Übung
Informationssysteme 1 2018w
SQL Part 2

Lecturer: Lisa Ehrlinger, Josef Küng, Wolfram Wöß

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Technical Guidelines

The course information system is implemented in an Oracle database. You can use two alternative connection types.

1) Oracle SQL Developer

The client software "Oracle SQL Developer" is currently available for Windows, macOS and Linux. The "Oracle SQL Developer" (e.g., Windows 64-bit with JDK 8 included) has to be downloaded from the Oracle website (https://www.oracle.com/technetwork/developer-tools/sql-developer/downloads/index.html) and installed on your PC. In Windows, after unzipping the downloaded file, you can immediately start "sqldeveloper.exe" without any further installation procedure.

Create a new database connection (green +-Symbol at the upper left side of the window) and connect to the database:
Verbindungsname (connection): choose a name for the connection by your own
Benutzername (user): infosys
Kennwort (password): infosys
Hostname (host): infosys.faw.jku.at
Port: 1521
SID: infosys

After you are successfully connected to the database, you can create and execute SQL statements in the "Query Builder" frame.

2) Oracle iSQLPlus

iSQLPlus allows to connect to the database by using a web browser. Unfortunately, the iSQLPlus service is not very stable when too many users are connected simultaneously. Thus, the iSQLPlus service is automatically restarted every hour. Normally, when the iSQLPlus service is down, you can still connect to the database using Oracle SQL Developer. If iSQLPlus is not available for a longer time, please contact Prof. Wolfram Wöß (wolfram.woess@jku.at).

Connection:
http://infosys.faw.jku.at/isqlplus/
Benutzername (user): infosys
Kennwort (password): infosys
Connect-Bezeichner: infosys

Course Information System

The JKU stores data about courses of the SS 2030 in an information system with the following four relations: LVA (course), Person (lecturer), Abhaltung (appointment), and Raum (room).

LVANr is structured as follows: the first 3 digits correspond to the institute number and the first 4 digits correspond to the department number. The institutes with the number 311, 312, and 321 comprise the entire area of "Computer Science". Course types are VO (Vorlesung / lecture), UE (Übung / exercise), SE (Seminar / seminar), PR (Praktikum / practical course).

The table "Abhaltung" (appointment) is based on the calendar day. Thus, for each appointment a course takes place, there is one entry in the table.

Relation name	Attribute	Type	Remarks	English
LVA (course)	LVANr	varchar2(6)	312704	course number
	Name	varchar2(50)		course title
	Std	number(2)		weekly hours
	Typ	char(2)	VO, UE, SE, ...	type (lecture, …)
Person (lecturer)	PersNr	varchar2(4)	Personal-Nummer	person id
	Name	varchar2(50)	Name	name
Abhaltung (appointment)	LVANr	varchar2(6)		course number
	PersNr	varchar2(4)		person id
	Tag	date	Kalender-Tag	date (calendar day)
	Von_Stunde	number(2)		start hour
	Von_Minute	number(2)		start minute
	Bis_Stunde	number(2)		end hour
	Bis_Minute	number(2)		end minute
	Raum_Id	varchar2(8)		room id
Raum (room)	Raum_Id	varchar2(8)	Raum-Nummer	room id
	Name	varchar2(30)	Raumbezeichnung	room name
	AnzPers	number(4)		number of persons
	Gebaeude	varchar2(20)		name of building

Exercises

Create and execute the following SQL statements. You have to submit the SQL statement as well as the result set (output) including the number of rows in the result set. Please consider that the layout of the output should be easy to read (one line for one row).

6.9. Create a list of all rooms (room name and number of persons) in building "Physikgebaeude", which have less than the average number of persons of the rooms in this building. Order the result set by the number of persons in descending order. (4 points)

6.10. Create a list of the number of courses per course type for each institute of the Computer Science department (institute number, course type, number of courses per type). Limit the list to those courses held in May 2030 and order the results ascending by institute number and descending by number of courses. (5 points)

6.11. Create a list of all courses held by the FAW institute (LVANr begins with "3127"), including the number of appointments (course number, course name, number of appointments). Limit the list to those courses with more than 10 appointments and order the results by the number of appointments in descending order. (5 points)

6.12. Create a list of all courses (course number, course name, type, weekly hours) with the number of appointments, the estimated total hours (i.e. weekly hours * number of appointments, taking into account that a weekly hour is 45 minutes) and the actually held number of hours for that course (calculated on the basis of hours and minutes). Limit the result set to the courses with at least 100 appointments and arrange the list in descending order of number of appointments. (6 points)

6.13. Create a list of all rooms, which are assigned to (partially) overlapping courses on May 13th, 2030. The result set should contain the name of the room, as well as the course numbers (LVANR), start time, end time, and the lecturer's names of the overlapping courses in ascending order of room name. Each overlap should be listed only once. The output format for time should be hh:mm (e.g., "9:15", "10:0"). The concatenation operator || allows to concatenate strings, e.g. 'Name is ' || last_name. (8 points)

6.14. Create a list of all lecturers (name) of courses held by the FAW institute (LVANr begins with "3127") in alphabetical order and without duplicates. (2 points)

Create a view based on that query with the name "FAW_Lecturer". Attention: This operation cannot be executed in the Oracle database since you do not have the "Create View" privilege. Destructive student(s) attacked the database server and therefore student privileges had to be limited to SELECT. (2 points).

Delete the View "FAW_Lecturer" (1 point)

6.15. Create a list of all course appointments held by Wolfram Wöß in April 2030, including the lecturer's name, course number, course name, type, date, and room id. The output format is defined in the next paragraph. (2 points)

Assume that your query result is persisted in the database as table "CourseAppointments" with the columns "lecturer", "courseNo", "courseTitle", "type", "date", "roomId".
CourseAppointments ({lecturer, courseNo, courseTitle, type, date, roomId}, {courseNo → courseTitle type}.

Answer the following questions:
a) What is the primary key of the table "CourseAppointments"? (1 point)
b) In which normal form is the table "CourseAppointments"? (1 point)
c) Rename the course "Übung Informationssysteme 1" to "Exercises Information Systems 1". This operation cannot be executed in the Oracle database (see comments above in 6.14). (2 points)
d) What are the consequences of that update concerning anomalies and consistency of the entire course database? (2 points)

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