Task list No. 1 for project laboratories 1, 2, 3

Task 0. In a few sentences, an outline of a fragment of reality is presented:

After many years of independence, cats of both sexes hunting in the village of Wólka Mała decided to organize themselves. So a herd was created, commanded by the greatest mouse hunter with the nickname Tiger. As part of the herd, under the leadership of the Tiger, an informal hierarchy of cats formed naturally - each cat knew which other cat it was subordinated to. The herd was additionally, administratively, divided into several, having a unique number and name, of the bands, each commanded by an outstanding mouse hunter nominated by the Tiger. Each band was given an independent area where the band's cats could organize their hunts. The Tiger and members of his band, due to their high position, had the privilege of hunting in the entire area controlled by the herd. For identification purposes, each cat was required to choose a unique nickname. The cat should also have a name. It was agreed that a member of the herd would be rewarded with a ration of mice every month for his contribution to maintaining the entire herd. This ration will be adequate to the function performed in the feline community. This function will define the lower and upper limit of mice ration. Regardless of the size of the mice ration, the herd leader, for special merits, will be able to grant the cat, at his own discretion, additional mice ration. Cats hunted happily in their assigned areas, but from time to time there were incidents with representatives of other breeds. The participants of incidents, identified by their name, automatically became the personal enemies of the wronged cats and their degree of hostility and their species were carefully noted. As a warning to cats and infamy for enemies all these events were described (mandatory with their date). Assuming, however, that a real hunter can avoid known enemies, only the first cat incident with a specific enemy was recorded. Over time, cats noticed that handed to enemies bribes are able to reduce their alertness. For this reason, the sort of bribe, preferred by each enemy, was noted.

As a result of the analysis of this fragment or reality, the following database schema was created, consisting of five relations (**Bands**, **Functions**, **Cats**, **Enemies**, **Incidents)**:

Bands:

```
band_no                 NUMBER(2)               primary key
name                    VARCHAR2(20)            mandatory
attribute
site                    VARCHAR2(15)            unique attribute
band_chief              VARCHAR2(15)            unique foreign key
from Cats relation (attribute nickname)
```

Functions:

```
function                VARCHAR2(10)            primary key
min_mice                NUMBER(3)               value > 5
max_mice                NUMBER(3)               200 > value >=
min_mouse
```

Enemies:

```
enemy_name              VARCHAR2(15)            primary key
hostility_degree        NUMBER(2)               value from 1
to 10
species                 VARCHAR2(15)
bride                   VARCHAR2(20)
```

Cats:

```
name                    VARCHAR2(15)            mandatory
attribute
```

```
gender                VARCHAR2(1)           two values: 'M'
and 'W'
nickname              VARCHAR2(15)          primary key
function              VARCHAR2(10)          foreign key from
Function relation (attribute function)
chief                 VARCHAR2(15)          foreign key from
Cats relation (attribute  nickname)
in_herd_since         DATE                  default value:
current date value (SYSDATE)
mice_ration           NUMBER(3)
mice_extra            NUMBER(3)
band_no               NUMBER(2)             foreign key from Bands
relation (attribute band_no)
```

Incidents:

```
nickname              VARCHAR2(15)          partial primary
key, foreign key from Cats relation (attribute nickname)
enemy_name            VARCHAR2(15)          partial primary
key, foreign key from Enemies relation (attribute enemy_name)
incident_date         DATE                  mandatory
attribute
incident_desc         VARCHAR2(50)
```

Please write a script that creates the above relations in the database. The lack of information about the attribute mandatory means the default nonmandatory value. Please define all potential column constraints as column ones. The definitions of all constraints are to be a component of the CREATE TABLE command (do not use the ALTER TABLE command, with one exception, when this will be the only solution to the problem). Run the script created in the SQL Developer application. Then create a script that fills the relations with the data presented below and also run it in the SQL Developer application.

