**SPORT FACILITIES MANAGEMENT SYSTEM**

**DATABASE**

**MEHMET ÖRS**

**B2105.090156**

**ISTANBUL AYDIN UNIVERSITY**

**SOFTWARE ENGINEERING**

**SEN232 DATABASE SYSTEMS 2**

**CONTENTS**

1. **Introduction**
2. **Entities**
3. **ER Diagrams**
4. **Relationships, weak entities**
5. **Queries**
6. **Tables and Data**
7. **Table Creations - Data types**

**Introduction**

The sport facility management system database is designed to manage the operations of multiple sport facilities like membership and payment management, course registration, facility maintenance, event scheduling, keeping track of staff member’s schedule.

The system supports sport facilities of different types and for different sport types like football, basketball, volleyball, tennis, handball, swimming, diving, martial arts (karate, boxing, judo, taekwondo…), badminton etc., keeps track of the amenities information that are provided in the facility, like the amount of each amenity and the age restriction on them, stores information of the complexes that those facilities belong to, like the location of that complex, it’s social media etc.. It provides a comprehensive solution for managing and organizing the data of various aspects of sport facilities and complexes.

Graphical user interface, application

Description automatically generatedGraphical user interface, application

Description automatically generated with medium confidence **Entities**

Graphical user interface, application

Description automatically generatedA picture containing table

Description automatically generated

**Graphical user interface, application

Description automatically generated**

**Graphical user interface, application, table

Description automatically generatedGraphical user interface, application

Description automatically generatedGraphical user interface, application, table

Description automatically generated**

**Chart

Description automatically generated with medium confidenceGraphical user interface, application

Description automatically generatedGraphical user interface, text, application

Description automatically generatedTable

Description automatically generated with low confidence**

**Table

Description automatically generated with medium confidenceGraphical user interface, table

Description automatically generatedTable

Description automatically generated**

**ER DIAGRAMS**

**Cardinality:**

**Diagram

Description automatically generated**

**Chen’s Notation:**

**Diagram

Description automatically generated**

**Relationships:**

**Complex - Facility**

A complex must contain at least one, at most many facility.

A facility must belong to a complex.

**Diagram

Description automatically generated**

**Diagram

Description automatically generated**

**Complex - Social Media**

It's possible for a complex to have one or more social media accounts, but it's not a requirement.

A social media account must belong to a complex.

**Diagram

Description automatically generated Diagram

Description automatically generated**

**Facility – Amenity**

A facility may have 0 or many amenities and an amenity be used in 0 or many facilities. We need the 3rd table facility\_amenity to record this relationship.

Diagram

Description automatically generatedDiagram

Description automatically generated

**Member - Payment**

Diagram

Description automatically generatedA payment is related to only 1 member and a member may not make any payment (maybe he gained a free membership) or make multiple payments (like each month). A payment can’t exist without a member who makes it, which makes payment a **weak entity**.A picture containing diagram

Description automatically generated

**Event – Sponsor**

An event may have 0 or 1 sponsor and a sponsor may finance 0 or many events.

A picture containing diagram

Description automatically generatedDiagram

Description automatically generated

**Facility – Sport type**

A facility must provide at least 1 and may provide many sport types.

A sport type may be provided in 0 or many facilities. Due to the many to many relationship, 3rd table is required.

Table

Description automatically generated with medium confidenceDiagram

Description automatically generated

**Member – Membership types**



A member must have a membership type.

A membership may not be registered or may be registered by multiple members. When a member is registering, a membership type should be chosen, so member entity totally participates to the relationship.

Diagram

Description automatically generatedDiagram

Description automatically generated

**Facility - Member**

A facility may have 0 or many members.

A member must be registered to only 1 facility.

Diagram

Description automatically generatedA picture containing diagram

Description automatically generated

**Facility - Course**

A course must be held at 1 facility

A facility may hold no courses or multiple courses.

Diagram

Description automatically generated A picture containing diagram

Description automatically generated



**Course - Coach**

A coach may not lead a course or may lead multiple courses.

A course must be lead by 1 coach so course entity totally participates to the relationship.

Diagram

Description automatically generated Diagram

Description automatically generated



**Course - Member**

Members may enroll to 0 or many courses.

Courses must have at least 1 member and can have many members.

Since the relationship is many to many, third table is required

Diagram

Description automatically generatedDiagram

Description automatically generated

**Course – Course schedule**

A course must have at least 1 and may have many schedule records so it totally participates.

A schedule must belong to 1 course and can’t exist without the course entity. So it is a **weak entity**.

Diagram

Description automatically generatedDiagram

Description automatically generated

**Staff – Coach**

A staff may or may not be a coach.

A coach must also be a staff and can’t exist without the staff record. So it is a **weak entity**.

Diagram

Description automatically generated with medium confidenceDiagram

Description automatically generated

**Facility – Staff**

A facility may have 0 or many staff.

A staff must belong to 1 facility.

Diagram

Description automatically generatedA picture containing diagram

Description automatically generated

Diagram

Description automatically generated **Facility – Availability**

A facility may or may not be available in different time lines.

An availability record must be associated with a facility and can’t exist without one. So it is a **weak entity.**

Diagram

Description automatically generated with medium confidence

**Facility – Event**

Diagram

Description automatically generated Facility may host 0 or many events, where an event must be hosted at only 1 facility. So event entity participates.

Diagram

Description automatically generated

**Member - Ranking**

A member may or may not rank the facility he is registered.

A ranking must belong to a member and can’t exist without one which makes it a **weak entity**.

Graphical user interface, application, table, Excel

Description automatically generatedDiagram

Description automatically generated

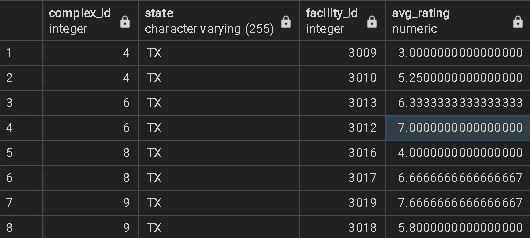


**Queries**

**1-Average ranking rate of facilities located in Texas:**

Text

Description automatically generated



**Explanation:**

With the subquery (SELECT facility\_id, AVG(rate) AS avg\_rating FROM facility\_rating

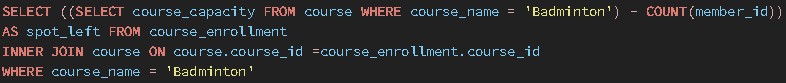
INNER JOIN member ON member.member\_id = facility\_rating.member\_id

GROUP BY facility\_id) AS facility\_rank we first get the get the average rating of each facility.

And then joining the complex and facility tables with the new generated table facility\_rank

using the facility\_id attribute and display also the state and complex\_id using complex table.

**2- Number of spots available in the badminton course:**

****

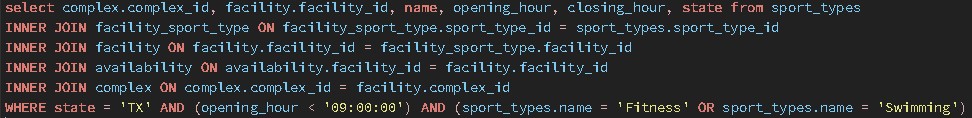
**Text

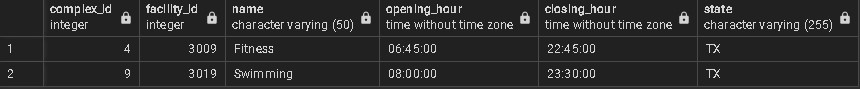
Description automatically generated with low confidence**

**Explanation:**

The sub subquery (SELECT course\_capacity FROM course WHERE course\_name = 'Badminton') returns the capacity of the course ‘Badminton’ and we subtract the number of members that are enrolled to this course using function COUNT(‘member\_id’) from the course\_enrollment and to get the name of the course and put the condition to the WHERE statement, we joined it with the course table.

**3- Facilities in Texas where fitness or swimming activities are available and open before 9 o’clock in the morning:**





**Explanation:**

In this query we joined various tables together. sport\_type to get the facilities that provides ‘swimming’ or ‘fitness’, facility\_sport\_type to join sport\_type and facility, facility to join the tables complex and availability, availability to get the opening of the facilities that are open before 9 am and complex to get the complex\_id and the state.

**4- Number of people who enrolled to swimming in year 2020:**

**Text

Description automatically generated**

**Graphical user interface, website

Description automatically generated**

**Explanation:**

By joining the tables facility, facility\_sport\_type and sport\_type, we get the facilities and the sport types they provide. By joining member and facility, we can get each member of facilities. With the new generated table, we can group by the course name which should be swimming in this case and get the corresponding number of members with COUNT(member).

**5- Second most expensive course in California:**

Text

Description automatically generated

Graphical user interface, application, website

Description automatically generated

**Explanation:**

We get the course\_cost values from the course table and state value from the complex table. To bridge them we use the facility table and after ordering the resulting table in descending order, by setting the OFFSET parameter of the LIMIT statement, we skip the first value and by limiting it to 1, we just get the second course\_cost value.

**6- Courses that are currently ongoing and cost between 100 and 150 :**



A picture containing text, scoreboard

Description automatically generated

**Explanation:**

Since the value of the end\_date attribute is null for the courses that still continue, we can simply us the IS NULL condition for that attribute and the constraint on cost that has the value between 100 and 150.

**7-The facility which hosts the most events :**

Text

Description automatically generated with medium confidence

Graphical user interface, application

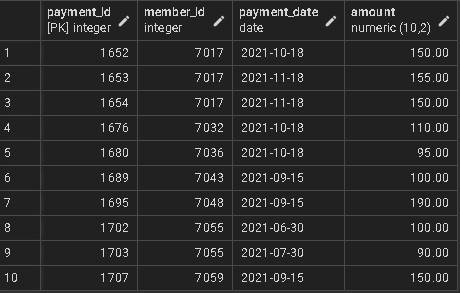
Description automatically generated

**Explanation:**

To get how many events are hosted by each facility, we simply group by the COUNT(event\_name) value with the facility\_id. Then to get the maximum, we can order by the num\_of\_events in descending and limit it by 1.

**8- Payments made in 2021:**

****

****

**Explanation:**

With the WHERE condition, we can simply put the BETWEEN keyword to specify that the payment\_date values we are looking for is in 2021.

**9- Coaches that have more than 8 years of experience:**

Graphical user interface, text, application

Description automatically generated

A screenshot of a computer

Description automatically generated with low confidence

**Explanation:**

With the condition years\_of\_experience >= 8 in WHERE condition, we can get the expected result.

**10- Number of members of that enrolled to each facilities after 2020:**

**A screenshot of a computer

Description automatically generated with medium confidence**

**A picture containing text, scoreboard, cellphone

Description automatically generated**

**Explanation:**

With the condition where date\_join is later than January 1 of 2020 we get thexpected enrollments. Counting them for each of the facilities with the group by statement, we get the expected result.

**Tables:**

**Complex**

A screen shot of a computer

Description automatically generated with low confidence

**Social Media**

Table

Description automatically generated with medium confidence

**Facility**

A picture containing table

Description automatically generated

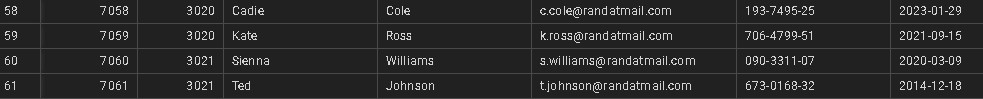
**Member**

**Table

Description automatically generated**

**Table

Description automatically generated**

****

**Member Ranking**

**A picture containing graphical user interface

Description automatically generatedCalendar

Description automatically generated with low confidenceTable

Description automatically generated**

A picture containing text, window, scoreboard

Description automatically generated**A picture containing table

Description automatically generatedCalendar

Description automatically generated with medium confidencePayments**

A picture containing table

Description automatically generated

**Course**

**A picture containing text

Description automatically generated**

**Course Enrollment**

**Calendar

Description automatically generated with medium confidence**

**Coach**

**A picture containing text, scoreboard

Description automatically generated**

**Staff**

**Table

Description automatically generated**

**Course Schedule**

**Table

Description automatically generated**

**Table

Description automatically generatedAvailability**

****

**Event**

Text

Description automatically generated

**Sponsor**

**Graphical user interface, text

Description automatically generated**

**Amenity**

Table, calendar

Description automatically generated

**Amenity – Facility**

A picture containing text, calculator, window, scoreboard

Description automatically generatedA picture containing text, scoreboard

Description automatically generated

**Sport Type**

Text

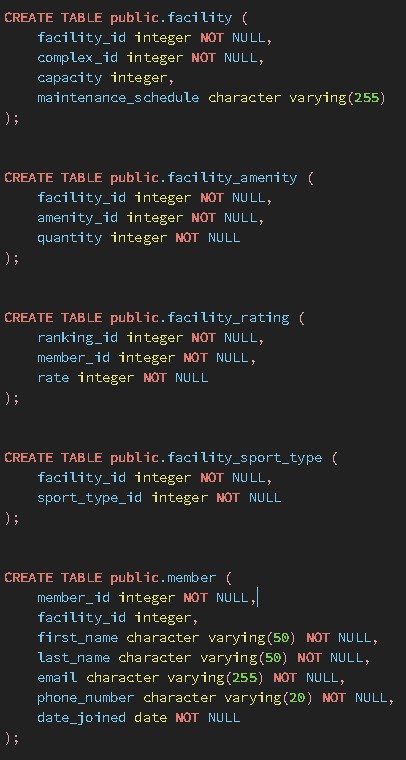
Description automatically generated

**Facility-Sport Type**

**Table

Description automatically generated with low confidence**

**Tables Creations and Data Types**

** **



