# Databases Exam (March 2015) – Football

Your exam consists of several parts, explained below. You may work independently on each exam part. Submit your solutions in the automated judge system:  
<https://judge.softuni.bg/Contests/95/Databases-Retake-Exam-22-June-2015>.

## Part I – SQL Queries

You are given a **MS SQL Server database "Football"** holding continents, countries, currencies, rivers, mountains and peaks, available as SQL script. Your task is to write SQL queries for displaying data from the given database. In all problems, please **name the columns exactly like in the sample tables below**.

### All Teams

Display all **teams** in alphabetical order. Submit for evaluation the result grid **with headers**.

|  |
| --- |
| **TeamName** |
| AC Milan |
| Arsenal |
| AS Monaco FC |
| … |

1 score

### Biggest Countries by Population

Find the 50 biggest countries by population. Display the country name and population. Sort the results by population (from biggest to smallest), then by country alphabetically. Submit for evaluation the result grid with headers.

|  |  |
| --- | --- |
| **CountryName** | **Population** |
| China | 1330044000 |
| India | 1173108018 |
| United States | 310232863 |
| … | … |

2 score

### Countries and Currency (Eurzone)

Find all countries along with information about their currency. Display the country name, country code and information if the country is in the Eurozone or not (the currency is **EUR** or not): either "**Inside**" or "**Outside**". Sort the results by country name alphabetically. Submit for evaluation the result grid with headers.

|  |  |  |
| --- | --- | --- |
| **CountryName** | **CountryCode** | **Eurozone** |
| Afghanistan | AF | Outside |
| Åland | AX | Inside |
| Albania | AL | Outside |
| … | … | … |

2 score

### Teams Holding Numbers

Find all teams that holds numbers in their name, sorted by country code. Display the team name and country code. Name the columns exactly like in the table below. Submit for evaluation the result grid with headers.

|  |  |
| --- | --- |
| **Team Name** | **Country Code** |
| Basel 1893 | CH |
| … | … |

3 score

### International Matches

Find all **international matches** sorted by date. Display the country name of the home and away team. Sort the results starting from **the newest date** and ending with games with no date. Name the columns exactly like in the table below. Submit for evaluation the result grid with headers.

|  |  |  |
| --- | --- | --- |
| **Home Team** | **Away Team** | **Match Date** |
| Albania | France | 2015-06-13 21:45:00.000 |
| Georgia | Malta | 2015-03-25 19:00:00.000 |
| Denmark | United States | 2015-03-25 00:00:00.000 |
| … | … | … |

3 score

### \*Teams with their League and League Country

Find **all teams**, along with the **leagues**, they play in and the **country of the league**. If the league does not have a country, display "**International**" instead. Sort the results **by team name**. Name the columns exactly like in the table below. Submit for evaluation the result grid with headers.

|  |  |  |
| --- | --- | --- |
| **Team Name** | **League** | **League Country** |
| AC Milan | Italian Serie A | Italy |
| Arsenal | UEFA Champions League | International |
| Arsenal | UK Premier League | United Kingdom |
| … | … | … |

5 score

### \* Teams with more than One Match

Find **all teams** that have **more than 1 match** in any league. Sort the results **by team name**. Name the columns exactly like in the table below. Submit for evaluation the result grid with headers.

|  |  |
| --- | --- |
| **Team** | **Matches Count** |
| Beroe | 3 |
| Botev (Plovdiv) | 3 |
| CSKA | 3 |
| … | … |

6 score

### Number of Teams and Matches in Leagues

For each **league** in the database, display the **number of teams**, **number of matches** and **average goals** per match in it. Sort the results by **number of** **teams** (from largest to smallest), then by **numbers of matches** (from largest to smallest). Name the columns exactly like in the table below. Submit for evaluation the result grid with headers.

|  |  |  |  |
| --- | --- | --- | --- |
| **League Name** | **Teams** | **Matches** | **Average Goals** |
| UK Premier League | 20 | 2 | 4 |
| Italian Serie A | 20 | 0 | 0 |
| German Bundesliga | 18 | 1 | 2 |
| … |  | … | … |

4 score

### Total Goals per Team in all Matches

Find the **number of goals for each Team** from all matches played. Sort the results by **number of** **goals** (from highest to lowest), then by **team name** alphabetically. Name the columns exactly like in the table below. Submit for evaluation the result grid with headers.

