**PECL2 – MySQL Database**

**by**

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**2ºGIC E & 2ºGII E**

**Databases I**

**Introduction**

This practice was made using as base the requirements provided at PECL1 and the previous practice made. For that reason, it was needed to make a set of changes to the previous practice to get the request results from the new one.

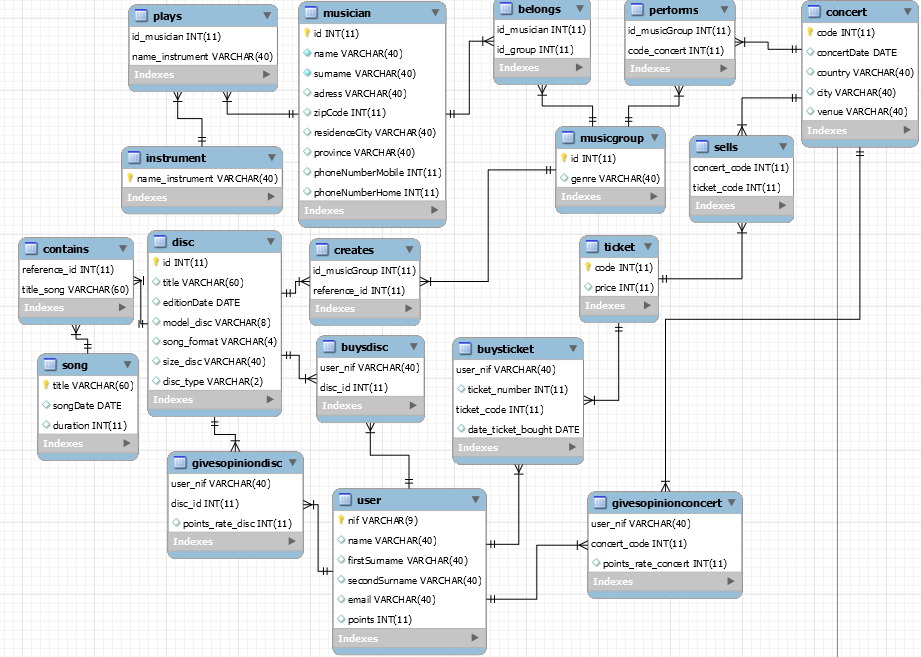
**Changes made to PECL1. The changelog is as follows:**

* The relation “composes” has been removed due to a relational redundancy with relation “contains” which, even though the path is longer, can reach also to the same information and to the difficulty for implementing it.
* The relation “buysTicket” has a new field called “date\_ticket\_bought” which symbolizes the day in which the user purchased the ticket. It also has a “ticket\_number” field now included which indicates the number of the tickets from the ones he/she has bought for a same concert with a maximum number of tickets that a user can buy for it.
* The entities “Physical” and “Digital” along with the “is a” relation have been removed due to the difficulty of implementing inheritance with MySQL. Instead, the entity “Disc” was changed to get the data regarding the previous two entities having the fields which were part from both. Now it has a “model\_disc” field which indicates if it is a physical or a digital disc. If it is a physical disc, the “disc\_type” field will have either “CD” or “LP” as an indicator of the disc´s physical format. If it´s a digital disc, the “song\_format” field will indicate if it has a “mp3”, “wav”, “wma” or “flac” digital format, and the “size\_disc” field will contain the disc´s size in megabytes. Whenever one of the options is taken the fields related with the other will be put to null.
* The field “phoneNumbers” in musician has been substituted by the “phoneNumberMobile” and “phoneNumberHome” fields. This has been done due to the difficulty implementing multivalued attributes and to simplify the program.
* “The relations givesOpinionConcert” and “givesOpinionDisc” both have new fields called “points\_rate\_concert” and “points\_rate\_disc” respectively, which indicate the score that a user has given to a concert or disc, being the lowest score a 0 and the highest one a 10. The field “opinion” has been removed as it was unnecessary as the user only gives its opinion with a score.
* The “duration” field of the entity “song” has been changed from a varchar to an int which indicates the duration in seconds. This allows us to compare song durations in an easy manner.
* Cardinality constraints are mostly gone due to the difficulty of correctly implementing it using MySQL. Instead, it was used the field “ticket\_number” in the case of the relation “buyTicket” and in the rest of cases to represent it, it was used foreign keys in the relations tables like “plays”, “belongs” and “contains” letting us to have different number of relations between the different entities.
* Some minor renames have been made, which should seem obvious.
* The entity “Instrument” isn’t anymore a weak-entity to avoid more complexity in the database.

**Advantages from this new model**

* This new model lets the database be more organized and reduces the complexity from the weak entities which were created in the previous model.
* If a new insertion is made regarding the entity “disc”, the user doesn’t need to indicate to which kind of disc does he/she wants to introduce it.
* If a new insertion is made regarding the entities “instrument” and “song” it is not needed to specify the id from the musician, in the case of the “instrument”, or else have problems regarding having as discriminator the primary key of two other entities plus their attribute consider part of the discriminator, in the case of the “song”.
* Reduction of complexity comparing difference of timing.

**The following diagram was obtained using reverse engineering from MySQL and accurately illustrates the current database structure:**



**Queries and results:**

**1.Show all Jazz groups**

Query:

Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta

Result:

There are only two Jazz groups in the database and their ids are these:

**Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta**

**2. Show the name of all musicians playing drums**

Query:

Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta

Result:

There are only four musicians which plays the drums in the database and these are their names:

**Imagen que contiene captura de pantalla

Descripción generada con confianza alta**

**3. Show the name of all Jazz saxophonists**

Query:

**Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta**

Result:

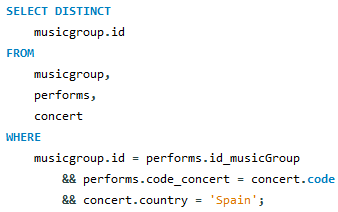
There are only two saphonists which are in a Jazz group in the database and these are their names:

Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta

**4. Show all the groups that have given concerts in Spain**

Query:

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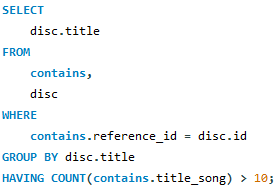
Result:

From the six music groups, only four of them makes at least a concert in Spain and these are their ids.

