BRAND NAME: topUmd

Description of the ER Model (in words):
The goal of the project is to help potential students select the best business graduate school to attend, based on a variety of factors. Our team would like to design a conceptual model of the agencies which rank Business Graduate Programs internationally using the entity-relationship model. A database is required to keep track of all graduate business schools, the amount donated to them, their faculty, employers which hired students from this school, publications contributed by a school's faculty, and a comparison against other ratings agencies referring to each school. A description of the business rules is as follows:

Each school is described by a unique name, location, number of students, proportion of international students, proportion of female students, graduation rate, employment rate of graduating students, notable alumni who went on to be famous, and average salary upon graduation of these students. Each school receives donations every year, or over multiple years, which can be identified by a unique donation Id which matches the school to which it is donated. Each donation also has an amount associated with it. Each Faculty is described by a unique name, years of experience teaching, number of projects (or publications), number of awards, name of their domain of expertise, and number of nobel prizes received on their publications or work. Each faculty also belongs to at least one school, but can teach at more than one at a time. We also keep track of the publications written by the faculty, with each Publication Statistics having a unique publication Id, and year of publication. Each publication is written by at least one faculty, but can be co-authored by many faculty. This ratings agency also tries to compare its school statistics against other agency ratings, which are identified with their unique rating agency Ids, which refer to the same school as each other.

Mission Statement:
Our mission is to reflect on multiple aspects of the top graduate business schools in the United States, including the Smith Program at the University of Maryland, College Park, and thus create a helpful report to answer the question of "How is this university?" Our hope is that this will improve the ranking of the Smith School compared to the other top 9 business schools, and help make the Smith School to be considered as a top business school in the future as well.

Mission Objectives:
1. What faculty has taught for the highest number of years, which business school and what is his/her school's USNews ranking?
2. What are the faculty and their number of publications, in order of publication amount, for the faculty that have Nobel prizes, and what are their corresponding business schools?
3. What is the relationship between the USNews ranking and the financial support in terms of donations to the school, in order of donations?

4. What is the comparison between the USNews Ranking and the average of the agency rankings, in order of USNews Ranking for each business school?
5. What 5 faculty had the highest number of awards, and what is their corresponding business school's USNews ranking?
6. What is the relationship between the proportion of female and international students and the USNews ranking (to see if diversity of the student body affects a school's rank)?
7. What is the relationship between employment rate, salary, and USNews Ranking, in order of employment rate and highest salary?

ER Schema:

Entities, Attributes and Primary Keys:

BusinessSchool (**busName,** busLocation, busNumStudents, busProIntStudents, busProFemStudents, busGrdRate, busEmpRate, busNotableAlum, busAvgSalary)
Donation (**donId**, donAmount)
Faculty (**facName**, facNumAwards, facNumProjects, facDomExpert, facYearsTeach, facNumberNobel)
Publication (**pubId**, pubYear)
RatingAgency (**othAgnId**, othAgnName, othAgnRate)

Relationships, Attributes, Degrees, Participating Entities and Constraints:

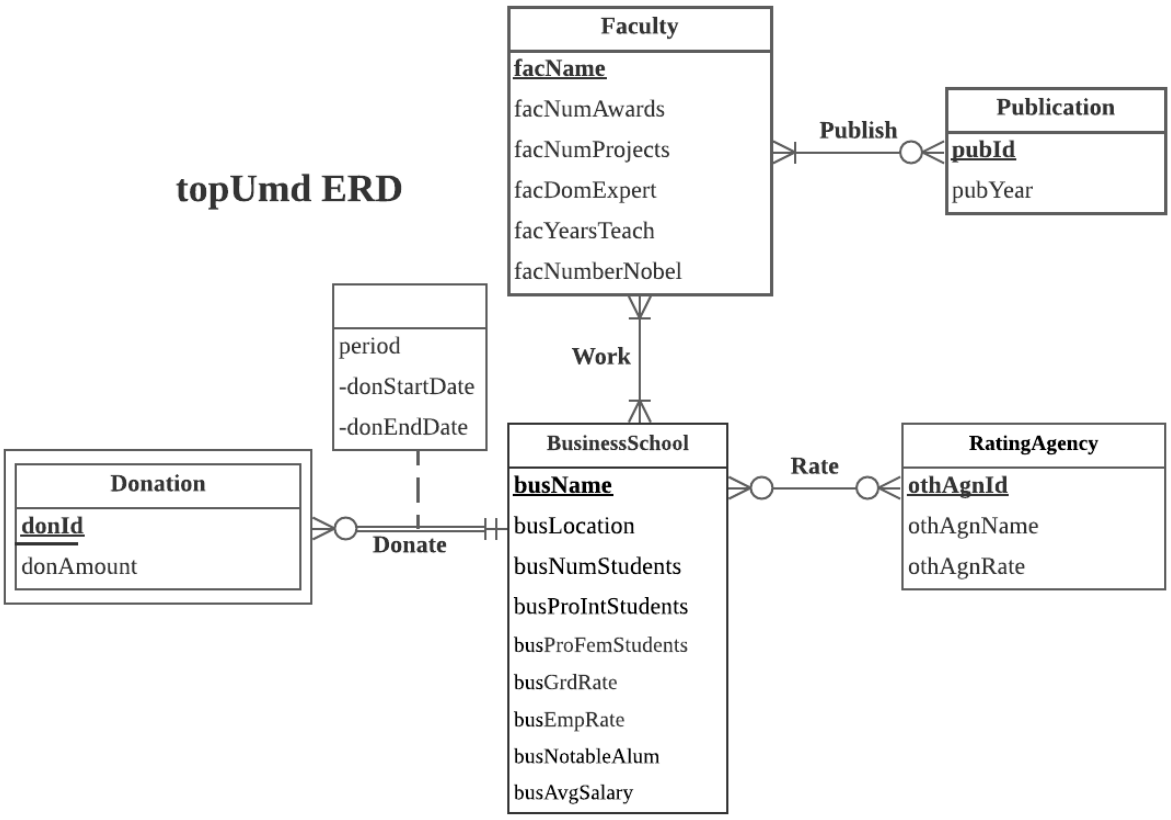
Donate (period): binary relationship
- 1 Donation record to 1 Business School
- 1 Business School to 0 or many Donation Record

