Robert H. Smith Ranking Database Documentation

We built a strong database management system (DBMS) that will support the Robert H. Smith School of Business's strategic objective. The foundation for compiling and analyzing graduate program rankings from multiple sources will be the framework. The knowledge gained will enable the school to improve and expand its offerings, guaranteeing that resources are allocated in a way that is both economical and successful. The DBMS will be essential for making well-informed decisions, strengthening program advantages, and maintaining the school's dedication to academic achievement and innovation by integrating historical data and tracking ranking evolution.

Description:

The objective of the creation of this database management system for Robert H. Smith School of Business is:

1. To enable efficient and optimized resource allocation by identifying and analyzing top-performing graduate programs at the Robert H. Smith School of Business
2. To provide insights on potential areas of improvement of graduate programs by offering historical perspectives of their performances and monitoring the evolution of their rankings.
3. To enable informed decision-making regarding the enhancement of program strengths by evaluating the influence of factors such as academic reputation and graduation rates on program rankings
4. To effectively organize and make use of faculty data in the database in order to improve the caliber of academic programs, research output, and the Robert H. Smith School's standing overall.

Data Sources:

1. Robert H. Smith School of Business Directory
2. Robert H. Smith School of Business Programs
3. U.S. News & World Report
4. QS World University Rankings
5. The Princeton Review
6. Times Higher Education (THE) World University Rankings
7. QS Business Masters Rankings
8. Financial Times
9. Best Masters

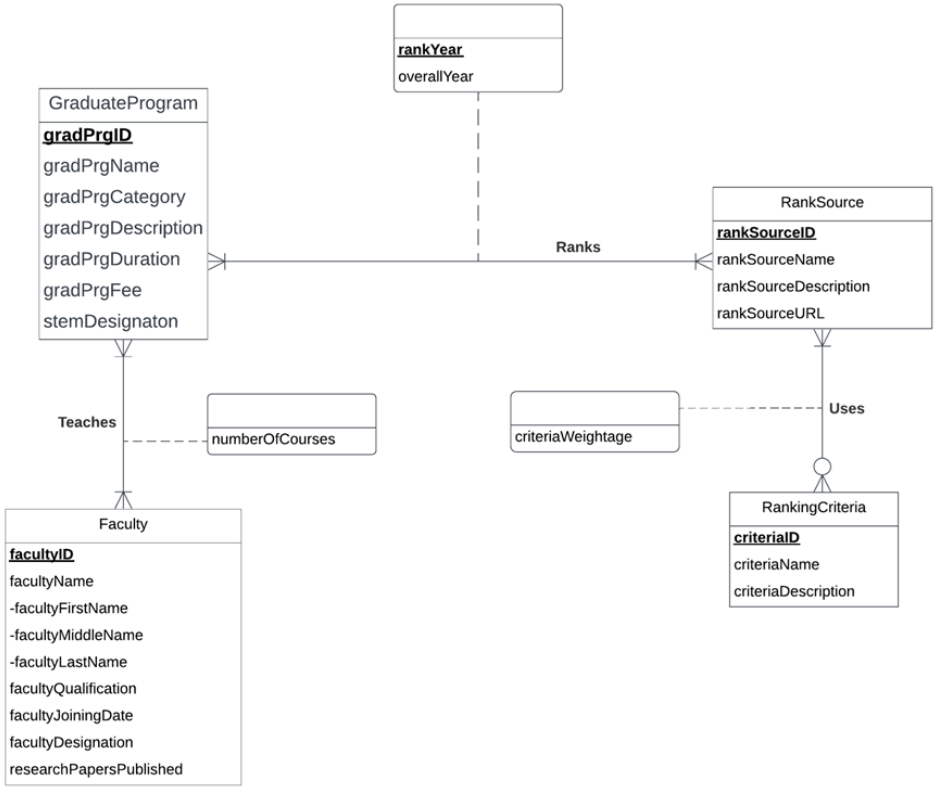
References:

1. Hoffer, Jeffrey A., et al. *Modern Database Management*. Pearson Education Limited, 2020.

Functionalities:

- All graduate programs and their related information are stored in the '**GraduateProgram'** table.
- All ranking sources used to obtain program rankings are stored in the '**RankSource'** table.
- All information about the school's faculty is stored in the '**Faculty'** table.
- Ranking criteria used by ranking a program are stored in the '**RankingCriteria'** table.
- Program ranking by ranking sources for all available years are stored in '**Ranks'** table.
- **'Teaches'** table provides the number of courses taught by faculty members.
- **'Uses'** table provides the ranking criteria used by ranking sources.

