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Escuela Técnica Superior de Ingeniería Informática

etsinf

# Databases and Information Systems

## Degree in Informatics Engineering

## Unit 2.2: SQL Exercises

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

V. 24

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# 1 INTRODUCTION

The main goal of these laboratory sessions is to learn to make queries in the SQL language. We will use the Oracle SQL Developer Tool.

The Data Manipulation Language included in Oracle SQL is based in the SQL/92 standard. In this part of the laboratory sessions, we will use the SELECT statement to make queries.

This document includes exercises corresponding to several databases. After a brief presentation of each database, a set of queries is proposed. These queries are organized into six groups:

- Queries over one single relation.

  These are the simplest queries and only one table is necessary to solve them.

- Queries over more than one relation.

  This group includes queries that can be solved including more than one table in the FROM clause of the SELECT statement. The connections between these tables are established in the WHERE clause.

- Queries with subqueries.

  This group includes queries that can be solved using a subquery in the WHERE clause.

- Queries with universal quantification.

  These queries have a straightforward solution using a universal quantifier. Unfortunately, Oracle SQL does not provide the universal quantifier operator, and we will have to represent the universal quantification in terms of negation and existential quantification. This transformation is as follows: “Every element E in set C **has** the property P” is equivalent to “There is **no** element E in set C which **does not have** the property P”. We propose to find solution to these queries by using the predicate NOT EXISTS.

- Queries with Group by.

  The queries in this group require the use of the GROUP BY clause.

- Other queries.

  This section includes general queries with different requirements.

Please, note that some queries can be solved in different ways, so it could be included in more than one group. You will find following all the queries the result (extension) to check with your answer: If the result is not the same, the query is wrong, but if the result is the same, the query might be right or might be wrong (a wrong query may sometimes give rise to a correct result).

We are using the following **notation** for the database schemas:

**PK**: Primary Key: the set of attributes with this constraint forms the primary key.

**UNI**: Uniqueness constraint: the set of attributes with this constraint cannot be repeated.

**FK**: Foreign Key: the set of attributes with this constraint refers to corresponding attributes of the referred relation.

**NNV**: Not Null Value: the set of attributes with this constraint cannot be null.

**Using dates in SQL**

To avoid problems when using dates corresponding to several centuries, we strongly recommend to use four digits for representing years. This can be easily configured in SQL Developer: "Tools/Preferences/Databases/NLS/Date Format" DD/MM/RRRR

The **EXTRACT** function returns the day, month, or year from a date. Let's consider that X='02/06/1965', then

- EXTRACT (DAY FROM X) returns 2;
- EXTRACT (MONTH FROM X) return 6;
- EXTRACT (YEAR FROM X) return 1965.

## 2 THE CINEMA DATABASE

We are interested in storing the information of movies, actors, movies directors, … In order to do that, the following relational database has been designed:

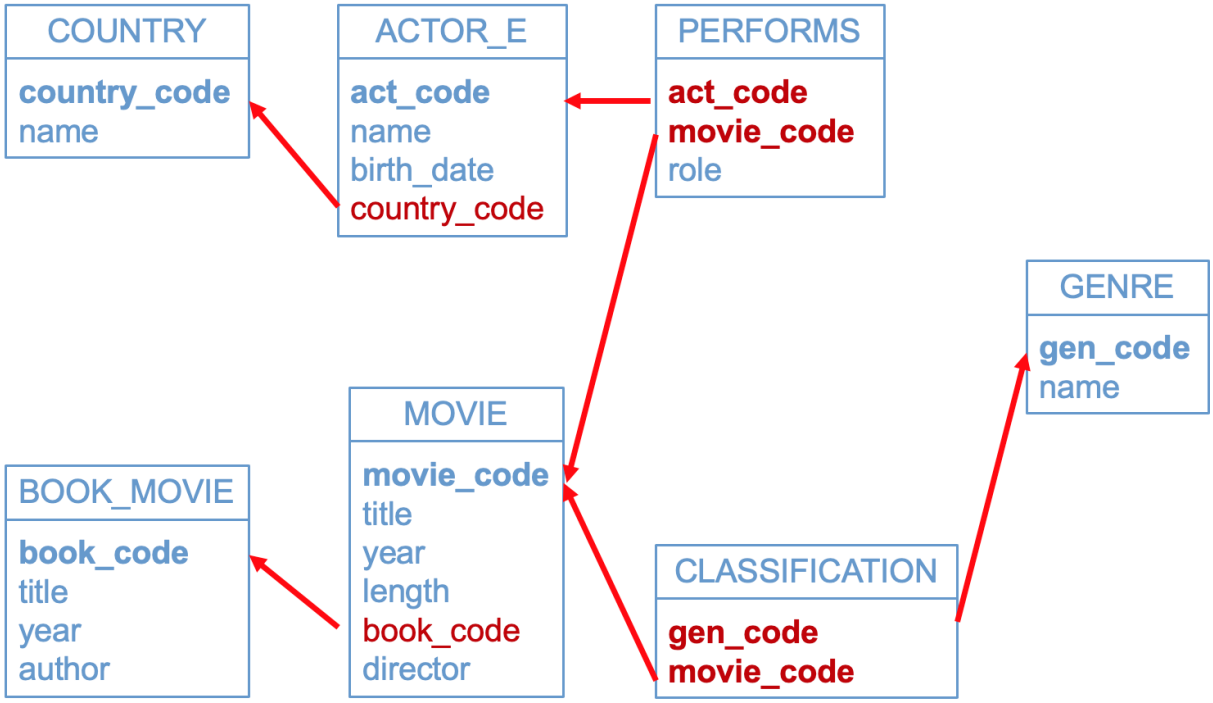
```
COUNTRY(country_code:char(5),name:char(20))
  PK:{country_code}
  NNV:{name}

ACTOR_E(act_code:char(5),name:char(70),birth_date:date,country_code:char(5))
  PK:{act_code}
  NNV:{name,birth_date,country_code}
  FK:{country_code} → Country(country_code)

BOOK_MOVIE(book_code:char(5),title:char(70),year:number,author:char(80))
  PK:{book_code}
  NNV:{title,author}

MOVIE(movie_code:char(5),title:char(70),year:number,length:number,
    book_code:char(5),director:char(70))
  PK:{movie_code}
  NNV:{title,length}
  FK:{book_code} → Book_movie(book_code)

GENRE(gen_code:char(5),name:char(30))
  PK:{gen_code}

PERFORMS(act_code:char(5),movie_code:char(5),role:char(10))
  PK:{act_code,movie_code}
  NNV:{role}
  FK:{movie_code} → Movie(movie_code)
  FK:{act_code} → Actor(act_code)

CLASSIFICATION(gen_code:char(5),movie_code:char(5))
  PK:{gen_code,movie_code}
  FK:{movie_code} → Movie(movie_code)
  FK:{gen_code} → Genre(gen_code)
```

Below is a brief explanation of the meaning of the different relations and their attributes.

- **Country:**
  - *country_code*: country code.
  - *name*: name of the country.
- **Actor_e:**
  - *act_code:* actor code.
  - *name:* name of the actor.
  - *birth_date:* actor's date of birth.
  - *country_code:* code of the actor's country.

- **Book_movie:**
  - *book_code:* code of the book.
  - *title:* book title.
  - *year:* publishing year of the book.
  - *author:* name of the author of the book.
- **Movie:**
  - *movie_code:* movie code.
  - *title:* movie title.
  - *year:* release year of the movie.
  - *length:* length (in minutes) of the movie.
  - *book_code:* code of the book used for the movie (the movie is based on the book).
  - *director:* name of the movie director.
- **Genre:**
  - *gen_code:* code of the genre.
  - *name:* name of the genre.
- **Performs**: The actor with code *act_code* has performed the role *role* in the movie with code *movie_code.*
- **Classification**: the movie with code *movie_code* is classified in the genre with code *gen_code.*

Below is a graphical representation of the "Cinema" relational schema:



# 3 CINEMA DATABASE EXERCISES

## 3.1 Queries using one single relation

1. Obtain the code of the countries with some actor in ascending order.

```
COUNTRY_CODE
------------
ad63
gg74
hg45
nb12
rt89
sd53
sf15
ty11
we74
zf58
 10 filas seleccionadas
```

```
SELECT DISTINCT country_code FROM ACTOR_E ORDER BY country_code ASC
```

2. Obtain the code and the title of the movies released before 1970 which are not based on a book. Sort the movies by the title.

```
MOVIE_CODE TITLE
---------- ----------------------------------------------------------
357L       Cleopatra
365N       Cortina rasgada
332D       Dos hombres y un destino
```

```
SELECT movie_code, title
FROM movie
WHERE year < 1970 AND book_code IS NULL
ORDER BY title
```

3. Obtain the code and name of the actors which name includes “John”.

```
ACT_CODE NAME
-------- ----------------------------------
A62      John Goodman
```

```
SELECT act_code, name
FROM ACTOR_E
WHERE name LIKE '%John%'
```

4. Obtain the code and title of the movies with a length greater than 120 minutes, released in the 80’s.

```
MOVIE_CODE TITLE
---------- ----------------------------------
365A       Indiana Jones y la última cruzada
```

```
SELECT movie_code, title
FROM MOVIE
WHERE length > 120 AND year >= 1980 AND year < 1990
```

5. Obtain the code and title of the movies based on a book, directed by a director with the last name ‘Pakula’.

```
MOVIE_CODE TITLE
---------- ----------------------------
856A       El informe pelícano
```

```
SELECT movie_code, title
FROM MOVIE
WHERE book_code IS NOT NULL AND director LIKE '%Pakula'
```

6. How many movies are there with a length greater than 120 minutes released in the 80’s?

```
  COUNT(*)
----------
         1
```

```
SELECT COUNT(*)
FROM MOVIE
WHERE length > 120 AND year >= 1980 AND year < 1990
```

7. How many movies have been classified in the genres with codes 'BB5', 'GG4', o 'JH6' ?

```
HOW_MANY_MOVIES
---------------
             43
```

```
SELECT COUNT(DISTINCT(movie_code)) AS "HOW_MANY_MOVIES"
FROM CLASSIFICATION
WHERE gen_code IN ('BB5', 'GG4', 'JH6')
```

8. In which year was published the oldest book ?

```
 YEAR
-----
 1877
```

```
SELECT MIN(year)
FROM BOOK_MOVIE
```

9. What is the average length of the movies released in 1987?

```
AVERAGE LENGTH
--------------
         119,5
```

```
SELECT AVG(length)
FROM MOVIE
WHERE year = 1987
```

10. What is the total length of the movies directed by 'Steven Spielberg'?

```
TOAL_MIN
--------
     296
```

```
SELECT SUM(length)
FROM MOVIE
WHERE director = 'Steven Spielberg'
```

## 3.2 Queries using more than one relation

11. Obtain the code and title of the movies in which act an actor with the same name as the movie director (sorted by title).

```
MOVIE_CODE TITLE
---------- --------------------------------
654J       Buenas noches, y buena suerte
778E       Sin perdón
455K       The monuments men
118E       Un mundo perfecto
```

```
SELECT m.movie_code, m.title
FROM actor_e a, movie m, performs p
WHERE a.act_code = p.act_code
AND p.movie_code = m.movie_code
AND m.director = a.name
```

```
SELECT m.movie_code, m.title
FROM movie m, actor_e a
WHERE a.name IN (SELECT m2.director
        FROM movie m2, performs p
        WHERE m2.title = m.title
        AND p.act_code = a.act_code
        AND p.movie_code = m2.movie_code)
ORDER BY m.title
```

12. Obtain the code and title of the movies of the genre 'Comedia' (sorted by title).

```
MOVIE_CODE TITLE
---------- --------------------------------
258S       Cuando Harry encontró a Sally
369F       Desayuno con diamantes
456G       El chip prodigioso
888T       El golpe
548J       Jamón, Jamón
147D       Los búfalos de Durham
874G       Los picapiedra
789B       The mexican
 8 filas seleccionadas
```

```
SELECT m.movie_code, m.title
FROM movie m, classification c, genre g
WHERE m.movie_code = c.movie_code
AND c.gen_code = g.gen_code
AND g.name = 'Comedia'
ORDER BY m.title
```

13. Obtain the code and title of the movies based on a book published before 1950.

```
MOVIE_CODE TITLE
---------- --------------------------------
159A       Ana Karenina
123V       Anna Karenina
159X       Anna Karenina
123N       Lo que el viento se llevó
123S  My Fair Lady
```

```
SELECT m.title
FROM movie m, book_movie b
WHERE m.book_code = b.book_code
AND b.year < 1950
```

```
258M  Un tranvía llamado deseo
 6 filas seleccionadas
```

14. Obtain the code and name of the countries in which were born the actors acting in movies of the genre 'Comedia' (sorted by name).

```
COUNTRY_CODE NAME
------------ --------------------
ad63         Bélgica
we74         España
sf15         USA
 3 filas seleccionadas
```

```
SELECT DISTINCT c.country_code, c.name
FROM country c, actor_e a, performs p, classification cl, genre g
WHERE c.country_code = a.country_code
AND a.act_code = p.act_code
AND p.movie_code = cl.movie_code
AND cl.gen_code = g.gen_code
AND g.name = 'Comedia'
ORDER BY c.name
```

## 3.3 Queries with subqueries

15. Write again a query for the exercises 11, 12, 13, and 14 using subqueries.

16. Obtain the code and name of the actors born before 1950 who perform the role 'Principal' in some movie (sorted by name).

```
ACT_CODE NAME
-------- ----------------------------------
Z15      Al Pacino
D49      Audrey Hepburn
L54      Christopher Plummer
L59      Clint Eastwood
L45      Elizabeth Taylor
S56      Elke Sommer
J47      Gene Hackman
V88      George Peppard
J45      Harrison Ford
X45      Julie Andrews
J56      Marlon Brandon
D14      Martin Sheen
U88      Morgan Freeman
W34      Paul Newman
T44      Rex Harrison
F56      Richard Burton
M45      Richard Gere
E56      Robert de Niro
H45      Robert Redford
W32      Sean Connery
E45      Susan Sarandon
D01      Vivien Leigh
 22 filas seleccionadas
```

```
SELECT a.act_code, a.name
FROM actor_e a
WHERE a.birth_date < '01/JAN/50'
AND a.name IN (SELECT a2.name
        FROM actor_e a2, performs p
        WHERE a2.act_code = p.act_code
        AND p.role = 'Principal')
ORDER BY a.name
```

