



Sistemas de Informação e Bases de Dados

Assignment 2 - Implementing the Databas

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Group 10

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1 Instruções SQL para a criação de tabelas na base de dados

```
1 SET foreign_key_checks = 0;
2 drop table if exists employee;
3 drop table if exists phone_number_employee;
4 drop table if exists receptionist;
5 drop table if exists doctor;
6 drop table if exists nurse;
7 drop table if exists client;
8 drop table if exists phone_number_client;
9 drop table if exists permanent_doctor;
10 drop table if exists trainee_doctor;
11 drop table if exists supervision_report;
12 drop table if exists appointment;
13 drop table if exists consultation;
14 drop table if exists consultation_assistant;
15 drop table if exists diagnostic_code;
16 drop table if exists diagnostic_code_relation;
17 drop table if exists consultation_diagnostic;
18 drop table if exists medication;
19 drop table if exists prescription;
20 drop table if exists _procedure;
21 drop table if exists procedure_in_consultation;
22 drop table if exists procedure_radiology;
23 drop table if exists teeth;
24 drop table if exists procedure_charting;
25 SET foreign_key_checks = 1;
26
27 create table employee
28   (VAT char(10),
29    _name varchar(255),
30    birth_date char(10), /* ex.:YYYY-MM-DD */
31    street varchar(50),
32    city varchar(50),
33    zip varchar(50),
34    IBAN char(10),
35    salary numeric(7,2),
36    primary key (VAT),
37    check(salary > 0),
38    unique(IBAN));
39 /* IC: All employees are either receptionists, nurses or doctors */
40
41 create table phone_number_employee
42   (VAT char(10),
43    phone integer,
44    primary key(VAT, phone),
45    foreign key(VAT) references employee(VAT) on delete cascade);
46
47 create table receptionist
48   (VAT char(10),
49    primary key(VAT),
50    foreign key(VAT) references employee(VAT) on delete cascade);
51
52 create table doctor
53   (VAT char(10),
54    specialization varchar(255),
55    biography varchar(255),
56    e_mail varchar(255),
57    primary key(VAT),
58    foreign key(VAT) references employee(VAT) on delete cascade,
```

```

59     unique(e_mail));
60     /* IC: All doctors are either trainees or permanent */
61
62 create table nurse
63 (VAT char(10),
64  primary key(VAT),
65  foreign key(VAT) references employee(VAT) on delete cascade);
66
67 create table client
68 (VAT char(10),
69  _name varchar(255),
70  birth_date char(10),
71  street varchar(255),
72  city varchar(255),
73  zip varchar(255),
74  gender char(1), /* ex.:M/F */
75  age integer,
76  primary key(VAT),
77  check(age > 0));
78  /* IC: age derived from birth_date */
79
80 create table phone_number_client
81 (VAT char(10),
82  phone integer,
83  primary key(VAT, phone),
84  foreign key(VAT) references client(VAT) on delete cascade);
85
86 create table permanent_doctor
87 (VAT char(10),
88  primary key(VAT),
89  foreign key(VAT) references doctor(VAT) on delete cascade);
90
91 create table trainee_doctor
92 (VAT char(10),
93  supervisor char(10),
94  primary key(VAT),
95  foreign key(VAT) references doctor(VAT) on delete cascade,
96  foreign key(supervisor) references permanent_doctor(VAT) on delete cascade
97  );
98
99 create table supervision_report
100 (VAT char(10),
101  date_timestamp char(20), /* ex.:YYYY-MM-DD HH:MM:SS */
102  _description varchar(255),
103  evaluation integer,
104  primary key(VAT, date_timestamp),
105  foreign key(VAT) references trainee_doctor(VAT) on delete cascade,
106  check(evaluation between 1 and 5));
107
108 create table appointment
109 (VAT_doctor char(10),
110  date_timestamp char(20),
111  _description varchar(255),
112  VAT_client char(10),
113  primary key(VAT_doctor, date_timestamp),
114  foreign key(VAT_doctor) references doctor(VAT) on delete cascade,
115  foreign key(VAT_client) references client(VAT) on delete cascade);
116
117 create table consultation
118 (VAT_doctor char(10),
119  date_timestamp char(20),

```

```

119 SOAP_S varchar(255),
120 SOAP_O varchar(255),
121 SOAP_A varchar(255),
122 SOAP_P varchar(255),
123 primary key(VAT_doctor, date_timestamp),
124 foreign key(VAT_doctor, date_timestamp) references appointment(VAT_doctor,
    date_timestamp) on delete cascade);
125 /* IC: Consultations are always assigned to at least one assistant nurse
    */
126
127 create table consultation_assistant
128 (VAT_doctor char(10),
129  date_timestamp char(20),
130  VAT_nurse char(10),
131  primary key(VAT_doctor, date_timestamp),
132  foreign key(VAT_doctor, date_timestamp) references consultation(VAT_doctor
    , date_timestamp) on delete cascade,
133  foreign key(VAT_nurse) references nurse(VAT) on delete cascade);
134
135 create table diagnostic_code
136 (ID char(10),
137  _description varchar(255),
138  primary key(ID));
139
140 create table diagnostic_code_relation
141 (ID1 char(10),
142  ID2 char(10),
143  _type varchar(255),
144  primary key(ID1, ID2),
145  foreign key(ID1) references diagnostic_code(ID) on delete cascade,
146  foreign key(ID2) references diagnostic_code(ID) on delete cascade);
147
148 create table consultation_diagnostic
149 (VAT_doctor char(10),
150  date_timestamp char(20),
151  ID char(10),
152  primary key(VAT_doctor, date_timestamp, ID),
153  foreign key(VAT_doctor, date_timestamp) references consultation(VAT_doctor
    , date_timestamp) on delete cascade,
154  foreign key(ID) references diagnostic_code(ID) on delete cascade);
155
156 create table medication
157 (_name varchar(255),
158  lab varchar(255),
159  primary key(_name, lab));
160
161 create table prescription
162 (_name varchar(255),
163  lab varchar(255),
164  VAT_doctor char(10),
165  date_timestamp char(20),
166  ID char(10),
167  dosage varchar(255), /* ex.:8h-8h */
168  _description varchar(255),
169  primary key(_name, lab, VAT_doctor, date_timestamp, ID),
170  foreign key(_name, lab) references medication(_name, lab) on delete
    cascade,
171  foreign key(VAT_doctor, date_timestamp, ID) references
    consultation_diagnostic(VAT_doctor, date_timestamp, ID) on delete cascade
    );
172

