College Database Project

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Milestone/Version	Date
M1V1	14 Sept. 2021
M1V2	25 Sept. 2021
M1V3	30 Sept. 2021
M1V4	4 Oct. 2021

Contents

Section I: Project Description

The aim of this project is to build a cutting-edge College Database Management System to enable universities an easier administration of their duties. This project will allow the university to add, delete, and modify information about staff, students, courses, clubs, as well as creating and organizing events and competitions. This will make university staff and students' records more secure, efficient, and accessible, ensuring better user experience that will make the client university stand out from competitors.

This project will boost organization by separating courses into degrees and sections, each with an assigned instructor, which enables students to get clear and precise information about what classes they will be taking, which betters ease of use during enrollment. Also, staff with proper clearance will be able to better access information for each classes' students, as well as being able to see data related to each class, like students' grades, or the failure percentage of a class. This allows staff to better manage their syllabus, or to better judge professors' performance.

Furthermore, this project aims to connect the client university to others like it around the world, allowing its students to expand their horizons through exchange programs. Information about foreign universities and the exchange process will be organized and available for students to see, allowing them to plan their studies abroad more easily, as well as providing international students with an easier transition into the university.

To enhance student participation in activities and sports, this Database Management System will store information about events and competitions the university participates in, as well as information about teams and clubs. This will help the university when deciding on what to invest, as they will have data on what students like to spend time on, and what activities have the most attendees.

Section II: Use Cases

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1. **Use Case:** Student Class Enrollment

Actors: Lewis (Student), Class

Description: Lewis has returned from summer vacation and is starting college in a few weeks. He needs to enroll in the classes he must take the next semester, but he needs to find a schedule that works for him. Last year, he failed a course, so he needs to add and accommodate this course into the ones he is supposed to take this semester, and this year he plans on working to earn some extra money. However, he is not sure if he will be able to pass all his courses if he is overloaded with work. He is planning on learning which courses are easiest and leaving them for a later semester where he has more time: only enrolling in the hardest ones, and the course he already failed.

The College Database System we are designing will help Lewis find information about the courses the university offers, organized by degrees, year, and semester when they are taught. He will be able to access the course syllabus, as well as the professors that teach that class, and the percentage of passing students. He can enroll in these classes and drop them, and the database will keep an updated list of his courses, and their enrollment status.

2. **Use Case:** Updating Grades

Actors: Hirva (Professor), Class, Student, Exam

Description: Hirva teaches several classes in her university and has just finished grading the midterms from one of her classes. She is tired, and wants to upload her students' grades as quickly as possible and without any complications. She doesn't know the names of all her students, so she needs a way to filter her students and have all the information organized. Using the old university's system, she has made several mistakes before, so she hopes to save herself from students requesting exam revisions when they receive unexpected grades.

Our Database System is designed to make this process easier, by having exams and students sorted by classes, so that professors have a list of students for each exam for each class, so that grades can be updated without unnecessary complications.

3. **Use Case:** Head of Department adds a Foreign Exchange University

Actors: Brandon (Head of Department), University, Course

Description: Brandon, the head of his university's Computer Science department, has noticed that the COVID-19 crisis is almost at its end in some countries outside the US. Due to the pandemic, the university had to cancel its exchange programs, and the list of available foreign universities had to be severely modified. For 2022, his superiors have decided to open the university up to foreign exchange students and allow students to study abroad. After meetings and negotiations, agreements have been made with other universities to create exchange programs. Brandon wants to add these universities to the list of universities available with their corresponding information, so that students can learn about the new foreign exchange program.

The College Database System aids in updating this information by allowing users with appropriate clearance to manage these tables, organizing them by countries, and containing pertinent information such as location, number of available admissions, cost, exchange duration, and more. Once edited, this information can be viewed by students and can be updated at any given time.

4. **Use Case:** Student wants to update personal information

Actors: Jorge (Student), Address, Phone number

Description: Jorge had to change his phone number and has changed apartment this year. The university has told him that it is necessary for him to update his information in the university's records. He doesn't want to make a mistake with this, because last time he got lost during the process of updating his data and wrote down the wrong address. He expects to be done quickly with this task, as it is very simple.

