**Olympic Games Database Management Project**

**Problem Statement**

In this project, I have designed a database management system to store information about the Olympic games.

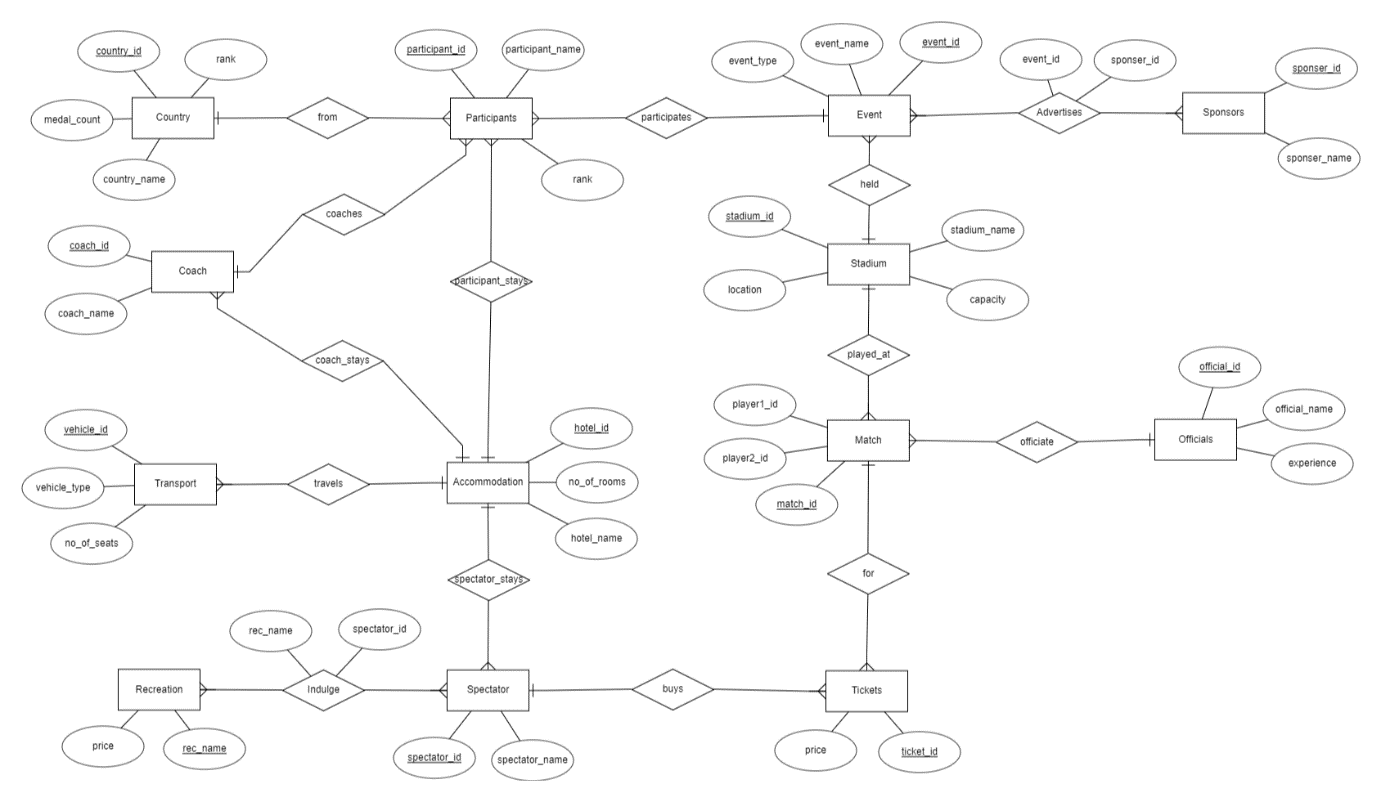
The database will contain details of the Olympic teams of each country, participating athletes and their support staff, sporting venues and spectating audiences' details. It also provides categorization of tickets and events, details of accommodation and transport for participants, ranking based on sport/country, match fixtures, sponsors, and other recreational facilities for both participants and audience.

This database was created with the objective of assisting the International Olympic Committee in successfully organizing the Olympic games. It aims to provide an efficient and secure environment for the organizing committee to store, access, manage and analyze the essential information for the smooth conduct of the Olympics.