```

```

173 create table _procedure
174   (_name varchar(255),
175    _type varchar(255),
176    primary key(_name));
177
178 create table procedure_in_consultation
179   (_name varchar(255),
180    VAT_doctor char(10),
181    date_timestamp char(20),
182    _description varchar(255),
183    primary key(_name, VAT_doctor, date_timestamp),
184    foreign key(_name) references _procedure(_name) on delete cascade,
185    foreign key(VAT_doctor, date_timestamp) references consultation(VAT_doctor
186      , date_timestamp) on delete cascade);
187
188 create table procedure_radiology
189   (_name varchar(255),
190    _file varchar(255),
191    VAT_doctor char(10),
192    date_timestamp char(20),
193    primary key(_name, _file, VAT_doctor, date_timestamp),
194    foreign key(_name, VAT_doctor, date_timestamp) references
195      procedure_in_consultation(_name, VAT_doctor, date_timestamp) on delete
196      cascade);
197
198 create table teeth
199   (quadrant integer, /* 1 a 4 */
200    _number integer, /* 1 a 8 */
201    _name varchar(255),
202    primary key(quadrant, _number));
203
204 create table procedure_charting
205   (_name varchar(255),
206    VAT char(10),
207    date_timestamp char(20),
208    quadrant integer,
209    _number integer,
210    _desc varchar(255),
211    measure numeric(3,1),
212    primary key(_name, VAT, date_timestamp, quadrant, _number),
213    foreign key(_name, VAT, date_timestamp) references
214      procedure_in_consultation(_name, VAT_doctor, date_timestamp) on delete
215      cascade,
216    foreign key(quadrant, _number) references teeth(quadrant, _number) on
217      delete cascade);

```

2 População, inserções de dados na base de dados

```
1 insert into employee values('25001', 'Jane Sweettooth', '1978-09-30', '
  Castanheiras Street', 'Lisboa', '1100-300', '1234', 1000.90);-- doutor
2 insert into employee values('15101', 'Andr Fernandes', '1978-06-07', '
  T cnico Avenue', 'Lisboa', '1110-450', '5323', 2000.00);-- doutor
3 insert into employee values('10120', 'Jorge Goodenough', '1938-05-12', '
  Cinzeiro Street', 'Lisboa', '1100-320', '4321', 1000.10);-- doutor
4 insert into employee values('11982', 'Deolinda de Villa Mar', '1967-09-06',
  'Grande Campo Street', 'Lisboa', '1100-270', '6979', 1000.01);-- doutor
5 insert into employee values('12309', 'Ermelinda Boavida', '1945-12-17', '
  Cinco Batalhas Street', 'Lisboa', '1110-150', '5901', 2000.89);-- enferm
6 insert into employee values('13490', 'Zacarias Fernandes', '1950-02-3', '
  Janelas Street', 'Lisboa', '1110-260', '6501', 2000.12);-- enferm
7 insert into employee values('15574', 'Joaquim Ahmad', '1965-03-14', 'Linhas
  de ferro Street', 'Lisboa', '1100-100', '0912', 1000.11);-- recep
8 insert into employee values('16347', 'Maria Peixeira', '1980-01-02', 'R s -
  do-ch o Street', 'Lisboa', '1200-230', '6832', 2000.09);-- recep
9
10 insert into phone_number_employee values('25001', 1000);
11 insert into phone_number_employee values('15101', 1001);
12 insert into phone_number_employee values('10120', 1002);
13 insert into phone_number_employee values('11982', 1003);
14 insert into phone_number_employee values('12309', 1004);
15 insert into phone_number_employee values('13490', 1005);
16 insert into phone_number_employee values('15574', 1006);
17 insert into phone_number_employee values('16347', 1007);
18
19 insert into receptionist values('15574');
20 insert into receptionist values('16347');
21
22 insert into doctor values('25001', 'Anesthesiology', 'this is Janes
  biography', 'janesweettooth@gmail.com');-- permanent
23 insert into doctor values('15101', 'Pediatric dentistry', 'this is Andres
  biography', 'andrefernandes@gmail.com');-- permanent
24 insert into doctor values('10120', 'Dental public health', 'this is Jorges
  biography', 'goodenough@gmail.com');-- trainee
25 insert into doctor values('11982', 'Implant dentistry', 'this is Deolindas
  biography', 'marvilla@gmail.com');-- trainee
26
27 insert into nurse values('12309');
28 insert into nurse values('13490');
29
30 insert into client values('14001', 'Rafael Silva', '1989-12-21', 'Seixal
  Street', 'Lisbon', '1305-400', 'M', 30);
31 insert into client values('14002', 'Jo o Tavares', '1998-12-31', 'Buenos
  Aires Street', 'Lisbon', '1200-632', 'M', 20);
32 insert into client values('14003', 'Maria Barracosa', '1999-07-18', 'Poeta
  Bocage Street', 'Lisbon', '1100-020', 'F', 20);
33 insert into client values('14004', 'Benedita Alves', '2000-04-18', 'Liberty
  Avenue', 'Lisbon', '1400-270', 'F', 19);
34 insert into client values('14005', 'Rosa Mota', '1962-05-31', 'Mota Rosa
  Street', 'Setubal', '1800-032', 'F', 57);
35 insert into client values('14006', 'Eus bio Ferreira', '1952-06-07', '
  Fernando Pessoa Street', 'Lisbon', '2725-300', 'M', 67);
36 insert into client values('14007', 'Maria Coluna', '1997-03-13', 'Miguel
  Torga Street', 'Lisbon', '2725-300', 'F', 22);
37 insert into client values('14008', 'Adalberto Correia', '1979-08-17', 'Lagos
  Street', 'Lisbon', '2725-300', 'M', 40);
```

```

38 insert into client values('14009', 'Pedro Martin', '1998-12-07', 'Lumiar
    Street', 'Lisbon', '1020-780', 'M', 20);
39 insert into client values('14010', 'Xavier Dias', '1998-02-24', 'Almada
    Negreiros Street', 'Sintra', '1300-590', 'M', 21);
40 insert into client values('14011', 'Maria Jos ', '2001-12-23', 'Alves Redol
    Street', 'Lisbon', '2725-300', 'F', 17);
41 insert into client values('14014', 'Madalena Ramos', '2001-12-27', 'Campo
    Grande Street', 'Lisbon', '1700-360', 'F', 17);
42 insert into client values('14012', 'Jos Maria Turras', '1998-10-04', '
    Marinha Street', 'Lisbon', '1200-400', 'M', 21);
43 insert into client values('14013', 'Bruce Wayne', '1988-12-08', 'Wayne
    building Street', 'Lisbon', '1225-300', 'M', 31);
44
45 insert into phone_number_client values('14001', 2001);
46 insert into phone_number_client values('14002', 2002);
47 insert into phone_number_client values('14003', 2003);
48 insert into phone_number_client values('14004', 2004);
49 insert into phone_number_client values('14005', 2005);
50 insert into phone_number_client values('14006', 2006);
51 insert into phone_number_client values('14007', 2007);
52 insert into phone_number_client values('14008', 2008);
53 insert into phone_number_client values('14009', 2009);
54 insert into phone_number_client values('14010', 2010);
55 insert into phone_number_client values('14011', 2011);
56 insert into phone_number_client values('14012', 2012);
57 insert into phone_number_client values('14013', 2013);
58
59 insert into permanent_doctor values('25001');
60 insert into permanent_doctor values('15101');
61
62 insert into trainee_doctor values('11982', '15101');
63 insert into trainee_doctor values('10120', '25001');
64
65 insert into supervision_report values('11982', '2019-09-04 14:15:03', 'Very
    good!', 4);
66 insert into supervision_report values('10120', '2019-10-04 00:10:03', '
    Something plus insufficient', 4);
67 insert into supervision_report values('11982', '2019-11-04 14:15:03', 'Very
    bad!', 1);
68 insert into supervision_report values('10120', '2019-12-04 00:10:03', '
    Insufficient plus something', 2);
69
70 insert into appointment values('25001', '2019-01-01 01:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
71 insert into appointment values('25001', '2019-01-02 02:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
72 insert into appointment values('25001', '2019-01-03 03:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
73 insert into appointment values('25001', '2019-01-04 04:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
74 insert into appointment values('25001', '2019-01-05 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
75 insert into appointment values('25001', '2019-01-06 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
76 insert into appointment values('25001', '2019-01-07 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
77 insert into appointment values('25001', '2019-01-08 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
78 insert into appointment values('25001', '2019-01-09 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');

