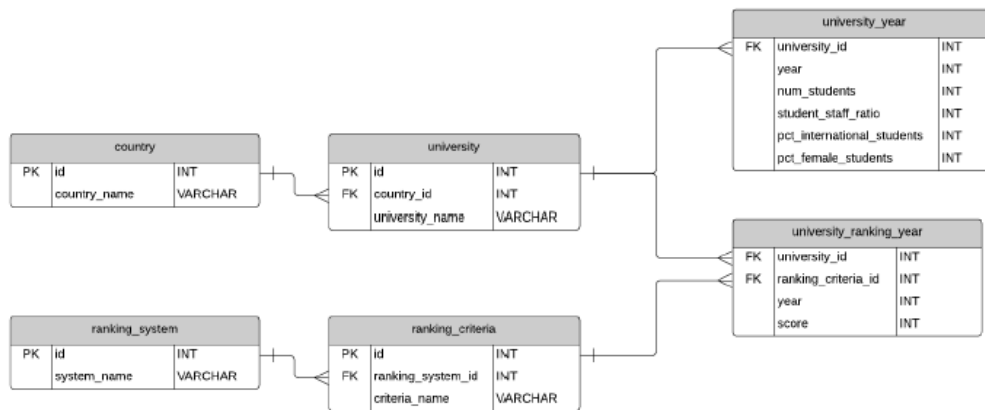


# Exámen Final

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## EXAMEN FINAL – Bases de datos con SQL

Considerando el siguiente modelo de datos:



## Base de Datos Relacional

1.

The screenshot shows the DBeaver SQL editor with the following query:

```
select distinct university_ranking_year.university_id, university_ranking_year.year, university_ranking_year.score,
university.university_name, university_year.pct_international_students
from university_ranking_year
inner join university on university_ranking_year.university_id = university.id
inner join university_year on university.id = university_year.university_id
order by year desc, score desc, pct_international_students desc
limit 3;
```

The results table shows the top 3 universities:

Rank	university_id	year	score	university_name	pct_international_students
1	151	2016	100	Nanyang Technological University	33
2	20	2016	100	Massachusetts Institute of Technology	33
3	507	2016	100	California Institute of Technology	27

2.

The screenshot shows the DBeaver SQL editor with a query to identify universities that improved their ranking over the last three years. The query is as follows:

```

-- 2. Identifica las universidades que mejoraron su ranking año tras año durante los últimos
-- tres años y muestra su progreso en cada año.

select distinct university_ranking_year.university_id, university_ranking_year.year, university.university_name, avg(score)
from university_ranking_year
inner join university on university_ranking_year.university_id = university.id
where year in (
select distinct year
from university_ranking_year
order by year desc)
group by 1,2

```

The results table shows the following data:

Grilla	university_id	year	university_name	avg(score)
1	1	2011	Harvard University	90,0769
2	5	2011	California Institute of Technology	73,8462
3	2	2011	Massachusetts Institute of Technology	85,5
4	3	2011	Stanford University	73,2308
5	6	2011	Princeton University	72,3333
6	4	2011	University of Cambridge	75,6154
7	7	2011	University of Oxford	69,0769
8	10	2011	University of California, Berkeley	74,4167
9	28	2011	Imperial College London	90,8333
10	8	2011	Yale University	65,6667
11	19	2011	University of California, Los Angeles	62,1667
12	11	2011	University of Chicago	66,9167
13	15	2011	Johns Hopkins University	84,3333
14	12	2011	Cornell University	60
15	1,025	2011	ETH Zurich - Swiss Federal Institute of Technology Zurich	85,2
16	1,026	2011	University of Michigan	79,5
17	9	2011	Columbia University	68,0833
18	13	2011	University of Pennsylvania	56,6623
19	43	2011	Carnegie Mellon University	48,6154
20	156	2011	University of Hong Kong	77
21	31	2011	University College London	56,9462
22	1,027	2011	University of Washington	54,7862

3.

The screenshot shows the DBeaver SQL editor with a query to determine the average of international students for universities that are in the top 5 in the most recent year. The query is as follows:

```

-- 3. Determina el promedio de estudiantes internacionales para universidades que están en
-- el top 5 en el año más reciente. Al mismo tiempo, clasifica esos países según el
-- promedio de estudiantes internacionales y su ranking en ese año.

with cte as (
select university_ranking_year.university_id, university_ranking_year.score, country.country_name,
university.university_name, university_ranking_year.year,
university_year.pct international students as promedio,
row_number() over (partition by university_ranking_year.university_id
order by university_ranking_year.score desc) as row_num
from university_ranking_year
inner join university on university_ranking_year.university_id = university.id
inner join university_year on university.id = university_year.university_id
inner join country on country.id = university.country_id
)
select university_id, score, university_name, year, promedio, country_name
from cte
where row_num = 1
order by score desc
limit 5;

```

The results table shows the following data:

Grilla	university_id	score	university_name	year	promedio	country_name
1	952	997	Alexandria University	2,015	1	Egypt
2	100	980	Mines ParisTech	2,014	22	France
3	854	973	Florida Institute of Technology	2,015	26	United States of America
4	792	950	National Sun Yat-sen University	2,015	4	Taiwan
5	679	937	Hong Kong Baptist University	2,015	25	Hong Kong

The screenshot shows the DBeaver 23.2.1 interface. The top menu bar includes Archivo, Editar, Navegar, Buscar, Editor SQL, Base de Datos, Ventana, and Ayuda. The main window is titled "db\_universities" and contains a SQL editor with the following query:

```
# 4. Determina cuál sistema de ranking tiene la mayor cantidad de criterios y muestra la
# universidad mejor rankeada para ese sistema en el año más reciente.

select distinct ranking_system.system_name, university.university_name, max(university_ranking_year.score),
max(university_ranking_year.year), count(criteria_name) as cantidad_criterio
from ranking_system
inner join ranking_criteria on ranking_system.id = ranking_criteria.ranking_system_id
inner join university_ranking_year on ranking_criteria.id = university_ranking_year.ranking_criteria_id
inner join university on university_ranking_year.university_id = university.id
group by 1,2
order by cantidad_criterio desc;
```

The results pane shows the output of the query, filtered by " ranking\_system(+) 1 X". The table has 5 columns: ranking\_system\_name, university\_name, max(university\_ranking\_year.score), max(university\_ranking\_year.year), and cantidad\_criterio. The results are sorted by cantidad\_criterio in descending order.

	ranking_system_name	university_name	max(university_ranking_year.score)	max(university_ranking_year.year)	cantidad_criterio
1	Shanghai Ranking	Leiden University	49	2.015	77
2	Shanghai Ranking	Rice University	39	2.015	77
3	Shanghai Ranking	McGill University	60	2.015	77
4	Shanghai Ranking	École normale supérieure - Paris	60	2.015	77
5	Shanghai Ranking	Stanford University	90	2.015	77
6	Shanghai Ranking	University of California, San Francisco	62	2.015	77
7	Shanghai Ranking	University of Bristol	40	2.015	77
8	Shanghai Ranking	Rockefeller University	62	2.015	77
9	Shanghai Ranking	New York University	57	2.015	77
10	Shanghai Ranking	University of Zurich	52	2.015	77
11	Shanghai Ranking	Cornell University	66	2.015	77
12	Shanghai Ranking	Uppsala University	50	2.015	77

The screenshot shows the DBeaver 23.2.1 interface. The top toolbar includes buttons for File, Edit, Nav, Search, SQL, Rollback, and Auto. The main editor displays a SQL query for a ranking system. The left sidebar shows the database structure, including 'db\_universities' and 'ranking\_system'. The bottom pane shows the results of the query, which is a table with 5 columns: system\_name, university\_name, country\_name, promedio\_score, and max(university\_ranking\_year).

**SQL Query:**

```
# 5. Considerando el año más reciente, muestra el sistema de ranking que tiene el promedio
# de score más alto para las universidades del país que tiene la universidad con el score
# más alto en general

select distinct ranking_system.system_name, university.university_name, country.country_name,
avg(university_ranking_year.score) as promedio_score,
max(university_ranking_year.year)
from university_ranking_year
inner join ranking_criteria on university_ranking_year.ranking_criteria_id = ranking_criteria.id
inner join ranking_system on ranking_criteria.ranking_system_id = ranking_system.id
inner join university on university_ranking_year.university_id = university.id
inner join country on university.country_id = country.id
group by 1,2,3
order by promedio_score desc;
```

**Query Results:**

system_name	university_name	country_name	promedio_score	max(university_ranking_year)
Center for World University Rankings	Henan Normal University	China	603.625	2015
Center for World University Rankings	University of Pau and Pays de l'Adour	France	586.6975	2015
Center for World University Rankings	Harbin Engineering University	China	580.125	2015
Center for World University Rankings	Yuan Ze University	Taiwan	579.875	2015
Center for World University Rankings	Shahid Beheshti University of Medical Sciences	Iran	579	2015
Center for World University Rankings	Dokuz Eylul University	Turkey	578.3125	2015
Center for World University Rankings	Babes-Bolyai University	Romania	576	2015
Center for World University Rankings	Hunan Normal University	China	573.8125	2015
Center for World University Rankings	University of Almeria	Spain	573.6875	2015
Center for World University Rankings	Tianjin Medical University	China	573.625	2015
Center for World University Rankings	Shanghai Normal University	China	572.5	2015
Center for World University Rankings	Federal University of Santa Maria	Brazil	572.1875	2015
Center for World University Rankings	University of Chemistry and Technology, Prague	Czech Republic	570.875	2015
Center for World University Rankings	Yangzhou University	China	568.875	2015
Center for World University Rankings	Shaanxi Normal University	China	568.125	2014
Center for World University Rankings	University of Hyderabad	India	567.9125	2014