Work: binary relationship
- 1 Business School to 1 or many Faculty
- 1 Faculty to 1 or many Business School

Rate: binary relationship
- 1 Business School to 0 or many Ratings Agencies
- 1 Ratings Agency to 0 or many Business Schools

Publish: binary relationship
- 1 Faculty to 0 or many Publications
- 1 Publications to 1 or many Faculty

ER Diagram:


topUmd ERD
Faculty
facName
facNumAwards
facNumProjects
facDomExpert
facYearsTeach
facNumberNobel
Publish
Publication
pubId
pubYear
Work
period
-donStartDate
-donEndDate
Donation
donId
donAmount
Donate
BusinessSchool
busName
busLocation
busNumStudents
busProIntStudents
busProFemStudents
busGrdRate
busEmpRate
busNotableAlum
busAvgSalary
Rate
RatingAgency
othAgnId
othAgnName
othAgnRate

Relational Schema:

Faculty(**facName**, facNumAwards, facNumProjects, facDomExpert. facYearsTeach, facNumberNobel)
Publication(**pubId**, pubYear)
BusinessSchool(**busName**, busLocation, busNumStudents, busProIntStudents, busProFemStudents, busGrdRate, busEmpRate, busNotableAlum, busAvgSalary)
RatingAgency(**othAgnId**, othAgnName, othAgnRate)
Donation(***busName***, **donId**, donAmount, donStartDate, donEndDate)
Publish(***facName***, ***pubId***)
Rate(***busName***, ***othAgnId***)
Work(***facName***, ***busName***)

Functional Dependencies:

facName → facNumAwards, facNumProjects, facDomExpert. facYearsTeach, facNumberNobel
pubId → pubYear
busName → busLocation, busNumStudents, busProIntStudents, busProFemStudents, busGrdRate, busEmpRate, busNotableAlum, busAvgSalary
othAgnId → othAgnName, othAgnRate
busName, donId → donAmount, donStartDate, donEndDate
facName, pubId →
busName, othAgnId →
facName, busName →

Business Rules:

[R1] When a Business School is deleted from or changed in the database, all corresponding Donation data of the business school should be deleted or changed accordingly.
[R2] When a Faculty has published a Publication, then the Faculty and the Publication cannot be deleted or changed in the database.
[R3] When a Business School is deleted from or changed in the database, the Ranking of the business school should be deleted or changed accordingly.
[R4] When a Rating Agency is deleted from or changed in the database, the Rankings provided by the rating agency should be deleted or changed accordingly.
[R5] When a Faculty working at a Business School is deleted from or changed in the database, the data of the Faculty should be deleted or changed accordingly.
[R6] When a Business School is deleted from or changed in the database, the data of the Business School should be deleted or changed accordingly.

Referential Integrity Rule/Action Table:

Relation	Foreign Key	Base Relation	Primary Key	Business Rule	Constraint: ON DELETE	Business Rule	Constraint: ON UPDATE
Donation	busName	BusinessSchool	busName	R1	CASCADE	R1	CASCADE
Publish	facName	Faculty	facName	R2	NO ACTION	R2	NO ACTION
Publish	pubId	Publication	pubId	R2	NO ACTION	R2	NO ACTION
Rate	busName	BusinessSchool	busName	R3	CASCADE	R3	CASCADE
Rate	othAgnId	RatingAgency	othAgnId	R4	CASCADE	R4	CASCADE
Work	facName	Faculty	facName	R5	CASCADE	R5	CASCADE
Work	busName	BusinessSchool	busName	R6	CASCADE	R6	CASCADE

Sample Data: (INSERT one record into each relation)

Faculty(**facName**, facNumAwards, facNumProjects, facDomExpert. facYearsTeach, facNumberNobel)
= (**Progyan Basu**, 6, 20, Accounting and Information Assurance, 30, 0)

Publication(**pubId**, pubYear)
= (**10.1016/0748-5751(94)90027-2**, 1994)

BusinessSchool(**busName**, busLocation, busNumStudents, busProIntStudents, busProFemStudents, busGrdRate, busEmpRate, busNotableAlum, busAvgSalary)
= (**University of Maryland**, college park MD, 119, 97%, 0.35, 0.963, .735, Jeff Knabe, $159,772.00)

RatingAgency(**othAgnId**, othAgnName, othAgnRate)
= (**20**, QS, 41)

Donation(***busName***, **donId**, donAmount, donStartDate, donEndDate)
= (***University of Maryland***, **32**, 8451971, '07/01/2019', '06/30/2020')