

Databases and Information Systems

Degree in Informatics Engineering

Unit 2.2: SQL Exercises



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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)

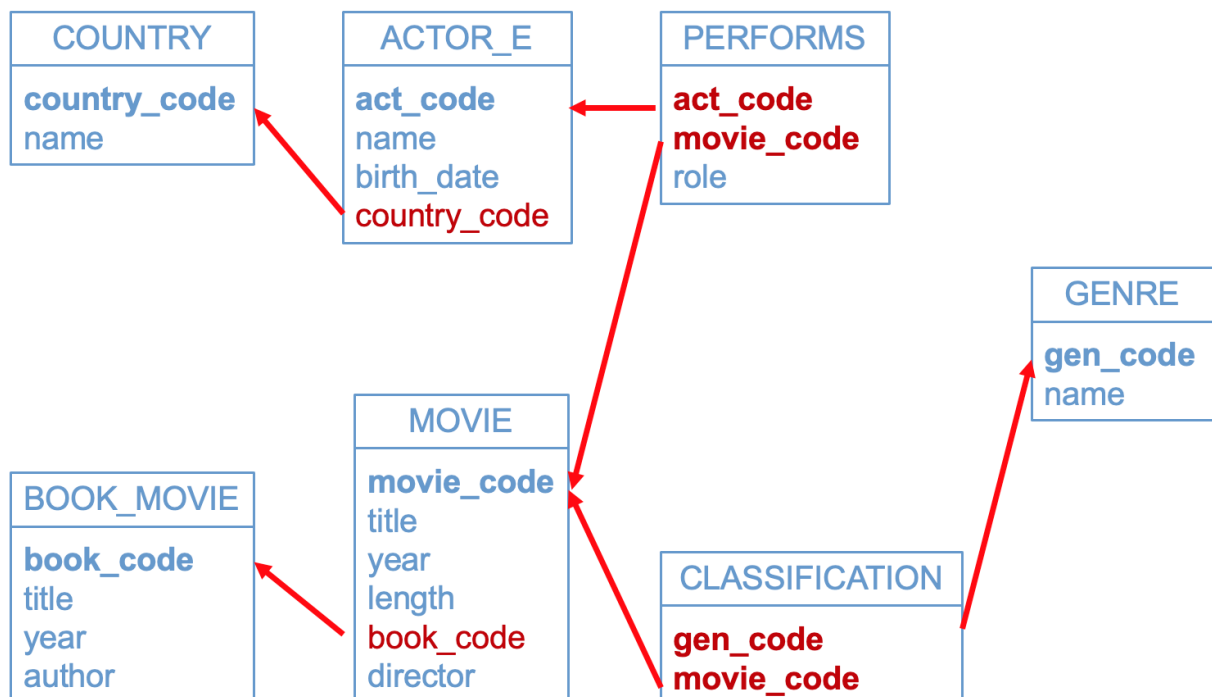
FK:{gen_code} → Genre(gen_code)

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	
-----	SELECT DISTINCT country_code FROM ACTOR_E ORDER BY country_code ASC
ad63	
gg74	
hg45	
nb12	
rt89	
sd53	
sf15	
ty11	
we74	
zf58	
10 filas seleccionadas	

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	
-----	-----	SELECT movie_code, title
357L	Cleopatra	FROM movie
365N	Cortina rasgada	WHERE year < 1970 AND book_code IS NULL
332D	Dos hombres y un destino	ORDER BY title

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

ACT_CODE	NAME	
-----	-----	SELECT act_code, name
A62	John Goodman	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	
-----	-----	SELECT movie_code, title
365A	Indiana Jones y la última cruzada	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	
-----	-----	SELECT movie_code, title
856A	El informe pelícano	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 (*)	
-----	SELECT COUNT(*)
1	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	SELECT COUNT(DISTINCT(movie_code)) AS "HOW_MANY_MOVIES"
-----	FROM CLASSIFICATION
43	WHERE gen_code IN ('BB5', 'GG4', 'JH6')

