IT214 Database Management Systems Project

OlympiDB : A Comprehensive Database Management System for the Olympic Games

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1   Objective

To design and implement a database management system for the Olympic Games that can efficiently manage and store data related to athletes, events, venues, and results for different Olympic Games.

2   Description of the project

The Olympic Games is a prestigious international event that brings together athletes from different countries to compete in various sports. With the increasing popularity and complexity of the event, managing and storing data related to athletes, events, venues, and results has become a challenging task. A database management system (DBMS) can help address these challenges by providing an efficient and scalable solution for managing data.

The system will be designed to handle different types of data, including athlete profiles, event schedules, venue information, also the sponsored brands details, media outcomes like viewer description, brand value of player etc.
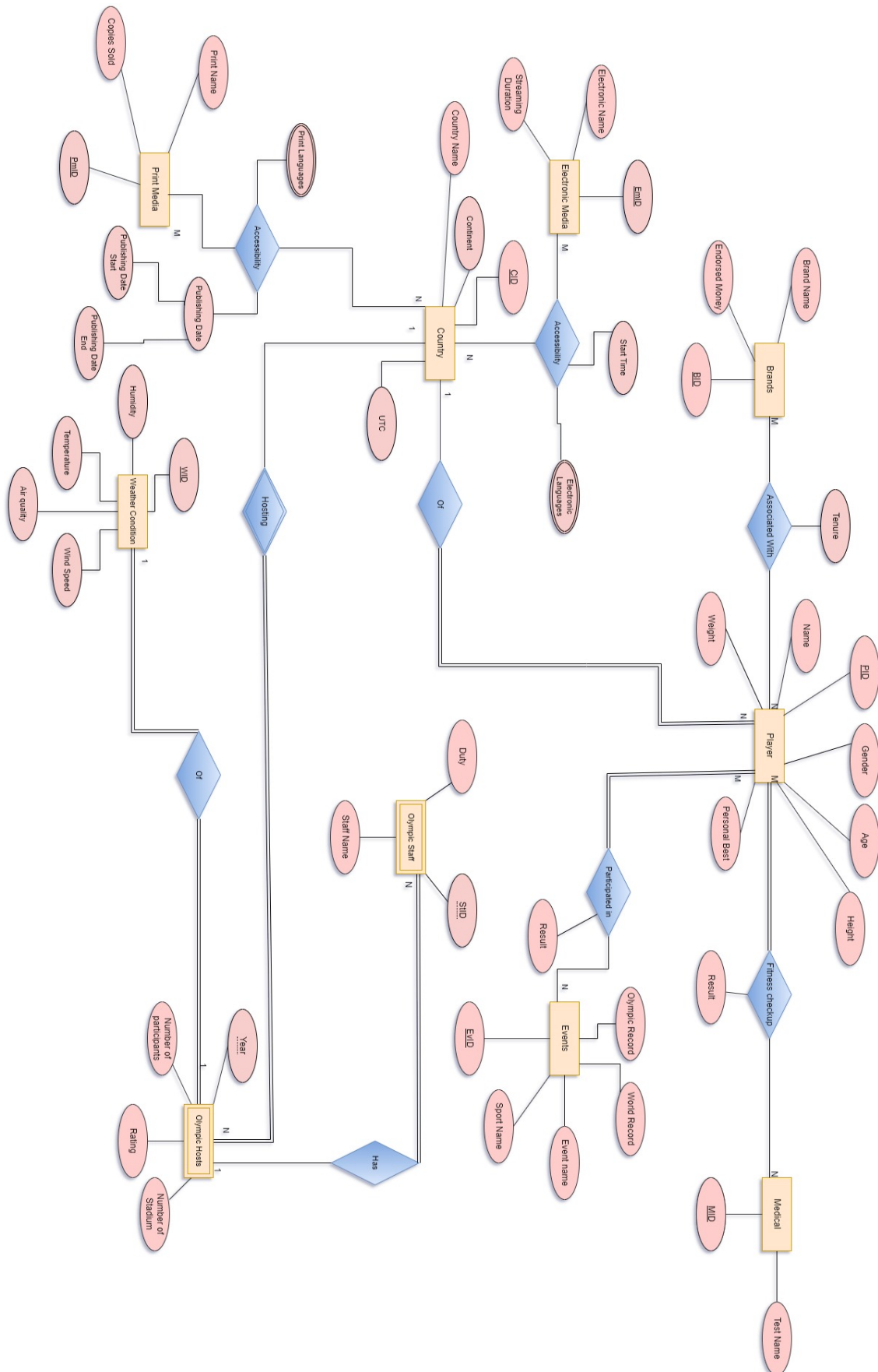
The schema would also consist of medical information of the players and also the medical teams will be required to submit those reports to the association to decide whether a player is fit and eligible to participate or not. We would also include brands associated with each player participating in the Olympics and those brands can also access the data that shows how many players are ambassadors and are promoting their brand. The schema will be designed to ensure that the data is organized in a structured manner and is easy to retrieve and manipulate.

