НАЦІОНАЛЬНИЙ ТЕХНІЧНИЙ УНІВЕРСИТЕТ УКРАЇНИ

«КИЇВСЬКИЙ ПОЛІТЕХНІЧНИЙ ІНСТИТУТ

ІМЕНІ ІГОРЯ СІКОРСЬКОГО»

ФАКУЛЬТЕТ ІНФОРМАТИКИ ТА ОБЧИСЛЮВАЛЬНОЇ ТЕХНІКИ

(повна назва інституту/факультету)

КАФЕДРА інформатики та програмної інженерії

(повна назва кафедри)

## КУРСОВА РОБОТА

з дисципліни «Бази даних»

(назва дисципліни)

на тему: База даних для збереження даних про футбольні чемпіонати

Студента (ки) \_\_2\_\_ курсу \_ІТ-01\_ групи спеціальності 121 «Інженерія програмного забезпечення»

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(прізвище та ініціали)

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(посада, вчене звання, науковий ступінь, прізвище та ініціали)

Національна шкала \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Кількість балів: \_\_\_\_\_\_ Оцінка ECTS \_\_\_\_\_\_\_

Члени комісії \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(підпис) (вчене звання, науковий ступінь, прізвище та ініціали)

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(підпис) (вчене звання, науковий ступінь, прізвище та ініціали)

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(підпис) (вчене звання, науковий ступінь, прізвище та ініціали)

Київ – 2021 рік

**ЗАВДАННЯ**

Завданням курсової роботи є розробка бази даних з забезпеченням роботи всіх бізнес правил та можливість її подальшого використання. При розробці проекту потрібно врахувати певні вимоги:

* вимоги до функціональності (наявність усіх функцій, які необхідні для реалізації поставленої задачі);
* вимоги до цілісності даних;
* вимоги до мінімізації об’єму даних, що зберігаються;
* наявність багатокористувацького режиму; - вимоги до швидкодії.

Це необхідно для створення ефективної та зручної системи зберігання користувацьких даних. Також потрібно чітко враховувати предметну область поставленої цілі для чого варто створити ER – модель, що дозволить краще зрозуміти всі бізнес правила та особливості поставленої задачі. Для її створення необхідно:

* детально проаналізувати предметне середовище;
* сформулювати бізнес-правила, які будуть основою завдання обмежень при проектуванні та реалізації бази даних;
* виявити необхідний набір сутностей;
* визначити необхідний набір атрибутів для кожної сутності;
* визначити зв'язки між об'єктами;
* описати отриману ER-модель в одній з відомих нотацій;
* розробити модель користувачів бази даних з описом їх прав;

Після аналізу предметної області необхідно:

* побудувати реляційну схему з ER-моделі;
* створити базу даних, що була спроектована, у форматі обраної системи управління базою даних (СУБД);
* створити користувачів бази даних, реалізувавши розроблену багатокористувацьку модель;
* імпортувати дані з використанням засобів СУБД в створену базу даних;
* мовою SQL написати запити для визначених на етапі аналізу предметного середовища потреб користувачів;
* оптимізувати роботу запитів (продемонструвати роботу до і після оптимізації).

Обов’язкові вимоги до проєкту:

* кількість таблиць бази даних не менше 10;
* реалізація створених бізнес-правил;
* забезпечення цілісності бази даних;
* використання збережених процедур/функцій;
* використання тригерів;
* використання генераторів;
* використання представлень;
* створення не менше 20 DML-запитів типу SELECT (не включаючи insert, delete, update);
* кількість таблиць, атрибути яких використовуються у запиті не менше двох.

**ЗМІСТ**

ВСТУП

РОЗДІЛИ ОСНОВНОЇ ЧАСТИНИ РОБОТИ

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  2. ЛОГІЧНА МОДЕЛЬ БАЗИ ДАНИХ
  3. ПРОГРАМНА РЕАЛІЗАЦІЯ

2.5.1 Створення бази даних

2.5.2 Наповнення схеми даними

* + 1. Створення запитів
    2. Використання процедури
    3. Використання тригера
    4. Використання представлення
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ВСТУП

В нашому житті напевне кожна людина бачила футбол в тому чи іншому вигляді. Сучасний спорт нездатний обійтися без його головної частини. Футбольні чемпіонати завжди були цікаві різним людям, тому й важливо розробити базу даних, яка надасть можливість зручно зберігати дані і забезпечить зручний доступ до них.

Перед реалізацією бази даних було необхідно обрати СУБД. Зваживши всі за і проти вибір впав на PostgreSQL за її широкий функціонал і відкриті джерела коду.

РОЗДІЛИ ОСНОВНОЇ ЧАСТИНИ РОБОТИ

2.1 ОПИС ПРЕДМЕТНОГО СЕРЕДОВИЩА

Загалом першим кроком у розробці бази даних є опис предметного середовища обраної теми. Без чіткого аналізу теми неможливо розробити базу даних, яка б задовольнила потреби користувачів. В даному випадку цією темою є збереження даних про футбольні чемпіонати.

Футбольні чемпіонати мають місце проведення. Тому реалізована база даних має містити в собі дані про те, де проводиться чемпіонат. Основою чемпіонатів являються гравці і команди, тож база даних має містити в собі дані і про них. Також в команд є тренери, і матчі в яких є рефері і асистенти рефері. З огляду на ці дані ми маємо реалізувати можливість збереження їх даних в базі даних.

2.2 КОНЦЕПТУАЛЬНА МОДЕЛЬ БАЗИ ДАНИХ

Після аналізу предметної області було необхідно розробити концептуальну модель бази даних.

Було виділено такі сутності:

футбольна країна;

футбольне місто;

футбольний майданчик;

футбольна команда;

ігрове положення;

гравець;

рефері;

матч;

тренер;

помічник арбітра;

деталі матчу;

деталі голу;

серія пенальті;

гравець в грі;

гравець поза грою;

капітан матчу;

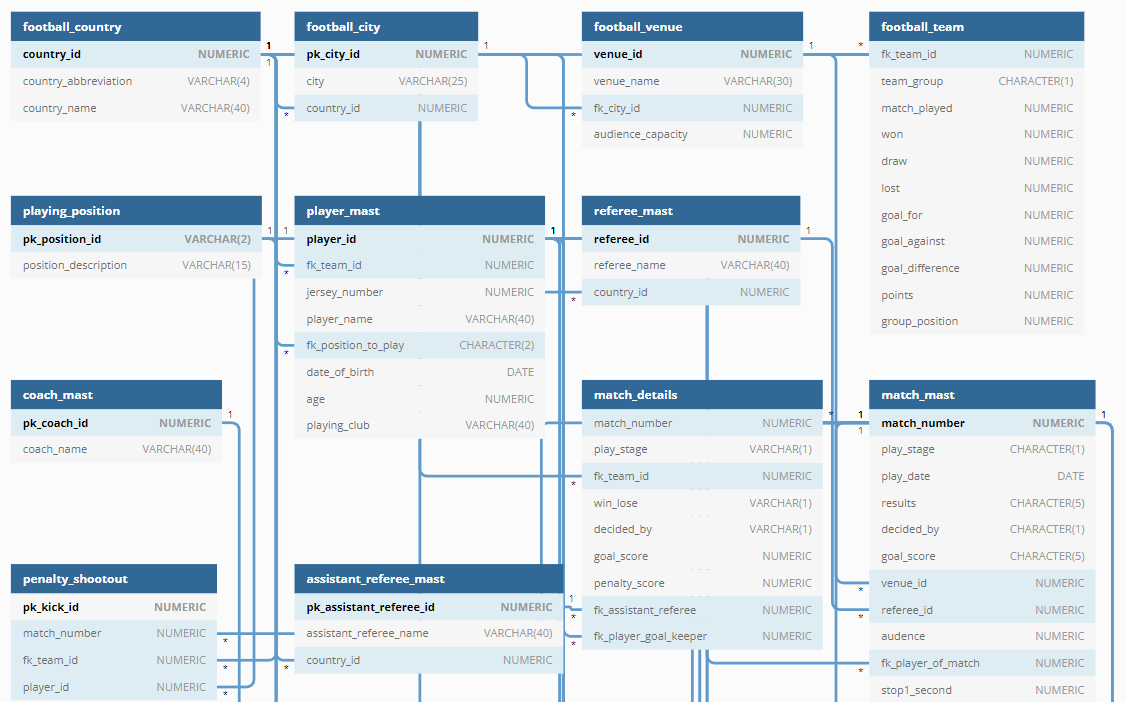
тренер команд;

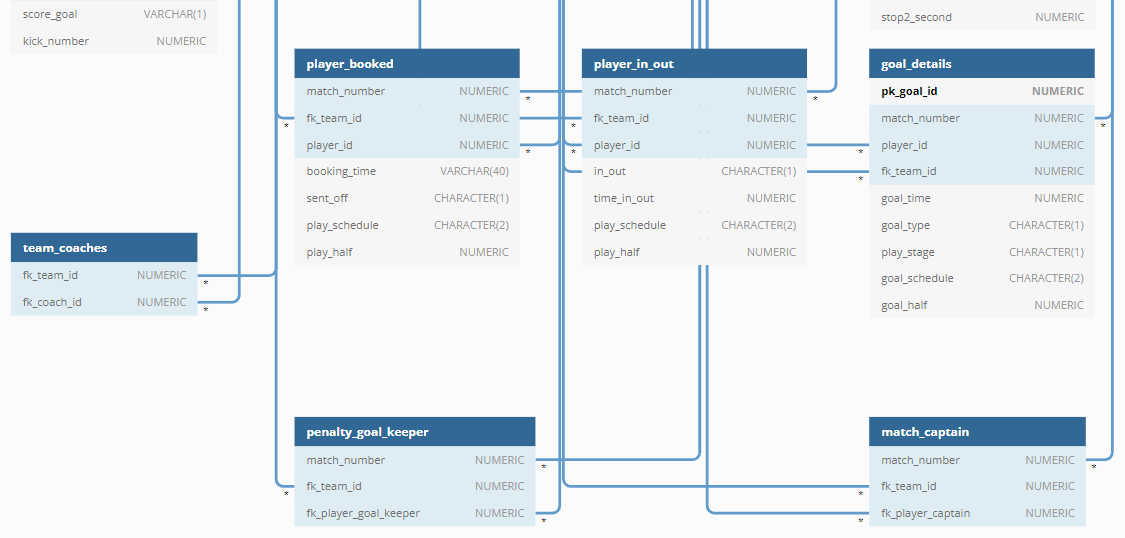
пенальті воротар.

Далі було необхідно визначити атрибути сутностей і їх типи даних. Вказані в порядку наведеному вище сутності є таблицями з атрибутами:

