

Proyecto: QS Rankings en el mundo y Mexico

1. Definición del proyecto (Fuentes y problemas a resolver)

1) Fuentes de BD:

Los datos provienen de un dataset de Kaggle con información del ranking anual QS World Universities: <https://www.kaggle.com/prasertk/qs-world-university-rankings-2021?select=QS+World+University+Rankings+2017.csv>

2) Problema a resolver:

La información proviene de una investigación realizada por la Secretaria de Educación que busca identificar a las universidades mejor calificadas en el mundo, compararlas con las mejores Universidades de México así como obtener una idea del perfil que da el sistema educativo frente al mundo para así comenzar a fijar metas realistas para implementar mejoras al sistema y preparar un programa de becas para ayudar a alumnos ejemplares a obtener oportunidades en dichas universidades.

2. Definición de la base de datos

La data proviene de 3 archivos:

- a) QS Ranking 2021: El archivo QS Ranking 2021.csv contiene toda la información relevante sobre la clasificación de las universidades en el QS World University 2021.
- b) QS Ranking 2020: El archivo QS Ranking 2020.csv contiene toda la información relevante sobre la clasificación de las universidades en el QS World University 2020.

Diagrama Entidad Relación

Glosario

QS Ranking 2020 y QS Rankings 2021

- **university** (String): Nombre de la universidad.
- **year** (Decimal): Año en que se realizó la clasificación.
- **rank_display** (Decimal): posición en la clasificación que se encuentra basada en su calificación. Puede haber empates.
- **university** (String): Nombre de la universidad.
- **score** (Decimal): Las instituciones son evaluadas de acuerdo con las siguientes seis métricas:
 - Reputación académica (40%)
 - Reputación del empleador (10%)
 - Ratio profesorado/alumnos (20%)
 - Citas por profesorado (20%)
 - Ratio de profesorado internacional (5%)
 - Ratio de estudiantes internacionales (5%)
- **link** (String): Hipervínculo a la Home Page de la universidad en el sitio web de QS.
- **country** (Decimal): El país de la institución.
- **city** (Decimal): La ciudad de la institución.
- **region** (Decimal): Región donde se encuentra la universidad (puede no aplicar).
- **logo** (Decimal): Hipervínculo al logo de la institución en la página web de QS Top Universities.

Creación de BBDD en Mongo DB

Colecciones de QS Rankings 2020 y QS Ranking 2021

The screenshot shows the MongoDB Compass interface. On the left, the 'Local' sidebar displays the database structure, including hosts, clusters, and a list of collections under the 'DiegoOswaldoGonzalezMa...' database. The main panel shows the 'Collections' tab with three collections listed:

Collection Name	Storage size	Documents	Avg. document size	Indexes	Total index size
QS Rankings 2019	4.10 kB	1 K	362.00 B	1	4.10 kB
QS Rankings 2020	122.88 kB	1.1 K	360.00 B	1	28.67 kB
QS Rankings 2021	4.10 kB	1.2 K	361.00 B	1	4.10 kB

3. Consultas

1) ¿Cuáles han sido las 5 primeras universidades en 2021, excluyendo aquellas que no tienen calificación o clasificación?

The screenshot shows the MongoDB Compass interface. The left sidebar displays the database structure, including collections like 'OS Rankings 2021'. The main panel shows a query for the 'Documents' collection in the 'DiegoOswaldoGonzalezMacias.OS Rankings 2021' database. The query is: `{ $rank_display: { $ne: null } }`. The results show the top 5 universities based on their rank_display value.

rank_display	university
1	"Massachusetts Institute of Technology (MIT)"
2	"stanford university"
3	"harvard university"
4	"california institute of technology (caltech)"
5	"university of oxford"

2) ¿Cuáles han sido las 5 universidades que han quedado al final de la clasificación en 2021?