Once the schema is finalized, the system will be implemented using a relational database management system (RDBMS) in PostgreSQL Server. The database will be created and populated with sample data to test the system's functionality.
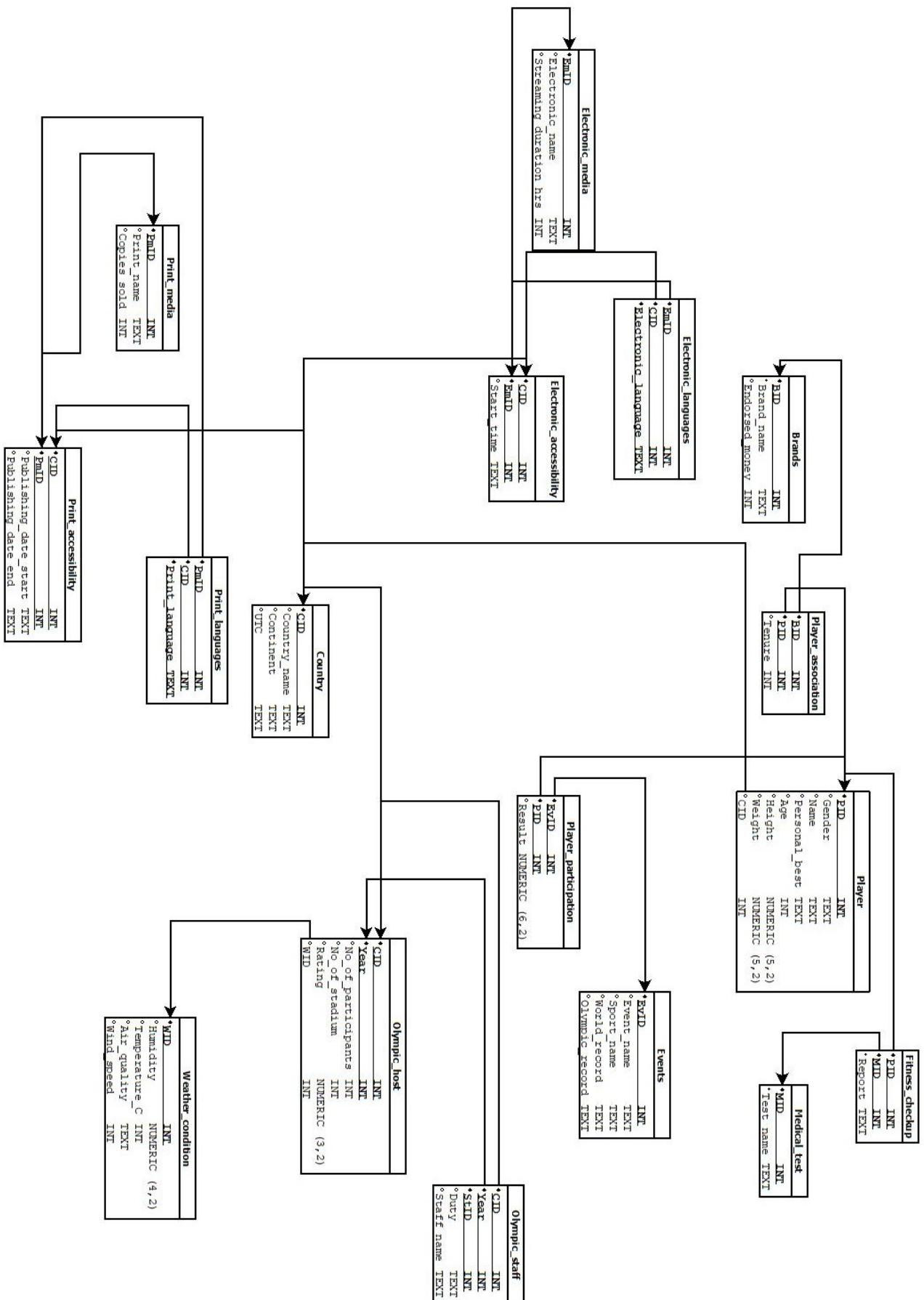
The system will include a user interface that allows users to query the database and retrieve information based on specific criteria. Thus this enables the general public to access the relevant data like the number of players participating from different nations and the medal tally of different sports events.