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**5. Show all discs with more than 10 songs**

Query:

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Result:

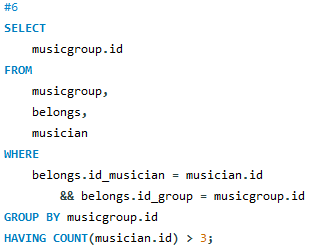
From the fifteen groups there are in the database, seven of them contains more than ten songs and these are their titles:

**Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta**

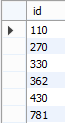
**6. Show all groups with more than 3 members**

Query:

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Result:

All the music groups in the database have more than three members and these are their ids:

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**7. Show all reviews of discs issued by users who have purchased at least three discs**

Query:

Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta

Result:

Only nine of the fourteen users in the database have bought at least three discs and here it is their names with the score they gave to same of the discs they bought and the name of the disc they are given they opinion.

Imagen que contiene captura de pantalla

Descripción generada con confianza alta

**8. Show all vinyl records that have at least one song longer than 5 minutes and have been recorded by a Rock group.**

Query:

Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta

Result:

There are six discs made by Rock music groups which are vinyl, but only three of them have at least one song which is longer than 5 minutes and these are their ids and titles:

Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta

**9. Show the name of the musicians of groups that have given concerts at Madrid and have put on sale tickets with a price higher than 100 euros.**

Query:

**Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta**

Result:

There are only two concerts which were in Madrid registered at the database and both, their tickets cost more than 100 euros and each of them is from a different music group. Here it is shown the names of the members from both music groups:

**Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta**

**10. Show the opinions of the users attending the concerts shown form the previous query.**

As it was said in the previous practice that the users could give their opinion, but it wasn’t compulsory to give it not only at the discs they buy, but also at the concerts they bought the ticket, and at these practice was not said anything regarding these point, we considered that not all the users they went to a concert gave an opinion.

Query:

**Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta**

Result:

These are the scores given from the users which went to the previous two concerts with the nif and the name from the user who gave the opinion:

**Imagen que contiene captura de pantalla, pared, interior

Descripción generada con confianza muy alta**

**11. Find the songs and composer names for Heavy Metal albums published during 2018.**

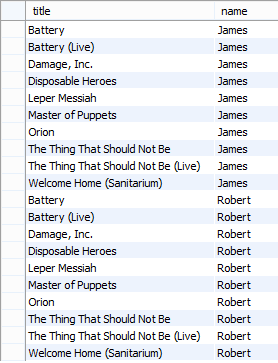
Query:

**Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta**

Result:

From the two music groups from heavy metal, only one has made a disc in 2018. These are titles of the songs with the names of the members of the music group. As there are four members the names from the songs from the disc will be repeated four times.



**12. Show name of the Jazz group guitarists having digital discs together with the name and format of such discs and their size in MB.**

Query:

**Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta**

Result:

There is only a Jazz guitarist which has at least one digital disc. This is its name, the title of the disc, the format of the song and the size of the disc:

**Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta**

**13. Show name and surname of the users who bought tickets during 2018 for jazz groups and published opinions about those concerts.**

Query:

**Imagen que contiene captura de pantalla

Descripción generada con confianza alta**

Result:

From the fourteen users in the database, only one of them bought tickets during 2018 for jazz groups and published an opinion of the concert. This is his name and his surnames:

**Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta**

**14. Show the title, and the songs for any disc bought by users whose ratings on that disc were 8 or more points.**

Query:

**Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta**

Result:

These are the title of the discs, the titles of its songs and the average score the disc obtained by the user which is superior or equal to 8.

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**Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta**

**15. Find the groups and their members that never performed in Spain and have recorded discs with more than 10 songs.**

Query:

**Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta**

**Imagen que contiene captura de pantalla

Descripción generada con confianza alta**

Result:

There are only two groups in the database which didn’t performed any concert in Spain, but only one has recorded at least one disc with more than 10 songs. This is the id from the group with the genre of the group and the id and name from each of its members:

Imagen que contiene captura de pantalla, pared, interior

Descripción generada con confianza alta

**16. Show song names and composer names for groups not performing any concert during 2017.**

Query:

Imagen que contiene captura de pantalla

Descripción generada con confianza muy alta

Result:

All the music groups except one have not performed any concert in 2017 and this are the titles of the discs, with its songs and the musician of the group. The songs will be repeated as many times as members of the groups are. From the fifteen discs of the database, fourteen discs are shown as output. For that reason, it will be shown over here the a part of the results obtained.

**Difficulties:**

At first, we had some problems regarding the creation of tables with foreign keys as we wanted to put as primary keys, the primary keys from other entities, but that have more than one field as primary key. We learnt how it worked, but it wasn’t used at the final version from the database.

There were also during a time some complications regarding limited cardinality, regarding the number of tickets from a specific concert bought by a user; inheritance, in the case of the types of discs; and considering the order of how the different insertions needed to be made. Even though we had those problems, finally we could solve them.

Finally, we had a few problems with the command “not in” from MySQL at the begging, making us to see that we need to compare it with something to get the correct result from the query instead of nothing.