Entity Relationship (ER) Diagram of ‘Project’ Database:



Relational Schema:

GraduateProgram (**gradPrgID**,gradPrgName, gradPrgCategory, gradPrgDescription, gradPrgDuration, gradPrgFee, gradPrgCredits, stemDesignation)

RankSource (**rankSourceID**, rankSourceName, rankSourceDescription, rankSourceURL)

Faculty (**facultyID**, facultyName, -facultyFirstName, -facultyMiddleName, -facultyLastName facultyQualification, facultyJoiningDate, facultyDesignation, researchPapersPublished)
RankingCriteria (**criteriaID**, criteriaName, criteriaDescription)

Ranks (***gradPrgID***, ***rankSourceID***, **rankYear**, overallRank)

Teaches (***gradPrgID***, ***facultyID***, numberOfCourses)

Uses (***rankSourceID***, ***criteriaID***, criteriaWeightage)

Implementation:

The database was built using SQL Server Management Studio version 19.1.The system is created in the database - ***BUDT702_Project_0501_05.***
Before running any of the queries, make sure that the query - **USE BUDT702_Project_0501_05** has been run.

Drop Statements:

Before creating the table,ensure that the tables do not exist in the database.To achieve this, run the **DROP** statements considering the foreign key dependencies.

```
DROP TABLE IF EXISTS [Project.Uses];
DROP TABLE IF EXISTS [Project.Teaches];
DROP TABLE IF EXISTS [Project.Ranks];
DROP TABLE IF EXISTS [Project.RankingCriteria];
DROP TABLE IF EXISTS [Project.GraduateProgram];
DROP TABLE IF EXISTS [Project.RankSource];
DROP TABLE IF EXISTS [Project.Faculty];
```

Note : The IF EXISTS clause ensures that the query only affects the tables that have been created and does not return an error if the table does not exist.

CREATE Statements:

To create the tables,we need to run the following statements in order as these are curated considering the Foreign key dependencies.There are total 7 tables that need to be created

GraduateProgram table:

```
CREATE TABLE [Project.GraduateProgram] (
gradPrgID CHAR (20) NOT NULL,
gradPrgName VARCHAR(30),
gradPrgCategory VARCHAR(5),
gradPrgDescription VARCHAR(200),
gradPrgDuration INT,
gradPrgFee CHAR(10),
gradPrgCredits INT,
stemDesignation VARCHAR(10),
CONSTRAINT pk_GraduateProgram_gradPrgID PRIMARY KEY (gradPrgID),
);
```

RankSource table:

```
CREATE TABLE [Project.RankSource] (
rankSourceID CHAR (20) NOT NULL,
rankSourceName VARCHAR(150),
rankSourceDescription VARCHAR(200),
rankSourceURL VARCHAR(100),
CONSTRAINT pk_RankSource_rankSourceID PRIMARY KEY (rankSourceID),
);
```

Faculty table:

```
CREATE TABLE [Project.Faculty] (
facultyID CHAR (20) NOT NULL,
facultyFirstName VARCHAR(20),
facultyMiddleName VARCHAR(10),
facultyLastName VARCHAR(20),
facultyQualification CHAR(30),
facultyJoiningDate DATE,
facultyDesignation VARCHAR(100),
researchPapersPublished INT,
CONSTRAINT pk_Faculty_facultyID PRIMARY KEY (facultyID),
);
```

RankingCriteria Table:

```
CREATE TABLE [Project.RankingCriteria] (
criteriaID CHAR (20) NOT NULL,
criteriaName VARCHAR(30),
criteriaDescription VARCHAR(200),
CONSTRAINT pk_RankingCriteria_criteriaID PRIMARY KEY (criteriaID)
);
```

Ranks Table:

```
CREATE TABLE [Project.Ranks] (
gradPrgID CHAR (20) NOT NULL,
rankSourceID CHAR(20),
rankYear INT,
overallRank INT,
CONSTRAINT pk_Ranks_gradPrgID_rankSourceID_rankYear PRIMARY
        KEY(gradPrgID,rankSourceID,rankYear),
CONSTRAINT fk_Ranks_rankSourceID FOREIGN KEY (rankSourceID)
```

```
        REFERENCES [Project.RankSource] (rankSourceID)
        ON DELETE CASCADE ON UPDATE CASCADE,
CONSTRAINT fk_Ranks_gradPrgID FOREIGN KEY (gradPrgID)
        REFERENCES [Project.GraduateProgram] (gradPrgID)
        ON DELETE CASCADE ON UPDATE CASCADE
);
```