|  |  |  |  |
| --- | --- | --- | --- |
| Таблиця: |  |  |  |
|  | ***football\_country*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | pk\_country\_id |  | NUMERIC |
|  | country\_abbreviation |  | VARCHAR(4) |
|  | country\_name |  | VARCHAR(40) |
| Таблиця: |  |  |  |
|  | ***football\_city*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | pk\_city\_id |  | NUMERIC |
|  | city |  | VARCHAR(25) |
|  | fk\_country\_id |  | NUMERIC |
| Таблиця: |  |  |  |
|  | ***football\_venue*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | pk\_venue\_id |  | NUMERIC |
|  | venue\_name |  | VARCHAR(30) |
|  | fk\_city\_id |  | NUMERIC |
|  | audience\_capacity |  | NUMERIC |
| Таблиця: |  |  |  |
|  | ***football\_team*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | fk\_team\_id |  | NUMERIC |
|  | team\_group |  | CHARACTER(1) |
|  | match\_played |  | NUMERIC |
|  | won |  | NUMERIC |
|  | draw |  | NUMERIC |
|  | lost |  | NUMERIC |
|  | goal\_for |  | NUMERIC |
|  | goal\_against |  | NUMERIC |
|  | goal\_difference |  | NUMERIC |
|  | points |  | NUMERIC |
|  | group\_position |  | NUMERIC |
| Таблиця: |  |  |  |
|  | ***playing\_position*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | pk\_position\_id |  | VARCHAR(2) |
|  | position\_description |  | VARCHAR(15) |
| Таблиця: |  |  |  |
|  | ***player\_mast*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | pk\_player\_id |  | NUMERIC |
|  | fk\_team\_id |  | NUMERIC |
|  | jersey\_number |  | NUMERIC |
|  | player\_name |  | VARCHAR(40) |
|  | fk\_position\_to\_play |  | CHARACTER(2) |
|  | date\_of\_birth |  | DATE |
|  | age |  | NUMERIC |
|  | playing\_club |  | VARCHAR(40) |
| Таблиця: |  |  |  |
|  | ***referee\_mast*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | pk\_referee\_id |  | NUMERIC |
|  | referee\_name |  | VARCHAR(40) |
|  | fk\_country\_id |  | NUMERIC |
| Таблиця: |  |  |  |
|  | ***match\_mast*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | pk\_match\_number |  | NUMERIC |
|  | play\_stage |  | CHARACTER(1) |
|  | play\_date |  | DATE |
|  | results |  | CHARACTER(5) |
|  | decided\_by |  | CHARACTER(1) |
|  | goal\_score |  | CHARACTER(5) |
|  | fk\_venue\_id |  | NUMERIC |
|  | fk\_referee\_id |  | NUMERIC |
|  | audence |  | NUMERIC |
|  | fk\_player\_of\_match |  | NUMERIC |
|  | stop1\_second |  | NUMERIC |
|  | stop2\_second |  | NUMERIC |
| Таблиця: |  |  |  |
|  | ***coach\_mast*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | pk\_coach\_id |  | NUMERIC |
|  | coach\_name |  | VARCHAR(40) |
| Таблиця: |  |  |  |
|  | ***assistant\_referee\_mast*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | pk\_assistant\_referee\_id |  | NUMERIC |
|  | assistant\_referee\_name |  | VARCHAR(40) |
|  | fk\_country\_id |  | NUMERIC |
| Таблиця: |  |  |  |
|  | ***match\_details*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | fk\_match\_number |  | NUMERIC |
|  | play\_stage |  | VARCHAR(1) |
|  | fk\_team\_id |  | NUMERIC |
|  | win\_lose |  | VARCHAR(1) |
|  | decided\_by |  | VARCHAR(1) |
|  | goal\_score |  | NUMERIC |
|  | penalty\_score |  | NUMERIC |
|  | fk\_assistant\_referee |  | NUMERIC |
|  | fk\_player\_goal\_keeper |  | NUMERIC |
| Таблиця: |  |  |  |
|  | ***goal\_details*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | pk\_goal\_id |  | NUMERIC |
|  | fk\_match\_number |  | NUMERIC |
|  | fk\_player\_id |  | NUMERIC |
|  | fk\_team\_id |  | NUMERIC |
|  | goal\_time |  | NUMERIC |
|  | goal\_type |  | CHARACTER(1) |
|  | play\_stage |  | CHARACTER(1) |
|  | goal\_schedule |  | CHARACTER(2) |
|  | goal\_half |  | NUMERIC |
| Таблиця: |  |  |  |
|  | ***penalty\_shootout*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | pk\_kick\_id |  | NUMERIC |
|  | fk\_match\_number |  | NUMERIC |
|  | fk\_team\_id |  | NUMERIC |
|  | fk\_player\_id |  | NUMERIC |
|  | score\_goal |  | VARCHAR(1) |
|  | kick\_number |  | NUMERIC |
| Таблиця: |  |  |  |
|  | ***player\_booked*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | fk\_match\_number |  | NUMERIC |
|  | fk\_team\_id |  | NUMERIC |
|  | fk\_player\_id |  | NUMERIC |
|  | booking\_time |  | VARCHAR(40) |
|  | sent\_off |  | CHARACTER(1) |
|  | play\_schedule |  | CHARACTER(2) |
|  | play\_half |  | NUMERIC |
| Таблиця: |  |  |  |
|  | ***player\_in\_out*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | fk\_match\_number |  | NUMERIC |
|  | fk\_team\_id |  | NUMERIC |
|  | fk\_player\_id |  | NUMERIC |
|  | in\_out |  | CHARACTER(1) |
|  | time\_in\_out |  | NUMERIC |
|  | play\_schedule |  | CHARACTER(2) |
|  | play\_half |  | NUMERIC |
| Таблиця: |  |  |  |
|  | ***match\_captain*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | fk\_match\_number |  | NUMERIC |
|  | fk\_team\_id |  | NUMERIC |
|  | fk\_player\_captain |  | NUMERIC |
| Таблиця: |  |  |  |
|  | ***team\_coaches*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | fk\_team\_id |  | NUMERIC |
|  | fk\_coach\_id |  | NUMERIC |
| Таблиця: |  |  |  |
|  | ***penalty\_goal\_keeper*** |  |  |
| Атрибути: |  | Тип даних: |  |
|  | fk\_match\_number |  | NUMERIC |
|  | fk\_team\_id |  | NUMERIC |
|  | fk\_player\_goal\_keeper |  | NUMERIC |

Наступним важливим кроком у розробці бази даних є створення зв’язків між таблицями. Без зв’язків у базі даних таблиці не можуть взаємодіяти. Для того аби представити розроблені зв’язки ми візуалізували їх у вигляді ER-діаграми представленої нижче:

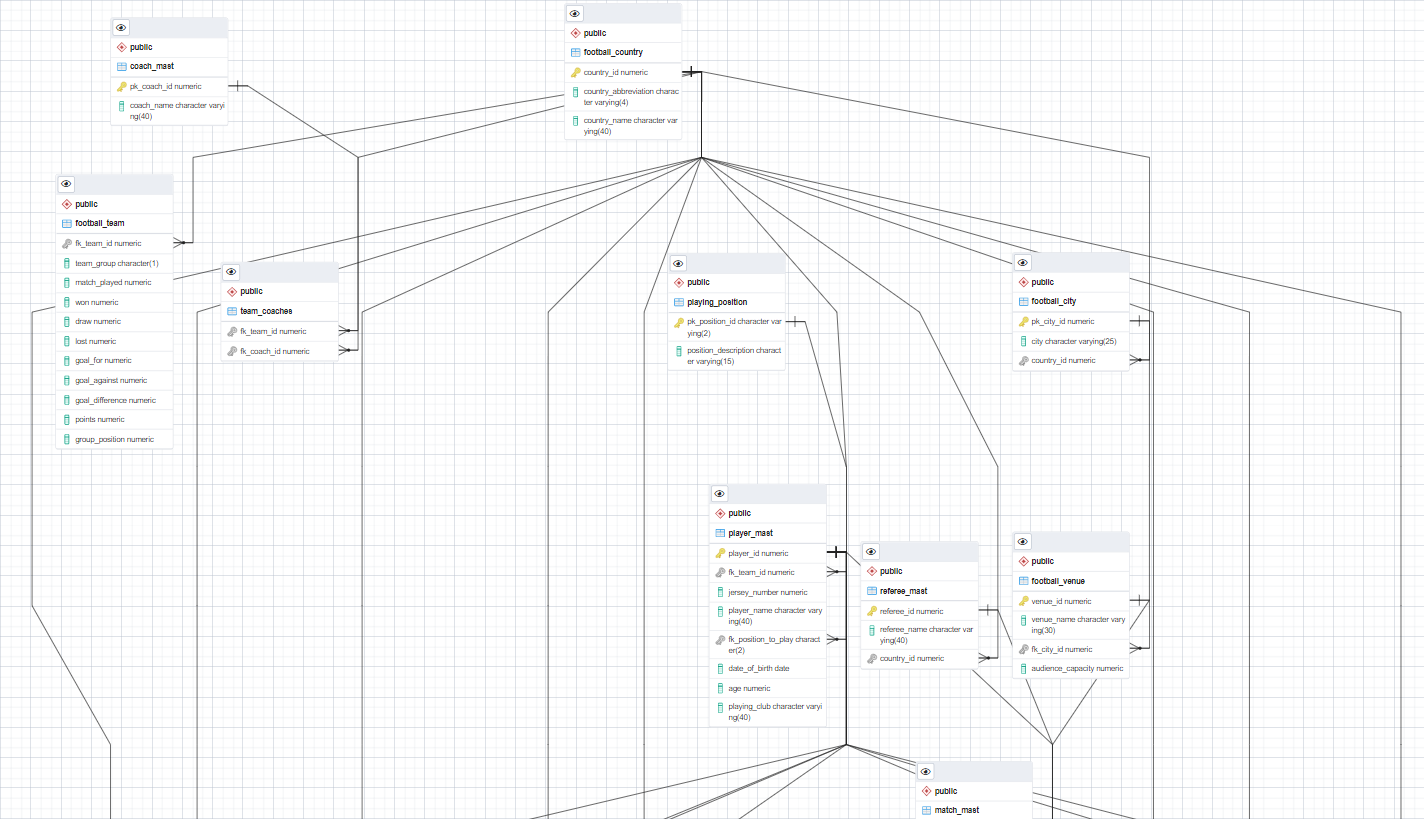


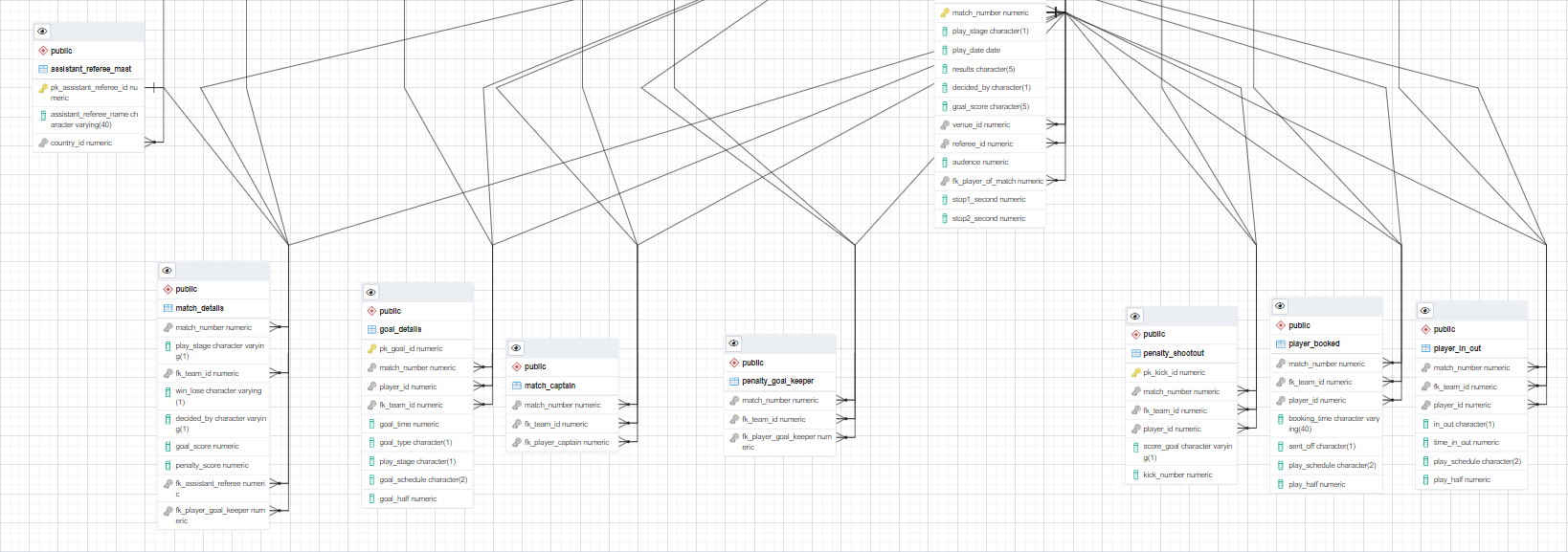


Де “1” – один, а “\*” багато.

2.3 ЛОГІЧНА МОДЕЛЬ БАЗИ ДАНИХ

Логічна модель бази даних згенерована з допомогою СУБД представлена нижче:





2.5 ПРОГРАМНА РЕАЛІЗАЦІЯ

2.5.1 Створення бази даних

Створення бази даних та користувачів наступним скриптом:

-- Створення бази даних та користувачів

CREATE USER "FootballChampionshipOwner" WITH PASSWORD 'Football\_Championship\_Owner';

CREATE DATABASE "FootballChampionshipDB" OWNER "FootballChampionshipOwner";

ALTER DATABASE "FootballChampionshipDB" SET TIMEZONE = 'UTC';

GRANT ALL PRIVILEGES ON DATABASE "FootballChampionshipDB" TO "FootballChampionshipOwner";

CREATE USER "FootballChampionshipReader" WITH PASSWORD 'Football\_Championship\_Reader';

GRANT CONNECT ON DATABASE "FootballChampionshipDB" TO "FootballChampionshipReader";

GRANT USAGE ON SCHEMA public TO "FootballChampionshipReader";

GRANT SELECT ON ALL TABLES IN SCHEMA public TO "FootballChampionshipReader";

Створення таблиць наступним скриптом:

-- Створення таблиць

--

CREATE TABLE IF NOT EXISTS football\_country

(

country\_id NUMERIC PRIMARY KEY,

country\_abbreviation VARCHAR(4),

country\_name VARCHAR(40)

);

--

CREATE TABLE IF NOT EXISTS football\_city

(

pk\_city\_id NUMERIC PRIMARY KEY,

city VARCHAR(25),

country\_id NUMERIC REFERENCES football\_country(country\_id)

);

--

CREATE TABLE IF NOT EXISTS football\_venue

(

venue\_id NUMERIC PRIMARY KEY,

venue\_name VARCHAR(30),

fk\_city\_id NUMERIC REFERENCES football\_city(pk\_city\_id),

audience\_capacity NUMERIC

);

--

CREATE TABLE IF NOT EXISTS football\_team

(

fk\_team\_id NUMERIC REFERENCES football\_country(country\_id),

team\_group CHARACTER(1),

match\_played NUMERIC,

won NUMERIC,

draw NUMERIC,

lost NUMERIC,

goal\_for NUMERIC,

goal\_against NUMERIC,

goal\_difference NUMERIC,

points NUMERIC,

group\_position NUMERIC

);

--

CREATE TABLE IF NOT EXISTS playing\_position

(

pk\_position\_id VARCHAR(2) PRIMARY KEY,

position\_description VARCHAR(15)

);

--

CREATE TABLE IF NOT EXISTS player\_mast

(

player\_id NUMERIC PRIMARY KEY,

fk\_team\_id NUMERIC REFERENCES football\_country(country\_id),

jersey\_number NUMERIC,

player\_name VARCHAR(40),

fk\_position\_to\_play CHARACTER(2) REFERENCES playing\_position(pk\_position\_id),

date\_of\_birth DATE,

age NUMERIC,

playing\_club VARCHAR(40)

