

College Database

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Section I: Project Description

I am creating a College Database that holds all the basic information a college would need to function. This includes a detailed list of college infrastructure, staff, and faculty. Also, since this is a data base for a college, our College Database will also help facilitate the needs of students too.

A college community wants to know the basic layout of its college. Which buildings contain what departments? Where is the best place to find available parking? These are just a few questions that our College Database aims to help answer quick and efficiently.

Colleges often deal with a great amount of people every day. This includes staff who work at the college. Faculty who may function as professors or fill other roles within the college. Finally, a college is there to provide for its students and that is why our College Database attempts to focus on these key demographics' needs.

Section II: Use Cases

Use Case Title:	Checking class schedule
Actors:	Student
Description	Bob is a student at our college. Bob just registered for all the classes he needed for the upcoming semester. He would now like to view his class schedule for this semester, to see if there are any time conflicts. He would also like to view his class schedule for last semester, to see if he can sync up his old bus schedule with this upcoming semester.

Use Case Title:	Checking an instructor's department
Actors:	Faculty
Description:	Sam is employed at our college as a faculty member. She just received a phone call from a student asking whether a popular instructor at the school, Prof. Bob, has any open waitlist spots for his Computer Science class. Sam sees that there are two Prof. Bobs at our college, one teaches history and the other teaches Computer Science. Sam must find the correct Professor being referenced by the student. She then sees that there is one open spot on the waitlist for this class and lets the student know that she can register for the class using a waitlist spot.

User Case Title:	Register for a class with conflicting time schedule
Actors:	Student
Description:	<p>Molly is a student at our college. She is signing up for classes for the upcoming semester. She attempts to sign up for one of the classes that she needs, but the registration system gives her an error message, stating that there's a conflicting time schedule with one of her other classes. She decides that the new class she is trying to register for is more important than the other one, so she drops her previous class and again attempts to re-register for the new class and does so successfully this time.</p>

Use Case Title:	Deciding whether a student meets graduation requirements
Actors:	College Faculty, Student
Description:	<p>Bob is a student at our college, he is planning to graduate next semester and checks with the school website to see whether he meets all requirements for graduation. He thinks that he does, so he applies for graduation. Sam is a faculty member at our college, and she receives the graduation application. Sam then looks up to see whether Bob indeed meets all the requirements to graduate. She sees that Bob is missing one required course and tells Bob that he must get an advisor to authorize marking the course as completed in order to graduate.</p>

Use Case Title:	Dropping all classes for the semester
Actors:	Student
Description:	After having trouble at home and work, Mark concludes that he needs to drop all his current courses so he could focus all his attention on his home needs. Mark drops all of his courses and plans to register for them all again during the following semester.

Use Case Title:	Vehicles owned by the school
Actors:	Staff
Description:	Simon is a custodian at our campus. He needs a vehicle to be able to transfer all his equipment across multiple campuses that are contained within our college. His current vehicle is no longer working, so Simon moves onto the next available and vacant vehicle, using this one instead to help complete his work schedule.

Use Case Title:	Checking the College's General Information
Actors:	Staff
Description:	Bob is a food clerk for our college. He's stopped by a random person on his way to his job at our college. This person asks Bob general questions about the college, and Bob's able to answer these questions by pulling up the college website which provides basic information about the college.

Use Case Title:	Checking whether the college has a library or not
Actors:	Student
Description:	Matt's never been to our campus in person and wants to know whether the college has a library or not. He looks up online and see's that our college has many buildings, and one of them is in fact a library.

Use Case Title:	Clubs
Actors:	Student
Description:	Joe is a student at our college. He's very interested in Star Trek and wishes to find a club based on the popular series. He searches for a list of on-campus programs and finds one that matches his desire. He requests to join this program.

Use Case Title:	Checking level of degrees
Actors:	Faculty
Description:	Zane is a faculty member for our college. He gets a call from someone inquiring about what kind of degrees our college offers. After confirming with our database, Zane tells the person over the phone that the college offers only four-year degrees and above.

Section III: Database Rules (Business Requirements)

1) College

- a) A college can have clubs.
- b) A college can have a student.
- c) A college offers degrees.
- d) A college can have faculty.
- e) A college can have buildings.
- f) A college can have parking lots.

2) Student

- a) A student can register for classes.
- b) A student must be in at least one college.
- c) A student must have at least one degree to graduate.
- d) A student must be registered for at least one semester.

