Assignment 1

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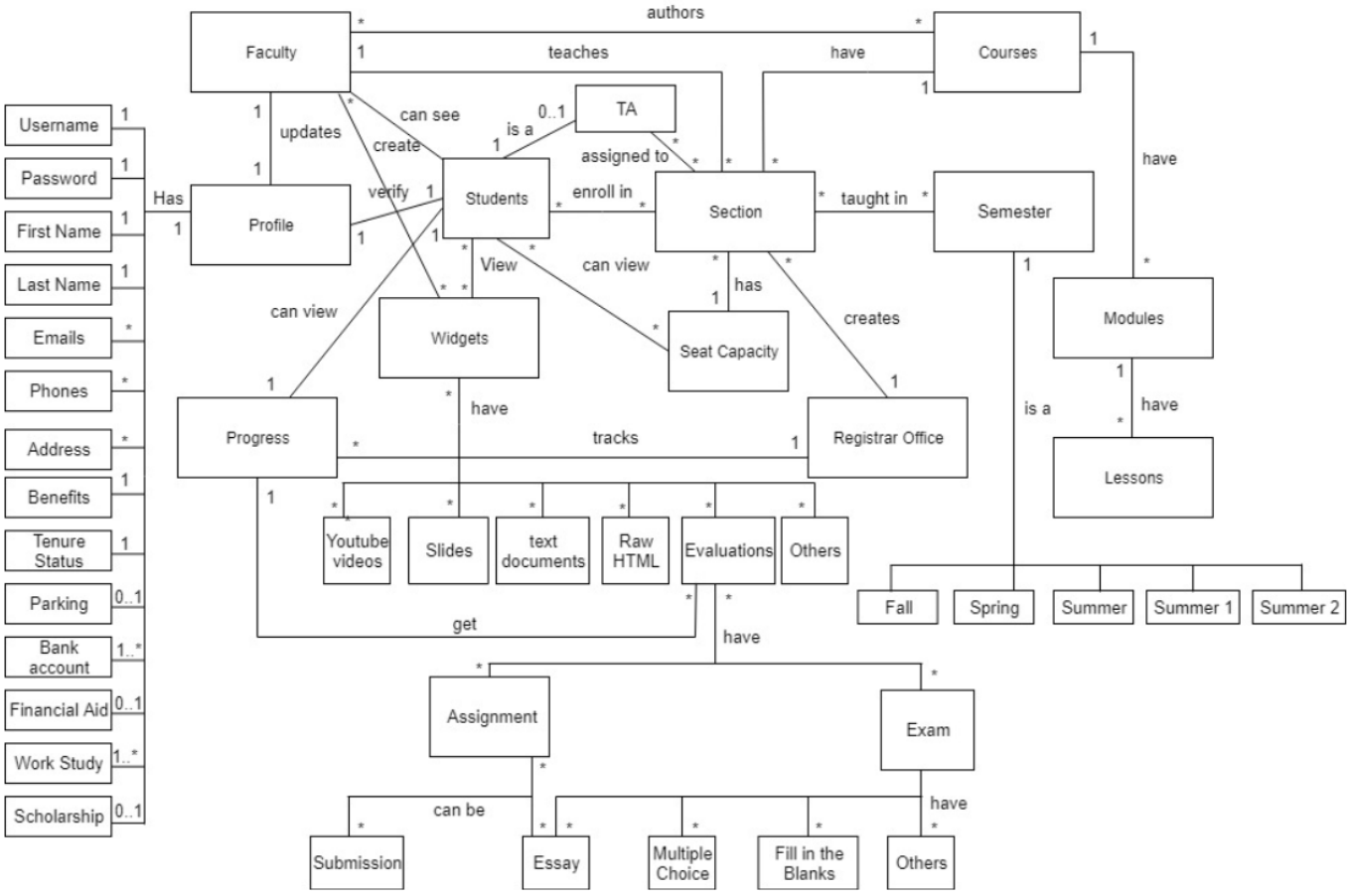
Candidate Classes/Attributes:

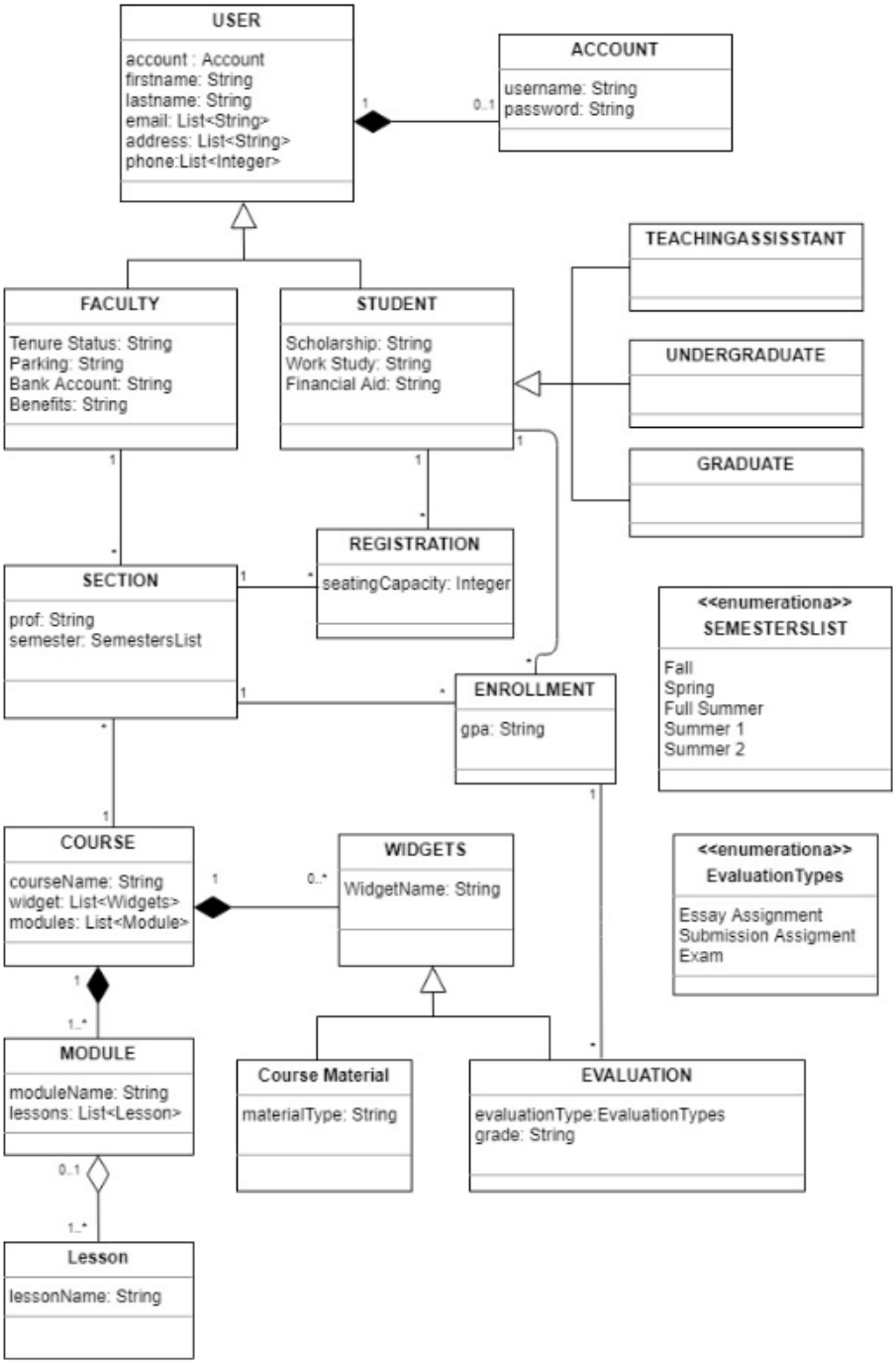
Nouns	Verbs
Faculty	Faculty *authors* courses
Students	Faculty *teaches* section
Courses	Students *view* seat capacity of a section
Modules	Section *has* seat capacity
Lessons	Faculty *create* widgets
Calendar Schedule	Faculty *updates* profile
Youtube Videos	Students *view* progress
Slides	Courses *have* sections
Text Documents	Section *taught* in semester
Raw HTML	Registrar office *creates* sections
Evalutions	Registrar office *tracks* student's progress
Widgets	Courses *have* modules
Evaluation Widgets	Modules *have* Lessons
Essay Assignment	Widgets *have* Youtube Videos, Slides, Text Documents, Raw HTML, Evaluations and others
Submission Assignment	Evaluations *have* Submission Assignment, Essay Assignment and Exams
Exam	Exams *have* Essay, Multiple Choice Questions, Fill in the blanks and others
Progress	Semesters *are of type* Fall, Spring, Full Summer, Summer 1 and Summer 2
Essay Questions	Students *can* view grades
Multiple Choice Questions	Faculty *updates* Benefits, Tenure Status, Parking and Bank Account
Fill In the Blanks	Students *verify* Financial Aid, Work Study, Scholarship
Sections	Users *can verify* username, password, first name, last name, emails, phones and addresses
Semester	Students *enroll* in section
Fall	
Spring	
Full Summer	
Summer 1	
Summer 2	
Seat Capacity	
Undergrad students	
Graduate Students	
Teaching Assistants	
Enrollment	
Grades	
Username	
Password	
FirstName	
Lastname	
Email	
Phone	
Address	
Benefits	
Tenure Status	

