INGENIERÍA DE LA SALUD

Base Toxicológica

REALIZADO POR:

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https://github.com/alexpascualm/ProyectoBasesBio
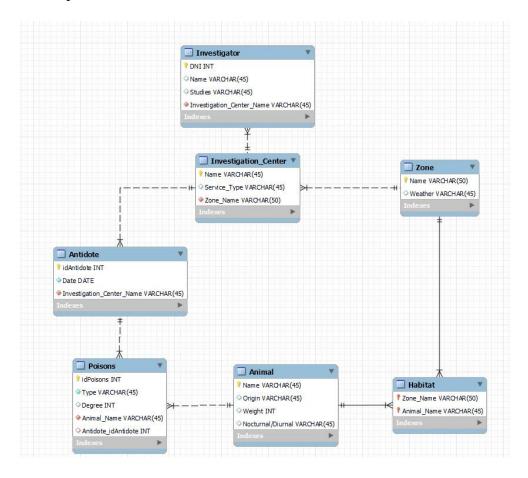
TUTORIZADO POR:

ISMAEL NAVAS DELGADO

INDEX

1. INTRODUCTION

It is going to implement a data base to manage the toxicology information needed for the study of the different toxic agents in different zones where one or more researching centres take part in.

2. DESIGN AND DATA IMPLEMENTATION

Different tables have been developed in order to build the structure of the database.

Description of each one:

Venenos: table in which the id of the toxic will be saved as primary key, accompanied by its type, mortality degree (1-10) being 10 the most dangerous.

Animal: animal which originates that specific poison.

Zona: it specifies the weather. It has a 1:N relation with Centro_de_Investigacion class (one zone could have more than one investigation center) and a relation N:N with animal which is the table Habita.

Centro_de_Investigacion: the organisation that studies and develop the antidotes of each toxic agent it can be either public or private.

Investigador: table which saves the professionals working on each centre and general information about them.

Antídoto: the antidote associated to a specific poison which was created in a date and which have an id acting as a PK.

All this logical model was designed with mysql, from this, a sql file was generated and the data was inserted manually in it with the function insert.

Now it is possible to make queries, functions, triggers…

3. QUERY DESIGN

For each researching centre with three or more researchers, show it name and the zone it belongs to.

```sql
select Investigation_Center.Name, Investigation_Center.Zone_Name from Investigation_Center
where Investigation_Center.Name in (select Investigation_Center_Name from Investigator
group by Investigation_Center_Name
having count(Investigator.DNI)>=3);
```

	Name	Zone_Name
▶	NaturaSt	Amazonas

Show the antidotes that have been developed in researching centres from a specified zone

```sql
select * from Antidote
where Investigation_Center_Name in
(select Investigation_Center.Name from Investigation_Center where Investigation_Center.Zone_Name='Alpes');
```

	idAntidote	Date	Investigation_Center_Name
▶	202	2002-12-07	ColdI+d

Show the poisons and its antidotes if it exists

```sql
select Animal_Name, idPoisons, Antidote_idAntidote from Poisons
where Antidote_idAntidote is not null;
```

Animal_Name	idPoisons	Antidote_idAntidote
Rana Dardo	77	150
Tarántula	80	151
Mamba Negra	82	152
Escorpion	79	153
Víbora	81	154
Avispa de mar	851	202
Cobra Kai	852	203
La ex del carlos	855	204
Ornitorrinco	853	205

Access the name of the animals in the animals table and their area of the inhabits table that do not inhabit a specific zone

```sql
select Animal.Name, Habitat.Zone_Name from Animal inner join Habitat on Animal.Name=Habitat.Animal_Name
where Name <>All(select Animal_Name from Habitat where Zone_Name='Tailandia');
```

Name	Zone_Name
Escorpion	Sahara
Escorpion	Spain
La ex del carlos	Sahara
Lince Iberico Mutante	Spain
Lolo	Alpes
Ornitorrinco	Sahara
Pulpo Pol	Spain
Rana Dardo	Amazonas
Víbora	Spain
Viuda Negra	Amazonas

4. QUERY OPTIMIZATION

Given Tuples / Examinated Tuples

	No Index	Investigation_Center_Name
Q1	1/9	1/9

	No Index	Investigation_Center_Name
Q2	1/2	1/2

	No Index
Q3	9/9

	No Index	
Q4	10/36	10/36

It is not possible to improve the performance of the queries with new indexes because the database is already using indexes created by foreign keys.