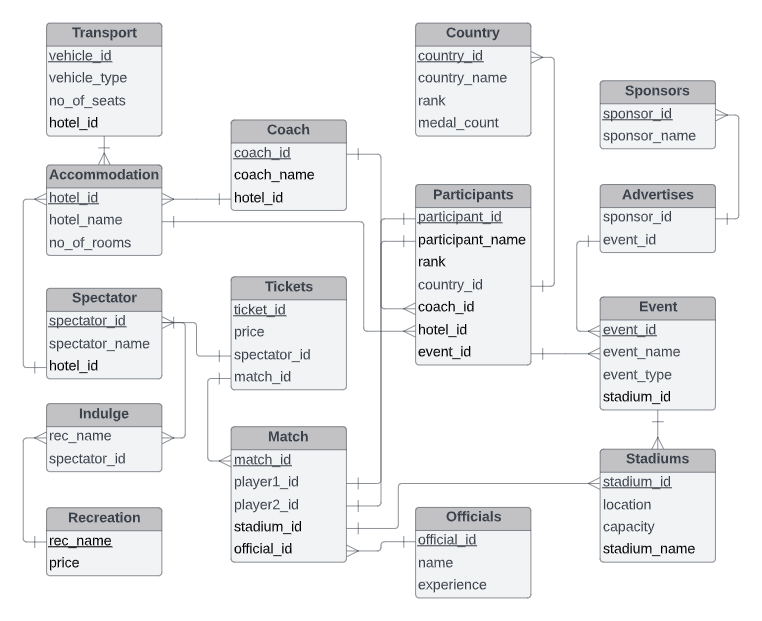
**ER Model Assumptions**

1. Only two players can play in a match.
2. Each player can only have one coach.
3. Each vehicle can only operate for one accommodation.
4. Each match can only have one official.
5. Each event can only take place in one stadium.

**ER Diagram**



**Relational Schema:**

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**Tables**

**Transport**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Constraints** |
| vehicle\_id | NUMBER | PRIMARY KEY |
| vehicle\_type | VARCHAR(30) |  |
| no\_of\_seats | NUMBER |  |
| hotel\_id | NUMBER | FOREIGN KEY |

**Country**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Constraints** |
| country\_id | NUMBER | PRIMARY KEY |
| country\_name | VARCHAR(30) |  |
| rank | NUMBER |  |
| medal\_count | NUMBER |  |

**Sponsors**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Constraints** |
| sponsor\_id | NUMBER | PRIMARY KEY |
| sponsor\_name | VARCHAR(30) |  |

**Coach**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Constraints** |
| coach\_id | NUMBER | PRIMARY KEY |
| coach\_name | VARCHAR(30) |  |
| hotel\_id | NUMBER | FOREIGN KEY |

**Accommodation**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Constraints** |
| hotel\_id | NUMBER | PRIMARY KEY |
| hotel\_name | VARCHAR(30) |  |
| no\_of\_rooms | NUMBER |  |

**Participants**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Constraints** |
| participant\_id | NUMBER | PRIMARY KEY |
| participant\_name | VARCHAR(30) |  |
| rank | NUMBER |  |
| country\_id | NUMBER | FOREIGN KEY |
| coach\_id | NUMBER | FOREIGN KEY |
| hotel\_id | NUMBER | FOREIGN KEY |
| event\_id | NUMBER | FOREIGN KEY |

**Advertises**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Constraints** |
| sponsor\_id | NUMBER | FOREIGN KEY |
| event\_id | NUMBER | FOREIGN KEY |

**Spectator**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Constraints** |
| spectator\_id | NUMBER | PRIMARY KEY |
| spectator\_name | VARCHAR(30) |  |
| hotel\_id | NUMBER | FOREIGN KEY |

**Tickets**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Constraints** |
| ticket\_id | NUMBER | PRIMARY KEY |
| price | FLOAT |  |
| spectator\_id | NUMBER | FOREIGN KEY |
| match\_id | NUMBER | FOREIGN KEY |

**Event**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Constraints** |
| event\_id | NUMBER | PRIMARY KEY |
| event\_name | VARCHAR(30) |  |
| event\_type | VARCHAR(30) |  |
| stadium\_id | NUMBER | FOREIGN KEY |