After logging in to his account, Jorge enters his profile, where he has his personal information listed. He edits the fields he wishes to change and saves his changes before moving on to other fields he wished to change. The database is updated in real time, and other users with permission can look at his profile to get information on that student.

5. **Use Case:** Head of Department wants to evaluate professor

Actors: Lisa (Head of Dept), Professor, Course

Description: Lisa is the Head of the Economics Department at the university she works at. She has heard several complaints from students about a new professor who is extremely demanding in a class which is not supposed to be too challenging, so she has decided to investigate more about this. She thought that a good way to evaluate the harshness of this new professor was to look at the proportion of failing students in this professor's classes compared to other professors, and previous years' classes.

Our College Database System allows Lisa to view the classes this professor teaches, and the percentage of failing students. She can also access other professors' classes in the same subject to compare the data and look up previous years' classes to see the failure rates.

6. **Use Case:** Student wants to learn about clubs & events

Actors: Jeffrey (Student), Club, Event

Description: Jeffrey is an incoming freshman in his new university who wants to get to know people and build a social circle for his college experience. He has heard that his university has different fraternities, clubs, and events where he can socialize and make new friends. However, he has heard that some of these are not recognized by the university, so he only wants to see which are serious and official.

Jeffrey can find the information he is looking for in the university's Database Management System. There he can find listed the fraternities, sororities, clubs, and events he can partake in. He can find information about these aspects of university life, but to enlist in one of these he needs to be admitted by a user with the necessary permissions to edit the content of these groups.

7. **Use Case:** Rector adds Degree

Actors: Sarah (Rector), Degree, Course

Description: Sarah is the rector of her university, and as the highest authority in her institution she can decide which degrees are offered at her university. After some meetings, the university board has decided to stop offering a degree, and to create new one. Sarah then uses her credentials to log in to the database system, and in the degrees section she closes the degree she wants to close. Future students will not be able to choose this degree option, and courses which are unique to this degree will be deleted for future classes. Then, she adds the new degree to the database, with its corresponding courses. Current students are not allowed to enroll in this degree, but in the next academic session, they will be.

Section III: Database Requirements

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1. **User**

a. A user is either a student, a professor, a head of department, a rector, or an administrator.

b. A user shall attend many events.

c. Only users who are students may be club, frat, or team members.

d. A user shall have at least one set of credentials.

e. A user can have many gym memberships.

f. Only users who are students can obtain student jobs, insurance, and scholarships.

g. Users who are students can have many jobs.

h. Users who are students can have many insurance contracts.

i. Users who are students can have at most one frat membership.

j. Users who are students can have many club memberships.

k. Users who are students can have many team memberships.

l. Users who are students can obtain many scholarships.

m. Users shall have only one password.

2. **Credentials**

a. Credentials shall be linked to one and only one user.

3. **Student**

a. A student shall enroll in at least one section.

b. A student shall study at least one degree.

c. A student shall be registered by one and only one administrator.

d. A student shall be permitted to perform at least one action.

e. A student shall

4. Student **Job**

a. A job shall belong to many users.

b. Jobs shall be available only to users who are students.

5. **Insurance Contract**

a. An insurance contract can belong to many users.

b. Insurance contracts shall only be available for users who are students.

6. **Scholarship**

a. Scholarships can be awarded to users.

b. Scholarships can only be awarded to users who are students.

7. **Fraternity**

a. A fraternity shall have at least one frat member.

b. Only users who are students can be frat members.

8. **Club**

a. A club shall have at least one member.

b. Only users who are students can be club members.

9. **Team**

a. A team shall have at least one team member.

b. A team shall have at least one match.

c. A team shall compete many competitions.

d. A team shall belong to only one division.

e. Only users who are students can be team members.

10. **Match**

a. A match shall be played by only two different teams.

b. A match shall belong to only one competition.

c. A match shall be hosted at one venue at least.

