**LEVEL EASY**

**1.- Employees and departments.**

Create the relational model of the following hypothetical scenario:

A. An employee (eid, ename, esurname, eaddress, ephone) works in a concrete department (did, dname).

B. An employee can have another employee as his/her manager.

 EMPLOYEE: eid, ename, esurname, eaddress, ephone, did\*, eid\_manaer\*

DEPARTMENTS: did, dname

**2.- Companies.**

Create the relational model of the following hypothetical scenario:

A. An employee (eid, ename, esurname, eaddress, ephone) works in one or more companies (cid, cname).

B. An employee can have another employee as his/her manager.

C. Every company has an employee working as a manager.

EMPLEADO: eid, ename, esurname, eaddress, ephone, eid\_gerente\*

TRABAJA: eid\*, cid\*

EMPRESA: cid, cname, eid\_gerente\*

**3.- Companies with departments.**

Create the relational model of the following hypothetical scenario:

A.    An employee (eid, ename, esurname, eaddress, ephone) works for one or more departments (did, dname).

B. Every department belongs to a company (cid, cname).

1. A department can have an employee as its manager.

D. Every company has an employee working as a general manager of the company.

EMPLEADO: eid, ename, esurname, eaddress, ephone, did\*

TRABAJA: eid\*, did\*, id\_manager\*

DEPARTAMENTO: did, dname

EMPRESA: cid, cname, id\_manager\*

**4.- Companies with departments enhanced.**

What should you do in the last exercise to keep the dates when an employee started and finished working in a department?

TRABAJA: eid\*, did\*, start\_date, end\_date

**5.- Hierarchical organization structure.**

Create the relational model of the following hypothetical scenario:

A.    A group (gid, gname) has several companies (cid, cname), whereas a company belongs to one group.

B.     Companies are connected by a hierarchical structure; each subsidiary company is assigned to exactly one company of the next higher hierarchy level, the parent company.

C.     Each company has several plants (pid, pname, paddress, phone); a plant belongs to one company only.

D.    A plant produces many items (inumber, iname). An item is only produced in one of the plants.

GRUPO: gid, gname

EMPRESA: cid, cname, gidgrupo\*, gid\_otraempresa\*

PLANTAS: pid, pname, paddress, pphone, cid\*

ARTICULOS: inumber, iname, pid\*

**6.- Hierarchical organization structure enhanced.**

What should you do in the last exercise if items could be manufactured in more than one plant?

 PRODUCE: inumbers\_items\*, pid\_plantas\*

**7.- Customer discounts.**

Create the relational model of the following hypothetical scenario:

A.    Customers (cnum, cname, clastname, caddress, cphone) get discounts (dcode, damount) on items (inum, iname) depending on the date when they order them.

B.     Items belong to a single category (cid, cname).

C.     When a customer order items discounts can be applied to them.

 CUSTOMER: cnum, cname, clastname, caddress

DISCOUNTS: doce, damount

GET: cnum\*, doce\*

APPLY: doce\*, inum

ITEMS: inum, iname, cnum\*, cidcategory\*

CATEOGORY: cid, cname

**8.- Items and vendors.**

Create the relational model of the following hypothetical scenario:

A.    Items (inum, iname) belong to a category (cid, cname). There is a hierarchical classification system of item categories. Each item category has exactly a single parent category.

B.     Items have a unit of measure (uomid, uomname). An item is uniquely assigned to a UOM.

C.     A specific item is supplied by more than one vendor (vid, vname, vaddress, vphone) only. Vendors supply several items.

 ARTICULO: inum, iname,

CATEGORIA: cid, cname, cid\_otracategoria\*, inum\*

UnidadMedida: uomid, uomname, eid\*

VENDEDOR: vid, vname, vaddress, vphone

Art\_Vend: vid\*, eid\*

**9.- Simple flight database.**

Create the relational model of the following hypothetical scenario:

A.    An airplane (anum, amodel) is assigned to several flights (fcode, fdeparturedate, fdeparturetime, farrivaldate, farrivaltime). A flight is assigned to only one airplane.

B.     A pilot (plicensenumber, pname, psurname, paddress, pphone) can perform several flights. A flight is performed by several (normally at least two) pilots.

AVION: anum, modelo

VUELOS: fcode, fdepartmedate, farrivaldate, farrivaltime, anum\*

PILOTO: plicensenumber, pname, psurname, paddress, pphone

VULO\_PILOTO: plicensenumber\*, fcode\*

**10. Webtrainer.**

A. Our webtrainer includes many exercises. The type of an exercise is either ERM or EPC. The exercises also have a description. An exercise can only be of one type. Each exercise has a level of difficulty (a number).

B. An exercise consists of several contents. Each content (e.g. partial question, partial solution,...) belongs to one exercise.

C. Each exercise belongs to a category. One category (sales & distribution, master data,...) can be assigned to several exercises.

EJERCICIO: número, descripción, idcategoria\*

CATEGORIA: id

CONTENIDO: id, número\_ejercicio\*

**LEVEL MEDIUM**

**11.- Project management.**

A.A project consists of several work packages.