Overall, this DBMS project based on the Olympics will provide a robust and efficient solution for managing data related to athletes, events, venues, and results for different Olympic Games. It will also provide valuable insights into how database management systems can be used to solve real-world problems.

3 ER Diagram

4 Relational Schema

Electronic_media
- • EmID — INT
- • Electronic_name — TEXT
- ° Streaming_duration_hrs — INT

Print_media
- • PmID — INT
- ° Print_name — TEXT
- ° Copies_sold — INT

Electronic_languages
- • EmID — INT
- • CID — INT
- ° Electronic_language — TEXT

Brands
- • BID — INT
- ° Brand_name — TEXT
- ° Endorsed_money — INT

Electronic_accessibility
- • CID — INT
- • EmID — INT
- ° Start_time — TEXT

Print_accessibility
- • CID — INT
- • PmID — INT
- ° Publishing_date_start — TEXT
- ° Publishing_date_end — TEXT

Print_languages
- • PmID — INT
- • CID — INT
- ° Print_language — TEXT

Country
- • CID — INT
- ° Country_name — TEXT
- ° Continent — TEXT
- ° UTC — TEXT

Player_association
- • BID — INT
- • PID — INT
- ° Tenure — INT

Player_participation
- • EvID — INT
- • PID — INT
- ° Result — NUMERIC (6,2)

Player
- • PID — INT
- ° Gender — TEXT
- ° Name — TEXT
- ° Age — INT
- • Personal_best — TEXT
- ° Height — NUMERIC (5,2)
- • Weight — NUMERIC (5,2)
- ° CID — INT

Events
- • EvID — INT
- ° Event_name — TEXT
- ° Sport_name — TEXT
- ° World_record — TEXT
- ° Olympic_record — TEXT

Medical_test
- • MID — INT
- ° Test_name — TEXT

Fitness_checkup
- • PID — INT
- • MID — INT
- ° Report — TEXT

Weather_condition
- • WID — INT
- ° Humidity — INT
- ° Temperature_C — NUMERIC (4,2)
- ° Air_quality — TEXT
- ° Wind_speed — INT

Olympic_host
- • CID — INT
- • Year — INT
- ° No_of_participants — INT
- ° No_of_stadium — INT
- ° Rating — NUMERIC (3,2)
- ° WID — INT

Olympic_staff
- • CID — INT
- • Year — INT
- • StID — INT
- ° Duty — TEXT
- ° Staff_name — TEXT

5 Minimal FD Set and Proof that relations are in BCNF

1) **Player**(PID, Gender, Name, Personal_best, Age, Height, Weight, CID)

- PID $\rightarrow$ {Gender, Name, Personal_best, Age, Height, Weight, CID}
- $PID^+ \rightarrow$ {PID, Gender, Name, Personal_best, Age, Height, Weight, CID}
- PID^+ has all the attributes. So, PID is the key of the relation.
- All FDs have key, i.e., PID on the left side. So, this relation is in BCNF.

2) **Country**(CID, Country_name, Continent, UTC)

- CID $\rightarrow$ {Country_name, Continent, UTC}
- $CID^+ \rightarrow$ {CID, Country_name, Continent, UTC}
- CID^+ has all the attributes. So, CID is the key of the relation.
- All FDs have key, i.e., CID on the left side. So, this relation is in BCNF.

3) **Medical_test**(MID, Test_name)

- MID $\rightarrow$ {Test_name}
- $MID^+ \rightarrow$ {MID, Test_name}
- MID^+ has all the attributes. So, MID is the key of the relation.
- All FDs have key, i.e., MID on the left side. So, this relation is in BCNF.

4) **Fitness_checkup**(PID, MID, Result)

- {PID, MID} $\rightarrow$ {Result}
- $\{PID, MID\}^+ \rightarrow$ {PID, MID, Result}
- $\{PID, MID\}^+$ has all the attributes. So, {PID, MID} is the key.
- All FDs have key, i.e., {PID, MID} on the left side. So, this relation is in BCNF.

5) **Electronic_media**(EmID, Electronic_name, Streaming_duration)

- EmID $\rightarrow$ {Electronic_name, Streaming_duration}
- $EmID^+ \rightarrow$ {EmID, Electronic_name, Streaming_duration}
- $EmID^+$ has all the attributes. So, EmID is the key of the relation.
- All FDs have key, i.e., EmID on the left side. So, this relation is in BCNF.