The screenshot shows the MongoDB Compass interface. The left sidebar displays the database structure, including collections like 'OS Rankings 2021'. The main panel shows a query for the 'Documents' collection in the 'DiegoOswaldoGonzalezMacias.OS Rankings 2021' database. The query is: `{ $rank_display: { $gt: 995 } }`. The results show the bottom 5 universities based on their rank_display value.

rank_display	university
1001	"hally university"
1001	"alejandro joan coza university"
1001	"toyama sakun university"
1001	"ho-nagan national university"
1001	"si-shahr university"

3) ¿Cuántas escuelas en el top 30 son de la región de Norteamérica y que clasificación tienen?

MongoDB Compass - cluster0.ytnqo.mongodb.net/DiegoOswaldoGonzalezMacias.QS Rankings 2021

Connect View Collection Help

Local

13 DBS 34 COLLECTIONS

HOSTS

- cluster0-shard-00-00.ytnq...
- cluster0-shard-00-01.ytnq...
- cluster0-shard-00-02.ytnq...

CLUSTER

Replica Set (atlas-3e252f-...)

3 Nodes

EDITION

MongoDB 4.4.11 Enterprise

Filter your data

- BEDUProjects
 - Best songs
 - DiegoOswaldoGonzalezMa...
 - Songs
 - WFB - People
- DiegoOswaldoGonzalezMacias
 - QS Rankings 2019
 - QS Rankings 2020
 - QS Rankings 2021
- Starbucks
- admin
- local
- sample_airbnb
- listingsAndReviews
- sample_analytics
- sample_geospatial
- sample_mflix
- User comments password

Documents

DiegoOswaldoGonzalezMacias.QS Rankings 2021

DOCUMENTS 1.2k STORAGE SIZE 4.1Kb AVG. SIZE 361B INDEXES 1 TOTAL SIZE 4.1Kb AVG. SIZE 4.1Kb

Documents Aggregations Schema Explain Plan Indexes Validation

Filter: `{ $and: [{ rank_display: { $lte: 30 } }, { region: "north america" }] }`

Options: FIND RESET

Projection: `{ university: 1, rank_display: 1, region: 1, _id: 0 }`

Sort: `{ field: -1 } or { [field], -1 }`

Collation: `{ locale: "simple" }`

MAX TIME MS: 60000 SKIP: 0 LIMIT: 30

Displaying documents 1 - 15 of 15

rank_display	university	region
1	Massachusetts Institute of Technology (MIT)	North America
2	Stanford University	North America
3	Harvard University	North America
4	California Institute of Technology (Caltech)	North America
5	University of Chicago	North America
12	Princeton University	North America
18	University of Pennsylvania	North America

4) ¿Cuántas escuelas en el top 30 son de la región de Europa y que clasificación tienen?

MongoDB Compass - cluster0.ytnqo.mongodb.net/DiegoOswaldoGonzalezMacias.QS Rankings 2021

Connect View Collection Help

Local

13 DBS 34 COLLECTIONS

HOSTS

- cluster0-shard-00-00.ytnq...
- cluster0-shard-00-01.ytnq...
- cluster0-shard-00-02.ytnq...

CLUSTER

Replica Set (atlas-3e252f-...)

3 Nodes

EDITION

MongoDB 4.4.11 Enterprise

Filter your data

- BEDUProjects
 - Best songs
 - DiegoOswaldoGonzalezMa...
 - Songs
 - WFB - People
- DiegoOswaldoGonzalezMacias
 - QS Rankings 2019
 - QS Rankings 2020
 - QS Rankings 2021
- Starbucks
- admin
- local
- sample_airbnb
- listingsAndReviews
- sample_analytics
- sample_geospatial
- sample_mflix
- User comments password

Documents

DiegoOswaldoGonzalezMacias.QS Rankings 2021

DOCUMENTS 1.2k STORAGE SIZE 4.1Kb AVG. SIZE 361B INDEXES 1 TOTAL SIZE 4.1Kb AVG. SIZE 4.1Kb

Documents Aggregations Schema Explain Plan Indexes Validation

Filter: `{ $and: [{ rank_display: { $lte: 30 } }, { region: "Europe" }] }`

Options: FIND RESET

Projection: `{ university: 1, rank_display: 1, region: 1, _id: 0 }`

Sort: `{ field: -1 } or { [field], -1 }`

Collation: `{ locale: "simple" }`

MAX TIME MS: 60000 SKIP: 0 LIMIT: 30

Displaying documents 1 - 8 of 8

rank_display	university	region
5	University of Oxford	Europe
6	The Zurich - Swiss Federal Institute of Technology	Europe
7	University of Cambridge	Europe
8	Imperial College London	Europe
18	ETH Zurich	Europe
14	EPFL	Europe
20	The University of Edinburgh	Europe

5) ¿Cuántas escuelas en el top 30 son de la región Asia y que clasificación tienen?

