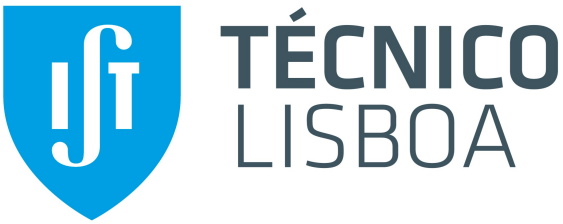

MEEC

Sistemas de Informação e Bases de Dados

Implementing the Database

Project - Part 2

Grup 57

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1 Queries

1.1

```
select distinct A.name, P.name, A.species_name, A.age
from person P, animal A, consult C
where P.name in (select name from person where VAT_owner = P.VAT and VAT_vet = 583057692)
and A.name = C.name and VAT_vet in
  (select VAT
   from person
   where name='John Smith');
```

```
+--------+---------------+--------------------+------+
| name   | name          | species_name       | age  |
+--------+---------------+--------------------+------+
| Daisy  | John Wick     | beagle             |    4 |
| Fang   | Rubeus Hagrid | neapolitan mastiff |   17 |
| Hedwig | Harry Potter  | snowy owl          |   17 |
| Iago   | Jafar         | parrot             |   26 |
| Odie   | Jon Arbuckle  | beagle             |   14 |
+--------+---------------+--------------------+------+
5 rows in set (0.00 sec)
```

1.2

```
select name, reference_value
from indicator
where reference_value > 100 and units='mg'
order by reference_value desc;
```

```
+-------------+-----------------+
| name        | reference_value |
+-------------+-----------------+
| hemoglobine |          200.00 |
| glucose     |          130.00 |
+-------------+-----------------+
2 rows in set (0.00 sec)
```

1.3

```
select animal.name, person.name, animal.species_name, animal.age from animal, person
    where animal.VAT=person.VAT
    and animal.name in
    (select name from consult where consult.weight>30 group by animal.name having
    max(consult.date_timestamp)
     union
     select name from consult where consult.obj like '%obese%');
```

```
+-----------+---------------+---------------------------+------+
| name      | name          | species_name              | age  |
+-----------+---------------+---------------------------+------+
| Buckbeack | Rubeus Hagrid | hippogriff                |   17 |
| Garfield  | Jon Arbuckle  | exotic short hair persian |   14 |
| Scooby    | Shaggy Rogers | great dane                |    8 |
+-----------+---------------+---------------------------+------+
3 rows in set, 13 warnings (0.00 sec)
```

1.4

```
select P.name
from consult C, person P
where P.VAT=VAT_client and VAT_client not in (select VAT from animal);
```

```
+--------------+
| name         |
+--------------+
| Lois Griffin |
+--------------+
1 row in set (0.00 sec)
```

1.5

```
select prescription.code, count(prescription.name_med)
from prescription
group by prescription.code
order by count(prescription.name_med) ASC;
```

```
+------+------------------------------+
| code | count(prescription.name_med) |
+------+------------------------------+
| blk  |                            1 |
| r    |                            1 |
| y    |                            1 |
| a    |                            1 |
| b    |                            1 |
+------+------------------------------+
5 rows in set (0.00 sec)
```

1.6

```
select
(select count(*) from procedures where year(procedures.date_timestamp)='2017')/
(select count(*) from consult where year(consult.date_timestamp)='2017') as avg_pro,
(select count(*) from assist_participation where
year(assist_participation.date_timestamp)='2017')/
(select count(*) from consult where year(consult.date_timestamp)='2017') as avg_asist,
(select count(*) from consultdiagnosis where year(consultdiagnosis.date_timestamp)='2017')/
(select count(*) from consult where year(consult.date_timestamp)='2017') as avg_diag,
(select count(*) from prescription where year(prescription.date_timestamp)='2017')/
(select count(*) from consult where year(consult.date_timestamp)='2017') as avg_pres;
```

```
+---------+-----------+----------+----------+
| avg_pro | avg_asist | avg_diag | avg_pres |
+---------+-----------+----------+----------+
|  0.4444 |    1.0000 |   1.0000 |   0.4444 |
+---------+-----------+----------+----------+
1 row in set (0.01 sec)
```

