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October 23, 2019

Databases IIB: DBMS-Implementation — Exercise Sheet 1 —

Part a) and b) will be discussed in class, you only have to submit Part d). Please upload your solution into the StudIP file folder called “Hausaufgabe_1” in the StudIP entry of the lecture (with course ID `06fb9210013971fbdbb78ff1746b744e`). The deadline is October 29 (the day before the next lecture).

It is permitted to form groups of up two members, but please make sure that both members can fully explain all homeworks submitted by the group. The intention is certainly not that each member solves only half of the exercises. Please upload only one file per group and ensure that both last names are contained in the file name.

Not all submitted homeworks will be corrected, but all homework exercises will be discussed in class. If you should have questions about your homework, please ask! A precondition for getting credit for this course is that you submit solutions to two thirds of the homeworks. Obviously wrong or very incomplete submissions do not count.

In-Class Exercises

a) Please answer the following questions (similar questions might be asked in an oral exam):

- Please name at least one textbook or online tutorial about the topics of this course.
- Which DBMS do you know? Which have you used so far? Did you install a DBMS on your own computer?
- Please name some advantages of using a DBMS for storing data compared to directly managing a file in your application program.

b) Let us have an open discussion on the following questions:

- What are your expectations for this course? What do you want to learn? Why did you select this course?
- Do you remember SQL well? What are some important SQL keywords used in queries? Give an example for a `CREATE TABLE` statement.
- Which programming languages do you know? In which languages did you write programs of at least 300 lines?
- Which data structures do you know for searching data, i.e. implementing a “map” or “dictionary” data structure? Which algorithms do you know for sorting?

Web Links

c) Have a look at the “Database Concepts” manual of the Oracle Database (Version 18c, Part Number E84295-04, August 2018):

[https://docs.oracle.com/en/database/oracle/oracle-database/18/cncpt/index.html]

Homework Exercises

d) For getting used to C++, please write a small program that

- reads an integer from “standard input” (`cin`), and
- prints “prime number” if it is a prime number (note that 1 is no prime number),
- prints “can be divided by n”, if the input number is no prime number, as proven by the divisor/factor n (you can choose whether you want to print all divisors or stop immediately when you find one),
- prints “invalid input” for negative numbers and zero. You should also handle the case that the user input is no number (but that is formally not required).

This program is only slightly more than the “Hello, world” program shown on the slides. Since C++ is the recommended language for the programming project, you should make sure that you can compile and run C++ programs.

For Windows computers, one option would be to use the community edition of Visual Studio:

[https://www.visualstudio.com/vs/community/]

For Linux systems, the most common compiler is `g++` from the “GNU Compiler Collection”:

[https://gcc.gnu.org/]

There is a version of `Eclipse` for C/C++ development:

[https://www.eclipse.org/cdt/]

There are many other IDEs that support C++, e.g. `Netbeans` or `XCode`, just search with Google. `CMake` is a cross-platform build tool.

Something similar to `javadoc` for C++ is `doxygen`:

[http://www.doxygen.nl/]