8. In which year was published the oldest book ?

YEAR	SELECT MIN(year)
-----	FROM BOOK_MOVIE
1877	

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

AVERAGE LENGTH	SELECT AVG(length)
-----	FROM MOVIE
119,5	WHERE year = 1987

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

TOAL_MIN	SELECT SUM(length)
-----	FROM MOVIE
296	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

GJ7 Ana Karenina
GJ6 El informe pelícano
UU4 El padrino
DF6 Entrevista con el vampiro
LP9 Rita Hayworth y la redención de Shawshank
AR3 Vida de este chico
6 filas seleccionadas

AUTHOR

Leon Tolstoi
John Grisham
Mario Puzo
Anne Rice
Stephen King
Tobias Wolff

```
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).

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).

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'?

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 the 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
nbl2      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_CODE	TITLE	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, the 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.

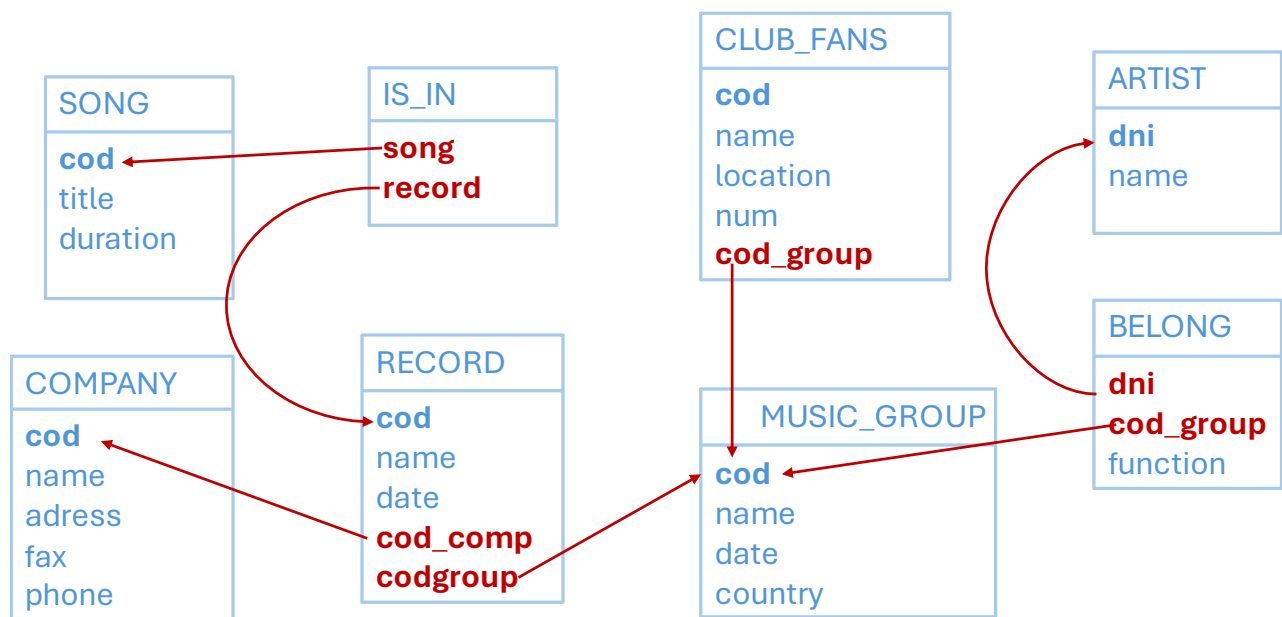
num: number of members of the club.

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

- How many records are there?