);

--

CREATE TABLE IF NOT EXISTS referee\_mast

(

referee\_id NUMERIC PRIMARY KEY,

referee\_name VARCHAR(40),

country\_id NUMERIC REFERENCES football\_country(country\_id)

);

--

CREATE TABLE IF NOT EXISTS match\_mast

(

match\_number NUMERIC PRIMARY KEY,

play\_stage CHARACTER(1),

play\_date DATE,

results CHARACTER(5),

decided\_by CHARACTER(1),

goal\_score CHARACTER(5),

venue\_id NUMERIC REFERENCES football\_venue(venue\_id),

referee\_id NUMERIC REFERENCES referee\_mast(referee\_id),

audence NUMERIC,

fk\_player\_of\_match NUMERIC REFERENCES player\_mast(player\_id),

stop1\_second NUMERIC,

stop2\_second NUMERIC

);

--

CREATE TABLE IF NOT EXISTS coach\_mast

(

pk\_coach\_id NUMERIC PRIMARY KEY,

coach\_name VARCHAR(40)

);

--

CREATE TABLE IF NOT EXISTS assistant\_referee\_mast

(

pk\_assistant\_referee\_id NUMERIC PRIMARY KEY,

assistant\_referee\_name VARCHAR(40),

country\_id NUMERIC REFERENCES football\_country(country\_id)

);

--

CREATE TABLE IF NOT EXISTS match\_details

(

match\_number NUMERIC REFERENCES match\_mast(match\_number),

play\_stage VARCHAR(1),

fk\_team\_id NUMERIC REFERENCES football\_country(country\_id),

win\_lose VARCHAR(1),

decided\_by VARCHAR(1),

goal\_score NUMERIC,

penalty\_score NUMERIC,

fk\_assistant\_referee NUMERIC REFERENCES assistant\_referee\_mast(pk\_assistant\_referee\_id),

fk\_player\_goal\_keeper NUMERIC REFERENCES player\_mast(player\_id)

);

--

CREATE TABLE IF NOT EXISTS goal\_details

(

pk\_goal\_id NUMERIC PRIMARY KEY,

match\_number NUMERIC REFERENCES match\_mast(match\_number),

player\_id NUMERIC REFERENCES player\_mast(player\_id),

fk\_team\_id NUMERIC REFERENCES football\_country(country\_id),

goal\_time NUMERIC,

goal\_type CHARACTER(1),

play\_stage CHARACTER(1),

goal\_schedule CHARACTER(2),

goal\_half NUMERIC

);

--

CREATE TABLE IF NOT EXISTS penalty\_shootout

(

pk\_kick\_id NUMERIC PRIMARY KEY,

match\_number NUMERIC REFERENCES match\_mast(match\_number),

fk\_team\_id NUMERIC REFERENCES football\_country(country\_id),

player\_id NUMERIC REFERENCES player\_mast(player\_id),

score\_goal VARCHAR(1),

kick\_number NUMERIC

);

--

CREATE TABLE IF NOT EXISTS player\_booked

(

match\_number NUMERIC REFERENCES match\_mast(match\_number),

fk\_team\_id NUMERIC REFERENCES football\_country(country\_id),

player\_id NUMERIC REFERENCES player\_mast(player\_id),

booking\_time VARCHAR(40),

sent\_off CHARACTER(1),

play\_schedule CHARACTER(2),

play\_half NUMERIC

);

--

CREATE TABLE IF NOT EXISTS player\_in\_out

(

match\_number NUMERIC REFERENCES match\_mast(match\_number),

fk\_team\_id NUMERIC REFERENCES football\_country(country\_id),

player\_id NUMERIC REFERENCES player\_mast(player\_id),

in\_out CHARACTER(1),

time\_in\_out NUMERIC,

play\_schedule CHARACTER(2),

play\_half NUMERIC

);

--

CREATE TABLE IF NOT EXISTS match\_captain

(

match\_number NUMERIC REFERENCES match\_mast(match\_number),

fk\_team\_id NUMERIC REFERENCES football\_country(country\_id),

fk\_player\_captain NUMERIC REFERENCES player\_mast(player\_id)

);

--

CREATE TABLE IF NOT EXISTS team\_coaches

(

fk\_team\_id NUMERIC REFERENCES football\_country(country\_id),

fk\_coach\_id NUMERIC REFERENCES coach\_mast(pk\_coach\_id)

);

--

CREATE TABLE IF NOT EXISTS penalty\_goal\_keeper

(

match\_number NUMERIC REFERENCES match\_mast(match\_number),

fk\_team\_id NUMERIC REFERENCES football\_country(country\_id),

fk\_player\_goal\_keeper NUMERIC REFERENCES player\_mast(player\_id)

);

2.5.2 Наповнення таблиць даними

Наповнення таблиць даними наступними командами:

-- Втавлення даних в таблиці

\copy football\_country FROM 'C:\Users\User\Desktop\CourseWork\CSV\football\_country.csv' DELIMITER ';' CSV

\copy football\_city FROM 'C:\Users\User\Desktop\CourseWork\CSV\football\_city.csv' DELIMITER ';' CSV

\copy football\_venue FROM 'C:\Users\User\Desktop\CourseWork\CSV\football\_venue.csv' DELIMITER ';' CSV

\copy football\_team FROM 'C:\Users\User\Desktop\CourseWork\CSV\football\_team.csv' DELIMITER ';' CSV

\copy referee\_mast FROM 'C:\Users\User\Desktop\CourseWork\CSV\referee\_mast.csv' DELIMITER ';' CSV

\copy coach\_mast FROM 'C:\Users\User\Desktop\CourseWork\CSV\coach\_mast.csv' DELIMITER ';' CSV

\copy assistant\_referee\_mast FROM 'C:\Users\User\Desktop\CourseWork\CSV\assistant\_referee\_mast.csv' DELIMITER ';' CSV

\copy team\_coaches FROM 'C:\Users\User\Desktop\CourseWork\CSV\team\_coaches.csv' DELIMITER ';' CSV

\copy playing\_position FROM 'C:\Users\User\Desktop\CourseWork\CSV\playing\_position.csv' DELIMITER ';' CSV

\copy player\_mast FROM 'C:\Users\User\Desktop\CourseWork\CSV\player\_mast.csv' DELIMITER ';' CSV

\copy match\_mast FROM 'C:\Users\User\Desktop\CourseWork\CSV\match\_mast.csv' DELIMITER ';' CSV

\copy match\_details FROM 'C:\Users\User\Desktop\CourseWork\CSV\match\_details.csv' DELIMITER ';' CSV

\copy penalty\_shootout FROM 'C:\Users\User\Desktop\CourseWork\CSV\penalty\_shootout.csv' DELIMITER ';' CSV

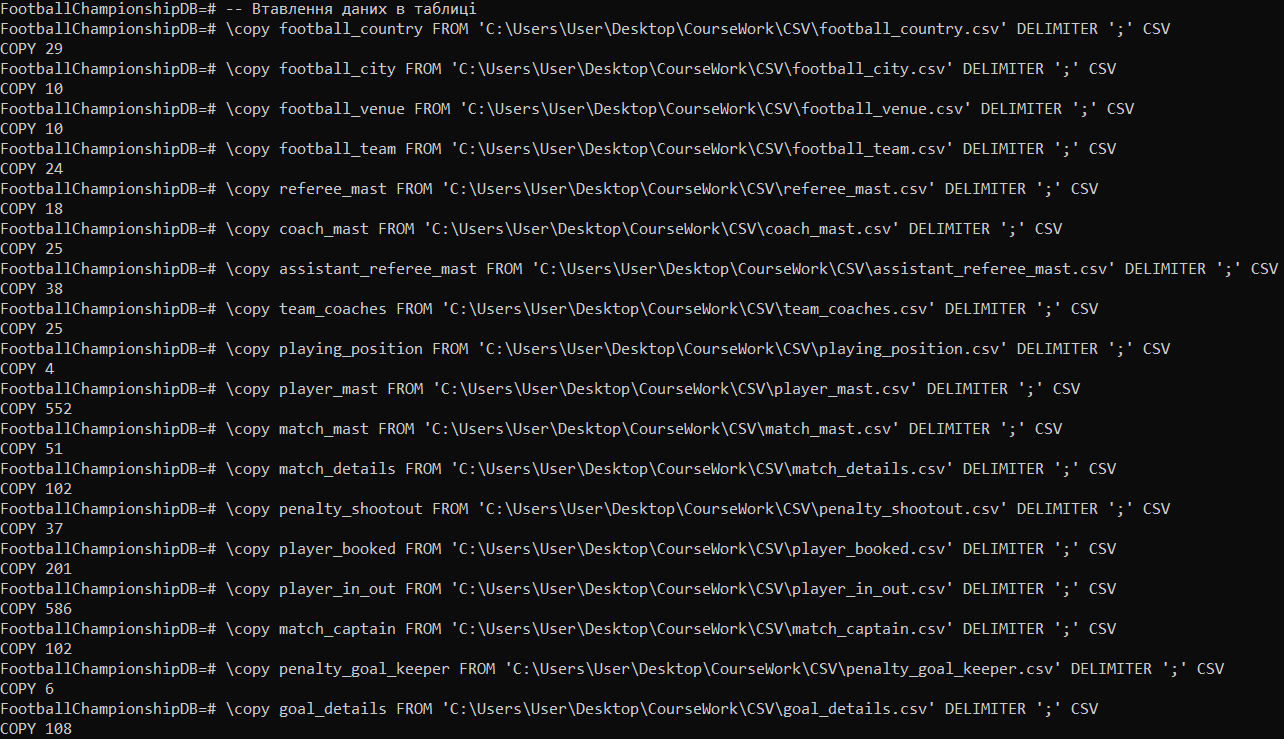
\copy player\_booked FROM 'C:\Users\User\Desktop\CourseWork\CSV\player\_booked.csv' DELIMITER ';' CSV

\copy player\_in\_out FROM 'C:\Users\User\Desktop\CourseWork\CSV\player\_in\_out.csv' DELIMITER ';' CSV

\copy match\_captain FROM 'C:\Users\User\Desktop\CourseWork\CSV\match\_captain.csv' DELIMITER ';' CSV

\copy penalty\_goal\_keeper FROM 'C:\Users\User\Desktop\CourseWork\CSV\penalty\_goal\_keeper.csv' DELIMITER ';' CSV

\copy goal\_details FROM 'C:\Users\User\Desktop\CourseWork\CSV\goal\_details.csv' DELIMITER ';' CSV



Файли з яких читають дані було додано до ГітХаб.

2.5.3 Створення запитів

Нижче наведено скрипти для вибірки даних:

-- Запити для вибірки даних

--

SELECT c.match\_number,a.country\_name AS "Team",

b.player\_name, b.jersey\_number, c.score\_goal ,c.kick\_number

FROM football\_country a, penalty\_shootout c, player\_mast b

WHERE c.fk\_team\_id=a.country\_id

AND c.player\_id=b.player\_id;

--

SELECT a.country\_name, COUNT(b.\*) as "Number of Shots"

FROM football\_country a, penalty\_shootout b

WHERE b.fk\_team\_id=a.country\_id

GROUP BY a.country\_name;

--

SELECT play\_half,play\_schedule,COUNT(\*)

FROM player\_booked

WHERE play\_schedule='NT'

GROUP BY play\_half,play\_schedule;

--

SELECT play\_half,play\_schedule,COUNT(\*)

FROM player\_in\_out

WHERE in\_out='I'

GROUP BY play\_half,play\_schedule

ORDER BY play\_half,play\_schedule,count(\*) DESC;

--

SELECT COUNT(goal\_score)

FROM match\_details

WHERE win\_lose='W'

AND decided\_by<>'P'

AND goal\_score=1;

-- Запити з підзапитами для вибірки даних

--

SELECT match\_number,country\_name, player\_name, COUNT(match\_number)

FROM goal\_details a, football\_country b, player\_mast c

WHERE a.fk\_team\_id=b.country\_id

AND a.player\_id=c.player\_id

GROUP BY match\_number,country\_name,player\_name

ORDER BY match\_number;

--

SELECT country\_name

FROM football\_country

WHERE country\_id IN(

SELECT fk\_team\_id

FROM goal\_details

WHERE match\_number=(

SELECT match\_number

FROM match\_mast

WHERE audence=(

SELECT max(audence)

FROM match\_mast)

ORDER BY audence DESC));

--

SELECT player\_name,jersey\_number

FROM player\_mast

WHERE player\_id=(

SELECT player\_id

FROM goal\_details

WHERE goal\_type='P' AND match\_number=(

SELECT MIN(match\_number)

FROM goal\_details

WHERE goal\_type='P' AND play\_stage='G'));

--

SELECT MAX(stop2\_second)

FROM match\_mast

WHERE stop2\_second<>(

SELECT MAX(stop2\_second)

FROM match\_mast);

--

SELECT country\_name

FROM football\_country

WHERE country\_id IN(

SELECT fk\_team\_id

FROM match\_details

WHERE match\_number IN(

SELECT match\_number

FROM match\_mast

WHERE stop2\_second=(

SELECT max(stop2\_second)

FROM match\_mast

WHERE stop2\_second<>(

SELECT max(stop2\_second)

FROM match\_mast))));

-- Запити з JOIN для вибірки даних

--

SELECT match\_details.match\_number, football\_country.country\_name

FROM match\_mast

JOIN match\_details

ON match\_mast.match\_number=match\_details.match\_number

JOIN football\_country

ON match\_details.fk\_team\_id=football\_country.country\_id

WHERE stop1\_second=0;

--

SELECT country\_name,team\_group,match\_played,

won,lost,goal\_for,goal\_against

FROM football\_team

JOIN football\_country

ON football\_team.fk\_team\_id=football\_country.country\_id

WHERE goal\_against=(

SELECT MAX(goal\_against)

FROM football\_team);

--

SELECT match\_details.match\_number, football\_country.country\_name,

match\_mast.stop2\_second as "Stoppage Time(sec.)"

