PostgreSQL Regular Exam

Exam problems for the [PostgreSQL course @ Software University](#).

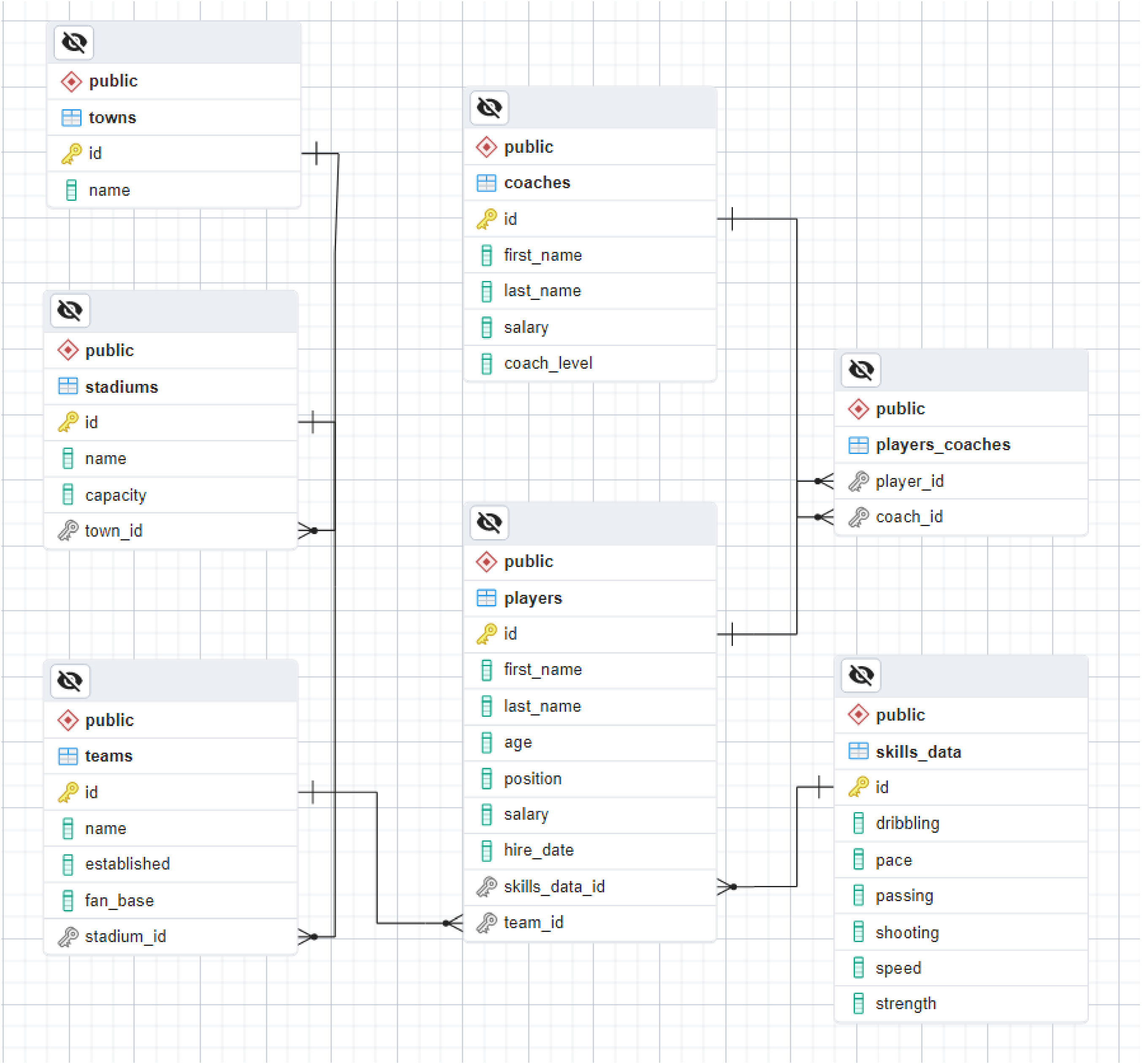
Submit your solutions in the SoftUni [Judge Contest](#).