MongoDB Compass - cluster0.ytnq.mongodb.net/DiegoOswaldoGonzalezMacias.QS Rankings 2021

Connect View Collection Help

Local

13 DBS 34 COLLECTIONS

HOSTS

cluster0-shard-00-00.ytnq...
cluster0-shard-00-01.ytnq...
cluster0-shard-00-02.ytnq...

CLUSTER

Replica Set (atlas-3e252f-...)
3 Nodes

EDITION

MongoDB 4.4.11 Enterprise

Filter your data

BEDUProjects

DiegoOswaldoGonzalezMacias

QS Rankings 2019

QS Rankings 2020

QS Rankings 2021

Starbucks

admin

local

sample_arbnb

sample_analytics

sample_geospatial

sample_mflix

sample_restaurants

sample_supplies

sample_training

sample_weatherdata

DiegoOswaldoGonzalezMacias.QS Rankings 2021

Documents Aggregations Schema Explain Plan Indexes Validation

country: "Argentina" country: "Mexico" country: "Brazil"

Output after \$limit stage (Sample of 10 documents)

```
1 // **
2 // Provide the number of documents to limit.
3 //
4 //
```

Output after \$group stage (Sample of 1 document)

```
1 // **
2 // _id: the id of the group.
3 // fields: the first field name.
4 //
5 //
```

Output after \$addFields stage (Sample of 1 document)

```
1 // **
2 // newField: the new field name.
3 // expression: the new field expression.
4 //
5 //
```

8) ¿Cuál es la puntuación promedio de las 10 universidades norteamericanas principales?

MongoDB Compass - cluster0.ytnq.mongodb.net/DiegoOswaldoGonzalezMacias.QS Rankings 2021

Connect View Collection Help

Local

13 DBS 34 COLLECTIONS

HOSTS

cluster0-shard-00-00.ytnq...
cluster0-shard-00-01.ytnq...
cluster0-shard-00-02.ytnq...

CLUSTER

Replica Set (atlas-3e252f-...)
3 Nodes

EDITION

MongoDB 4.4.11 Enterprise

Filter your data

BEDUProjects

DiegoOswaldoGonzalezMacias

QS Rankings 2019

QS Rankings 2020

QS Rankings 2021

Starbucks

admin

local

sample_arbnb

sample_analytics

sample_geospatial

sample_mflix

sample_restaurants

sample_supplies

sample_training

sample_weatherdata

DiegoOswaldoGonzalezMacias.QS Rankings 2021

Documents Aggregations Schema Explain Plan Indexes Validation

country: "Argentina" country: "Mexico" country: "Brazil"

Output after \$limit stage (Sample of 10 documents)

```
1 // **
2 // Provide the number of documents to limit.
3 //
4 //
```

Output after \$group stage (Sample of 1 document)

```
1 // **
2 // _id: the id of the group.
3 // fields: the first field name.
4 //
5 //
```

Output after \$addFields stage (Sample of 1 document)

```
1 // **
2 // newField: the new field name.
3 // expression: the new field expression.
4 //
5 //
```

9) ¿Cuál es el promedio de las 10 mejores Universidades mexicanas?

MongoDB Compass - cluster0.ytnq.mongodb.net/DiegoOswaldoGonzalezMacias.QS Rankings 2021

Local

13 DBS 34 COLLECTIONS

HOSTS

cluster0-shard-00-00.ytnq...
cluster0-shard-00-01.ytnq...
cluster0-shard-00-02.ytnq...