17. Obtain the code, title, and author of the books used in some movie released in the 90's (sorted by title).

```
BOOK_CODE TITLE                                              AUTHOR
--------- -------------------------------------------------- ------------------
GJ7       Ana Karenina                                       Leon Tolstoi
GJ6       El informe pelícano                                John Grisham
UU4       El padrino                                         Mario Puzo
DF6       Entrevista con el vampiro                          Anne Rice
LP9       Rita Hayworth y la redención de Shawshank          Stephen King
AR3       Vida de este chico                                 Tobias Wolff
 6 filas seleccionadas
```

```
SELECT b.book_code, b.title, b.author
FROM book_movie b
WHERE b.book_code IN (SELECT m.book_code
        FROM movie m
        WHERE m.year >= 1990
        AND m.year < 2000)
ORDER BY b.title
```

18. Obtain the code, title, and author of the books not used in any movie.

```
SELECT b.book_code, b.title, b.author
FROM book_movie b
WHERE b.book_code NOT IN (SELECT m.book_code
                          FROM movie m
                          where m.book_code IS NOT NULL)
ORDER BY b.title
```

```
BOOK_CODE TITLE                          AUTHOR
--------- ------------------------------ --------------------
FA6       La caída de los gigantes       Ken Follet
```

19. Obtain the name of the genre (or genres) of the movies in which there is no actor acting (sorted by name).

```
select distinct G.name
from movie M, classification C, genre G
where M.movie_code = C.movie_code and C.gen_code = G.gen_code
and M.movie_code not in (select M2.movie_code
                         from movie M2, performs P
                         where M2.movie_code = P.movie_code)
order by G.name
```

```
NAME
------------
Animación
Aventuras
Drama
```

20. Obtain the title of the books used in some movie with no actors from the country called 'USA' (sorted by title).

```
select BM.title
from book_movie BM
where BM.book_code in (select M.book_code
                       from movie M
                       where not exists (select *
                                         from movie M2, performs P, actor_e A, country C
                                         where P.movie_code = M.movie_code
                                         and P.act_code = A.act_code
                                         and A.country_code = C.country_code
                                         and C.name = 'USA'))
```

```
TITLE
-----------------------------
Ana Karenina
Lo que el viento se llevó
Pigmalion
The sound of music
```

21. How many movies of the genre 'Comedia' are there with only one actor playing the role 'Secundario'?

```
select count(*)
from classification C
where C.gen_code in (select G.gen_code
                     from genre G
                     where G.name like 'Comedia')
and (select count(*)
     from performs P
     where C.movie_code = P.movie_code
     and P.role like 'Secundario') = 1
```

```
COUNT(MOVIE_CODE)
-----------------
                2
```

22. Obtain the release year of the first movie in which the actor named 'Jude Law' performed the 'Principal' role.

```
      YEAR
----------
      2001
```

23. Obtain the code and name of the oldest actor (or actors).

```
ACT_CODE  NAME
--------  ----------------
K58       Stanley Holloway
```

24. Obtain the code, name, and date of birth of the oldest actor born in 1940.

```
ACT_CODE NAME                           BIRTH_DATE
-------- ------------------------------ ---------------
C89      James Caan                     26/03/1940
```

25. Obtain the genre (or genres) of the longest movie.

```
NAME
-----------------
Bélica
Drama
Romance
```

26. Obtain the code and title of the book used in the movies in which act actors from the country called 'España' (sorted by title).

```
BOOK_CODE TITLE
--------- ------------------------------------
ZF4       Come, reza, ama
PP4       Desayuno en Tiffanys
DF6       Entrevista con el vampiro
```

27. Obtain the title of the movies of more than one genre released before 1950 (sorted by title).

```
TITLE
---------------------------------------------
Lo que el viento se llevó
```

28. Obtain the number of movies with less than 4 actors.

```
  COUNT(*)
----------
        68
```

29. Obtain the directors who have directed more than 250 minutes (considering the length of all their movies).

```
DIRECTOR
-----------------------------------------------------------------------
Steven Soderbergh
Clint Eastwood
Steven Spielberg
Francis Ford Coppola
Guy Ritchie
```

30. Obtain the year (or years) in which were born more than 3 actors.

```
       YEAR
----------
      1954
      1940
```

31. Obtain the code and name of the youngest actor who has participated in a movie of the genre with code 'DD8'.

```
ACT_CODE NAME
-------- ---------------
S47      Kevin Costner
```

## 3.4 Queries with universal quantification

32. Obtain de code and name of the countries with actors such that all the actors from that country were born in the XX century (sorted by name).

```
COUNTRY_CODE NAME
------------ -----------
hg45          Alemania
zf58          Australia
rt89          Austria
```

```
ad63          Bélgica
gg74          Canadá
nb12          Cuba
we74          España
sd53          Francia
sf15          USA
9 filas seleccionadas
```

33. Obtain the code and name of the actors such that all their roles have been 'Secundario'. We are only interested in actors who have acted in some movie.

```
ACT_CODE NAME
-------- ------------------------------
E22      Diane Keaton
C89      James Caan
F77      José L. de Villalonga
Q47      Ludwig Donath
C15      Robert Duvall
K58      Stanley Holloway
 6 filas seleccionadas
```

34. Obtain the code and name of the actors who have appeared in all the movies directed by 'Guy Ritchie' (only if this director has directed at least one movie).

```
ACT_CODE NAME
-------- ------------------------------
A47      Robert Downey Jr.
A52      Jude Law
```

35. Write a query for the previous problem but using the director named 'John Steel'.

```
no se ha seleccionado ninguna fila
```

36. Obtain the code and title of the movies with a length shorter than 100 minutes in which all the actors who have acted are from the same country.

```
MOVIE_CODE TITLE
---------- ------------------------------
258S       Cuando Harry encontró a Sally
548J       Jamón, Jamón
654J       Buenas noches, y buena suerte
874G       Los picapiedra
951D       Al caer el sol
```

37. Obtain the code, title, and year of release of the movies in which some actor has acted, but only if all the actors of that movie were born before 1943.

```
MOVIE_CODE TITLE                            YEAR
---------- -----------------------------------  ------
159X       Anna Karenina                        1948
159D       Bajo sospecha                        2000
357L       Cleopatra                            1963
365N       Cortina rasgada                      1966
369F       Desayuno con diamantes               1961
332D       Dos hombres y un destino             1969
888T       El golpe                             1973
144H       El premio                            1963
753N       La gata sobre el tejado de zinc      1958
```

```
123N        Lo que el viento se llevó          1939
123S        My Fair Lady                       1964
778E        Sin perdón                         1992
589B        Sonrisas y lágrimas                1965
258M        Un tranvía llamado deseo           1951
 14 filas seleccionadas
```

38. Obtain the code and name of all the countries if all the actors from that country have acted in at least one movie with a length greater than 120 minutes (sorted by name).

```
COUNTRY_CODE NAME
------------ --------------------
hg45         Alemania
rt89         Austria
ad63         Bélgica
gg74         Canadá
nb12         Cuba
ty11         UK
 6 filas seleccionadas
```

## 3.5 Queries with GROUP BY

39. Obtain the code and title of the book (or books) used in more than one movie. Include also how many movies have been based on that book.

```
BOOK_CODE TITLE                              HOW_MANY
--------- ---------------------------------.- --------
UU4       El padrino                                3
GJ7       Ana Karenina                              3
```

40. Obtain for each genre with more than 5 movies, the code and the name of the genre, including the amount of movies of that genre and the average length of all that movies. (sorted by name). You can use the ROUND function.

```
GEN_CODE NAME                           CUÁNTAS   DUR_MEDI
-------- ------------------------------ ---------- ----------
DR5      Acción                                  8        138
DF2      Biografía                               6        146
JJ9      Comedia                                 8        110
GG4      Crimen                                 18        132
BB5      Drama                                  38        134
KK4      Misterio                                6        127
HH2      Romance                                 8        127
 7 filas seleccionadas
```

41. Obtain the code and title of the movies released after the 2000 year, and how many genres they have (if they have genre) sorted by title.

```
MOVIE_CODETITLE                                                    CUÁNTOS
----------- ------------------------------------------------------------
159A        Ana Karenina                                                1
654J        Buenas noches, y buena suerte                               2
145K        Camino a la perdición                                       3
465H        El código da Vinci                                          1
158S        Enemigo a las puertas                                       3
369J        Golpe de efecto                                             2
457P        Invictus                                                    3
```

```
159U  Mi novio es un ladrón                          1
326F  Mystic river                                   3
189G  Ocean's Thirteen                               2
658G  Sherlock Holmes                                3
452W  Sherlock Holmes: Juego de sombras              3
789B  The mexican                                        3
455K  The monuments men                              3
 14 filas seleccionadas
```

42. Obtain the directors who have directed two (exactly 2) movies whose name contains the string 'George'.

```
DIRECTOR
-----------------------------------
George Roy Hill
George Clooney
```

43. Obtain for each movie with some actor and classified in one (and only one) genre, the code, title and amount of actors who have acted in that movie.

```
MOVIE_CODE TITLE                                                HOW_MANY
---------- ---------------------------------------------------- ---------
159A       Ana Karenina                                                2
159X       Anna Karenina                                               1
365N       Cortina rasgada                                             3
465H       El código da Vinci                                          1
475A       Filadelfia                                                  3
753N       La gata sobre el tejado de zinc                             2
159U       Mi novio es un ladrón                                       2
778E       Sin perdón                                                  3
258M       Un tranvía llamado deseo                                    2
 9 filas seleccionadas
```

44. Obtain the code and name of the countries in which at least one actor from the country has acted in a film of the 1960s, indicating also how many actors have done so

```
COUNTRY_CODE NAME                 HOW_MANY
------------ -------------------- ----------
hg45          Alemania                     1
rt89          Austria                      1
ad63          Bélgica                      1
gg74          Canadá                       1
we74          España                       1
ty11          UK                           4
sf15          USA                          4
 7 filas seleccionadas
```

45. Obtain the code (or codes) and the genre (or genres) with most movies.

```
GEN_CODE NAME
-------- --------------
BB5      Drama
```

46. Obtain the code/s, title/s and author/s of the book most used in movies.

```
BOOK_CODE TITLE                          AUTHOR
--------- ------------------------------ -------------
UU4        El padrino                    Mario Puzo
GJ7        Ana Karenina                  Leon Tolstoi
```

47. Obtain the code and name of the country which has most actors who have participated in exactly 2 movies.

```
COUNTRY_CODE NAME
------------ --------------------
sf15          USA
```

48. Obtain the year (or years) in which more than 3 actors were born, indicating how many actors were born in that year.

```
      YEAR   HOW_MANY
---------- ----------
      1954          4
      1940          4
```

49. Do again the query 36 but using GROUP BY.

## 3.6 Queries with different joins

50. Obtain for all the countries in the database, the code, name, and amount of actors in each country.

```
COUNTRY_CODE NAME                 HOW_MANY
------------ -------------------- ----------
hg45          Alemania                     1
zf58          Australia                    1
rt89          Austria                      1
ad63          Bélgica                      1
gg74          Canadá                       1
nb12          Cuba                         1
we74          España                       5
sd53          Francia                      1
hy76          Italia                       0
ty11          UK                           9
sf15          USA                         38
 11 filas seleccionadas
```

51. Obtain the code and the title of all the books in the database published after 1980, and the amount of movies based on each book.

```
BOOK_CODE TITLE                                              HOW_MANY
--------- -------------------------------------------------- ---------
GJ6       El informe pelícano                                        1
GH4       El código da Vinci                                         1
AR3       Vida de este chico                                         1
AE8       El color del dinero                                        1
FA6       La caída de los gigantes                                   0
LP9       Rita Hayworth y la redención de Shawshank                  1
KS5       El factor humano                                           1
ZF4       Come, reza, ama                                            1
 8 filas seleccionadas
```

52. Obtain for all the countries in the database, the code, name and amount of actors from that country who have performed the “Secundario” role in some movie.

```
COUNTRY_CODE NAME                 HOW_MANY
------------ -------------------- ----------
hg45         Alemania                      0
zf58         Australia                     0
rt89         Austria                       1
ad63         Bélgica                       0
gg74         Canadá                        0
nb12         Cuba                          1
we74         España                        3
sd53         Francia                       0
hy76         Italia                        0
ty11         UK                            4
sf15         USA                          16
 11 filas seleccionadas
```

53. Obtain for all the movies in the database longer than 140 minutes, its code, title, amount of genres and amount of actors acting in that movie.

```
MOVIE_CODE TITLE                                GEN     ACT
---------- ------------------------------------ ------ -------
123V       Anna Karenina                         1         0
963L       Apocalypse now                        0         4
666F       Atrápame si puedes                    0         2
438S       Cadena perpetua                       2         2
357L       Cleopatra                             3         3
465H       El código da Vinci                    1         1
856A       El informe pelícano                   0         2
123X       El padrino                            2         5
741G       El padrino II                         2         4
741S       El padrino III                        2         3
123N       Lo que el viento se llevó             3         1
123S       My Fair Lady                          3         3
314G       Robin Hood, príncipe de ladrones      3         2
951L       Salvar al soldado Ryan                3         2
589B       Sonrisas y lágrimas                   3         2
996H       Titanic                               0         2
874F       Un domingo cualquiera                 0         3
321N       Wyatt Earp                            3         3
 18 filas seleccionadas
```

## 3.7 Queries with set operations

54. Obtain the years, in ascending order, of all the years in which a book was published or a movie was released. We are only interested in years without the digit 9.

```
      YEAR
----------
      1877
      2000
      2001
      2002
      2003
      2004
      2005
      2006
      2007
      2008
      2010
```

```
      2011
      2012
      2013
      2014
 15 filas seleccionadas
```

## 3.8 Other queries

55. Obtain the name of the genre (or genres) of the longest movie.

```
GEN_CODE NAME
-------- ------------------------------
BB5      Drama
HH2      Romance
OI9      Bélica
```

56. Obtain, for each actor born before 1948 who has acted in 2 or more movies in any role, the code, the name and the date of birth, indicating in how many movies he/she has performed the 'Principal' role.

```
ACT_CODE NAME                      BIRTH_DATE      HOW_MANY_PRINC
-------- ------------------------- --------------- --------------
Z15      Al Pacino                 25/04/1940                   4
D49      Audrey Hepburn            04/05/1929                   2
L59      Clint Eastwood            31/05/1930                   3
E22      Diane Keaton              05/01/1946                   0
L45      Elizabeth Taylor          27/02/1932                   2
J47      Gene Hackman              30/01/1930                   4
J45      Harrison Ford             13/07/1943                   1
X45      Julie Andrews             01/10/1935                   2
J56      Marlon Brandon            03/04/1924                   3
U88      Morgan Freeman            01/06/1937                   3
W34      Paul Newman               26/01/1925                   8
T44      Rex Harrison              05/03/1908                   1
E56      Robert de Niro            17/08/1943                   2
C15      Robert Duvall             05/01/1931                   0
H45      Robert Redford            18/08/1936                   2
W32      Sean Connery              25/08/1930                   2
E45      Susan Sarandon            04/10/1946                   3
D01      Vivien Leigh              05/11/1913                   3
 18 filas seleccionadas
```