Teaches Table:

```
CREATE TABLE [Project.Teaches] (
gradPrgID CHAR (20) NOT NULL,
facultyID CHAR(20) NOT NULL,
numberOfCourses INT,
CONSTRAINT pk_Teaches_gradPrgID_facultyID PRIMARY KEY(gradPrgID,facultyID),
CONSTRAINT fk_Teaches_gradPrgID FOREIGN KEY (gradPrgID)
        REFERENCES [Project.GraduateProgram] (gradPrgID)
        ON DELETE NO ACTION ON UPDATE NO ACTION,
CONSTRAINT fk_Teaches_facultyID FOREIGN KEY (facultyID)
        REFERENCES [Project.Faculty] (facultyID)
        ON DELETE NO ACTION ON UPDATE NO ACTION,
);
```

Uses Table:

```
CREATE TABLE [Project.Uses] (
rankSourceID CHAR (20) NOT NULL,
criteriaID CHAR(20) NOT NULL,
criteriaWeightage DECIMAL(5,2),
CONSTRAINT pk_Uses_rankSourceID_criteria_ID primary key(rankSourceID,criteriaID),
CONSTRAINT fk_Uses_rankSourceID FOREIGN KEY (rankSourceID)
        REFERENCES [Project.RankSource] (rankSourceID)
        ON DELETE CASCADE ON UPDATE CASCADE,
CONSTRAINT fk_Uses_criteriaID FOREIGN KEY (criteriaID)
        REFERENCES [Project.RankingCriteria] (criteriaID)
        ON DELETE NO ACTION ON UPDATE NO ACTION,
);
```

INSERT Statements:

You can use the following commands to insert the values into the tables we created above.

Graduate Program

```
INSERT INTO [Project.GraduateProgram] VALUES
('GP001','Information Systems','MS','Covers a range of courses related to information systems, technology management, and business',18,70000,30,'Yes')

INSERT INTO [Project.GraduateProgram] VALUES
('GP002','Business Analytics','MS','Covers fundamental principles of data analysis, including statistical methods, data visualization, and interpretation of results',18,65000,30,'Yes')

INSERT INTO [Project.GraduateProgram] VALUES
('GP003','Marketing Analytics','MS','Covers basic principles of marketing analytics, including data collection, analysis, and interpretation for marketing purposes',18,60000,30,'Yes')

INSERT INTO [Project.GraduateProgram] VALUES
('GP004','Supply chain management','MS','Introduces the basic principles and concepts of supply chain management, including the flow of goods, information, and finances across the supply chain.',24,62500,30,'Yes')

INSERT INTO [Project.GraduateProgram] VALUES
('GP005','Business Administration','MBA','Prepare students for leadership roles in various industries by imparting a broad understanding of business concepts, strategic thinking, and management skills',24,90000,54,'No')
```

RankSource

```
INSERT INTO [Project.RankSource] VALUES
('RS001','U.S. News & World Report','Provide rankings for a variety of fields, including business, law, engineering, education, and more','https://www.usnews.com/best-graduate-schools')

INSERT INTO [Project.RankSource] VALUES
('RS002','QS World University Rankings','Rankings cover a variety of subjects, including business, engineering, social sciences, and more','https://www.topuniversities.com/qs-world-university-rankings')

INSERT INTO [Project.RankSource] VALUES
('RS003','U.S. News & World Report','Reviews of graduate programs, often highlighting specific aspects such as academic quality, financial aid, and campus life','https://www.princetonreview.com/business-school')

INSERT INTO [Project.RankSource] VALUES
('RS004','Times Higher Education (THE) World University Rankings','Rankings consider factors such as teaching, research, international outlook, and industry income','https://www.timeshighereducation.com/world-university-rankings')

INSERT INTO [Project.RankSource] VALUES
('RS005','QS Business Masters Rankings','Provides rankings specifically for business master''s programs','https://www.topuniversities.com/university-rankings/business-masters-rankings')
```