CLUSTER

Replica Set (atlas-3e292)...
3 Nodes

EDITION

MongoDB 4.4.11 Enterprise

Filter your data

BEDUPProjects

DiegoOswaldoGonzalezMacias

QS Rankings 2019

QS Rankings 2020

QS Rankings 2021

Starbucks

admin

local

sample_airbnb

sample_analytics

sample_geospatial

sample_mflix

sample_restaurants

sample_supplies

sample_training

sample_weatherdata

DiegoOswaldoGonzalezMacias.QS Rankings 2021

Documents Aggregations Schema Explain Plan Indexes Validation

Aggregations

QS: Top Ranks 19-20-21 PB: Modified

1. \$match

2. \$provide the number of documents to limit.

3. \$limit

4. 10

Output after \$match stage (10 (sample or 10 documents))

1. \$project

2. \$set: the id of the group.

3. \$fields: the first field name.

4. \$

5. \$

6. \$

7. \$

8. \$

9. \$

10. \$

11. \$

12. \$

13. \$

Output after \$project stage (10 (sample or 10 documents))

1. \$group

2. \$

3. \$

4. \$

5. \$

6. \$

7. \$

8. \$

9. \$

10. \$

11. \$

12. \$

13. \$

Output after \$group stage (1 (Sample of 1 document))

1. \$addFields

2. \$

3. \$

4. \$

5. \$

6. \$

7. \$

8. \$

9. \$

10. \$

11. \$

12. \$

13. \$

Output after \$addFields stage (1 (Sample of 1 document))

10) ¿Cuáles son las universidades con una puntuación superior al promedio latinoamericano?

MongoDB Compass - cluster0.ytnq.mongodb.net/DiegoOswaldoGonzalezMacias.QS Rankings 2021

Local

13 DBS 34 COLLECTIONS

HOSTS

cluster0-shard-00-00.ytnq...
cluster0-shard-00-01.ytnq...
cluster0-shard-00-02.ytnq...

CLUSTER

Replica Set (atlas-3e292)...
3 Nodes

EDITION

MongoDB 4.4.11 Enterprise

Filter your data

BEDUPProjects

DiegoOswaldoGonzalezMacias

QS Rankings 2019

QS Rankings 2020

QS Rankings 2021

Starbucks

admin

local

sample_airbnb

sample_analytics

sample_geospatial

sample_mflix

sample_restaurants

sample_supplies

sample_training

sample_weatherdata

DiegoOswaldoGonzalezMacias.QS Rankings 2021

Documents Aggregations Schema Explain Plan Indexes Validation

Aggregations

QS: Top Ranks 19-20-21 PB: Modified

1. \$match

2. \$

3. \$

4. \$

5. \$

6. \$

7. \$

8. \$

9. \$

10. \$

11. \$

12. \$

13. \$

Output after \$match stage (20 (Sample of 20 documents))

1. \$group

2. \$

3. \$

4. \$

5. \$

6. \$

7. \$

8. \$

9. \$

10. \$

11. \$

12. \$

13. \$

Output after \$group stage (1 (Sample of 1 document))

11) ¿Cuántas universidades del top 50 son de Estados Unidos?

MongoDB Compass - cluster0.ytnq.mongodb.net/DiegoOswaldoGonzalezMacias.QS Rankings 2021

Connect View Collection Help

Local

13 DBS 34 COLLECTIONS

DIAGNOSTICS

cluster0-shard-00-00.ytnq...
cluster0-shard-00-01.ytnq...
cluster0-shard-00-02.ytnq...

CLUSTER

Replica Set (atlas-3e252)-...
3 Nodes

EDITION

MongoDB 4.4.11 Enterprise

Filter your data

Starbucks

admin

local

sample_airbnb

sample_analytics

sample_geospatial

sample_mflix

sample_restaurants

sample_supplies

sample_training

sample_weatherdata

Aggregations

Documents Aggregations Schema Explain Plan Indexes Validation

COLLATION: QS_TopRanks_19-20-21_P11 SAVE

SAMPLE MODE AUTO PREVIEW

Select an operator to construct expressions used in the aggregation pipeline stages. [Learn more](#)

Match

Output after Match stage (Sample of 17 documents)

```
1 // **
2 // query: The query in JSON.
3 //
4 //
5 rank_display: ($ite: 10),
6 country: "United States"
7 }
```

Group

Output after Group stage (Sample of 1 document)

```
1 // **
2 // _id: the id of the group.
3 // _id: the first field name.
4 //
5 {
6   _id: null,
7   "Frecuencia EUA": {
8     $sum: 1
9   }
10 }
```

12) ¿Cuál ha sido la diferencia o cambio entre las universidades en el top 10 entre 2020 y 2021 respecto a ranking?