57. Obtain the code and name of "actors" who have only acted in films released after 1994.

```
ACT_CODE NAME
-------- --------------------
K77      Cameron Diaz
D52      Cate Blanchett
J58      Ed Harris
F55      George Clooney
A52      Jude Law
K78      Kate Winslet
H54      Keira Knightley
S65      Kevin Bacon
C52      Matt Damon
A47      Robert Downey Jr.
P14      Sean Penn
11 filas seleccionadas.
```

# 4 THE MUSIC LIBRARY DATABASE

We are interested in storing the information of a music library: The CD's, he publishing companies, the recorded songs and who recorded them,... In order to do that, the following relational database has been designed:

```
SONG(cod:integer, title:char(30), duration:real)
  PK:{cod}
  NNV:{title}

COMPANY(cod:char(3), name:char(30), address:char(30), fax:char(10),
          phone:char(10))
  PK:{cod}
  NNV:{name}

RECORD(cod:char(3), name:char(30), date:date, cod_comp:char(3),
       cod_group:char(3))
  PK:{cod}
  FK:{cod_comp}→ COMPANY
  NNV:{cod_comp}
  FK:{cod_group}→ GROUP
  NNV:{cod_group}

IS_IN(can:integer, cod:char(3))
  PK:{song,cod}
  FK:{song}→ SONG
  FK:{cod}→ RECORD

MUSIC_GROUP(cod:char(3), name:char(30), date:date, country:char(10))
  PK:{cod}
  NNV:{name}

ARTIST(dni:char(10), name:char(30))
  PK:{dni}
  NNV:{name}

CLUB_FANS(cod:char(3), name:char(30), location:char(30), num:integer,
       cod_group:char(3))
  PK:{cod}
  FK:{cod_group}→ GROUP
  NNV:{cod_group}
  NNV:{name}

BELONG(dni:char(10), cod_group:char(3), function:char(10))
  PK:{dni,cod_group}
  FK:{dni}→ ARTIST
  FK:{cod_group}→ GROUP
```

Below is a brief explanation of the meaning of the different relations and their attributes.

**Song**

*cod*: song code (id).

*title*: Song title.

*duration*: Length of the song.

**Company**

*cod*: record company (record label) code.

*name*: company name.

*address*: Address of the company.

*fax*: Fax number of the company.

*phone*.: Phone number of the company.

**Record**

*cod*: record code (id).

*name*: record name.

*date*: Publishing date.

*cod_comp*: Code of the record company which has published this record.

*cod_group*: Code of the music group (band) which has recorded this record.

**Is_in**

It stores what songs are included in each record, where "*song"* is the code of a song appearing in the record "cod".

**Music Group**

*cod*: Group (band) code.

*name*: Name of the group.

*date*: Date of the group foundation.

*country*: Country where the group was created.

**Artist**

*dni*: artist id.

*name*: name of the artist.

**Club fans**

*cod*: fan club code (id).

*name*: name of the club.

*location*: Address of the main office.

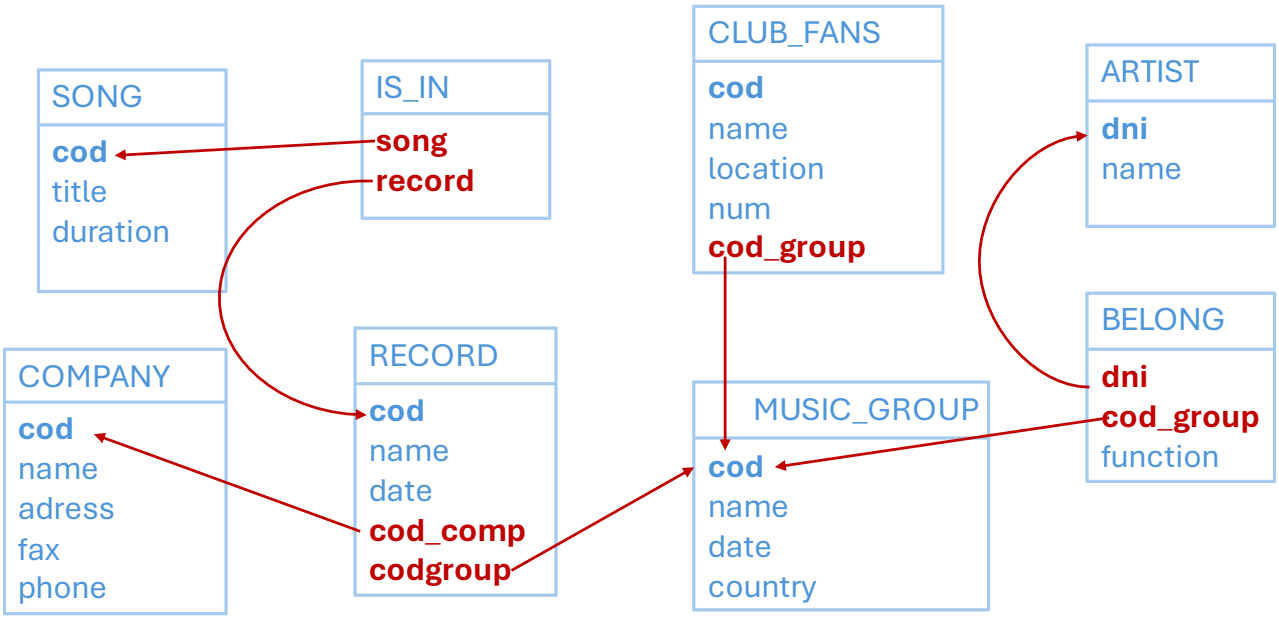
*num*: number of members of the club.

*cod_group*: code of the group which the club is fan of.

**Belong**

It contains the group members information: The artist "dni" is member of the group "cod_group" performing the function "function" (e.g. plays the guitar, sings,…).

Below is a graphical representation of the "Música" relational schema:




# 5 MUSICA DATABASE EXERCISES

## 5.1 Queries using one single relation

1. How many records are there?

```
COUNT(*)
----------
        18
1 fila seleccionada.
```

2. Show the names of the non-Spanish groups.

```
NAME
------------------------------
U2
Simple Minds
Mike + The Mechanics
Genesis
4 filas seleccionadas.
```

3. Show the title of the songs that are more than 5 minutes long.

```
TITLE
```

```
----------------------------
7 Deadly Sins
Lemon
So Cruel
Zooropa
4 filas seleccionadas.
```

4. Obtain the different functions that can be performed in a group.

```
FUNCTION
---------------
bajo
batería
guitarra
teclado
voz
5 filas seleccionadas.
```

5. Obtain the name of the fan clubs and their size (number of members). The list must be sorted into ascending order according to the club size.

```
CLUB                          SIZE
----------------------------- ----------------------
FanMike                       11
Implicado                     25
Bonoculture                   129
Waterfront                    234
Presuntos                     237
Che U2                        239
Los Culpables                 355
Jardin Botanico               357
Troglominds                   999
The best mind                 1413
u2foryou                      1700
Mentes Fuertes                1984
Zoomania                      2508
Machines                      7789
Futuristas                    9850
Fanaticgens                   12002
Genefans                      23412
17 filas seleccionadas.
```

6. Show the name and address (location) of the clubs with more than 500 members.

```
NAME                          LOCATION
----------------------------- ------------------------------
Zoomania                      33, Abbey Road
Machines                      Calle 3, Lab 3
u2foryou                      23, 11th Street
Troglominds                   C/Lepe 22
Mentes Fuertes                Ramon y Cajal 14
The best mind                 24, Homeround
Genefans                      C/Visitacion 34
Fanaticgens                   Av. H. Dominicos 155
Futuristas                    C/Alboraya 10
9 filas seleccionadas.
```

## 5.2 Queries using more than one relation

7. Obtain the name and address (location) of the fan clubs of Spanish groups, and the name of the group which they are fans of.

```
NAME                LOCATION                 NAME
------------------  ------------------------ ----------------------
Jardin Botanico      203,Valencia 46004       Radio Futura
Presuntos            C/Albacete 12, bajo      Presuntos Implicados
Implicado            Torrejon de Ardoz 12     Presuntos Implicados
Los Culpables        C/Maria Cristina 67      Presuntos Implicados
Futuristas           C/Alboraya 10            Radio Futura
5 filas seleccionadas.
```

8. Obtain the names of the artists that are member of any Spanish group.

```
NAME
------------------------------
Carlos Torero
Enrique Sierra
J.L. Giménez
Luis Auseron
Nacho Maño
Santiago Auseron
Soledad Giménez
7 filas seleccionadas.
```

9. Obtain the name of the records that contain some song that is more than 5 minutes long.

```
NAME
------------------------------
Achtung baby
Good news F.N. world
Zooropa
3 filas seleccionadas.
```

10. Obtain the title of the songs that have the same title that the record in which the song appears.

```
TITLE
------------------------------
Alma de blues
De sol a sol
Invisible touch
Living years
October
Ser de agua
The unforgettable fi
Word of mouth
Zooropa
Once upon a time
10 filas seleccionadas.
```

11. Show the name and address of the companies which have recorded a record whose title begins with 'A'.

```
NAME                          ADDRESS
----------------------------- ------------------------------
```

```
WEA                            L Hoyos 42
Island                         67, JB St.
2 filas seleccionadas.
```

12. Show the id (dni) of the artists which are members of more than one group.

```
DNI
----------
8884566666
1 fila seleccionada.
```

## 5.3 Queries with subqueries

13. Show the name of the records recorded by the oldest group.

```
NAME
------------------------------
We can't dance
Invisible touch
Seconds out
3 filas seleccionadas.
```

14. Obtain the name of the records which have been recorded by groups with a fan club greater than 5,000 (more than 5,000 members)

```
NAME
------------------------------
Word of mouth
Living years
We can't dance
Invisible touch
Seconds out
La ley del desierto
La canción de Jperro
7 filas seleccionadas.
```

15. Show the name of the club/s with the greatest number of fans. Do also indicate its number of fans.

```
NAME                           NUM
------------------------------ ----------
Genefans                            23412
1 fila seleccionada.
```

16. Show the title of the longest songs also indicating their length.

```
TITLE                          DURATION
------------------------------ ----------
7 Deadly Sins                           6
Lemon                                   6
So Cruel                                6
Zooropa                                 6
4 filas seleccionadas.
```

## 5.4 Queries with universal quantification

17. Obtain the name of the record companies that have not worked with Spanish groups.

```
NAME
------------------------------
Island
Virgin
ATLANTIC
PoliDiscos
PoliDiscos
5 filas seleccionadas.
```

18. Obtain the name of the companies that have only worked with Spanish groups.

```
NAME
------------------------------
ARIOLA
WEA
2 filas seleccionadas.
```

19. Obtain the name and address of the companies which have recorded all the records of some group.

```
NAME                           ADDRESS
------------------------------ ------------------------------
ARIOLA                         Aragon 204
ATLANTIC                       12, E St.
Island                         67, JB St.
Virgin                         2,23th St.
WEA                            L Hoyos 42
5 filas seleccionadas.
```

## 5.5 Queries with Group By

20. Obtain the names of the Spanish groups and the total amount of their fans.

```
NAME                           FANS
------------------------------ ----------
Presuntos Implicados                  617
Radio Futura                        10207
2 filas seleccionadas.
```

21. Obtain the name and number of components of any group with more than 2 members.

```
NAME                           NUMBER
------------------------------ ----------
Genesis                                 3
Mike + The Mechanics                    4
Presuntos Implicados                    3
Radio Futura                            4
U2                                      4
5 filas seleccionadas.
```

22. Obtain the number of records of each group.

```
NAME                           RECORDS
------------------------------ ----------
U2                                      4
Simple Minds                            4
Mike + The Mechanics                    2
Genesis                                 3
```

```
Presuntos Implicados                    3
Radio Futura                            2
6 filas seleccionadas.
```

23. Obtain the number of songs recorded by each company and the company address.

```
NAME                      SONGS      ADDRESS
------------------------- ---------- -------------------------
ARIOLA                            22 Aragon 204
ATLANTIC                          54 12, E St.
Island                            43 67, JB St.
PoliDiscos                         0 Cami de Vera
PoliDiscos                         0 Polynesia St.
Virgin                            34 2,23th St.
WEA                               31 L Hoyos 42
7 filas seleccionadas.
```

## 5.6 Other queries

24. Obtain the name of the artists member of groups with a fan club greater than 500. The group must be from England.

```
NAME
------------------------------
Adam Clayton
Adrian Lee
Bono
C. Burchill
Edge
Jim Kerr
Larry Jr.Mullen
M. Rutherford
P. van Hooke
Paul Young
Phil Collins
Tony Banks
12 filas seleccionadas.
```

25. Show the song titles included in any ‘U2´ record.

```
TITLE
------------------------------
4th of July
A sort of homecoming
Artitoestoy
Babyface
Bad
Daddys Goma pay for
Dirty day
Elvis Presley & USA
Even Better Than...
Fire
Fly
Gloria
I Fall Down
I Threw a Brick
Indian summer sky
Is That All
```

```
Lemon
Love is Blindness
MLK
Mysterious Ways
Numb
October
One
Price
Promenade
Rejoice
Scarlet
So Cruel
Some days are better
Stay
Stranger in a Land
The first time
The unforgettable fi
The wanderer
Tomorrow
Tryin to Throw...
Ultra Violet
Until The end...
Whos Gonna ride...
Wire
With a Shout
Zoo Station
Zooropa
43 filas seleccionadas.
```

26. Obtain all the pairs of artists from two different Spanish groups such that the first one is a singer (function = 'voz´) and the second one plays the guitar (function = 'guitarra´),

```
VOZ                            GUITARRA
------------------------------ ------------------------------
Soledad Giménez                Enrique Sierra
Santiago Auseron               J.L. Giménez
2 filas seleccionadas.
```

27. Obtain the names of the artists which are members of more than one groups.

```
NAME
------------------------------
M. Rutherford
1 fila seleccionada.
```

28. Show the name of the longest song if there is only one song with this length.

```
TITLE                          DURARION
------------------------------ ----------
0 filas seleccionadas.
```

29. Show the tenth fan club in number of members (i.e. there must be only 9 above it). Do indicate the club size (number of members).

```
NAME                           NUM
------------------------------ ----------
Jardin Botanico                       357
1 fila seleccionada.
```

30. Obtain the name of the artists who play the bass (función='bajo´) in only one group and also this group has more than 2 members.

```
NAME
------------------------------
Adam Clayton
Luis Auseron
Nacho Maño
3 filas seleccionadas.
```

31. What is the name of the record company that has recorded more songs?

```
NAME                           SONGS
------------------------------ ----------
ATLANTIC                               54
1 fila seleccionada.
```

# 6 THE BIBLIOTECA (BOOK LIBRARY) DATABASE

We are interested in maintaining the information of a home library. We have defined a relational database with the following schema:

```
AUTOR(autor_id: char(4), nombre: char(35), nacionalidad: char(20))
  PK: {autor_id}
  NNV: {nombre}

LIBRO(id_lib:  char(10), titulo: char(80), año: integer, num_obras: integer)
  PK: {id_lib}

TEMA(tematica: char(20), descripcion: char(50))
  PK: {tematica}

OBRA(cod_ob: integer, titulo: char(80), tematica: char(20))
  PK: {cod_ob}
  FK: {tematica}→ TEMA
  NNV: {titulo}

AMIGO(num: integer, nombre: char(60), telefono: char(10))
  PK: {num}
  NNV: {nombre}

LEER(num: integer, cod_ob: integer)
  PK: {num, cod_ob}
  FK: {num} → AMIGO
  FK: {cod_ob} → OBRA

ESTA_EN(cod_ob: integer, id_lib: char(10))
  PK: {cod_ob, id_lib}
  FK: {cod_ob} → OBRA
  FK: {id_lib} → LIBRO

ESCRIBIR(cod_ob: integer, autor_id: char(4))
  PK: {cod_ob, autor_id}
  FK: {cod_ob}→ OBRA
  FK: {autor_id}→ AUTOR
```

Below is a brief explanation of the meaning of the different relations and their attributes.