Soccer Talent

You've been selected to help soccer coaches pick the best players for their teams. Using your database skills, you're creating Soccer Talent a custom database with expert scout data. Once done, you can easily answer coaches' queries and streamline player selection. Mastering the database structure comes first, then filling it with soccer talent data. Welcome to a world where your database skills shape the future stars of the beautiful game.

Section 1. Data Definition Language (DDL) - (30 pts)

The E/R Diagram for **Soccer Talent** has been supplied to you. This diagram illustrates the connections among different entities within **Soccer Talent**, offering a visual depiction of the database structure.



Create a PostgreSQL database named **"soccer_talent_db"** that comprises eight tables:

- **"towns"** - contains information about the players' towns;
- **"stadiums"** - holds data about the stadiums;
- **"teams"** - contains information about the teams;
- **"coaches"** - stores details about the coaches. A coach can train multiple players;
- **"skills_data"** - holds information about the current player's skills;
- **"players"** - contains details about the players;
- **"players_coaches"** - serves as a many-to-many mapping table between players and coaches;

NOTE: Please ensure that you use the exact data types specified in the model tables when working with dates. For instance, if a column is of type "DATE," make sure to use the "DATE" type. Similarly, if a column is of type "TIMESTAMP" use the "TIMESTAMP" data type. If you use an incorrect type, the Judge system will not accept your submission as correct.

Additionally, it's crucial to remember that foreign keys should follow the specified naming convention:

fk_<referencing_table>_<referenced_table>

Example: **fk_stadiums_towns**

Your first task is to set up the database tables following the provided models. Follow the specifications closely, maintaining the same column order as shown below. Ensure that the constraints match the order of columns.

towns

Column Name	Data Type	Constraints
id	**Integer** from **0** to **2,147,483,647**	Primary Key, Unique table identification, Auto-increment
name	**String** up to **45** symbols	**NULL** is **not** allowed

stadiums

Column Name	Data Type	Constraints
id	**Integer** from **0** to **2,147,483,647**	Primary Key, Unique table identification, Auto-increment
name	**String** up to **45** symbols	**NULL** is **not** allowed
capacity	**Integer** from **0** to **2,147,483,647**	The **capacity** is a **positive number greater than 0** **NULL** is **not** allowed
town_id	**Integer** from **0** to **2,147,483,647**	Relationship with table **towns**, Cascade Operations, **NULL** is **not** allowed

teams

Column Name	Data Type	Constraints
id	**Integer** from **0** to **2,147,483,647**	Primary Key, Unique table identification, Auto-increment
name	**String** up to **45** symbols	**NULL** is **not** allowed

established	**DATE**	**NULL** is **not** allowed
fan_base	**Integer** from **0** to **2,147,483,647**	The **DEFAULT** value is **0**, the column must always have a value **greater than or equal to zero** **NULL** is **not** allowed
stadium_id	**Integer** from **0** to **2,147,483,647**	Relationship with table **stadiums**, Cascade Operations, **NULL** is **not** allowed

coaches

Column Name	Data Type	Constraints
id	**Integer** from **0** to **2,147,483,647**	Primary Key, Unique table identification, Auto-increment
first_name	**String** up to **10** symbols	**NULL** is **not** allowed
last_name	**String** up to **20** symbols	**NULL** is **not** allowed
salary	**Numeric** number with a precision of **10** digits, including **2** digits after the decimal point	The **DEFAULT** value is **0**, the column must always have a value **greater than or equal to zero** **NULL** is **not** allowed
coach_level	**Integer** from **0** to **2,147,483,647**	The **DEFAULT** value is **0**, the column must always have a value **greater than or equal to zero** **NULL** is **not** allowed

skills_data

Column Name	Data Type	Constraints
id	**Integer** from **0** to **2,147,483,647**	Primary Key, Unique table identification, Auto-increment
dribbling	**Integer** from **0** to **2,147,483,647**	The **DEFAULT** value is **0**, the column must always have a value **greater than or equal to zero** **NULL** is permitted
pace	**Integer** from **0** to **2,147,483,647**	The **DEFAULT** value is **0**, the column must always have a value **greater than or equal to zero** **NULL** is permitted
passing	**Integer** from **0** to **2,147,483,647**	The **DEFAULT** value is **0**, the column must always have a value **greater than or equal to zero** **NULL** is permitted
shooting	**Integer** from **0** to **2,147,483,647**	The **DEFAULT** value is **0**, the column must always have a value **greater than or equal to zero** **NULL** is permitted
speed	**Integer** from **0** to **2,147,483,647**	The **DEFAULT** value is **0**, the column must always have a value **greater than or equal to zero** **NULL** is permitted

