



TECHNICAL UNIVERSITY OF CRETE

DISTRIBUTED INFORMATION
SYSTEMS AND APPLICATIONS WORKSHOP

DATABASES - PLI302

SECOND PHASE OF LABORATORY WORK

TEACHER: Antonios Deligiannakis

LABORATORY SUPPORT : Nektarios Moumoutzis, Nikos Pappas

The second phase of the laboratory work includes the following requests:

1. Java application communication with the PostgreSQL database management system via JDBC.

To implement the application you will use the Eclipse environment and the JDBC driver provided with the PostgreSQL 11 server.

- The application should offer menu options for the following:

1. Enter data to connect to a specific database in a PostgreSQL server (IP address, database name, username, password)
2. Validate Current Transaction/ Start a new one
3. Cancellation of Current Transaction
4. Display all workshops (code, title and domain)
5. Display all knowledge objects (code, title)
6. Change lab name with a specific code that will be requested by the user
7. Change the title of a knowledge object with a specific code that will be requested by the user
8. Enter a grade in a course with a specific code for the current semester. The registered students will be presented one by one in alphabetical order and the grade of the laboratory (if the course is laboratory) and the final exam will be requested.
9. Undoing a specific number from recent score entries. The app will prompt the user for x number and then cancel the last x student score entries in the current session. An error message will be displayed if the number is greater than the number of imports that have been made.

2. Construction of updatable views (Updatable Views)

- Create an updateable view on one of the base tables you think it would be useful and check its operation
- Create a view that will present all the labs in the department. For each lab will be displayed: director's name, email address, title, knowledge areas and sector (lab_code, director_full_name, contact_email, lab_title, lab_fields, sector_title). In the event that the cognitive areas of the laboratory are more than one, they will be presented in a comma-separated string. This view is complex and is not automatically updateable. Make this view updateable by implementing appropriate INSTEAD OF trigger/s. Update actions on the view will result in corresponding changes to the profdirects, lab_title and sector_code fields in the Lab table, the email field in the Professor table, and deletions/insertions of records in the Covers table. Updates to the lab code will not be allowed. Appropriate exception messages should be displayed in cases of incorrect data entry, e.g. wrong name of professor, wrong title of knowledge area or field.



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~~3. Question performance study – physical design: Study the following request: Find students with entry_date after 9/1/2010 and before 9/1/2012 who have passed a course with a grade greater than 9 and professor of the course has the same name as the student.~~

~~Start with the base you already have from the first phase of the laboratory work where, logically, the number of students does not exceed a few hundred. Study using EXPLAIN ANALYZE and record your results and observations in your report. Then sequentially try to create one or more suitable indexes that you think might speed up the execution of the request and re-examine the execution plan. What index or indexes is chosen, what type and why? Try to minimize the use of indexes so that update operations are not burdened. Try and note in your report the differences between different types of indexes. What do you notice? Which index or indexes do you think is most appropriate? Also try further speeding up the request by leveraging the clustering feature. What do you notice? Note all your observations in your report. Finally, increase the number of students (by adding tens of thousands of students to the existing years) in your base table, as we showed in Lab 7. Create corresponding course records and enter a grade. Delete any indexes you've created so far. Re-examine the pre- and post-indexing execution plans following the previous steps and note for each step the observations justifying your choices in your report.~~

Deliverable

The deliverable of the second phase of the laboratory work includes:

1. The Eclipse project of the external application you implemented (issue 1)
2. Backup of the Database with the updatable views (question 2) together with all the indexes and the extra data you created (issue 3)
3. An implementation report in which you will justify the indexes you created, the results from using the EXPLAIN ANALYZE command, and the difference in execution times you observed (question 3).

Delivery date: 17/05/2019