**Autor (author):** For each author the database stores his/her id (author_id), name (nombre) and nationality (nacionalidad).

**Libro (book):** For each book the database stores the book id (id_lib), title (titulo), if it has one, the year in which it was published, and the number of works (num_obras) that it contains.

**Tema (topic):** For each topic its id (tematica) and a short description (descripción) is stored.

**Obra (work):** For each work the database stores the work id (cod_ob), the title (titulo), and its topic (temática).

**Amigo (friend):** For each friend, her/his id (num), her/his name (nombre), and his/her phone number (teléfono) is stored.

**Leer (read):** A tuple in this relation represents that a friend (num) has read a work (cod_ob)

**Esta_en (is_in):** A tuple in this relation represents that a work (cod_ob) is included in a book (id_lib).

**Escribir (has_written):** A tuple in this relation represents that an author (autor_id) has written a work (cod_ob).

Additionally, the following properties must be satisfied:

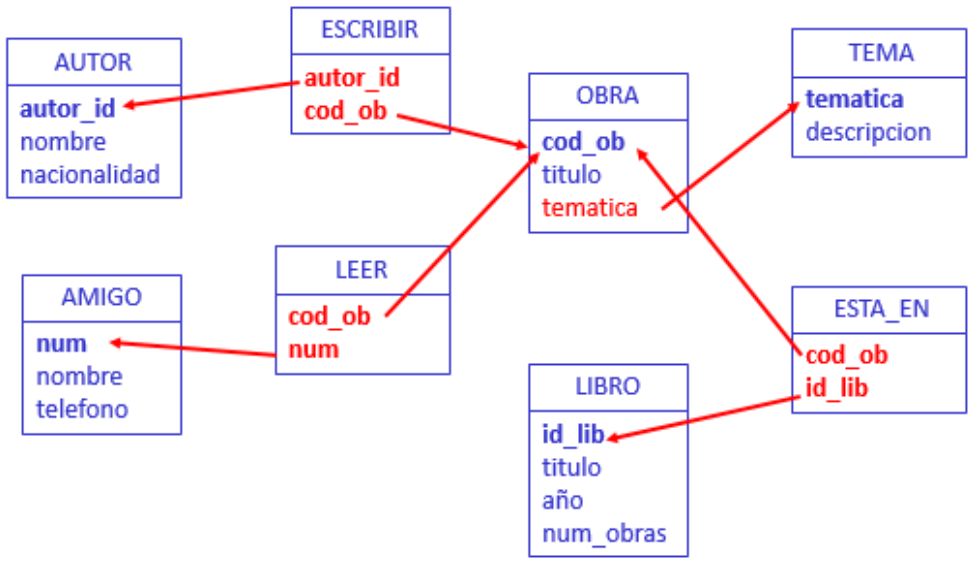
- The value of the attribute *num_obras* in the "libro" relation must be equal to the number of tuples in "*Esta_en"* for the book.
- Every book contains at least one work.
- If a book has a title and it only contains one work, the title of the book matches the title of the work.

**Interpretation of the relational schema BIBLIOTECA**

In order to understand the reality represented by the precious relational schema, answer the following questions:

- Why do we need the relations *Libro* y *Obra* ? Could we define only one of both?
- How many authors can write a work? How many works can be written by one author? Could there be one author who has not written any work? And a work with no author?
- Could there be a friend who has not read any work? How could be stored the information of a friend who has read the same work several times?

Below is a graphical representation of the "Biblioteca" relational schema:



# 7 BIBLIOTECA DATABASE EXERCISES

## 7.1 Queries using one single relation

1. Obtain the name of the authors from 'Argentina'.

```
NOMBRE
-----------------------------------
Bioy Casares, Adolfo
Borges, Jorge Luis
Cortázar, Julio
3 filas seleccionadas.
```

2. Obtain the work titles containing the word 'mundo'.

```
TITULO
------------------------------------------------------------
Un mundo feliz
El ahogado más hermoso del mundo
2 filas seleccionadas.
```

3. Obtain the id of the books published before 1990, containing more than one work. Show the numbers of woks contained in each book

```
ID_LIB     NUM_OBRAS
---------- ----------------------
LIB-000187 2
1 filas seleccionadas.
```

4. How many books are in the database such that we know the year in which they were published?

```
LIB_AÑO
----------
 92
1 fila seleccionada.
```

5. How many books contain more than one work? Use the attribute num_obras.

```
MÁS_1_OB
----------
 30
1 fila seleccionada.
```

6. Obtain the id of the books published in 1997 with no title

```
ID_LIB
----------
LIB-000045
LIB-000046
LIB-000048
LIB-000310
LIB-000311
LIB-000424
6 filas seleccionadas.
```

7. Obtain all book titles alphabetically in descendant order (ignore the books with no title).

```
TITULO
--------------------------------------------------------------------------
Vuelva usted mañana y otros artículos
Vox
Tres pastiches victorianos
Todos los cuentos. EL balneario y las ataduras
Sherlock Holmes. Obras completas III
Sherlock Holmes. Obras completas II
Sherlock Holmes. Obras completas I
Relatos que me asustaron
Raymon Chandler. Obras selectas II
Raymon Chandler. Obras selectas I
Pequeños cuentos misóginos
Narraciones extraordinarias
Lo infinitamente pequeño
La mano parda y otros relatos
La increíble y triste historia de la cándida Eréndida y su abuela desalmada
Inglés-Español, VOX
Francés-Español, Sopena
Doce cuentos peregrinos
Cuentos juveniles
Cuentos de la taberna del ciervo blanco
Cuentos
Clásicos de Grecia y Roma
Blanco en azul
Algunos cuentos chilenos
24 filas seleccionadas.
```

8. Calculate how many works are included in the books published between 1990 and 1999.

```
OBRAS
----------------------
127
1 fila seleccionada.
```

## 7.2 Queries using more than one relation

9. Calculate how many authors have written a work with the word “ciudad” in the work title.

```
AUTORES
----------------------
4
1 fila seleccionada.
```

10. Obtain the title of the works written by ‘Camús, Albert’.

```
TITULO
-----------------------------------------------------------------
El extranjero
1 fila seleccionada.
```

11. Who is the author of the work titled ‘La tata’?

```
NOMBRE
---------------------------------
Martín Gaite, Carmen
1 fila seleccionada.
```

12. Obtain the name of the friends who have read some work written by the author with id 'RUKI'.

```
NOMBRE
--------------------------------------------
Isabel Peiró García
Eloy Prim Gros
2 filas seleccionadas.
```

13. Obtain the name and the book id of the books with a title and containing more than one work. Don't use the num_obras attribute.

```
ID_LIB    TITULO
------------------------
    ...
21 filas seleccionadas.
```

## 7.3 Queries with subqueries

14. Obtain the author and title of the works written by only one author, additionally the author must be French (nacionalidad='Francesa').

```
TITULO                                      NOMBRE
------------------------------------------ ----------------------
Bella del señor                            Cohen, Albert
El método Montignac                        Montignac, Michel
Madame Bovary                              Flaubert, Gustave
La hierba roja                             Vian, Boris
Con las mujeres no hay quien pueda         Vian, Boris
Que se mueran los feos                     Vian, Boris
Escupiré sobre vuestras tumbas             Vian, Boris
El lobo hombre                             Vian, Boris
El extranjero                              Camús, Albert
Bosquejo de una teoría de las emociones    Sartre, Jean-Paul
El amante                                  Duras, Marguerite
Ana, soror…                                Yourcenar, Marguerite
Opus nigrum                                Yourcenar, Marguerite
Los amotinados de la "Bounty"              Verne, Jules
14 filas seleccionadas.
```

15. How many authors are there in the database such that they have written no work?

```
SIN_OBRA
----------
 3
1 fila seleccionada.
```

16. Obtain the name of the authors counted in the previous query.

```
NOMBRE
-----------------------------------
Peris Rossi, Cristina
Apollinaire, Guillaume
García Hortelano, Juan
3 filas seleccionadas.
```

17. Obtain the name of the Spanish authors (nacionalidad "Española") who have written two or more works.

```
NOMBRE
----------------------------------
     ...
18 filas seleccionadas.
```

18. Obtain the name of the Spanish authors who have written some work included in two or more books.

```
NOMBRE
----------------------------------
Valera, Juan
1 fila seleccionada.
```

19. Obtain the title and id of the works with more than one author.

```
COD_OB             TITULO
-----------------------------------------------
 151               El quinto jinete
 170               A escullar
2 filas seleccionadas.
```

## 7.4 Queries with universal quantification

20. Obtain the names of the friends who have read all the works written by 'RUKI' (author id).

```
NOMBRE
-----------------------------------------------
Isabel Peiró García
1 fila seleccionada.
```

21. Obtain the names of the friends who have read all the works written by 'GUAP' (author id).

```
No se ha seleccionado ninguna fila
```

22. Obtain the names of the friends who have read all the works written by some author (included in the AUTOR table).

```
NOMBRE
-----------------------------------------------
Isabel Peiró García
Yolanda Milanés Cuba
2 filas seleccionadas.
```

23. Solve the previous query showing the name of the author.

```
NOMBRE_AMIGO            NOMBRE_AUTOR
-------------------------------------------------------
Isabel Peiró García         Maalouf, Amin
Yolanda Milanés Cuba        Vian, Boris
Isabel Peiró García         Kipling, Rudyard
3 filas seleccionadas.
```

24. Obtain the name of the friends who have only read works written by 'CAMA' (author id).

```
NOMBRE
-----------------------------------------------
Pepe Pérez Pérez
```

```
1 filas seleccionadas.
```

25. Obtain the name of the friends who have only read works written by 'GUAP' (author id).

```
No se ha seleccionado ninguna fila
```

26. Obtain the name of the friends who have only read works written by one author (all the read books are written by the same author).

```
NOMBRE
--------------------------------------------------
Pepe Pérez Pérez
Eloy Prim Gros
Yolanda Milanés Cuba
3 filas seleccionadas.
```

27. Solve the previous query showing the name of the author.

```
NOMBRE_AMIGO            NOMBRE_AUTOR
----------------------  ------------------------------
Eloy Prim Gros              Kipling, Rudyard
Pepe Pérez Pérez            Martín Gaite, Carmen
Yolanda Milanés Cuba        Vian, Boris
3 filas seleccionadas.
```

28. Obtain the name of the friends who have read all the works written by some author but have not read any work written by other author. Show also the name of that author.

```
NOMBRE_AMIGO                NOMBRE
----------------------  ------------------------------
Yolanda Milanés Cuba        Vian, Boris
1 fila seleccionada.
```

## 7.5 Queries with GROUP BY

29. Obtain the title and the book id of the books with a title and containing more than one work. (use "Group by" clause).

```
ID_LIB    TITULO
----------------------
    ...
21 filas seleccionadas.
```

30. Obtain the name of the friends who have read more than 3 works indicating the total amount of works that he/she has read.

```
NOMBRE                                            CUANTAS
------------------------------------------------- ---------------
Isabel Peiró García                                7
Yolanda Milanés Cuba                               5
2 filas seleccionadas.
```

31. Obtain the topics and number of works that use that topic. Do not show the topics that are not used in any work.

```
TEMATICA              NUM_OBRAS
-------------------- ----------
Antropología                  4
Artículo                     57
Aventuras                     2
Biografía                     6
Ciencia Ficción               6
Clásico                      14
Cocina                       10
Cuento                      164
Experiencias                  1
Filosofía                     3
Histórica                    16
Intriga                       1
Inventada                     1
Juvenil                      18
Lógica                        3
Misterio                     60
Mitología                     1
Negra                        23
Novela                      139
Poesía                        9
Teatro                        7
Viajes                       10
22 filas seleccionadas
```

32. Obtain, for all the topics in the database, the attribute “tematica” and the number of works using that topic.

```
TEMATICA              NUM_OBRAS
-------------------- ----------
Antropología                  4
Artículo                     57
Aventuras                     2
Biografía                     6
Ciencia Ficción               6
Clásico                      14
Cocina                       10
Cuento                      164
Diccionario                   0
Ensayo                        0
Experiencias                  1
Filosofía                     3
Histórica                    16
Intriga                       1
Inventada                     1
Juvenil                      18
Lógica                        3
Misterio                     60
Mitología                     1
Negra                        23
Novela                      139
Poesía                        9
Teatro                        7
Viajes                       10
24 filas seleccionadas
```

33. Obtain the name of the author (or authors) who has written the most works.

```
NOMBRE
--------------------------------
Pla, Josep
1 fila seleccionada.
```

34. Obtain the less used nationality.

```
NACIONALIDAD
--------------------
Alemana
Checa
Colombiana
Danesa
Griega
Mejicana
6 filas seleccionadas.
```

35. Obtain the name of the friend who has read the greatest amount of works.

```
NOMBRE
--------------------------------------------------
Isabel Peiró García
1 fila seleccionada.
```

## 7.6 Other queries

36. Obtain the title and the id of the books that have a title and contain only one work.

```
TITULO
------------------------------------------------------------------
No se ha seleccionado ninguna fila
```

37. From the previous query can be deduced that the books with only one work have no title. Assuming that its title is the one given by the work that the book contains, obtain all the book titles stored in the database independently of the number of works that they have.

```
TITULO
--------------------------------------------------

     ...
301 filas seleccionadas.
```