Faculty

```
INSERT INTO [Project.Faculty] VALUES
('FAC001','John','A','Bono','EdD','10-03-2001','Associate Academic Director, MS Information Systems',14)

INSERT INTO [Project.Faculty] VALUES
('FAC002','Sujin','B','Kim','PhD','07-19-2012','Associate Clinical Professor',12)

INSERT INTO [Project.Faculty] VALUES
('FAC003','Woei-jyh','A','Lee','PhD','08-11-2012','Associate Clinical Professor',18)

INSERT INTO [Project.Faculty] VALUES
('FAC004','Siva','I','Viswanathan','PhD','01-05-2001','Dean''s Professor of Information Systems',16)

INSERT INTO [Project.Faculty] VALUES
('FAC005','Tejwansh','S','Anand','PhD','08-20-2021','Academic Director, MS in Information Systems',18)
```

RankingCriteria

```
INSERT INTO [Project.RankingCriteria] VALUES
('CR001','Academic quality','Quality of course content')

INSERT INTO [Project.RankingCriteria] VALUES
('CR002','Industry income','Range of income of graduating students')

INSERT INTO [Project.RankingCriteria] VALUES
('CR003','Research','Based on the quantity and quality of research papers published')
```

Rank

```
INSERT INTO [Project.Ranks] VALUES
('GP001','RS001',2022,8)

INSERT INTO [Project.Ranks] VALUES
('GP002','RS002',2023,10)

INSERT INTO [Project.Ranks] VALUES
('GP003','RS003',2021,15)
```

Teaches

```
INSERT INTO [Project.Teaches] VALUES
('GP001','FAC001',1)

INSERT INTO [Project.Teaches] VALUES
('GP002','FAC002',1)

INSERT INTO [Project.Teaches] VALUES
('GP001','FAC005',3)
```

Uses

```
INSERT INTO [Project.Uses] VALUES
('RS001','CR001',0.4)

 INSERT INTO [Project.Uses] VALUES
('RS002','CR002',0.3)

INSERT INTO [Project.Uses] VALUES
('RS003','CR003',0.55)
```

Testing:

The primary purpose of this section is to outline the testing strategy for our database, which currently consists of tables containing details of Ranking of Graduate Programs offered by Robert H. Smith School of Business over the years. The focus will be on ensuring data integrity, schema correctness and overall performance of the database.
We will be covering the details on testing of the database schema, data stored in the tables, and the efficiency and accuracy of query responses.

Test Environment:

Before running any of the queries, make sure that the query - **USE BUDT702_Project_0501_05** has been run

Data Integrity Testing:

Verify Table Creation

Let's run the following command and ensure that all the tables have been successfully created. We expect all the 7 tables mentioned to be present in the database.

```
SELECT TABLE_NAME
FROM INFORMATION_SCHEMA.TABLES
WHERE TABLE_TYPE = 'BASE TABLE';
```

Expected Output :

	TABLE_NAME
1	Project.GraduateProgram
2	Project.RankSource
3	Project.Faculty
4	Project.RankingCriteria
5	Project.Ranks
6	Project.Teaches
7	Project.Uses

Verify Table Structure

This is to verify if all the required columns have been correctly created during table creation. Let's run the following command and see the output.

```
SELECT
   COLUMN_NAME,
   DATA_TYPE,
   CHARACTER_MAXIMUM_LENGTH,
   NUMERIC_PRECISION,
   NUMERIC_SCALE,
   IS_NULLABLE,
   COLUMN_DEFAULT
FROM
   INFORMATION_SCHEMA.COLUMNS
WHERE
   TABLE_NAME = 'Project.GraduateProgram';
```

Below is the sample output of Project.GraduateProgram table in the database

	COLUMN_NAME	DATA_TYPE	CHARACTER_MAXIMUM_LENGTH	NUMERIC_PRECISION	NUMERIC_SCALE	IS_NULLABLE	COLUMN_DEFAULT
1	gradPrgID	char	20	NULL	NULL	NO	NULL
2	gradPrgName	varchar	30	NULL	NULL	YES	NULL
3	gradPrgCategory	varchar	5	NULL	NULL	YES	NULL
4	gradPrgDescription	varchar	200	NULL	NULL	YES	NULL
5	gradPrgDuration	int	NULL	10	0	YES	NULL
6	gradPrgFee	char	10	NULL	NULL	YES	NULL
7	gradPrgCredits	int	NULL	10	0	YES	NULL
8	stemDesignation	varchar	10	NULL	NULL	YES	NULL

Continue the same for all the remaining tables.

