
Laboratory 10

Controlling database transactions

It is expected that you do Homework 10 before implementation of the tasks included in Laboratory 10.

Download a file `scripts10.zip` with SQL scripts. Unzip a file `scripts10.zip`. Start SQL*Plus client and connect to your database account at Oracle database servers. Execute a script `dbcreate.sql` to create a sample database. A script `dbdrop.sql` drops a sample database.

This laboratory consists of 2 tasks.

Task 1 Implementing database transactions that demonstrate "phantom phenomenon"

Implement in PL/SQL the following database transactions.

The first transaction supposed to increase by 10% salaries of all positions offered by employers from New South Wales.

The second transaction supposed to decrease by 50% salaries of all positions offered by University of Wollongong.

Both transactions supposed to run at `READ COMMITTED` isolation level.

Save the transactions in the files `task1-1.sql` and `task1-2.sql`. Simulate a concurrent execution of the transaction such that it will reveal *non-repeatable read* phenomenon. To control the concurrent execution of the transactions use a PL/SQL procedure `SLEEP` from the standard PL/SQL package `DBMS_LOCK`. A script `delay.sql` shows a sample application of a procedure `SLEEP`.

Save the reports from the execution the transactions in the files `task1-1.lst` and `task1-2.lst`. The files `task1-1.lst` and `task1-2.lst` will be submitted at the end of laboratory class.

Task 2 Implementing database transactions that demonstrate "deadlock"

Implement in PL/SQL the following database transactions.

The first transaction supposed to increase by 5% bonuses of all positions that offer bonuses and set to zero the values of all other bonuses of all positions that do not offer bonuses.

The second transaction supposed to add a Rolls Royce as an extra to all positions offered by University of New South Wales and add a computer as an extra to all positions that already have a mouse pad as an extra.

Both transactions supposed to run at `SERIALIZABLE` isolation level.

Save the transactions in the files `task2-1.sql` and `task2-2.sql`. Simulate a concurrent execution of the transactions such that both of them will get into a *deadlock situation*. To control the concurrent execution of the transactions use a PL/SQL procedure `SLEEP` from the standard PL/SQL package `DBMS_LOCK`. A script `delay.sql` shows a sample application of a procedure `SLEEP`.

Save the reports from the execution the transactions in the files `task2-1.lst` and `task2-2.lst`. The files `task2-1.lst` and `task2-2.lst` will be submitted at the end of laboratory class.

Submission

Zip the files `task1-1.lst`, `task1-2.lst`, `task2-1.lst`, and `task2-2.lst` obtained as the solutions of tasks 1 and 2 into a file `solutions10.zip` and submit the file through Moodle. A submission procedure is the following.

- (1) Connect to Moodle.
- (2) Navigate to a folder `SUBMISSIONS`→`LABORATORY SUBMISSIONS`.
- (3) Click at `LABORATORY 10`, `Submit your solutions here` link.
- (4) Click at `Add Attachments` button.
- (5) Navigate to a location where a file `solutions10.zip` has been saved.
- (6) Select the file and click at `Open` button.
- (7) Click at `Submit` button.
- (8) Click at `OK` button to return to `Home Page`.

End of laboratory 10
