updates

16. Add a new product*: Loudspeakers, $70, manufacturer 2.*
17. Update the name of product 8 to "Laser Printer".
18. Apply a 10% discount to all products.
19. Apply a 10% discount to all products with a price larger than or equal to $120.

Tasks – Part II (I/III)

0. Write an SQL that will extend the given schema with the table “Orders”.

- Table name: **orders**
- Columns: **order_id, product_code, order_time*, amount, total_price**
- Description: ***Table with orders***
- Table Data: **See the file “orders-data.csv” ****

- To load the data from the “.csv” file and use following commands (only for the terminal). Tables that are used here, should already exist:

```
.mode csv
.import orders-data.csv Orders
```

- * Should be stored as TEXT and following functions should be later used for data manipulation - https://www.sqlite.org/lang_datefunc.html
- ** Details about importing CSV into SQLite can be found here - https://www.quackit.com/sqlite/tutorial/import_data_from_csv_file.cfm

Tasks – Part II (II/III)

1. How many orders exist in total?
2. Find out how many items of each product were ordered (show product_code and counter only).
3. Find out the product_code of the item that was sold only once.
4. Find out and print all the names and codes of the items, which were sold at least once.
5. Find out and print the name of the item that was sold exactly one time.
6. What is the total revenue generated by all orders?
7. Find out the total revenue generated by each product.
8. Find out product_code of the items with the minimum revenue.
9. Find out product_code of the items with the maximum revenue.
10. Find out the most successful manufacturer (the one, which has the most revenue).

Tasks – Part II (III/III)

11. Sort the given orders by the time of the transaction.
12. When (date) the first order took place?
13. When (date) the last order took place?
14. What is the total amount of days between the first order and the last order (in time dimension). Amount of days should be casted to an integer.
15. Find out the transaction (e.g. order) with the wrong price.

Credits and Materials

- *Get started with SQL: Plan and design a database* by Thomas Nield
- Tutorial "Beginner's Guide to Data Modelling" via http://www.databaseanswers.org/tutorial4_data_modelling/index.htm
- “Industry Data Models” via http://www.databaseanswers.org/data_models/
- MOOC course on databases Introduction to Databases by Jennifer Widom.
- “SQL Exercises, Practice, Solution” via http://www.w3resource.com/sql-exercises/
- "SQLBolt - Learn SQL with simple, interactive exercises" via https://sqlbolt.com/
- SQL tasks with different difficulty levels can be found on HackeRank

Submission

- Use StudIP to upload your solution (PDF report with SQL queries)

- You should upload PDF report with verified SQL queries
  - Further information on the SQL verification system is announced separately

- Name convention for your submission file (without extension)
  - **E02**_FIRSTNAME LASTNAME

- Submission deadline (it is a “soft” deadline)
  - 10 days after this exercise starts
  - Some exercises could take a bit more time and could be submitted later
  - NOTE: to receive feedback, you should first submit your progress