Data Retrieval Testing

In order to test the data that has been inserted into the table,use the following queries:

```
SELECT * FROM  [Project.GraduateProgram]
```

gradPrgID	gradPrgName	gradPrgCategory	gradPrgDescription	gradPrgDuration	gradPrgFee	gradPrgCredits	stemDesignation
GP001	Information Systems	MS	Covers a range of courses related to information sy...	18	70000	30	Yes
GP002	Business Analytics	MS	Covers fundamental principles of data analysis, incl...	18	65000	30	Yes
GP003	Marketing Analytics	MS	Covers basic principles of marketing analytics, incl...	18	60000	30	Yes
GP004	Supply chain management	MS	Introduces the basic principles and concepts of sup...	24	62500	30	Yes
GP005	Business Administration	MBA	Prepare students for leadership roles in various ind...	24	90000	54	No
GP006	Accounting	MS	Focussed on providing a set of accounting knowled...	18	63450	30	Yes
GP007	Finance	MFin	Learn the basics of programming and discover ho...	18	63450	30	Yes
GP008	Quantitative Finance	MQFin	Gain in-depth, specialized knowledge of financial ...	24	76140	36	Yes

*SELECT * FROM [Project.RankSource]*

rankSourceID	rankSourceName	rankSourceDescription	rankSourceURL
RS001	U.S. News & World Report	Provide rankings for a variety of fields, including bu...	https://www.usnews.com/best-graduate-schools
RS002	QS World University Rankings	Rankings cover a variety of subjects, including busi...	https://www.topuniversities.com/qs-world-university-...
RS003	Princeton Review	Reviews of graduate programs, often highlighting ...	https://www.princetonreview.com/business-school
RS004	Times Higher Education (THE) World University Ra...	Rankings consider factors such as teaching, resea...	https://www.timeshighereducation.com/world-unive...
RS005	QS Business Masters Rankings	Provides rankings specifically for business master'...	https://www.topuniversities.com/university-rankings/...
RS006	Financial Times	Provides ranking specifically for MBA	https://rankings.ft.com/
RS007	Best Masters	Provide an in depth view on academic expertise w...	https://www.best-masters.us/

*SELECT * FROM [Project.Faculty]*

facultyID	facultyFirstName	facultyMiddleName	facultyLastName	facultyQualification	facultyJoiningDate	facultyDesignation	researchPapersPublished
FAC001	John	NULL	Bono	EdD	2001-10-03	Associate Academic Director, MS Information Syste...	14
FAC002	Sujin	NULL	Kim	PhD	2012-07-19	Associate Clinical Professor	12
FAC003	Woei-Jyh	NULL	Lee	PhD	2012-08-11	Associate Clinical Professor	18
FAC004	Siva	NULL	Viswanathan	PhD	2001-01-05	Dean's Professor of Information Systems	16
FAC005	Tejwansh	Singh	Anand	PhD	2021-08-20	Academic Director, MS in Information Systems	18
FAC006	Kislaya	NULL	Prasad	PhD	2005-08-01	Research Professor	19
FAC007	Pallassana	K	Kannan	PhD	1995-08-07	Associate Dean for Strategic Initiatives	72
FAC008	Judy	K	Frels	PhD	2014-08-04	Academic Director of the MS Marketing Analytics	13
FAC009	Rosellina	NULL	Ferraro	PhD	2005-01-01	Associate Professor of Marketing	17
FAC010	Amna	NULL	Kirmani	PhD	2006-01-01	Ralph J. Tyser Professor of Marketing	26
FAC011	Christine	M	Schaaf	MS	2017-08-07	Faculty Director of the Smith Business Leadership F...	NULL
FAC012	Gisela	M	Gisela	PhD	2018-08-06	Associate Clinical Professor	3
FAC013	Zhi	Long	Chen	PhD	2001-08-06	Professor of Operations Management	17
FAC014	Suresh	NULL	Acharya	PhD	2018-08-06	MS	NULL
FAC015	Jessica	M	Clark	PhD	2017-08-07	Assistant Professor of Information System	5
FAC016	Emanuel	NULL	Zur	PhD	2013-07-01	Academic Director, MS in Accounting Program	8