11. **Competition**

a. A competition shall have more than one team.

b. A competition shall belong to one and only one division.

c. A competition shall have at least one match.

d. A competition shall take place in at least one venue.

12. **Division**

a. A division can have many teams.

b. A division can have many competitions.

13. **Venue**

a. A venue can host many matches.

b. A venue can host many competitions.

14. **Sections**

a. A section shall have at least one student.

b. A section shall have at least one professor.

c. A section shall belong to one and only one course.

d. A section shall have at least one class.

15. **Course**

a. A course shall have at least one section.

b. A course shall be part of at least one degree.

16. **Degree**

a. A degree shall have at least one course.

b. A degree shall belong to at least one department.

c. A degree shall belong to many students.

d. A degree can be equivalent to at least one foreign degree.

17. **Professor**

a. A professor shall teach at least one section.

b. A professor shall be registered by one and only one administrator.

c. A professor will be permitted to perform at least one action.

18. **Department**

a. A department shall have at least one degree.

b. A department shall have at least one head of department.

19. **Head of Department**

a. A head of department shall belong to at least one department.

b. A head of department shall be registered by one and only one administrator.

c. A head of department shall be permitted to perform at least one action.

20. **Rector**

a. A rector shall manage many departments.

b. A rector shall manage many degrees.

c. A rector shall manage many courses.

d. A rector shall manage many sections.

e. A rector shall be registered by one and only one administrator.

f. A rector shall be permitted to perform at least one action.

21. **Administrator**

a. An administrator shall register all other user types.

b. An administrator shall have permission to perform all the actions in the database, to the whole database.

22. **Actions**

a. An action will be performed by at least one user type.

23. **Class**

a. A class shall be taken by at least one section.

b. A class shall take place in only one classroom.

c. A class shall take place in only one laboratory.

d. A class shall have either a classroom or a laboratory.

24. **Classroom**

a. A classroom can belong to many classes.

25. **Laboratory**

a. A laboratory can belong to many classes.

26. **Event**

a. An event can be attended by many users.

27. **Product**

a. A product can be sold to many stores.

28. **Store**

a. A store shall have at least one product.

29. **Cafeteria**

a. A cafeteria can offer many menus.

30. **Menu**

a. A menu can be found at many cafeterias.

31. **Foreign University**

a. A foreign university can offer many foreign degrees.

32. **Foreign Degree**

a. A foreign degree shall belong to one and only one foreign university.

b. A foreign degree shall be equivalent to at least one degree.

33. **University Gym**

a. University Gyms can have many users.

Section IV: Main Entities, Attributes and Keys

When referring to foreign keys, the parameter type is referred to as Entity.Attribute, like class attributes in python.

Also, PK = primary key, and FK = foreign key.

1. **User** (Strong):
    - ***** User_ID: primary key, alphanumeric
    - *Password: alphanumeric
    - *Name: composite, alphanumeric
        1. Name
        2. Surname
    - *Gender: alphanumeric
    - *PhoneNum: multivalue, composite, number
        1. Prefix
        2. Number
    - *Address: composite
        1. Country, alphanumeric
        2. City, alphanumeric
        3. Street, alphanumeric
        4. Apartment: (optional) alphanumeric
        5. Postal code, number
    - *DOB: date, composite
        1. Day
        2. Month
        3. Year

*Age: derived, number

2. **Foreign University** (Strong):

*UniversityID: primary key, alphanumeric

*UniversityName: alphanumeric

*Campus: unique key, alphanumeric

*Country: alphanumeric

*City: alphanumeric

*Language: aplhanumeric

*Specialty: multivalue, alphanumeric.