```


[illegible]

[illegible]

```

169 insert into appointment values('25001', '2019-04-10 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
170 insert into appointment values('25001', '2019-04-11 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
171 insert into appointment values('25001', '2019-04-12 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
172 insert into appointment values('25001', '2019-04-13 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
173 insert into appointment values('25001', '2019-04-14 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
174 insert into appointment values('25001', '2019-04-15 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
175 insert into appointment values('25001', '2019-04-16 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
176 insert into appointment values('25001', '2019-04-17 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
177 insert into appointment values('25001', '2019-04-18 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
178 insert into appointment values('25001', '2019-04-19 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
179 insert into appointment values('25001', '2019-04-20 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
180 insert into appointment values('25001', '2019-04-21 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
181 insert into appointment values('25001', '2019-04-22 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
182 insert into appointment values('25001', '2019-04-23 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
183 insert into appointment values('25001', '2019-04-24 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
184 insert into appointment values('25001', '2019-04-25 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
185 insert into appointment values('25001', '2019-04-26 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
186 insert into appointment values('25001', '2019-04-27 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
187 insert into appointment values('25001', '2019-04-28 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
188 insert into appointment values('25001', '2019-11-04 16:00:00', 'There is
    nothing more practical than a good practical theory', '14010');
189 insert into appointment values('25001', '2019-11-04 17:00:00', 'Madness is
    like gravity, all it needs is a little push!', '14001');
190 insert into appointment values('15101', '2019-11-05 17:25:00', 'Madness is
    like ...', '14007');
191 insert into appointment values('10120', '2019-11-04 16:30:00', 'There is
    nothing more...', '14010');
192 insert into appointment values('11982', '2019-11-05 12:25:00', 'My madness
    ....', '14003');
193 insert into appointment values('25001', '2019-12-05 16:05:00', 'My madness
    ....', '14009');
194 insert into appointment values('25001', '2019-12-14 13:05:00', 'My madness
    ....', '14013');
195 insert into appointment values('25001', '2019-12-15 19:05:00', 'My madness
    ....', '14005');
196 insert into appointment values('25001', '2019-12-14 13:35:00', 'txt', '14005
    ');
197 insert into appointment values('25001', '2019-12-14 14:35:00', 'txt', '14005
    ');
198 insert into appointment values('25001', '2019-12-06 16:05:00', 'txt', '14013
    ');

```

```

199 insert into appointment values('25001', '2019-12-15 13:05:00', 'txt', '14013
    ');
200 insert into appointment values('25001', '2019-12-07 16:05:00', 'txt', '14009
    ');
201 insert into appointment values('25001', '2019-12-16 13:05:00', 'txt', '14009
    ');
202 insert into appointment values('10120', '2019-11-01 16:30:00', 'under 18', '
    14014');
203 insert into appointment values('10120', '2019-11-02 16:30:00', 'under 18', '
    14011');
204
205 insert into consultation values('25001', '2019-04-02 16:00:00', 'This is my
    s-soap', 'This is my o-soap', 'This is my a-soap', 'This is my p-soap');
206 insert into consultation values('25001', '2019-04-25 16:00:00', 'This is my
    s-soap', 'This is my o-soap', 'This is my a-soap', 'This is my p-soap');
207 insert into consultation values('10120', '2019-11-04 16:30:00', 'This is my
    s-soap', 'gingivitis', 'This is my a-soap', 'This is my p-soap');
208 insert into consultation values('25001', '2019-11-04 16:00:00', 'This is my
    s-soap', 'gingivitis', 'This is my a-soap', 'This is my p-soap');
209 insert into consultation values('25001', '2019-11-04 17:00:00', 'This is my
    s-soap', 'This is my o-soap', 'This is my a-soap', 'This is my p-soap');
210 insert into consultation values('15101', '2019-11-05 17:25:00', 'This is my
    s-soap', 'periodontitis', 'This is my a-soap', 'This is my p-soap');
211 insert into consultation values('25001', '2019-12-05 16:05:00', 'This is my
    s-soap', 'This is my o-soap', 'This is my a-soap', 'This is my p-soap');
212 insert into consultation values('25001', '2019-12-14 13:05:00', 'This is my
    s-soap', 'gingivitis and periodontitis', 'This is my a-soap', 'This is my
    p-soap');
213 insert into consultation values('25001', '2019-12-14 13:35:00', 'This is my
    s-soap', 'gingivitis', 'This is my a-soap', 'This is my p-soap');
214 insert into consultation values('25001', '2019-12-14 14:35:00', 'This is my
    s-soap', 'gingivitis', 'This is my a-soap', 'This is my p-soap');
215 insert into consultation values('25001', '2019-12-06 16:05:00', 'This is my
    s-soap', 'gingivitis', 'This is my a-soap', 'This is my p-soap');
216 insert into consultation values('25001', '2019-12-15 13:05:00', 'This is my
    s-soap', 'gingivitis', 'This is my a-soap', 'This is my p-soap');
217 insert into consultation values('25001', '2019-12-07 16:05:00', 'This is my
    s-soap', 'gingivitis', 'This is my a-soap', 'This is my p-soap');
218 insert into consultation values('25001', '2019-12-16 13:05:00', 'This is my
    s-soap', 'gingivitis', 'This is my a-soap', 'This is my p-soap');
219 insert into consultation values('10120', '2019-11-01 16:30:00', 'This is my
    s-soap', 'gingivitis', 'This is my a-soap', 'This is my p-soap');
220 insert into consultation values('10120', '2019-11-02 16:30:00', 'This is my
    s-soap', 'gingivitis', 'This is my a-soap', 'This is my p-soap');
221
222 insert into consultation_assistant values('25001', '2019-04-02 16:00:00', '
    13490');
223 insert into consultation_assistant values('25001', '2019-04-25 16:00:00', '
    13490');
224 insert into consultation_assistant values('10120', '2019-11-04 16:30:00', '
    12309');
225 insert into consultation_assistant values('25001', '2019-11-04 16:00:00', '
    12309');
226 insert into consultation_assistant values('25001', '2019-11-04 17:00:00', '
    13490');
227 insert into consultation_assistant values('15101', '2019-11-05 17:25:00', '
    12309');
228 insert into consultation_assistant values('25001', '2019-12-05 16:05:00', '
    12309');
229 insert into consultation_assistant values('25001', '2019-12-14 13:05:00', '
    13490');