Data for the relation Cats(name, gender, nickname, function, chief, in_herd_since, mice_ration, mice_extra, band_no)

```
'JACEK','M','CAKE','CATCHING','BALD','2008-12-01',67,NULL,2
'BARI','M','TUBE','CATCHER','BALD','2009-09-01',56,NULL,2
'MICKA','D','LOLA','NICE','TIGER','2009-10-14',25,47,1
'LUCEK','M','ZERO','CAT','HEN','2010-03-01',43,NULL,3
'SONIA','D','FLUFFY','NICE','ZOMBIES','2010-11-18',20,35,3
'LATKA','D','EAR','CAT','REEF','2011-01-01',40,NULL,4
'DUDEK','M','SMALL','CAT','REEF','2011-05-15',40,NULL,4
'MRUCZEK','M','TIGER','BOSS',NULL,'2002-01-01',103,33,1
'CHYTRY','M','BOLEK','DIVISIVE','TIGER','2002-05-05',50,NULL,1
'KOREK','M','ZOMBIES','THUG','TIGER','2004-03-16',75,13,3
'BOLEK','M','BALD','THUG','TIGER','2006-08-15',72,21,2
'ZUZIA','D','FAST','CATCHING','BALD','2006-07-21',65,NULL,2
'RUDA','D','LITTLE','NICE','TIGER','2006-09-17',22,42,1
'PUCEK','M','REEF','CATCHING','TIGER','2006-10-15',65,NULL,4
'PUNIA','D','HEN','CATCHING','ZOMBIES','2008-01-01',61,NULL,3
'BELA','D','MISS','NICE','BALD','2008-02-01',24,28,2
'KSAWERY','M','MAN','CATCHER','REEF','2008-07-12',51,NULL,4
'MELA','D','LADY','CATCHER','REEF','2008-11-01',51,NULL,4
```

Data for the relation Bands(band_no, name, site, band_chief)

```
1,'SUPERIORS','WHOLE AREA','TIGER'
2,'BLACK KNIGHTS','FIELD','BALD'
3,'WHITE HUNTERS','ORCHARD','ZOMBIES'
4,'PINTO HUNTERS','HILLOCK','REEF'
5,'ROCKERS','FARM',NULL
```

Data for the relation Functions (function, min_mice, max_mice)

```
'BOSS',90,110
'THUG',70,90
'CATCHING',60,70
'CATCHER',50,60
'CAT',40,50
'NICE',20,30
'DIVISIVE',45,55
'HONORARY',6,25
```

Data for the relation Enemies(enemy_name, hostility_degree, species, bribe)

```
'KAZIO',10,'MAN','BOTTLE'
'STUPID SOPHIA',1,'MAN','BEAD'
'UNRULY DYZIO',7,'MAN','CHEWING
GUM'
'DUN',4,'DOG','BONE'
'WILD BILL',10,'DOG',NULL
'REKS',2,'DOG','BONE'
'BETHOVEN',1,'DOG','PEDIGRIPALL'
'SLYBOOTS',5,'FOX','CHICKEN'
'SLIM',1,'PINE',NULL
'BASIL',3,'ROOSTER','HEN TO THE HERD'
```

Data for the relation Incidents(nickname, enemy_name, incident_date, incident_desc)

```
'TIGER','KAZIO','2004-10-13','HE HAS TRYING TO STICK ON THE FORK'
'ZOMBIES', 'UNRULY DYZIO','2005-03-07','HE FOOTED AN EYE FROM
PROCAST'
'BOLEK','KAZIO','2005-03-29','HE CLEANED DOG'
'FAST', 'STUPID SOPHIA' ,'2006-09-12','SHE USED THE CAT AS A CLOTH'
'LITTLE','SLYBOOTS','2007-03-07','HE RECOMMENDED HIMSELF AS A
HUSBAND'
'TIGER','WILD BILL','2007-06-12','HE TRIED TO KILL'
'BOLEK','WILD BILL','2007-11-10','HE BITE THE EAR'
'MISS','WILD BILL','2008-12-12','HE BITCHED'
'MISS','KAZIO','2009-01-07','HE CAUGHT THE TAIL AND MADE A WIND'
'LADY','KAZIO','2009-02-07','HE WANTED TO SKIN OFF'
'MAN','REKS','2009-04-14','HE BARKED EXTREMELY RUDELY'
'BALD','BETHOVEN','2009-05-11','HE DID NOT SHARE THE PORRIDGE'
'TUBE','WILD BILL','2009-09-03','HE TOOK THE TAIL'
'CAKE','BASIL','2010-07-12','HE PREVENTED THE CHICKEN FROM BEING
HUNTED'
'FLUFFY','SLIM','2010-11-19','SHE THREW CONES'
'HEN','DUN','2010-12-14','HE CHASED'
'SMALL','SLYBOOTS','2011-07-13','HE TOOK THE STOLEN EGGS'
'EAR', 'UNRULY DYZIO','2011-07-14','HE THREW STONES'
```

The database describing the population of cats will be the basis of all tasks on the lists and also the basis of examples in the lecture.

