

CTU 2024

Software Development

SUBJECT NAME: Business Programming Semester 2

SUBJECT CODE: PRG522

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Question 1

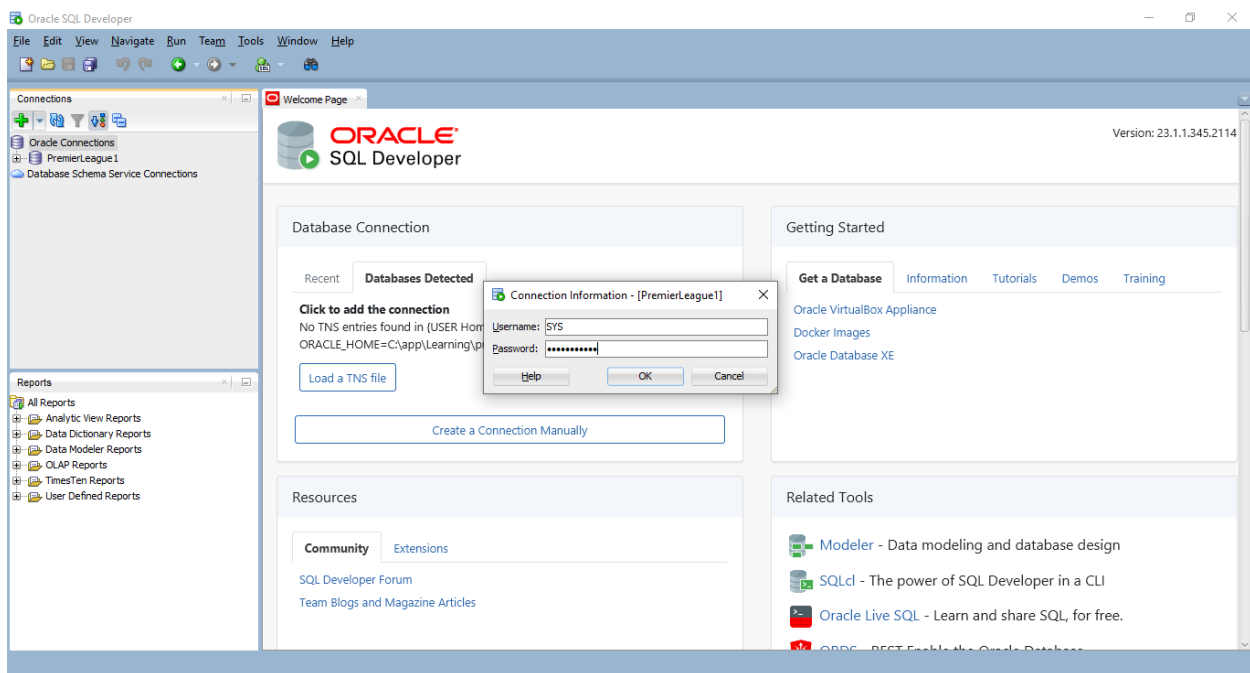
Project Description:

In this project, you will develop an Oracle database for managing a football league. The database will store information about football clubs, players, games, and game results. The ER diagram above provides an overview of the entities and their relationships in the system.