**Indulge**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Constraints** |
| rec\_name | VARCHAR(30) | FOREIGN KEY |
| spectator\_id | NUMBER | FOREIGN KEY |

**Recreation**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Constraints** |
| rec\_name | VARCHAR(30) | PRIMARY KEY, |
| price | FLOAT |  |

**Match**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Constraints** |
| match\_id | NUMBER | PRIMARY KEY |
| player1\_id | NUMBER | FOREIGN KEY |
| player2\_id | NUMBER | FOREIGN KEY |
| stadium\_id | NUMBER | FOREIGN KEY |
| official\_id | NUMBER | FOREIGN KEY |

**Officials**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Constraints** |
| official\_id | NUMBER | PRIMARY KEY |
| name | VARCHAR(30) |  |
| experience | NUMBER |  |

**Stadiums**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Constraints** |
| stadium\_id | NUMBER | PRIMARY KEY |
| location | VARCHAR(30) |  |
| capacity | NUMBER |  |
| stadium\_name | VARCHAR(30) |  |

**Functional Dependency and Primary Key:**

**Sponsors:**

sponsor\_id -> {sponsor\_id, sponsor\_name}

Since all the fields depend on sponsor\_id, (sponsor\_id)+ -> R

Hence, sponsor\_id is Primary Key of Sponsors table

**Accomodation:**

hotel\_id -> {hotel\_id, hotel\_name, no\_of\_rooms}

Since all the fields depend on hotel\_id, (hotel\_id)+ -> R

Hence, hotel\_id is Primary Key of Accomodation table

**Transport:**

vehicle\_id -> {vehicle\_id, vehicle\_type, no\_of\_seats, hotel\_id}

Since all the fields depend on vehicle\_id, (vehicle\_id)+ -> R

Hence, vehicle\_id is Primary Key of Transport table

**Coach:**

coach\_id -> {coach\_id, coach\_name, hotel\_id}

Since all the fields depend on coach\_id, (coach\_id)+ -> R

Hence, coach\_id is Primary Key of Coach table

**Stadiums:**

stadium\_id -> {stadium\_id, location, capacity, stadium\_name}

Since all the fields depend on stadium\_id, (stadium\_id)+ -> R

Hence, stadium\_id is Primary Key of Stadiums table

**Country:**

country\_id -> {country\_id, country\_name, rank, medal\_count}

Since all the fields depend on stadium\_id, (country\_id)+ -> R

Hence, country\_id is Primary Key of Country table

**Officials:**

official\_id -> {official\_id, name, experience}

Since all the fields depend on official\_id, (official\_id)+ -> R

Hence, official\_id is Primary Key of Officials table

**Spectators:**

spectator\_id -> {spectator\_id, spectator\_name, hotel\_id}

Since all the fields depend on spectator\_id, (spectator\_id)+ -> R

Hence, spectator\_id is Primary Key of Spectators table

**Recreation:**

rec\_name -> {rec\_name, price}

Since all the fields depend on rec\_name, (rec\_name)+ -> R

Hence, rec\_name is Primary Key of Recreation table

**Event:**

event\_id -> {event\_id, event\_name, event\_type, stadium\_id}

Since all the fields depend on event\_id, (event\_id)+ -> R

Hence, event\_id is Primary Key of Event table

**Participants:**

participant\_id -> {participant\_id, participant\_name, rank, country\_id, coach\_id, hotel\_id, event\_id}

Since all the fields depend on participant\_id, (participant\_id)+ -> R

Hence, participant\_id is Primary Key of Participants table

**Match:**

match\_id -> {match\_id, player1\_id, player2\_id, stadium\_id, official\_id}

Since all the fields depend on match\_id, (match\_id)+ -> R

Hence, match\_id is Primary Key of Match table

**Tickets:**

ticket\_id -> {ticket\_id, price, spectator\_id, match\_id}

Since all the fields depend on ticket\_id, (ticket\_id)+ -> R

Hence, ticket\_id is Primary Key of Tickets table

**Indulge:**

{rec\_name, spectator\_id} -> {rec\_name, spectator\_id}

Since all the fields depend on {rec\_name, spectator\_id}, {rec\_name, spectator\_id}+ -> R

Hence, {rec\_name, spectator\_id} is Primary Key of Indulge table

**Advertises:**

{sponsor\_id, event\_id} -> {sponsor\_id, event\_id}

Since all the fields depend on {sponsor\_id, event\_id}, {sponsor\_id, event\_id}+ -> R

Hence, {sponsor\_id, event\_id} is Primary Key of Advertises table

**Normalisation:**

**Sponsors:**

Primary key: sponsor\_id

All attributes depend on the sponsor\_id, hence the table is 2NF.