B. Work packages are structured into a hierarchical work breakdown structure, whereby a work package can be subdivided into several further work packages, while each work package is subordinated to exactly one work package.

C. One or more employees are assigned to each work package, whereby employees can also be employed in several work packages. Employees have certain qualifications and are uniquely assigned to departments.

D. A work package can require one or more qualification.

E. Each project has an employee as a responsible person; however, an employee can also have responsibility for several projects.

PROYECTO: id, idempleado\*

PAQUETE: id, idproyecto\*, idpaquetesuperior\*

EMPLEADO: DNI, codedepartamento\*

CUALIFICACIONES: id

DEPARTAMENTO: id,

PAQUETE\_CUALIFI: idpaquete\*, idcualificacion\*

EMPLEADO\_PAQUETE: DNIempleado\*, idpaquete\*

EMPLEADO\_CUALIFIC: DNIempleado\*, idcualificacion\*

**13.- Borja League.**

We want to keep data about a simple local football league. We have teams and these teams have players. We want to keep also information about matches (a local team versus a visitor teams with a local score and a visitor score).

EQUIPO: id

JUGADOR: id, idequipo\*

PARTIDO: id, idequipoLocal\*, idequipoVisitante\*, scorelocal, scorevisitante

**14.- Borja League with Seasons.**

Do the last exercise adding season (eg. Season 2018/2019, Season 2019/2020, etc.). You must consider that a player could belong to different teams in different seasons… And maybe there are different teams in different seasons...

TEMPORADA: id

EQUIPO: id

JUGADOR: id

PARTIDO: id, idlocal\*, idvisitante\*,

JUEGA: idtemporada\*, idequipo\*, idjugadores\*

**15.- Company and departments enhanced.**

A company wants to keep information about the departments in which it is divided and about the heads of those departments. Moreover, it must be kept data about the projects that are carried out currently, employees that participate in them and who coordinates them.

You must consider:

A.    Each department can only have a head and an employee can be head of many departments.

B.     Each project is coordinated by a single employee who can be coordinator of several projects.

C.     Each employee can work in a single department.

D.    Each employee can work on several projects at once.

E.     You must select the attributes that you consider.

PROJECT: id, name, descrption, idcoordinador\*

WORK: idproject\*, idemployee\*

EMPLOYEE: id, name, surname, iddepartment\*

DEPARTMENT: id, name, description, idemployee\_head\*

**16.- Census.**

We want to save the data of towns/villages in Spain and its inhabitants. We must consider:

A.    Each person can only be registered in a single house (their residence).

B.     Each person can own more than one house and one house can have more than one owner.

C.     You want to store of each person his/her NIF, name, surname, and date of birth. Of the house you want to store cadastral reference, street, number, floor and door.

D.    Each person can depend on another person, who will be the head of the family.

E.     Each house is located in a town. You want to store of each town its name.

F.      The towns are located in provinces and the provinces are located in regions. You want to store of provinces and regions their name.

PERSON: nif, name, surname, date\_of\_birth, nifhead\*, castas\_ref\*

HOUSE: catastral\_reference, street, number, floor, door

OWN: nifperson\*, catastral\_reference\*

TOWN: id, name

PROVINCE: id, name, id\_region\*

REGION: id, name

**17.- Music Database.**

We want to keep information about digital music.  We must consider:

1. A song is represented by a track. We want to keep the name of the track, their composers (zero, one, or many), bytes of the file, path to the file in the operating system, the length of the song in miliseconds, their media type (mp3, aac, avi, etc.). Every track (or song) has also a single genre. We want to keep the name of the composers and the name of the genre.

B.     There are also albums (we want to keep its title). An album could be created by one or many artists (we want to know their name). Obviously, an album is formed by one or many tracks. The tracks are ordered inside the album.

C.     We want to keep also information about playlists (basically their title). A playlist is an ordered list of tracks.

ARTISTA: id, nombre

ALBUM: id, título

ART\_ALB: idartista\*, idalbum\*

TRACK: id, nombre, bytes, path, duración, id\_album\*, id\_genero\*, id\_tipomedio\*

COMPOSITORES: id

COM\_TRACK: idtrack\*, idcompositor\*

GÉNERO: id

PLAYLIST: id, título

TRACK\_PLAY: idplaylist\*, idtrack\*

TIPO\_MEDIA: id

**18.- IMDB**

We want to keep information about movies. About these films, we want to keep its name, year of premiere and a rank (a number from 0 to 10). Movies can have one or more directors. Obviously actors are also important, we want to keep their roles in different movies. Finally, a movie can have many genres.

DIRECTOR: id, nombre, apellidos, experiencia

MOVIE: id, nombre, año\_estreno

ACTOR: id, nombre, apellidos, fecha\_nacimiento

GÉNERO: id

DIRECTOR\_PELICULA: iD\_director\*, id\_pelicula\*

ACTOR\_PELICULA: id\_película\*, id\_actor\*, role

GENERO\_PELICULA: id\_género\*, id\_pelicula\*