3. **Club** (Strong):

*ClubID: primary key, alphanumeric

*ClubName: alphanumeric

*Category: multivalue, alphanumeric

*Description: alphanumeric

*Num_of_Members: number

*Email: multivalue, alphanumeric

4. **Event** (Strong):

*Event_ID: primary key, alphanumeric

*EventName: alphanumeric

*Date: primary key, date

*Location: primary key,class composite

1. LocationName, alphanumeric
2. Address, composite
    a. Country, alphanumeric
    b. City, alphanumeric

c. Street, alphanumeric

d. Apartment: (optional) alphanumeric

e. Postal code, number

*Category: alphanumeric

*Description: alphanumeric

5. **Division** (Strong)**:**

*DivisionID: primary key, alphanumeric

*DivisionID: alphanumeric

*Sport: alphanumeric

*Num_of_Teams: number

6. **Farternity** (Strong)**:**

*Frat_ID: primary key, alphanumeric

*FratName: alphanumeric

*Address: unique key, composite

1. Country, alphanumeric
2. City, alphanumeric
3. Street, alphanumeric
4. Apartment: (optional) alphanumeric
5. Postal code, number

*FoundingDate: date

*Num_of_Members: number

7. **Venue** (Strong):

*VenueID: primary key, alphanumeric

*VenueName: alphanumeric

*Address: composite, unique key

1. Country, alphanumeric
2. City, alphanumeric
3. Street, alphanumeric
4. Apartment: (optional) alphanumeric
5. Postal code, number

*Capacity: number

8. **Classroom** (Strong)**:**

*Place_ID: primary key, alphanumeric

*Purpose: alphanumeric

*Capacity: number

9. **Laboratory** (Strong):

*Place_ID: primary key, alphanumeric

*Category: alphanumeric

*Capacity: number

*Equipment: multivalue, alphanumeric

10. **Scholarship** (Strong):

*Schol_ID: primary key, alphanumeric

*Company: alphanumeric

*Num_of_offers: number

*Sum: number

11. **Insurance Contract** (Strong):

    *Ins_ID: primary key, alphanumeric

    *Company: alphanumeric

    *Money_Available: number

    *Cost_per_month: number

12. **Product** (Strong):

    *Product_ID: primary key, alphanumeric

    *ProdName: alphanumeric

    *Price: number

    *Availability: number

    *Weight: number

    *Height: number

    *Category: alphanumeric

    *Description: alphanumeric

13. **Cafeteria** (Strong):

    *CafeteriaID: primary key, alphanumeric

    *CafeteriaName: alphanumeric

    *Location: Address: composite, unique key

        1. Country, alphanumeric
        2. City, alphanumeric
        3. Street, alphanumeric
        4. Apartment: (optional) alphanumeric
        5. Postal code, number

    *Opening_hours: composite

        1. Hour: number
        2. Minute: number

*Closing_hours: composite

1. Hour: number
2. Minute: number

14. **Gym** (Strong):

*GymID: primary key, alphanumeric

*GymName: alphanumeric

*Address: unique key, composite

1. Country, alphanumeric
2. City, alphanumeric
3. Street, alphanumeric
4. Apartment: (optional) alphanumeric
5. Postal code, number

*Capacity: number

*Sports_facilities: multivalue, alphanumeric

15. **Student Job** (Strong):

*Job_ID: primary key, alphanumeric

*JobName: alphanumeric

*Wage: number

*Employer: alphanumeric

*Requisites: alphanumeric

*Description: alphanumeric

16. **Menu** (Strong):

*Menu_ID: primary key, alphanumeric

*Appetizer: primary key, alphanumeric

*Main_course: primary key, alphanumeric

*Dessert: primary key, alphanumeric

*Drink: alphanumeric

*Price: number

17. **Team** (Weak):

*TeamID: primary key, alphanumeric

*TeamName: alphanumeric

*Division: PK/FK, Division.DivisionID

*Competitions: FK, Competition.CompetitionID

*Trophies: FK/UK, Competition.CompetitionID

*Number_of_players: number

18. **Team_member** (Weak):

*User_ID: FK/PK, User.User_ID

*Team: FK/PK, Team.TeamID

***Position: alphanumeric

*Extra_info: alphanumeric

*Number: alphanumeric

*Season: composite, date

1. Start
2. End

19. **Frat_member** (Weak):
    *Frat: FK/PK, Fraternity.Frat_ID
    *Member: FK/PK, User.User_ID
    *Status: alphanumeric
    *Date_of_entry: date