All attributes depend directly on sponsor\_id, hence the table is in 3NF.

All determinants sponsor\_id are candidate keys, hence the table is in BCNF.

**Accomodation:**

Primary key: hotel\_id

All attributes depend on the hotel\_id, hence the table is 2NF.

All attributes depend directly on hotel\_id, hence the table is in 3NF.

All determinants hotel\_id are candidate keys, hence the table is in BCNF.

**Transport:**

Primary key: vehicle\_id

All attributes depend on the vehicle\_id, hence the table is 2NF.

All attributes depend directly on vehicle\_id, hence the table is in 3NF.

All determinants vehicle\_id are candidate keys, hence the table is in BCNF.

**Coach:**

Primary key: coach\_id

All attributes depend on the coach\_id, hence the table is 2NF.

All attributes depend directly on coach\_id, hence the table is in 3NF.

All determinants coach\_id are candidate keys, hence the table is in BCNF.

**Stadiums:**

Primary key: stadium\_id

All attributes depend on the stadium\_id, hence the table is 2NF.

All attributes depend directly on stadium\_id, hence the table is in 3NF.

All determinants stadium\_id are candidate keys, hence the table is in BCNF.

**Country:**

Primary key: country\_id

All attributes depend on the country\_id, hence the table is 2NF.

All attributes depend directly on country\_id, hence the table is in 3NF.

All determinants country\_id are candidate keys, hence the table is in BCNF.

**Officials:**

Primary key: official\_id

All attributes depend on the official\_id, hence the table is 2NF.

All attributes depend directly on official\_id, hence the table is in 3NF.

All determinants official\_id are candidate keys, hence the table is in BCNF.

**Spectators:**

Primary key: spectator\_id

All attributes depend on the spectator\_id, hence the table is 2NF.

All attributes depend directly on spectator\_id, hence the table is in 3NF.

All determinants spectator\_id are candidate keys, hence the table is in BCNF.

**Recreation:**

Primary key: rec\_name

All attributes depend on the rec\_name, hence the table is 2NF.

All attributes depend directly on rec\_name, hence the table is in 3NF.

All determinants rec\_name are candidate keys, hence the table is in BCNF.

**Event:**

Primary key: event\_id

All attributes depend on the event\_id, hence the table is 2NF.

All attributes depend directly on event\_id, hence the table is in 3NF.

All determinants event\_id are candidate keys, hence the table is in BCNF.

**Participants:**

Primary key: participant\_id

All attributes depend on the participant\_id, hence the table is 2NF.

All attributes depend directly on participant\_id, hence the table is in 3NF.

All determinants participant\_id are candidate keys, hence the table is in BCNF.

**Match:**

Primary key: match\_id

All attributes depend on the match\_id, hence the table is 2NF.

All attributes depend directly on match\_id, hence the table is in 3NF.

All determinants match\_id are candidate keys, hence the table is in BCNF.

**Tickets:**

Primary key: ticket\_id

All attributes depend on the ticket\_id, hence the table is 2NF.

All attributes depend directly on ticket\_id , hence the table is in 3NF.

All determinants ticket\_id are candidate keys, hence the table is in BCNF.

**Indulge:**

Primary key: {rec\_name, spectator\_id}

All attributes depend on the {rec\_name, spectator\_id}, hence the table is 2NF.

All attributes depend directly on {rec\_name, spectator\_id}, hence the table is in 3NF.

All determinants {rec\_name, spectator\_id} are candidate keys, hence the table is in BCNF.

**Advertises:**

Primary key: {sponsor\_id, event\_id}

All attributes depend on the {sponsor\_id, event\_id}, hence the table is 2NF.