1.7

```
select tab.species_name, tab.name, max(tab.cnt)
from
    (select animal.species_name, diagnosis_code.name, count(diagnosis_code.name) as cnt
     from animal, generalization_species, consultdiagnosis, diagnosis_code
     where animal.species_name=generalization_species.name1
     and generalization_species.name2='dog'
     and diagnosis_code.code=consultdiagnosis.code
     and consultdiagnosis.name=animal.name
     group by diagnosis_code.name, animal.species_name) as tab
group by tab.species_name;
```

```
+--------------------+------------------------+--------------+
| species_name       | name                   | max(tab.cnt) |
+--------------------+------------------------+--------------+
| beagle             | everything ok          |            2 |
| great dane         | articulations problems |            1 |
| labrador retriever | something broken       |            2 |
| neapolitan mastiff | everything ok          |            1 |
+--------------------+------------------------+--------------+
4 rows in set (0.00 sec)
```

1.8

```
select person.name
from person
where person.VAT in (select VAT from veterinary where VAT in
(select VAT_owner from consult union select VAT_client from consult)
union select VAT from assistant where VAT in (select VAT_owner from
consult union select VAT_client from consult));
```

```
+------------------+
| name             |
+------------------+
| Shaggy Rogers    |
| Hermione Granger |
| Rubeus Hagrid    |
| Peter Griffin    |
| Shrek            |
| John Smith       |
+------------------+
6 rows in set (0.00 sec)
```

1.9

```
select name, address_street, address_city, address_zip
from person
where VAT in
    (select VAT from animal where animal.species_name in
      (select name1
       from generalization_species
       where name2='bird'))
    and VAT not in
      (select VAT
       from animal
       where animal.species_name in
        (select name1
         from generalization_species
         where name2 not in
          (select name2
           from generalization_species
           where name2='bird')));
```

```
+-------------------+-----------------------------+--------------+-------------+
| name              | address_street              | address_city | address_zip |
+-------------------+-----------------------------+--------------+-------------+
| Luis Filipe Vieira | Av Eusebio da Silva Ferreira | Lisbon       | 1000-120    |
| Harry Potter      | Privet Drive                | London       | 1002-345    |
| Jafar             | Pharaoh Street              | Lisbon       | 1000-671    |
+-------------------+-----------------------------+--------------+-------------+
3 rows in set (0.00 sec)
```

2 Indexes

For both queries we chose a non clustered index. We concluded that sorting the table wouldn't help the query to be faster, therefore a clustered index would be a little pointless, but having a pointer to a non primary key would help so the non clustered index made more sense.

For the first query we indexed the non primary key VAT_vet as it was the only non primary key asked in the query, and the primary keys need not be indexed.

For the second query we used the same line of thought for both the non primary keys reference_value and units.

2.1

```
create index ix_consult_vet on consult (VAT_vet);
```

```
select distinct animal.name, person.name, animal.species_name, animal.age
from person, animal, consult
use index (ix_consult_vet)
where VAT_vet in (select VAT from person where name='John Smith')
and person.name in (select name from person where VAT_owner=person.VAT)
and animal.name=consult.name;
```

```
+--------+---------------+--------------------+------+
| name   | name          | species_name       | age  |
+--------+---------------+--------------------+------+
| Daisy  | John Wick     | beagle             |    4 |
| Fang   | Rubeus Hagrid | neapolitan mastiff |   17 |
| Hedwig | Harry Potter  | snowy owl          |   17 |
| Iago   | Jafar         | parrot             |   26 |
| Odie   | Jon Arbuckle  | beagle             |   14 |
+--------+---------------+--------------------+------+
5 rows in set (0.00 sec)
```

```
set foreign_key_checks=0;
drop index ix_consult_vet on consult;
set foreign_key_checks=1;
```