|  |  |
| --- | --- |
| **TeamName** | **Total Goals** |
| Lokomotiv (Sofia) | 4 |
| Ludogorets | 4 |
| Beroe | 3 |
| … |  |

4 score

### Pairs of Matches on the Same Day

Find all pairs of team matches that are on the same day. Show the date and time of each pair. Sort the dates **from** **the newest to the oldest** **first date,** then from the newest to the oldest **second date**. Name the columns exactly like in the table below. Submit for evaluation the result grid with headers.

|  |  |
| --- | --- |
| **First Date** | **Second Date** |
| 2015-04-11 17:00:00.000 | 2015-04-11 20:00:00.000 |
| 2015-04-05 17:00:00.000 | 2015-04-05 20:00:00.000 |
| 2015-03-22 16:00:00.000 | 2015-03-22 21:00:00.000 |
| … | … |

5 score

### Mix of Team Names

Combine all team names with one another (including itself), so that the last letter of the first team name is the same as the first letter of the reversed second team name. Sort the results by the obtained mix alphabetically. Submit for evaluation the result grid with headers.

|  |
| --- |
| **Mix** |
| ac milanalim ca |
| ac milanemerb redrew |
| ac milanesukrevel reyab |
| … |

5 score

### Countries with International and Team Matches

For each country, extract the **total amount** of **international** and **team** matches. List only countries with **at least one** international or team match. Sort the results in **decreasing** order by **international matches count**, then by **team matches count**, than **alphabetically** by **country name**. Submit for evaluation the result grid with headers.

|  |  |  |
| --- | --- | --- |
| **Country Name** | **International Matches** | **Team Matches** |
| Bulgaria | 4 | 9 |
| Germany | 2 | 1 |
| Spain | 2 | 0 |
| … | … | … |

5 score

## Part II – Changes in the Database

You are given a **MS SQL Server database "Football"** holding countries, teams, leagues, team matches and international matches, available as SQL script. Your task is to modify the database schema and data and write SQL queries for displaying data from the database.

### Non-international Matches

1. Create a **table FriendlyMatches(Id, HomeTeamID, AwayTeamId, MatchDate)**. Use auto-increment for the primary key. Create a **foreign keys** between the tables FriendlyMatches and Teams.
2. Execute the following SQL script (it should pass without any errors):

|  |
| --- |
| INSERT INTO Teams(TeamName) VALUES  ('US All Stars'),  ('Formula 1 Drivers'),  ('Actors'),  ('FIFA Legends'),  ('UEFA Legends'),  ('Svetlio & The Legends')  GO  INSERT INTO FriendlyMatches(  HomeTeamId, AwayTeamId, MatchDate) VALUES    ((SELECT Id FROM Teams WHERE TeamName='US All Stars'),  (SELECT Id FROM Teams WHERE TeamName='Liverpool'),  '30-Jun-2015 17:00'),    ((SELECT Id FROM Teams WHERE TeamName='Formula 1 Drivers'),  (SELECT Id FROM Teams WHERE TeamName='Porto'),  '12-May-2015 10:00'),    ((SELECT Id FROM Teams WHERE TeamName='Actors'),  (SELECT Id FROM Teams WHERE TeamName='Manchester United'),  '30-Jan-2015 17:00'),  ((SELECT Id FROM Teams WHERE TeamName='FIFA Legends'),  (SELECT Id FROM Teams WHERE TeamName='UEFA Legends'),  '23-Dec-2015 18:00'),  ((SELECT Id FROM Teams WHERE TeamName='Svetlio & The Legends'),  (SELECT Id FROM Teams WHERE TeamName='Ludogorets'),  '22-Jun-2015 21:00')  GO |

1. Write a query to display all **non-international matches** along with the given team names, starting from **the newest date** and ending with games with no date. Submit for evaluation the result grid with headers.

|  |  |  |
| --- | --- | --- |
| **Home Team** | **Away Team** | **Match Date** |
| FIFA Legends | UEFA Legends | 2015-12-23 18:00:00.000 |
| Manchester United | Schalke 04 | 2015-09-18 00:00:00.000 |
| US All Stars | Liverpool | 2015-06-30 17:00:00.000 |
| Svetlio & The Legends | Ludogorets | 2015-06-22 21:00:00.000 |
| … | … | … |