All attributes depend directly on {sponsor\_id, event\_id}, hence the table is in 3NF.

All determinants {sponsor\_id, event\_id} are candidate keys, hence the table is in BCNF.

**SQL Code**

**Creation of Tables**

1. **Sponsors**

CREATE TABLE Sponsors (

sponsor\_id NUMBER PRIMARY KEY,

sponsor\_name VARCHAR(30)

);

**Output:**



1. **Accomodation**

CREATE TABLE Accomodation (

hotel\_id NUMBER PRIMARY KEY,

hotel\_name VARCHAR(30),

no\_of\_rooms NUMBER

);

**Output:**



1. **Transport**

CREATE TABLE Transport (

vehicle\_id NUMBER PRIMARY KEY,

vehicle\_type VARCHAR(30),

no\_of\_seats NUMBER,

hotel\_id NUMBER,

FOREIGN KEY(hotel\_id) REFERENCES Accomodation

);

**Output:**

****

1. **Coach**

CREATE TABLE Coach (

  coach\_id NUMBER PRIMARY KEY,

  coach\_name VARCHAR(30),

  hotel\_id NUMBER,

  FOREIGN KEY(hotel\_id) REFERENCES Accomodation

);

**Output:**

****

1. **Stadiums**

CREATE TABLE Stadiums (

  stadium\_id NUMBER PRIMARY KEY,

  location VARCHAR(30),

  capacity NUMBER,

  stadium\_name VARCHAR(30)

);

**Output:**

****

1. **Country**

CREATE TABLE Country (

country\_id NUMBER PRIMARY KEY,

country\_name VARCHAR(30),

rank NUMBER,

medal\_count NUMBER

);

**Output:**



1. **Officials**

CREATE TABLE Officials (

official\_id NUMBER PRIMARY KEY,

name VARCHAR(30),

experience NUMBER

);

**Output:**

****

1. **Spectator**

CREATE TABLE Spectator (

spectator\_id NUMBER PRIMARY KEY,

spectator\_name VARCHAR(30),

hotel\_id NUMBER,

FOREIGN KEY(hotel\_id) REFERENCES Accomodation

);

**Output:**

****

1. **Recreation**

CREATE TABLE Recreation (

  rec\_name VARCHAR(30) PRIMARY KEY,

  price FLOAT

);

**Output:**

****

1. **Event**

CREATE TABLE Event (

event\_id NUMBER PRIMARY KEY,

event\_name VARCHAR(30),

event\_type VARCHAR(30),

stadium\_id NUMBER,

FOREIGN KEY(stadium\_id) REFERENCES Stadiums

);

**Output:**

****

1. **Participants**

CREATE TABLE Participants (

participant\_id NUMBER PRIMARY KEY,

participant\_name VARCHAR(30),

rank NUMBER,

country\_id NUMBER,

coach\_id NUMBER,

hotel\_id NUMBER,

event\_id NUMBER,

FOREIGN KEY(country\_id) REFERENCES Country,

FOREIGN KEY(coach\_id) REFERENCES Coach,

FOREIGN KEY(hotel\_id) REFERENCES Accomodation,

FOREIGN KEY(event\_id) REFERENCES Event

);

**Output:**



1. **Match**

CREATE TABLE Match (

  match\_id NUMBER PRIMARY KEY,

  player1\_id NUMBER,

  player2\_id NUMBER,

  stadium\_id NUMBER,

  official\_id NUMBER,

  FOREIGN KEY(player1\_id) REFERENCES Participants,

  FOREIGN KEY(player2\_id) REFERENCES Participants,

  FOREIGN KEY(stadium\_id) REFERENCES Stadiums,

  FOREIGN KEY(official\_id) REFERENCES Officials

);

**Output:**

****

1. **Tickets**

CREATE TABLE Tickets (

ticket\_id NUMBER PRIMARY KEY,

price FLOAT,

spectator\_id NUMBER,

match\_id NUMBER,

FOREIGN KEY(spectator\_id) REFERENCES Spectator,

FOREIGN KEY(match\_id) REFERENCES Match

);

