Assignment-3

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Create a ranking system that enables universities to measure the quality of the education they deliver to their students. The metrics should include,

- How faculty and courses contribute to the growth of their graduates over 5 year period.
- Track jobs, promotions of the graduates over time.
- Connection of courses and their relevance to graduates' growth.

Solution:

To quantify how faculty and courses contribute to graduate growth over five years

- We first consider the feedback from Alumni regarding the courses they took during their enrolment in University.
- We also consider feedback for the Alumni regarding the professors that taught the courses they enrolled in.
- We consider the Alumni employment or education history in the past 5 years.
    - The Alumni employment history tracks
        - The number of promotions obtained in the past five years.
        - Starting and current salary.
        - Number of Patents
        - Relevant courses for employment as deemed by the Alumni.
    - The Alumni education history tracks
        - Number of Publications
        - Relevant courses for higher education as deemed by the Alumni.

We quantify these measurements and combine them to obtain a metric to measure the quality of education the University delivers to its students from the alumni perspective.

- AvgAlumCourseScore = $\left(\sum_{i=0}^{numAlumni} (courseRating)\right)$ /numAlumni

  courseRating taken from the Alumni feedback.

- AvgAlumFacultyScore = $\left(\sum_{i=0}^{numAlumni} (facultyRating)\right)$ /numAlumni

  facultyRating taken from the Alumni feedback.

For ranking alumni to obtain an estimate of alumni performance after graduation, we consider **AlumniJobScore** and also **AlumniHigherEdScore**

$$\text{AlumniJobScore} = \left(\frac{\text{current salary - prev. salary}}{\text{prev.salary} * 10} + \text{numOfPromotions} + \text{numOfPatents} \right)$$

$$\text{AlumniHigherEdScore} = \left(\text{numOfPublications} + \text{numOfCitations} \right)$$

Next, we convert both scores to a number between **1 to 10** enabling us to track these scores across Departments, Universities. Finally, we obtain the AlumniScore,

$$\text{AlumniScore} = \left(\sum_{i=0}^{numAlumni} (AlumniJobScore + AlumniHigherEdScore) \right) / \text{numAlumni}$$

Courses, Faculty, and Relevance to graduate growth:

- When we consider the feedback from the Alumni, we are additionally requesting the courses information from them which they feel are most relevant to their job growth in the past 5 years. (relevantCourses)
- Next, we calculate the **AlumniScore** of all the alumni for the given department (e.g, Information Systems) and consider the **top 10%** of the alumni based on the AlumniScore.
- We navigate to find these Alumni's relevantCourses using alumniId and also get faculty for these courses along with their ratings.
- Now from this pool, we pick the 10 most frequent courses, which are essentially the most relevant and top-rated courses

To obtain the combined score so that we can compare among Departments in a university and also among the universities themselves, we combine the course, professor, alumni score we use the following formula

$$\text{CombinedRating} = \text{AvgAlumCourseScore} + \text{AvgAlumFacultyScore} + \text{AlumniScore}$$

Ranking system for students to decide which University they choose:

One of your deliverables will be to design a dashboard that enables college and university administrators to compare the performance of their academic units.

Deliverables

Report outlining your proposed solution.

Sequence diagrams showing how to navigate the university object model to deliver performance metrics needed for performance and feedback.

A class diagram showing the changes to the university model to support the new capabilities. This diagram must include the additional methods and attributes required to deliver the results.