```

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

- Show the names of the non-Spanish groups.

```

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

- 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	GUIARRA
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:

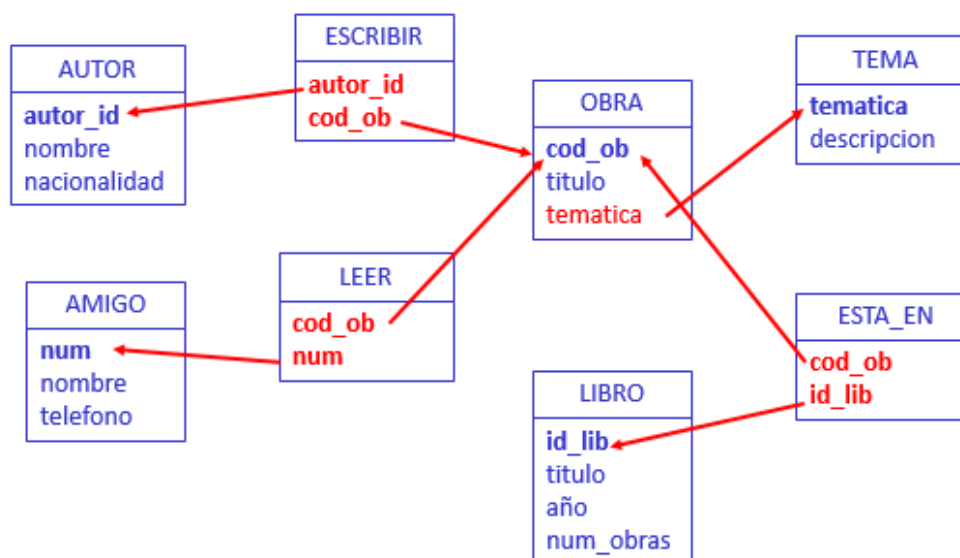
- The value of the attribute *num_obras* in the “libro” relation must be equal to the number of tuples in “Esta_en” for the book.
- Every book contains at least one work.
- If a book has a title and it only contains one work, the title of the book matches the title of the work.

Interpretation of the relational schema BIBLIOTECA

In order to understand the reality represented by the previous 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 Gaité, 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

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 Gaité, 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.

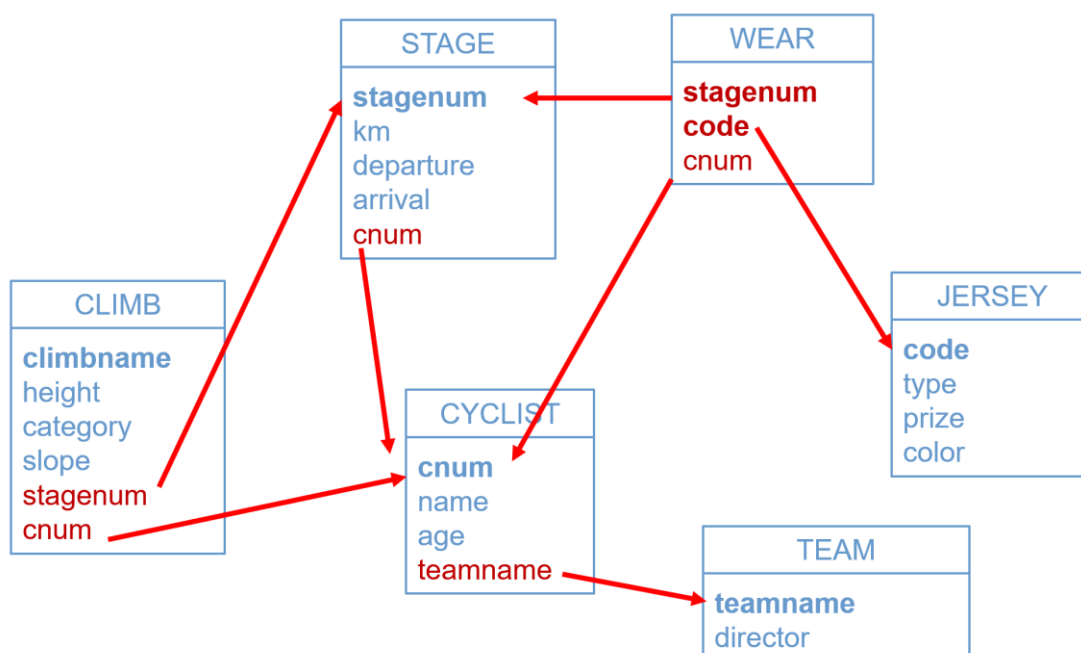
