Project Proposal

Brand Name : UniRank

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ER Schema:

Entities, Attributes and Primary Keys:

Program(**progId**, progName, progLocation, progTuitionFee, progDuration, progEmployabilityRate)

University(**uniId**, uniName, uniLocation, uniFoundedYear, uniAlumniNetwork)

RankSource(**rankSrcId**, rankSrcName, rankSrcLink)

Criteria(**rankCriteria**)

User(**userId**, userName, userEmailId, userCategory)

Relationships, Attributes, Degrees, Participating Entities and Constraints:

Offers: Binary relationship

A University offers one or more Programs.

A Program is offered by 0 or more Universities.

Ranks: Binary relationship

A Program is ranked by 0 or more RankSources in a given year.

A RankSource can rank 1 or more Programs each rank.

Defines: Binary relationship

A criteria is defined by one or more RankSources.

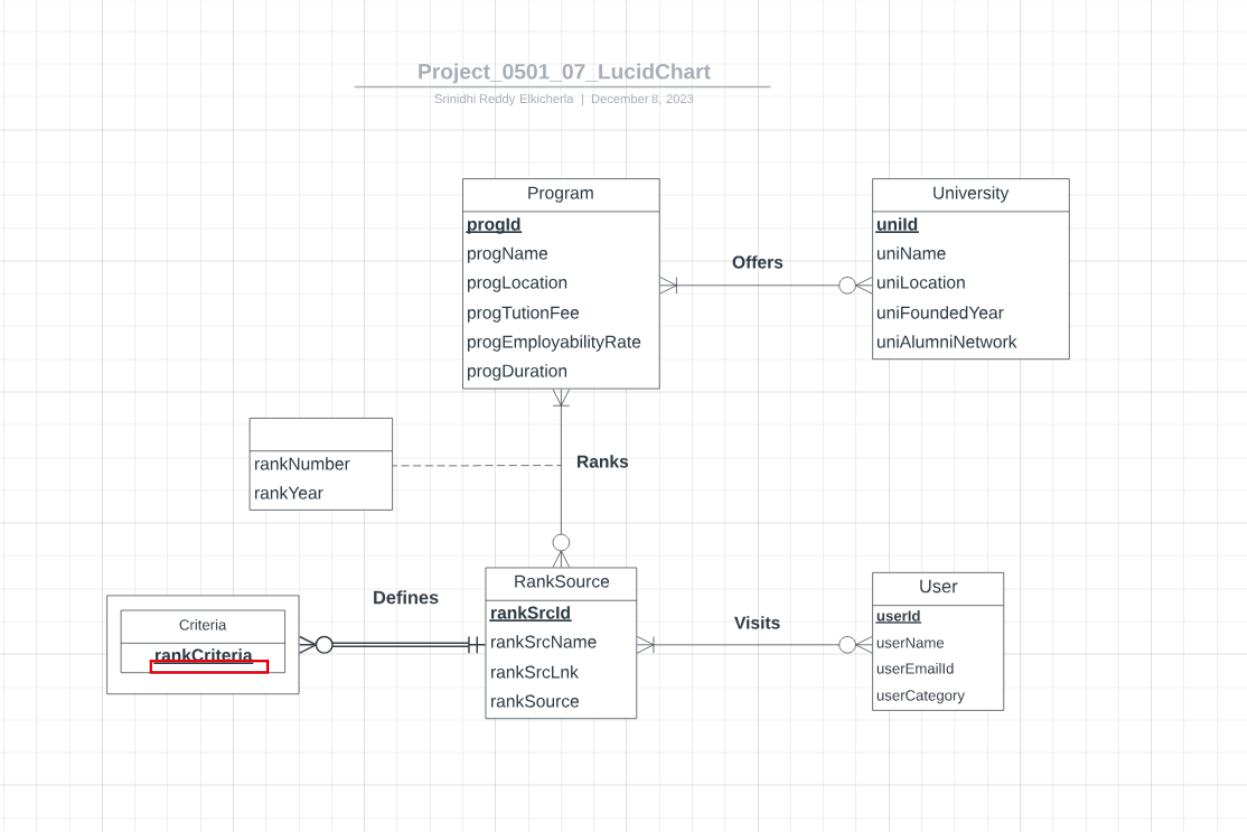
A RankSource can define zero or more Criterias.

Visits: Binary relationship between User and RankSource.

A User visits one or more RankSources.

A RankSource can be visited by 0 or multiple Users.

ER Diagram:



Convert ER model into relational schema and identify primary and foreign keys.