3) Faculty

- a) Faculty may work at a college.
- b) A faculty member may be an advisor.
- c) A faculty member is a researcher.
- d) A faculty member is a professor.
- e) A faculty member is a lecturer.
- f) A faculty member is a chair.

4) Advisor

- a) An advisor is a faculty member.

5) Researcher

- a) A researcher is a faculty member.

6) Lecturer

- a) A lecturer is a faculty member.
- b) A lecturer must teach at least one course.
- c) A lecturer must be in at least one department.

7) Professor

- a) A professor is a faculty member.
- b) A professor must teach at least one course.
- c) A professor must be in at least one department.

8) Chair

- a) A chair is a faculty member.
- b) A chair must teach at least one course.
- c) A chair must belong to at least one department.

9) Staff

- a) Staff is a custodian.
- b) Staff is a librarian.
- c) Staff is a food clerk.
- d) Staff can have equipment.

10) Custodian

- a) A custodian is a staff.

11) Librarian

- a) A librarian is a staff.

12) Food Clerks

- a) A food clerk is a staff.

13) Equipment

- a) Equipment can belong to a staff member.

14) Clubs

- a) A club can belong to a college.

15) Parking Lots

- a) A parking lot can be in a college.

16) Departments

- a) A department can have a lecturer.
- b) A department can have a professor.
- c) A department can have a chair.
- d) A department can have offices.
- e) A department may be found in a building.

17) Offices

- a) An office can belong to a department.

18) Buildings

- a) A building can contain a department.
- b) A building can belong to our college.
- c) A building can contain campuses.
- d) A building can contain services.

19) Campuses

- a) Campuses can be found in buildings.

20) Services

- a) Services can be found inside buildings.
- b) Services can be tutoring.
- c) Services can be Health & Wellness.

21) Tutoring

- a) Tutoring is a service.

22) Health & Wellness

- a) Health & Wellness is a service.

23) Degrees

- a) Many different four-year degrees are offered by our college.
- b) Degrees enable students to graduate.

24) Subjects

- a) Subjects can be found in courses.
- b) Subjects can contain arts.
- c) Subjects can contain sciences.

- d) Subjects can contain languages.

25) Arts

- a) Arts are a subject.

26) Sciences

- a) Sciences are a subject.

27) Languages

- a) Languages are a subject.

28) Courses

- a) Courses can be based off subjects.
- b) Courses can be graded by a grader.
- c) Courses can be taught by a lecturer.
- d) Courses can be taught by a professor.
- e) Courses can be taught by a chair.
- f) Courses can be based around a schedule.
- g) Courses can have a waitlist.
- h) Many courses can be found in a semester.

29) Waitlist

- a) A waitlist must be based around a single course.

30) Schedule

- a) A schedule can belong to a course.

31) Semesters

- a) A semester can have many courses.
- b) A semester can have zero to many registered students.
- c) A semester can have zero to many sections.

32) Sections

- a) Sections belong to at least one semester.

Section IV: Detailed List of Main Entities, Attributes, and Keys

- 1) College (Strong)
 - a) college_id: key, numeric
 - b) name: alphanumeric
 - c) address: composite, alphanumeric
- 2) Student (Weak)
 - a) student_id: key, numeric
 - b) name: composite, alphanumeric
 - c) address: composite, alphanumeric
 - d) email: alphanumeric
- 3) Faculty (Strong)
 - a) faculty_id: key, numeric
 - b) name: composite, alphanumeric
 - c) address: composite, alphanumeric
 - d) salary: numeric
 - e) email: alphanumeric
- 4) Advisor (Weak)
 - a) advisor_id: composite, key, numeric
 - b) description: alphanumeric
- 5) Researcher (Weak)
 - a) researcher_id: composite, key, numeric
 - b) description: alphanumeric
- 6) Lecturer (Weak)
 - a) lecturer_id: composite, key, numeric
 - b) description: alphanumeric

7) Chair (Weak)

- a) chair_id: composite, key, numeric
- b) description: alphanumeric

8) Staff (Strong)

- a) staff_id: key, numeric
- b) name: composite, alphanumeric
- c) address: composite, alphanumeric
- d) salary: numeric
- e) phone: composite, alphanumeric

9) Custodian (Weak)

- a) custodian_id: composite, key, numeric
- b) description: alphanumeric

10) Librarian (Weak)

- a) librarian_id: composite, key, numeric
- b) description: alphanumeric

11) Food Clerks (Weak)