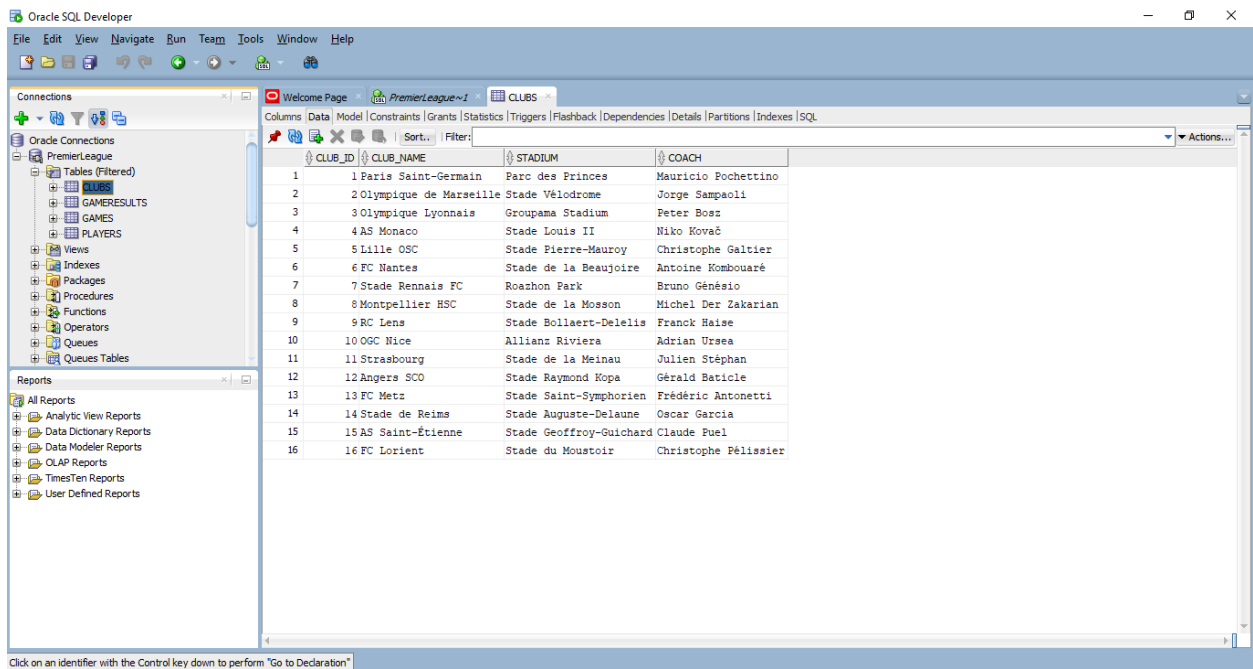
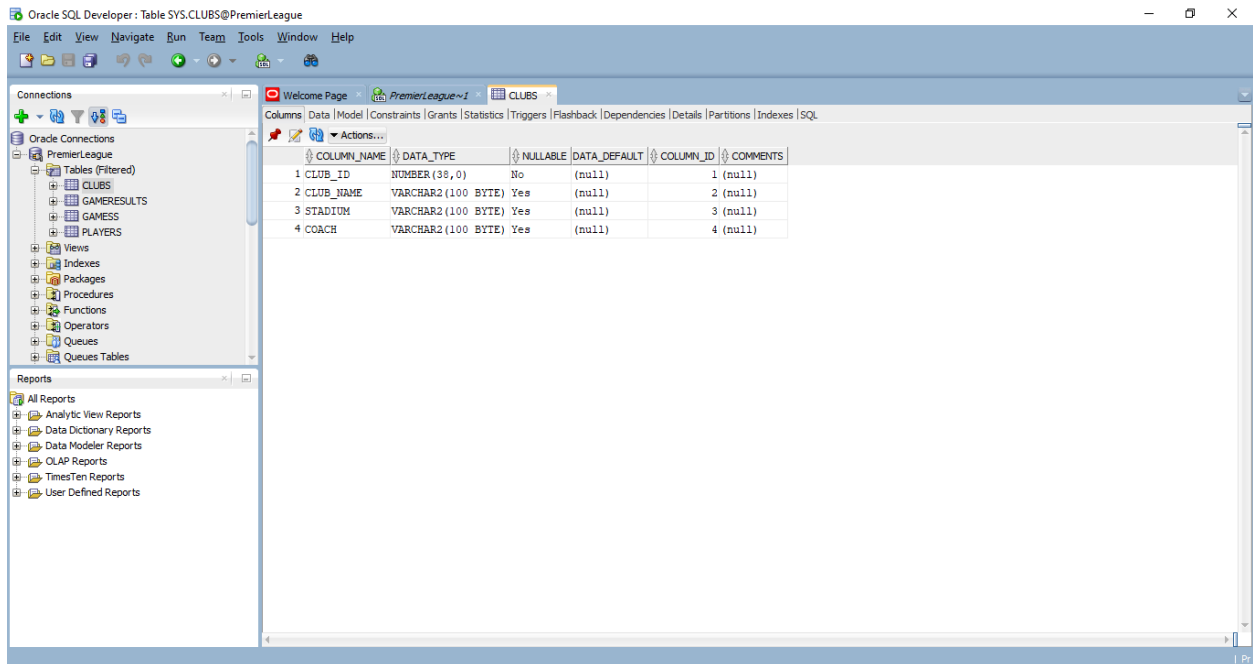
Task 1: Database Design and Normalization

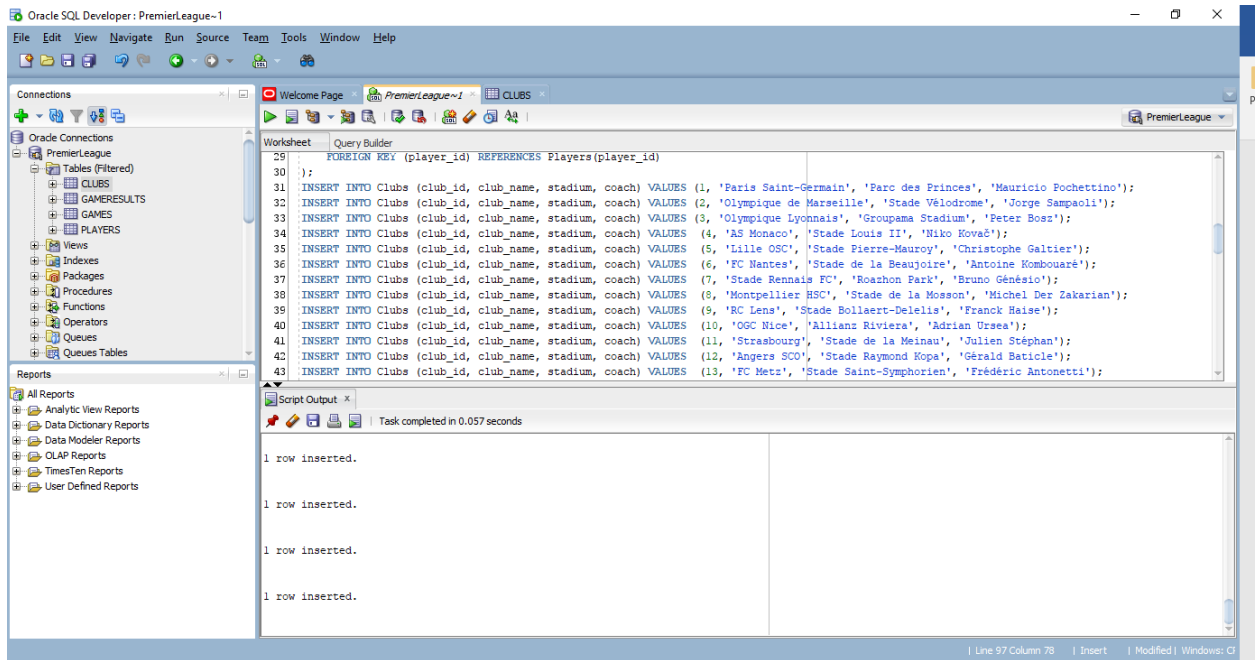
- Transform the conceptual design (ER diagram) into the relational model by converting the entities and relationships into appropriate tables. Check if your tables are normalized using the 1st, 2nd, and 3rd normal forms.