2.2

```
create index ix_ref_value_units on indicator (reference_value, units);
```

```
select name, reference_value
from indicator
use index (ix_ref_value_units)
where units='mg'
and reference_value>=100
order by reference_value desc;
```

```
+-------------+-----------------+
| name        | reference_value |
+-------------+-----------------+
| hemoglobine |          200.00 |
| glucose     |          130.00 |
+-------------+-----------------+
2 rows in set (0.00 sec)
```

```
set foreign_key_checks=0;
drop index ix_ref_value_units on indicator;
set foreign_key_checks=1;
```

3 Updates

3.1

```
MySQL [ist181161]> select * from person;
+-----------+--------------------+------------------------------+--------------+-------------+
| VAT       | name               | address_street               | address_city | address_zip |
+-----------+--------------------+------------------------------+--------------+-------------+
| 103957320 | Shaggy Rogers      | Maple Street                 | Boston       | 1001-420    |
| 120958001 | Luis Filipe Vieira | Av Eusebio da Silva Ferreira | Lisbon       | 1000-120    |
| 239570075 | Hermione Granger   | Hagrids Hut                  | London       | 1002-392    |
| 292839283 | Jon Arbuckle       | Spooner Street               | Boston       | 1001-234    |
| 294750283 | Rubeus Hagrid      | Hagrids Hut                  | London       | 1002-392    |
| 347834694 | Harry Potter       | Privet Drive                 | London       | 1002-345    |
| 439502753 | Peter Griffin      | Spooner Street               | Boston       | 1001-234    |
| 474926579 | Shrek              | Swamp Street                 | Lisbon       | 1000-222    |
| 475028667 | Jafar              | Pharaoh Street               | Lisbon       | 1000-671    |
| 583057692 | John Smith         | Spooner Street               | Boston       | 1000-123    |
| 673938590 | John Wick          | Main Street                  | Boston       | 1001-123    |
| 848049583 | Lois Griffin       | Spooner Street               | Boston       | 1001-234    |
+-----------+--------------------+------------------------------+--------------+-------------+
12 rows in set (0.00 sec)
```

```
update person set address_street='Spooner Street', address_city='Boston'
where name='John Smith';
```

```
+-----------+--------------------+------------------------------+--------------+-------------+
| VAT       | name               | address_street               | address_city | address_zip |
+-----------+--------------------+------------------------------+--------------+-------------+
| 103957320 | Shaggy Rogers      | Maple Street                 | Boston       | 1001-420    |
| 120958001 | Luis Filipe Vieira | Av Eusebio da Silva Ferreira | Lisbon       | 1000-120    |
| 239570075 | Hermione Granger   | Hagrids Hut                  | London       | 1002-392    |
| 292839283 | Jon Arbuckle       | Spooner Street               | Boston       | 1001-234    |
| 294750283 | Rubeus Hagrid      | Hagrids Hut                  | London       | 1002-392    |
| 347834694 | Harry Potter       | Privet Drive                 | London       | 1002-345    |
| 439502753 | Peter Griffin      | Spooner Street               | Boston       | 1001-234    |
| 474926579 | Shrek              | Swamp Street                 | Lisbon       | 1000-222    |
| 475028667 | Jafar              | Pharaoh Street               | Lisbon       | 1000-671    |
| 583057692 | John Smith         | Spooner Street               | Boston       | 1000-123    |
| 673938590 | John Wick          | Main Street                  | Boston       | 1001-123    |
| 848049583 | Lois Griffin       | Spooner Street               | Boston       | 1001-234    |
+-----------+--------------------+------------------------------+--------------+-------------+
12 rows in set (0.00 sec)
```