color: color of the jersey.

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 Sciacchi
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 Onís
20	Segovia
21	Destilerías 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
-----
Igalada                        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 Sciacchi
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 Pérez	Artiach
Lonrenzo Sciacchi	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}

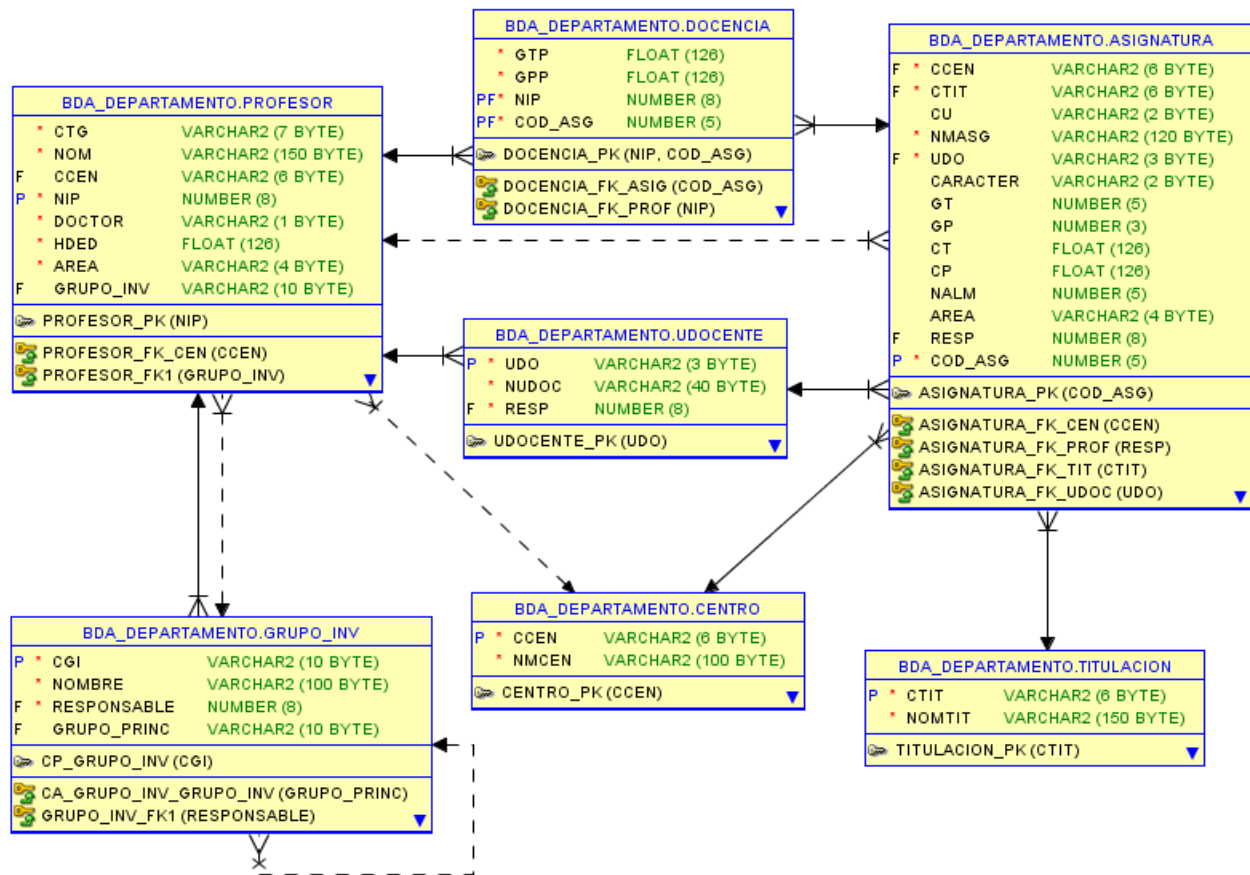
FK:{resp}→Profesor(nip)

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 area 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 EXERCISES¹

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                          Gorris 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	Pedrerera 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 NMSG

```

-----
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 (theory) (*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.
```