**Output:**

****

1. **Indulge**

CREATE TABLE Indulge (

rec\_name VARCHAR(30),

spectator\_id NUMBER,

FOREIGN KEY(rec\_name) REFERENCES Recreation,

FOREIGN KEY(spectator\_id) REFERENCES Spectator

);

**Output:**

****

1. **Advertises**

CREATE TABLE Advertises (

  sponsor\_id NUMBER,

  event\_id NUMBER,

  FOREIGN KEY(sponsor\_id) REFERENCES Sponsors,

  FOREIGN KEY(event\_id) REFERENCES Event

);

**Output:**

****

**Insertion of Values into Tables**

1. **Sponsors**

INSERT INTO Sponsors VALUES(501, 'Coca Cola');

INSERT INTO Sponsors VALUES(502, 'Lenovo');

INSERT INTO Sponsors VALUES(503, 'Ferrari Ltd.');

INSERT INTO Sponsors VALUES(504, 'Subway');

SELECT \* FROM Sponsors;

**Output:**



1. **Accomodation**

INSERT INTO Accomodation VALUES(601, 'Taj Hotel', 200);

INSERT INTO Accomodation VALUES(602, 'Radisson Blu', 300);

INSERT INTO Accomodation VALUES(603, 'Grand Hyatt', 250);

INSERT INTO Accomodation VALUES(604, 'Holiday Inn', 350);

INSERT INTO Accomodation VALUES(605, 'Leela Palace', 150);

SELECT \* FROM Accomodation;

**Output:**



1. **Transport**

INSERT INTO Transport VALUES(701, 'Bus', 15, 601);

INSERT INTO Transport VALUES(702, 'Van', 10, 601);

INSERT INTO Transport VALUES(703, 'Car', 8, 602);

INSERT INTO Transport VALUES(704, 'Van', 10, 602);

INSERT INTO Transport VALUES(705, 'Bus', 20, 603);

INSERT INTO Transport VALUES(706, 'Car', 5, 604);

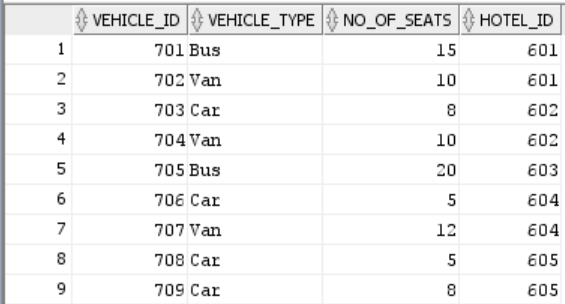
INSERT INTO Transport VALUES(707, 'Van', 12, 604);

INSERT INTO Transport VALUES(708, 'Car', 5, 605);

INSERT INTO Transport VALUES(709, 'Car', 8, 605);

SELECT \* FROM Transport;

**Output:**



1. **Coach**

INSERT INTO Coach VALUES(401, 'Glen Mills', 602);

INSERT INTO Coach VALUES(402, 'Dennis Mitchell', 601);

INSERT INTO Coach VALUES(403, 'Rana Reider', 604);

INSERT INTO Coach VALUES(404, 'Kim Ji-hyun', 601);

INSERT INTO Coach VALUES(405, 'Shoji Sato', 605);

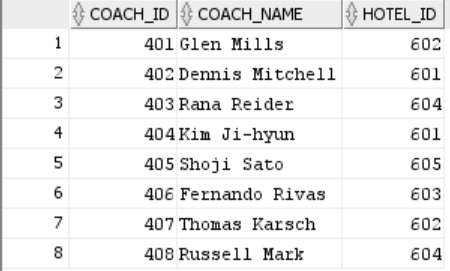
INSERT INTO Coach VALUES(406, 'Fernando Rivas', 603);

INSERT INTO Coach VALUES(407, 'Thomas Karsch', 602);

INSERT INTO Coach VALUES(408, 'Russell Mark', 604);

SELECT \* FROM Coach;

**Output:**



1. **Stadiums**

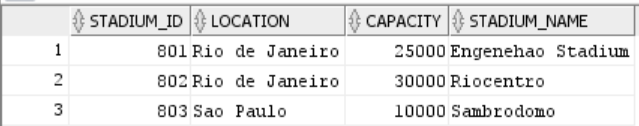
INSERT INTO Stadiums VALUES(801, 'Rio de Janeiro', 25000, 'Engenehao Stadium');