MongoDB Compass - cluster0.ytnq.mongodb.net/DiegoOswaldoGonzalezMacias.QS Rankings 2021

Connect View Collection Help

Local

13 DBS 37 COLLECTIONS

DIAGNOSTICS

cluster0-shard-00-00.ytnq...
cluster0-shard-00-01.ytnq...
cluster0-shard-00-02.ytnq...

CLUSTER

Replica Set (atlas-3e252)-...
3 Nodes

EDITION

MongoDB 4.4.11 Enterprise

Filter your data

DiegoOswaldoGonzalezMacias

Mexico 2020 - 2021 Score

Mexico2020 - 2021_Score

QS Rankings 2019

QS Rankings 2020

QS Rankings 2021

Starbucks

admin

local

sample_airbnb

sample_analytics

sample_geospatial

sample_mflix

sample_restaurants

sample_supplies

sample_training

sample_weatherdata

Aggregations

Documents Aggregations Schema Explain Plan Indexes Validation

COLLATION: QS_TopRanks_19-20-21_P12 SAVE

SAMPLE MODE AUTO PREVIEW

AddFields

Output after AddFields stage (Sample of 20 documents)

```
1 // **
2 // newField: The new field name.
3 // expression: The new field expression.
4 //
5 {
6   rank_20: ($arrayElemAt: ["$rank_old",0])
7 }
```

AddFields

Output after AddFields stage (Sample of 20 documents)

```
1 // **
2 // newField: The new field name.
3 // expression: The new field expression.
4 //
5 {
6   rank_display_2020: "$rank_20_rank_display"
7 }
```

Project

Output after Project stage (Sample of 20 documents)

```
1 // **
2 // specifications: The fields to
3 // include or exclude.
4 //
5 {
6   _id: 0,
7   year: 1,
8   rank_display_2020: 1,
9   rank_display: 1,
10  university: 1,
11  country: 1,
12  city: 1,
13  region: 1
14 }
```

13) ¿Cuál ha sido la diferencia en calificación entre las universidades en el top 10 entre 2020 y 2021?

MongoDB Compass - cluster0.ytnqo.mongodb.net/DiegoOswaldoGonzalezMacias.QS Rankings 2021

Documents Aggregations Schema Explain Plan Indexes Validation

Documents 1.2k STORAGE SIZE 1473KB AVG. SIZE 361B INDEXES 1 TOTAL SIZE 57.3KB

Collation: OS: Top Ranks 19-20-21 P13

Aggregations

1. \$newField: The new field name.
2. \$expression: The new field expression.
3. \$if: If true, the new field expression.
4. \$ifFalse: If false, the new field expression.
5. \$ifNull: If null, the new field expression.
6. \$score_obj: (\$score_obj, \$1)
7. \$

Output after \$newField stage (Sample of 20 documents)

1. \$newField: The new field name.
2. \$expression: The new field expression.
3. \$if: If true, the new field expression.
4. \$ifFalse: If false, the new field expression.
5. \$ifNull: If null, the new field expression.
6. \$score_obj: (\$score_obj, \$1)
7. \$

Output after \$score_obj stage (Sample of 20 documents)

1. \$newField: The new field name.
2. \$expression: The new field expression.
3. \$if: If true, the new field expression.
4. \$ifFalse: If false, the new field expression.
5. \$ifNull: If null, the new field expression.
6. \$score_obj: (\$score_obj, \$1)
7. \$

14) ¿Cuál ha sido la diferencia en la posición de México respecto 2020 y 2021?

