CENG351 – DATA MANAGEMENT AND FILE STRUCTURES
PROGRAMMING HOMEWORK 2

Database Programming and SQL Query Exercises with MySQL

Due Date: 20.01.2012

1. Introduction

In this homework you will be familiar with database management systems. You are going to program to connect to a DBMS(Database Management System), create tables and execute queries and get its results.

For the scope of this homework, MySQL is used as DBMS.You are goint to be provided an account on the MySQL Server on my office machine. Your user ids and passwords are going to be sent to your department mail accounts. You will be able to connect to it from inek machines and wireless network of the department(Cengi) until the deadline of the homework. Note that, you are not allowed to connect my office machine from outside of the department. So, you can first connect to inek machines and then connect to my office machine through it from outside of the department.

Because my office machine is not powerful enough to handle too many connections, you may face with slowness problems sometimes while connecting to it. Therefore, I recommend you to install MySQL Server on your machine. It is open source. Therefore you can download it using package manager software in most of the Linux distributions. Alternatively, you can download and install it from "http://dev.mysql.com/downloads/mysql/" for all platforms for free. Moreover, to be able to connect MySQL Server, you need MySQL Client installed on your machine. If you install server, client is also installed. If you do not want to install server, you should install client seperately. You can download the client from "http://dev.mysql.com/downloads/connector/odbc/".

2. Database Structure

In this homework you are going to work on a simple NBA database. You have following 4 simple tables:

Players (**id**:int, **name**:char(50), **no**:int, **teamid**:int, **height**:float, **weight**:float, **age**:int)

Teams (**id**:int, **name**:char(50), **conference**:char(10), **division**:char(10), **coachname**:char(50))

Played (**playerid**:int, **teamid**:int, **no**:int, **startseason**:char(4), **endseason**:char(4))

Champions (**season**:char(4), **teamid**:int)

- Players table holds information for all players. 'id' field is the primary key of the table. Names provided will be shorter than 50 characters. Retired players also included in this table.
- 'teamid' field of Players table is a foreign key referenced to Teams table.
- Teams table holds information for all teams in the league. 'id' field is the primary key of the table. Names provided will be shorter than 50 characters.
- Played table holds information about all teams which each player played for. There is no primary key in Played table.
- Seasons are represented with starting year (eg. 2008 for 2008-2009 season) in Played table.
- If a player is transferred to a team in the beginning of 2008-2009 season and played just one season for that team, 'startseason' field is set to 2008 and 'endseason' field is set to 2009 for that entry.
- If a player transferred to a team and then transferred another team in the same season, 'startseason' and 'endseason' fields is set to same value for that entry.
- 'endseason' field of Played table is set to 0 if Player still plays for that team.
- If a player does not change its team but its number, an extra entry is inserted into Played table.
- 'playerid' field of Played table is a foreign key referenced to Players table. 'teamid' field of Played table is not a foreign key.
- Champions table holds information of champion of each season. 'season' field is the primary key of this table.

- 'teamid' field of Champions table is not a foreign key.

3. Tasks

Your homework will read commands from standard input until 'quit' command is given. There are 3 tasks at all. They are creating tables, inserting tuples to the database and executing queries.

3.1 Create Tables

The database will be empty initially. With 'create' command given from standard input you should create 4 tables explained above with necessary primary and foreign keys. Name of the tables and name and type of the fields should be exactly same as explained above. You can assume that 'create' command will be given only once.

3.2 Insert Data

Tables will be empty initially after you create them. With 'insert' command given from standard input you should read tuples from text files named same with the table name and insert them into corresponding table.

- You can assume that there will be 4 files named 'Players.txt', 'Teams.txt', 'Played.txt' and 'Champions.txt' in the current execution directory when 'insert' command is given.
- Each line represents a tuple. Fields are seperated by '|' character.
- You should insert tuples in 'Players.txt' to Players table, 'Teams.txt' to Teams table, 'Played.txt' to Played table and 'Champions.txt' to Champions table.

Example Playes.txt

156987|Kobe Bryant|24|12|1.98|93|34
126325|Vince Carter|25|14|1.98|99.8|35
136489|LeBron James|6|9|2.03|113.4|28

Example Teams.txt

12|Los Angeles Lakers|Western|Pacific|Mike Brown

14|Dallas Mavericks|Western|Southwest|Rick Carlisle

9|Miami Heat|Eastern|Southeast|Erik Spoelstra

Example Played.txt

156987|12|8|1996|2006

156987|12|24|2006|0

136489|16|23|2003|2010

136489|9|6|2010|0

Example Champions.txt

2009|12

2010|12

2011|14

3.3 Execute Queries

You are to write outputs of some predefined SQL queries to standard output. There are 10 queries at all. They are enumerated from 1 to 10 as below. When 'query i' command is given, you should write output of the ith query to standard output. For queries whic return more than one result, each result should be written in a seperate line.

For example, assume result of the query "players score more than 80 in a game" is Kobe Brant and Wilt Chamberlain. You should write this result as (order is not important):

Kobe Bryant

Wilt Chamberlain

Queries

1. Name of the team(s) which become champion most.
2. Name of the most experienced player(s) according to year of play.
3. Name of the player(s) transfered to same team more than one times (First team also counted as transfer).
4. Name of the player(s) who become champion at least 3 times.

5. Name of the player(s) who become champion at least in two different teams.
6. Name of the team(s) which become champion consecutively.
7. Name of the player(s) who changed its number at least 3 times.
8. Name of the player(s) played in both Eastern and Western conference.
9. Name of the player(s) become champion in both Eastern and Western conference.
10. How many times a team in Western conference become champion.

Note : A player becomes champion when the team which the player plays for becomes champion.

4. Additional Information

- You will use C++ to implement your homework. Example code to and a short tutorial to connect to a database will be provided on cow.
- All work you submit should be your own work.
- You should compress all necessary header and source files with a Makefile as phw2.tar.gz and submit it. Submission will be done through cow.
- Try your homeworks on inek machines before submitting. Evaluation will be done on inek machines.