3.2

```
MySQL [ist181161]> select * from indicator;
+-----------------+-----------------+---------+-------------------------------------+
| name            | reference_value | units   | description                         |
+-----------------+-----------------+---------+-------------------------------------+
| creatinine      |            1.00 | mg/mol  | Ideal value.                        |
| glucose         |          130.00 | mg      | Ideal value.                        |
| hemoglobine     |          200.00 | mg      | Ideal value.                        |
| protein         |           90.00 | mg      | Ideal value.                        |
| red blood cells |          300.00 | cells/L | Higher limit                        |
| temperature     |           38.00 | celcius | Higher than reference value, fever. |
+-----------------+-----------------+---------+-------------------------------------+
6 rows in set (0.00 sec)
```

```
update indicator set reference_value=reference_value*1.1
where indicator.units='mg' and indicator.name in
  (select indicator_name
   from produced_indicator
   where num in
    (select num
     from test_procedures
     where type like '%blood%'));
```

```
+-----------------+-----------------+---------+-------------------------------------+
| name            | reference_value | units   | description                         |
+-----------------+-----------------+---------+-------------------------------------+
| creatinine      |            1.00 | mg/mol  | Ideal value.                        |
| glucose         |          130.00 | mg      | Ideal value.                        |
| hemoglobine     |          220.00 | mg      | Ideal value.                        |
| protein         |           90.00 | mg      | Ideal value.                        |
| red blood cells |          300.00 | cells/L | Higher limit                        |
| temperature     |           38.00 | celcius | Higher than reference value, fever. |
+-----------------+-----------------+---------+-------------------------------------+
6 rows in set (0.00 sec)
```

3.3

3.4

```
insert into diagnosis_code(code,name) values ('esrd', 'end-state renal disease');

update consultdiagnosis set code='esrd'
where code='p' and name in
  (select name
   from procedures
   where name in
    (select name
    from test_procedures
    where type like '%blood%' and name in
      (select name
       from produced_indicator
       where indicator_name='creatinine' and value>ALL
        (select reference_value
         from indicator
         where name='creatinine'))));
```

```
MySQL [ist181161]> select code from diagnosis_code where name='kidney failure';
+------+
| code |
+------+
| p    |
+------+
1 row in set (0.00 sec)
```

```
MySQL [ist181161]> select * from diagnosis_code;
+------+----------------------------+
| code | name                       |
+------+----------------------------+
| a    | articulations problems     |
| b    | sick                       |
| blk  | superficial injuries       |
| esrd | end-state renal disease    |
| g    | everything ok              |
| o    | obese                      |
| p    | kidney failure             |
| r    | something broken           |
| y    | gastro-intestinal problems |
+------+----------------------------+
9 rows in set (0.00 sec)
```

```
MySQL [ist181161]> select * from consultdiagnosis;
+------+--------------+-----------+---------------------+
| code | name         | VAT_owner | date_timestamp      |
+------+--------------+-----------+---------------------+
| r    | Brian        | 439502753 | 2017-7-27 09:45:30.75  |
| r    | Buckbeack    | 294750283 | 2018-7-27 09:00:30.75  |
| blk  | Croockshanks | 239570075 | 2016-7-27 10:00:30.75  |
| p    | Croockshanks | 239570075 | 2016-7-27 10:00:30.75  |
| b    | Daisy        | 673938590 | 2017-11-27 09:00:30.75 |
| g    | Daisy        | 673938590 | 2017-7-27 09:00:30.75  |
| g    | Donkey       | 474926579 | 2017-7-26 09:00:30.75  |
| g    | Fang         | 294750283 | 2017-1-27 09:00:30.75  |
| y    | Garfield     | 292839283 | 2017-7-27 09:40:30.75  |
| g    | Hedwig       | 347834694 | 2016-7-27 09:00:30.75  |
| g    | Iago         | 475028667 | 2016-7-30 09:00:30.75  |
| r    | Lucky        | 583057692 | 2017-11-27 18:30:30.75 |
| g    | Odie         | 292839283 | 2017-7-27 09:00:30.75  |
| o    | Scooby       | 103957320 | 2016-7-27 09:00:45.75  |
| a    | Scooby       | 103957320 | 2017-5-27 10:00:30.75  |
| p    | Vitoria      | 120958001 | 2016-7-28 09:00:30.75  |
+------+--------------+-----------+---------------------+
16 rows in set (0.00 sec)
```

```
MySQL [ist181161]> select * from produced_indicator;
+--------------+-----------+---------------------+-----+----------------+--------+
| name         | VAT_owner | date_timestamp      | num | indicator_name | value  |
+--------------+-----------+---------------------+-----+----------------+--------+
| Croockshanks | 239570075 | 2016-7-27 10:00:30.75 |   6 | hemoglobine    | 210.00 |
| Croockshanks | 239570075 | 2016-7-27 10:00:30.75 |   7 | creatinine     |   0.90 |
| Garfield     | 292839283 | 2017-7-27 09:40:30.75 |   5 | hemoglobine    | 250.00 |
| Vitoria      | 120958001 | 2016-7-28 09:00:30.75 |   2 | protein        |  30.00 |
| Vitoria      | 120958001 | 2016-7-28 09:00:30.75 |   7 | creatinine     |   1.50 |
+--------------+-----------+---------------------+-----+----------------+--------+
5 rows in set (0.00 sec)
```

```
MySQL [ist181161]> select * from consultdiagnosis;
+------+--------------+-----------+-----------------------+
| code | name         | VAT_owner | date_timestamp        |
+------+--------------+-----------+-----------------------+
| r    | Brian        | 439502753 | 2017-7-27 09:45:30.75 |
| r    | Buckbeack    | 294750283 | 2018-7-27 09:00:30.75 |
| blk  | Croockshanks | 239570075 | 2016-7-27 10:00:30.75 |
| p    | Croockshanks | 239570075 | 2016-7-27 10:00:30.75 |
| b    | Daisy        | 673938590 | 2017-11-27 09:00:30.75|
| g    | Daisy        | 673938590 | 2017-7-27 09:00:30.75 |
| g    | Donkey       | 474926579 | 2017-7-26 09:00:30.75 |
| g    | Fang         | 294750283 | 2017-1-27 09:00:30.75 |
| y    | Garfield     | 292839283 | 2017-7-27 09:40:30.75 |
| g    | Hedwig       | 347834694 | 2016-7-27 09:00:30.75 |
| g    | Iago         | 475028667 | 2016-7-30 09:00:30.75 |
| r    | Lucky        | 583057692 | 2017-11-27 18:30:30.75|
| g    | Odie         | 292839283 | 2017-7-27 09:00:30.75 |
| o    | Scooby       | 103957320 | 2016-7-27 09:00:45.75 |
| a    | Scooby       | 103957320 | 2017-5-27 10:00:30.75 |
| esrd | Vitoria      | 120958001 | 2016-7-28 09:00:30.75 |
+------+--------------+-----------+-----------------------+
16 rows in set (0.00 sec)
```