- a) foodclerk_id: composite, key, numeric
- b) description: alphanumeric

12) Equipment (Strong)

- a) equip_id: key, numeric
- b) location: composite, alphanumeric
- c) description: alphanumeric

13) Clubs (Strong)

- a) club_id: key, numeric
- b) name: alphanumeric
- c) members_num: numeric
- d) location: composite, alphanumeric
- e) website: alphanumeric

14) Parking Lots (Strong)

- a) parkinglot_id: key, numeric
- b) name: composite, alphanumeric
- c) location: composite, alphanumeric
- d) capacity: numeric

15) Departments (Strong)

- a) department_id: key, numeric
- b) name: composite, alphanumeric
- c) office_location: composite, alphanumeric
- d) chair: composite, alphanumeric

16) Offices (Strong)

- a) office_id: key, numeric
- b) room_num: numeric
- c) location: composite, alphanumeric

17) Buildings (Strong)

- a) building_id: key, numeric
- b) capacity: numeric
- c) location: composite, alphanumeric

18) Campuses (Strong)

- a) campus_id: key, numeric
- b) roles: composite, alphanumeric
- c) location: composite, alphanumeric

19) Services (Strong)

- a) service_id: key, numeric
- b) roles: composite, alphanumeric
- c) location: composite, alphanumeric
- d) staff_num: composite, numeric

20) Tutoring (Weak)

- a) tutor_id: composite, key, numeric

- b) subject: composite, alphanumeric
- c) location: composite, alphanumeric
- d) staff_members: numeric

21) Health & Wellness (Weak)

- a) healthwellness_id: composite, key, numeric
- b) location: composite, alphanumeric
- c) staff_members: numeric

22) Degrees (Strong)

- a) degree_id: key, numeric
- b) subject: alphanumeric
- c) type: composite, alphanumeric
- d) description: alphanumeric

23) Subjects (Strong)

- a) subject_id: key, numeric
- b) description: alphanumeric
- c) total_subject_nums: composite, numeric

24) Arts (Weak)

- a) arts_id: composite, key, numeric
- b) subject_num: numeric

25) Sciences (Weak)

- a) sciences_id: composite, key, numeric
- b) subject_num: numeric

26) Languages (Weak)

- a) languages_id: composite, key, numeric
- b) subject_num: numeric

27) Courses (Weak)

- a) course_id: key, numeric
- b) teacher: composite, alphanumeric
- c) subject: composite, alphanumeric

- d) student_num: numeric
- e) location: composite, alphanumeric

28) Waitlist (Weak)

- a) waitlist_id: composite, key, numeric
- b) capacity: numeric

29) Schedule (Strong)

- a) schedule_id: key, numeric
- b) time: multivalue, timestamp
- c) course: composite, alphanumeric