MongoDB Compass - cluster0.ytnqo.mongodb.net/DiegoOswaldoGonzalezMacias.QS Rankings 2021

Documents Aggregations Schema Explain Plan Indexes Validation

Documents 1.2k STORAGE SIZE 1473KB AVG. SIZE 361B INDEXES 1 TOTAL SIZE 57.3KB

Collation: OS: Top Ranks 19-20-21 P14

Aggregations

1. \$newField: The new field name.
2. \$expression: The new field expression.
3. \$if: If true, the new field expression.
4. \$ifFalse: If false, the new field expression.
5. \$ifNull: If null, the new field expression.
6. \$score_obj: (\$score_obj, \$1)
7. \$

Output after \$score_obj stage (Sample of 20 documents)

1. \$newField: The new field name.
2. \$expression: The new field expression.
3. \$if: If true, the new field expression.
4. \$ifFalse: If false, the new field expression.
5. \$ifNull: If null, the new field expression.
6. \$score_obj: (\$score_obj, \$1)
7. \$

Output after \$score_obj stage (Sample of 20 documents)

1. \$newField: The new field name.
2. \$expression: The new field expression.
3. \$if: If true, the new field expression.
4. \$ifFalse: If false, the new field expression.
5. \$ifNull: If null, the new field expression.
6. \$score_obj: (\$score_obj, \$1)
7. \$

Output after \$match stage (Sample of 20 documents)

1. \$newField: The new field name.
2. \$expression: The new field expression.
3. \$if: If true, the new field expression.
4. \$ifFalse: If false, the new field expression.
5. \$ifNull: If null, the new field expression.
6. \$score_obj: (\$score_obj, \$1)
7. \$

15) ¿Cuál ha sido la diferencia en calificación o puntaje entre las universidades mexicanas en 2020 y 2021?

MongoDB Compass - cluster0.ytnq.mongodb.net/DiegoOswaldoGonzalezMacias.QS Rankings 2021

Connect View Collection Help

Local

13 DBS 37 COLLECTIONS

HOSTS

cluster0-shard-00-00.ytnq...
cluster0-shard-00-01.ytnq...
cluster0-shard-00-02.ytnq...

CLUSTER

Replica Set (atlas-3e252...)
3 Nodes

EDITION

MongoDB 4.4.11 Enterprise

Filter your data

DiegoOswaldoGonzalezMacias

Mexico 2020 - 2021 Score
Mexico2020 - 2021_Score
QS Rankings 2019
QS Rankings 2020
QS Rankings 2021
QS_Rankings_2021_Mexico

Starbucks
admin
local
sample_airbnb
sample_analytics
sample_geospatial
sample_mflix
sample_restaurants
sample_supplies
sample_training
sample_weatherdata

DiegoOswaldoGonzalezMacias.QS Rankings 2021

Documents Aggregations Schema Explain Plan Indexes Validation

COLLATION: QS: Top Ranks 19-20-21 P15

1 *
2 * newField: The new field name.
3 * expression: The new field expression.
4 */
5 \$
6 score_20: (\$arrayElemAt: ['\$score_sld',0])
7 }

Output after \$addFields stage (Sample of 10 documents)

1 *
2 * newField: The new field name.
3 * expression: The new field expression.
4 */
5 \$
6 score_2020: "\$score_20_score"
7 }

Output after \$project stage (Sample of 10 documents)

1 *
2 * specifications: The fields to
3 * include or exclude.
4 */
5 \$
6 {
7 id: 1,
8 year: 1,
9 score: 1,
10 score_2020: 1,
11 country: 1,
12 city: 1,
13 region: 1
14 }

ADD STAGE

4. Vistas relevantes

MongoDB Compass - cluster0.ytnq.mongodb.net/DiegoOswaldoGonzalezMacias.QS Rankings 20-21 Scores

Connect View Collection Help

Local

13 DBS 39 COLLECTIONS

HOSTS

cluster0-shard-00-00.ytnq...
cluster0-shard-00-01.ytnq...
cluster0-shard-00-02.ytnq...