FROM match\_mast

JOIN match\_details

ON match\_mast.match\_number=match\_details.match\_number

JOIN football\_country

ON match\_details.fk\_team\_id=football\_country.country\_id

WHERE stop2\_second IN (

SELECT MAX(stop2\_second)

FROM match\_mast);

--

SELECT match\_number,country\_name

FROM match\_details

JOIN football\_country ON football\_country.country\_id=match\_details.fk\_team\_id

WHERE win\_lose='D' AND goal\_score=0 AND play\_stage='G'

ORDER BY match\_number;

--

SELECT a.match\_number, c.country\_name, a.stop2\_second

FROM match\_mast a

JOIN match\_details b ON a.match\_number=b.match\_number

JOIN football\_country c ON b.fk\_team\_id=c.country\_id

WHERE (2-1) = (

SELECT COUNT(DISTINCT(b.stop2\_second))

FROM match\_mast b

WHERE b.stop2\_second > a.stop2\_second);

--

SELECT b.country\_name,c.player\_name,COUNT(a.fk\_player\_goal\_keeper) count\_gk

FROM match\_details a

JOIN football\_country b ON a.fk\_team\_id=b.country\_id

JOIN player\_mast c ON a.fk\_player\_goal\_keeper=c.player\_id

GROUP BY b.country\_name,c.player\_name

ORDER BY country\_name,player\_name,count\_gk DESC;

--

SELECT venue\_name, count(venue\_name)

FROM goal\_details

JOIN football\_country

ON goal\_details.fk\_team\_id=football\_country.country\_id

JOIN match\_mast ON goal\_details.match\_number=match\_mast.match\_number

JOIN football\_venue ON match\_mast.venue\_id=football\_venue.venue\_id

GROUP BY venue\_name

HAVING COUNT (venue\_name)=(

SELECT MAX(mycount)

FROM (

SELECT venue\_name, COUNT(venue\_name) mycount

FROM goal\_details

JOIN football\_country

ON goal\_details.fk\_team\_id=football\_country.country\_id

JOIN match\_mast ON goal\_details.match\_number=match\_mast.match\_number

JOIN football\_venue ON match\_mast.venue\_id=football\_venue.venue\_id

GROUP BY venue\_name) gd);

--

SELECT a.country\_name,b.player\_name,b.jersey\_number,b.age

FROM football\_country a

JOIN player\_mast b

ON a.country\_id=b.fk\_team\_id

WHERE b.age IN (

SELECT MAX(age)

FROM player\_mast);

--

SELECT match\_number,country\_name

FROM match\_details a

JOIN football\_country b

ON a.fk\_team\_id=b.country\_id

WHERE goal\_score=3 AND win\_lose='D';

--

SELECT a.country\_name as Team , b.team\_group,b.match\_played,

b.goal\_against, b.group\_position

FROM football\_country a

JOIN football\_team b

ON a.country\_id=b.fk\_team\_id

WHERE goal\_against=4 AND group\_position=4

ORDER BY team\_group;

Нижче в додаток А додано результати виконання всіх запитів.

2.5.4 Використання процедури

Нижче наведено приклад створення і використання процедури:

-- Створення процедури

CREATE OR REPLACE PROCEDURE create\_temp\_table\_football\_country()

AS

$$

BEGIN

CREATE TEMP TABLE IF NOT EXISTS temp\_table\_football\_country AS

SELECT concat(FC.country\_abbreviation, ' ', FC.country\_name)

FROM football\_country AS FC;

END;

$$ LANGUAGE plpgsql;

CALL create\_temp\_table\_football\_country();

SELECT \*

FROM temp\_table\_football\_country;

DROP TABLE IF EXISTS temp\_table\_football\_country;

Нижче в додаток Б додано результат використання процедури.

2.5.5 Використання тригера

Нижче наведено приклад створення тригера:

-- Створення тригера

CREATE TRIGGER person\_validate\_insert

BEFORE INSERT

ON penalty\_shootout

FOR EACH ROW

BEGIN

IF NEW.score\_goal NOT LIKE 'Y' OR 'N' THEN

SIGNAL SQLSTATE VALUE '45000'

SET MESSAGE\_TEXT = '[table:penalty\_shootout] - score\_goal column is not valid';

END IF;

END;

2.5.6 Використання представлення

Нижче наведено приклад створення і використання представлення:

-- Створення представлення

--

CREATE VIEW "Number of matches played by Germany" AS

SELECT match\_number,

country\_name

FROM penalty\_shootout a

JOIN football\_country c ON a.fk\_team\_id=c.country\_id

WHERE match\_number=

(SELECT match\_number

FROM penalty\_shootout

WHERE pk\_kick\_id=26)

AND country\_name<>

(SELECT country\_name

FROM football\_country

WHERE country\_id=

(SELECT fk\_team\_id

FROM penalty\_shootout

WHERE pk\_kick\_id=26))

GROUP BY match\_number,

country\_name;

-- Отримання даних з представлення

SELECT \* FROM "Number of matches played by Germany";

Нижче в додаток Б додано результат використання представлення.

2.5.7 Використання функції

Нижче наведено приклад створення і використання функції:

-- Створення функції

CREATE OR REPLACE FUNCTION check\_if\_table\_exists(schema\_name VARCHAR, \_table\_name VARCHAR)

RETURNS BOOLEAN

AS

$$

SELECT EXISTS(

SELECT

FROM information\_schema.tables

WHERE table\_schema = schema\_name

AND table\_name = \_table\_name

);

$$ LANGUAGE sql;

-- Перевірка роботи функції

SELECT check\_if\_table\_exists('public', 'football\_country');

Нижче в додаток Б додано результат використання функції.

ВИСНОВКИ

Метою даної курсової роботи була реалізація бази даних для футбольних чемпіонатів. База даних була успішно протестована з допомогою запитів для вибірки даних, процедур функцій, представлень. Дана база даних є актуальною і зможе знайти широке застосування. Вона є відкритою до покращень та розширень.

Завдання курсової роботи було виконане в повній мірі:

створено користувачів бази даних;

реалізовано більше десяти таблиць: 18;

імпортовано дані;

реалізовано більше двадцяти запитів: 123, в роботі наведено виконання лише двадцяти, але нижче в додатку В наведено скрипти усіх;

створено і використано процедуру;

створено тригер;

створено і використано представлення;

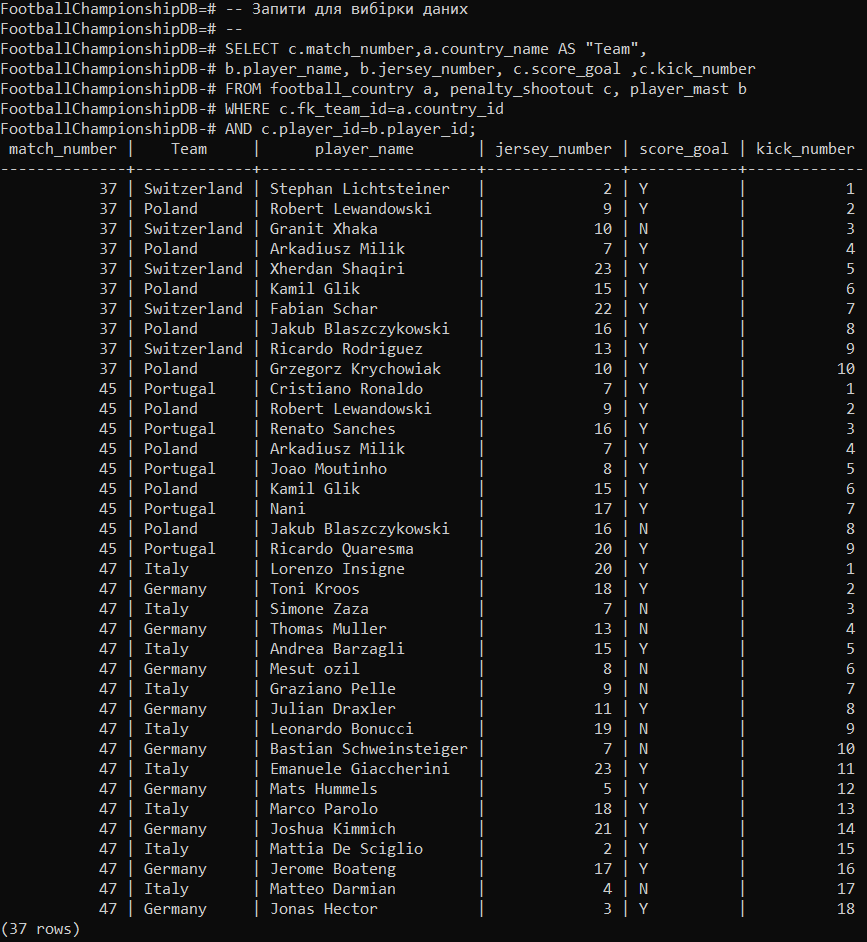
створено і використано функцію.

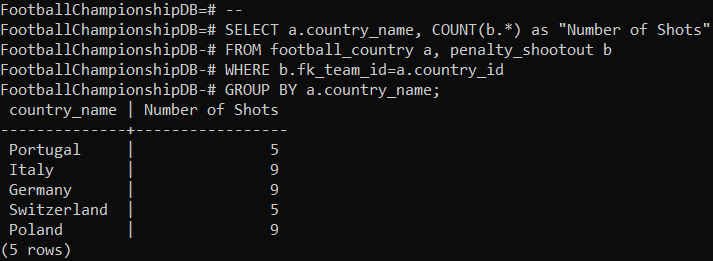
СПИСОК ВИКОРИСТАНОЇ ЛІТЕРАТУРИ

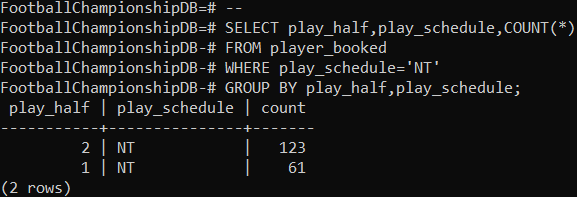
1. SQL. Повне керівництво. Джеймс Р. Грофф, Пол Н. Вайнберг, Ендрю Дж. Оппель. Видавництво «Вільямс» – 2015.
2. SQL та реляційна теорія. К. Дж. Дейт. Видавництво «Вільямс» – 2010.
3. github.com – [Електронний ресурс] – 2021. Режим доступу до ресурсу: <https://github.com/iamnno/CourseWork_DB>
4. dbdiagram.io – [Електронний ресурс] – 2021. Режим доступу до ресурсу: <https://dbdiagram.io/embed/61c28fa73205b45b73c8246c>

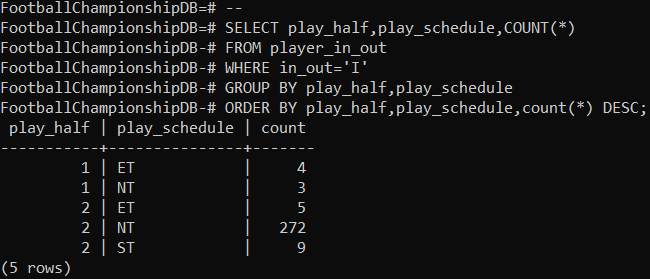
ДОДАТКИ

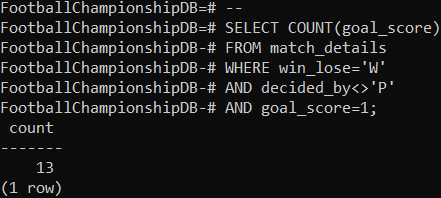
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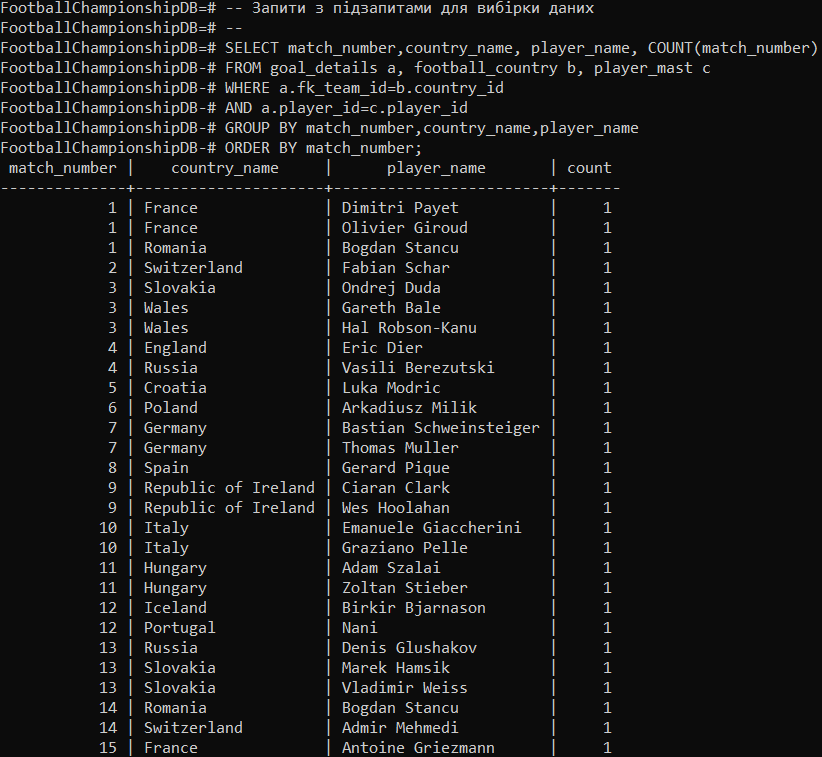




