CSC 4402 Database Systems

Database Project For
High School Extracurricular Activities

Team 2:

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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
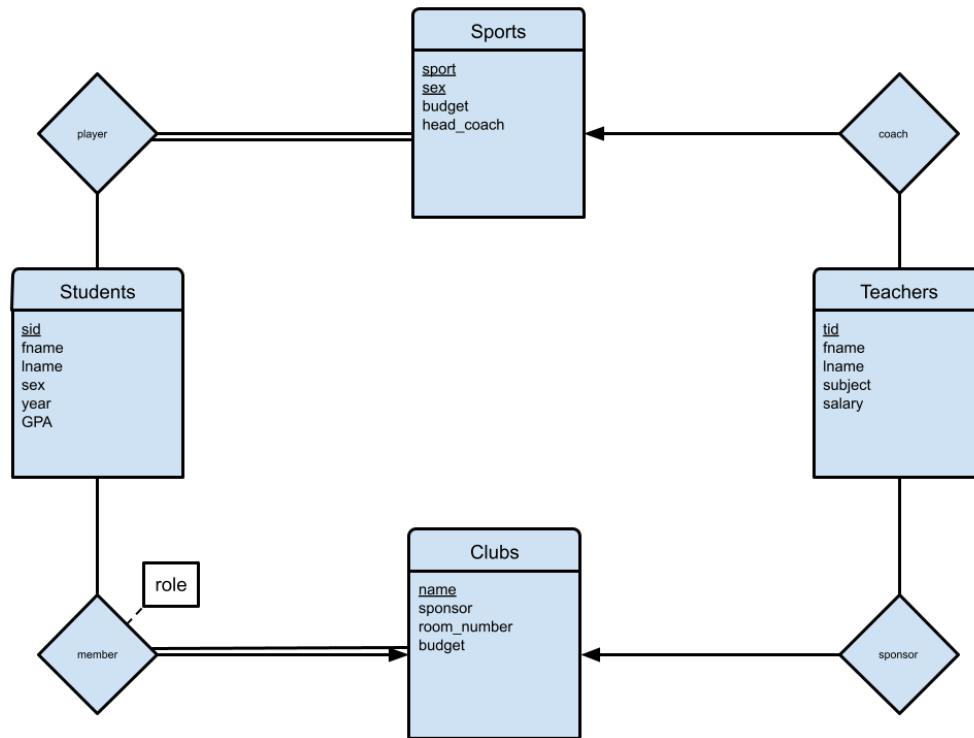
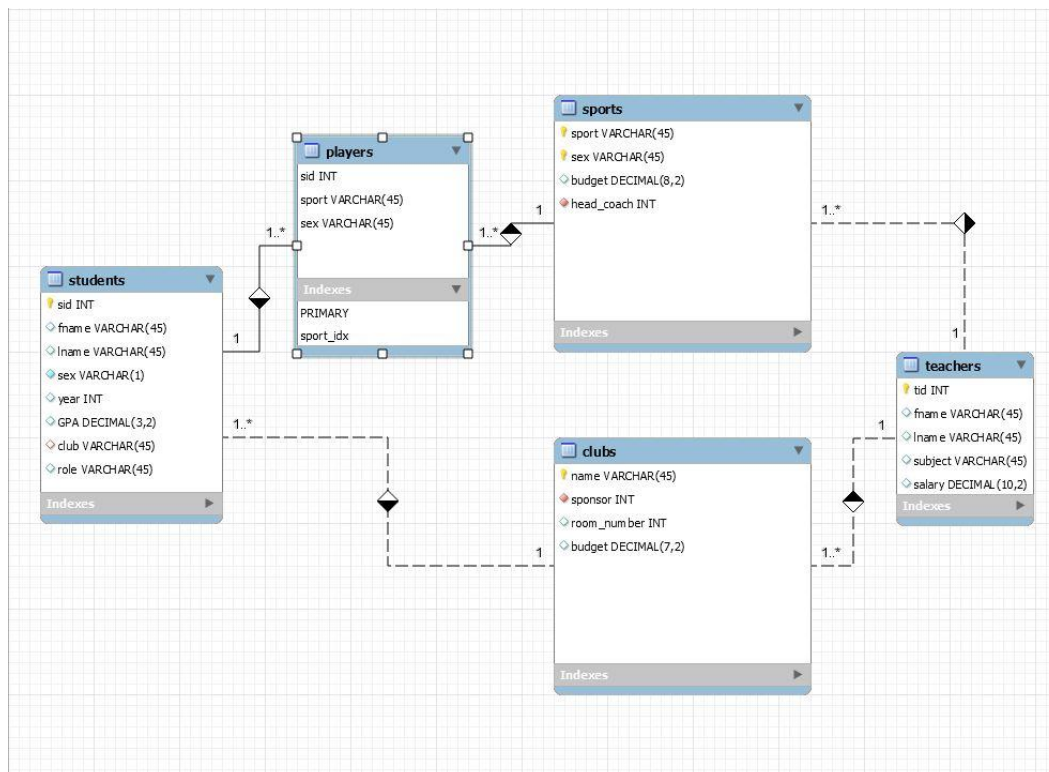# Data:

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} → {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} → {sponsor, room_number, budget}
This is the only candidate key and is the primary key.