5. XML DATABASE

Query 1

```
1  xquery version "3.1";
2  (: Por cada Centro de investigación con tres o más Investigatores, mostrar su Zone :)
3  for $zona in doc("/db/tox/provisional")/Poison_root/Zone
4    where (count (for $Centro in $zona/Investigation_Center
5    return $Centro/Investigator) >= 3)
6    return data($zona/@Name)
7
```

→ /db//tox/query1

⏪ [Adaptive Output ▾] ☑ Indent ☐ Live Preview ☑ Highlight Index Matches ⊞

```
1  "Amazonas"
```

Query 2

```
1  xquery version "3.1";
2  (: Selecciona los Antidotes desarrollados en un centro de investigación específico ('Madris') :
3  for $centro in doc("/db/tox/provisional")/Poison_root/Zone/Investigation_Center
4    where ($centro/@Name="Madris")
5    return $centro/Animal/Poison/Antidote
6
```

▸ /db//tox/query2

⏪ [Adaptive Output ▾] ☑ Indent ☐ Live Preview ☑ Highlight Index Matches ⊞

```
1  <Antidote idAntidote="550" Date="1912-08-13"/>

2  <Antidote idAntidote="5" Date="1812-11-22"/>
```

Query 3

```
xquery version "3.1";
(: #Selecciona cada veneno y su Antidote si existe :)
for $venenoide in doc("/db/tox/provisional")/Poison_root/Zone/Investigation_Center/Animal/Poison
return $venenoide
```

/db//tox/query3

Adaptive Output ▼ ☑ Indent ☐ Live Preview ☑ Highlight Index Matches ⊞

```
Poison idPoisons="77" Type="Hemotoxico" Degree="10">
                              <Antidote idAntidote="150" Date="2005-03-14"/>
                   </Poison>
Poison idPoisons="77" Type="Hemotoxico" Degree="10">
                              <Antidote idAntidote="150" Date="2005-03-14"/>
                   </Poison>
Poison idPoisons="850" Type="Hemotoxico" Degree="10">
                              <Antidote idAntidote="550" Date="1912-08-13"/>
                   </Poison>
Poison idPoisons="85" Type="Hemotoxico" Degree="2">
                                <Antidote idAntidote="5" Date="1812-11-22"/>
                   </Poison>
Poison idPoisons="340" Type="text1" Degree="10">
```

Query 4

```
xquery version "3.1";
(: #Accede al Name de los animales de la tabla animales y su Zone de la tabla Habitat, que no Habitatn una Zone concreta ('Tai
for $zona in doc("/db/tox/provisional")/Poison_root/Zone
where $zona/@Name!="Tailandia"
return $zona//Animal/@Name
```

db//tox/query4

Adaptive Output ▼ ☑ Indent ☐ Live Preview ☑ Highlight Index Matches ⊞

```
me="Rana Dardo"

me="Rana Dardo"

me="Lince Iberico Mutante"

me="Avispa"

me="text1"

me="text"

me="text2"

me="text4"

me="text4'"
```

6. NoSQL Database

Query 1

Show all the animal with the name "VIBORA"
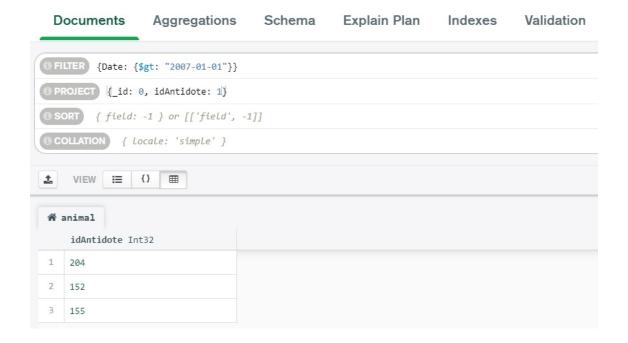

Query 2

Show all the animals with a weight superior to 2
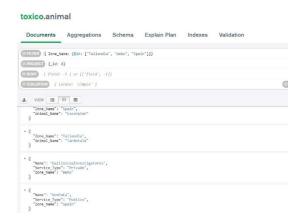

Query 3

Show all the antidotes developed since 2007

Query 4

Show all the antidotes developed since 2007

7. Conclusion

We have used different database languages, the first one was easier for us since we have worked it before in other courses but we have discovered that XML is a fast and useful way to work with big amounts of data if you make an efficient and staggered schema.

About mongoDB, we have not worked it as much as we had but as we saw in the web is a big tool to manage databases and it is internationally used in all kinds of fields. Also it is another way to use the CSV file extension and the JSON one.