*SELECT * FROM [Project.RankingCriteria]*

criteriaID	criteriaName	criteriaDescription
CR001	Academic quality	Quality of course content
CR002	Industry income	Range of income of graduating students
CR003	Research	Based on the quantity and quality of research pa...
CR004	Alumni Outcomes	Quality of post college work that the alumni is inv...
CR005	Diversity	Diversity in the incoming students
CR006	Faculty/Student	Number of faculties per student
CR007	Citation/Faculty	Number of citations per faculty
CR008	Value For Money	Calculated according to alumni salaries today, co...
CR009	Faculty doctorate	Percentage of full-time faculty with doctoral degr...
CR010	Careers service	Effectiveness of the school careers service
CR011	Female faculty	Percentage of full-time female faculty
CR012	Salary% inc	Avg diff in alumni salary bw completion & today
CR013	Employer Reputation	Reputation of employer
CR014	Graduation Rate	Graduation rate
CR015	Female Faculty	Percentage of female faculties in the university

*SELECT * FROM [Project.Ranks]*

gradPrgID	rankSourceID	rankYear	overallRank
GP001	RS001	2021	10
GP001	RS001	2022	8
GP001	RS001	2023	22
GP002	RS002	2023	10
GP003	RS003	2021	15
GP003	RS005	2021	34
GP003	RS005	2022	37
GP003	RS005	2023	39
GP004	RS002	2021	24
GP004	RS002	2022	26
GP004	RS002	2023	28
GP005	RS006	2019	72
GP005	RS006	2020	73
GP005	RS006	2021	52
GP005	RS006	2022	85
GP005	RS006	2023	57

*SELECT * FROM [Project.Uses]*

rankSourceID	criterialD	criteriaWeightage
RS001	CR001	0.40
RS001	CR006	0.04
RS001	CR014	0.16
RS002	CR001	0.30
RS002	CR002	0.30
RS002	CR006	0.10
RS002	CR007	0.20
RS002	CR013	0.15
RS003	CR003	0.55
RS006	CR008	0.06
RS006	CR009	0.05
RS006	CR010	0.05
RS006	CR011	0.05
RS006	CR012	0.10

```
SELECT * FROM  [Project.Teaches]
```

gradPrgID	facultyID	numberOfCourses
GP001	FAC001	1
GP001	FAC003	1
GP001	FAC005	3
GP001	FAC020	2
GP002	FAC002	1
GP002	FAC003	1
GP003	FAC008	1
GP003	FAC009	1
GP003	FAC019	3
GP004	FAC017	3
GP006	FAC003	1

SQL Queries and Output:

To understand our analysis use the Project_0501_05_SELECT.sql file to run the following queries and get the respective outputs.

Query 1

What is the latest rank of all the programs offered at Robert H Smith School of Business

```
GO
DROP VIEW IF EXISTS Latest_Rank_View
GO
CREATE VIEW Latest_Rank_View AS
SELECT gp.gradPrgName AS 'Graduate Program',
rs.rankSourceName AS 'Rank Source',
r.rankYear AS 'Year',
r.overallRank AS 'Rank'
FROM [Project.GraduateProgram] gp
JOIN [Project.Ranks] r ON gp.gradPrgID = r.gradPrgID
JOIN [Project.RankSource] rs ON r.rankSourceID = rs.rankSourceID
INNER JOIN (
        SELECT gradPrgID, rankSourceID, MAX(rankYear) as maxYear
        FROM [Project.Ranks]
        GROUP BY gradPrgID, rankSourceID
) as latestRanks ON r.gradPrgID = latestRanks.gradPrgID
AND r.rankSourceID = latestRanks.rankSourceID
AND r.rankYear = latestRanks.maxYear
GO
SELECT * FROM Latest_Rank_View
ORDER BY 'Graduate Program', 'Rank Source'
```

Graduate Program	Rank Source	Year	Rank
Accounting	Best Masters	2023	34
Business Administration	Financial Times	2023	57
Business Analytics	QS World University Rankings	2023	10
Finance	Financial Times	2023	55
Information Systems	U.S. News & World Report	2023	22
Marketing Analytics	Princeton Review	2021	15
Marketing Analytics	QS Business Masters Rankings	2023	39
Quantitative Finance	Financial Times	2023	NULL
Supply chain management	QS World University Rankings	2023	28

