CSI 3335 Spring 2019

Database Project

Developing a curriculum

Universities are constantly developing curriculums (majors). We would like to develop tools to maintain various information about curriculums.

Curriculum

A curriculum has a unique name associated to it. It has a person who is in charge of it. We store the name and a unique ID of the person in charge.

A curriculum is made up of courses. Each course has a (unique) name, a subject code (a four character string) and a course number. The combination of subject code and four-digit course number is unique for each course. Each course also has a number of credit hours (a positive integer). Notice that a course can be shared by multiple curricula. Each course should also have a short paragraph that serves as a course description.

Some courses are required for a curriculum and some are optional, this needed to be recorded. A course that is required within one curriculum may be optional in another.

Each curriculum has also a minimum number of credit hours. That is, it must have courses that totaled up to that number of credit hours. (It can have more).

Curriculum topics

Each curriculum is also associated with a set of topics. Each topic has an unique id and a name. Notice that a topic may be associated with multiple curricula.

For each topic that is associated to a curriculum, it has the following other attributes denoting the association to it:

- Level: it can be either level 1, 2 or 3. (See below for meaning)
- Subject area: The subject area that this topic corresponds to within that curriculum
- Units: the unit of "time" that this topic should be covered (a positive number, allow one decimal place).

Notice that if a topic is associated with multiple curricula, the three attributes can be completely different for different curriculum.

Relation between curriculum, topics and courses

Each course in a curriculum must cover a subset of topics that is associated with the course. A course can at most cover a certain units of topics (this unit is different for different curricula). (It can cover less, but it must cover at least 1 unit). There is no limit of subject area and level of topics to be covered in a course (it can mix and match). A topic can also be covered by multiple courses. If a topic has multiple units, the units can be divided among multiple courses.

Each curriculum is evaluated (in terms of coverage by topics) and is assigned one of the following topic-catagories:

- Extensive: All level 1 and 2 topic for the curriculum are covered by the required courses in the curriculum, and at least a certain number of units (this is dependent of the curriculum) of topics in level 3 are covered. By covered it means that the require number of units for each topic is covered
- Inclusive: All level 1 and 2 topic for the curriculum are covered by the required courses in the curriculum.
- Basic-plus: All level 1 topics for the curriculum are covered by the required courses, and at least a certain percentage (depend on the curriculum) of the units for the level 2 topics are covered by the required courses, and the remaining units are covered by the optional courses.
- Basic: All level 1 topics for the curriculum are covered by the required courses, and at least a certain percentage (depend on the curriculum) of the units for the level 2 topics are covered by the required courses.
- Unsatisfactory: All level 1 topics for the curriculum are covered by the required courses, but not enough percentage (depend on the curriculum) of the units for the level 2 topics are covered by the required courses.
- Substandard: Some level 1 topics for the curriculum are not covered by the required courses.

Goals

Another important aspect of a curriculum is the goals it wants to achieve. Each curriculum has a set number of goals. Each goal has a unique ID and a string describing the goal. (A string of at most 255 characters). Notice that goals are NOT shared between curricula.

Curriculum, course and goals

For each course in a curricula, there ***may*** be a set of goals for that curriculum assigned to the goal (it can be any number of it).

A curriculum is called *goal-valid* if every goal of that curriculum is covered by at least a certain number of credit hours in that curriculum. (The number differs for different curricula)

Goal grades for each course/section

Courses are being offered during the semesters. We assume there are four possible semester (Spring, Summer, Fall, Winter). Each course may have multiple sections offered during the semester, we distinguish them by a unit section ID (a three digit number).

For each section of a course being offered, one need to record the following:

- The number of students enrolled.
- The grade distribution of the students (how many get an A, A-, B etc.) We assume the possible grades are A, B, C, D and F, W, I, with + and – allowed for A, B, C, D.

- Each outcome associated with the course is also graded. We need to input the grade distribution of the grade for each outcome (use the same criteria). The only requirement is the numbers of W and I should match with the overall distribution of grades respectively.
- There should also be two comment sections that allow user the enter text. (You can call them comment1 and comment2).

TASKS

Your goal is to develop a database system that store the information about and a web-based GUI to allow the data to be input and queried.

Data input:

- You need to allow the user to enter information about a curriculum, with all relevant information (like courses, topics, courses) and all other relevant attributes. You need to ensure all the integrity constraints are satisfied.
- You should also allow users to edit information about existing curriculum, courses etc.
- You need to allow users to enter information about outcomes for each course. The user should specify what courses need to be entered and then entered the required information. Once again, existing information can be edited.
- A curriculum does not have to be goal-valid or satisfy any requirement for topics to stay in the database, but one need to know such curriculum do not satisfy such requirements (see below)

Query / data display:

- Display information about a given curriculum, include topics and courses.
- Display information about a course, including which curriculum it belongs to and the corresponding information (notice that a course can belong to multiple curriculum)
- For a given course and curriculum, output all sections and its outcome information (grade distribution). The user can restrict the search to a range of year/semesters.
    - Also allow the user to see the aggregrate grade distribution of the courses through the specified semester range
- For each curriculum and a given semester range, output the aggregate distribution of each outcomes. Once can further limit the search to a range of course numbers.
- Have a curriculum dashboard, which list summary information of all curriculum
    - Person-in-charge
    - Number of required/optional courses (and total credits)
    - Total number of level covered
    - For each outcome, how many credits are used to covered it
    - Whether the curriculum is goal-valid
    - The topic-category for each curriculum

Implementation

You must use MySQL as the backend to store the database. However, you have complete freedom of choosing whatever programming language/front end tool to use. The only requirement is that it must either be available in the labs or is free software.

You will need a web server to demonstrate your program. You are free to use any web server, subject to be same requirement as above.

Milestones

Apr 15th (Mon), 11:59pm: Each group should upload a copy of their initial database schema. It will count at 10% of the project grade.

May 6th- 7th (Mon/Tue): Each group schedule a 20-minute demo for your project with me. By that time your project should be in a pretty finished stage. You are still allowed some minor improvement that I will point out, but major omission will be a problem. This will count 20% of the grade

May 8th (Wed): 8:45 am – 11:15 am. Each group will have a 10-15 minutes presentation/demo of their project. The time will be divided into 2 sessions and each group only need to be present in 1 of the 2 sessions (detail to be provided later). At that time all the errors should be ironed-out. This will count 20% of the grade

May 9th (Thu), 11:59pm. The final project, with all the code and the documentation will need to be uploaded to canvas.

The documentation needed are

- Description of the final database schema. With annotation on what each attribute/table means and all the constraints.
- A copy of the source code that you use
- A user manual that describe how to use your system
- A developer manual that describe what software is needed, and how to install and run your program

This will count 50% of the project grade.

(I may ask some group to come back before the end of finals to do one more demo if needed).