Created a database with a connection

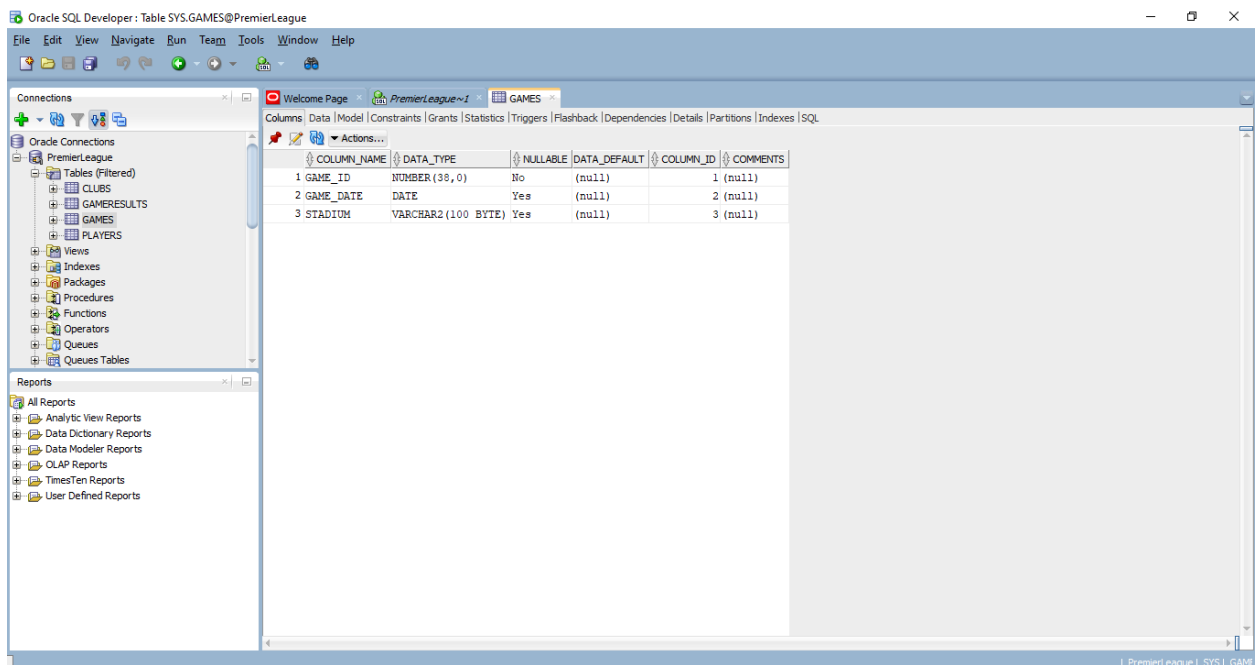


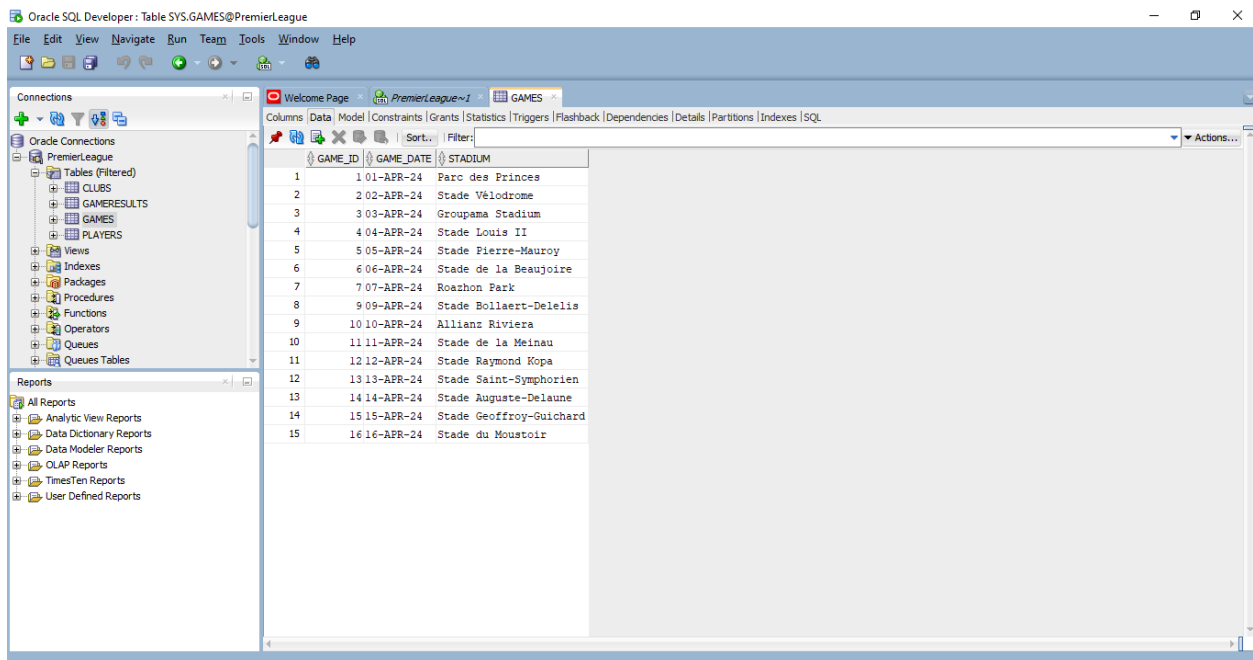
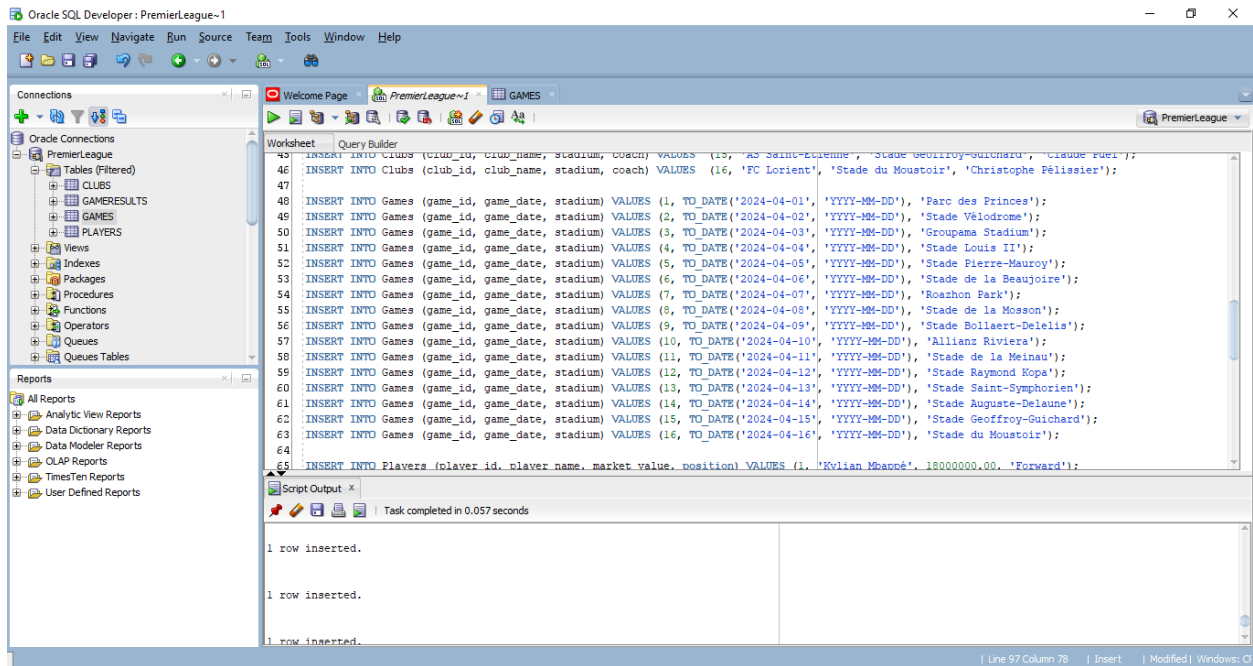
Clubs