4 Views

4.1

```
create view dim_date as
  (select date_timestamp, year(date_timestamp) as year, month(date_timestamp) as month,
  day(date_timestamp) as day
   from consult
  );
```

```
MySQL [ist181161]> select * from dim_date;
+-------------------------+------+-------+------+
| date_timestamp          | year | month | day  |
+-------------------------+------+-------+------+
| 2016-7-30 09:00:30.75   | 2016 |     7 |   30 |
| 2016-7-28 09:00:30.75   | 2016 |     7 |   28 |
| 2016-7-27 10:00:30.75   | 2016 |     7 |   27 |
| 2017-7-27 09:40:30.75   | 2017 |     7 |   27 |
| 2018-7-27 09:00:30.75   | 2018 |     7 |   27 |
| 2018-9-27 09:00:30.75   | 2018 |     9 |   27 |
| 2017-1-27 09:00:30.75   | 2017 |     1 |   27 |
| 2016-7-27 09:00:30.75   | 2016 |     7 |   27 |
| 2017-7-27 09:00:30.75   | 2017 |     7 |   27 |
| 2017-7-26 09:00:30.75   | 2017 |     7 |   26 |
| 2017-11-27 18:30:30.75  | 2017 |    11 |   27 |
| 2017-11-27 09:00:30.75  | 2017 |    11 |   27 |
| 2017-7-27 09:00:30.75   | 2017 |     7 |   27 |
| 2016-7-27 09:00:45.75   | 2016 |     7 |   27 |
| 2017-5-27 10:00:30.75   | 2017 |     5 |   27 |
| 2017-7-27 09:45:30.75   | 2017 |     7 |   27 |
+-------------------------+------+-------+------+
16 rows in set (0.00 sec)
```