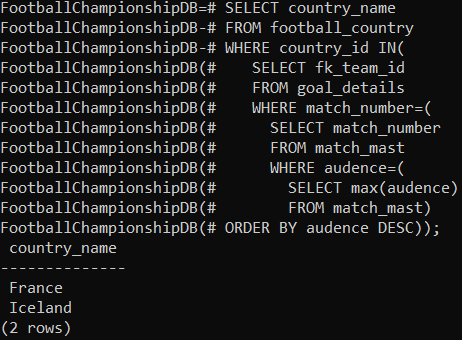


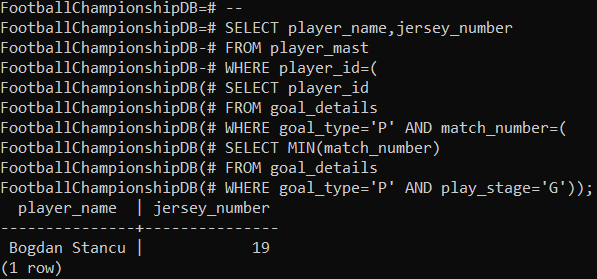


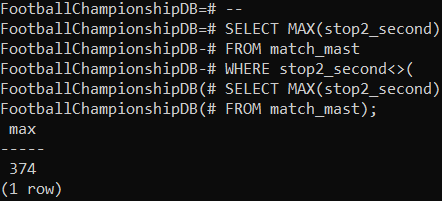


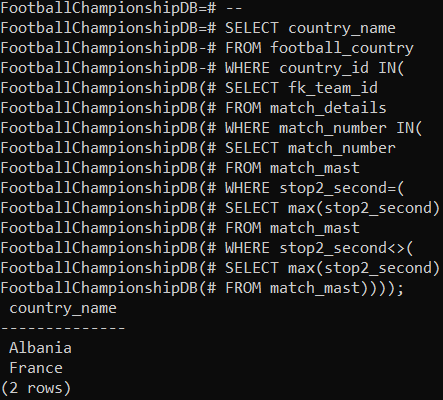


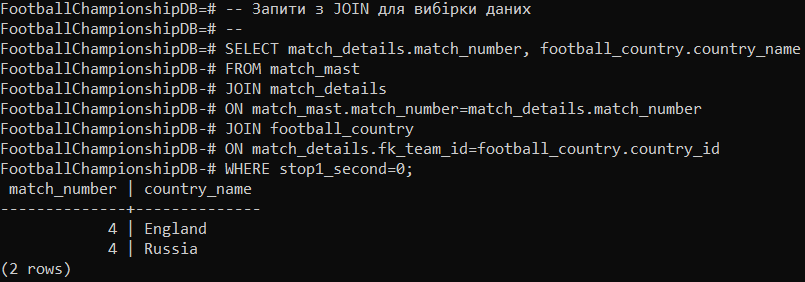
В запиті вище результатом є сто рядків

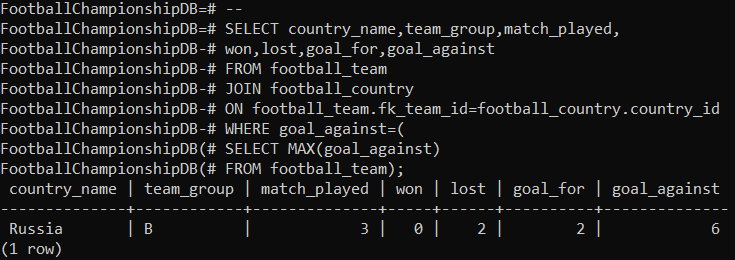


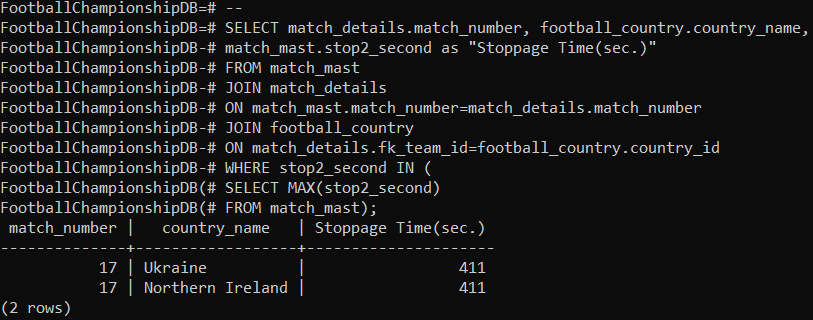


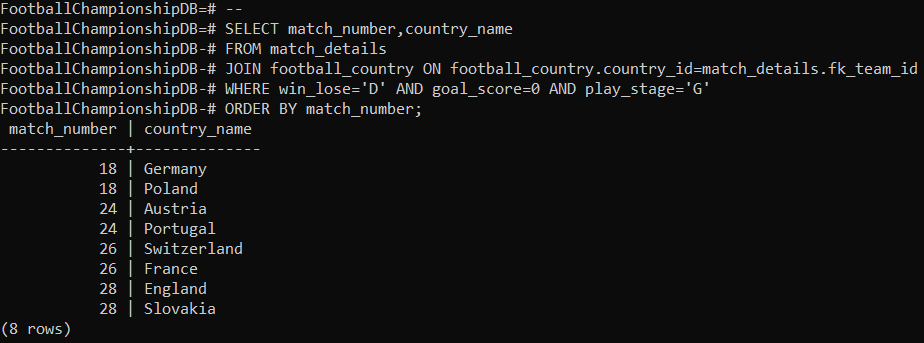


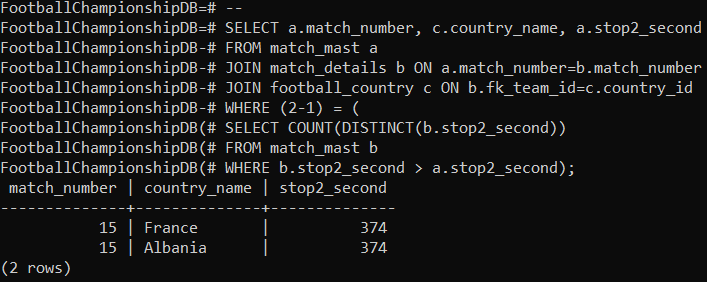


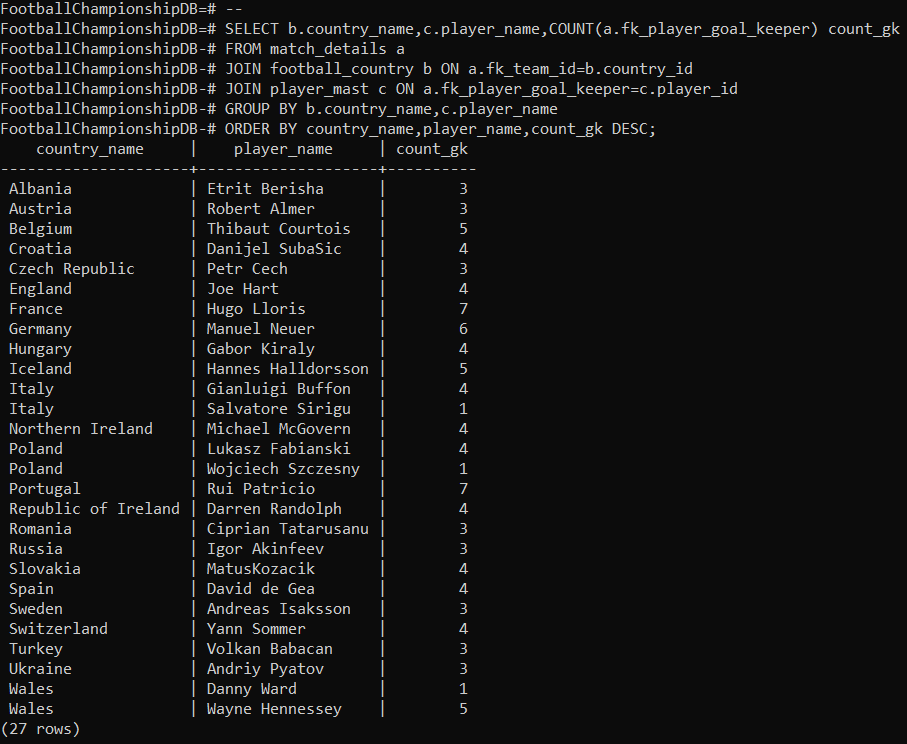


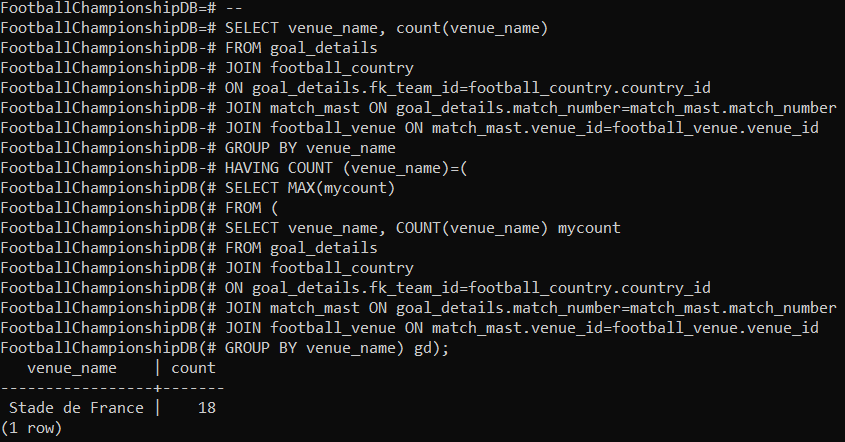


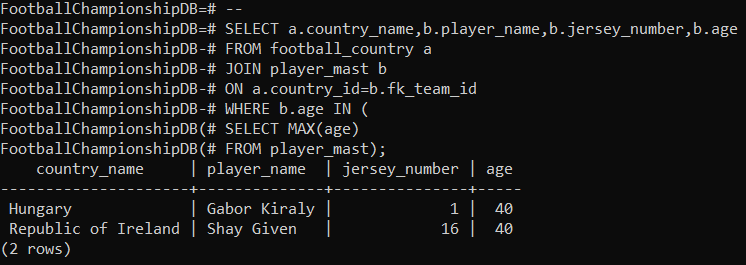


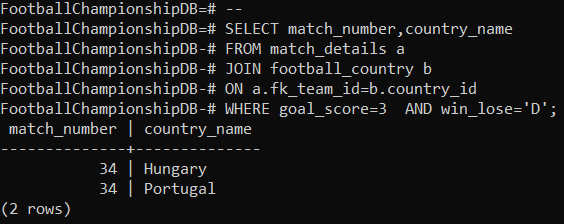


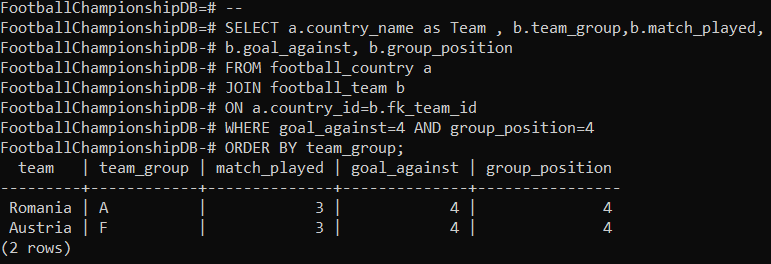






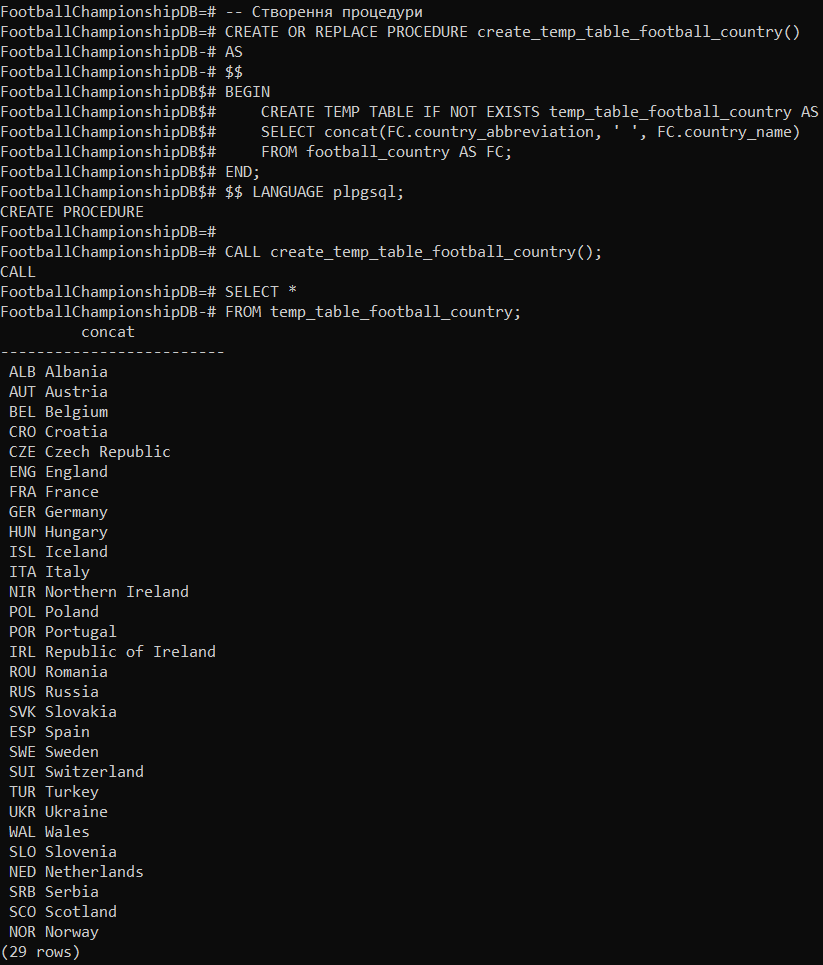






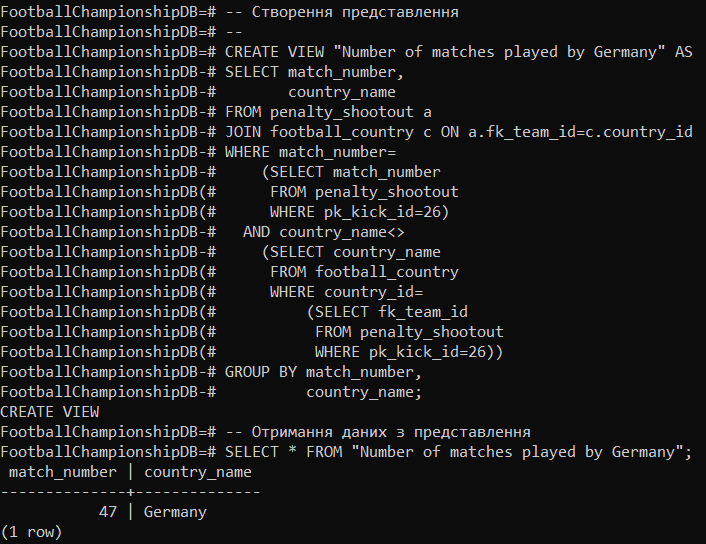
ДОДАТОКБ

Процедура:

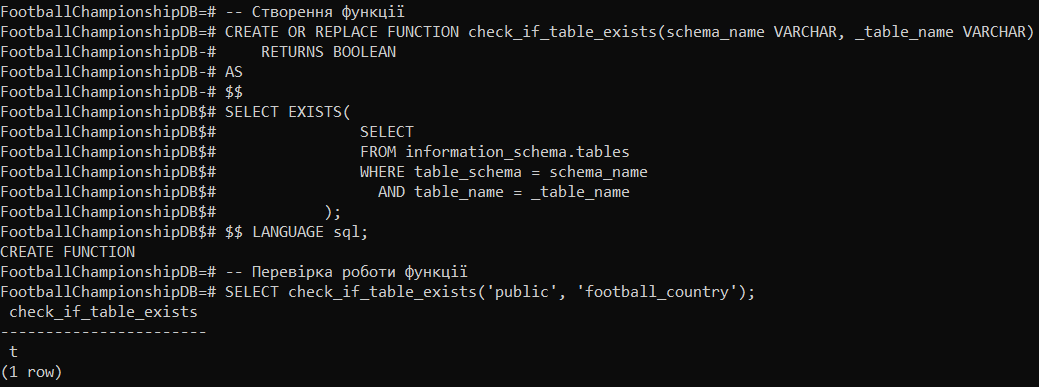




Представлення:



Функція:



ДОДАТОКВ

-- Запити для вибірки даних

--

SELECT COUNT(\*)

FROM football\_venue;

--

SELECT COUNT(DISTINCT fk\_team\_id)

FROM player\_mast;

--

SELECT COUNT(\*)

FROM goal\_details;

--

SELECT COUNT(\*)

FROM match\_mast

WHERE results='WIN';

--

SELECT COUNT(\*)

FROM match\_mast

WHERE results='DRAW';

--

SELECT play\_date "Beginning Date"

FROM match\_mast

WHERE match\_number=1;

--

SELECT COUNT(\*)

FROM goal\_details

WHERE goal\_type='O';

--

SELECT COUNT(\*)

FROM match\_mast

WHERE results='WIN'

AND play\_stage='G';

--

SELECT COUNT(DISTINCT match\_number)

FROM penalty\_shootout;

--

SELECT COUNT(\*)

FROM match\_mast

WHERE decided\_by='P' AND play\_stage='R';

--

SELECT match\_number,COUNT(\*)

FROM goal\_details

GROUP BY match\_number

ORDER BY match\_number;

--

SELECT match\_number, play\_date, goal\_score

FROM match\_mast

WHERE stop1\_second=0;

--

SELECT COUNT(DISTINCT(match\_number))

FROM match\_details

WHERE win\_lose='D'

AND goal\_score=0 AND play\_stage='G';

--

SELECT COUNT(goal\_score)

FROM match\_details

WHERE win\_lose='W'

AND decided\_by<>'P'

AND goal\_score=1;

--

SELECT COUNT(\*) as "Player Replaced"

FROM player\_in\_out

WHERE in\_out='I';

--

SELECT COUNT(\*) as "Player Replaced"

FROM player\_in\_out

WHERE in\_out='I'

AND play\_schedule='NT';

--

SELECT COUNT(\*) as "Player Replaced"

FROM player\_in\_out

WHERE in\_out='I'

AND play\_schedule='ST';

--

SELECT COUNT(\*) as "Player Replaced"

FROM player\_in\_out

WHERE in\_out='I'

AND play\_schedule='NT'

AND play\_half=1;

--

SELECT COUNT(DISTINCT match\_number)

FROM match\_details

WHERE win\_lose='D'

AND goal\_score=0;

--

SELECT COUNT(\*)

FROM player\_in\_out

WHERE play\_schedule='ET'

AND in\_out='I';

--

SELECT play\_half,play\_schedule,COUNT(\*)

FROM player\_in\_out

WHERE in\_out='I'

GROUP BY play\_half,play\_schedule

ORDER BY play\_half,play\_schedule,count(\*) DESC;

--

SELECT COUNT(\*) AS "Number of Penalty Kicks"

FROM penalty\_shootout;

--

SELECT COUNT(\*) AS "Goal Scored by Penalty Kicks"

FROM penalty\_shootout

WHERE score\_goal='Y';

--

SELECT COUNT(\*) AS "Goal missed or saved by Penalty Kicks"

FROM penalty\_shootout

WHERE score\_goal='N';

--

SELECT c.match\_number,a.country\_name AS "Team",

b.player\_name, b.jersey\_number, c.score\_goal ,c.kick\_number

FROM football\_country a, penalty\_shootout c, player\_mast b

WHERE c.fk\_team\_id=a.country\_id

AND c.player\_id=b.player\_id;

--

SELECT a.country\_name, COUNT(b.\*) as "Number of Shots"

FROM football\_country a, penalty\_shootout b

WHERE b.fk\_team\_id=a.country\_id

GROUP BY a.country\_name;

--

SELECT play\_half,play\_schedule,COUNT(\*)

FROM player\_booked

WHERE play\_schedule='NT'

GROUP BY play\_half,play\_schedule;

--

SELECT COUNT(\*)

FROM player\_booked

WHERE play\_schedule='ST';

--

SELECT COUNT(\*)

FROM player\_booked

WHERE play\_schedule='ET';

-- Запити з підзапитами для вибірки даних

--

SELECT match\_number,country\_name

FROM match\_details a, football\_country b

WHERE a.fk\_team\_id=b.country\_id

AND a.match\_number=1;

--

SELECT country\_name as Team

FROM football\_country

WHERE country\_id in (

SELECT fk\_team\_id

FROM match\_details

WHERE play\_stage='F' and win\_lose='W');

--

SELECT match\_number, play\_stage, goal\_score, audence

FROM match\_mast