20. **Membership** (Weak):
    *Gym: FK/PK, Gym.GymID
    *User: PK/FK, User_ID
    *Type: PK, composite
        1. Price_per_month: number
        2. Type_ID: alphanumeric
        3. Description: alphanumeric
    *Expedition_date: date
21. **Contract** (Weak):
    *User: PK/FK, User.User_ID
    *Job: PK/FK, StudentJob.Job_ID
    *Shift: PK, alphanumeric

22. **Attends** (Weak):
    *User: PK/FK, User.User_ID
    *Event: PK/FK, Event.EventID
    *Ticket: composite
        1. Price: number
        2. Tier: alphanumeric

23. **Student** (Weak):

*User: PK/FK, User.User_ID

*Student_ID: primary key, alphanumeric

*AverageGrade: number

*EnrollmentYear: number

24. **Professor** (Weak):

*User: PK/FK, User.User_ID

*Prof_ID: primary key, alphanumeric

*Salary: number

*NumberOfSections: number

25. **Head_of_Dept** (Weak):

*User: PK/FK, User.User_ID

*Head_ID: primary key, alphanumeric

*Salary: number

*NumberOfDepts: number

26. **Rector** (Weak):

*User: PK/FK, User.User_ID

*Rector_ID: primary key, alphanumeric

*Salary: number

27. **Admin** (Weak):

    *User: PK/FK, User.User_ID

    *Admin_ID: primary key, alphanumeric

28. **Permissions** (Weak):

    *User: PK/FK, User.User_ID

    *Action: alphanumeric

29. **Actions** (Strong):

    *Action_ID: primary key, alphanumeric

    *Description: alphanumeric

30. **Enrolls** (Weak):

    *Student: PK/FK, Student.Student_ID

    *Section: PK/FK, Section.Section_ID

    *Semester: primary key, composite

        1. Year: number

        2. Period: alphanumeric

    *Grade: number

31. **Belongs_to** (Weak):

    *Department: PK/FK Department.Department_ID

    *Degree: PK/FK Degree.Degree_ID

32. **Teaches** (Weak):

    *Professor: PK/FK Professor.Professor_ID

    *Section: PK/FK Section.Section_ID

    *Semester: primary key, composite

1. Year: number
2. Period: alphanumeric

33. **Manages** (Weak):

*Head: PK/FK Head_of_Department.Head_ID

*Department: PK/FK Department.Department_ID

34. **Section** (Weak):

*Section_ID: primary key, alphanumeric

*Course: PK/FK Course.Course_ID

*Number_of_students: number

*Passing_Students: number

35. **Course** (Weak):

*Course_ID: primary key, alphanumeric

*Sections: Foreign key, multivalue, Section.Section_ID

*Description: alphanumeric

*Credits: number

36. **Studies** (Weak):

*Student: PK/FK Student.Student_ID

*Degree: PK/FK Degree.Degree_ID

*Year_Start: number

*Year_End::number

37. **Is_part_of** (Weak):

*Course: PK/FK Course.Course_ID

*Degree: PK/FK Degree.Degree_ID

38. **Degree** (Strong):

*Degree_ID: primary key, alphanumeric

*Description: alphanumeric

*Number_of_Students: derived, number

39. **Department** (Weak):

*Department_ID: primary key, alphanumeric

*Number_of_degrees: derived, number

*Category: alphanumeric

40**valent** (Weak):

*Degree: PK/FK Degree.Degree_ID

*Foreign_Degree: PK/FK ForeignDegree.ForDeg_ID

41. **ForeignDegree** (Weak):

*ForDeg_ID: primary key, numeric

*Description: alphanumeric

42. **Takes** (Weak):

*Section: PK/FK Section.Section_ID

*Class: PK/FK Class.Class_ID

43. **Class** (Weak):

*Class_ID: primary key, alphanumeric

*Time_Slot: primary key, composite

1. Date: date
2. Time: time

44. **Store** (Weak):

*Store_ID: primary key, alphanumeric

*Address: unique key, composite

1. Country, alphanumeric
2. City, alphanumeric
3. Street, alphanumeric
4. Postal code, number

45. **Sells** (Weak):