6) **Electronic_languages**(EmID, CID, Electronic_language)

- {EmID, CID, Electronic_language} $\rightarrow \phi$
- $\{EmID, CID, Electronic\_language\}^+ \rightarrow$ {EmID, CID, Electronic_language}
- $\{EmID, CID, Electronic\_language\}^+$ has all the attributes. So, {EmID, CID, Electronic_language} is the key of the relation.
- All FDs have key, i.e., {EmID, CID, Electronic_language} on the left side. So, this relation is in BCNF.

7) **Electronic_accessibility**(EmID, CID, Start_time)

- {EmID, CID} → {Start_time}
- {EmID, CID}$^+$→ {EmID, CID, Start_time}
- {EmID, CID}$^+$ has all the attributes. So, {EmID, CID} is the key of the relation.
- All FDs have key, i.e., {EmID, CID} on the left side. So, this relation is in BCNF.

8) **Events**(EvID, Event_name, Sport_name, World_record, Olympic_record)

- EvID → {Event_name, Sport_name, World_record, Olympic_record}
- EvID$^+$→ {EvID, Event_name, Sport_name, World_record, Olympic_record}
- EvID$^+$ has all the attributes. So, EvID is the key of the relation.
- All FDs have key, i.e., EvID on the left side. So, this relation is in BCNF.

9) **Brands**(BID, Brand_name, Endorsed_money)

- BID → {Brand_name, Endorsed_money}
- BID$^+$→ {BID, Brand_name, Endorsed_money}
- BID$^+$ has all the attributes. So, BID is the key of the relation.
- All FDs have key, i.e., BID on the left side. So, this relation is in BCNF.

10) **Weather_conditions**(WID, Temperature, Air_quality, Humidity, Wind_speed)

- {WID} → {Temperature, Air_quality, Humidity, Wind_speed}
- {WID}$^+$→ {WID, Temperature, Air_quality, Humidity, Wind_speed}
- {WID}$^+$ has all the attributes. So, WID is the key of the relation.
- All FDs have key, i.e., WID on the left side. So, this relation is in BCNF.

11) **Print_media**(PmID, Print_name, Copies_sold)

- PmID → {Print_name, Copies_sold}
- PmID$^+$→ {PmID, Print_name, Copies_sold}
- PmID$^+$ has all the attributes. So, PmID is the key of the relation.
- All FDs have key, i.e., PmID on the left side. So, this relation is in BCNF.

12) **Print_languages**(PmID, CID, Print_language)

- {PmID, CID, Print_language} → ϕ
- {PmID, CID, Print_language}$^+$ → {PmID, CID, Print_language}
- {PmID, CID, Print_language}$^+$ has all the attributes. So, {PmID, CID, Print_language} is the key of the relation.
- All FDs have key, i.e., {PmID, CID, Print_language} on the left side. So, this relation is in BCNF.

13) **Print_accessibility**(PmID, CID, Publishing_date_start, Publishing_date_end)

- {PmID, CID} → {Publishing_date_start, Publishing_date_end}
- {PmID, CID}$^+$→ {PmID, CID, Publishing_date_start, Publishing_date_end}
- {PmID, CID}$^+$ has all the attributes. So, {PmID, CID} is the key of the relation.
- All FDs have key, i.e., {PmID, CID} on the left side. So, this relation is in BCNF.

14) **Player_association**(PID, BID, Tenure)

- {PID, BID} → {Tenure}
- {PID, BID}$^+$→ {PID, BID, Tenure}
- {PID, BID}$^+$ has all the attributes. So, {PID, BID} is the key of the relation.
- All FDs have key, i.e., {PID, BID} on the left side. So, this relation is in BCNF.

15) **Player_participation**(PID, EvID, Result)

- {PID, EvID} → {Result}
- {PID, EvID}$^+$→ {PID, EvID, Result}
- {PID, EvID}$^+$ has all the attributes. So, {PID, EvID} is the key of the relation.
- All FDs have key, i.e., {PID, EvID} on the left side. So, this relation is in BCNF.

16) **Olympic_host**(CID, Year, No_of_participants,No_of_stadium, Rating, WID)

- {CID, Year} → {No_of_participants,No_of_stadium, Rating, WID}
- {CID, Year}$^+$→ {CID, Year, No_of_participants,No_of_stadium, Rating, WID}
- {CID, Year}$^+$ has all the attributes. So, {CID, Year} is the key of the relation.
- All FDs have key, i.e., {CID, Year} on the left side. So, this relation is in BCNF.

17) **Olympic_staff**(StID, CID, Staff_name, Duty)

- StID → {CID, Staff_name, Duty}
- StID$^+$→ {StID, CID, Staff_name, Duty}
- StID$^+$ has all the attributes. So, StID is the key of the relation.
- All FDs have key, i.e., StID on the left side. So, this relation is in BCNF.