strength	**Integer** from **0** to **2,147,483,647**	The **DEFAULT** value is **0**, the column must always have a value **greater than or equal to zero** **NULL** is permitted

players

Column Name	Data Type	Constraints
id	**Integer** from **0** to **2,147,483,647**	Primary Key, Unique table identification, Auto-increment
first_name	**String** up to **10** symbols	**NULL** is **not** allowed
last_name	**String** up to **20** symbols	**NULL** is **not** allowed
age	**Integer** from **0** to **2,147,483,647**	The **DEFAULT** value is **0**, the column must always have a value **greater than or equal to zero** **NULL** is **not** allowed
position	**String** limited to **1** character	**NULL** is **not** allowed
salary	**Numeric** number with a precision of **10** digits, including **2** digits after the decimal point	The **DEFAULT** value is **0**, the column must always have a value **greater than or equal to zero** **NULL** is **not** allowed
hire_date	**TIMESTAMP** indicates when the player's contract starts	**NULL** is permitted
skills_data_id	**Integer** from **0** to **2,147,483,647**	Relationship with table **skills_data**, Cascade Operations, **NULL** is **not** allowed
team_id	**Integer** from **0** to **2,147,483,647**	Relationship with table **teams**, Cascade Operations, **NULL** is permitted

players_coaches

Column Name	Data Type	Constraints
player_id	**Integer** from **0** to **2,147,483,647**	Relationship with table **players**, Cascade Operations, **NULL** is permitted
coach_id	**Integer** from **0** to **2,147,483,647**	Relationship with table **coaches**, Cascade Operations, **NULL** is permitted

1. Database Design

Submit only your **CREATE** statements for all tables to the Judge.

Section 2. Data Manipulation Language (DML) - (10 pts)

Before beginning, it is necessary to import "dataset.sql". The data should be inserted successfully if the structure has been properly created.

This section requires performing various data manipulations:

2. Insert

Players hired **before** `'2013-12-13 07:18:46'` are eligible to apply for coaching positions. Your task is to update the **"coaches"** table by extracting information from the **"players"** table. Insert data into the **"coaches"** table with the following specifications:

- set the **"first_name"** to the **player's first name**.
- set the **"last_name"** to the **player's last name**.
- set the **"salary"** to **double** the **player's salary**.
- set the **"coach_level"** to the **character count** of the player's **first name**.

Example

id	first_name	last_name	salary	coach_level
1	Anollie	Phelip	578112.19	4
2	Aster	Krolak	876807.09	1
3	Aesra	Simoneton	336677.23	4
…	…	…	…	…
9	Rudie	Gorgl	460354.93	2
10	Lewes	Dymocke	898257.96	7
11	Harlie	Sandells	1580855.78	6
12	Thor	Serrels	911203.34	4
…	…	…	…	…
43	Curtis	Lawrenceson	74142.90	6
44	Kate	Taylder	991817.08	4
45	Jorrie	Lumsden	1016070.88	6

3. Update

For the upcoming task**, update the salaries of coaches** whose **"first_name"** starts with **'C'** and who **train one or more players**. Increase the **"salary"** by **multiplying** their current **"salary"** by their **"coach_level"**.

Example

Before update

id	first_name	last_name	salary	coach_level
1	Anollie	Phelip	578112.19	4
…	…	…	…	…
7	Mickey	Dabernott	680019.08	7
8	Chilton	Cookley	56839.58	4
9	Rudie	Gorgl	460354.93	2
…	…	…	…	…

15	Jorrie	Lumsden	1016070.88	6

After update

id	first_name	last_name	salary	coach_level
1	Anollie	Phelip	578112.19	4
…	…	…	…	…
7	Mickey	Dabernott	680019.08	7
8	Chilton	Cookley	227358.32	4
9	Rudie	Gorgl	460354.93	2
…	…	…	…	…
15	Jorrie	Lumsden	1016070.88	6

4. Delete

As you may recall, at the beginning of our project, we promoted several football players to coaching roles. To ensure the accurate update of our database, your assignment is to **remove all instances of these promoted players** from the **"players"** table. More specifically, eliminate players **hired before** '2013-12-13 07:18:46'. Additionally, delete all associated records for these players from the **"players_coaches"** table.

