CS333 Application Software Development Lab

Laboratory Manual

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KTU SYLLABUS

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Contents

Part One

1. Syllabus

1.1 Course Objectives

- To introduce basic commands and operations on database
- To introduce stored programming concepts PL-SQL using Cursors and Triggers
- To familiarise front end tools of database

1.2 Course Outcomes

1. Design and implement a database for a given problem using database design principles
2. Apply stored programming concepts PL-SQL using Cursors and Triggers
3. Use Graphical user Interface, Event Handling and Database connectivity to develop and deploy application and applets
4. Develop medium-sized project in a team

1.3 List of Experiments

1. Creation of database using DDL commands and writes DQL queries to retrieve information from database
2. Performing DML commands like Insertion, Deletion, Modifying, Altering, and Updating records based on conditions
3. Creating relationship within databases. *
4. Creating a database to set various constraints. *
5. Practise of SQL TCL commands like Rollback, Commit, Savepoint
6. Practise of SQL DCL commands for granting and revoking user privileges
7. Creation of Views and Assertions *
8. Implementation of Built-in functions in RDBMS *
9. Implementation of various aggregate functions in SQL. *
10. Implementation of Order By, Group By and Having Clause. *
11. Implementation of set operators, nested queries and Join Queries. *
12. Implementation of various control structures using PL/SQL *

13. Creation of Procedures and Functions *
14. Creation of Packages *
15. Creation of Database Triggers and Cursors *
16. Practise various front-end tools with report generation.
17. Creating Forms and Menus
18. Mini Project (Application Development using Oracle/MySQL using Database connectivity)*
    (a) Inventory Control System
    (b) Material Requirement Processing
    (c) Hospital Management System
    (d) Railway Reservation System
    (e) Personal Information System
    (f) Web-based User Identification System
    (g) Timetable Management System
    (h) Hotel Management System

2. Brief Outline

2.1 History

MariaDB is a community-developed fork of the MySQL relational database management system intended to remain free under the GNU GPL. The lead developer of MariaDB is Michael "Monty" Widenius, one of the founders of MySQL AB and the founder of Monty Program AB. On 16 January 2008, MySQL AB announced that it had agreed to be acquired by Sun Microsystems for approximately $1 billion.

The acquisition completed on 26 February 2008. MariaDB is named after Monty's younger daughter Maria, similar to how MySQL is named after his other daughter My. The developers of MySQL forked it due to concerns over its acquisition by Oracle Corporation. Contributors are required to share their copyright with the MariaDB Foundation.

	Windows	Mac OS X	Linux	BSD	UNIX
DB2	Yes	No	Yes	No	Yes
Microsoft SQL Server	Yes	No	No	No	No
MySQL	Yes	Yes	Yes	Yes	Yes
MariaDB	Yes	Yes	Yes	Yes	Yes
Oracle	Yes	Yes	Yes	No	Yes
PostgreSQL	Yes	Yes	Yes	Yes	Yes
Teradata	Yes	No	Yes	No	Yes

Figure 2.1: RDMS and Operating Systems

MariaDB intends to maintain high compatibility with MySQL, ensuring a drop-in replacement capability with library binary equivalency and exact matching with MySQL APIs and commands. It includes the XtraDB storage engine for replacing InnoDB,[8] as well as a new storage engine, Aria, that intends to be both a transactional and non-transactional engine perhaps even included in

future versions of MySQL.

MariaDB is used at DBS Bank, Google, Mozilla and the Wikimedia Foundation since 2013 and is emerging as the most preferred RDBMS for many establishments and professionals worldwide.

3. EER Schema and DDL Commands

3.1 EER Schema

Exercise 3.1 Download an existing database and generate an EER schema for it. ■

R An Entity Relationship (ER) Diagram is a type of flowchart that illustrates how "entities" such as people, objects or concepts relate to each other within a system. ER Diagrams are most often used to design or debug relational databases in the fields of software engineering, business information systems, education and research.