The INSERT command for filling relations with data will be presented later in the lecture, hence the fragment of the lecture on the syntax of this command is given below.

The INSERT command is used to insert one or more rows directly or indirectly into an existing relation. The latter case occurs when insertion takes place through a simple view, also known as a modifiable perspective (both concepts will be presented later in the lecture). The syntax for the INSERT command is as follows:

INSERT INTO RelationViewName [({attribute [, …]})]
{**VALUES** ({value [, …]})} | subquery

The list of attributes specified after comma specifies the names of the attributes that will get values. All attributes not listed must be optional (NULL) or have a default value defined (specified in the CREATE TABLE command - DDL component of SQL language). The lack of a list of attributes in the command indicates that all attributes of the relation will be filled in the order of their definition in the CREATE TABLE command. Data can be specified explicitly in the VALUES clause through a list of values specified after comma or implicitly through the subquery. In the first case into the relation one row is inserted, in the second case, as many rows as the rows return the subquery. The number of explicitly entered values as well as the number of values returned by the subquery must be equal to the number of attributes specified in the attribute list (if any) and the types of these values must match the types of the respective attributes.

There is also a version of the INSERT command that allows you to insert multiple rows as part of one such command. The short version of this command has the following syntax:

INSERT ALL {INTO RelationViewName [({attribute [, …]})]
VALUES ({value [, …]}) [...]}
{SELECT * FROM Dual }| subquery

The above version of the INSERT command reduces the time to load data into the database (only one connection to the database) and can be used to batch rewrite data from one database to another, when it is certain that the source data is correct. In this version, it is also possible to enter rows into many different relations with one command. The subquery returning rows to insert can also be data source. In this case, the values in the VALUES clause will be the names of the expressions (their aliases) or the names of the attributes returned by the subquery.

Task 1. Find the names of enemies who participated in incidents in 2009.

```
Enemy           Fault description
--------------- ------------------------------------------
KAZIO           HE CAUGHT THE TAIL AND MADE A WIND
KAZIO           HE WANTED TO SKIN OFF
```

```
REKS             HE BARKED EXTREMELY RUDELY
BETHOVEN         HE DID NOT SHARE THE PORRIDGE WILD BILL HE TOOK
THE TAIL
```

Task 2. Find all females cats who joined the herd between September 1, 2005. and July 31, 2007.

```
NAME            FUNCTION   WITH AS FROM
--------------- ---------- -------------------------
ZUZIA           CATCHING   2006-07-21
RUDA            NICE       2006-09-17
```

Task 3. Display the names, species and degrees of hostility of incorruptible enemies. Results sort in ascending order of hostility degree.

```
ENEMY           SPECIES         HOSTILITY DEGREE
--------------- --------------- ----------------------
SLIM            PINE            1
WILD BILL       DOG             10
```

Task 4. Display data on male cats collected in one column of the form:

```
JACEK called CAKE (fun. CATCHING) has been catching mice in band 2 since 2008-
12-01
```

The results should be ordered in descending order date entry to the herd. In the case of the same date joining the herd, sort the results alphabetically by nickname.

```
ALL_ABOUT_MALE_CATS
--------------------------------------------------------------------------------
------
DUDEK called SMALL (fun. CAT) has been catching mice in band 4 since 2011-05-15
LUCEK called ZERO (fun. CAT) has been catching mice in band 3 since 2010-03-01
BARI called TUBE (fun. CATCHER) has been catching mice in band 2 since 2009-09-01
JACEK called CAKE (fun. CATCHING) has been catching mice in band 2 since 2008-12-01
KSAWERY called MAN (fun. CATCHER) has been catching mice in band 4 since 2008-07-12
PUCEK called REEF (fun. CATCHING) has been catching mice in band 4 since 2006-10-15
BOLEK called BALD (fun. THUG) has been catching mice in band 2 since 2006-08-15
KOREK called ZOMBIES (fun. THUG) has been catching mice in band 3 since 2004-03-
16
CHYTRY called BOLEK (fun. DIVISIVE) has been catching mice in band 1 since 2002-
05-05
MRUCZEK called TIGER (fun. BOSS) has been catching mice in band 1 since 2002-01-
01
```