38. Obtain the name of the friends who have read some work written by 'CAMA' (author id).

```
NOMBRE
-------------------------------------------------
Pepe Pérez Pérez
Isabel Peiró García
Isidro Catalá Ferrer
3 filas seleccionadas.
```

39. Obtain the name of the friends who have read no work written by 'CAMA' (author id).

```
NOMBRE
------------------------------------------------------------
Marina Sánchez Vidal
Eloy Prim Gros
Yolanda Milanés Cuba
```

```
Félix Díaz Drac
4 filas seleccionadas.
```

40. Obtain the name of the friends who have read no work written by 'CAMA' (author id) but that have read some work.

```
NOMBRE
------------------------------------------------------------
Eloy Prim Gros
Yolanda Milanés Cuba
2 filas seleccionadas.
```

41. Obtain the name of the friend (or friends) who have read the most works. Don't use the "Group by" clause.

```
NOMBRE
--------------------------------------------------
Isabel Peiró García
1 fila seleccionada.
```

# 8 THE CYCLING RACE DATABASE

We are interested in storing the information about the results of a cycling race (such as the Tour de France, Il Giro di Italia, or La Vuelta a España). In order to do that, the following relational database has been designed:

```
TEAM(teamname:char(25),director:char(30))
  PK:{teamname}
  NNV:{teamname,director}

CYCLIST(cnum:integer, name:char(30), age:integer, teamname:char(25))
  PK:{cnum}
  FK:{teamname}→ TEAM
  NNV:{name,teamname}

STAGE(stagenum:integer, km:integer, departure:char(35), arrival:char(35),
      cnum:integer)
  PK:{stagenum}
  FK:{cnum}→ CYCLIST
  NNV:{km,departure,arrival,cnum}

JERSEY(code:char(3, type:char(30), prize:integer, color:char(25))
  PK:{code}
  NNV:{type,prize,color}

CLIMB(climbname:char(30), height:integer, category:char(1), slope:real,
     stagenum:integer, cnum:integer)
  PK:{climbname}
  FK:{stagenum}→ STAGE
  FK:{cnum}→ CYCLIST
  NNV:{height, category, slope, stagenum, cnum}

WEAR(stagenum:integer, code:char(3), cnum:integer,)
  PK:{stagenum,code}
  FK:{stagenum}→ STAGE
  FK:{cnum}→ CYCLIST
  FK:{code}→ JERSEY
  NNV:{code,cnum}
```

In order to clarify the schema, we describe the meaning of each attribute:

**Attribute description:**

**TEAM**

*teamname*: name of the team.

*director*: name of the team director.

**CYCLIST**

*cnum*: cyclist number assigned to the cyclist during the race.

*name*: cyclist name.

*age*: age of the cyclist.

*teamname*: name of the cyclist team.

**STAGE**

*stagenum*: stage number (in the race).

*km*: How many kilometers the stage has.

*departure*: name of the city where the stage starts.

*arrival*: name of the city where the stage finish.

*cnum*: number of the cyclist who has won the stage.

**CLIMB**

*climbname*: name of the climb.

*height*: maximum height in the climb.

*category*: category of the climb: 1ª/primera (first), especial (special), ….

*slope*: steeper slope of the climb (in %).

*stagenum*: stage number where the climb is.

*cnum*: number of the cyclist who has won the climb.

**JERSEY**

*code*: code of the jersey.

*type*: indicates the prize level of the jersey.

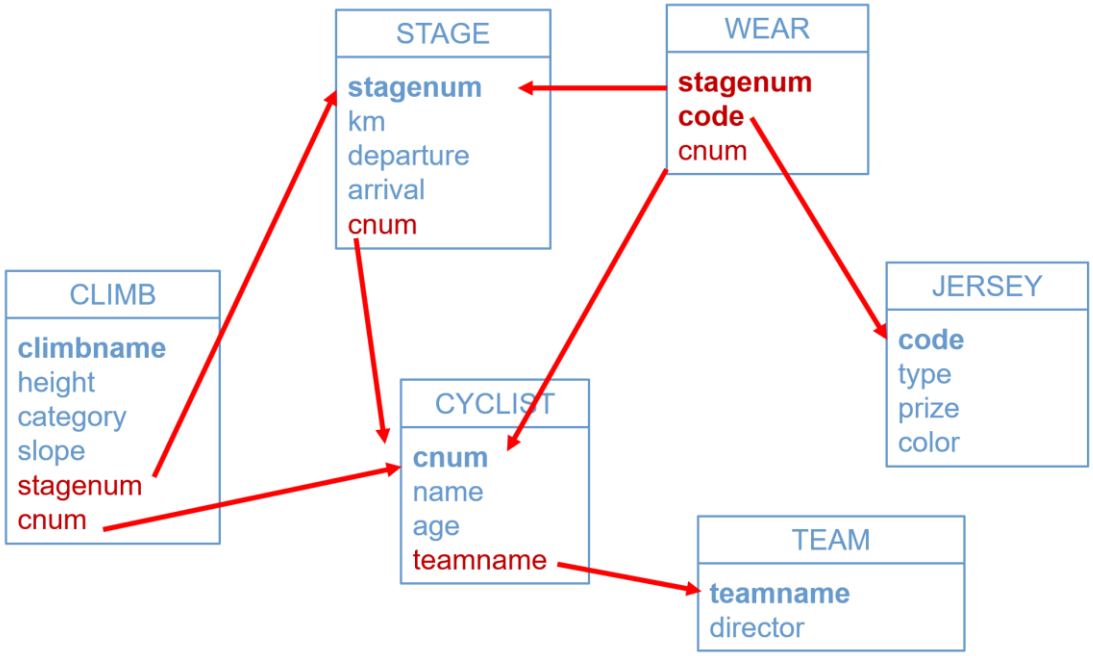
*color*: color of the jersey.

*prize*: how much money the cyclist wins if he finishes the race wearing this jersey.

**WEAR**

The cyclist with number '*cnum*' has worn the jersey identified by '*code*' at the stage with number '*stagenum*'.

Below is a graphical representation of the "Cycling Race" relational schema:



# 9 CYCLING RACE DATABASE EXERCISES

## 9.1 Queries using one single relation

1. Obtain the code, the type, the color and the prize of all the jerseys in the database.

```
COD TYPE                           COLOR                PRIZE
--- ------------------------------ -------------------- ----------
MGE General                        Amarillo                8000000
MMO Montaña                        Blanco y Rojo           2000000
MMS Mas Sufrido                    Estrellitas moradas     2000000
MMV Metas volantes                 Rojo                    2000000
MRE Regularidad                    Verde                   2000000
MSE Sprints especiales             Rosa                    2000000
6 filas seleccionadas.
```

2. Obtain the cyclist number and the name of the cyclists whose age is equal or lower than 25.

```
CNUM     NAME
---------- ------------------------------
        38 Javier Palacin
        41 Rolf Aldag
        46 Agustin Sagasti
        49 Eugeni Berzin
        66 Enrico Zaina
        98 Eleuterio Anguita
6 filas seleccionadas.
```

3. Obtain the name and the height of all the climbs of category 'E' (special).

```
CLIMBNAME                          HEIGHT
---------------------------------- ----------
Arcalis                                  2230
Cerler-Circo de Ampriu                   2500
Coll de Ordino                           1980
Cruz de la Demanda                       1850
Lagos de Covadonga                       1134
Sierra Nevada                            2500
6 filas seleccionadas.
```

4. Obtain the value of the stagenum attribute for those stages with "departure" and "arrival" in the same city.

```
STAGENUM
----------
         1
         8
        18
3 filas seleccionadas.
```

5. How many cyclists are there in the database?

```
CYCLISTS
----------
       100
1 fila seleccionada.
```

6. How many cyclists are there who are more than 25 years old?

```
COUNT(*)
----------
        94
1 fila seleccionada.
```

7. How many teams are there?

```
COUNT(*)
----------
        22
1 fila seleccionada.
```

8. Obtain the average age of all the cyclists.

```
AVG(AGE)
----------
     29,89
1 fila seleccionada.
```

9. Obtain the minimum and maximum height of the climbs.

```
MIN(HEIGHT MAX(HEIGHT
---------- ----------
       565       2500
1 fila seleccionada.
```

## 9.2 Queries using more than one relation

10. Obtain the name and the category of the climbs won by cyclists from the 'Banesto' team.

```
CLIMBNAME                          C
---------------------------------- -
Alto del Naranco                   1
Coll de la Comella                 1
Navacerrada                        1
Puerto de Alisas                   1
Puerto de la Morcuera              2
Puerto de Navalmoral               2
Sierra Nevada                      E
7 filas seleccionadas.
```

11. Obtain the name of each climb, also showing the number (stagenum) and the kilometers of the stage in which the climb is.

```
CLIMBNAME                          STAGENUM     KM
---------------------------------- ---------- ----------
Alto del Naranco                           10        200
Arcalis                                    10        200
Cerler-Circo de Ampriu                     11        195
Coll de la Comella                         10        200
Coll de Ordino                             10        200
Cruz de la Demanda                         11        195
Lagos de Covadonga                         16        160
Navacerrada                                19        190
Puerto de Alisas                           15        207
```

```
Puerto de la Morcuera                      19        190
Puerto de Mijares                          18        195
Puerto de Navalmoral                       18        195
Puerto de Pedro Bernardo                   18        195
Sierra Nevada                               2        180
14 filas seleccionadas.
```

12. Obtain the name and the director of the teams having at least one cyclist of age greater than 33.

```
TEAMNAME                  DIRECTOR
------------------------- ------------------------------
Amore Vita                Ricardo Padacci
Banesto                   Miguel Echevarria
Bresciali-Refin           Pietro Armani
Carrera                   Luigi Petroni
Gatorade                  Gian Luca Pacceli
Kelme                     Álvaro Pino
Mapei-Clas                Juan Fernandez
Navigare                  Lonrenzo Sciacci
TVM                       Steveens Henk
Telecom                   Morgan Reikcard
10 filas seleccionadas.
```

13. Obtain the name of the cyclists with the color of each jersey that they have worn.

```
NAME                          COLOR
----------------------------- --------------------
Alessio Di Basco                Rosa
Alex Zulle                      Amarillo
Alfonso Gutiérrez               Rojo
Alfonso Gutiérrez               Verde
Armand de las Cuevas            Estrellitas moradas
Bruno Leali                     Rojo
Claudio Chiappucci              Blanco y Rojo
Davide Cassani                  Rojo
Dimitri Konishev                Rojo
Eddy Seigneur                   Estrellitas moradas
Gianni Bugno                    Blanco y Rojo
Giorgio Furlan                  Rosa
Jean Van Poppel                 Rosa
Jesus Montoya                   Blanco y Rojo
Laurent Jalabert                Verde
Marco Saligari                  Rojo
Mario Cipollini                 Rosa
Melchor Mauri                   Amarillo
Melchor Mauri                   Blanco y Rojo
Miguel Induráin                 Amarillo
Miguel Induráin                 Blanco y Rojo
Miguel Induráin                 Rojo
Miguel Induráin                 Rosa
Miguel Induráin                 Verde
Mikel Zarrabeitia               Amarillo
Mikel Zarrabeitia               Blanco y Rojo
Pedro Delgado                   Amarillo
Pedro Delgado                   Blanco y Rojo
Per Pedersen                    Rosa
Stefano della Santa             Rojo
Tony Rominger                   Amarillo
31 filas seleccionadas.
```

14. Obtain the name of a cyclist and the number of the stage such that the cyclist has won the stage and has worn the yellow jersey ('jersey' with color = 'Amarillo') at least once.

```
NAME                           STAGENUM
------------------------------ ----------
Miguel Induráin                         1
Miguel Induráin                         8
Pedro Delgado                          10
Pedro Delgado                          19
Pedro Delgado                          20
Tony Rominger                          17
6 filas seleccionadas.
```

15. Obtain the value of the stagenum attribute of the stages which do not start in the same city where the previous stage finished.

```
STAGENUM
----------
         4
         7
         8
        10
        12
        15
        17
        18
        20
9 filas seleccionadas.
```

## 9.3 Queries with subqueries

16. Obtain the value of the attribute stagenum and the departure city for those stages with no climb.

```
STAGENUM     DEPARTURE
---------- -----------------------------------
         1 Valladolid
         3 Salamanca
         4 Almendralejo
         5 Córdoba
         6 Granada
         7 Baza
         8 Benidorm
         9 Benidorm
        12 Benasque
        13 Zaragoza
        14 Pamplona
        17 Cangas de Onis
        20 Segovia
        21 Destilerias Dyc
14 filas seleccionadas.
```

17. Obtain the average age of the cyclists who have won a stage.

```
AVG(AGE)
----------
   30,5625
1 fila seleccionada.
```

18. Select the name of the climbs with a height greater than the average height of all the climbs.

```
CLIMBNAME
---------------------------------
Arcalis
Cerler-Circo de Ampriu
Coll de Ordino
Cruz de la Demanda
Navacerrada
Puerto de la Morcuera
Sierra Nevada
7 filas seleccionadas.
```

19. Obtain the name of the departure and the arrival cities of the stages where the steepest climbs are located.

```
DEPARTURE                           ARRIVAL
----------------------------------- -----------------------------------
Igualada                           Andorra
1 fila seleccionada.
```

20. Obtain the cyclist number and the name of the cyclists who have won the highest climb.

```
CNUM     NAME
---------- ------------------------------
         9 Massimo Podenzana
        26 Mikel Zarrabeitia
2 filas seleccionadas.
```

21. Obtain the name of the youngest cyclist.

```
NAME
------------------------------
Eugeni Berzin
1 fila seleccionada.
```

22. Obtain the name of the youngest cyclist who has won at least one stage.

```
NAME
------------------------------
Vladislav Bobrik
1 fila seleccionada.
```

23. Obtain the name of the cyclists who have won more than one climb.

```
NAME
------------------------------
Pedro Delgado
1 fila seleccionada.
```

## 9.4 Queries with universal quantification

24. Obtain the value of the stagenum attribute for those stages such that all the climbs in them are more than 700 meters high.

```
STAGENUM
----------
         2
        11
        16
        18
        19
5 filas seleccionadas.
```

25. Obtain the name and the director of the teams such that all their cyclists are more than 25 years old.

```
TEAMNAME                    DIRECTOR
--------------------------- ------------------------------
Amore Vita                  Ricardo Padacci
Banesto                     Miguel Echevarria
Bresciali-Refin             Pietro Armani
Carrera                     Luigi Petroni
Castorama                   Jean Philip
Gatorade                    Gian Luca Pacceli
Jolly Club                  Johan Richard
Kelme                       Álvaro Pino
Lotus Festina               Suarez Cuevas
Mapei-Clas                  Juan Fernandez
Mercatone Uno               Ettore Romano
Motorola                    John Fidwell
Navigare                    Lonrenzo Sciacci
ONCE                        Manuel Sainz
Seguros Amaya               Minguez
TVM                         Steveens Henk
Wordperfect                 Bill Gates
17 filas seleccionadas.
```