```



```

230 insert into consultation_assistant values('10120', '2019-11-01 16:30:00', '
    12309');
231 insert into consultation_assistant values('10120', '2019-11-02 16:30:00', '
    13490');
232
233 insert into diagnostic_code values('301', 'You are going to die');
234 insert into diagnostic_code values('302', 'You only have 3 more... 2, 1,
    0...');
235 insert into diagnostic_code values('321', 'This is gingivitis');
236 insert into diagnostic_code values('334', 'Hi, I am not ingivitis');
237 insert into diagnostic_code values('322', 'There are dental cavities!');
238 insert into diagnostic_code values('333', 'Dental cavities and other things'
    );
239 insert into diagnostic_code values('354', 'Infectious disease');
240 insert into diagnostic_code values('344', 'Infectious disease and dental
    cavities');
241
242 insert into diagnostic_code_relation values('321', '334', 'Includes');
243 insert into diagnostic_code_relation values('301', '302', 'Includes');
244
245 insert into consultation_diagnostic values('10120', '2019-11-04 16:30:00', '
    334');
246 insert into consultation_diagnostic values('25001', '2019-11-04 16:00:00', '
    301');
247 insert into consultation_diagnostic values('25001', '2019-11-04 17:00:00', '
    301');
248 insert into consultation_diagnostic values('15101', '2019-11-05 17:25:00', '
    321');
249 insert into consultation_diagnostic values('25001', '2019-12-14 13:05:00', '
    322');
250 insert into consultation_diagnostic values('25001', '2019-12-14 13:35:00', '
    302');
251 insert into consultation_diagnostic values('25001', '2019-12-06 16:05:00', '
    302');
252 insert into consultation_diagnostic values('25001', '2019-12-06 16:05:00', '
    333');
253 insert into consultation_diagnostic values('25001', '2019-12-15 13:05:00', '
    333');
254 insert into consultation_diagnostic values('25001', '2019-12-07 16:05:00', '
    354');
255 insert into consultation_diagnostic values('25001', '2019-12-16 13:05:00', '
    344');
256 insert into consultation_diagnostic values('10120', '2019-11-02 16:30:00', '
    302');
257 insert into consultation_diagnostic values('10120', '2019-11-01 16:30:00', '
    354');
258 insert into consultation_diagnostic values('10120', '2019-11-01 16:30:00', '
    333');-- mesma consulta que de cima
259
260 insert into medication values('Ben-u-ron', 'J lio de Matos LAB');
261 insert into medication values('Brufen', 'Chemistry LAB');
262 insert into medication values('Xanax', 'Chemistry LAB');
263 insert into medication values('Aerius', 'MSD LAB');
264 insert into medication values('Advil liqui-gel', 'SIBD LAB');
265 insert into medication values('Green Tea', 'Homemade LAB');
266
267 insert into prescription values('Xanax', 'Chemistry LAB', '25001', '
    2019-11-04 16:00:00', '301', '8h-8h', 'Be careful with overdoses...');
268 insert into prescription values('Brufen', 'Chemistry LAB', '25001', '
    2019-11-04 17:00:00', '301', '12h-12h', 'Be careful with overdoses...');

```

```

269 insert into prescription values('Ben-u-ron', 'J lio de Matos LAB', '15101',
    '2019-11-05 17:25:00', '321', '6h-6h', 'Be careful with overdoses...');
270 insert into prescription values('Brufen', 'Chemistry LAB', '25001', '
    2019-12-06 16:05:00', '302', '12h-12h', 'Be careful with overdoses...');
271 insert into prescription values('Brufen', 'Chemistry LAB', '25001', '
    2019-12-14 13:05:00', '322', '12h-12h', 'Be careful with overdoses...');
272 insert into prescription values('Aerius', 'MSD LAB', '25001', '2019-12-06
    16:05:00', '333', '12h-12h', 'Be careful with overdoses...');
273 insert into prescription values('Advil liqui-gel', 'SIBD LAB', '25001', '
    2019-12-15 13:05:00', '333', '12h-12h', 'Be careful with overdoses...');
274 insert into prescription values('Aerius', 'MSD LAB', '25001', '2019-12-07
    16:05:00', '354', '12h-12h', 'Be careful with overdoses...');
275 insert into prescription values('Green Tea', 'Homemade LAB', '25001', '
    2019-12-16 13:05:00', '344', '12h-12h', 'Be careful with overdoses...');
276 insert into prescription values('Green Tea', 'Homemade LAB', '10120', '
    2019-11-01 16:30:00', '354', '12h-12h', 'Be careful with overdoses...');
277 insert into prescription values('Aerius', 'MSD LAB', '10120', '2019-11-01
    16:30:00', '333', '12h-12h', 'Be careful with overdoses...');
278 insert into prescription values('Aerius', 'MSD LAB', '10120', '2019-11-02
    16:30:00', '302', '12h-12h', 'Be careful with overdoses...');
279
280 insert into _procedure values('Tooth extraction', 'Extraction');
281 insert into _procedure values('Maxillary molar periapical radiograph', '
    Radiography exam');
282 insert into _procedure values('Root canal treatments', 'Cirurgy');
283 insert into _procedure values('Dental charting', 'Dental evaluation');
284 insert into _procedure values('Tooth whitening', 'Tooth clean'); -- unico
285
286 insert into procedure_in_consultation values('Tooth whitening', '25001', '
    2019-04-02 16:00:00', 'Converting black to white!');
287 insert into procedure_in_consultation values('Tooth whitening', '25001', '
    2019-04-25 16:00:00', 'Converting black to white!');
288 insert into procedure_in_consultation values('Maxillary molar periapical
    radiograph', '10120', '2019-11-04 16:30:00', 'Not a maxillar! It is a...
    ');
289 insert into procedure_in_consultation values('Dental charting', '10120', '
    2019-11-04 16:30:00', 'Not a maxillar! It is a...');
290 insert into procedure_in_consultation values('Maxillary molar periapical
    radiograph', '25001', '2019-11-04 16:00:00', 'Good maxillar!');
291 insert into procedure_in_consultation values('Maxillary molar periapical
    radiograph', '25001', '2019-11-04 17:00:00', 'Good maxillar!');
292 insert into procedure_in_consultation values('Root canal treatments', '15101
    ', '2019-11-05 17:25:00', 'What a root!');
293 insert into procedure_in_consultation values('Tooth extraction', '25001', '
    2019-12-05 16:05:00', 'Not so great teeth!');
294 insert into procedure_in_consultation values('Dental charting', '25001', '
    2019-12-14 13:05:00', 'Great teeth!');
295 insert into procedure_in_consultation values('Tooth extraction', '10120', '
    2019-11-01 16:30:00', 'Not so great teeth!');
296 insert into procedure_in_consultation values('Dental charting', '10120', '
    2019-11-02 16:30:00', 'Great teeth!');
297
298 insert into procedure_radiology values('Maxillary molar periapical
    radiograph', 'thisfile0', '10120', '2019-11-04 16:30:00');
299 insert into procedure_radiology values('Maxillary molar periapical
    radiograph', 'thisfile1', '25001', '2019-11-04 16:00:00');
300 insert into procedure_radiology values('Maxillary molar periapical
    radiograph', 'thisfile2', '25001', '2019-11-04 17:00:00');
301
302 insert into teeth values(1, 1, 'Central incisor');
303 insert into teeth values(1, 2, 'Lateral incisor');