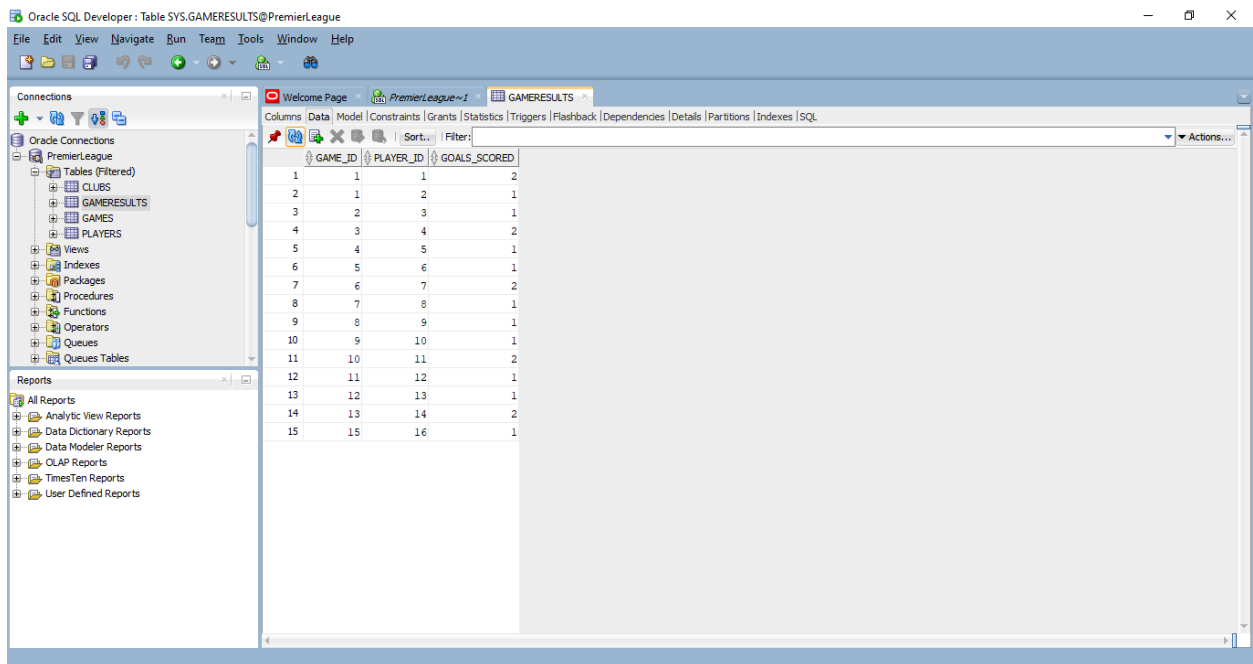
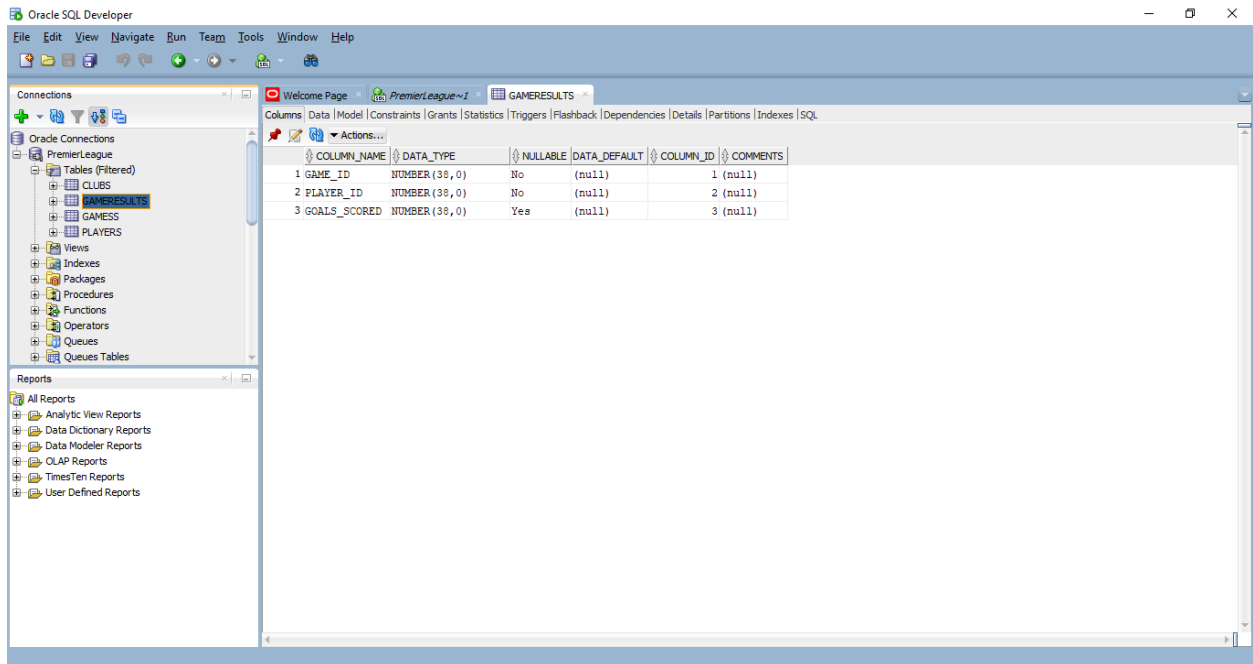