INSERT INTO Stadiums VALUES(802, 'Rio de Janeiro', 30000, 'Riocentro');

INSERT INTO Stadiums VALUES(803, 'Sao Paulo', 10000, 'Sambrodomo');

SELECT \* FROM Stadiums;

**Output:**



1. **Country**

INSERT INTO Country values(201, 'USA', 1, 32);

INSERT INTO Country values(202, 'Canada', 2, 23);

INSERT INTO Country values(203, 'Japan', 3, 17);

INSERT INTO Country values(204, 'Jamaica', 4, 8);

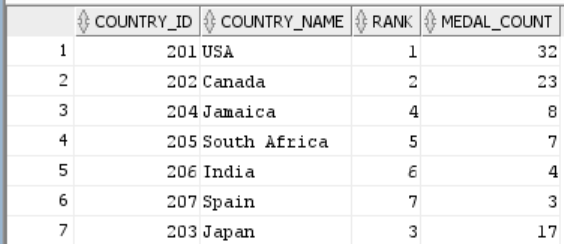
INSERT INTO Country values(205, 'South Africa', 5, 7);

INSERT INTO Country values(206, 'India', 6, 4);

INSERT INTO Country values(207, 'Spain', 7, 3);

SELECT \* FROM Country;

**Output:**



1. **Officials**

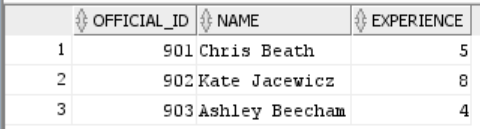
INSERT INTO Officials VALUES(901, 'Chris Beath', 5);

INSERT INTO Officials VALUES(902, 'Kate Jacewicz', 8);

INSERT INTO Officials VALUES(903, 'Ashley Beecham', 4);

SELECT \* FROM Officials;

**Output:**

****

1. **Spectator**

INSERT INTO Spectator VALUES(1001, 'Camilla Beck', 605);

INSERT INTO Spectator VALUES(1002, 'Jeffrey Collins', 603);

INSERT INTO Spectator VALUES(1004, 'George Noble', 602);

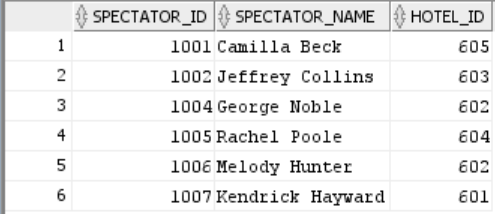
INSERT INTO Spectator VALUES(1005, 'Rachel Poole', 604);

INSERT INTO Spectator VALUES(1006, 'Melody Hunter', 602);

INSERT INTO Spectator VALUES(1007, 'Kendrick Hayward', 601);

SELECT \* FROM Spectator;

**Output:**

****

1. **Recreation**

INSERT INTO Recreation VALUES('Bar', 200);

INSERT INTO Recreation VALUES('Pool Table', 400);

INSERT INTO Recreation VALUES('Gaming', 100);

INSERT INTO Recreation VALUES('Spa', 600);

SELECT \* FROM Recreation;

**Output:  
**

1. **Event**

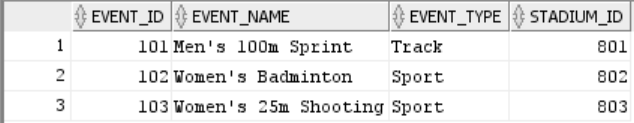
INSERT INTO Event VALUES(101, 'Men''s 100m Sprint', 'Track', 801);

INSERT INTO Event VALUES(102, 'Women''s Badminton', 'Sport', 802);

INSERT INTO Event VALUES(103, 'Women''s 25m Shooting', 'Sport', 803);

SELECT \* FROM Event;

**Output:**



1. **Participants**

INSERT INTO Participants VALUES(301, 'Usain Bolt', 1, 204, 401, 602, 101);

INSERT INTO Participants VALUES(302, 'Justin Gatlin', 3, 201, 402, 601, 101);

INSERT INTO Participants VALUES(303, 'Andre De Grasse', 4, 202, 403, 604, 101);