CLUSTER

Replica Set (atlas-3e252...)
3 Nodes

EDITION

MongoDB 4.4.11 Enterprise

Filter your data

BEDUProjects

DiegoOswaldoGonzalezMacias

Mexico 2020 - 2021 Score
Mexico2020 - 2021_Score
QS Rankings 20-21 S...
QS Rankings 2019
QS Rankings 2020
QS Rankings 2021
QS Rankings Mexico Top 1...
QS_Rankings_2021_Mexico

Starbucks
admin
local
sample_airbnb
sample_analytics
sample_geospatial
sample_mflix
sample_restaurants

DiegoOswaldoGonzalezMacias.QS Rankings 20-21 Scores

Documents Aggregations Schema Explain Plan Indexes Validation

view on: DiegoOswaldoGonzalezMacias.QS Rankings 2021

1 *
2 * specifications: The fields to
3 * include or exclude.
4 */
5 \$
6 {
7 id: 1,
8 year: 1,
9 score: 1,
10 score_2020: 1,
11 country: 1,
12 city: 1,
13 region: 1
14 }

Displaying documents 1 - 20 of 1185

year: 2021
university: "Massachusetts Institute of Technology (MIT)"
score: 100
country: "United States"
city: "Cambridge"
region: "North America"
score_2020: 100

year: 2021
university: "Stanford University"
score: 99.4
country: "United States"
city: "Stanford"
region: "North America"
score_2020: 99.4

year: 2021
university: "Harvard University"
score: 97.9
country: "United States"
city: "Cambridge"
region: "North America"

year: 2021
university: "California Institute of Technology (Caltech)"
score: 97
country: "United States"
city: "Pasadena"
region: "North America"

year: 2021
university: "University of Oxford"
score: 96.7
country: "United Kingdom"
city: "Oxford"
region: "Europe"

5. Conclusiones

- Mongo probó ser más fácil de comprender para mí que SQL y eso, junto con el hecho que tiene un desempeño muy bueno, fueron las razones por las que decidí enfocarme en Mongo.
- Las partes más frustrantes del proyecto fueron: formular las preguntas y generar los JSONs correctos.
- El hecho de que muchas universidades no tengan calificación del año 2020 refleja el impacto que tuvo la pandemia en su decisión de no participar o que QS haya decidido no cambiar las calificaciones.
- El desempeño de las Universidades mexicanas está muy por detrás, incluso de otras universidades latinoamericanas.
- México debería poner más interés por mejorar en algunas de las métricas evaluadas para ser más competitivo.

6. JSONs

MongoDB

- **Pregunta 1**

```
{
  filter: {
    rank_display: {
      $ne: NaN
    }
  },
  project: {
    rank_display: 1,
    university: 1,
    _id: 0
  },
  sort: {
    rank_display: 1
  },
  limit: 5
}
```

- **Pregunta 2**

```
{
  filter: {
    rank_display: {
      $ne: NaN
    }
  },
}
```

```
project: {
  rank_display: 1,
  university: 1,
  _id: 0
},
sort: {
  rank_display: -1
},
limit: 5
}
```

- **Pregunta 3**

```
{
  filter: {
    $and: [
      {
        rank_display: {
          $lte: 30
        }
      },
      {
        region: 'North America'
      }
    ]
  },
  project: {
    university: 1,
    rank_display: 1,
    region: 1,
    _id: 0
  },
  limit: 30
}
```

- **Pregunta 4**

```
{
  filter: {
    $and: [
      {
        rank_display: {
          $lte: 30
        }
      },
      {
        region: 'Europe'
      }
    ]
  },
  project: {
```

```

    university: 1,
    rank_display: 1,
    region: 1,
    _id: 0
  },
  limit: 30
}

```

- **Pregunta 5**

```

{
  filter: {
    $and: [
      {
        rank_display: {
          $lte: 30
        }
      },
      {
        region: 'Asia'
      }
    ]
  },
  project: {
    university: 1,
    rank_display: 1,
    region: 1,
    _id: 0
  },
  limit: 30
}

```

- **Pregunta 6**

```

[{$match: {
  rank_display: {
    $lte: 10
  }
}}, {$group: {
  _id: null,
  universities: {
    $sum: 1
  },
  scores: {
    $sum: '$score'
  }
}}, {$addFields: {
  calificacion_promedio_top10: {
    $divide: [
      '$scores',
      '$universities'
    ]
  }
}}