WHERE audence=(

SELECT max(audence)

FROM match\_mast);

--

SELECT match\_number

FROM match\_details

WHERE fk\_team\_id=(

SELECT country\_id

FROM football\_country

WHERE country\_name='Germany')

OR fk\_team\_id=(

SELECT country\_id

FROM football\_country

WHERE country\_name='Poland')

GROUP BY match\_number

HAVING COUNT(DISTINCT fk\_team\_id)=2;

--

SELECT match\_number, play\_stage, play\_date, results, goal\_score

FROM match\_mast

WHERE match\_number

IN(

SELECT match\_number

FROM match\_details

WHERE fk\_team\_id=(

SELECT country\_id

FROM football\_country

WHERE country\_name='Portugal') OR fk\_team\_id=(

SELECT country\_id

FROM football\_country

WHERE country\_name='Hungary')

GROUP BY match\_number

HAVING COUNT(DISTINCT fk\_team\_id)=2);

--

SELECT match\_number,country\_name, player\_name, COUNT(match\_number)

FROM goal\_details a, football\_country b, player\_mast c

WHERE a.fk\_team\_id=b.country\_id

AND a.player\_id=c.player\_id

GROUP BY match\_number,country\_name,player\_name

ORDER BY match\_number;

--

SELECT country\_name

FROM football\_country

WHERE country\_id IN(

SELECT fk\_team\_id

FROM goal\_details

WHERE match\_number=(

SELECT match\_number

FROM match\_mast

WHERE audence=(

SELECT max(audence)

FROM match\_mast)

ORDER BY audence DESC));

--

SELECT player\_name

FROM player\_mast

WHERE player\_id=(

SELECT player\_id

FROM goal\_details

where match\_number=(SELECT match\_number FROM match\_details

WHERE fk\_team\_id=(

SELECT country\_id FROM football\_country

WHERE country\_name='Hungary')

or fk\_team\_id=(SELECT country\_id FROM football\_country

WHERE country\_name='Portugal')

GROUP BY match\_number HAVING COUNT(DISTINCT fk\_team\_id)=2)

AND fk\_team\_id=(SELECT fk\_team\_id

FROM football\_country a, football\_team b

WHERE a.country\_id=b.fk\_team\_id AND country\_name='Portugal')

AND goal\_time=(

SELECT max(goal\_time)

FROM goal\_details

WHERE match\_number=(SELECT match\_number FROM match\_details

WHERE fk\_team\_id=(

SELECT country\_id FROM football\_country

WHERE country\_name='Hungary')

or fk\_team\_id=(SELECT country\_id FROM football\_country

WHERE country\_name='Portugal')

GROUP BY match\_number HAVING COUNT(DISTINCT fk\_team\_id)=2) AND fk\_team\_id=(

SELECT fk\_team\_id

FROM football\_country a, football\_team b

WHERE a.country\_id=b.fk\_team\_id AND country\_name='Portugal'))

);

--

SELECT MAX(stop2\_second)

FROM match\_mast

WHERE stop2\_second<>(

SELECT MAX(stop2\_second)

FROM match\_mast);

--

SELECT country\_name

FROM football\_country

WHERE country\_id IN(

SELECT fk\_team\_id

FROM match\_details

WHERE match\_number IN(

SELECT match\_number

FROM match\_mast

WHERE stop2\_second=(

SELECT max(stop2\_second)

FROM match\_mast

WHERE stop2\_second<>(

SELECT max(stop2\_second)

FROM match\_mast))));

--

SELECT match\_number,play\_date,stop2\_second

FROM match\_mast a

WHERE (2-1) = (

SELECT COUNT(DISTINCT(b.stop2\_second))

FROM match\_mast b

WHERE b.stop2\_second > a.stop2\_second);

--

SELECT country\_name

FROM football\_country

WHERE country\_id=(

SELECT fk\_team\_id

FROM match\_details

WHERE play\_stage='F'

AND fk\_team\_id<>(

SELECT country\_id

FROM football\_country

WHERE country\_name='Portugal'));

--

SELECT playing\_club, COUNT(playing\_club)

FROM player\_mast GROUP BY playing\_club

HAVING COUNT (playing\_club)=(

SELECT MAX(mycount)

FROM (

SELECT playing\_club, COUNT(playing\_club) mycount

FROM player\_mast

GROUP BY playing\_club) pm);

--

SELECT player\_name,jersey\_number

FROM player\_mast

WHERE player\_id=(

SELECT player\_id

FROM goal\_details

WHERE goal\_type='P' AND match\_number=(

SELECT MIN(match\_number)

FROM goal\_details

WHERE goal\_type='P' AND play\_stage='G'));

--

SELECT a.player\_name,a.jersey\_number,d.country\_name

FROM player\_mast a, goal\_details b, goal\_details c, football\_country d

WHERE a.player\_id=b.player\_id AND a.fk\_team\_id=d.country\_id AND

a.player\_id=(

SELECT b.player\_id

FROM goal\_details b

WHERE b.goal\_type='P' AND b.match\_number=(

SELECT MIN(c.match\_number)

FROM goal\_details c

WHERE c.goal\_type='P' AND c.play\_stage='G'))