```

```

304 insert into teeth values(1, 3, 'Canine');
305 insert into teeth values(1, 4, 'First premolar');
306 insert into teeth values(1, 5, 'Second premolar');
307 insert into teeth values(1, 6, 'First molar');
308 insert into teeth values(1, 7, 'Second molar');
309 insert into teeth values(1, 8, 'Third molar');
310 insert into teeth values(2, 1, 'Central incisor');
311 insert into teeth values(2, 2, 'Lateral incisor');
312 insert into teeth values(2, 3, 'Canine');
313 insert into teeth values(2, 4, 'First premolar');
314 insert into teeth values(2, 5, 'Second premolar');
315 insert into teeth values(2, 6, 'First molar');
316 insert into teeth values(2, 7, 'Second molar');
317 insert into teeth values(2, 8, 'Third molar');
318 insert into teeth values(3, 1, 'Central incisor');
319 insert into teeth values(3, 2, 'Lateral incisor');
320 insert into teeth values(3, 3, 'Canine');
321 insert into teeth values(3, 4, 'First premolar');
322 insert into teeth values(3, 5, 'Second premolar');
323 insert into teeth values(3, 6, 'First molar');
324 insert into teeth values(3, 7, 'Second molar');
325 insert into teeth values(3, 8, 'Third molar');
326 insert into teeth values(4, 1, 'Central incisor');
327 insert into teeth values(4, 2, 'Lateral incisor');
328 insert into teeth values(4, 3, 'Canine');
329 insert into teeth values(4, 4, 'First premolar');
330 insert into teeth values(4, 5, 'Second premolar');
331 insert into teeth values(4, 6, 'First molar');
332 insert into teeth values(4, 7, 'Second molar');
333 insert into teeth values(4, 8, 'Third molar');
334
335 insert into procedure_charting values('Dental charting', '10120', '
    2019-11-04 16:30:00', 1, 1, 'Is it a mollar?', 5.1);
336 insert into procedure_charting values('Dental charting', '10120', '
    2019-11-04 16:30:00', 1, 2, 'Is it a mollar?', 3.1);
337 insert into procedure_charting values('Dental charting', '10120', '
    2019-11-04 16:30:00', 1, 3, 'Is it a mollar?', 5.1);
338 insert into procedure_charting values('Dental charting', '10120', '
    2019-11-04 16:30:00', 1, 4, 'Is it a mollar?', 5.1);
339 insert into procedure_charting values('Dental charting', '10120', '
    2019-11-04 16:30:00', 1, 5, 'Is it a mollar?', 5.1);
340 insert into procedure_charting values('Dental charting', '10120', '
    2019-11-04 16:30:00', 1, 6, 'Is it a mollar?', 5.6);
341 insert into procedure_charting values('Dental charting', '10120', '
    2019-11-04 16:30:00', 1, 7, 'Is it a mollar?', 4.1);
342 insert into procedure_charting values('Dental charting', '10120', '
    2019-11-04 16:30:00', 1, 8, 'Is it a mollar?', 4.1);
343 insert into procedure_charting values('Dental charting', '10120', '
    2019-11-04 16:30:00', 2, 1, 'Is it a mollar?', 5.1);
344 insert into procedure_charting values('Dental charting', '10120', '
    2019-11-04 16:30:00', 2, 2, 'Is it a mollar?', 5.1);
345 insert into procedure_charting values('Dental charting', '10120', '
    2019-11-04 16:30:00', 2, 3, 'Is it a mollar?', 8.1);
346 insert into procedure_charting values('Dental charting', '10120', '
    2019-11-04 16:30:00', 2, 4, 'Is it a mollar?', 5.9);
347 insert into procedure_charting values('Dental charting', '10120', '
    2019-11-04 16:30:00', 2, 5, 'Is it a mollar?', 5.1);
348 insert into procedure_charting values('Dental charting', '10120', '
    2019-11-04 16:30:00', 2, 6, 'Is it a mollar?', 5.1);
349 insert into procedure_charting values('Dental charting', '10120', '
    2019-11-04 16:30:00', 2, 7, 'Is it a mollar?', 8.3);

```



```

350 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 2, 8, 'Is it a mollar?', 4.1);
351 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 3, 1, 'Is it a mollar?', 5.1);
352 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 3, 2, 'Is it a mollar?', 6.1);
353 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 3, 3, 'Is it a mollar?', 5.1);
354 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 3, 4, 'Is it a mollar?', 5.1);
355 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 3, 5, 'Is it a mollar?', 5.1);
356 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 3, 6, 'Is it a mollar?', 5.1);
357 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 3, 7, 'Is it a mollar?', 5.1);
358 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 3, 8, 'Is it a mollar?', 5.1);
359 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 4, 1, 'Is it a mollar?', 5.1);
360 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 4, 2, 'Is it a mollar?', 5.1);
361 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 4, 3, 'Is it a mollar?', 5.1);
362 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 4, 4, 'Is it a mollar?', 7.1);
363 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 4, 5, 'Is it a mollar?', 5.1);
364 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 4, 6, 'Is it a mollar?', 6.1);
365 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 4, 7, 'Is it a mollar?', 2.1);
366 insert into procedure_charting values('Dental charting', '10120', '
      2019-11-04 16:30:00', 4, 8, 'Is it a mollar?', 5.1);
367 insert into procedure_charting values('Dental charting', '25001', '
      2019-12-14 13:05:00', 1, 1, 'Damn good teeth you ve got there sir!', 3.1)
      ;
368 insert into procedure_charting values('Dental charting', '25001', '
      2019-12-14 13:05:00', 1, 2, 'Damn good teeth you ve got there sir!', 2.2)
      ;
369 insert into procedure_charting values('Dental charting', '25001', '
      2019-12-14 13:05:00', 1, 3, 'Damn good teeth you ve got there sir!', 1.3)
      ;
370 insert into procedure_charting values('Dental charting', '25001', '
      2019-12-14 13:05:00', 1, 4, 'Damn good teeth you ve got there sir!', 0.2)
      ;
371 insert into procedure_charting values('Dental charting', '25001', '
      2019-12-14 13:05:00', 1, 5, 'Damn good teeth you ve got there sir!', 1.1)
      ;
372 insert into procedure_charting values('Dental charting', '25001', '
      2019-12-14 13:05:00', 1, 6, 'Damn good teeth you ve got there sir!', 2.0)
      ;
373 insert into procedure_charting values('Dental charting', '25001', '
      2019-12-14 13:05:00', 1, 7, 'Damn good teeth you ve got there sir!', 3.1)
      ;
374 insert into procedure_charting values('Dental charting', '25001', '
      2019-12-14 13:05:00', 1, 8, 'Damn good teeth you ve got there sir!', 2.2)
      ;
375 insert into procedure_charting values('Dental charting', '25001', '
      2019-12-14 13:05:00', 2, 1, 'Damn good teeth you ve got there sir!', 1.3)
      ;