```

```
}  
}}]
```

- **Pregunta 7**

```
[{$match: {  
  region: 'Latin America'  
}}, {$limit: 10}, {$group: {  
  _id: null,  
  universities: {  
    $sum: 1  
  },  
  scores: {  
    $sum: '$score'  
  }  
}}, {$addFields: {  
  calificacion_promedio_top10: {  
    $divide: [  
      '$scores',  
      '$universities'  
    ]  
  }  
}}]
```

- **Pregunta 8**

```
[{$match: {  
  region: 'North America'  
}}, {$limit: 10}, {$group: {  
  _id: null,  
  universities: {  
    $sum: 1  
  },  
  scores: {  
    $sum: '$score'  
  }  
}}, {$addFields: {  
  calificacion_promedio_top10: {  
    $divide: [  
      '$scores',  
      '$universities'  
    ]  
  }  
}}]
```

- **Pregunta 9**

```
[{$match: {  
  country: 'Mexico'  
}}, {$limit: 10}, {$group: {  
  _id: null,
```

```

universities: {
  $sum: 1
},
scores: {
  $sum: '$score'
}
}}, {$addField: {
calificacion_promedio_top10: {
  $divide: [
    '$scores',
    '$universities'
  ]
}
}
}}]

```

- **Pregunta 10**

```

[{$match: {
  score: {
    $lte: 47.8
  }
}}, {$group: {
  _id: null,
  Universidades_superiores_a_Mexico: {
    $sum: 1
  }
}
}}]

```

- **Pregunta 11**

```

[{$match: {
  rank_display: {
    $lte: 50
  },
  country: 'United States'
}}, {$group: {
  _id: null,
  'Frecuencia EUA': {
    $sum: 1
  }
}
}}]

```

- **Pregunta 12**

```

[{$lookup: {
  from: 'QS Rankings 2020',
  localField: 'rank_display',
  foreignField: 'rank_display',
  as: 'rank_old'
}}, {$addField: {
  rank_20: {

```

```

$arrayElemAt: [
  '$rank_old',
  0
]
}
}}, {$addFields: {
  rank_display_2020: '$rank_20.rank_display'
}}, {$project: {
  _id: 0,
  year: 1,
  rank_display_2020: 1,
  rank_display: 1,
  university: 1,
  country: 1,
  city: 1,
  region: 1
}}

```

- **Pregunta 13**

```

[{$lookup: {
  from: 'QS Rankings 2020',
  localField: 'score',
  foreignField: 'score',
  as: 'score_old'
}}, {$addFields: {
  score_20: {
    $arrayElemAt: [
      '$score_old',
      0
    ]
  }
}}, {$addFields: {
  score_2020: '$score_20.score'
}}, {$project: {
  _id: 0,
  year: 1,
  score_2020: 1,
  score: 1,
  university: 1,
  country: 1,
  city: 1,
  region: 1
}}

```

- **Pregunta 14**

```

[{$match: {
  country: 'Mexico'
}}, {$limit: 10}, {$lookup: {
  from: 'QS Rankings 2020',
  localField: 'rank_display',

```



```

foreignField: 'rank_display',
as: 'rank_old'
}}, {$addField: {
rank_20: {
$arrayElemAt: [
'$rank_old',
0
]
}
}}, {$addField: {
rank_2020: '$rank_20.rank_display'
}}, {$project: {
_id: 0,
year: 1,
rank_2020: 1,
rank_display: 1,
university: 1,
country: 1,
city: 1,
region: 1
}}}
Pregunta 15
[{$match: {
country: 'Mexico'
}}, {$limit: 10}, {$lookup: {
from: 'QS Rankings 2020',
localField: 'score',
foreignField: 'score',
as: 'score_old'
}}, {$addField: {
score_20: {
$arrayElemAt: [
'$score_old',
0
]
}
}}, {$addField: {
score_2020: '$score_20.score'
}}, {$project: {
_id: 0,
year: 1,
score_2020: 1,
score: 1,
university: 1,
country: 1,
city: 1,
region: 1
}}}

```