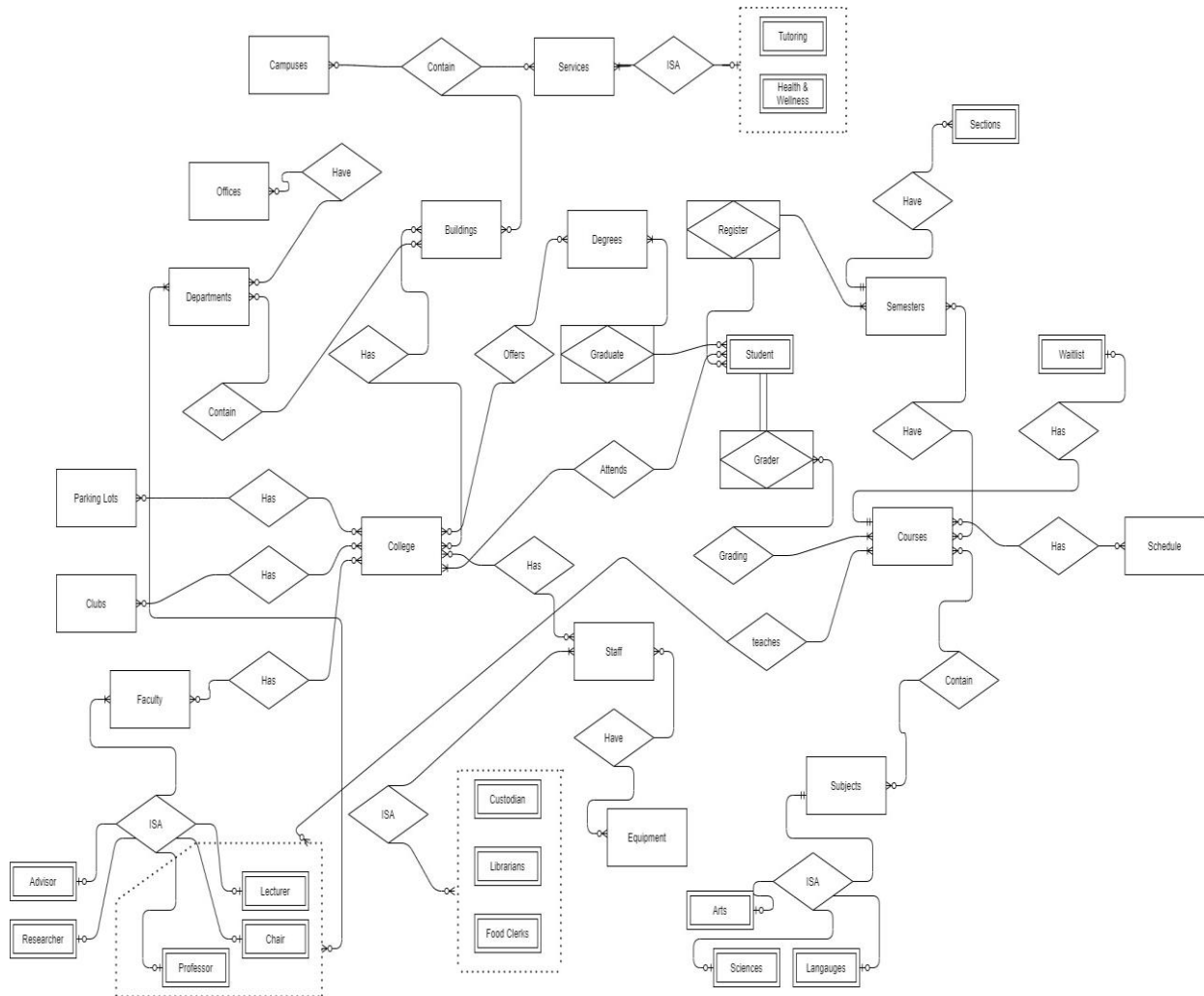
30) Semesters (Strong)

- a) semester_id: key, numeric
- b) term: composite, alphanumeric
- c) student_num: composite, numeric
- d) date: multivalue, timestamp

31) Sections (Strong)

- a) section_id: key, numeric
- b) semester: composite, alphanumeric
- c) student_num: composite, numeric
- d) date: multivalue, timestamp

Section V: Entity Relationship Diagram (ERD)



Section VI: Testing Table

Rule	Entity A	Relation	Entity B	Cardinality	Pass /Fail	Error Description
1	college	has	clubs	M-to-1	Fail	A club can belong to more than one college.
2	College	Have	Student	M-to-N	Fail	A student needs a college to be a student
3	College	Offers	Degrees	M-to-N	Pass	None
4	College	Have	Faculty	M-to-N	Pass	None
5	College	Have	Buildings	M-to-N	Pass	None
6	College	Has	Parking Lots	M-to-N	Pass	None
7	Student	Register	Course	1-to-M	Fail	A student will register for a semester, which contains courses.
8	Student	Be in	College	M-to-N	Fail	A student must be in at least one college to be a student
9	Student	Have Degree	Graduate	1-to-M	Pass	None
10	Student	Register	Semester	1-to-M	Fail	A semester happens with or without a student
11	Faculty	Work	College	M-to-N	Pass	None
12	Faculty	Is a	Advisor	1-to-0:1	Pass	None
13	Faculty	Is a	Researcher	1-to-0:1	Pass	None
14	Faculty	Is a	Professor	1-to-0:1	Pass	None
15	Faculty	Is a	Lecturer	1-to-0:1	Pass	None

16	Faculty	Is a	Chair	1-to-0:1	Pass	None
17	Advisor	Is a	Faculty	0:1-to-1	Pass	None
18	Researcher	Is a	Faculty	0:1-to-1	Pass	None
19	Lecturer	Is a	Faculty	0:1-to-1	Pass	None
20	Lecturer	May have	Office	M-to-N	Fail	Lecturer is weak, doing this would make it strong
21	Lecturer	teaches	Course	1:M-to-N	Pass	None
22	Lecture	Be in	Department	1-to-N	Pass	None
23	Professor	Is a	Faculty	0:1-to-1	Pass	None
24	Professor	May Have	Office	M-to-N	Fail	Professor is weak, doing this would make it strong
25	Professor	Teaches	Course	1:M-to-N	Pass	None
26	Professor	Be in	Department	1-to-N	Pass	None
27	Chair	Is a	Faculty	0:1-to-1	Pass	None
28	Chair	May have	Office	M-to-N	Fail	Chair is weak, doing this would make it strong
29	Chair	Teaches	Course	1:M-to-N	Unsure	I want my department chairs to be able to teach if they're needed to, but if I make this relationship "chair can teach" then chair is no longer weak. Chair needs to be weak because it's a child entity.
30	Chair	Be in	Department	1-to-N	Pass	None
31	Staff	Is a	Custodian	1-to-0:1	Pass	None
32	Staff	Is a	Librarian	1-to-0:1	Pass	None
33	Staff	Is a	Food Clerk	1-to-0:1	Pass	None
34	Staff	Have	Equipment	M-to-N	Pass	None
35	Custodian	Is a	Staff	0:1-to-1	Pass	None
36	Librarian	Is a	Staff	0:1-to-1	Pass	None
37	Food Clerk	Is a	Staff	0:1-to-1	Pass	None

38	Equipment	Have	Staff	M-to-N	Pass	None
39	Clubs	Belong to	College	M-to-N	Pass	None
40	Parking Lots	Have	College	M-to-N	Pass	None
41	Department	Have	Lecturer	N-to-1	Pass	None
42	Department	Have	Professor	N-to-1	Pass	None
43	Department	Have	Chair	N-to-1	Pass	None
44	Department	Have	Offices	M-to-N	Pass	None
45	Department	Contain	Building	M-to-N	Pass	None
46	Offices	Have	Lecturer	M-to-N	Fail	Professor is weak, doing this would make it strong
47	Offices	Have	Chair	M-to-N	Fail	Chair is weak, doing this would make it strong
48	Offices	Have	Professor	M-to-N	Fail	Professor is weak, doing this would make it strong
49	Offices	Have	Department	M-to-N	Pass	None
50	Buildings	Contain	Department	M-to-N	Pass	None
51	Buildings	Have	College	M-to-N	Pass	None
52	Buildings	Have	Campuses	M-to-N	Pass	None
53	Buildings	Have	Services	M-to-N	Pass	None
54	Campuses	Have	Buildings	M-to-N	Pass	None
55	Services	Have	Buildings	M-to-N	Pass	None
56	Services	Is a	Tutoring	1-to-0:1	Pass	None
57	Services	Is a	Health & Wellness	1-to-0:1	Pass	None
58	Tutoring	Is a	Services	0:1-to-1	Pass	None
59	Health & Wellness	Is a	Services	0:1-to-1	Pass	None
60	Degrees	Offers	College	M-to-N	Pass	None

61	Degrees	Graduate	Student	M-to-N	Fail	This would make student strong, but student is a weak entity.
62	Subject	Contain	Courses	M-to-N	Pass	None
63	Subject	Is a	Arts	1-to-0:1	Pass	None
64	Subject	Is a	Science	1-to-0:1	Pass	None
65	Subject	Is a	Languages	1-to-0:1	Pass	None
66	Arts	Is a	Subject	0:1-to-1	Pass	None
67	Science	Is a	Subject	0:1-to-1	Pass	None
68	Languages	Is a	Subject	0:1-to-1	Pass	None
69	Courses	Contain	Subjects	M-to-N	Pass	None
70	Courses	Graded	Grader	N-to-1:M	Pass	None
71	Courses	Taught by	Lecturer	N-to-1:M	Pass	None
72	Courses	Taught by	Professor	N-to-1:M	Pass	None
73	Courses	Taught by	Chair	N-to-1:M	Unsure	Same reasons as #29
74	Courses	Have	Schedules	M-to-N	Pass	None
75	Courses	Have	Waitlist	0:1-to-1:M	Pass	None
76	Courses	Have	Semesters	M-to-N	Pass	None
77	Waitlist	Have	Courses	1:M-to-0:1	Pass	None
78	Schedule	Have	Course	M-to-N	Pass	None
79	Semester	Have	Courses	M-to-N	Pass	None
80	Semester	Registered	Students	M-to-N	Fail	This would make student strong, but student is weak
81	Semester	Have	Sections	N-to-1:M	Fail	Sections can belong to one and only one semester.
82	Sections	Have	Semester	N-to-1:M	Fail	Same as #82