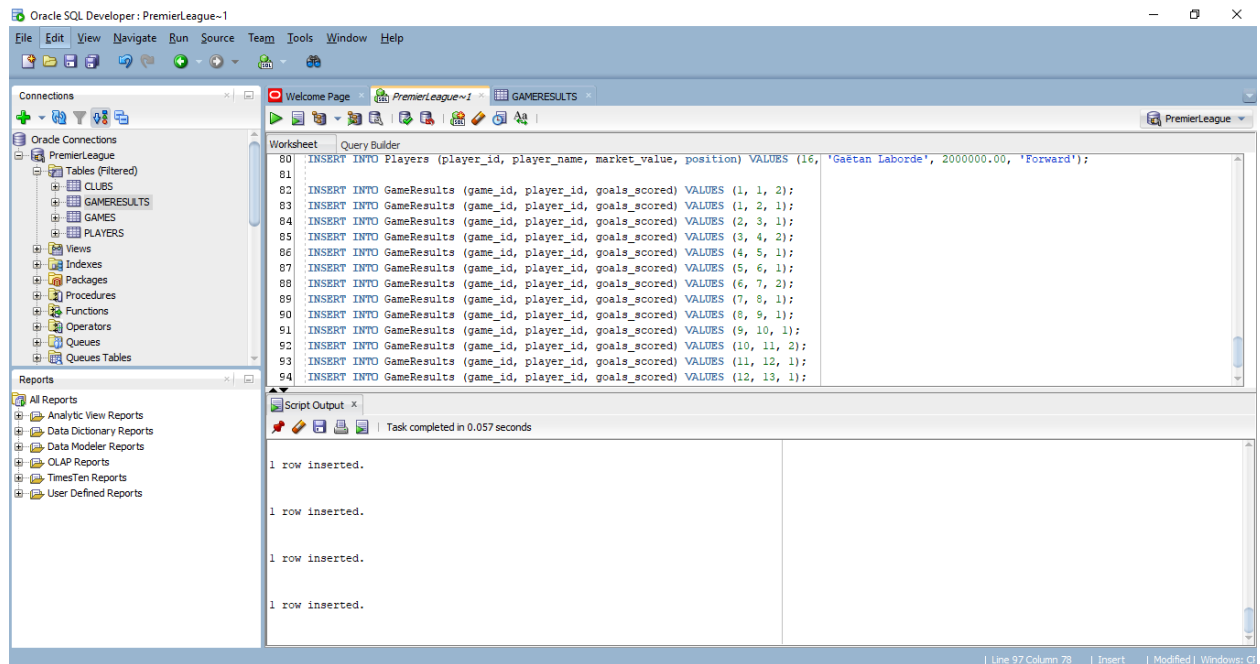
Games



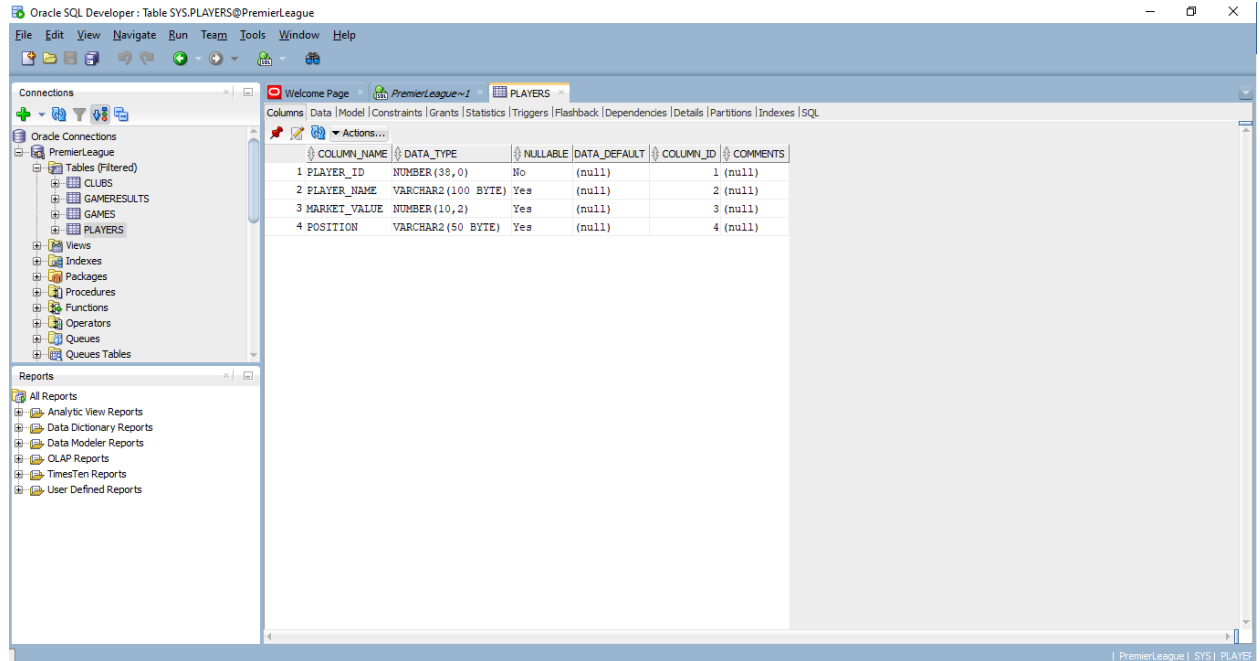