Query 2

Which program has the highest ranking across all sources in the year 2023?

```
GO
DROP VIEW IF EXISTS Highest_Rank_View
GO
CREATE VIEW Highest_Rank_View AS
SELECT gp.gradPrgName AS 'Graduate Program',
r.rankYear AS 'Year',
r.overallRank AS 'Best Rank'
FROM [Project.GraduateProgram] gp
JOIN [Project.Ranks] r ON gp.gradPrgID = r.gradPrgID
WHERE r.rankYear = 2023 AND r.overallRank = (
            SELECT MIN(overallRank)
            FROM [Project.Ranks]
            WHERE rankYear = 2023
)
GO
SELECT * FROM Highest_Rank_View
ORDER BY 'Graduate Program'
```

Graduate Program	Year	Best Rank
Business Analytics	2023	10

Query 3

What is the historical ranking of Business Administration program over the years?

```
GO
DROP VIEW IF EXISTS BusinessAdmin_View
GO
CREATE VIEW BusinessAdmin_View AS
SELECT gradPrgName AS 'Graduate Program',
rs.rankSourceName AS 'Rank Source',
r.rankYear AS 'Year',
r.overallRank AS 'Rank'
FROM [Project.GraduateProgram] gp
JOIN [Project.Ranks] r ON gp.gradPrgID = r.gradPrgID
JOIN [Project.RankSource] rs ON r.rankSourceID = rs.rankSourceID
WHERE gp.gradPrgName = 'Business Administration'
GO
SELECT * FROM BusinessAdmin_View
ORDER BY 'Year','Rank Source'
```

Graduate Program	Rank Source	Year	Rank
Business Administration	Financial Times	2019	72
Business Administration	Financial Times	2020	73
Business Administration	Financial Times	2021	52
Business Administration	Financial Times	2022	85
Business Administration	Financial Times	2023	57

Query 4

Who are the faculty members teaching in the programs ranked below 25 in the year 2022 and how many courses do they teach?

```
GO
DROP VIEW IF EXISTS Top_Rank_Faculty_View
GO
CREATE VIEW Top_Rank_Faculty_View AS
SELECT gp.gradPrgName AS 'Graduate Program',
MinRank.ProgramRank AS 'Rank',
CONCAT(f.facultyFirstName,' ',f.facultyMiddleName ,' ',f.facultyLastName) AS 'Faculty Name',
t.numberOfCourses AS 'Number of Courses'
FROM [Project.Faculty] f
JOIN [Project.Teaches] t ON f.facultyID = t.facultyID
JOIN [Project.GraduateProgram] gp ON t.gradPrgID = gp.gradPrgID
JOIN (
        SELECT gradPrgID, MIN(overallRank) as ProgramRank
        FROM [Project.Ranks]
        WHERE rankYear = 2022
        GROUP BY gradPrgID
) MinRank ON gp.gradPrgID = MinRank.gradPrgID
WHERE MinRank.ProgramRank <= 25
GO
SELECT * FROM Top_Rank_Faculty_View
ORDER BY 'Graduate Program','Faculty Name'
```

Graduate Program	Rank	Faculty Name	Number of Courses
Information Systems	8	John Bono	1
Information Systems	8	Paul Shapiro	2
Information Systems	8	Tejwansh Singh Anand	3
Information Systems	8	Woei-Jyh Lee	1

Query 5

What are the specific criteria used by each ranking source to evaluate the program?

```
GO
DROP VIEW IF EXISTS Ranking_Criteria_View
GO
CREATE VIEW Ranking_Criteria_View AS
SELECT rs.rankSourceName AS 'Rank Source',
rc.criteriaName AS 'Criteria Name',
rc.criteriaDescription AS 'Criteria Description'
FROM [Project.RankSource] rs
JOIN [Project.Uses] u ON rs.rankSourceID = u.rankSourceID
JOIN [Project.RankingCriteria] rc ON u.criteriaID = rc.criteriaID
GO
SELECT * FROM Ranking_Criteria_View
ORDER BY 'Rank Source','Criteria Name'
```