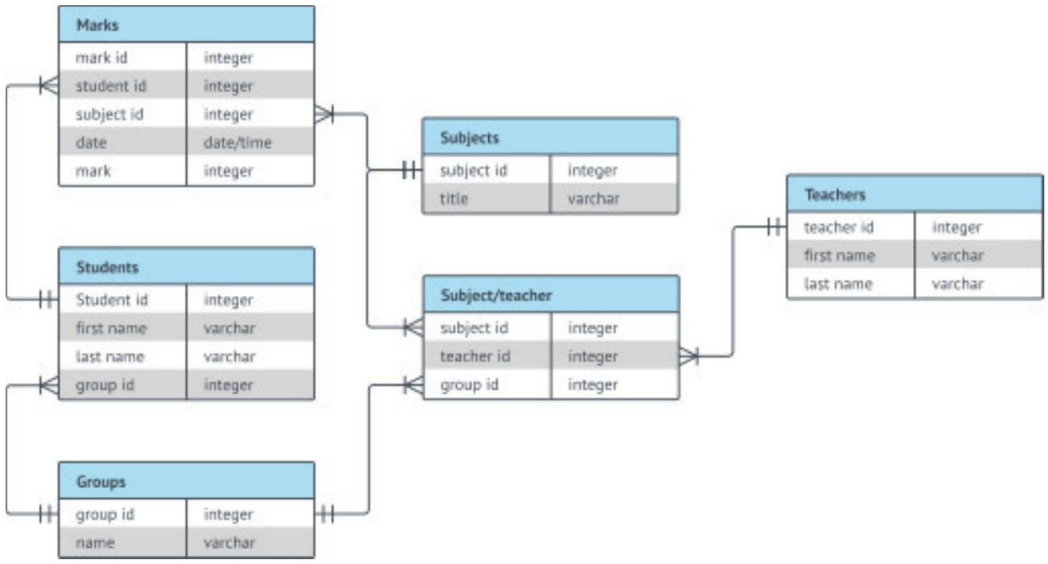


Figure 3.1: EER Schema for a school

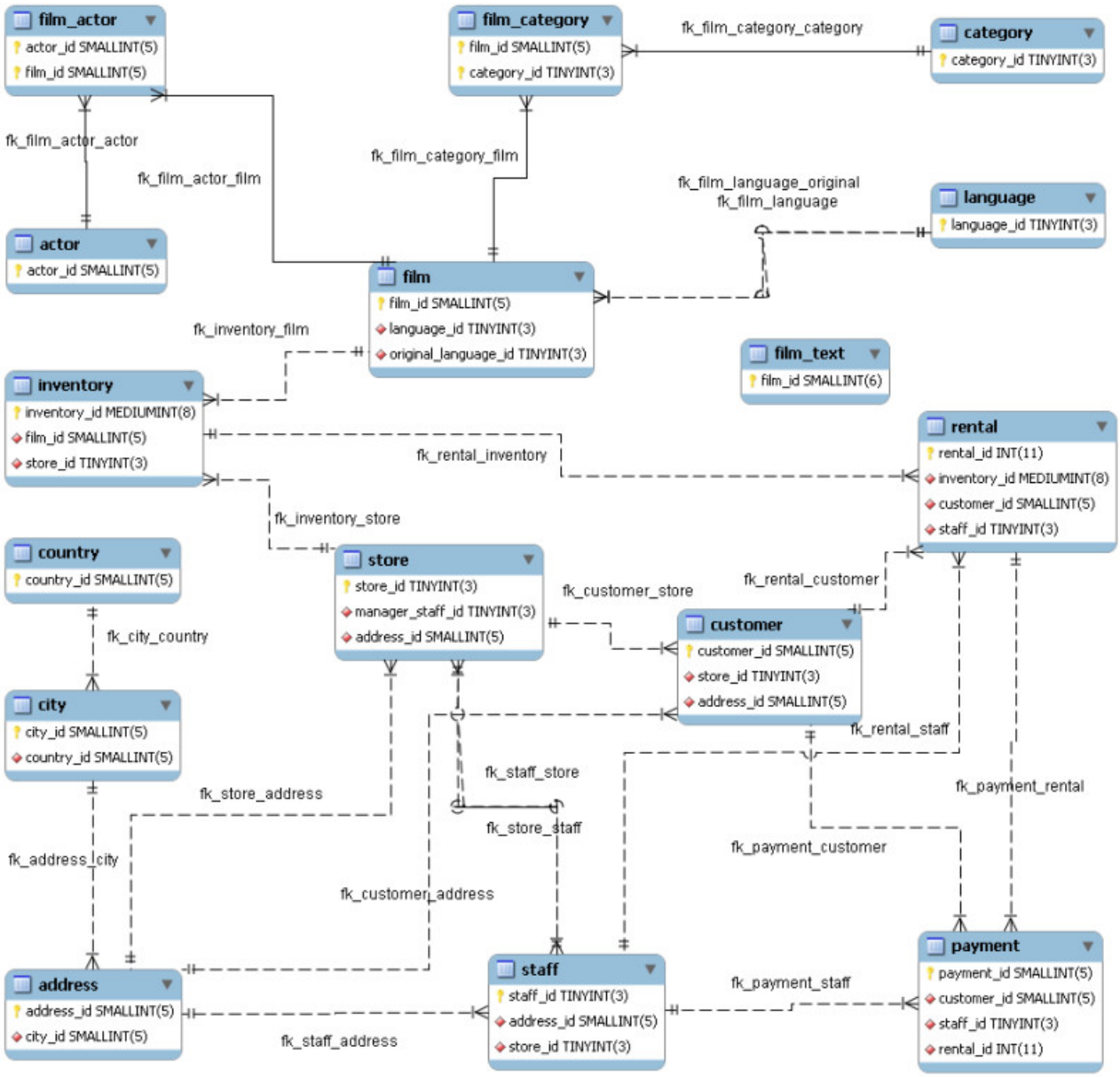


Figure 3.2: EER Schema for sakila database

3.2 DDL Commands

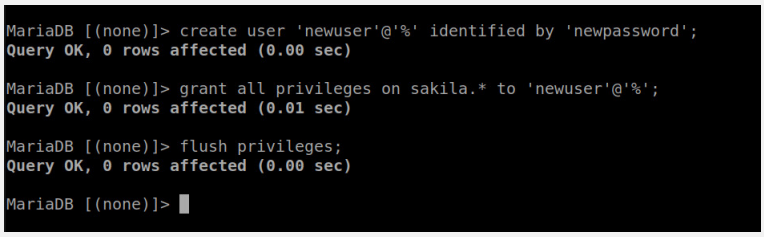
Theorem 3.2.1 A couple of examples from the data definition language includes creation and dropping of databases, creation and dropping of tables etc. We should also know how to create a database from its archived backup, as well as creating a backup for an existing database.

Exercise 3.2
- Create database from an existing database dump.
- Create a new user and associate privileges with it.
- Create a backup from an existing database - discuss significance

■

3.3 DCL Commands

Theorem 3.3.1 By using these commands, *all privileges* would be extended to *newuser* on *sakila* database.



3.4 TCL Commands

Theorem 3.4.1 Transactional Control Language is used to control transactions occurring within a database. It gives more flexibility for the database programme to exercise control over transactions.

In MariaDB, the AUTOCOMMIT flag is usually set to 1 (or ON). This implies that any transaction is a "commit" by default. To enable TCL, one has to reset AUTOCOMMIT flag by setting it to 0 (or OFF).

mariadb> SET AUTOCOMMIT = 0

Thereafter, the transactions are not committed unless explicitly done by issuing a COMMIT. This also implies that all changes made to database are transcient in nature and could be rolled back by issuing ROLLBACK command.

Experiments: Carry out experiments on DDL, DML and DCL commands to figure out which all SQL statements come under the purview of this feature of TCL.

- By issuing "SET AUTOCOMMIT=0" command, ROLLBACK will be active as long as AUTOCOMMIT is not set to 1. ie until SET AUTOCOMMIT=1 is issued, or database reset (by quitting and restarting).
- START TRANSACTION is a valid statement that enables Transaction Control, but will be in force only till the first ROLLBACK or COMMIT is issued. After the ROLLBACK/COMMIT statement is issued, one has to start new block with another START TRANSACTION command.

4. Content Management System

4.1 Downloading Drupal Tarball