Task 5. Find the first occurrence of the letter A and the first occurrence of the letter L in each nickname and then replace the letters found with # and %, respectively. Use functions that work on strings. Only consider nicknames that contain both letters.

```
NICKNAME        After replacing A and L
--------------- --------------------------------------------------
------
BALD            B#%D
LADY            %#DY
LOLA            %OL#
SMALL           SM#%L
```

Task 6. Display the names of cats with at least 11 years of experience (which additionally joined the herd from March 1 to September 30), dates of their joining the herd, initial ration of mice (current ration, due to its increase after half a year of joining of cat to the herd, is 10% higher than the initial ration), the date of the mentioned increase by 10% and the current mice ration. Use appropriate functions working on dates. In the solution presented below, the current date is 04.04.2020.

```
NAME          In herd         Ate          Increase        Eat
------------- --------------- ------------ --------------- ----------
--
KOREK         2004-03-16      68           2004-09-16      75
BOLEK         2006-08-15      65           2007-02-15      72
ZUZIA         2006-07-21      59           2007-01-21      65
KSAWERY       2008-07-12      46           2009-01-12      51
CHYTRY         2002-05-05       45            2002-11-05
50
RUDA           2006-09-17       20            2007-03-17
22
```

Task 7. Display names, quarterly mice rations, and quarterly rations extra of all cats in which the ration of mice is greater than twice the ration extra but not smaller than 55.

```
NAME            MICE QARTERLY          EXTRA QARTERLY
--------------- ---------------------- ----------------------
MRUCZEK         309                    99
KOREK           225                    39
BOLEK           216                    63
JACEK           201                    0
PUCEK           195                    0
ZUZIA           195                    0
PUNIA           183                    0
BARI            168                    0
```

Task 8. Display for each cat (name) the following information about the total annual consumption of mice: the value of total consumption if it exceeds 660, 'Limit' if it is equal to 660, 'Below 660' if it is less than 660. Do not use set operators (UNION , INTERSECT, MINUS).

```
NAME            Eats annually
--------------- ---------------------------------------
BARI            672
BELA            Below 660
BOLEK           1116
CHYTRY          Below 660
DUDEK           Below 660
JACEK           804
KOREK           1056
KSAWERY         Below 660
LATKA           Below 660
LUCEK           Below 660
MELA            Below 660
MICKA           864
MRUCZEK         1632
PUCEK           780
```

```
PUNIA           732
RUDA            768
SONIA           Limit
ZUZIA
780
```

Task 9. After a few months suspending the issuance of mice, caused by the crisis, the Tiger resumed today payments on a in accordance with the principle that cats that joined the herd in the first half of the month (with15 day) receive the first ration of mice (after the break) on last Wednesday of this month, while cats that joined the herd after 15 day of the month receive their first ration of mice (after the break) on the last Wednesday of the next month. In the following months, mice are issued to all cats on the last Wednesday of month. Display for each cat its nickname, date of entry to the herd and date of the first ration of mice after the break, assuming that the current date is October 27 and 29, 2020.
October 27

NICKNAME	IN HERD	PAYMENT
TIGER	2002-01-01	2020-10-28
BOLEK	2002-05-05	2020-10-28
ZOMBIES	2004-03-16	2020-11-25
FAST	2006-07-21	2020-11-25
BALD	2006-08-15	2020-10-28
LITTLE	2006-09-17	2020-11-25
REEF	2006-10-15	2020-10-28
HEN	2008-01-01	2020-10-28
MISS	2008-02-01	2020-10-28
MAN	2008-07-12	2020-10-28
LADY	2008-11-01	2020-10-28
CAKE	2008-12-01	2020-10-28
TUBE	2009-09-01	2020-10-28
LOLA	2009-10-14	2020-10-28
ZERO	2010-03-01	2020-10-28
FLUFFY	2010-11-18	2020-11-25
EAR	2011-01-01	2020-10-28
SMALL	2011-05-15	2020-10-28