```

```

376 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 2, 2, 'Damn good teeth you ve got there sir!', 0.2)
    ;
377 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 2, 3, 'Damn good teeth you ve got there sir!', 1.1)
    ;
378 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 2, 4, 'Damn good teeth you ve got there sir!', 2.1)
    ;
379 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 2, 5, 'Damn good teeth you ve got there sir!', 3.2)
    ;
380 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 2, 6, 'Damn good teeth you ve got there sir!', 2.3)
    ;
381 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 2, 7, 'Damn good teeth you ve got there sir!', 1.2)
    ;
382 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 2, 8, 'Damn good teeth you ve got there sir!', 0.1)
    ;
383 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 3, 1, 'Damn good teeth you ve got there sir!', 1.0)
    ;
384 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 3, 2, 'Damn good teeth you ve got there sir!', 2.0)
    ;
385 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 3, 3, 'Damn good teeth you ve got there sir!', 3.1)
    ;
386 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 3, 4, 'Damn good teeth you ve got there sir!', 2.2)
    ;
387 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 3, 5, 'Damn good teeth you ve got there sir!', 1.2)
    ;
388 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 3, 6, 'Damn good teeth you ve got there sir!', 0.2)
    ;
389 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 3, 7, 'Damn good teeth you ve got there sir!', 1.3)
    ;
390 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 3, 8, 'Damn good teeth you ve got there sir!', 2.1)
    ;
391 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 4, 1, 'Damn good teeth you ve got there sir!', 3.0)
    ;
392 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 4, 2, 'Damn good teeth you ve got there sir!', 2.1)
    ;
393 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 4, 3, 'Damn good teeth you ve got there sir!', 1.3)
    ;
394 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 4, 4, 'Damn good teeth you ve got there sir!', 0.2)
    ;
395 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 4, 5, 'Damn good teeth you ve got there sir!', 1.1)
    ;

```

```
396 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 4, 6, 'Damn good teeth you ve got there sir!', 2.0)
    ;
397 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 4, 7, 'Damn good teeth you ve got there sir!', 3.3)
    ;
398 insert into procedure_charting values('Dental charting', '25001', '
    2019-12-14 13:05:00', 4, 8, 'Damn good teeth you ve got there sir!', 2.2)
    ;
```

3 Queries

3.1 Query 1

```
1 select distinct client.VAT, client._name as name, PN.phone
2 from (client natural join phone_number_client as PN),
3      (appointment right outer join consultation
4        on appointment.date_timestamp = consultation.date_timestamp)
5 where client.VAT = appointment.VAT_client
6 and consultation.VAT_doctor = all(select employee.VAT
7                                   from employee
8                                   where employee._name = 'Jane Sweettooth')
9 order by client._name;
```

O que esta query irá selecionar serão vários *clients* que tiveram *consultations* com a doutora *JaneSweettooth*. Ora como um cliente pode ter várias consultas com o mesmo doutor, então não nos interessa a informação repetida de cada *client*. Portanto usamos o comando *distinct*.

3.2 Query 2

```
1 select E_t._name as trainee_name, SR.VAT as trainee_VAT, E_p._name as
   permanent_name, SR.evaluation, SR._description as description
2 from ((supervision_report as SR) natural left outer join trainee_doctor),
3      employee as E_p, employee as E_t
4 where (SR.evaluation < 3 or SR._description like '%insufficient')
5       and trainee_doctor.supervisor = E_p.VAT
6       and trainee_doctor.VAT=E_t.VAT
7 order by SR.evaluation desc;
```

3.3 Query 3

```
1 select client._name as name, client.city, client.VAT
2 from client, appointment, consultation
3 where client.VAT=appointment.VAT_client
4 and appointment.VAT_doctor=consultation.VAT_doctor
5 and appointment.date_timestamp=consultation.date_timestamp
6 and (SOAP_0 like '%gingivitis' or SOAP_0 like '%periodontitis');
```

3.4 Query 4

```
1 select client._name as name, client.VAT, client.street, client.city, client.
   zip
2 from client, appointment
3 left join consultation
4 on appointment.date_timestamp=consultation.date_timestamp
5 and appointment.VAT_doctor=consultation.VAT_doctor
6 where consultation.date_timestamp is null
7 and consultation.VAT_doctor is null
8 and client.VAT=appointment.VAT_client;
```

3.5 Query 5

```
1 select distinct diagnostic_code.ID, diagnostic_code._description,
   prescription._name
2 from diagnostic_code, consultation_diagnostic, prescription
3 where diagnostic_code.ID=consultation_diagnostic.ID
4 and consultation_diagnostic.VAT_doctor=prescription.VAT_doctor
```

```

5 and consultation_diagnostic.date_timestamp=prescription.date_timestamp
6 and consultation_diagnostic.ID=prescription.ID
7 order by prescription._name;

