**COLLEGE POOL**

**State mission statement(s) for the client.**

To provide our prospective students with rankings and relevant information of US universities according to major journals for the following programs – MBA, MS in Information Systems and MS in Business Analytics.

**State mission objectives for the client.**

We intend to make a fair and valuable pool of ranking information from different journals and deliver it to end users in such a way that makes gaining insights in the database a hassle-free experience. To make all the relevant information like average GRE score of admitted students, average salary of graduates, etc. available in one place and just a few clicks away.

**Finalize ER diagram.**

**A screenshot of a cell phone

Description generated with very high confidence**

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

Relations:

University (**univId**, univName, *ctyId*)

Location (**ctyId**, ctyName, ctyState)

Program (**prgmId**, prgmName)

Journal (**journalId**, journalName)

PublishedRankings (***universityId***, ***programId***, ***journalId***, **yearNumber**, rank)

CourseDetails (***universityId***, ***programId***, tuitionFee, avgJobSalary, acceptanceRate, avgGREScore, avgGMATScore, avgGPA)

**Determine functional dependencies and perform normalization to 3NF.**

Functional Dependency:

universityId -> universityName, ctyId

ctyId -> ctyName, state

programId -> programName

journalId -> journalName

yearId -> year

universityId, programId, journalId, yearId -> rank

universityId, programId, yearId -> tuitionFee, avgJobSalary, acceptanceRate, numOfApplicants, avgGREscore, avgGMATscore, avgGPA

Normalization:

University (**univId**, univName, *ctyId*) = 3NF

Location (**ctyId**, ctyName, ctyState) = 3NF

Program (**pgmId**, pgmName) = 3NF

Journal (**journalId**, journalName) = 3NF

PublishedRankings (***universityId***, ***programId***, ***journalId***, **yearNumber**, rank) =3NF

CourseDetails (***universityId***, ***programId***, tuitionFee, avgJobSalary, acceptanceRate, avgGREscore, avgGMATscore, avgGPA) = 3NF

**Generate business rules and determine referential integrity actions.**

Business Rules:

1. When a city contains a university, that city information should not be deleted from the database.
2. When a city information gets updated, the corresponding information for universities located in that city should also get updated.
3. If the University no longer exists or shuts down, the university information cannot be deleted from the database if there is corresponding information in the Course Details database.
4. If the University information gets updated (i.e. university changes identifier), the corresponding information in the Course Details table should also get updated accordingly.
5. If a program is no longer being offered by a university, the program details should not be deleted from the database if there is corresponding information in the Course Details table.
6. If the program information gets updated (i.e. program changes identifier), the corresponding information in the Course Details table should also get updated accordingly.
7. If the University no longer exists or shuts down, the university information cannot be deleted from the database if there is corresponding information in the Published Rankings database.
8. If the University information gets updated (i.e. university changes identifier), the corresponding information in the Published Rankings table should also get updated accordingly.
9. If a program is no longer being offered by a university, the program details should not be deleted from the database if there is corresponding information in the Published Rankings table.
10. If the program information gets updated (i.e. program changes identifier), the corresponding information in the Published Rankings table should also get updated accordingly.
11. If a journal shuts down or no longer exists, the journal information cannot be deleted from the database if there is corresponding information in the Published Rankings database.
12. If the journal information gets updated (i.e. journal changes identifier), the corresponding information in the Published Rankings table should also get updated accordingly.

Referential Integrity:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Relation | Foreign Key | Base Relation | Primary Key | Constraint:  ON DELETE | Business  Rule | Constraint:  ON UPDATE | Business  Rule |
| University | ctyId | Location | ctyId | NO ACTION | R1 | CASCADE | R2 |
| CourseDetails | univId | University | univId | NO ACTION | R3 | CASCADE | R4 |
| CourseDetails | pgmId | Programs | pgmId | NO ACTION | R5 | CASCADE | R6 |
| PublishedRankings | univId | University | univId | NO ACTION | R7 | CASCADE | R8 |
| PublishedRankings | pgmId | Programs | pgmId | NO ACTION | R9 | CASCADE | R10 |
| PublishedRankings | journalId | Journals | journalId | NO ACTION | R11 | CASCADE | R12 |

**Describe sample data for every relation.**

University

|  |  |  |
| --- | --- | --- |
| **univId** | **univName** | **ctyId** |
| 1 | Harvard University | C001 |
| 2 | University of Pennslyvania | C002 |
| 3 | MIT | C001 |

Location

|  |  |  |
| --- | --- | --- |
| **ctyId** | **ctyName** | **ctyState** |
| C001 | Cambridge | MA |
| C002 | Philadelphia | PA |
| C003 | Washington D.C. | DC |

Program

|  |  |
| --- | --- |
| **pgmId** | **pgmName** |
| MBA | Master of Business Administration |
| MSBA | Master of Business Analytics |
| MSIS | Master of Information Systems |

Journal

|  |  |
| --- | --- |
| **journalId** | **journalName** |
| J01 | Bloomsberg |
| J02 | Economist |
| J03 | Financial Times |

PublishedRankings

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **univId** | **pgmId** | **journalId** | **YearNumber** | **ranking** |
| 1 | MBA | J01 | 2015 | NULL |
| 1 | MBA | J01 | 2016 | 1 |
| 1 | MBA | J01 | 2017 | 1 |

CourseDetails

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **univId** | **pgmId** | **tuitionFee** | **avgJobSalary** | **acceptanceRate** | **avgGREscore** | **avgGMATscore** | **avgGPA** |
| 1 | MBA | 106800 | 202666 | 0.11 | NULL | 730 | 3.71 |
| 2 | MBA | 125000 | 218900 | 0.13 | NULL | 730 | 3.60 |
| 3 | MBA | 131500 | 145826 | 0.11 | NULL | 724 | 3.64 |

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