Exercise 4.1 The first task is to download the drupal tarball. This can be done by issuing the following command

Place the tarball inside your Downloads folder. ■

Exercise 4.2 The next task would be to explode the tarball to /var/www

$ cd /var/www $ sudo gzip -cd /path-to-Downloads/drupal-8.6.1.tar.gz | sudo tar xvf -
$ sudo mv /var/www/drupal-8.6.1/ /var/www/html
$ sudo chown -R www-data.www-data /var/www/html

Note: You must have installed apache2 and all associated modules for enabling php support. ■

Exercise 4.3 A new database drupal need to be created alongwith admin user with password and privileges

```
MariaDB [(none)]> create database newdrupal;
Query OK, 1 row affected (0.00 sec)

MariaDB [(none)]> create user 'someuser'@'%' identified by 'somepassword';
Query OK, 0 rows affected (0.00 sec)

MariaDB [(none)]> grant all privileges on newdrupal.* to 'someuser'@'%' with grant option;
Query OK, 0 rows affected (0.00 sec)
```

Note: This will create a database named newdrupal, and a new admin user someuser having password somepassword. ■

4.2 Enabling PHP module for Drupal

Exercise 4.4 $ sudo apt-get install php-fdomdocument php-gd ■

"Clean URL" feature for Drupal need to be activated. For this,

Exercise 4.5 $ sudo vim /etc/apache2/sites-enabled/000-default.conf

Add the following snippet under the line where "DocumentRoot /var/www/html" appear

```
<Directory /var/www/html/>

  Options Indexes FollowSymLinks

  AllowOverride All

</Directory>
```

Next issue the following command

```
$ sudo systemctl restart apache2
```

■

Exercise 4.6 At this point, most of the background preparation ought to be over. Open browser and execute "http://localhost" as URL.

If drupal points out any errors, these need to be eliminated.

At the end, the site should be up for further work. ■

Exercise 4.7 As a default, Drupal 8.x doesn't support PHP module. To activate it, the PHP module must be downloaded from **Extend** feature inside Drupal admin panel, and the tarball must be exploded inside core/modules/ of drupal installation folder. After exploding, the PHP module need to be installed through the admin panel of Drupal. ■