26. Obtain the cyclist number and the name of the cyclists such that all the stages they have won are more than 170 km long (i.e. they have only won stages longer than 170 km).

```
CNUM     NAME
---------- ------------------------------
         8 Jean Van Poppel
        10 Mario Cipollini
        12 Alessio Di Basco
        22 Giorgio Furlan
        36 Gian Matteo Fagnini
        65 Pascal Lino
        83 Hernan Buenahora
        86 Juan Martinez Oliver
        93 Bo Hamburger
9 filas seleccionadas.
```

27. Obtain the name of the cyclists who have won all the climbs in some stage and have won that stage.

```
NAME
------------------------------
Pedro Delgado
1 fila seleccionada.
```

28. Obtain the name of the teams such that all their cyclists have worn some jersey or have won some climbs.

```
TEAMNAME
-------------------------
Castorama
1 fila seleccionada.
```

29. Obtain the code and the color of those jerseys which have only been worn by cyclists of the same team.

```
COD COLOR
--- --------------------
MMS Estrellitas moradas
1 fila seleccionada.
```

30. Obtain the name of those teams such that their cyclists have only won climbs of category = 1.

```
TEAMNAME
-------------------------
Carrera
Gatorade
2 filas seleccionadas.
```

## 9.5 Queries with Group By

31. Obtain the value of the 'stagenum' attribute of those stages which have climbs, also indicating how many it has.

```
STAGENUM     NUM_PUERTOS
---------- ----------
         2          1
        10          4
        11          2
        15          1
        16          1
        18          3
        19          2
7 filas seleccionadas.
```

32. Obtain the name of the teams which have cyclists, indicating how many cyclists there are in the team.

```
TEAMNAME                    CYCLIST
------------------------- ----------
Amore Vita                         3
Artiach                            7
Banesto                           11
Bresciali-Refin                    4
Carrera                            3
Castorama                          2
Euskadi                            2
Gatorade                           4
Gewiss                             8
Jolly Club                         2
Kelme                              7
Lotus Festina                      3
Mapei-Clas                         7
Mercatone Uno                      8
Motorola                           3
Navigare                           5
ONCE                               5
```

```
Seguros Amaya                     3
TVM                               6
Telecom                           4
Wordperfect                       3
21 filas seleccionadas.
```

33. Obtain the name of all the teams, indicating how many cyclists there are in each team.

```
TEAMNAME                    CYCLIST
------------------------ ----------
Amore Vita                        3
Artiach                           7
Banesto                          11
Bresciali-Refin                   4
Carrera                           3
Castorama                         2
Euskadi                           2
Gatorade                          4
Gewiss                            8
Jolly Club                        2
Kelme                             7
Lotus Festina                     3
Mapei-Clas                        7
Mercatone Uno                     8
Motorola                          3
Navigare                          5
ONCE                              5
PDM                               0
Seguros Amaya                     3
TVM                               6
Telecom                           4
Wordperfect                       3
22 filas seleccionadas.
```

34. Obtain the director and the name of the teams which have more than 3 cyclists and with an average age lower or equal to 30.

```
DIRECTOR                    TEAMNAME
--------------------------- -------------------------
Ettore Romano               Mercatone Uno
José Peréz                  Artiach
Lonrenzo Sciacci            Navigare
Manuel Sainz                ONCE
Moreno Argentin             Gewiss
Morgan Reikcard             Telecom
6 filas seleccionadas.
```

35. Obtain the name of the cyclists who have won one or more stages and belong to a team which has more than five cyclists. Please also indicate how many stages each cyclist has won.

```
NAME                        STAGE
--------------------------- ----------
Bo Hamburger                         1
Gert-Jan Theunisse                   1
Gian Matteo Fagnini                  1
Giorgio Furlan                       1
Hernan Buenahora                     1
Juan Martinez Oliver                 1
Mario Cipollini                      1
```

```
Miguel Induráin                          2
Pedro Delgado                            3
Tony Rominger                            1
Vladislav Bobrik                         1
11 filas seleccionadas.
```

36. Obtain the name of the teams and the average age of the cyclists of those teams who have the highest average age of all the teams.

```
TEAMNAME                     MEDIA
------------------------ ----------
Amore Vita                       32
Gatorade                         32
2 filas seleccionadas.
```

37. Obtain the director of the teams whose cyclists have worn jerseys (of any type) more days than the rest. Note: each tuple in the Wear relation indicate that a cyclist has worn a jersey one day.

```
DIRECTOR
------------------------------
Miguel Echevarria
1 fila seleccionada.
```

## 9.6 Other queries

38. Obtain the code and the color of the jersey which has been worn by some cyclist who hasn't won any stage.

```
COD COLOR
--- --------------------
MGE Amarillo
MMO Blanco y Rojo
MMS Estrellitas moradas
MMV Rojo
MRE Verde
MSE Rosa
6 filas seleccionadas.
```

39. Obtain the value for the 'stagenum' attribute, the departure city and the arrival city of the stages longer than 190 km. and with at least two climbs.

```
STAGENUM     DEPARTURE                      ARRIVAL
---------- ------------------------------ ------------------------------
        10 Igualada                       Andorra
        11 Andorra                        Estación de Cerler
        18 Ávila                          Ávila
3 filas seleccionadas.
```

40. Obtain the cyclist number and the name of the cyclists who have not worn all the jerseys worn by the cyclist with number 20.

```
CNUM     NAME
---------- ------------------------------
...             ...             /* All except 1 and 20*/

98 filas seleccionadas.
```

41. Obtain the cyclist number and the name of the cyclists who have worn at least one of the jerseys worn by the cyclist with number 20.

```
CNUM     NAME
---------- ------------------------------
         1 Miguel Induráin
        16 Dimitri Konishev
        17 Bruno Leali
        27 Laurent Jalabert
        33 Stefano della Santa
        42 Davide Cassani
        48 Marco Saligari
7 filas seleccionadas.
```

42. Obtain the cyclist number and the name of the cyclists who have not worn any of the jerseys worn by the cyclist with number 20.

```
CNUM     NAME
---------- ------------------------------
...             ...   /*All numbers except 1,16,17,20,27,33,42 and 48*/
92 filas seleccionadas.
```

43. Obtain the cyclist number and the name of the cyclists who have worn all the jerseys worn by the cyclist with number 20.

```
CNUM     NAME
---------- ------------------------------
         1 Miguel Induráin
1 fila seleccionada.
```

44. Obtain the cyclist number and the name of the cyclists who have worn exactly the same jerseys as the cyclist with number 20.

```
CNUM     NAME
---------- ------------------------------
0 filas seleccionadas.
```

45. Obtain the cyclist number and the name of the cyclist who has worn the same jersey during more kilometers than any other cyclist, and also indicate the color of this jersey.

```
CNUM     NAME                           COLOR
---------- ------------------------------ --------------------
        20 Alfonso Gutiérrez              Verde
1 fila seleccionada.
```

46. Obtain the cyclist number and the name of the cyclists who have worn three types of jersey less than the jerseys worn by the cyclist with number 1.

```
CNUM     NAME
---------- ------------------------------
        20 Alfonso Gutiérrez
        30 Melchor Mauri
        26 Mikel Zarrabeitia
         2 Pedro Delgado
4 filas seleccionadas.
```

47. Obtain the value of the stagenum attribute and the length of the stages (in km) which have climbs.

```
STAGENUM     KM
---------- ----------
         2        180
        10        200
        11        195
        15        207
        16        160
        18        195
        19        190
7 filas seleccionadas.
```

# 10 THE DEPARTAMENTO (DEPARTMENT) DATABASE

The queries for this schema are not classified in sections and are not ordered by difficulty. The student should decide the way of solving each query.

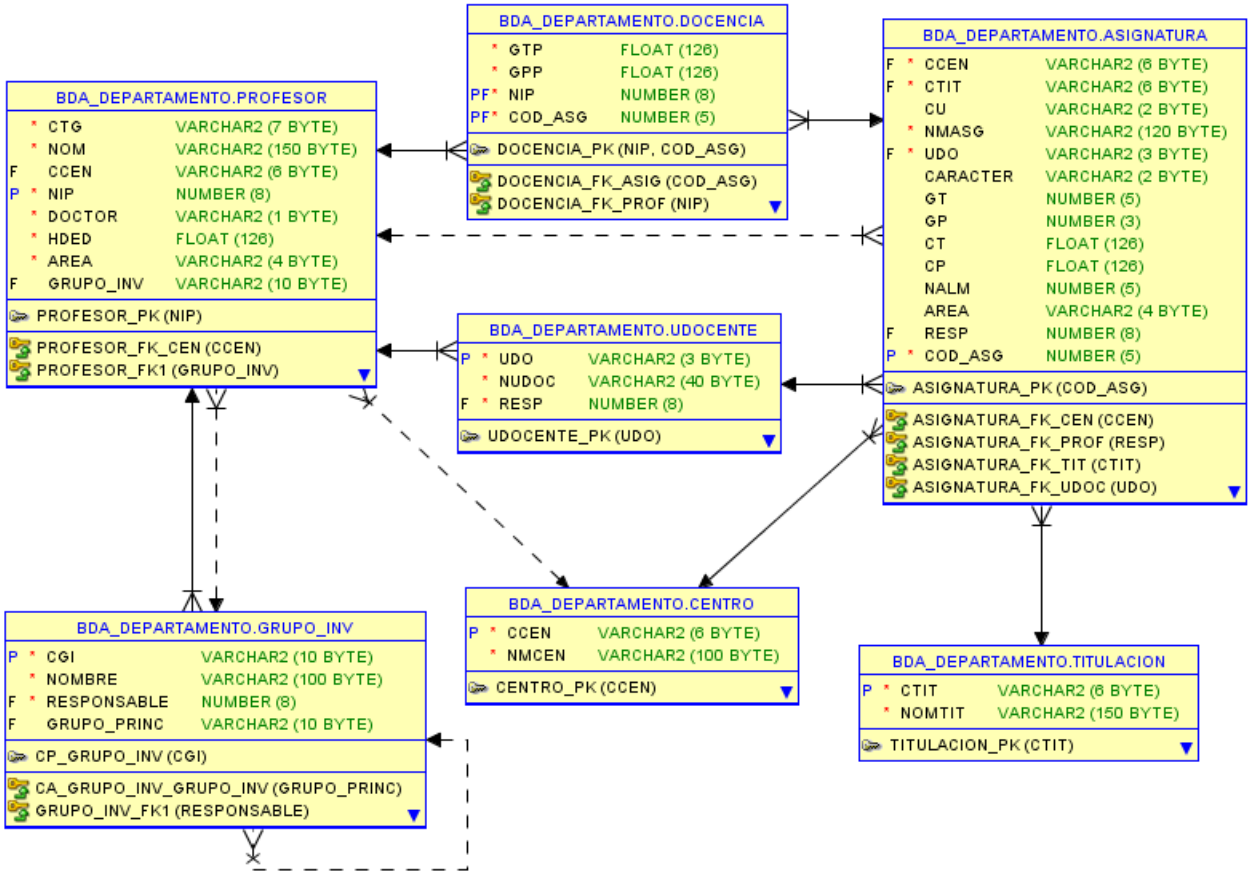
The Department of Information Systems and Computing want to create a database to store information about its organization using the following relational schema:

```
CENTRO(ccen:char(6),nmcen:char(100))
  PK:{ccen}
  NNV: {nmcen}

PROFESOR(nip:entero,nom:char(150),ctg:char(7),ccen:char(6),
         doctor:char(1),hded:real,area:char(3), grupo_inv:char(10))
  PK:{nip}
  FK:{ccen}→Centro
  FK:{grupo_inv}→Grupo_inv(cgi)
  NNV:{nom,ctg,doctor,area,hded}

TITULACION(ctit:char(6),nomtit:char(150))
  PK:{ctit}
  NNV:{nomtit}

ASIGNATURA(cod_asg:entero,ccen:char(6),ctit:char(6), cu:char(2),
         nmasg:char(120), resp:entero,udo:char(3),caracter:char(2),
         gt:entero,gp:entero,ct:real,cp:real, nalm:entero,area:char(4))
  PK:{cod_asg}
  FK:{ccen}→Centro
  FK:{resp}→ Profesorf(resp) = nip
  FK:{ctit}→Titulacion
  FK:{udo}→Udocente
  NNV:{ccen,ctit,nmasg,udo}

GRUPO_INV(cgi:char(10),nombre:char(100),responsable:entero,
         grupo_princ:char(10))
  PK:{cgi}
  FK:{responsable}→Profesor(nip)
  FK:{grupo_princ}→ Grupo_inv(cgi)
  NNV:{nombre,responsable}

DOCENCIA(cod_asg:entero,nip:entero,gtp:real,gpp:real)
  PK:{ccen,ctit,casg,nip}
  FK:{ccen,ctit,casg}→Asignatura
  FK:{nip}→Profesor
  NNV:{gtp,gpp}

UDOCENTE(udo:char(3),nudoc:char(40),resp:entero)
  PK:{udo}
  FK:{resp}→Profesor(nip)
  NNV:{nudoc,resp}
```

Below is a brief explanation of the meaning of the different relations and their attributes.

- **Centro:** centers where the department is teaching subjects
  - *ccen*: Code of the center.
  - *nmcen*: Name of the center.
- **Titulación:** Degrees where the department is teaching some subject.
  - *ctit*: Code of the degree.
  - *nomtit*: Name of the degree.
- **Profesor**: department lecturers
  - *nip*: id of the teacher.
  - *nom*: Name.
  - *ctg*: Category.
  - *ccen*: Center where the lecturer teaches.
  - *doctor*: 'S' if the lecturer has a PhD. 'N' if not.
  - *hded*: Number of credits the lecturer has to teach.
  - *area*: Knowledge are of the lecturer.
  - *grupo_inv*: Research group of the teacher.
- **Asignatura:** Subject.
  - *cod_asg*: Code of the subject.
  - *ccen*: Code of the center where the subject is taught.
  - *ctit*: Code of the degree of the subject.
  - *cu*: Course and semester of the subject.
  - *nmasg*: Name of the subject.
  - *resp*: id of the responsible lecturer.
  - *udo*: Teaching area of the subject.
  - *caracter*: Type of subject. O: optional, B: compulsory, S: basic).
  - *gt*: Number of groups.
  - *gp*: Number of laboratory groups.
  - *ct*: Credits for each group.
  - *cp*: Credits for each laboratory group.
  - *nalm*: Number of students.
  - *area*: Knowledge area of the subject.
- **Grupo_inv:** Research groups.
  - *cgi*: Code of the research group.
  - *nombre*: Name of the group.
  - *responsable*: id of the head of the group.
  - *grupo_princ*: Main group to which this subgroup belongs.
- **Docencia:** Teaching assignation.
  - *cod_asg*: Subject code.
  - *nip*: Lecturer code.
  - *gtp*: Number of groups of this subject that the lecturer is teaching.
  - *gpp*: Number of laboratory groups of this subject that the lecturer is teaching.
- **Udocente:** Teaching areas.
  - *udo*: Code of the teaching area.
  - *nudoc*: Name of the teaching area.
  - *resp*: id of the lecturer in charge of the teaching area..