To successfully accomplish the specified task, make sure to submit **all SQL queries** to the Judge

Example

Before delete

id	first_name	last_name	age	position	salary	hire_date	skills_data_id	team_id
1	Alden	Wrettum	21	A	32283.83	[null]	87	[null]
2	Dayna	Halesworth	23	M	897853.69	2020-01-15 07:26:33	88	77
…	…	…	…	…	…	…	…	…
11	Curry	Brando	17	M	511422.90	2019-08-16 16:02:01	34	36
12	Thor	Serrels	24	D	455601.67	2013-03-19 15:23:23	47	36
13	Berkie	Maryin	45	A	698230.79	2016-12-27 13:45:05	65	77
…	…	…	…	…	…	…	…	…
16	Eldin	Gravet	35	D	821422.57	2019-03-23 11:24:11	69	53

17	Glory	Crosetti	28	A	394462.27	2010-08-05 19:01:14	13	1
18	Doretta	Rignold	42	M	665969.43	2015-09-18 11:43:44	40	66
…	…	…	…	…	…	…	…	…
19	Gwendolen	Semple	17	D	407582.09	[null]	94	[null]
20	Launce	Perchard	44	A	899242.30	2013-09-13 14:16:39	70	13
21	Vasili	Grigorescu	45	M	46428.66	2013-12-13 07:18:46	91	76
…	…	…	…	…	…	…	…	…
99	Miranda	Frichley	45	A	307130.04	2019-06-20 16:31:41	53	22
100	Jorrie	Lumsden	50	M	508035.44	2010-09-19 11:52:56	4	54

player_id	coach_id
1	1
54	2
17	5
33	4
24	8
66	10
90	5
4	6
39	10
71	8

After delete

id	first_name	last_name	age	position	salary	hire_date	skills_data_id	team_id
1	Alden	Wrettum	21	A	32283.83	[null]	87	[null]

2	Dayna	Halesworth	23	M	897853.69	2020-01-15 07:26:33	88	77
…	…	…	…	…	…	…	…	…
11	Curry	Brando	17	M	511422.90	2019-08-16 16:02:01	34	36
13	Berkie	Maryin	45	A	698230.79	2016-12-27 13:45:05	65	77
…	…	…	…	…	…	…	…	…
16	Eldin	Gravet	35	D	821422.57	2019-03-23 11:24:11	69	53
18	Doretta	Rignold	42	M	665969.43	2015-09-18 11:43:44	40	66
…	…	…	…	…	…	…	…	…
19	Gwendolen	Semple	17	D	407582.09	[null]	94	[null]
21	Vasili	Grigorescu	45	M	46428.66	2013-12-13 07:18:46	91	76
…	…	…	…	…	…	…	…	…
99	Miranda	Frichley	45	A	307130.04	2019-06-20 16:31:41	53	22

player_id	coach_id
1	1
33	4
24	8
90	5
4	6
39	10

Section 3. Querying - (40 pts)

Now we will perform some data extraction tasks. Please note that the example results provided in this section are based on a fresh database. It is highly recommended to clear the database that was manipulated in the previous problems from the DML section and insert the given dataset again to ensure consistency with the examples in this section.

5. Players

Extract information about all the **"players"** with their **"full_name"** (concatenation of **"first_name"** and **"last_name"**), **"age"**, and **"hire_date"**. Select only the players whose **"first_name"** starts with **'M%'**. Sort the list by **"age"** in **descending order**. If there is more than one player with the same age, the results should be further sorted by their **"full_name"** in **ascending order**.