*Store: PK/FK Store.Store_ID

*Product: PK/FK Product.Product_ID

*Stock: number

46. **Offers** (Weak):

*Cafeteria: PK/FK Cafeteria.Cafeteria_ID

*Menu: PK/FK Menu.Menu_ID

*Time Frame: composite

1. DateStart: date
2. DateEnd: date

47. **Club_member** (Weak):

*User_ID: FK/PK, User.User_ID

*Club: FK/PK, Club.Club_ID

***Role: alphanumeric

*Extra_info: alphanumeric

48. **Winner** (Weak):

*User: PK/FK, User.User_ID

*Scholarship: PK/FK Scholarship. Schol_ID

49. **Plan** (Weak):

*User: PK/FK, User.User_ID

*Insurance: PK/FK, Insurance.Insurance_ID

*Date_Bought: date

50. **Takes_Place_In** (Weak):

*Class: PK/FK Class.Class_ID

*Place: PK/FK Place_ID

51. **Competition** (Weak):

*Competition_ID: primary key, alphanumeric

*Division: PK/FK, Division.Division_ID

*Number_of_teams: number

*Reward: number

52. **Competes** (Weak):

*Competition: PK/FK Competition.Competition_ID

*Team: PK/FK Team.Team_ID

*Season: Primary key, number

53. **Match** (Weak):

