UMD Smith School Program Ranking

Project Name: Fearlessly Forward

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Mission Statement

Provide a centralized database to access rankings of various programs offered at Smith School of Business. The rankings will be broken down by past years, based on the data from reputable web sources of university ranking providers. This can help students, faculty, and administration to make informed decisions in their respective programs. The Smith admissions office can better invest or divest its resources for programs being offered at the school, in order to uplift the overall image of Smith.

Mission Objectives

- What years of Full - time MBA had an employment rate greater than or equal to 90%?
- What is the program and its department with the highest average starting salary in 2022?
- What is the trend across all years of a program's rankings by a website?
- What is the return on investment for each program during 2022? (ROI = Employment rate * average starting salary * 10 / tuition fee * program length in years)?

Business terms, facts, attributes, and identifiers:

- We are only considering Business Masters speciality and MBA programs at Smith School of Business.
- The number of programs are 12 (8 Masters speciality and 4 MBA).
- The number of Academic Departments is 6.
- Each Academic Department consists of a unique department id and department name.
- Each Program is described by a unique program id and has attributes program name, program duration, program start date, program credits, and the program scholarship. Each program is assigned under a department.
- Each Ranking Website consists of a unique website id, website name and a website link. These are a few websites which rank all the educational institutes and their programs based on many factors signifying the quality of education offered by them.

- Each Yearly Ranking Factors consists of a unique rank factor for the year and the program id it is associated with, employment rate of graduates, tuition fees associated with the program, intakes during the year, student to faculty ratio and the average starting salary upon graduation. These yearly statistics are published each year by the administration and are unique to each program.
- Each Ranking Website ranks a program based on Yearly Ranking factors: This relationship signifies that a ranking is published by a specific Ranking Website. The website uses its own methodology to evaluate and Rank Programs offered by the institution.

ER Schema
A list of entities, attributes, and primary keys.

Program (**prgId**, prgName, prgDuration, prgStartDate, prgCredits, prgScholarship)
Ranking Website (**webId**, webName, webLink)
Academic Department (**depId**, depName)
Yearly Ranking Factors (**facYear**, facEmploymentRate, facStudentIntake, facTuitionFees, facAvgStartSalary, facStudentToFacultyRatio)

Relationships, Attributes, Degrees, Participating Entities and Constraints

Ranks: Binary relationship
1 ranking website to 0 or many yearly ranking factors
1 yearly ranking factor to 0 or many ranking website :- Inferred by best judgment

Holds: Binary relationship
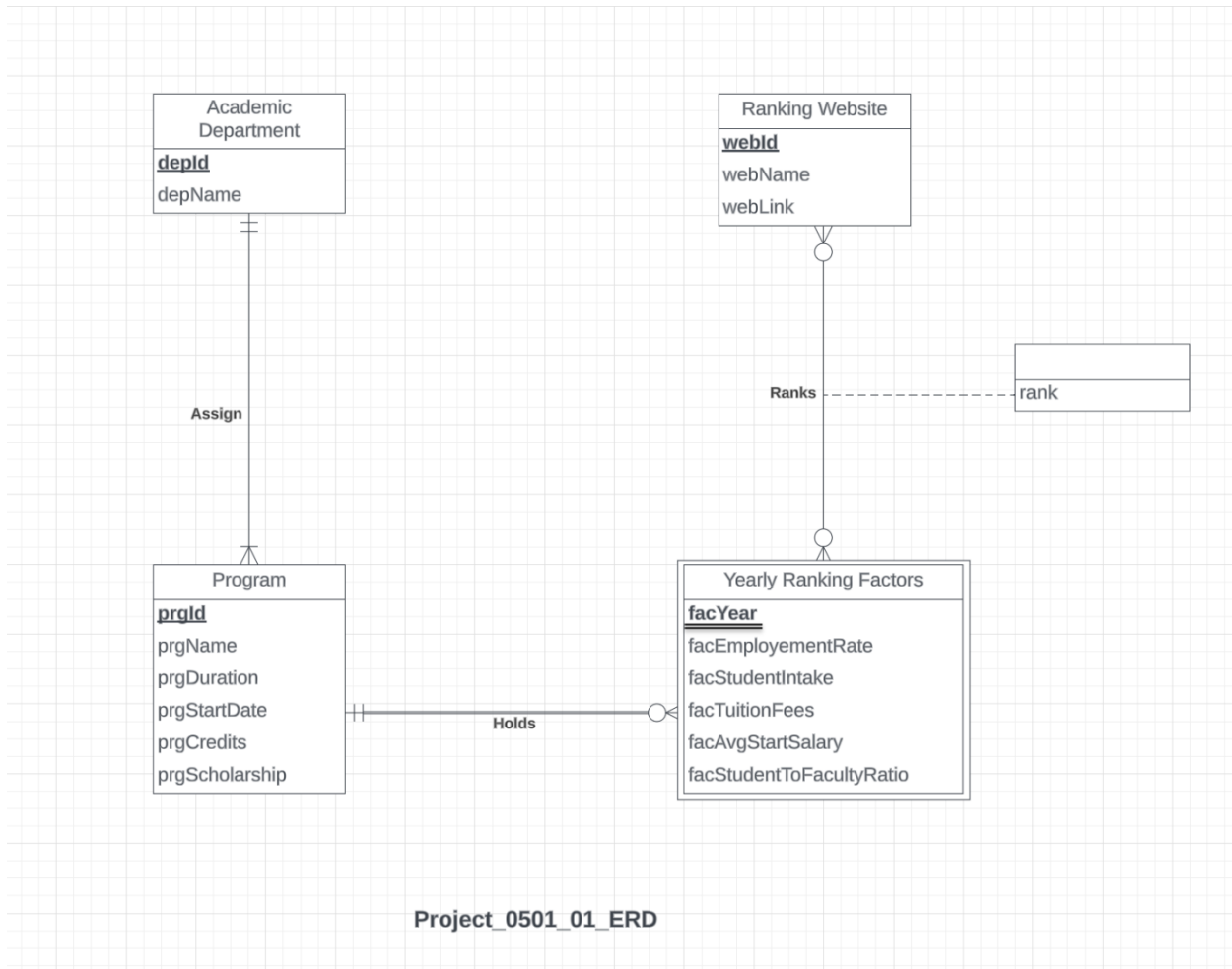0 or more yearly ranking factors to 1 program :- Inferred by best judgment
1 program to 1 yearly ranking factor