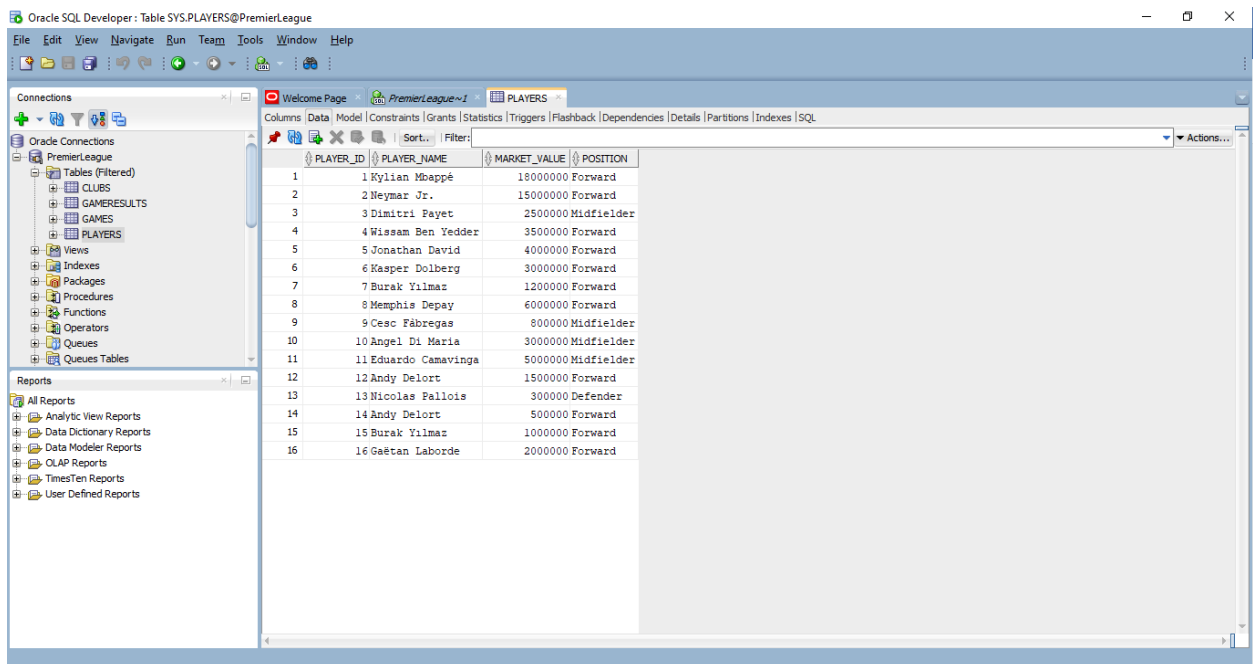
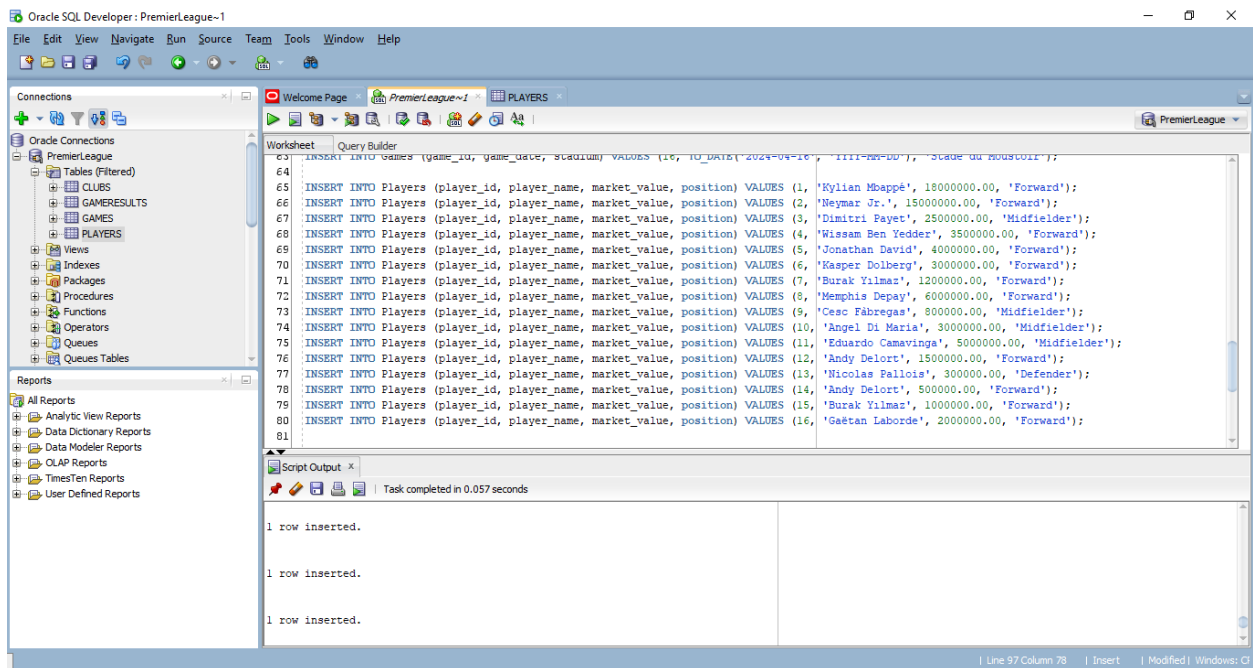
Games Results