*Match_ID: primary key, alphanumeric

*Team1: PK/FK Team.Team_ID

*Team2: PK/FK Team.Team_ID

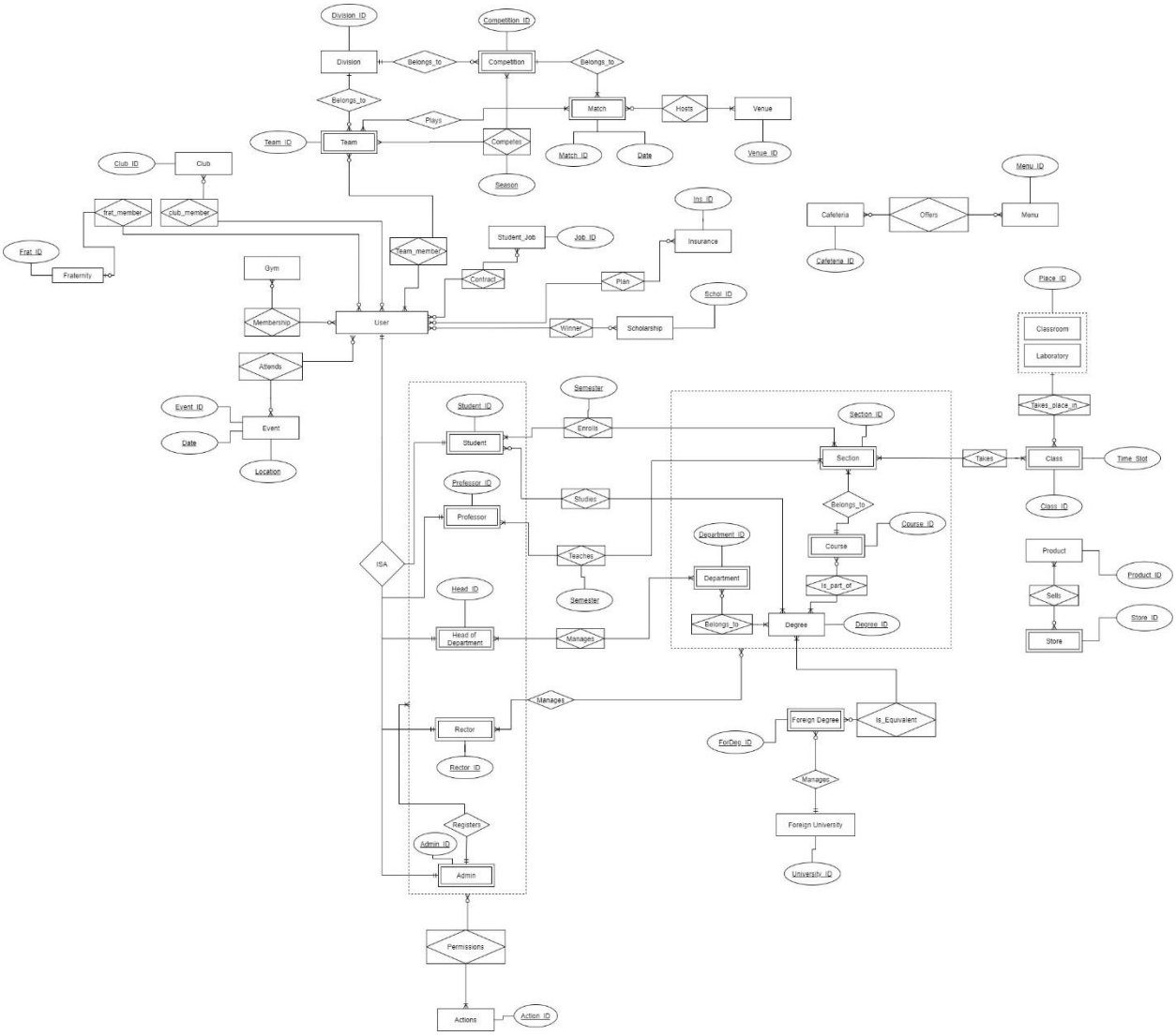
*Date: PK, date

54. **Hosts** (Weak):

*Match: PK/FK Match.Match_ID

*Venue: PK/FK Venue.Venue_ID

Section V: Entity Relationship Diagram



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Section VI: Testing Table

Rule	Entity 1	Relation	Entity 2	Cardinality	Pass/Fail
1.a	User	ISA	Student	1:1	PASS
1.a	User	ISA	Professor	1:1	PASS
1.a	User	ISA	Head of Department	1:1	PASS
1.a	User	ISA	Rector	1:1	PASS
1.a	User	ISA	Admin	1:1	PASS
1.b	User	Attend	Event	M:N	PASS
1.c	Student	Is_member	Club	M:N	FAIL
1.c	Student	Is_member	Team	M:N	FAIL
1.c	Student	Is_member	Frat	M:1	FAIL
1.d	User	Have	Credentials	1:M	PASS
1.e	User	Membership	UniversityGym	M:N	PASS
1.g	Student	Obtains	StudentJob	M:N	FAIL
1.h	Student	Obtains	Insurance	M:N	FAIL
1.i	Student	Is_member	Frat	M:1	FAIL
1.j	Student	Is_member	Club	M:N	FAIL
1.k	Student	Is_member	Team	M:N	FAIL
1.l	Student	Obtain	Scholarship	M:N	FAIL
2.a	Credentials	Have	User	M:1	PASS
3.a	Student	Enroll	Section	M:N	FAIL
3.b	Student	Belongs_to	Degree	M:N	PASS
3.c	Student	Registered_by	Administrator	M:1	PASS
3.d	Student	Permission	Action	1:M	PASS
4.a	StudentJob	Obtain	Student	N:M	FAIL
4.b	StudentJob	Obtain	Student	N:M	FAIL
5.a	Insurance	Obtain	Student	N:M	FAIL
5.b	Insurance	Obtain	Student	N:M	FAIL
6.a	Scholarship	Obtain	Student	N:M	FAIL
6.b	Scholarship	Obtain	Student	N:M	FAIL
7.a	Frat	Has	Student	1:M	FAIL
7.b	Frat	Has	Student	1:M	FAIL
8.a	Club	Has	Student	N:M	FAIL
8.b	Club	Has	Student	N:M	FAIL
9.a	Team	Has	Student	N:M	FAIL
9.b	Team	Play	Match	2:M	PASS
9.c	Team	Compete	Competition	N:M	PASS