```

3.6 Query 6

```

1 select '> 18' as _group, AVG_nurse._nurses/AVG_nurse.num_consultation as '
  AVG (nurses)',
2   AVG_procedure.num_procedures/AVG_procedure.num_consultation as 'AVG (
  procedures)',
3   AVG_diagnostic_code.num_diagnostic_codes/AVG_diagnostic_code.
  num_consultation as 'AVG (diagnostic_code)',
4   AVG_prescription.num_prescription/AVG_prescription.num_consultation as '
  AVG (prescription)'
5 from
6 (
7   select count(consultation_assistant.VAT_nurse) as _nurses, count(distinct
  consultation.date_timestamp, consultation.VAT_doctor) as num_consultation
8   from consultation
9   left join consultation_assistant on consultation.date_timestamp =
  consultation_assistant.date_timestamp
10                                and consultation.VAT_doctor =
  consultation_assistant.VAT_doctor
11   inner join appointment on consultation.date_timestamp = appointment.
  date_timestamp
12                                and consultation.VAT_doctor = appointment.
  VAT_doctor
13   inner join client on appointment.VAT_CLIENT=client.VAT
14   where consultation.date_timestamp like '2019%' and client.age > 18) as
  AVG_nurse,
15 (
16   select count(procedure_in_consultation._name) as num_procedures, count(
  distinct consultation.date_timestamp, consultation.VAT_doctor) as
  num_consultation
17   from consultation
18   left join procedure_in_consultation on consultation.date_timestamp =
  procedure_in_consultation.date_timestamp
19                                and consultation.VAT_doctor =
  procedure_in_consultation.VAT_doctor
20   inner join appointment on consultation.date_timestamp = appointment.
  date_timestamp
21                                and consultation.VAT_doctor = appointment.
  VAT_doctor
22   inner join client on appointment.VAT_CLIENT=client.VAT
23   where consultation.date_timestamp like '2019%' and client.age > 18) as
  AVG_procedure,
24 (
25   select count(consultation_diagnostic.ID) as num_diagnostic_codes, count(
  distinct consultation.date_timestamp, consultation.VAT_doctor) as
  num_consultation
26   from consultation
27   left join consultation_diagnostic on consultation.date_timestamp =
  consultation_diagnostic.date_timestamp
28                                and consultation.VAT_doctor =
  consultation_diagnostic.VAT_doctor
29   inner join appointment on consultation.date_timestamp = appointment.
  date_timestamp
30                                and consultation.VAT_doctor = appointment.
  VAT_doctor
31   inner join client on appointment.VAT_CLIENT=client.VAT

```

```

32 where consultation.date_timestamp like '2019%' and client.age > 18
33 ) as AVG_diagnostic_code,
34 (
35 select count(prescription.ID) as num_prescription, count(distinct
36 consultation.date_timestamp, consultation.VAT_doctor) as num_consultation
37 from consultation
38 left join prescription on consultation.date_timestamp = prescription.
39 date_timestamp
40 and consultation.VAT_doctor =
41 prescription.VAT_doctor
42 inner join appointment on consultation.date_timestamp = appointment.
43 date_timestamp
44 and consultation.VAT_doctor = appointment.
45 VAT_doctor
46 inner join client on appointment.VAT_CLIENT=client.VAT
47 where consultation.date_timestamp like '2019%' and client.age > 18
48 ) as AVG_prescription
49
50 Union all
51
52 select '<= 18' as _group, AVG_nurse._nurses/AVG_nurse.num_consultation as '
53 AVG (nurses)',
54 AVG_procedure.num_procedures/AVG_procedure.num_consultation as 'AVG (
55 procedures)',
56 AVG_diagnostic_code.num_diagnostic_codes/AVG_diagnostic_code.
57 num_consultation as 'AVG (diagnostic_code)',
58 AVG_prescription.num_prescription/AVG_prescription.num_consultation as '
59 AVG (prescription)'
60 from
61 (
62 select count(consultation_assistant.VAT_nurse) as _nurses, count(distinct
63 consultation.date_timestamp, consultation.VAT_doctor) as num_consultation
64 from consultation
65 left join consultation_assistant on consultation.date_timestamp =
66 consultation_assistant.date_timestamp
67 and consultation.VAT_doctor =
68 consultation_assistant.VAT_doctor
69 inner join appointment on consultation.date_timestamp = appointment.
70 date_timestamp
71 and consultation.VAT_doctor = appointment.
72 VAT_doctor
73 inner join client on appointment.VAT_CLIENT=client.VAT
74 where consultation.date_timestamp like '2019%' and client.age <= 18) as
75 AVG_nurse,
76 (
77 select count(procedure_in_consultation._name) as num_procedures, count(
78 distinct consultation.date_timestamp, consultation.VAT_doctor) as
79 num_consultation
80 from consultation
81 left join procedure_in_consultation on consultation.date_timestamp =
82 procedure_in_consultation.date_timestamp
83 and consultation.VAT_doctor =
84 procedure_in_consultation.VAT_doctor
85 inner join appointment on consultation.date_timestamp = appointment.
86 date_timestamp
87 and consultation.VAT_doctor = appointment.
88 VAT_doctor
89 inner join client on appointment.VAT_CLIENT=client.VAT
90 where consultation.date_timestamp like '2019%' and client.age <= 18) as
91 AVG_procedure,
92 (

```

```

71 select count(consultation_diagnostic.ID) as num_diagnostic_codes, count(
    distinct consultation.date_timestamp, consultation.VAT_doctor) as
    num_consultation
72 from consultation
73 left join consultation_diagnostic on consultation.date_timestamp =
    consultation_diagnostic.date_timestamp
74                                and consultation.VAT_doctor =
    consultation_diagnostic.VAT_doctor
75 inner join appointment on consultation.date_timestamp = appointment.
    date_timestamp
76                                and consultation.VAT_doctor = appointment.
    VAT_doctor
77 inner join client on appointment.VAT_CLIENT=client.VAT
78 where consultation.date_timestamp like '2019%' and client.age <= 18
79 ) as AVG_diagnostic_code,
80 (
81 select count(prescription.ID) as num_prescription, count(distinct
    consultation.date_timestamp, consultation.VAT_doctor) as num_consultation
82 from consultation
83 left join prescription on consultation.date_timestamp = prescription.
    date_timestamp
84                                and consultation.VAT_doctor =
    prescription.VAT_doctor
85 inner join appointment on consultation.date_timestamp = appointment.
    date_timestamp
86                                and consultation.VAT_doctor = appointment.
    VAT_doctor
87 inner join client on appointment.VAT_CLIENT=client.VAT
88 where consultation.date_timestamp like '2019%' and client.age <= 18
89 ) as AVG_prescription;

```

Na análise realizada para esta questão, considerou-se um código semelhante tanto para os cliente com mais de 18 anos como para os menores de 18 anos. Neste caso, utilizamos para cada situação - média de *nurses*, *procedures*, *diagnosis*, *prescriptions* - o número total de casos e dividiu-se pelo total de consultas no ano de 2019.