Players





Task 2: Database Creation and Data Population

i. In Oracle SQL Developer, create a database called "PremiumLeague."

ii. Implement the tables specified in Task 1 using DDL (Data Definition Language) commands. Choose the appropriate data types, primary and foreign keys for the attributes. Provide detailed assumptions for any of your design decisions.

iii. Generate some data to populate your tables to simulate real-world scenarios.

The screenshot shows the Oracle SQL Developer interface with the 'CLUBS' table selected in the 'Tables (Filtered)' pane. The main window displays the data for the 'CLUBS' table, which includes columns for CLUB_ID, CLUB_NAME, STADIUM, and COACH. The data is presented in a table format with 16 rows.

CLUB_ID	CLUB_NAME	STADIUM	COACH
1	Paris Saint-Germain	Parc des Princes	Mauricio Pochettino
2	Olympique de Marseille	Stade Vélodrome	Jorge Sampaoli
3	Olympique Lyonnais	Groupama Stadium	Peter Bosz
4	AS Monaco	Stade Louis II	Niko Kovač
5	Lille OSC	Stade Pierre-Mauroy	Christophe Galtier
6	FC Nantes	Stade de la Beaujoire	Antoine Kombouaré
7	Stade Rennais FC	Roazhon Park	Bruno Génésio
8	Montpellier HSC	Stade de la Mosson	Michel Der Zakarian
9	RC Lens	Stade Bollaert-Delelis	Franck Haise
10	OGC Nice	Allianz Riviera	Adrian Ursea
11	Strasbourg	Stade de la Meinau	Julien Stéphan
12	Angers SCO	Stade Raymond Kopa	Gérald Baticle
13	FC Metz	Stade Saint-Symphorien	Frédéric Antonetti
14	Stade de Reims	Stade Auguste-Delaune	Oscar Garcia
15	AS Saint-Étienne	Stade Geoffroy-Guichard	Claude Puel
16	FC Lorient	Stade du Moustoir	Christophe Pélissier

The screenshot shows the Oracle SQL Developer interface with the 'GAMES' table selected in the 'Tables (Filtered)' pane. The main window displays the data for the 'GAMES' table, which includes columns for GAME_ID, GAME_DATE, and STADIUM. The data is presented in a table format with 15 rows.

GAME_ID	GAME_DATE	STADIUM
1	01-APR-24	Parc des Princes
2	02-APR-24	Stade Vélodrome
3	03-APR-24	Groupama Stadium
4	04-APR-24	Stade Louis II
5	05-APR-24	Stade Pierre-Mauroy
6	06-APR-24	Stade de la Beaujoire
7	07-APR-24	Roazhon Park
8	09-APR-24	Stade Bollaert-Delelis
9	10-APR-24	Allianz Riviera
10	11-APR-24	Stade de la Meinau
11	12-APR-24	Stade Raymond Kopa
12	13-APR-24	Stade Saint-Symphorien
13	14-APR-24	Stade Auguste-Delaune
14	15-APR-24	Stade Geoffroy-Guichard
15	16-APR-24	Stade du Moustoir

Oracle SQL Developer

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Oracle Connections

PremierLeague

Tables (Filtered)

CLUBS

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All Reports

Analytic View Reports

Data Dictionary Reports

Data Modeler Reports

OLAP Reports

TimesTen Reports

User Defined Reports

Welcome Page PremierLeague~1 GAMERESULTS

Columns Data Model Constraints Grants Statistics Triggers Flashback Dependencies Details Partitions Indexes SQL

Sort... Filter...