Rank Source	Criteria Name	Criteria Description
Financial Times	Careers service	Effectiveness of the school careers service
Financial Times	Faculty doctorate	Percentage of full-time faculty with doctoral degr...
Financial Times	Female faculty	Percentage of full-time female faculty
Financial Times	Salary% inc	Avg diff in alumni salary bw completion & today
Financial Times	Value For Money	Calculated according to alumni salaries today, co...
Princeton Review	Research	Based on the quantity and quality of research pa...
QS World University Rankings	Academic quality	Quality of course content
QS World University Rankings	Citation/Faculty	Number of citations per faculty
QS World University Rankings	Employer Reputation	Reputation of employer
QS World University Rankings	Faculty/Student	Number of faculties per student
QS World University Rankings	Industry income	Range of income of graduating students
U.S. News & World Report	Academic quality	Quality of course content
U.S. News & World Report	Faculty/Student	Number of faculties per student
U.S. News & World Report	Graduation Rate	Graduation rate

Query 6

Which year did the programs achieve their best rank and what was the rank?

```
GO
DROP VIEW IF EXISTS GraduateProgram_Best_Rank_View
GO
CREATE VIEW GraduateProgram_Best_Rank_View AS
SELECT gp.gradPrgName AS 'Graduate Program',
r.rankYear AS 'Year',
pr.BestRank AS 'Best Rank'
FROM [Project.GraduateProgram] gp
JOIN (
        SELECT gradPrgID, MIN(overallRank) as BestRank
        FROM [Project.Ranks]
        GROUP BY gradPrgID
) pr ON gp.gradPrgID = pr.gradPrgID
JOIN [Project.Ranks] r ON gp.gradPrgID = r.gradPrgID AND pr.BestRank = r.overallRank
GO
SELECT * FROM GraduateProgram_Best_Rank_View
ORDER BY 'Graduate Program'
```

Graduate Program	Year	Best Rank
Accounting	2023	34
Business Administration	2021	52
Business Analytics	2023	10
Finance	2020	45
Information Systems	2022	8
Marketing Analytics	2021	15
Supply chain management	2021	24

Query 7

When was the most significant change in rankings observed for any graduate program?

```
GO
DROP VIEW IF EXISTS GraduateProgram_Rank_Change_View
GO
CREATE VIEW GraduateProgram_Rank_Change_View AS
SELECT TOP 1 gp.gradPrgName AS 'Graduate Program',
r1.rankYear AS 'Current Year',
r2.rankYear AS 'Previous Year',
r1.overallRank AS 'Current Rank',
r2.overallRank AS 'Previous Rank',
ABS(r1.overallRank - r2.overallRank) AS 'Rank Change'
FROM [Project.Ranks] r1
JOIN [Project.Ranks] r2 ON r1.gradPrgID = r2.gradPrgID AND r1.rankYear =
r2.rankYear + 1
JOIN [Project.GraduateProgram] gp ON r1.gradPrgID = gp.gradPrgID
GO
SELECT * FROM GraduateProgram_Rank_Change_View
ORDER BY 'Rank Change' DESC;
```

Graduate Program	Current Year	Previous Year	Current Rank	Previous Rank	Rank Change
Information Systems	2022	2021	8	10	2

Query 8

What are the ranking criterias used by the source when the Information Systems Program was ranked the worst?

```
GO
DROP VIEW IF EXISTS GraduateProgram_Rank_Criteria_View
GO
CREATE VIEW GraduateProgram_Rank_Criteria_View AS
SELECT rs.rankSourceName AS 'Rank Source',
rc.criteriaName AS 'Criteria Name',
rc.criteriaDescription AS 'Criteria Description'
FROM [Project.Ranks] r
JOIN [Project.GraduateProgram] gp ON r.gradPrgID = gp.gradPrgID
JOIN [Project.RankSource] rs ON r.rankSourceID = rs.rankSourceID
JOIN [Project.Uses] u ON rs.rankSourceID = u.rankSourceID
JOIN [Project.RankingCriteria] rc ON u.criteriaID = rc.criteriaID
WHERE gp.gradPrgName = 'Information Systems'
AND r.overallRank = (
        SELECT MAX(overallRank)
        FROM [Project.Ranks] rk
        JOIN [Project.GraduateProgram] g ON rk.gradPrgID = g.gradPrgID
        WHERE g.gradPrgName = 'Information Systems'
)
GO
SELECT * FROM GraduateProgram_Rank_Criteria_View
ORDER BY 'Criteria Name'
```

Rank Source	Criteria Name	Criteria Description
U.S. News & World Report	Academic quality	Quality of course content
U.S. News & World Report	Faculty/Student	Number of faculties per student
U.S. News & World Report	Graduation Rate	Graduation rate

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