GROUP BY player\_name,jersey\_number,country\_name;

--

SELECT player\_name

FROM player\_mast

WHERE player\_id=(

SELECT fk\_player\_goal\_keeper

FROM penalty\_goal\_keeper

WHERE match\_number=(

SELECT match\_number

FROM penalty\_goal\_keeper

WHERE fk\_team\_id=(

SELECT country\_id

FROM football\_country

WHERE country\_name='Italy')

OR fk\_team\_id=(

SELECT country\_id

FROM football\_country

WHERE country\_name='Germany')

GROUP BY match\_number

HAVING COUNT(DISTINCT fk\_team\_id)=2

)

AND fk\_team\_id=(

SELECT country\_id

FROM football\_country

WHERE country\_name='Italy')

);

--

SELECT COUNT(player\_id)

FROM goal\_details

WHERE fk\_team\_id=

(

SELECT country\_id

FROM football\_country

WHERE country\_name='Germany'

);

--

SELECT player\_name, jersey\_number, playing\_club

FROM player\_mast

WHERE fk\_position\_to\_play='GK' AND fk\_team\_id=(

SELECT country\_id

FROM football\_country

WHERE country\_name='England');

--

SELECT player\_name, jersey\_number, fk\_position\_to\_play, age

FROM player\_mast

WHERE playing\_club='Liverpool'

AND fk\_team\_id=(

SELECT country\_id

FROM football\_country

WHERE country\_name='England'

);

--

SELECT a.player\_name, b.goal\_time, b.goal\_half, c.country\_name

FROM player\_mast a, goal\_details b,football\_country c

WHERE a.player\_id=b.player\_id

AND b.fk\_team\_id=c.country\_id

AND match\_number=50

AND goal\_time= (

SELECT MAX(goal\_time)

FROM goal\_details

WHERE match\_number=50);

--

SELECT player\_name

FROM player\_mast

WHERE player\_id IN (

SELECT fk\_player\_captain

FROM match\_captain

WHERE fk\_team\_id=(

SELECT fk\_team\_id

FROM match\_details

WHERE play\_stage='F' AND win\_lose='W'));

--

SELECT COUNT(\*)+11 as "Number of players shared fields"

FROM player\_in\_out

WHERE match\_number=(

SELECT match\_number

FROM match\_mast

WHERE play\_stage='F')

AND in\_out='I'

AND fk\_team\_id=(

SELECT country\_id

FROM football\_country

WHERE country\_name='France');

--

SELECT player\_name,jersey\_number

FROM player\_mast

WHERE player\_id IN(

SELECT fk\_player\_goal\_keeper

FROM match\_details

WHERE play\_stage='G' and fk\_team\_id IN(

SELECT country\_id

FROM football\_country

WHERE country\_name='Germany'));

--

SELECT country\_name

FROM football\_country

WHERE country\_id=(

SELECT fk\_team\_id

FROM match\_details

WHERE play\_stage='F' AND win\_lose='L'

AND fk\_team\_id<>(

SELECT country\_id

FROM football\_country

WHERE country\_name='Portugal'));

--

SELECT a.country\_name, COUNT(b.\*) shots

FROM football\_country a, penalty\_shootout b

WHERE b.fk\_team\_id=a.country\_id

GROUP BY a.country\_name

having COUNT(b.\*)=(

SELECT MAX(shots) FROM (

SELECT COUNT(\*) shots

FROM penalty\_shootout

GROUP BY fk\_team\_id) inner\_result);

--

SELECT c.country\_name,a.player\_name, a.jersey\_number,COUNT(b.\*) shots

FROM player\_mast a, penalty\_shootout b, football\_country c

WHERE b.player\_id=a.player\_id

AND b.fk\_team\_id=c.country\_id

GROUP BY c.country\_name,a.player\_name,a.jersey\_number

HAVING COUNT(b.\*)=(

SELECT MAX(shots) FROM (

SELECT COUNT(\*) shots

FROM penalty\_shootout

GROUP BY player\_id) inner\_result);

--

SELECT match\_number,

COUNT(\*) shots

FROM penalty\_shootout

GROUP BY match\_number

HAVING COUNT(\*)=

(SELECT MAX(shots)

FROM

(SELECT COUNT(\*) shots

FROM penalty\_shootout

GROUP BY match\_number) inner\_result);

--

SELECT b.match\_number,

a.country\_name

FROM penalty\_shootout b,

football\_country a

WHERE b.fk\_team\_id=a.country\_id

AND match\_number=

(SELECT match\_number

FROM penalty\_shootout

GROUP BY match\_number

HAVING COUNT(\*)=

(SELECT MAX(shots)

FROM

(SELECT COUNT(\*) shots

FROM penalty\_shootout

GROUP BY match\_number) inner\_result))

GROUP BY b.match\_number,

a.country\_name;

--

SELECT a.match\_number,

b.player\_name,

a.kick\_number

FROM penalty\_shootout a,

player\_mast b

WHERE a.player\_id=b.player\_id

AND kick\_number=7

AND match\_number=

(SELECT match\_number

FROM penalty\_shootout

WHERE fk\_team\_id =

(SELECT country\_id

FROM football\_country

WHERE country\_name='Portugal' )

GROUP BY match\_number)

GROUP BY match\_number,

player\_name,

pk\_kick\_id;

--

SELECT match\_number,

play\_stage

FROM match\_mast

WHERE match\_number=

(SELECT match\_number

FROM penalty\_shootout

WHERE pk\_kick\_id=23);

--

SELECT venue\_name

FROM football\_venue

WHERE venue\_id IN

(SELECT venue\_id

FROM match\_mast

WHERE match\_number IN

(SELECT DISTINCT match\_number

FROM penalty\_shootout));

--

SELECT play\_date

FROM match\_mast

WHERE match\_number IN

(SELECT DISTINCT match\_number

FROM penalty\_shootout);

--

SELECT min(goal\_time) AS "Most quickest goal after 5 minutes"

FROM

(SELECT match\_number,

goal\_time

FROM goal\_details

WHERE goal\_time>5

GROUP BY match\_number,

goal\_time

ORDER BY goal\_time) hh;

-- Запити з JOIN для вибірки даних

--

SELECT venue\_name, city

FROM football\_venue a

JOIN football\_city b ON a.pk\_city\_id=b.pk\_city\_id

JOIN match\_mast d ON d.venue\_id=a.venue\_id

AND d.play\_stage='F';

--

SELECT match\_number,country\_name,goal\_score

FROM match\_details a

JOIN football\_country b

ON a.fk\_team\_id=b.country\_id

WHERE decided\_by='N'

ORDER BY match\_number;

--

SELECT player\_name,count(\*),country\_name

FROM goal\_details a

JOIN player\_mast b ON a.player\_id=b.player\_id

JOIN football\_country c ON a.fk\_team\_id=c.country\_id

WHERE goal\_schedule = 'NT'

GROUP BY player\_name,country\_name

ORDER BY count(\*) DESC;

--

SELECT player\_name,country\_name,count(player\_name)

FROM goal\_details gd

JOIN player\_mast pm ON gd.player\_id =pm.player\_id

JOIN football\_country sc ON pm.fk\_team\_id = sc.country\_id

GROUP BY country\_name,player\_name HAVING COUNT(player\_name) >= ALL

(SELECT COUNT(player\_name)

FROM goal\_details gd

JOIN player\_mast pm ON gd.player\_id =pm.player\_id

JOIN football\_country sc ON pm.fk\_team\_id = sc.country\_id

GROUP BY country\_name,player\_name);

--

SELECT player\_name,jersey\_number,country\_name

FROM goal\_details a

JOIN player\_mast b ON a.player\_id=b.player\_id

JOIN football\_country c ON a.fk\_team\_id=c.country\_id

WHERE play\_stage='F';

--

SELECT country\_name

FROM football\_country a

JOIN football\_city b ON a.country\_id=b.country\_id

JOIN football\_venue c ON b.pk\_city\_id=c.pk\_city\_id

GROUP BY country\_name;

--

SELECT a.player\_name,a.jersey\_number,b.country\_name,c.goal\_time,

c.play\_stage,c.goal\_schedule, c.goal\_half

FROM player\_mast a

JOIN football\_country b

ON a.fk\_team\_id=b.country\_id

JOIN goal\_details c

ON c.player\_id=a.player\_id

WHERE pk\_goal\_id=1;

--

SELECT b.referee\_name, c.country\_name

FROM match\_mast a

NATURAL JOIN referee\_mast b

NATURAL JOIN football\_country c

WHERE match\_number=1;

--

SELECT b.referee\_name, c.country\_name

FROM match\_mast a

NATURAL JOIN referee\_mast b

NATURAL JOIN football\_country c

WHERE play\_stage='F';

--

SELECT assistant\_referee\_name, country\_name

FROM assistant\_referee\_mast a

JOIN football\_country b

ON a.country\_id=b.country\_id

JOIN match\_details c

ON a.pk\_assistant\_referee\_id=c.fk\_assistant\_referee

WHERE match\_number=1;

--

SELECT assistant\_referee\_name, country\_name

FROM assistant\_referee\_mast a

JOIN football\_country b

ON a.country\_id=b.country\_id

JOIN match\_details c

ON a.pk\_assistant\_referee\_id=c.fk\_assistant\_referee

WHERE play\_stage='F';

--

SELECT a.venue\_name, b.city

FROM football\_venue a

JOIN football\_city b ON a.pk\_city\_id=b.pk\_city\_id

JOIN match\_mast c ON a.venue\_id=c.venue\_id

WHERE match\_number=1;

--

SELECT a.venue\_name, b.city, a.aud\_capacity, c.audence

FROM football\_venue a

JOIN football\_city b ON a.pk\_city\_id=b.pk\_city\_id

JOIN match\_mast c ON a.venue\_id=c.venue\_id

WHERE play\_stage='F';

--

SELECT a.venue\_name, b.city, count(c.match\_number)

FROM football\_venue a

JOIN football\_city b ON a.pk\_city\_id=b.pk\_city\_id

JOIN match\_mast c ON a.venue\_id=c.venue\_id

GROUP BY venue\_name,city

ORDER BY venue\_name;

--

SELECT match\_number, country\_name, player\_name,

booking\_time as "sent\_off\_time", play\_schedule, jersey\_number

FROM player\_booked a

JOIN player\_mast b

ON a.player\_id=b.player\_id

JOIN football\_country c

ON a.fk\_team\_id=c.country\_id

AND a.sent\_off='Y'

AND match\_number=(

SELECT MIN(match\_number)

from player\_booked)

ORDER BY match\_number,play\_schedule,play\_half,booking\_time;

--

SELECT country\_name as "Team" ,team\_group, goal\_for

FROM football\_team

JOIN football\_country

ON football\_team.fk\_team\_id=football\_country.country\_id

AND goal\_for=1;

--

SELECT country\_name, COUNT(\*)

FROM football\_country

JOIN player\_booked

ON football\_country.country\_id=player\_booked.fk\_team\_id

GROUP BY country\_name

ORDER BY COUNT(\*) DESC;

--

SELECT venue\_name, count(venue\_name)

FROM goal\_details

JOIN football\_country

ON goal\_details.fk\_team\_id=football\_country.country\_id

JOIN match\_mast ON goal\_details.match\_number=match\_mast.match\_number

JOIN football\_venue ON match\_mast.venue\_id=football\_venue.venue\_id

GROUP BY venue\_name

ORDER BY COUNT(venue\_name) DESC;

--

SELECT match\_details.match\_number, football\_country.country\_name

FROM match\_mast

JOIN match\_details

ON match\_mast.match\_number=match\_details.match\_number

JOIN football\_country

ON match\_details.fk\_team\_id=football\_country.country\_id

WHERE stop1\_second=0;

--

SELECT country\_name,team\_group,match\_played,

won,lost,goal\_for,goal\_against

FROM football\_team

JOIN football\_country

ON football\_team.fk\_team\_id=football\_country.country\_id

WHERE goal\_against=(

SELECT MAX(goal\_against)

FROM football\_team);

--

SELECT match\_details.match\_number, football\_country.country\_name,

match\_mast.stop2\_second as "Stoppage Time(sec.)"

