Database Systems, fall 2006

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Exercises for lecture on August 29

The aim of the first exercises is to get you up and running with the Oracle DBMS at ITU, and to give you some experience writing basic SQL queries. You are encouraged to start with some of the practical matters before the lecture.

To create an Oracle account, go to `http://itu.dk/sysadm/db/`. Type your unix/mail user name and password, then select "Oracle" (not "MySQL"), and write the user name and password you would like.

To start SQL*Plus, which is a text-based client for Oracle, you first need to log in on the machine `ssh`. In Linux this can be done by writing on the command line: `ssh ssh.itu.dk` (then type unix/mail user name and password). In Windows you can use an SSH client, installed on ITUs Windows machines (the course home page provides a link you can use if you want to install an SSH client at home). Once logged in, type in the SSH window:

`sqlplus yourOracleusername@studora` (then type Oracle password)

You may now type SQL commands, and the results will be displayed in the SQL*Plus window.

Tips:

- It is a good idea to write and edit your queries in a text editor, rather than in the SSH window, and copy and paste them into the SSH window.

- In SQL*Plus type `SET LINESIZE 128`, and enlarge the SSH window, to make SQL*Plus print longer lines (avoiding wrapping that makes query results hard to read).

- On ITUs Windows machines there is a graphical interface installed that can also be used to access Oracle. It is called Rational Data Architect, and we will use it later in the course.

Getting data to work on

To enter some data into Oracle, direct your browser to the URL

`http://www.itu.dk/people/pagh/DBSE06/data/all.rel`

Then copy and paste the SQL commands into the SQL*Plus window. This will create a number of relations to be used in exercises throughout the course. Test that you got the data entered by running the query `SELECT * FROM Movie;` — note the semicolon.

The following is a "crash course" in basic SQL. Note that you may not have the knowledge to do all the exercises — ask your teaching assistant or look in the book. The purpose is to give you an impression of relational data and how it is queried using basic SQL.

1. In Oracle, to display the names of all relations in your database, type `SELECT table_name FROM user_tables;` To display the contents of a relation X, you may run the SQL command `SELECT * FROM X;` In SQL*Plus you can view the schema (attributes and their data types) of a relation X by the command `desc X`. Try this on a few of the newly created relations.

2. Run the SQL query: `SELECT * FROM Movie WHERE studioName = 'Disney' AND year=1990;` Explain the result. Add another Disney movie to the `Movie` relation which will **not** be returned by the SQL query (use the syntax from `http://www.itu.dk/people/pagh/DBSE06/data/Movie.rel` to insert into the Movie relation).

3. Run the SQL query: `SELECT CONCAT(SUBSTR(title,1,8),'...') FROM Movie;` Explain the result.

4. Run the SQL query: `SELECT * FROM (Product NATURAL JOIN Laptop).` Explain the result.

5. Run the SQL query: `SELECT * FROM (Product NATURAL JOIN Laptop) where model LIKE '200%';` Explain the result, and experiment with other patterns replacing '200%'.

6. Run the SQL query: `SELECT name FROM (Ships NATURAL JOIN Classes) WHERE 2*numguns>bore;` Explain the result.

7. In the following you are asked to write various expressions in SQL. You may write

   `SELECT * FROM Movie WHERE X;`

   to test the expression X on the sample data in the `Movie` relation. Write an expression X for each of the following:

   (a) An expression that selects all movies from the 1990s.
   (b) An expression that selects all movies that are **not** produced by Paramount.
   (c) An expression that selects all movies that are produced by either MGM or Fox.
   (d) An expression that selects all movies that have a W in the title, but are not more than two hours long.

8. Experiment with rewriting some of the SQL commands used above: First try to write variants of the queries. Are the results as you expect? Then play with the syntax: Introduce line breaks and spaces, remove parentheses, change from upper to lower case and vice versa. Whenever a change happens (relative to before), try to understand why. Change the commands such that Oracle does not accept them – read the error message.