Teachers Determinants:
{tid} → {fname, name, subject, salary}
This is the only candidate key and is the primary key.

Sports Determinants:
{sport, sex} → {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:

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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;

```
1028|34410.46
1064|35649.29
1046|38945.32
1058|38947.22
1052|53762.42
1019|73320.89
1037|77312.6
1055|82064.79
1076|83492.35
1034|89434.49
1043|94426.22
1028|34410.46
1064|35649.29
1046|38945.32
1058|38947.22
1052|53762.42
1019|73320.89
1037|77312.6
1055|82064.79
1076|83492.35
1034|89434.49
1043|94426.22
```

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

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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;

```
225169|Gareth|Green|2|3.97
225238|Brian|Kim|4|3.87
225229|Stuart|Johnston|2|3.85
225221|Robert|Jackson|2|3.81
225165|Katrina|Graham|2|3.8
225243|Caroline|Lambert|2|3.75
225294|Grant|Meyer|2|3.68
225355|Hugh|Peterson|2|3.67
225223|Stephen|James|2|3.63
225161|Kirsten|Gonzalez|4|3.63
225167|Lynsey|Graves|3|3.52
```

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

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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;

```
225240|Elaine|Klein|1.98
225164|Kirsteen|Gordon|1.94
225188|Henry|Harrington|1.92
225342|Kathleen|Parks|1.92
225172|Eric|Griffin|1.87
225234|William|Keller|1.87
225214|Fiona|Howell|1.85
225295|Nicholas|Miles|1.84
225178|Zoe|Hale|1.76
225351|Alasdair|Perez|1.76
225189|Justin|Harris|1.75
225006|Susan|Alvarado|1.74
225186|Samuel|Harmon|1.73
225143|Melanie|Frazier|1.65
225343|Patricia|Parsons|1.65
225360|Calum|Porter|1.64
225287|Stewart|Mcguire|1.62
225301|Jonathan|Montgomery|1.62
225253|Barry|Lewis|1.56
225419|Scott|Simmons|1.56
225282|Simon|Mccormick|1.55
```

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

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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;

```
2.81769230769231|Basketball
2.66192307692308|Swim
2.56583333333333|Gymnastics
2.50260869565217|Track
2.48714285714286|Bowling
2.47933333333333|Soccer
2.38111111111111|Football
2.37888888888889|Tennis
2.34136363636364|Cross Country
2.32818181818182|Golf
```

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

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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;

```
225000|Acosta|Nicola
225001|Adams|Karen
225002|Adkins|David
225003|Aguilar|John
225004|Alexander|Paul
225005|Allen|Fiona
225006|Alvarado|Susan
225007|Alvarez|Mark
225008|Anderson|James
225009|Andrews|Claire
225010|Armstrong|Andrew
225011|Arnold|Scott
```

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

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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;

```
1007|Rachel|Davis|83319.54
1010|Tracy|Wilson|59474.79
1013|Michelle|Taylor|63570.75
1016|Martha|Moore|70556.27
1019|James|Thompson|73320.89
1022|Lisa|Lee|40650.89
1025|Lilly|Clark|49191.66
1028|Sharon|Walker|34410.46
1031|Laura|Young|42558.36
1034|Josh|Wright|89434.49
1037|Todd|Green|77312.6
1040|Carol|Nelson|98604.53
1043|Elizabeth|Campbell|94426.22
1046|James|Carter|38945.32
1049|Richard|Turner|50647.74
```

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

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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;

```
Drama|1463.45|2.842
Chess|1463.45|2.78857142857143
NULL|1463.45|2.62095238095238
National Honors Society|1463.45|2.61130434782609
Band|1463.45|2.57176470588235
Student Government|1463.45|2.5535
Music|1463.45|2.51086956521739
Science|1463.45|2.505
```

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;

```
Photography|1375.15|26
Yearbook|3127.21|25
Sports Journalism|3797.82|25
National Honors Society|1596.27|23
Music|9942.62|23
Mu Alpha Theta|7217.62|23
History|9908.61|21
Student Government|1107.01|20
Newspaper|9494.66|20
FFA|1165.17|20
Debate|8865.76|20
DECA|1463.45|20
Book|4892.27|20
Beta|6714.51|20
```

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

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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');

```
1007|Rachel|Davis|Science|Baseball
1013|Michelle|Taylor|FCA|Soccer
1019|James|Thompson|Debate|Gymnastics
1031|Laura|Young|DECA|Dance
1037|Todd|Green|Newspaper|Basketball
1046|James|Carter|Drama|Bowling
1052|Josh|Collins|4-H|Swim
1061|Clare|Rogers|Chess|Bowling
```

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

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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';

```
John|Aguilar|225003
Jacqueline|Barrett|225024
Colin|Beck|225028
Donna|Bowen|225038
Kenneth|Castro|225068
Gavin|Contreras|225085
Christine|Duran|225115
Ronald|Estrada|225121
Shona|Figueroa|225127
Denise|Ford|225136
Deborah|Lawrence|225247
Shirley|Paul|225347
Shaun|Salinas|225401
David|Schroeder|225410
Stuart|Soto|225427
Derek|Stewart|225435
```

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