9.d	Team	Belongs_to	Division	M:1	PASS
9.e	Team	Has	Student	N:M	FAIL
10.a	Match	Played_by	Team	M:2	PASS
10.b	Match	Belongs_to	Competition	M:1	PASS
10.c	Match	Hosted_at	Venue	M:1	PASS
11.a	Competition	Has	Team	M:N	PASS
11.c	Competition	Has	Match	1:M	PASS
11.d	Competition	Hosted_at	Venue	M:N	PASS
12.a	Division	Have	Team	1:M	FAIL
12.b	Division	Have	Competition	1:M	PASS
13.a	Venue	Host	Match	1:M	PASS
13.b	Venue	Host	Competition	M:N	PASS
14.a	Section	Has	Student	M:N	FAIL
14.b	Section	Has	Professor	M:1	FAIL
14.c	Section	Belongs_to	Course	M:1	PASS
14.d	Section	Has	Class	1:M	FAIL
15.a	Course	Has	Section	1:M	FAIL
15.b	Course	Belongs_to	Degree	M:N	FAIL
16.a	Degree	Has	Course	M:N	PASS
16.b	Degree	Belongs_to	Department	M:N	PASS
16.c	Degree	Belongs_to	Student	M:N	FAIL
16.d	Degree	Be_equivalent	Foreign Degree	M:N	PASS
17.a	Professor	Teach	Section	1:M	FAIL
17.b	Professor	Be_registered	Administrator	M:1	PASS
17.c	Professor	Permission	Action	M:N	PASS
18.a	Department	Has	Degree	M:N	PASS
18.b	Department	Has	Head_of_ department	M:N	PASS
19.a	Head of Dept	Belongs_to	Department	M:N	PASS
19.b	Head of Dept	Be_registered	Administrator	M:1	PASS
19.c	Head of Dept	Permission	Action	M:N	PASS
20.a	Rector	Manage	Department	M:N	PASS
20.b	Rector	Manage	Degree	M:N	PASS
20.c	Rector	Manage	Course	M:N	PASS
20.d	Rector	Manage	Section	M:N	PASS
20.e	Rector	Be_registered	Administrator	M:1	PASS
20.f	Rector	Permission	Action	M:N	PASS
21.a	Administrator	Register	User	1:M	PASS
21.b	Administrator	Permission	Action	1:M	PASS
22.a	Action	Performed_by	User	M:N	PASS
23.a	Class	Taken_by	Section	M:1	PASS

23.b	Class	Take_place	Classroom	M:N	PASS
23.b	Class	Take_place	Laboratory	M:N	PASS
24.a	Classroom	Belongs_to	Class	1:M	PASS
25.a	Laboratory	Belong_to	Class	1:M	PASS
26.a	Event	Attended_by	User	M:N	PASS
27.a	Product	Sold_in	Store	M:N	PASS
28.a	Store	Have	Product	M:N	PASS
29.a	Cafeteria	Offer	Menu	M:N	PASS
30.a	Menu	Be_found	Cafeteria	M:N	PASS
31.a	Foreign University	Offer	Foreign Degree	1:N	PASS
32.a	Foreign Degree	Belongs_to	Foreign University	M:1	PASS
32.b	Foreign Degree	Be_equivalent	Degree	M:N	PASS
33.a	University Gym	Have	User	M:N	PASS

Test	Error Description
1.c 1.g 1.h 1.i 1.k 1.l 4.a 4.b 5.a 5.b 6.a 6.b 7.a 7.b 8.a 8.b 9.a 9.e	Student is weak, so this makes all relations to jobs, scholarships, insurance, clubs, fraternities, and teams obligatory. We want these relations to be optional for students.
3.a 14.a	Students can’t enroll into several different sections and details like semester are missing.
12.a	Divisions can’t have no teams from the home university, but divisions are external to the university.
14.b 17.a	Professors can’t teach several sections. More details are needed, like semester.
14.d	Section can only have one class, and we want the section to have many classes.

15.a	Course doesn’t support many sections. More details are needed for this relation, as a course can have many sections and sections can belong to many courses.
15.b	Degree doesn’t support many courses. More details are needed for this relation, as a degree can have many courses and courses can belong to many degrees.
16.c	Student doesn’t support many degrees. More details are needed for this relation, as a degree can have many students and students can belong to many degrees.