Web Systems Fundamentals and Databases (Grundläggande webbsystem och databaser) DI4020 11hp

Lab Exercise 4

Course responsible:

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Lab Exercise 4 - Database Design – Physical Design

Physical Database Design

Physical database design is the third and final phase of the database design process, during which the designer decides how the database is to be implemented. The previous phase of database design involved the development of a logical structure for the database, which describes relations and enterprise constraints. Although this structure is DBMS-independent, it is developed in accordance with a particular data model, such as the relational model. However, in developing the physical database design, we must first identify the target DBMS.[1]

In general, the main aim of physical database design is to describe how we intend to physically implement the logical database design. For the relational model, this involves[1]:

- **Creating a set of relational tables and the constraints on these tables from the information presented in the logical data model.**
- Identifying the specific storage structures and access methods for the data to achieve an optimum performance for the database system.
- Designing security protection for the system.

Objective

In Lab Exercise 4, students will continue the work started in Lab Exercise 1 by developing a relational database schema from the logical data model.

Students will focus on the first step of logical database design for a relational database system and complete the following tasks:

- o **Task 1 – Data Definition**: Implement the set of relational tables and apply constraints using SQL.
- o **Task 2 – Data Manipulation**: Populate the relational tables with synthetic data.
  - o Ensure that each table in your relational schema contains at least four instances (rows).
  - o Your database must include:
    - ▪ A few apartments and houses
    - ▪ At least one furnished property
    - ▪ At least one unfurnished property
    - ▪ At least one property with appliances
    - ▪ At least one property with special features
    - ▪ At least one property that has never been leased or rented
    - ▪ At least one property that has been leased or rented at least once
    - ▪ At least one property that has been leased or rented twice
- o **Task 3 – Data Manipulation**: Create the following views:
  - o Create a view called **v_prop_info**, which lists of all properties, including owner information
  - o Create a view called **v_prop_details**, which lists of all properties, including room details, but excluding owner information

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[1] 2015 - Connolly & Begg - Database Systems - A practical approach to design, implementation and management

- Create a view called **v_occupancy_history**, which lists a history of occupancy, including periods when the property was unoccupied.
  - Use a property of your choice to test.

Preparation

This Lab Exercise is aligned with the content presented and discussed in Lectures 6 to 8. Thus, please consider:

- Preparation and suggested material.
- The concepts and examples presented in the Lectures.
- A good SQL resource is the SQL Tutorial in W3Schools[2], where you find examples to rely on if you are stuck.
- Similarly to Lab exercise 3, students will use the MySQL DBMS installed at the ddi.hh.se Server Environment.

Deliverable

- Deployed relational schema with data at your ddi.hh.se server.
- Submit the SQL code used to implement all the task listed above as a single .txt file.
  - Please name the file as **a4_grp_x.txt**. Replace x with your group number.

In Lab exercise 4, students will use the MySQL DBMS installed in the Server Environment. To access it, visit the folder **School Server Environment** on course page on blackboard and read:
- Get familiar with the School Server Environment
- MySQL with phpMyAdmin

NOTE:
- **Results will be submitted individually via Blackboard.**
- All students in the group are required execute the included SQL code on their respective ddi.hh.se server.
- **All students in the group are equally responsible for the submitted results.**
- **The group is responsible for making sure that the submitted results do not include cheating and plagiarism issues.**

Deadline
- Monday, February 24th by 13h.

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[2] http://www.w3schools.com/sql/default.asp

Expected format for the deliverable

The text file to be submitted is expected to have the following structure:

Group information: Group x (Thomas Edison, Neil Peart, Elon Musk)

Task 1 – Data Definition (include the CREATE TABLE statements for all tables in the model)
```
CREATE TABLE [IF NOT EXISTS] table_name (
    column1 datatype(length) column_constraint,
    column2 datatype(length) column_constraint,
    ...
    table_constraints
);
```

Task 2 – Data Definition (include the INSERT statements for all tables in the model)
```
INSERT INTO TableName [ (columnList) ]
VALUES (dataValueList)
```

Task 3 – Data Manipulation (include the CREATE VIEW statements for the 3 mentioned queries)
```
CREATE OR REPLACE VIEW view_name AS
  SELECT [DISTINCT | ALL]
  {* | [columnExprn [AS newName]] [,...] }
  FROM TableName [alias] [, ...]
  [WHERE condition]
  [GROUP BY columnList] [HAVING condition]
  [ORDER BY columnList]
```

Congratulations, you have now completed Lab Exercise 4.