Assign: Binary relationship
1 program to 1 academic Department
1 academic Department to 1 or many programs

ER Diagram

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Relational schema

AcademicDepartment (**depId,** depName)
Program (**prgId**, prgName, prgDuration, prgStartDate, prgCredits, prgScholarship, *depId*)
YearlyRankingFactors (***prgId***, **facYear**, facEmploymentRate, facStudentIntake, facTuitionFees, facAvgStartSalary, facStudentToFacultyRatio)
RankingWebsite (**webId**, webName, webLink)
Ranks (*facYear*, *prgId*, *webId*, rank)

Functional Dependencies

prgId → prgName, prgDuration, prgStartDate, prgCredits, prgScholarship
depId → dpName
webId → webName, webLink
facYear, prgId → facEmploymentRate, facStudentIntake, facTuitionFees, facAvgSalary, facStudentToFacultyRatio

facYear, prgId, webId→ rank

All entities are in 3NF

Business rules:

R1 - A department that contains a program cannot be deleted from the database.
R2 - When a program is deleted from the database the corresponding information related to YearlyRankingFactors of that program must be deleted from the database.
R3 - When a yearly ranking factor for a particular year for any program is deleted all ranks associated with that year should be deleted.
R4 - When a yearly ranking factor of a program for any year is deleted from the database, all ranks associated with that program and year must be deleted.
R5 - When a website is deleted from the database, all ranks associated with that website should be deleted.
R6 - When any information about the department is updated, the corresponding programs information should also be updated.
R7 - When information about a program is updated from the database the corresponding information related to YearlyRankingFactors of that program must be updated in the database.
R8 - When the yearly ranking factors of a particular program for any year is updated, all ranks associated with that year should be updated.
R9 - When the yearly ranking factors for a year for any program is updated, all ranks associated with that program must be updated.
R10 - When website details are updated in the database, all ranks associated with that website should be updated.

Referential Integrities:

Relation	Foreign Key	Base Relation	Primary Key	Business Rule	ON DELETE	Business Rule	ON UPDATE
Program	depId	AcademicDepartment	depId	[R1]	NO ACTION	[R6]	CASCADE
YearlyRankingFactors	prgId	Program	prgId	[R2]	CASCADE	[R7]	CASCADE
Ranks	facYear	YearlyRankingFactors	facYear	[R3]	CASCADE	[R8]	CASCADE
Ranks	prgId	YearlyRankingFactors	prgId	[R4]	CASCADE	[R9]	CASCADE
Ranks	webId	RankingWebsite	webId	[R5]	CASCADE	[R10]	CASCADE

Sample Data

Academic Department:

depId	depName
D01	Finance
D02	Marketing
D03	Decision, Operations & Information Technologies

Program:

prgId	prgName	prgDuration	prgStartDate	prgCredits	prgScholarship	depId
P001	MS Finance	1.5	2009-01-01	30	6250	D01
P002	MS Marketing	1.5	2013-01-01	30	6250	D02
P003	MS Information Systems	1.5	2011-01-01	30	6250	D03

Yearly Ranking Factors:

prgId	facYear	facEmploymentRate	facStudentIntake	facTuitionFees	facAvgStartSalary	facStudentToFacultyRatio
P001	2022	74	50	62175	91429	4
P002	2022	82	55	62175	91633	7
P003	2022	93	111	62175	83367	12

Ranking Website:

webId	webName	webLink
W001	US News	www.usnews.com
W002	Forbes	www.forbes.com
W003	Bloomberg	www.bloomberg.com

Ranks:

facYear	prgId	webId	rank
2022	P001	W005	4
2018	P001	W005	2
2017	P001	W005	4
2022	P002	W006	45