FROM match\_mast

JOIN match\_details

ON match\_mast.match\_number=match\_details.match\_number

JOIN football\_country

ON match\_details.fk\_team\_id=football\_country.country\_id

WHERE stop2\_second IN (

SELECT MAX(stop2\_second)

FROM match\_mast);

--

SELECT match\_number,country\_name

FROM match\_details

JOIN football\_country ON football\_country.country\_id=match\_details.fk\_team\_id

WHERE win\_lose='D' AND goal\_score=0 AND play\_stage='G'

ORDER BY match\_number;

--

SELECT a.match\_number, c.country\_name, a.stop2\_second

FROM match\_mast a

JOIN match\_details b ON a.match\_number=b.match\_number

JOIN football\_country c ON b.fk\_team\_id=c.country\_id

WHERE (2-1) = (

SELECT COUNT(DISTINCT(b.stop2\_second))

FROM match\_mast b

WHERE b.stop2\_second > a.stop2\_second);

--

SELECT b.country\_name,c.player\_name,COUNT(a.fk\_player\_goal\_keeper) count\_gk

FROM match\_details a

JOIN football\_country b ON a.fk\_team\_id=b.country\_id

JOIN player\_mast c ON a.fk\_player\_goal\_keeper=c.player\_id

GROUP BY b.country\_name,c.player\_name

ORDER BY country\_name,player\_name,count\_gk DESC;

--

SELECT venue\_name, count(venue\_name)

FROM goal\_details

JOIN football\_country

ON goal\_details.fk\_team\_id=football\_country.country\_id

JOIN match\_mast ON goal\_details.match\_number=match\_mast.match\_number

JOIN football\_venue ON match\_mast.venue\_id=football\_venue.venue\_id

GROUP BY venue\_name

HAVING COUNT (venue\_name)=(

SELECT MAX(mycount)

FROM (

SELECT venue\_name, COUNT(venue\_name) mycount

FROM goal\_details

JOIN football\_country

ON goal\_details.fk\_team\_id=football\_country.country\_id

JOIN match\_mast ON goal\_details.match\_number=match\_mast.match\_number

JOIN football\_venue ON match\_mast.venue\_id=football\_venue.venue\_id

GROUP BY venue\_name) gd);

--

SELECT a.country\_name,b.player\_name,b.jersey\_number,b.age

FROM football\_country a

JOIN player\_mast b

ON a.country\_id=b.fk\_team\_id

WHERE b.age IN (

SELECT MAX(age)

FROM player\_mast);

--

SELECT match\_number,country\_name

FROM match\_details a

JOIN football\_country b

ON a.fk\_team\_id=b.country\_id

WHERE goal\_score=3 AND win\_lose='D';

--

SELECT a.country\_name as Team , b.team\_group,b.match\_played,

b.goal\_against, b.group\_position

FROM football\_country a

JOIN football\_team b

ON a.country\_id=b.fk\_team\_id

WHERE goal\_against=4 AND group\_position=4

ORDER BY team\_group;

--

SELECT a.player\_name, a.jersey\_number, a.fk\_position\_to\_play, a.age, b.country\_name

FROM player\_mast a

JOIN football\_country b

ON a.fk\_team\_id=b.country\_id

WHERE a.playing\_club='Lyon'

AND a.fk\_team\_id IN (

SELECT b.country\_id

FROM football\_country b

WHERE b.country\_id IN (

SELECT c.fk\_team\_id

FROM match\_details c

WHERE c.play\_stage='F'

));

--

SELECT country\_name

FROM match\_details a

JOIN football\_country b

ON a.fk\_team\_id=b.country\_id

WHERE play\_stage='S';

--

SELECT country\_name, player\_name, jersey\_number, fk\_position\_to\_play

FROM match\_captain a

JOIN football\_country b ON a.fk\_team\_id=b.country\_id

JOIN player\_mast c ON a.fk\_player\_captain=c.player\_id

WHERE match\_number IN(48,49);

--

SELECT match\_number,country\_name, player\_name, jersey\_number, fk\_position\_to\_play

FROM match\_captain a

JOIN football\_country b ON a.fk\_team\_id=b.country\_id

JOIN player\_mast c ON a.fk\_player\_captain=c.player\_id

ORDER BY match\_number;

--

SELECT a.match\_number,c.player\_name as "Captain",

d.player\_name as "Goal Keeper",e.country\_name

FROM match\_captain a

NATURAL JOIN match\_details b

JOIN football\_country e ON b.fk\_team\_id=e.country\_id

JOIN player\_mast c ON a.fk\_player\_captain=c.player\_id

JOIN player\_mast d ON b.fk\_player\_goal\_keeper=d.player\_id;

--

SELECT a.player\_name, b.country\_name

FROM player\_mast a

JOIN match\_mast c ON c.fk\_player\_of\_match=a.player\_id

AND c.play\_stage='F'

JOIN football\_country b

ON a.fk\_team\_id=b.country\_id;

--

SELECT match\_number,country\_name,player\_name,jersey\_number,time\_in\_out

FROM player\_in\_out a

JOIN player\_mast b ON a.player\_id=b.player\_id

JOIN football\_country c ON b.fk\_team\_id=c.country\_id

WHERE a.in\_out='I'

AND a.play\_schedule='NT'

AND a.play\_half=1

ORDER BY match\_number;

--

SELECT match\_number,play\_date,country\_name,

player\_name AS "Player of the Match",jersey\_number

FROM match\_mast a

JOIN player\_mast b ON

a.fk\_player\_of\_match=b.player\_id

JOIN football\_country c ON

b.fk\_team\_id=c.country\_id;

--

SELECT match\_number,

country\_name,

player\_name

FROM penalty\_shootout a

JOIN player\_mast b ON a.player\_id=b.player\_id

JOIN football\_country c ON b.fk\_team\_id=c.country\_id

WHERE pk\_kick\_id=26;

--

SELECT match\_number,

country\_name

FROM penalty\_shootout a

JOIN football\_country c ON a.fk\_team\_id=c.country\_id

WHERE match\_number=

(SELECT match\_number

FROM penalty\_shootout

WHERE pk\_kick\_id=26)

AND country\_name<>

(SELECT country\_name

FROM football\_country

WHERE country\_id=

(SELECT fk\_team\_id

FROM penalty\_shootout

WHERE pk\_kick\_id=26))

GROUP BY match\_number,

country\_name;

--

SELECT match\_number,

country\_name,

player\_name,

jersey\_number

FROM match\_captain a

JOIN football\_country b ON a.fk\_team\_id=b.country\_id

JOIN player\_mast c ON a.fk\_player\_captain=c.player\_id

AND fk\_position\_to\_play='GK'

ORDER BY match\_number;

--

SELECT count(DISTINCT player\_name)

FROM match\_captain a

JOIN football\_country b ON a.fk\_team\_id=b.country\_id

JOIN player\_mast c ON a.fk\_player\_captain=c.player\_id

AND fk\_position\_to\_play='GK';

--

SELECT a.country\_name,c.player\_name,COUNT(b.\*) Booked

FROM football\_country a

JOIN player\_booked b ON a.country\_id=b.fk\_team\_id

JOIN player\_mast c ON b.player\_id=c.player\_id

GROUP BY a.country\_name,c.player\_name

ORDER BY a.country\_name,Booked DESC;

--

SELECT c.player\_name,COUNT(b.\*) Booked

FROM football\_country a

JOIN player\_booked b ON a.country\_id=b.fk\_team\_id

JOIN player\_mast c ON b.player\_id=c.player\_id

GROUP BY c.player\_name

having COUNT(b.\*)=(

SELECT MAX(mm) FROM (

SELECT COUNT(\*) mm

FROM player\_booked

GROUP BY player\_id) inner\_result);

--

SELECT a.country\_name,COUNT(b.\*) Booked

FROM football\_country a

JOIN player\_booked b ON a.country\_id=b.fk\_team\_id

GROUP BY a.country\_name

ORDER BY Booked DESC;

--

SELECT match\_number, Booked FROM (

SELECT match\_number,COUNT(\*) Booked

FROM player\_booked

GROUP BY match\_number) M1 where Booked=(

SELECT MAX(MX1)

FROM (SELECT match\_number,COUNT(\*) MX1

FROM player\_booked

GROUP BY match\_number) M2);

--

SELECT a.match\_number,

b.country\_name,

c.assistant\_referee\_name

FROM match\_details a

JOIN assistant\_referee\_mast c ON a.fk\_assistant\_referee=c.pk\_assistant\_referee\_id

JOIN football\_country b ON c.country\_id=b.country\_id

ORDER BY a.match\_number;

--

SELECT country\_name,

count(DISTINCT match\_number)

FROM match\_details a

JOIN assistant\_referee\_mast c ON a.fk\_assistant\_referee=c.pk\_assistant\_referee\_id

JOIN football\_country b ON c.country\_id=b.country\_id

GROUP BY country\_name

ORDER BY count(\*) DESC;

--

SELECT country\_name,

count(DISTINCT match\_number)

FROM match\_details a

JOIN assistant\_referee\_mast c ON a.fk\_assistant\_referee=c.pk\_assistant\_referee\_id

JOIN football\_country b ON c.country\_id=b.country\_id

GROUP BY country\_name

HAVING count(DISTINCT match\_number)=

(SELECT max(mm)

FROM

(SELECT count(DISTINCT match\_number) mm

FROM match\_details a

JOIN assistant\_referee\_mast c ON a.fk\_assistant\_referee=c.pk\_assistant\_referee\_id

JOIN football\_country b ON c.country\_id=b.country\_id

GROUP BY country\_name) hh);

--

SELECT a.match\_number,

b.country\_name,

c.referee\_name

FROM match\_mast a

JOIN referee\_mast c ON a.referee\_id=c.referee\_id

JOIN football\_country b ON c.country\_id=b.country\_id

ORDER BY a.match\_number;

--

SELECT country\_name,

count(match\_number)

FROM match\_mast a

JOIN referee\_mast c ON a.referee\_id=c.referee\_id

JOIN football\_country b ON c.country\_id=b.country\_id

GROUP BY country\_name

ORDER BY count(match\_number) DESC;

--

SELECT country\_name,

count(match\_number)

FROM match\_mast a

JOIN referee\_mast c ON a.referee\_id=c.referee\_id

JOIN football\_country b ON c.country\_id=b.country\_id

GROUP BY country\_name

HAVING count(match\_number)=

(SELECT max(mm)

FROM

(SELECT count(match\_number) mm

FROM match\_mast a

JOIN referee\_mast c ON a.referee\_id=c.referee\_id

JOIN football\_country b ON c.country\_id=b.country\_id

GROUP BY country\_name) hh);

--

SELECT c.referee\_name,

b.country\_name,

count(a.match\_number)

FROM match\_mast a

JOIN referee\_mast c ON a.referee\_id=c.referee\_id

JOIN football\_country b ON c.country\_id=b.country\_id

GROUP BY c.referee\_name,

b.country\_name;

--

SELECT c.referee\_name,

b.country\_name,

count(a.match\_number)

FROM match\_mast a

JOIN referee\_mast c ON a.referee\_id=c.referee\_id

JOIN football\_country b ON c.country\_id=b.country\_id

GROUP BY c.referee\_name,

b.country\_name

HAVING count(a.match\_number) =

(SELECT max(mm)

FROM

(SELECT count(a.match\_number) mm

FROM match\_mast a

JOIN referee\_mast c ON a.referee\_id=c.referee\_id

JOIN football\_country b ON c.country\_id=b.country\_id

GROUP BY c.referee\_name,

b.country\_name) hh);

--

SELECT c.referee\_name,

b.country\_name,

d.venue\_name,

count(a.match\_number)

FROM match\_mast a

JOIN referee\_mast c ON a.referee\_id=c.referee\_id

JOIN football\_country b ON c.country\_id=b.country\_id

JOIN football\_venue d ON a.venue\_id=d.venue\_id

GROUP BY c.referee\_name,

country\_name,

venue\_name

ORDER BY referee\_name;

--

SELECT c.referee\_name,

count(b.match\_number)

FROM player\_booked a

JOIN match\_mast b ON a.match\_number=b.match\_number

JOIN referee\_mast c ON b.referee\_id=c.referee\_id

GROUP BY referee\_name

ORDER BY count(b.match\_number) DESC;

--

SELECT c.referee\_name,

count(b.match\_number)

FROM player\_booked a

JOIN match\_mast b ON a.match\_number=b.match\_number

JOIN referee\_mast c ON b.referee\_id=c.referee\_id

GROUP BY referee\_name

HAVING count(b.match\_number)=

(SELECT max(mm)

FROM

(SELECT count(b.match\_number) mm

FROM player\_booked a

JOIN match\_mast b ON a.match\_number=b.match\_number

JOIN referee\_mast c ON b.referee\_id=c.referee\_id

GROUP BY referee\_name) hh);

--

SELECT country\_name,

player\_name,

fk\_position\_to\_play,

age,

playing\_club

FROM player\_mast a

JOIN football\_country b ON a.fk\_team\_id=b.country\_id

WHERE jersey\_number=10

ORDER BY country\_name;

--

SELECT player\_name,

jersey\_number,

country\_name,

age,

playing\_club

FROM goal\_details a

JOIN player\_mast b ON a.player\_id=b.player\_id

JOIN football\_country c ON a.fk\_team\_id=c.country\_id

WHERE fk\_position\_to\_play='DF'

ORDER BY player\_name;

--

SELECT player\_name,

jersey\_number,

country\_name,

age,

fk\_position\_to\_play,

playing\_club

FROM goal\_details a

JOIN player\_mast b ON a.player\_id=b.player\_id

JOIN football\_country c ON a.fk\_team\_id=c.country\_id

WHERE goal\_type='O'

ORDER BY player\_name;

--

SELECT match\_number,

play\_stage,

country\_name,

penalty\_score

FROM match\_details a

JOIN football\_country b ON a.fk\_team\_id=b.country\_id

WHERE decided\_by='P'

ORDER BY match\_number;

--

SELECT country\_name,

fk\_position\_to\_play,

count(\*) AS "Number of goals"

FROM goal\_details a

JOIN player\_mast b ON a.player\_id=b.player\_id

JOIN football\_country c ON a.fk\_team\_id=c.country\_id

GROUP BY country\_name,

fk\_position\_to\_play

ORDER BY country\_name;

--

SELECT match\_number,

country\_name,

player\_name,

jersey\_number,

time\_in\_out

FROM player\_in\_out a

JOIN player\_mast b ON a.player\_id=b.player\_id

JOIN football\_country c ON a.fk\_team\_id=c.country\_id

WHERE time\_in\_out=

(SELECT max(time\_in\_out)

FROM player\_in\_out)

AND in\_out='I';