4.2

```
create view dim_animal as
  (select name as animal_name, VAT as animal_vat, species_name as species, age
   from animal);
```

```
MySQL [ist181161]> select * from dim_animal;
+--------------+------------+--------------------------+------+
| animal_name  | animal_vat | species                  | age  |
+--------------+------------+--------------------------+------+
| Brian        |  439502753 | labrador retriever       |    8 |
| Buckbeack    |  294750283 | hippogriff               |   17 |
| Croockshanks |  239570075 | half kneazle             |   17 |
| Daisy        |  673938590 | beagle                   |    4 |
| Donkey       |  474926579 | donkey                   |    8 |
| Fang         |  294750283 | neapolitan mastiff       |   17 |
| Garfield     |  292839283 | exotic short hair persian |   14 |
| Hedwig       |  347834694 | snowy owl                |   17 |
| Iago         |  475028667 | parrot                   |   26 |
| Lucky        |  583057692 | labrador retriever       |    1 |
| Odie         |  292839283 | beagle                   |   14 |
| Scooby       |  103957320 | great dane               |    8 |
| Vitoria      |  120958001 | bald eagle               |    4 |
+--------------+------------+--------------------------+------+
13 rows in set (0.00 sec)
```

4.3

```
create view facts_concults as
    (select distinct consult.name, consult.VAT_owner, consult.date_timestamp,
      (select count(*)
       from procedures
       where procedures.name=consult.name and procedures.VAT_owner=consult.VAT_owner and
       procedures.date_timestamp=consult.date_timestamp) as num_pro,
      (select count(*)
       from prescription
       where prescription.name=consult.name and prescription.VAT_owner=consult.VAT_owner
       and prescription.date_timestamp=consult.date_timestamp) as num_pres from consult);
```

```
MySQL [ist181161]> select * from facts_concults;
+--------------+------------+---------------------+---------+----------+
| animal_name  | animal_vat | date_timestamp      | num_pro | num_pres |
+--------------+------------+---------------------+---------+----------+
| Brian        |  439502753 | 2017-7-27 09:45:30.75  |       1 |        0 |
| Buckbeack    |  294750283 | 2018-7-27 09:00:30.75  |       1 |        0 |
| Buckbeack    |  294750283 | 2018-9-27 09:00:30.75  |       0 |        0 |
| Croockshanks |  239570075 | 2016-7-27 10:00:30.75  |       2 |        1 |
| Daisy        |  673938590 | 2017-11-27 09:00:30.75 |       0 |        1 |
| Daisy        |  673938590 | 2017-7-27 09:00:30.75  |       0 |        0 |
| Donkey       |  474926579 | 2017-7-26 09:00:30.75  |       0 |        0 |
| Fang         |  294750283 | 2017-1-27 09:00:30.75  |       0 |        0 |
| Garfield     |  292839283 | 2017-7-27 09:40:30.75  |       1 |        1 |
| Hedwig       |  347834694 | 2016-7-27 09:00:30.75  |       0 |        0 |
| Iago         |  475028667 | 2016-7-30 09:00:30.75  |       0 |        0 |
| Lucky        |  583057692 | 2017-11-27 18:30:30.75 |       1 |        1 |
| Odie         |  292839283 | 2017-7-27 09:00:30.75  |       0 |        0 |
| Scooby       |  103957320 | 2016-7-27 09:00:45.75  |       0 |        0 |
| Scooby       |  103957320 | 2017-5-27 10:00:30.75  |       1 |        1 |
| Vitoria      |  120958001 | 2016-7-28 09:00:30.75  |       2 |        0 |
+--------------+------------+---------------------+---------+----------+
16 rows in set (0.01 sec)
```