3.7 Query 7

```

1 select count_dcode._name as 'medication name', count_dcode.dcode_ID as 'ID
    diagnostic_code'
2 from
3     (select diagnostic_code.ID as dcode_ID, prescription._name, count(
        prescription._name) as count_name
4         from prescription
5         right join diagnostic_code on prescription.ID = diagnostic_code.ID
6         group by diagnostic_code.ID) as count_dcode
7
8 inner join
9     (select max_dcode.dcode_ID, max(max_dcode.count_name) as
        max_count_name
10        from
11            (select diagnostic_code.ID as dcode_ID, prescription._name, count(
                prescription._name) as count_name
12                from prescription
13                right join diagnostic_code on prescription.ID = diagnostic_code.
14                ID
15                group by diagnostic_code.ID) as max_dcode
16            group by max_dcode.dcode_ID) as max_count_dcode
17 on count_dcode.dcode_ID = max_count_dcode.dcode_ID
18 and count_dcode.count_name = max_count_dcode.max_count_name;

```

3.8 Query 8

```
1 select distinct _name, lab
2 from prescription
3 where (_name, lab) in
4 (
5     select prescription._name, prescription.lab
6     from diagnostic_code
7     inner join prescription
8     on prescription.ID = diagnostic_code.ID
9     where diagnostic_code._description like '%dental cavities%'
10    and prescription.date_timestamp like '2019%'
11 )
12 and (_name, lab) not in
13 (
14     select prescription._name, prescription.lab
15     from diagnostic_code
16     inner join prescription
17     on prescription.ID = diagnostic_code.ID
18     where diagnostic_code._description like '%infectious disease%'
19    and prescription.date_timestamp like '2019%'
20 )
21 order by _name, lab;
```

3.9 Query 9

```
1 select client._name, client.street, client.city, client.zip
2 from client
3 inner join appointment
4 on client.VAT = appointment.VAT_client
5 where client.VAT not in (
6     select client.VAT
7     from consultation
8     right join appointment
9     on consultation.VAT_doctor = appointment.VAT_doctor
10    and consultation.date_timestamp = appointment.date_timestamp
11    inner join client
12    on client.VAT = appointment.VAT_client
13    where consultation.VAT_doctor is NULL and consultation.
14    date_timestamp is NULL
15    and appointment.date_timestamp like '2019%'
16 )
17 and appointment.date_timestamp like '2019%'
18 group by client.VAT;
```


4 Índices

4.1 Query 1

Para uma análise do desempenho da procura sem a utilização de índices, resolvemos utilizar o comando *EXPLAIN* antes da query. Feito isto, obtivemos uma procura estimada em todas as linhas de todas as tabelas. Com isto sugerimos indexar apenas os atributos (colunas) das tabelas que são procurados através de *WHEREs* e de *JOINs*.

Quando se procura por um valor de um atributo que seja uma chave primária, então não será necessário criar um índice, pois são *clustered indexes*. É o caso das seguintes chaves utilizadas: *client.VAT*, *phone_number_client.VAT*, *phone_number_client.phone*, *appointment.VAT_client*, *appointment.date_timestamp*, *consultation.date_timestamp*, *consultation.VAT_doctor*. Portanto, a única necessário indexar é: **employee._name**.

As instruções para a implementação dos índices estão escritas abaixo:

```
1 create index employeeName_idx on employee(_name);
```

4.2 Query 2

Do mesmo modo que se fez para a query 1, assim se procedeu para a indexação de atributos para a query 2. As *clustered indexes* são: *employee.VAT*, *trainee_doctor.VAT* e *trainee_doctor.supervisor*. Portanto, para otimizar, indexamos: **supervision_report.evaluation** e **supervision_report._description**.

As instruções para a implementação dos índices estão escritas abaixo:

```
1 create index srEval_idx on supervision_report(evaluation);
2 create index srDesc_idx on supervision_report(_description);
```

5 Instruções SQL para a modificações na base de dados

5.1 Modificação 1

```
1 update employee, doctor
2 set employee.street = 'Livro Street', employee.city = 'Alverca', employee.
  zip = '1234-098'
3 where employee._name = 'Jane Sweettooth' and employee.VAT = doctor.VAT; /*
  certificar que e doutor */
```

A *WHERE clause* poderia ser omitida. No entanto assegura-se que existe um doutor com nome Jane Sweettooth.

5.2 Modificação 2

```
1 update employee
2 set employee.salary =
3   case
4     when (select count(*)
5           from appointment
6           where extract(year from appointment.date_timestamp)='2019' and
7                 employee.VAT=appointment.VAT_doctor
8           group by appointment.VAT_doctor) > 100 then employee.salary*1.05
9     else employee.salary /* necessario, senao preenche com NULLs */
10  end;
```

O que se deve notar aqui é o facto de que se não se satisfizer a condição de haver uma *appointment* com data de 2019, então as colunas seleccionadas serão preenchidas com *NULL*, por isso acrescentamos a redundância no *else*.

5.3 Modificação 3

```
1 delete proc from _procedure proc
2   join procedure_in_consultation as pc on proc._name=pc._name
3   join doctor as d on pc.VAT_doctor=d.VAT
4   join employee on d.VAT=employee.VAT
5 where employee._name='Jane Sweettooth' and
6       not exists(select *
7                 from (select *
8                       from _procedure) as p natural join
9                 procedure_in_consultation
10                  where p._name=proc._name and procedure_in_consultation.
11                    VAT_doctor<>d.VAT);
12
13 delete dcode from diagnostic_code dcode
14   join consultation_diagnostic as consd on dcode.ID=consd.ID
15   join doctor as d on consd.VAT_doctor=d.VAT
16   join employee on d.VAT=employee.VAT
17 where employee._name='Jane Sweettooth' and
18       not exists(select * from (select * from diagnostic_code) as dcode1
19                 natural join consultation_diagnostic
20                 where dcode1.ID=dcode.ID and consultation_diagnostic.
21                   VAT_doctor<>d.VAT);
22
23 delete from employee,
24 where employee._name = 'Jane Sweettooth';
```

Para apagar várias linhas de várias tabelas onde o doutor com o nome Jane Sweettooth esteve implicado recorreu-se ao *ON DELETE CASCADE*. Com isto ao apagar uma linha de um *employee*, as outras linhas que tenham *foreign key* deste serão automaticamente apagados. Ora ainda se quer apagar os procedimentos e diagnósticos que foram realizados apenas por este doutor. Por isso recorreremos a mais dois *DELETES*, mas prévios ao do doutor

5.4 Modificação 4

```
1 insert into diagnostic_code values('400', 'It is periodontitis');
2
3 update consultation_diagnostic
4 set ID = (select ID from diagnostic_code where _description like '%
           periodontitis')
5 where consultation_diagnostic.ID = (select ID from diagnostic_code where
           diagnostic_code._description like '%gingivitis')
6 and exists (select procedure_charting.VAT
7             from procedure_charting
8             where consultation_diagnostic.VAT_doctor=procedure_charting.VAT
           and consultation_diagnostic.date_timestamp = procedure_charting.
           date_timestamp
9             group by procedure_charting.VAT, procedure_charting.
           date_timestamp
10            having avg(procedure_charting.measure)>4.0);
```

6 Criação das Views para as tabelas do modelo de base de dados

6.1 dim_date

```
1 create view dim_date as
2 select date_timestamp, day(date_timestamp) as 'Day', month(date_timestamp)
   as 'Month', year(date_timestamp) as 'Year'
3 from consultation;
```

6.2 dim_client

```
1 create view dim_client as
2 select VAT as 'VAT client', gender as 'Gender', age as 'Age'
3 from client;
```

6.3 dim_location_client

```
1 create view dim_location_client as
2 select zip as 'Zip code', city as 'City'
3 from client;
```

6.4 facts_consults

```
1 create view facts_consults as
2 select client.VAT, consultation.date_timestamp, client.zip, client.city,
   count(distinct procedure_in_consultation._name) as 'