

# CSC 4402 Database Systems

---

## Database Project For High School Extracurricular Activities

Team 2:

Dean Compton  
Adam Kardorff

Jared Key  
Justin Nguyen

---

## Table of Contents

---

Business Description	1
Data	1
Database Design and Management	2
ER-Model	2
MySQL Workbench EER Diagram	2
Normalization	3
Application	3
Queries	4

## **Business Description:**

A high school needs a database for keeping track of their students, teachers, clubs, club members, sports, and sports players. They gave us all the information that must be stored and the school's rules for extracurricular activities in regards to the students' and teachers' involvement.

For students, they want to store the their id number, first and last name, sex, year in high school, and GPA.

For teachers, they want to store their id number, first and last name, subject they teach, and salary.

For clubs, they want to store their club name, sponsor, room number that they meet in, and budget.

For sports, they want to store the name of the sport, sex of the team, budget, and head coach.

They also want information for which students are on what sports teams and what students are in what clubs and what role (Member, Officer, Vice-president, or President) they play in that club..

Their rules for involvement are as follows:

- Teachers can sponsor at most ONE club
- Teachers can head coach at most ONE team
- Teachers can be a head coach of a team and sponsor a club
- Students can be involved in at most ONE club
- Students can be on as many sports teams as they would like

## **Data:**

500 students

100 teachers

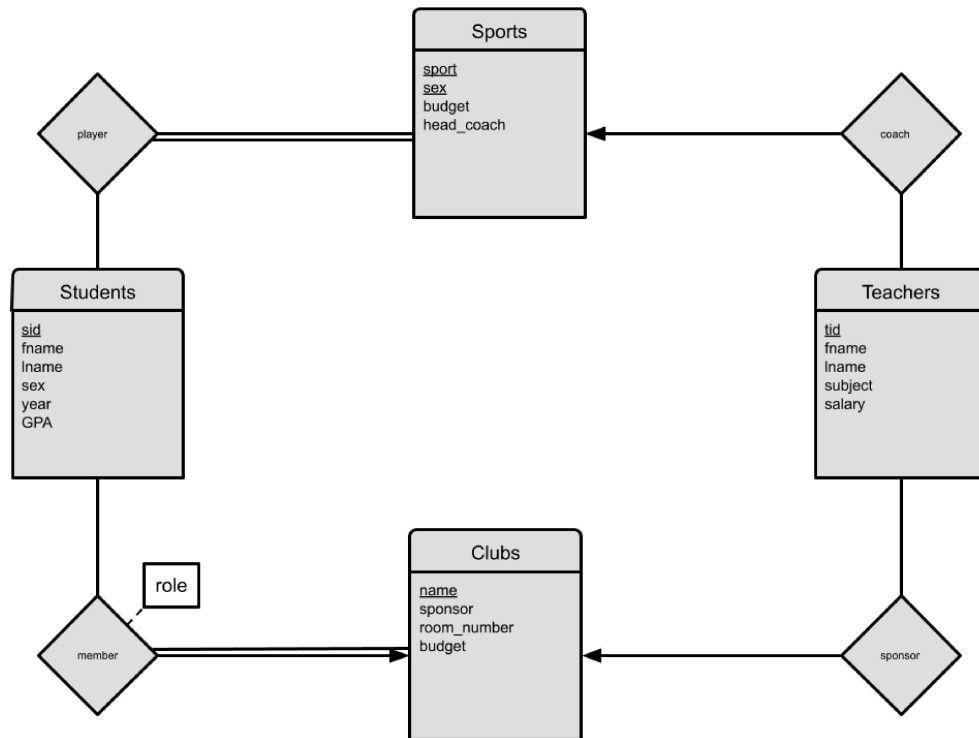
26 sports teams

23 clubs

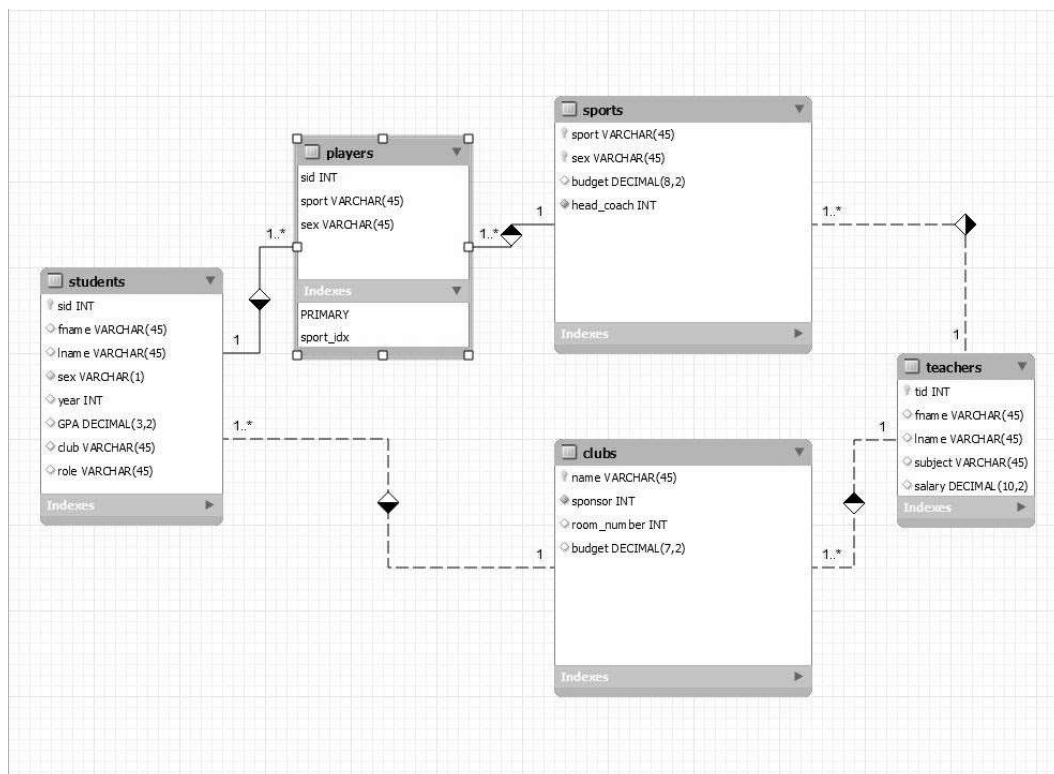
348 players

# Database Design and Management:

ER-Model:



MySQL Workbench EER Diagram:



## Normalization:

Students Determinants:

$\{sid\} \rightarrow \{fname, name, sex, year, gpa, club, role\}$

This is the only candidate key and is the primary key.

Players Determinants:

$\{sid, sport, sex\}$

This is the only candidate key and is the primary key.

Clubs Determinants:

$\{name\} \rightarrow \{sponsor, room\_number, budget\}$

This is the only candidate key and is the primary key.

Teachers Determinants:

$\{tid\} \rightarrow \{fname, name, subject, salary\}$

This is the only candidate key and is the primary key.

Sports Determinants:

$\{sport, sex\} \rightarrow \{budget, head\_coach\}$

This is the only candidate key and is the primary key.

Using these determinants our database is in Boyce-Codd Normal Form (BCNF) because every determinant is a candidate key.

## Application:

Our database was originally built and designed in MySQL to establish the design and management of the data. This is what we used to construct the EER diagram in MySQL to draw relationships between tables and to establish primary and foreign keys.

Then we built our database in sqlite using the .CSV files to perform meaningful queries on the data.

## Queries:

---

- 1. Find and order the salaries of teachers who head coach a sport that has at least 20 players:**

select tid, salary from teachers where tid in (select head\_coach from sports s, players p where s.sport=p.sport group by p.sport having count(p.sid)>20) order by salary;

*Purpose: Want to give a raise to the teachers who coach large sports teams as well as teaching*

---

- 2. Find students who are on at least 2 sports team, in a club, and have a GPA > 3.5 and return their id, first and last name, number of teams, and GPA and order them by gpa in descending order:**

select s.sid, s.fname, s.lname, count(p.sport), s.gpa from students s, players p where s.sid=p.sid and gpa>3.5 and club not null group by s.sid having count(p.sport)>1 order by s.gpa desc;

*Purpose: Want to give a special award to students who are active in extracurricular activities, while maintaining a high GPA*

---

- 3. Find the sid, fname, and lname, all 2nd year or greater students in a sport and a club with a GPA < 2.0, sort in descending order by GPA**

select distinct(S.sid), S.fname, S.lname, S.GPA from Students as S, Players as P where S.sid = P.sid and S.year > 2 and S.GPA < 2.0 and S.club IS NOT NULL order by GPA desc;

*Purpose: Need to meet with these students in order for them to focus on academics and graduate on time.*

---

**4. Find the average GPA of each sports team that has at least 20 students, order by average GPA in descending order:**

```
select avg(S.GPA) as AVG_GPA, P.sport from Students as S, Players as P where S.sid = P.sid  
group by P.sport having count(P.sid) > 20 ORDER BY AVG_GPA desc;
```

*Purpose: want to compare the academic achievements of the different sports teams at the school*

---

**5. Find all students with a last name between the letters A-E, sorted in alphabetical order**

```
select distinct(sid), lname, fname from Students where lname like 'A%' or lname like 'B%' or  
lname like 'C%' or lname like 'D%' or lname like 'E%' order by lname;
```

*Purpose: Need to give a list of students to the advisor that handles students with a name between A-E.*

---

**6. Find the salary of all teachers who are head coaches and club sponsors**

```
select distinct(T.tid), T.fname, T.lname, T.salary from Teachers as T, Clubs as C where T.tid =  
C.sponsor INTERSECT select distinct(T.tid), fname, lname, salary from Teachers as T, Sports  
as A where T.tid = A.head_coach;
```

*Purpose: want to give a raise to all teachers who are coaches and club sponsors as well as teaching*

---

**7. Find clubs with a budget of < 5000 and an average GPA of > 2.5**

```
select distinct(S.club), C.budget, avg(S.gpa) as avg_gpa from Clubs as C, Students as S where  
C.budget < 5000 group by S.club having avg_gpa > 2.5 Order by avg_gpa desc;
```

*Purpose: want to raise the budget of clubs with a high GPA*

---

**8. List the number of students in each club and their budget, order by number of students**

```
select distinct(S.club), C.budget, count(S.sid) as num_students from Students as S, Clubs as C
where C.name=S.club group by S.club Order by num_students desc;
```

*Purpose: want to ensure that the clubs with the most students have appropriate budgets*

---

**9. Find all teachers in the Algebra or Calculus or Physics or Chemistry department that sponsor a club and a Sport**

```
select distinct(t.tid), T.fname, T.lname, C.name, A.sport from Teachers as T, Clubs as C, Sports
as A where T.tid = C.sponsor and T.tid = A.head_coach and (T.subject='Algebra' or T.subject =
'Calculus' or T.subject = 'Physics' or T.subject = 'Chemistry');
```

*Purpose: Find teachers that are eligible for STEM teacher of the year award.*

---

**10. Find students who are not in a club and do not play a sport:**

```
select fname, lname, sid from students where sid not in (select sid from players group by sid)
and club='NULL';
```

*Purpose: Send email Promotions of extracurriculars that the students might be interested in.*