	GAME_ID	PLAYER_ID	GOALS_SCORED	
1	1	1	2	
2	1	2	1	
3	2	3	1	
4	3	4	2	
5	4	5	1	
6	5	6	1	
7	6	7	2	
8	7	8	1	
9	8	9	1	
10	9	10	1	
11	10	11	2	
12	11	12	1	
13	12	13	1	
14	13	14	2	
15	15	16	1	

Oracle SQL Developer

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Tables (Filtered)

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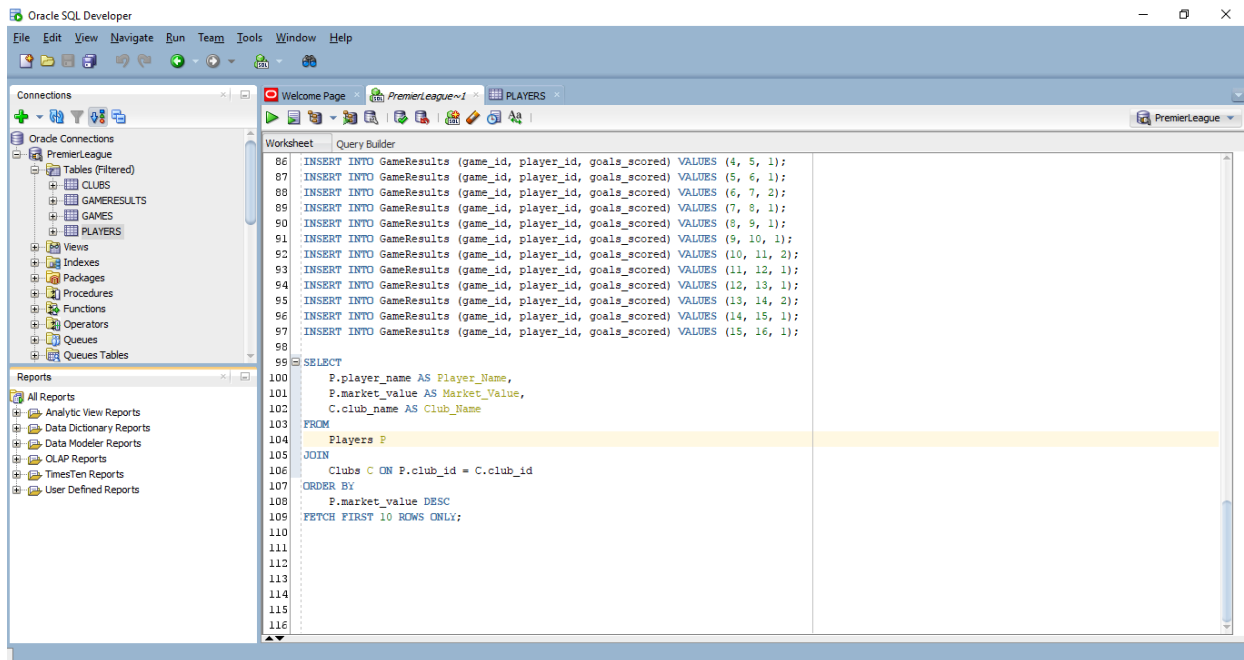
User Defined Reports

Welcome Page PremierLeague~1 PLAYERS

Columns Data Model Constraints Grants Statistics Triggers Flashback Dependencies Details Partitions Indexes SQL

Sort... Filter...

	PLAYER_ID	PLAYER_NAME	MARKET_VALUE	POSITION
1	1	Kyllian Mbappé	18000000	Forward
2	2	Neymar Jr.	15000000	Forward
3	3	Dimitri Payet	25000000	Midfielder
4	4	Wissam Ben Yedder	3500000	Forward
5	5	Jonathan David	4000000	Forward
6	6	Kasper Dolberg	3000000	Forward
7	7	Burak Yilmaz	1200000	Forward
8	8	Memphis Depay	6000000	Forward
9	9	Cesc Fàbregas	8000000	Midfielder
10	10	Angel Di Maria	3000000	Midfielder
11	11	Eduardo Camavinga	5000000	Midfielder
12	12	Andy Delort	1500000	Forward
13	13	Nicolas Fallois	300000	Defender
14	14	Andy Delort	500000	Forward
15	15	Burak Yilmaz	1000000	Forward
16	16	Gaëtan Laborde	2000000	Forward



Task 4: Database Security and Access Control

- I. Discuss the use of database roles and privileges to secure a database system.
- ii. Discuss the available grant options and how they enable the database administrator to control access. Provide examples of granting permissions on the database created in Tasks 1 and 2.
- iii. Discuss the role of views in controlling database access.

Answer:

Use of Database Roles and Privileges to Secure a Database System:

Database roles and privileges are essential components of database security. They help in controlling access to database objects and managing permissions for users. Here's how roles and privileges are used to secure a database system:

Access Control: Roles and privileges are used to enforce access control policies in the database.

Administrators can grant only the necessary privileges to users or roles, limiting their access to sensitive data and functionality. This helps in protecting data integrity, confidentiality, and availability.

Granular Control: Database administrators can grant privileges at a granular level, allowing fine-grained control over access to database objects. For example, they can grant SELECT privilege on specific columns of a table, restricting access to sensitive data while still allowing access to other columns.

Revoking Access: In addition to granting privileges, administrators can also revoke privileges when they are no longer needed or when users change roles within the organization. This helps in maintaining least privilege access and reducing the risk of unauthorized access to data.

Roles: Roles are named groups of privileges that can be assigned to users or other roles. They simplify the process of managing permissions by allowing administrators to grant and revoke permissions at the role level rather than individual user level. For example, roles can be created for different job functions such as administrators, developers, or analysts. Users can then be assigned to appropriate roles based on their roles in the organization.

Privileges: Privileges are specific rights granted to users or roles to perform certain actions on database objects. These actions include SELECT, INSERT, UPDATE, DELETE, and EXECUTE privileges on tables, views, procedures, and other database objects. By granting privileges selectively, administrators can control what actions users can perform on specific objects within the database.