Introduction to Databases, ITU, Fall 2004

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Exercises on September 10

The first goal of the exercises is to get crash-started with the SQL*Plus interface to the Oracle database at ITU. If you have no prior programming experience, you will probably need help with some of the questions.

Note: Due to installation of a new Oracle version, the system is not working at the time of writing. Course participants will be notified when the problems have been fixed. Later in the course we will be using a graphical interface to Oracle.

To create an Oracle account, go to `http://itu.dk/sysadm/db/`. Type your unix/mail user name and password, then select Oracle, and write the user name and password you would like.

To start SQL*Plus you first need to log in on the machine `ssh`. This can be done by writing the following on the command line:

`ssh ssh.itu.dk` (then type unix/mail user name and password)

`sqlplus` (now type Oracle user name and password)

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

1. First you need to enter some data into the database. Direct your browser to the URL `http://www.itu.dk/people/pagh/IDB04/data/` (and bookmark the URL). Copy and paste the SQL commands in the files `Movie.rel` and `Example.rel` into the SQL*Plus window to create the relations `Movie` and `Example`.

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 `Movie.rel` to insert into the Movie relation).

3. Run the SQL query: `SELECT title, MOD(year,100) AS shortyear FROM Movie;` Explain what the `MOD` operator does.

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

5. Run the SQL query: `SELECT s,t FROM Example WHERE t LIKE '%lo%';` Explain the result, and experiment with other patterns replacing `'%lo%'`.

6. Run the SQL query: `SELECT s,t FROM Example WHERE s<t;` When applied to text strings (such as `s` and `t` in `Example`), `<` gives the *lexicographic* ordering. Explain this term. (Hint: Think of a dictionary.)

7. Type `SET LINESIZE 128` to make SQL*Plus print longer lines (avoiding wrapping that makes query results hard to read). Enlarge your SQL*Plus window to maximum size. You can test this by typing `SELECT * FROM Example;`

8. In the following you are asked to write various expressions in SQL. You may write `SELECT * FROM Example WHERE` X; to test the expression X on the sample data in the `Example` relation. Replace X with each of the following:

(a) An expression that selects a row if the sum of `x` and `y` is more than 42.

(b) An expression that selects a row if exactly one of `a`,`b` and `c` is 1. (Hint: Use the boolean operators `AND` and `OR`).

(c) An expression that selects a row if `t` is lexicographically before the `a+b` first characters of `s`.

(d) An expression that selects a row if `1900 + z` is a leap year.

9. 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.

To be handed in no later than September 17, at 1 PM:

You may want to first read exercise 5.2.4 on page 210 for warship terminology. Hand in parts a, b, and d of exercise 6.2.3 on page 263 of GUW, plus the following addition:

g) Find those ships whose class contains at least three ships. (Hint: Use three tuple variables.) Explain why each ship appears several times in the result.

Test your answers in Oracle by downloading the relations of Figure 5.12 from `http://www.itu.dk/people/pagh/IDB03/data/`. You must hand in a printout of the query results.

Information on how and where to hand in will be available on the course home page.