Below is a graphical representation of the "Departamento" relational schema:




This diagram is generated by the Oracle DBMS and in it:

- Each box represents a table.

- A red asterisk in front of an attribute indicates that this attribute has a **non-null** value constraint.

- The **primary key** of a relation is indicated in several ways:

  - P in front of the attributes that is part of it.
  - Using the symbol 

- A **foreign key** is identified in several ways:

  - *F* in front of the attributes that are in the foreign key.
  - Using the symbol 
  - Using an arrow connecting the table to the referenced table. The arrow is continuous if the foreign key also has a non-zero value constraint and discontinuous if it can be null.

- A **uniqueness** constraint is identified by:

  - *U* in front of the attributes
  - .
  - Using the symbol 

# 11 DEPARTAMENTO DATABASE EXERCISES[1]

1. Obtain the name (*nom*) of the lecturers teaching the lowest number of credits.

```
NOMBRE
------------------------
Donat Cano, Pino
Yudici Cosme, Alexandro
```

2. How many subjects (*asignaturas*) are there that the responsible lecture does not teach that subject?

```
CUÁNTAS
--------
3
```

3. Obtain the name of the subjects (*nmasg)* of the center of code 'D' and of the degree with code 175 which has the most students enrolled.

```
NMASG
---------------
Informática y Redes
```

4. Obtain the name of the subjects (*nmasg*) and the name (nom) of the responsible lecturer for subjects with more than 6 theory groups (sorted by subject name).

```
ASIGNATURA                                              RESPONSABLE
------------------------------------------------------  ------------------------
Bases de Datos y Sistemas de Información                Luis Almiñana, Isaac
Computación Paralela                                    Delgado Cervantes, Camill
Concurrencia y Sistemas Distribuidos                    Cuallado Simó, Tomás
Estructuras de Datos y Algoritmos                       Dolz Eyob, Marlon
Gestión de Proyectos                                    Gorrís Arastey, Celia
Ingeniería del Software                                 Antón Álvaro, Roberto
Interfaces Persona Computador                           Caballero Mondejar, Aleja
Introducción a la Informática y a la Programación       Vázquez Angulo, Alba
Lenguajes, Tecnologías y Paradigmas de la Programación Alcañiz Campos, Àlvar
Programación                                            Albiñana Lucán, Carla
Sistemas Inteligentes                                   Barros Navalón, Antonio
Tecnología de Sistemas de Información en la Red         Ortúzar Ciborro, Laura
Teoría de Autómatas y Lenguajes Formales                Lanáquera Toledo, Marcos
13 filas seleccionadas.
```

5. Obtain the code (*ccen*) and name (*nmcen*) of the centers that do not have lecturers assigned (sorted by center name).

```
CCEN   NMCEN
------ --------------------------------------
C      E.T.S.I. Caminos, Canales y Puertos
X      Unidad de Másteres Universitarios
```

6. Obtain the name (*nom*) of non-doctoral professors who do not belong to a center (sorted by lecturer name).

```
NOMBRE
```

[1] When a row of a query result does not fit on a line, characters will be removed at the end.

```
------------------------------
Hernica Alejo, Wael
Peñarrocha Marimón, Vicente
```

7. Obtain the code (*ccen*) and name (*nmcen*) of the centers that do not have teachers or subjects.

```
CCEN   NMCEN
------ ------------------------------------
C      E.T.S.I. Caminos, Canales y Puertos
```

8. Obtain the code (*cod_asg*) and name (*nmasg)* of the optional subjects (O) whose responsible lecturer is also responsible for a teaching area, indicating the name (*nom*) of that lecturer. Sorted by subject name.

```
COD_ASG NOMBRE                                             RESPONSABLE
------- -------------------------------------------------- --------------------
11593   Algorítmica                                        Nielsen Vizcarro, Adr
34566   Algoritmos Paralelos en Procesamiento de Señal (Ap Mollá Gurrea, Héctor
34567   Computación de Altas Prestaciones en Problemas de  Mollá Gurrea, Héctor
11649   Criptografía                                       Lanáquera Toledo, Mar
11596   Diseño y Gestión de Bases de Datos                 Luis Almiñana, Isaac
14101   Entornos de Desarrollo de Videojuegos              Furió Vitoria, Carme
33948   Experiencias en Gestión de Modelos                 Arcas Lanzat, Enric
11729   Introducción a la Programación de Videojuegos      Valiño Montesinos, Ma
11575   Lenguajes y Entornos de Programación Paralela      Matos Cruz, Ismael
11569   Mantenimiento y Evolución de Software              Arcas Lanzat, Enric
11321   Programación de Dispositivos Móviles               Pedrosa Ivars, Erika
33984   Programación Gráfica                               Furió Vitoria, Carmel
13670   Programación Informática en Arduino                Moltó Lavandera, Idir
33983   Realidad Virtual y Aumentada                       Gutiérrez Lairón, Sar
33992   Reconocimiento Automático del Habla                Nielsen Vizcarro, Adr
33946   Sistemas de Gestión de Emergencias                 Carmona Navalón, Davi
16 filas seleccionadas.
```

9. Obtain the center code (*ccen)*, the degree code (*ctit)* and the name of the subjects (*nmasg*) with more than one credit per theory group of the teaching area whose responsible is the lecturer named 'Luis Almiñana, Isaac'. Sorted by subject name.

```
CCEN CTIT   NMASG
---- ------ ------------------------------------------------------
R    156    Análisis de Requisitos de Negocio
D    2269   Analysis of Genomic Data
R    2233   Auditoría, Calidad y Gestión de Sistemas de Información
R    189    Bases de Datos
G    153    Bases de Datos
R    156    Bases de Datos y Sistemas de Información
R    2233   Ciencia de Datos
R    156    Diseño y Gestión de Bases de Datos
R    156    Diseño y Gestión de Sistemas de Información Genómicos
R    2255   Explotación de Datos Masivos
R    189    Gestión de Datos
R    156    Gestión de las Tecnologías de la Información
R    2233   Informática Médica
R    189    Proyecto II, Integración y Preparación de Datos
R    189    Seguridad de los Datos
R    156    Sistemas de Almacenamiento y Recuperación y de Informaci
R    156    Sistemas de Información Estratégicos
R    156    Tecnología de Bases de Datos
 18 filas seleccionadas.
```

10. Obtain the name (*nom*) of the lecturers who teach a subject in a B semester (the course does not matter) in the degrees whose name contains the word 'Creativas' (sorted by lecturer name).

```
NOMBRE
---------------------------------------
Cruz Puche, Elisa
Galdón Jarl, Xavier
Gutiérrez Lairón, Sara
Marqués Sebastián, Nieves
Parcet Morell, Pino
Ponz Rica, Marta
Roselló Pallarés, Diego
Sanhermelando Jordá, Ana
Torras Delgado, Pau
9 filas seleccionadas.
```

11. Obtain, for each center with more than 100 lecturers, the code (*ccen*) and name (*nmcen*) of the center and the number of degrees taught there.

```
CCEN   NOMBRE                              TITULACIONES
------ ----------------------------------- ------------
R      E.T.S. de Ingeniería Informática              4
```

12. Obtain, for each category of lecturer (with some teaching duties), the category (*ctg)*, how many credits are taught by all the lecturers within that category, and how many lecturers are in that category. Sorted by category.

```
CTG       CRÉDITOS PROFESORES
------- ---------- ----------
ASOL-P3           1          1
ASOL-P4          18          2
ASOL-P6       81,85         10
AYD-TC          5,5          3
COD-TC       267,15         13
COL-TC           52          2
CU              516         31
TEU          408,73         12
TEU-P6        15,01          1
TU          1693,18         70
TU-P3             6          1
11 filas seleccionadas.
```

13. Obtain the name (*nom)* of the lecturers who are responsible for subjects which they are not teaching.

```
NOMBRE
--------------------------------
Cano Lanáquera, Guillem
Montesinos Carrión, David
Mor Ferrer, Alfons.
```

14. Obtain the code (*udo*) and name (*nudoc*) of the teaching areas that have subjects in all the centers whose name contains the string 'Inform'.

```
UDO NUDOC
--- ----------------------------------------
159 Computación
162 Computación Numérica
160 Desarrollo del Software
```

```
165 Informática Gráfica y Multimedia
161 Inteligencia Artificial
169 Programación
158 Sistemas
157 Sistemas de Información
8 filas seleccionadas.
```

15. Solve the above query, but for the string 'Bioinf'.

```
no se ha seleccionado ninguna fila
```

16. Obtain the code (*udo)* and name (*nudoc)* of the teaching areas that have subjects in exactly two centers.

```
UDO NUDOC
--- --------------------------
161 Inteligencia Artificial
162 Computación Numérica
```

17. Obtain the name (*nmasg*) of the subjects of character S in which some Phd (doctor) lecturer teaches more than 2 groups of laboratory or more than 2 groups of regular lectures (theory) *(ct)* indicating also the id (*nip)* of that lecturer and the total number of credits taught by that lecture in the subject. Ordered by subject name.

```
ASIGNATURA                                                    NIP   CRÉDITOS
------------------------------------------------------------ ---------- ----------
Conocimientos Básicos de Programación y Métodos Numéricos       2641          9
Conocimientos Básicos de Programación y Métodos Numéricos       3231          6
Conocimientos Básicos de Programación y Métodos Numéricos       1344          9
Informática                                                    11449       10,8
Informática                                                    20523        7,2
Informática                                                    10580         15
Informática                                                    31657       10,8
Informática                                                    37691         12
Informática Aplicada                                           10772         16
Informática y Redes                                              877       2,16
Informática y Redes                                             1357       4,08
Introducción a la Informática y a la Programación              10115         15
Introducción a la Informática y a la Programación              10613         18
Introducción a la Informática y a la Programación               1092         15
Programación                                                   10115       16,5
Programación                                                   10613       16,5
16 filas seleccionad.
```

18. Obtain the name of the professors whose name (*nom*) contains at least one accented capital vowel and who teach subjects in more than one teaching area. Sorted alphabetically by lecturer name.

```
NOMBRE
-----------------------------------
Agut Fortea, Óscar
Álvarez Pozo, Sául
Antón Álvaro, Roberto
Izquierdo Alarcón, Ángel
```

19. Obtain the name (*nmasg*) of the subjects whose name contains the string 'Datos' indicating also the name of each lecturer who teaches it.

```
ASIGNATURA                                PROFESOR
----------------------------------------- ----------------------------------------
Big Data/ Minería de Datos Geoespaciales          Ivars Bens, Diego
Bases de Datos y Sistemas de Información          Mejía Prieto, Sergio
Tecnología de Bases de Datos                      Mejía Prieto, Sergio
Bases de Datos                                    Mejía Prieto, Sergio
Gestión de Datos                                  Mejía Prieto, Sergio
Tecnologías de Gestión de Datos                   Mejía Prieto, Sergio
Bases de Datos y Sistemas de Información          Luis Almiñana, Isaac
Diseño y Gestión de Bases de Datos                Luis Almiñana, Isaac
Tecnología de Bases de Datos                      Luis Almiñana, Isaac
Bases de Datos                                    Luis Almiñana, Isaac
Gestión de Datos                                  Luis Almiñana, Isaac
Bases de Datos                                    Álvarez Pozo, Sául
Bases de Datos y Sistemas de Información          Álvarez Pozo, Sául
Bases de Datos y Sistemas de Información          Burguera Beltrán, Ismael
Bases de Datos y Sistemas de Información          Cal Brú, Isaac
Estructuras de Datos                              Wun Sancho, Máximo
Proyecto II, Integración y Preparación de Datos   Ochando Correa, Alfonso
Estructuras de Datos y Algoritmos                 Lozano Coma, Silvia
Bases de Datos y Sistemas de Información          Cerdán Guillen, Jaime
Seguridad de los Datos                            Cerdán Guillen, Jaime
Tecnología de Bases de Datos                      Alegre Rocha, Moises
Estructuras de Datos y Algoritmos                 Ejarque Valiente, Enrique
Bases de Datos y Sistemas de Información          Caballero Mondejar, Alejandro
Diseño y Gestión de Bases de Datos                Caballero Mondejar, Alejandro
Tecnología de Bases de Datos                      Caballero Mondejar, Alejandro
Bases de Datos y Sistemas de Información          Pérez Alejo, Gracia
Bases de Datos                                    Leiva Luna, Nicolás
Ciencia de Datos                                  Leiva Luna, Nicolás
Big Data/ Minería de Datos Geoespaciales          Ayora Forteza, Modesto
Diseño y Gestión de Bases de Datos                Pedrera Arraez, Antony
Bases de Datos y Sistemas de Información          Villarín Hernica, Jaime
Estructuras de Datos y Algoritmos                 Peinado Dolz, Sara
Estructuras de Datos y Algoritmos                 Baeza Vilar, Prados
Estructuras de Datos y Algoritmos                 Dolz Eyob, Marlon
Estructuras de Datos y Algoritmos                 Román Marrahí, Asier
Proyecto II, Integración y Preparación de Datos   Casamayor Millet, Ricard
Explotación de Datos Masivos                      Casamayor Millet, Ricard
Estructuras de Datos y Algoritmos                 Nielsen Vizcarro, Adrián
Estructuras de Datos y Algoritmos                 Sorli Hernandez, Aitor
Estructuras de Datos y Algoritmos                 Valiño Limorti, Joan
Seguridad de los Datos                            Cardona Luis, Vicente
41 filas seleccionadas.
```

20. Obtain the code (*udo*) of the teaching areas indicating how many subjects they have that are taught by more than four lecturers (only if they have more than one) (ordered by teaching area code).

```
UDO ASIGNATURAS
--- -----------
158           2
160           2
169           3
170           4
```