Relations:

University(**uniId**, uniName, uniLocation, uniFoundedYear, uniAlumniNetwork)

Program(**progId**, progName, progLocation, progTuitionFee, progDuration, progEmployabilityRate)

RankSource(**rankSrcId**, rankSrcName, rankSrcLink, rankCriteria)

Criteria(**rankCriteria**, ***rankSrcId***)

User(**userId**,userName, userEmailId, userCategory)

Ranks(***progId***, ***rankSrcId***, **rankYear**, rankNumber)

Offers(***progId***, ***uniId***)

Visits(***rankSrcId***, ***userId***)

Functional dependencies and verify normalization to 3NF

Functional dependencies:

uniId → uniName, uniLocation, uniFoundedYear, uniAlumniNetwork

progId→ progName, progLocation, progTuitionFee, progEmployabilityRate,

progDuration

rankSrcId → rankSrcName, rankSrcLink, rankCriteria

rankCriteria, *rankSrcId* →

userId → *rankSrcId,* userName, userEmailId, userCategory

progId, rankSrcId, rankYear → rankNumber

progId, uniId→

rankSrcId,userId →

Normalized to 3NF:

As the above relations do not have any multi-valued attribute, partial or transitive dependencies, the normalized relation schema would look like the following:

University(**uniId**, uniName, uniLocation, uniFoundedYear, uniAlumniNetwork)

Program(**progId**,*uniId*, progName, progLocation, progTuitionFee, progDuration, progEmployabilityRate)

RankSource(**rankSrcId**, rankSrcName, rankSrcLink)

Criteria(**rankCriteria**, ***rankSrcId***)

User(**userId**, *rankSrcId*, userName, userEmailId, userCategory)

Ranks(***progId*, *rankSrcId*, rankYear,**rankNumber)

Business Rules:

[R1].When a program is deleted from the database no action to be taken on the university table.

[R2].When a program details are updated then no action to be taken on the university table.

[R3].When a University details are updated then there is no action to be taken on the program table.

[R4].When a University details are deleted then the programs offered by the University would also get deleted.

[R5].When a program details are updated then Rank for the programs should also be updated based on the criteria.

[R6].When a program is deleted, then Rank for other programs should also be updated based on the criteria.

[R7].When a rank source is no longer available then there is no action to be taken on program details.

[R8].When a rank source is updated then there is no action to be taken on program details.

[R9].When a rank source is updated then there is no action to be taken on user details.

[R10].When a rank source is deleted, then user details captured by that website also get deleted.

[R11].When user details are deleted, then there is no action to be taken on the rank table.

[R12].When user details are updated,then there is no action to be taken on the rank table.

[R13].When RankSource is deleted, then its criteria should also be deleted.

[R14].When RankSource is updated, then there is no action to be taken on the criteria table.

Referential Integrity Actions:

Relation	Foreign Key	Base Relation	Primary Key	Business Rule	Constraint: ON DELETE	Business Rule	Constraint: ON UPDATE
Offers	progId	Program	progId	R1	NO ACTION	R2	NO ACTION
Offers	uniId	University	uniId	R4	CASCADE	R3	NO ACTION
Ranks	progId	Program	progId	R6	CASCADE	R5	CASCADE
Ranks	rankSrcId	RankSource	rankSrcId	R7	NO ACTION	R8	NO ACTION
Visits	rankSrcId	RankSource	rankSrcId	R10	CASCADE	R9	NO ACTION
Visits	userId	User	userId	R11	NO ACTION	R12	NO ACTION

Sample data for every relation:

Program

progId	UniId	University Name	progName	progLocation	progTuitionFee	progDuration	progEmployabilityRate
PR01	UN01	University of Maryland	Information Systems	College Park	50,000.00	1.5	80
PR02	UN01	University of Maryland	Business Analytics	College Park	60,000.00	1.5	70
PR03	UN01	University of Maryland	Supply Chain Analytics	College Park	50,000.00	2	88
PR04	UN01	University of Maryland	Finance	College Park	80,000.00	2	80
PR05	UN01	University of Maryland	MBA	College Park	95,763.00	2	77.3
PR06	UN02	University of Texas at Austin	Finance	Austin	62,000.00	2.5	85
PR07	UN02	University of Texas at Austin	Business Analytics	Austin	68,000.00	2	82
PR08	UN02	University of Texas at Austin	Information Systems	Austin	65,000.00	2	80
PR09	UN02	University of Texas at Austin	Supply Chain Management	Austin	70,000.00	2	86.3
PR10	UN02	University of Texas at Austin	MBA	Austin	58,720.00	2	95.3
PR11	UN03	Stanford University	Finance	Stanford	76,950.00	2	61.2
PR12	UN03	Stanford University	Business Analytics	Stanford	62,604.00	1	61.2
PR13	UN03	Stanford University	Information Systems	Stanford	101,406.00	2	61.2

