College Management System

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Database Purpose - The purpose of the database is to maintain the data used to generate and support college management system. It allows the college admin to maintain students. The students will be allowed to take courses based on the maximum credits per semester. The courses will be assigned to the respective professors. The courses will then be allocated to the physical classrooms.

Business Problems Addressed –

- To maintain data on students' name, contact number and addresses.
- To track the fee payment of students.
- To track the courses the student has taken.
- Associate a course with a professor and a physical room, also track the TA under a course.
- To track grants and the project's funds, also tracks the professor and department undertaking the project and grants.
- To perform searches on student data, fee payment data, courses taken.
- Report generation on students, courses and departments.

Business Rules –

- Each student may have one or more courses
- Each student may have one or more fee payment
- Each student may or may not be a TA for a course
- Each student may have one or more addresses
- Each department can have many professors
- Each department can have many projects
- Each grant can fund many projects
- A professor can have zero or more projects under him
- Each student can be a part of at most 2 clubs
- A project cannot be funded more than the required fund

Design Decisions

Entity Name	Why Entity Included	How Entity is Related to Other Entities
Student	The corner stone of college management system is to reliably store and fetch student's data. As the student is a very integral part of the system.	Each student can have many addresses. The primary key StudentID relates to address. StudentID also related to fee payment receipts. StudentID also helps identify the courses student has taken and if a student is a TA under some course. StudentID also helps identify the clubs student is involved in.
Course	The course table stores all the courses that are offered by the university and it also stores the prerequisites and the course levels(undergrad/grad) and the amount of credit it is worth. It is important to a college management database system.	A CourseID relates to Student_has_Course table which helps identify the courses a student has taken. CourseID also relates to the class table which helps connect a course with a professor and it's respective TAs under a timeslot.
Address	It tracks the addresses of various students and employees. A student can have many addresses, so, there needs to be a separate table that can track multiple addresses for a student.	An address table can have multiple entries per student or employee.
Fees	A student has to pay fees multiple times during the course of his study. So, all these transactions have to be stored for future reference, therefore, there is a dedicated fee table to store, search transactions.	Fee table can have multiple entries per student per billing cycle.
Student_has_Course	This table is specifically to connect the student to courses to track the grade of a student in that course. It also tells us the start date and the semester of Student.	Student_has_Course has composite key that is made by student id and course id and therefore it is connected to student and course.
TA	Each class may have multiple TAs and those TAs are essentially students. This table is used to track the TAs for a specific course.	A TA is related to a class and a student via StudentID and RoomID. It also has the CourseID and ProfessorID which can then help to check the professor for the course and the course itself.
Management	Management is a subclass of employee table. This table has the username and password of all management people	Management is related to the employee table via the EmployeeID which is the foreign key.
Class	A class table is a representation of an actual classroom where a course is connected to a professor and a room. It also has a timeslot to assign the specific room for a certain amount of time.	A class is connected to courses, professors and TAs as a class is required to have atleast 2 of them and might have TAs.

Department	The department table is there to track the professors in a department and the project undergoing a certain department.	DepartmentID relates to a professor, professor entity has a DepartmentID to help track the department that the professor is in. DepartmentID also relates to projects, so a project can be track back to source department.
Grants	Colleges often get grants from donators/well-wishers for research purposes. This table is necessary to track the funds to the projects they support.	It is related to projects through a many to one relationships as many grants can fund one project.
Professor	A course has to be taught by a trained professional and those have to be employed by a university / college. Hence, it is necessary to store the data.	There can be many professors in a department. A professor is connected to a class with one-to-one relationship and a professor can be involved with multiple projects.
Employee	It keeps track of all the professors and management people.	Employee is a superclass of Professor and Management table. Professor and Management is related to Employee table via EmployeeID which is the foreign key.
Club	Club table keeps track of all the clubs a student is involved in. A club has various presidents and a ClubID.	It is related to Student_has_club via the ClubID which is the primary key.
Student_has_club	This table shows whether a student is involved in a club or not.	Student_has_club has composite key that is made by student id and course id and therefore it is connected to student and club.
Projects	Universities usually research for academic purposes and are often funded to do so. So, these projects are important. Therefore, they have to be tracked and stored.	It is related to grants through a one to many relationships as many grants can fund one project. It is also related to professor table as professor may or may not be working on multiple projects.