October 29

NICKNAME	IN HERD	PAYMENT
TIGER	2002-01-01	2020-11-25
BOLEK	2002-05-05	2020-11-25
ZOMBIES	2004-03-16	2020-11-25
FAST	2006-07-21	2020-11-25
BALD	2006-08-15	2020-11-25
LITTLE	2006-09-17	2020-11-25
REEF	2006-10-15	2020-11-25
HEN	2008-01-01	2020-11-25
MISS	2008-02-01	2020-11-25
MAN	2008-07-12	2020-11-25
LADY	2008-11-01	2020-11-25
CAKE	2008-12-01	2020-11-25
TUBE	2009-09-01	2020-11-25
LOLA	2009-10-14	2020-11-25

```
ZERO            2010-03-01              2020-11-25
FLUFFY          2010-11-18              2020-11-25
EAR             2011-01-01              2020-11-25
SMALL           2011-05-15              2020-
11-25
```

Task 10. Attribute named nickname in the Cats table is the primary key of this table. Check if all the nicknames are really different. Do the same for the attribute named chief.

```
Uniqueness of the nickname
--------------------------
      BALD - unique
     BOLEK - unique
      CAKE - unique
       EAR - unique
      FAST - unique
    FLUFFY - unique
       HEN - unique
      LADY - unique
    LITTLE - unique
      LOLA - unique
       MAN - unique
      MISS - unique
      REEF - unique
     SMALL - unique
     TIGER - unique
      TUBE - unique
      ZERO -
unique
   ZOMBIES -
unique
Uniqueness of the chief
-----------------------
      BALD - non-unique
       HEN - unique
      REEF - non-unique
     TIGER - non-unique
   ZOMBIES - non-
unique
```

Task 11. Find nicknames of cats with at least two enemies.

```
Nickname        Number of enemies
--------------- ----------------------
BOLEK           2
MISS            2
TIGER           2
```

Task 12. Find the maximum total ration (total ration = sum of mice ration and mice extra) of mice for all function groups (excluding BOSS function and male cats) in which have an average total ration of mice greater than 50.

```
--------------- -- -------- ---------- ------------- ------ ---------
-----
Number of cats=  1 hunts as CATCHER    and eats max.  51.00 mice per
month
```

```
Number of cats=  2 hunts as CATCHING   and eats max.  65.00 mice per
month
Number of cats=  4 hunts as NICE       and eats max.  72.00 mice per
month
```

Task 13. Display the minimum ration of mice for each band by gender.

```
Band No                Gender Minimum ration
---------------------- ------ ----------------------
3                      M      43
4                      W      40
4                      M      40
1                      M      50
2                      M      56
1                      W      22
2                      W      24
3                      W      20
```

Task. 14. Display information about male cats having in the hierarchy of superiors the male chief with function THUG (also display the data of this supervisor). The data of cats subordinate to a particular chief are to be displayed according to their place in the hierarchy of subordination.

```
Level  Nickname        Function   Band No
------ --------------- ---------- ----------------------
      1    BALD            THUG       2
      2    CAKE            CATCHING   2
  2    TUBE            CATCHER    2
  1    ZOMBIES         THUG       3
      3    ZERO            CAT        3
```

Task 15. Present information about the subordination of cats possessing an extra payment (mice_extra) so that the name of the cat standing highest in the hierarchy is displayed with the smallest indentation and the remaining names with the indentation appropriate to the place in the hierarchy.

```
Hierarchy                                  Nickname of the chief
Function
---------------------------------------- -------------------- ------
----
0                MRUCZEK                   Master yourself      BOSS
===>1                BOLEK                 TIGER                THUG
===>===>2                BELA              BALD                 NICE
===>1                RUDA                  TIGER                NICE
===>1                MICKA                 TIGER                NICE
===>1                KOREK                 TIGER                THUG
===>===>2                SONIA             ZOMBIES              NICE
```

Task 16. Display the path of all chiefs specified by nicknames, from concrete cat nickname through all successive superiors to the main chief. Do it for male cats, without mice extra, belonging to herd more than eleven years (in the solution below, the current date is assumed as 06.04.2020).

```
Path of chiefs
```

```
------------------------------
BOLEK
    TIGER
CAKE
    BALD
        TIGER
MAN
    REEF
        TIGER
REEF
    TIGER
```