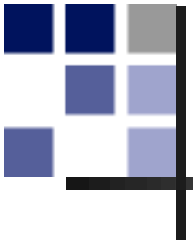
Digital Technology
B. Pernici

SQL EXERCISES



Material for this class

Book

- Chapter 2

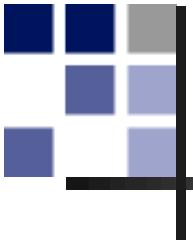
Slides

- 3-DT-BP-data-relational-exercises.pdf

Colaboratories

N1 Initial sample notebook
https://colab.research.google.com/drive/1IyI3_KCd7VlHbe9VOtCdsCOkkE8LqECy?usp=sharing

N2 SQL (empty, the solution will be published)
https://colab.research.google.com/drive/1DwZWNFPr5ktsyN9rs1R9ZRl0RULRjHyd?usp=sharing

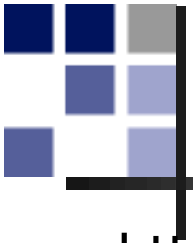


Useful links

- SQL online tutorial
- https://www.w3schools.com/sql/

- SQLlite
- https://www.sqlite.org/index.html

- Notebooks on colab
- https://colab.research.google.com/notebooks/basic_features_overview.ipynb



What is a colab

- https://colab.research.google.com/notebooks/basic_features_overview.ipynb

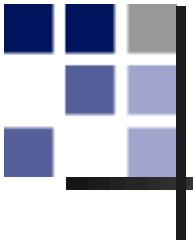
- To edit and execute code in the cloud (with Google account)

- You can create your own Python notebook or
- access notebooks created by the instructors - in this case after opening the colab do

  File -> Save a Copy in Drive

- Data are not persistent here, you have to upload (and download them to save them)

- After one hour of inactivity, the session will be ended

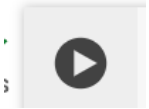


What is a notebook

To develop code interactively and analyze the result

- Two types of cells
  - Text
  - Code

- Writing the code does not execute it, you have to «run» it

(in colab, you go to the cell, click on  on left)

Initial sample notebook N1

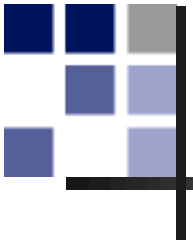
https://colab.research.google.com/drive/1IyI3_KCd7VlHbe9VOtCdsCOkkE8LqECy?usp=sharing

If in Italian select

Guida -> Visualizza in inglese

Create a new empty notebook

File -> New notebook in Drive



Try SQL on CoLab

- student version
- https://colab.research.google.com/drive/1DwZWNFPr5ktsyN9rs1R9ZRl0RULRjHyd?usp=sharing

- Create your own copy

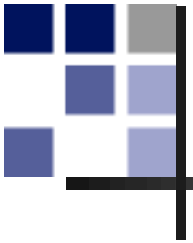
- Start the DBMS writing in a code cell

```
%load_ext sql
%sql sqlite:///mydb.sqlite
```

You are ready to write SQL statements

`You have to use the magic %%sql at the beginning of each code cell`

- Create a table and insert values
  - Remember to separate each SQL statement with a ;

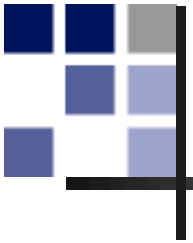


Example with Google CoLab

StudentID	LastName
21	Wang
13	Batini
32	Xu

CourseID	Name
3	Algorithms
7	Databases

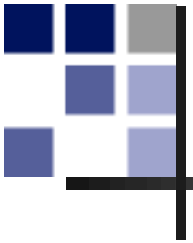
StudentID	CourseID	Grade
13	3	26
13	7	30
32	7	28



Exercises with a Notebook in Google CoLab

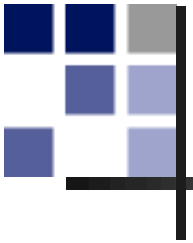
See the colab – here is a summary of the tasks that will be performed

- Connect to DB
- STUDENT DB
- INSERT 2 students
- STUDENT, EXAM, COURSE
- INSERT 2 courses
- INSERT courses attended by students
- SQL all course names with exams by students
- HOW TO IMPORT A SINGLE TABLE



Create and insert

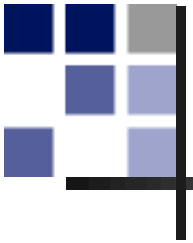
- Create the table STUDENT with SQL
- Insert student Wang with id 21
- Check you did it – how? Again with a query
- Insert the two other students in it
- Find the name of the course with CourseID 3



Uploading data

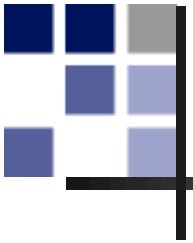
- Add a csv file to your notebook files, downloading it first from here (separator is ;)

https://www.dropbox.com/s/zp9v160frc6c4lw/COURSE.csv?dl=0



Try it on colab

- Add EXAM Table
- Add the tuples for exams as in the example
- Find all the grades of one of the students



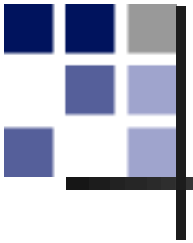
Answers to some questions

- %%%sql vs %sql

%%%sql for all the code cell
%sql within Python code, applies only to the current statement (see notebool)

- FOREIGN KEY AND PRIMARY KEY with multiple attributes (**when defining table**)

```
CREATE TABLE EXAM3(
StudentID REFERENCES STUDENT(StudentID),
CourseID,
Grade,
PRIMARY KEY (StudentID,CourseID)
);
```

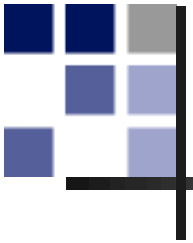


Structure of tables

- PRAGMA

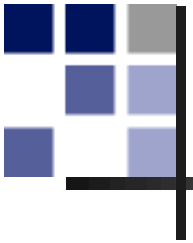
The table_info pragma is used to query information about a specific table.
The result set will contain one row for each column in the table.

Column name	Column type	Meaning
cid	Integer	Column index
name	Text	Column name
type	Text	Column type, as given
notnull	Integer	Has a NOT NULL constraint
dflt_value	Text	DEFAULT value
pk	Integer	Is part of the PRIMARY KEY



Challenges

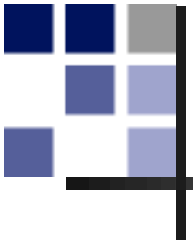
- Create 3 Tables Customer, Product, Sale
- Each has a key, attributes for describing them (e.g. Name, age for customers, brand for Products)
- Sales contains tuples indicating sales of products to customers, with Quantity and Date
- Insert 2 customers and 3 products
- Insert a tuple into Sale
- Display the age of Customers and Date for each sale



To prepare for the quiz

- The quiz will be next Wed at 13.30 (sharp) – 10 minutes
- Topics: chapters 1 and 2 of the book
- Some simple SQL queries will be part of the questions

- The link to the form is published on WeBeep in the announcements section



More exercises

- https://www.w3schools.com/sql
- https://www.sqlite.org/index.html