PR14	UN03	Stanford University	Supply Chain Management	Stanford	NULL	1	61.2
PR15	UN03	Stanford University	MBA	Stanford	79,860.00	2	88
PR16	UN04	Massachusetts Institute of Technology (MIT)	Finance	MIT	87,900.00	1.8	83.8
PR17	UN04	Massachusetts Institute of Technology (MIT)	MBA	MIT	82,000.00	2	83.8
PR18	UN04	Massachusetts Institute of Technology (MIT)	Business Analytics	MIT	87,600.00	1.8	83.8
PR19	UN04	Massachusetts Institute of Technology (MIT)	Supply Chain Management	MIT	82,000.00	1.6	83.8
PR20	UN04	Massachusetts Institute of Technology (MIT)	Information Systems	MIT	74,968.00	2	83.8

University:

uniId	uniName	uniLocation	uniFounded	uniAlumni

			Year	Network
UN01	University of Maryland (Robert H. Smith School of Business)	College Park	1921	66000
UN02	University of Texas at Austin (McCombs School of Business)	Austin	1922	103000
UN03	Stanford University (Stanford Graduate School of Business)	Stanford	1925	30000
UN04	Massachusetts Institute of Technology (MIT Sloan School of Management)	Cambridge	1914	24000
UN05	Carnegie Mellon University (Tepper School of Business)	Pittsburg	1949	17000
UN06	Harvard University (Harvard Business School)	Cambridge	1908	85000
UN07	University of Washington (Michael G. Foster School of Business)	Seattle	1917	57000
UN08	University of Arizona (Eller College of Management)	Tempe	1913	55000
UN09	University of Chicago (Chicago Booth School of Business)	Chicago	1898	56000
UN10	University of California (Haas School of Business)	Berkeley	1898	43000
UN11	The University of Pennsylvania (Wharton School)	Philadelphia	1881	100000
UN12	Northwestern University (Kellogg School of Management)	Evanston	1908	65000
UN13	Columbia University (Columbia Business School)	New York	1916	48000

RankSource:

rankSrcId	rankSrcName	rankSrcLink

R01	QS World University	https://www.topuniversities.com/
R02	Edvoy	https://edvoy.com/articles/top-mis-universities-in-usa/
R03	Poets&Quants	https://poetsandquants.com/category/mba/mba-rankings/
R04	Fortune	https://fortune.com/education/business/best-mba-programs/
R05	U.S. News & World Report	https://www.usnews.com/education

User:

userId	rankSrcId	userName	userEmailId	userCategory
US01	R01	Krupa Shah	shahkrupa903@gmail.com	Student
US02	R02	Shrinidhi Reddy	esrinidhireddy@gmail.com	Student
US03	R03	Rakshanda Hedawoo	rakshandahedawoo@gmail.com	Student
US04	R04	Srinivas Varma	srinivasvarmaakhil@gmail.com	Student
US05	R05	Nilesh Shah	nilesh.shah.king@gmail.com	Parent
US06	R01	Hiren Rathod	hirenr@imperial-overseas.com	Academic Advisor
US07	R02	Miloni Shah	milonishah@gmail.com	Prospective Student
US08	R01	Lalita Takle	takle.lalita@gmail.co	Prospective

			m	Student
US09	R02	Harshil Oza	harshiloza333@gmail.com	Prospective Student
US10	R03	Rutuja Samant	rsamant@umd.edu	Student
US11	R04	Vaibhavi Hedaoo	vhedaoo@umd.edu	Student
US12	R05	Akshay Belnekar	akshayy@umd.edu	Student

Ranks:

progId	rankSrcId	rankNumber	rankYear
P01	R01	10	2023
P02	R01	15	2023
P03	R02	5	2023
P04	R02	8	2023
P05	R03	12	2023
P06	R03	18	2023
P07	R03	6	2023
P08	R04	7	2023
P09	R04	14	2023
P010	R04	9	2023

Criteria:

rankSrcId	criteriaName
R01	Academic Reputation
R01	Faculty-to-Student Ratio
R01	International Faculty
R01	Employer reputation
R02	Alumni Salary
R02	Student Satisfaction
R02	Debt After Graduation
R03	Admissions Standards
R03	Academic Experience
R03	Career Outcomes
R04	Outcomes Score
R04	Brand Score
R04	Fortune 1000 Score
R05	Graduation Rate