Example

full_name	age	hire_date
Meredith Duffett	46	2015-10-30 16:20:42
Miranda Frichley	45	2019-06-20 16:31:41
Marni McDonald	42	2012-04-08 23:10:52
…	…	…
Malissa Paylie	27	2012-05-01 07:52:22
Marquita Sigert	27	2017-02-19 23:07:14
…	…	…
Melodee McVey	22	2018-02-11 08:41:37
Myer Daenen	16	2017-06-19 08:25:13

6. Offensive Players without Team

A coach has requested assistance in identifying players in offensive **"position"** (**'A'**) who are currently **not part of any team**. The coach aims to create a team consisting of players with strong offensive abilities, specifically those whose **combined score** in **"pace"** and **"shooting"** is above **130**. Required columns:

- **"id"** - players' id;
- **"full_name"** - concatenation of players' **"first_name"** and **"last_name"**;
- **"age"**;
- **"position"**;
- **"salary"**;
- **"pace"**;
- **"shooting"**;

Example

id	full_name	age	position	salary	pace	shooting
97	Gianni Morrow	16	A	762456.74	82	68

7. Teams with Player Count and Fan Base

Write an SQL query to retrieve information about **"teams"**, focusing on the **"player_count"** for each team and selecting only those with a **"fan_base" greater than 30000**. Arrange the results by **"player_count"** in **descending order**. If teams have the same **"player_count"**, further order them by **"fan_base"** in **descending order**. The output should include columns for **"team_id"**, **"team_name"**, **"player_count"**, and **"fan_base"**.

Example

team_id	team_name	player_count	fan_base
51	Ailane	10	32000
78	Skipstorm	2	32000
66	Yombu	1	32000
29	Voolia	1	31000
…	…	…	…
61	Tagopia	0	31000
52	Zoombox	0	31000

8. Coaches, Players Skills and Teams Overview

Retrieve information about coaches, their players, and their respective skills, along with the team each player belongs to. The goal is to obtain details such as the **"coach_full_name"**, the **"player_full_name"** (formed by combining **"first_name"** and **"last_name"**), and the **"name"** of the **team** each player is a part of. Additionally, select the **player's skills** (**"passing"**, **"shooting"**, and **"speed"**). Arrange the results by the **coach's full name** in **ascending order**. If a coach has multiple players, also sort the results by the **player's full name** in **descending order**.

Example

coach_full_name	player_full_name	team_name	passing	shooting	speed
Acad Clyne	Ada Doumic	Edgetag	84	44	88
Arcos Chettle	Melodee McVey	Feedmix	50	73	87
Arcos Chettle	Glory Crosetti	Skyble	61	73	41
…	…		…	…	…
Lewes Dymocke	Camey Michurin	Pixonyx	94	47	4
Reynard Gravenor	Bibbye O'Lunney	Ntags	39	72	49

Section 4. Programmability - (20 pts)

9. Stadium Teams Information

You have been assigned the creation of a user-defined function called **fn_stadium_team_name()**. This function is designed to take a **stadium's name** as a parameter (**"stadium_name"** of type **VARCHAR(30)**) and returns details about the **names of teams** playing home matches at that particular stadium. In cases where **multiple teams** share the same stadium, the function ensures they are **ordered alphabetically**.

For this task, please only submit your **user-defined function** in the Judge system.

Examples

Query
`SELECT fn_stadium_team_name('BlogXS')`

Output
fn_stadium_team_name
Fiveclub

Query
`SELECT fn_stadium_team_name('Quaxo')`

Output
fn_stadium_team_name
Divavu
Photobug

Query
`SELECT fn_stadium_team_name('Jaxworks')`

Output
fn_stadium_team_name
Ailane
Feedmix
Jabbercube
Skipstorm

10. Player Team Finder

Your last assignment is to create a stored procedure named **`sp_players_team_name()`**. This procedure is designed to accept the **full name of a player** as input (**`"player_name"`** of type **VARCHAR(50)**) and extract the **name of the team** to which the player currently belongs as output (**`"team_name"`** of type **VARCHAR(45)**). In cases where the player is not **associated with any team**, the output should be **`"The player currently has no team"`**.

For this task, please only submit your **stored procedure** in the Judge system.

Example

Query	Output
`CALL sp_players_team_name('Thor Serrels', '')`	`Ntags`
`CALL sp_players_team_name('Walther Olenchenko', '')`	`The player currently has no team`
`CALL sp_players_team_name('Isaak Duncombe', '')`	`Thoughtstorm`