INSERT INTO Participants VALUES(304, 'Yohan Blake', 6, 204, 401, 602, 101);

INSERT INTO Participants VALUES(305, 'P. V. Sindhu', 3, 206, 404, 601, 102);

INSERT INTO Participants VALUES(306, 'Nozomi Okuhara', 2, 203, 405, 605, 102);

INSERT INTO Participants VALUES(307, 'Carolina Marin', 5, 207, 406, 603, 102);

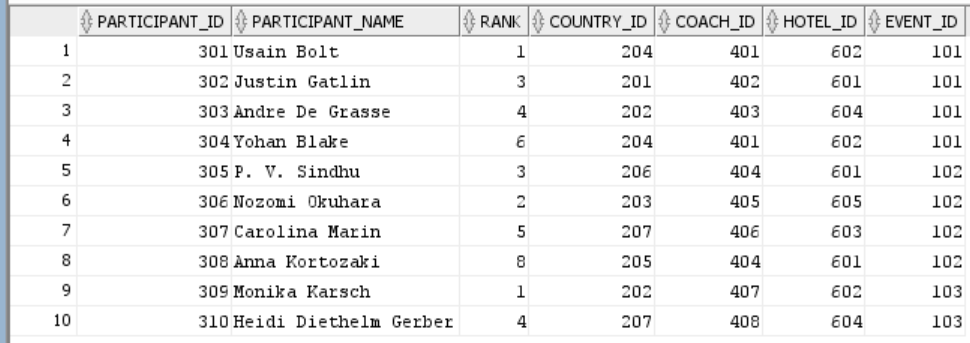
INSERT INTO Participants VALUES(308, 'Anna Kortozaki', 8, 205, 404, 601, 102);

INSERT INTO Participants VALUES(309, 'Monika Karsch', 1, 202, 407, 602, 103);

INSERT INTO Participants VALUES(310, 'Heidi Diethelm Gerber', 4, 207, 408, 604, 103);

SELECT \* FROM Participants;

**Output:**



1. **Match**

INSERT INTO Match VALUES(1, 301, 302, 801, 901);

INSERT INTO Match VALUES(2, 303, 304, 801, 902);

INSERT INTO Match VALUES(3, 305, 306, 802, 903);

INSERT INTO Match VALUES(4, 307, 308, 802, 901);

INSERT INTO Match VALUES(5, 309, 310, 803, 902);

SELECT \* FROM Match;

**Output:**

****

1. **Tickets**

INSERT INTO Tickets VALUES(1101, 2000, 1001, 1);

INSERT INTO Tickets VALUES(1102, 1200, 1001, 2);

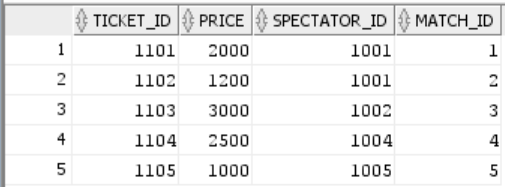
INSERT INTO Tickets VALUES(1103, 3000, 1002, 3);

INSERT INTO Tickets VALUES(1104, 2500, 1004, 4);

INSERT INTO Tickets VALUES(1105, 1000, 1005, 5);

SELECT \* FROM Tickets;

**Output:**



1. **Indulge**

INSERT INTO Indulge VALUES('Bar', 1001);

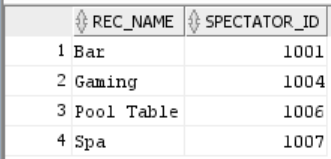
INSERT INTO Indulge VALUES('Gaming', 1004);

INSERT INTO Indulge VALUES('Pool Table', 1006);

INSERT INTO Indulge VALUES('Spa', 1007);

SELECT \* FROM Indulge;

**Output:**

****

1. **Advertises**

INSERT INTO Advertises VALUES(501, 101);

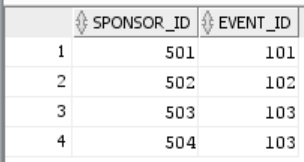
INSERT INTO Advertises VALUES(502, 102);

INSERT INTO Advertises VALUES(503, 103);

INSERT INTO Advertises VALUES(504, 103);

SELECT \* FROM Advertises;

**Output:**

****