Parking	
Bank Account	
Financial Aid	
Work Study	
Scholarship	
Grades	
Teaching Assistant	

Naive Diagram:



Final Class Diagram



Generalizations

1. From the above diagram, we can see that both, faculty and students are users of LMS. In order to access the account, they will have username and password. Each user will have First Name, Last Name, Emails, Phone and Address. Therefore they will be the attributes to a class User. The user will have two types, Faculty and Students. Both will have common attributes which will be available in the User, but they will have the specialized use cases where the Faculty will the ability to update Benefits Tenure status, Parking and Bank Account. Therefore, these attributes will be part of Faculty class. On the other hand, Students can view Scholarships, Financial Aid and Work Study, so theses attributes will be part of Student class. Therefore, we will have the User class as the parent class. Faculty and Students will inherit the specified attributes from the User class.

2. There can be Undergraduate Students, Graduate Students and Teaching Assistants, all having specific attributes to them. Hence, a student class will be the parent class and the above mention types will be individual classes having specific attributes.
3. The widgets available will be of multiple types. However, they can be extended to Course Materials and Evaluations. Course Material can have attributes which will specify certain categories such as Youtube Videos, Slides, Text Documents, Raw HTML whereas Evaluations will be of three types: Submission Assignment, Essay Assignment and Exams. These three types can be an enumeration of EvaluationTypes and can be added in Evaluation Widget through the attribute evaluationType to distinguish among the evaluation widgets and a grade pertaining to that evaluation. Similarly, Course Material class can have attribute courseMaterial which can have multiple types of widgets available.

Compositions

1. In LMS, the User will have an account. Therefore, without the user, its account will not exist, so it will have a dependency on the User class. The account will have username and password in order to access it. Every User may or may not have an account. There can be a possibility that there is a new user whose account has not be created yet. But, there will always be a user for an account.
2. A course will be comprised of multiple modules. Each course depends on modules designed on the basis of what the professor intends to teach. Therefore, the Course class owns the Module class. The course can contain multiple modules and it will have at least one module. Hence, the Course class has courseName, widgets and modules as its attributes. The course can own multiple modules. For a course to exist, there will have to be at least one module.
3. Similar to Module class, the Widget class also exists if the Course exists because the Widgets will be designed in the LMS for a particular course. It will have no existence separately. However, the cardinality is shown as 0 or more as there a possibility that initially when the course is created, the widgets have not yet been uploaded or designed for the course.

Aggregations

1. The Module is comprised of lessons. Therefore, there must be one or more lessons for the module to exist. Hence, the Module has lessons for its existence. But the lessons can exist individually explaining a topic without the module. Module class contains the moduleName as an attribute and a list of lessons.

Explanations of Class Diagram

From the naive diagram, we can see that the Faculty authors many course and a course can be authored by many courses. There can be multiple sections for a course. But each section can have only one course which is taught in it. Each section will have only one Professor who will teach it. Therefore there will be Section class. The Section class will be have an association with the Faculty class. It will have prof and semester as its attributes. The semester attribute will contain the semester value which will mention which semester that course is being taught currently. The semester attribute can have only five values, fall, spring, summer 1, summer 2 and full summer. Therefore they can be combined together in an enumeration.

We can have a Registration class which will be used as a mapping table between the sections available and the students. The students can view the available sections but at a time, each registration can show the seating capacity of one section. Therefore the seatingCapacity is the attribute of the Registration class.

The student has an association with the Enrollment class. Each enrollment will belong to one student but a student can have multiple enrollments. One enrollment will be for a particular section through which the student can get access to the course of that section and the widgets for course material and the assignments for that section. Each enrollment can show the cumulative gpa for the student. Therefore gpa is the attribute for that student.

Similarly, the student has an association will the Evaluation table. Each student can view multiple evaluations pertaining to multiple courses, however each evaluation will belong to on students. The Evaluation Class contains the grade obtained by the student for a particular assignment, essay or exams. Hence, the Evaluation Class contains the evaluationType and the grade as its attribute.

Since progress class is like the evaluation class because both will contain the grades. Hence that is redundant and can be removed.

Assuming that registrar is not the user of the LMS and is just an admin who takes care of creation of sections and tracking the students progress, the registrar class is irrelevant in this universe.