15 score

### Seasonal Matches

1. Write a SQL command to add a new Boolean column IsSeasonal in the Leagues table (defaults to false). Note that there is no "Boolean" type in SQL server, so you should use an alternative.
2. Add a **new team match** holding the following information: HomeTeam="Empoli", AwayTeam="Parma", HomeGoals=2, AwayGoals=2, Date= '19-Apr-2015 16:00', League= 'Italian Serie A'.
3. Add a **new team match** holding the following information: HomeTeam=" Internazionale", AwayTeam="AC Milan", HomeGoals=0, AwayGoals=0, Date= '19-Apr-2015 21:45, League= 'Italian Serie A'.
4. Write and execute a SQL command to **mark as seasonal all leagues that have at least one team match**.
5. Find all seasonal matches strictly after 10th April 2015. Display the **home team name and score**, the **away team name and score and the league**. Sort the results by league name (alphabetically), then by home team score count and away team score count (from largest to lowest). Name the columns exactly like in the table below. Submit for evaluation the result grid with headers.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Home Team** | **Home Goals** | **Away Team** | **Away Goals** | **League Name** |
| Litex | 1 | Beroe | 1 | Bulgarian A Football Group |
| Ludogorets | 0 | Lokomotiv (Sofia) | 0 | Bulgarian A Football Group |
| … | … | … | … | … |

20 score

## Part III – Stored Procedures

You are given a **MS SQL Server database "Football"** holding continents, countries, currencies, rivers, mountains and peaks, available as SQL script. Your task is to write some stored procedures, views and other server-side database objects and write some SQL queries for displaying data from the database.

**Important:** start with a clean copy of the "Football" database. Just execute the SQL script again.

### Stored Function: Bulgarian Teams with Matches JSON

Create a **stored function** fn\_TeamsJSON that lists **all Bulgarian teams** alphabetically along with **all games** starting from **the newest date** and ending with games with no date. Format the output as **JSON string** without any whitespace. \**HINT: Use code 103 for date conversion*

If your function is correct and you execute the following SQL query:

|  |
| --- |
| SELECT dbo. fn\_TeamsJSON() |

The result should be like the sample below:

|  |
| --- |
| {"teams":[{"name":"Beroe","matches":[{"Litex":1,"Beroe":1,"date":11/04/2015},{"Beroe":1,"Lokomotiv (Sofia)":4,"date":05/04/2015},{"CSKA":0,"Beroe":0,"date":21/03/2015}]},{"name":"Botev (Plovdiv)","matches":[{"CSKA":0,"Botev (Plovdiv)":0,"date":10/04/2015},{"Botev (Plovdiv)":0,"Litex":1,"date":05/04/2015},{"Ludogorets":0,"Botev (Plovdiv)":0,"date":22/03/2015}]},{"name":"Cherno More","matches":[]},…]} |

The same code is better understandable when it is formatted, but please do not add whitespace:

|  |
| --- |
| {  "teams": [  {  "name": "Beroe",  "matches": [  {  "Litex": 1,  "Beroe": 1,  "date": 11/04/2015  },  {  "Beroe": 1,  "Lokomotiv (Sofia)": 4,  "date": 05/04/2015  },  {  "CSKA": 0,  "Beroe": 0,  "date": 21/03/2015  }  ]  },  {  "name": "Botev (Plovdiv)",  "matches": [  {  "CSKA": 0,  "Botev (Plovdiv)": 0,  "date": 10/04/2015  },  {  "Botev (Plovdiv)": 0,  "Litex": 1,  "date": 05/04/2015  },  {  "Ludogorets": 0,  "Botev (Plovdiv)": 0,  "date": 22/03/2015  }  ]  },  {  "name": "Cherno More",  "matches": [    ]  },  …  ]  } |

To test your output, you could use JSON some JSON visualizer like <http://jsonviewer.stack.hu>.

Submit for evaluation the output from your stored function (JSON string without whitespace, **with no header row**).

20 score

## Exam Information

To avoid locale-specific problems, use the "**English / United States**" as your locale. The decimal point is ".", the month names are in English, etc.

You are allowed to use any resources you have like Internet, software, existing code.

You are not allowed to get help from other people: Skype, ICQ, FB, email, talks, phone calls, etc. are forbidden.

Exam time: **5 hours**.