21. Obtain the code (*ccen*) and the name (*nmcen*) of all the centers in the database, indicating how many Phd (doctors) lecturers are assigned to each one of them.

```
CCEN   NMCEN                                              CUÁNTOS
------ -------------------------------------------------- ----------
J      E. Politécnica Superior de Alcoy                            4
Q      E. Politécnica Superior de Gandía                          10
E      E.T.S. de Ingeniería del Diseño                             4
R      E.T.S. de Ingeniería Informática                           94
C      E.T.S.I. Caminos, Canales y Puertos                         0
T      E.T.S.I. de Telecomunicación                                3
G      E.T.S.I. Geodésica, Cartográfica y Topografía               3
D      E.T.S.I. Industriales                                       5
M      Facultad de Administración y Dirección de Empresas          3
L      Facultad de Bellas Artes                                   10
X      Unidad de Másteres Universitarios                           0
11 filas seleccionadas.
```

22. Obtain the name (*nom*) of the professors who teach all the subjects in a teaching area.

```
no se ha seleccionado ninguna fila
```

23. Obtain the code (*cod_asg*) and name (*nmasg*) of all the subjects in the database that belong to a teaching area with exactly 9 subjects indicating for each subject how many lecturers teach in it (sorted by subject code)

```
COD_ASG NMASG                                     PROFESORES
---------- ---------------------------------------- ----------
     11560 Sistemas Inteligentes                            12
     11587 Agentes Inteligentes                              3
     11589 Percepción                                        2
     11592 Técnicas, Entornos y Aplicaciones de Int          2
     11594 Aprendizaje Automático                            3
     14096 Social Web Behaviour & Network Analysis           2
     33425 Logística y Servicios                             2
     33436 Sistemas Inteligentes                             4
     34508 Big Data/ Minería de Datos Geoespaciales          2
9 filas seleccionadas.
```

24. Obtain the name of all the PhD lecturers responsible for a teaching area, indicating also the number of subjects they teach that have more than 3 credits of regular classes (theory) *(ct).*

```
NOM                            CUÁNTAS
------------------------------ ----------
Ayora Forteza, Modesto                  1
Carmona Navalón, David                  1
Cuallado Simó, Tomás                    2
Furió Vitoria, Carmelo                  1
Gutiérrez Lairón, Sara                  2
Lanáquera Toledo, Marcos                0
Lledó Novella, Ivar                     2
Luis Almiñana, Isaac                    4
Matos Cruz, Ismael                      0
Mollá Gurrea, Héctor                    1
Moltó Lavandera, Idir                   1
Nielsen Vizcarro, Adrián                1
Pedrosa Ivars, Erika                    0
Valiño Montesinos, Marta                0
14 filas seleccionadas.
```

25. Obtain the code (*ccen*) and name (*nmcen*) of all the centers in the database indicating how many PhD

and non-PhD lecturers are assigned to them. Ordered by name of the center.

```
CCEN   NOMBRE                                              DOCS      NODOCS
------ ---------------------------------------------- ---------- ----------
J      E. Politécnica Superior de Alcoy                         4          4
Q      E. Politécnica Superior de Gandía                       10          0
E      E.T.S. de Ingeniería del Diseño                          4          1
R      E.T.S. de Ingeniería Informática                        94          8
C      E.T.S.I. Caminos, Canales y Puertos                      0          0
T      E.T.S.I. de Telecomunicación                             3          0
G      E.T.S.I. Geodésica, Cartográfica y Topografía            3          0
D      E.T.S.I. Industriales                                    5          0
M      Facultad de Administración y Dirección de Empresas       3          0
L      Facultad de Bellas Artes                                10          2
X      Unidad de Másteres Universitarios                        0          0
11 filas seleccionadas.
```

26. Obtain the code (*cod_asg*) of all the subjects in the database indicating the total number of teaching credits assigned to lecturers. If a subject is not taught by any lecturer, the number of credits should be 0. Ordered by subject code.

```
COD_ASG      TOTAL
---------- ----------
         0          0
     10127         27
     10128          9
     10204        8,5
     10205        8,5
     10269         24
     10601         32
     11267       10,8
     11275          9
     11321        3,5
     11337         18
…
     34573          4
     34574          4
     34575          2
     34576          4
     34577          2
     34756          4
204 filas seleccionadas.
```

27. How many centers are there with a lower number of subjects than the number of lecturers assigned?

```
CENTROS
---------
3
```

28. Obtain the code (*cod_asg)* and name (*nmasg*) of the subject in which the most teachers teach.

```
COD_ASG  NMASG
-------  ----------------------
  11560  Sistemas Inteligentes
```

29. Obtain the name (*nom*) of the lecturers who teach more than 30 teaching credits among all the subjects they teach (in alphabetical order).

```
NOM
------------------------------
Albiñana Lucán, Carla
Alcañiz Campos, Àlvar
Álvarez Pozo, Sául
Álvarez Pozo, Sául
Antón Álvaro, Roberto
Bonet España, Tomás
Brisa Carmona, Camilla
Bruhn Olmos, Daniel
Caballero Mondejar, Alejandro
Calvo Margaix, Mario
Cerdán Guillen, Jaime
Cerezuela Boronat, Julio
Cuallado Simó, Tomás
Cuevas Gadea, Gonzalo
Dolz Eyob, Marlon
Fernández-Calvillo Piles, Rafael
Ferrero Puertes, Pino
Fontela Banegas, Pau
Galdón Jarl, Xavier
Limorti Díez, Blas
Lledó Novella, Ivar
Lorente Racho, Ivar
Lozano Coma, Silvia
Luis Almiñana, Isaac
Marqués Sebastián, Nieves
Mejía Prieto, Sergio
Molió Pallarés, Xavier
Mor Ferrer, Alfons
Ochando Correa, Alfonso
Ortúzar Ciborro, Laura
Torras Delgado, Pau
Vázquez Angulo, Alba
Wun Sancho, Máximo
Yusá Vidaurre, Albert
34 filas seleccionadas.
```

30. Obtain the code (*cod_asg*) and name (*nmasg*) of the subject with the highest number of credits per regular (theory) group *(ct)*.

```
COD_ASG NMASG
---------- -----------------
     14180 Programación
```

31. Obtain the name (*nom*) of the lecturers who teach in any of the subjects that belong to the degree of code 189 of the center of code *(ccen)* R and such that the subject has more than 70 students enrolled. Sorted alphabetically.

```
NOM
--------------------------
Ejarque Valiente, Enrique
Peinado Dolz, Sara
Treviño Orts, Alexandro
Wun Sancho, Máximo.
```

32. Obtain the name (*nom)* of the professors who teach a subject in the center of code *(ccen)* J.

```
NOM
------------------------------
Bonet Peñafiel, Ramón
Miret Hernández, Jorge
Valiño Montesinos, Marta
```

33. Obtain the code and the name (*nudoc)* of the teaching areas whose head has the category (*ctg)* 'TEU' only if he/she teaches only subjects of less than 2 credits of regular *(ct)* classes (theory).

```
UDO NUDOC
--- ---------------------------
160 DDesarrollo del Software
```

34. Obtain for each area of knowledge the area code indicating in each area how many professors there are in it, how many are doctors and how many are not

```
AREA PROFESORES   DOCTORES NO_DOCTORES
---- ---------- ---------- -----------
0035          2          2           0
0040          1          1           0
0075         17         14           3
0105          2          2           0
0185          2          1           1
0260          6          5           1
0385          1          1           0
0505          2          2           0
0560          1          1           0
0570        113        101          12
0595          1          1           0
0690          1          1           0
0785          3          3           0
0800          1          1           0
14 filas seleccionadas.
```

35. Obtain, for each and every center, the name of the center (*nmcen)*, the number of professors assigned to it from teaching area (*udo)* 0570 and the number of subjects assigned with more than 3 theory credits (*ct)*.

```
CENTRO                                              PROF        ASG
-------------------------------------------------- ---------- ----------
E. Politécnica Superior de Alcoy                            7          1
E. Politécnica Superior de Gandía                           7          1
E.T.S. de Ingeniería del Diseño                             3          0
E.T.S. de Ingeniería Informática                           85         26
E.T.S.I. Caminos, Canales y Puertos                         0          0
E.T.S.I. de Telecomunicación                                2          1
E.T.S.I. Geodésica, Cartográfica y Topografía               1          0
E.T.S.I. Industriales                                       4          3
Facultad de Administración y Dirección de Empresas          1          1
Facultad de Bellas Artes                                    1          0
Unidad de Másteres Universitarios                           0          0
11 filas seleccionadas.
```

36. Obtain, for each teaching area with assigned subjects, the name of the teaching area (*nudoc)*, the name (*nom)* of the professor responsible and the number of subjects assigned to that teaching area (sorted by teaching area name).

```
UNIDAD_DOCENTE                  RESPONSABLE                    PROF
------------------------------  ---------------------- ----------
Computación                     Lanáquera Toledo, Marcos          5
Computación Numérica            Mollá Gurrea, Héctor              6
Desarrollo del Software         Arcas Lanzat, Enric              18
Informática Gráfica y Multimedia Gutiérrez Lairón, Sara          19
Inteligencia Artificial         Lledó Novella, Ivar               9
Máster CPD                      Matos Cruz, Ismael               16
Máster IARFID                   Furió Vitoria, Carmelo           22
Máster ISMFSI                   Carmona Navalón, David           22
Programación                    Nielsen Vizcarro, Adrián          8
Programación Básica             Moltó Lavandera, Idir            19
Sección Departamental Alcoy     Valiño Montesinos, Marta          8
Sección Departamental Gandía    Pedrosa Ivars, Erika             20
Sistemas                        Cuallado Simó, Tomás             11
Sistemas de Información         Luis Almiñana, Isaac             21
14 filas seleccionadas.
```

37. Obtain, for each teaching area with two or more assigned subjects, the code (*udo)* of the teaching area, the name (*nom* )of the professor responsible and the number of professors teaching more than two theory groups (*gt)* of the subjects assigned to that area (ordered by teaching area code).

```
UDO RESPONSABLE                 PROF
--- ------------------------ ----------
160 Arcas Lanzat, Enric              14
168 Carmona Navalón, David            0
158 Cuallado Simó, Tomás              6
167 Furió Vitoria, Carmelo            0
165 Gutiérrez Lairón, Sara            5
159 Lanáquera Toledo, Marcos          2
161 Lledó Novella, Ivar               0
157 Luis Almiñana, Isaac              4
166 Matos Cruz, Ismael                0
162 Mollá Gurrea, Héctor              0
170 Moltó Lavandera, Idir             3
169 Nielsen Vizcarro, Adrián          6
164 Pedrosa Ivars, Erika              1
163 Valiño Montesinos, Marta          0
14 filas seleccionadas
```

38. Obtain the number of subjects with more regular credits (theoy) (*ct)* than laboratory credits (*cp*) that are taught by at least one non-PhD lecturer.

```
ASIGS
------
20
```

39. Obtain the names (*nom)* of the lecturers who teach the most subjects.

```
NOM
-------------------------
Marqués Sebastián, Nieves
Pedrosa Ivars, Erika
```

40. Obtain the code (*ccen*) and the name (*nmcen)* of the centers with fewer teachers assigned.

```
CCEN   NMCEN
------ ------------------------------------------------------
M      Facultad de Administración y Dirección de Empresas
T      E.T.S.I. de Telecomunicación
G      E.T.S.I. Geodésica, Cartográfica y Topografía
```

41. Obtain the nip, category (*ctg(* and total number of groups (theory or laboratory) of the lecturer who teaches the largest number of groups (theory or laboratory).

```
NIP         CTG   GRUPOS
----------- ----- ------
1234        TU        22
```

42. Obtain the name (*nom*) of the lecturers who teach all the subjects of a degree with at least two subjects

```
NOMBRE
-----------------------------------
Ayora Forteza, Modesto
Castelló Rodríguez, Gorka
Fontela Banegas, Pau
Insa Richart, Bruno
Moltó Lavandera, Idir
Roselló Pallarés, Diego
6 filas seleccionadas.
```

43. Obtain the name of the professors (*nom)* who only teach subjects of a degree and who belong to a research group *(Grupo_inv*) that has at least one subgroup.

```
NOMBRE
------------------------------
Álvarez Pozo, Sául
Barros Navalón, Antonio
Bastidas Castillo, Jorge
Calvo Mollá, Sava
Cruz Puche, Elisa
Milla Bonet, Alejandro
Montés Robles, Tadeusz
Talavera Quintanilla, Álvaro
Verdet Gómez, Jorge
Vila Donat, Mihai
10 filas seleccionadas.
```

44. Obtain the code (*ccen*) and the name (*nmcen*) of the centers that do not have subjects or teachers assigned.

```
CCEN   NMCEN
------ -------------------------------------
C      E.T.S.I. Caminos, Canales y Puertos
```

45. Obtain the code (*cgi)* and name (*nombre*) of all the research groups that exist indicating how many professors belong to the group and how many research subgroups it has (ordered by name).

```
CGI    NOMBRE                                                  PROF   SUBGRU
----- ---------------------------------------------------------- -----  ------
DB     Bases de Datos, Razonamiento Automático y Lenguaje Natural   13     0
ELP    Extensiones de la Programación Lógica                        15     0
GCP    Grupo de Computación Paralela                                15     0
OOM    Grupo de Métodos de Producción de Software                    1     0
```

```
GPS    Grupo de Planificación y Scheduling                          14     0
PRHLT  Grupo de Reconocimiento de Formas y Tecnología del Lenguaje   7     0
NaDie  Grupo sin éxito                                               0     0
SIG    Informática Gráfica                                          13     0
GTI-IA Inteligencia Artificial                                      16     0
OOCMDB Modelado Conceptual Orientado a Objetos y Bases de Datos     12     0
PLIS   Programación Lógica e Ingeniería del Software                10     4
RFIA   Reconocimiento de Formas e Inteligencia Artificial             6     0
SiDi   Sistemas Distribuidos                                        5     0
GTI    Tecnología Informática                                       12     3
TLCC   Teoría de Lenguajes, Computabilidad y Criptografía            6     0
15 filas seleccionadas.
```

46. Obtain the code (*udo*) and name (*nudoc*) of the teaching areas that have subjects in all the centers whose name (*nmcen*) contains the word 'Ingeniería'.

```
UDO NUDOC
--- ---------------
158 Sistemas
```

47. Solve the above query with the word Filosofía.

```
no se ha seleccionado ninguna fila
```

48. Obtain the code (*cod_asg*) and name (*nmasg*) of the subjects taught by more than 3 professors such that all the professors teaching them are of a category (*ctg)* other than 'TEU'.

```
COD_ASG NMASG
---------- ----------------------------------------
Algorítmica
Estructuras de Datos y Algoritmos
Informática
Informática
Interfaces Persona Computador
Reconocimiento Automático del Habla
Sistemas Inteligentes
Sistemas Inteligentes
8 filas seleccionadas.
```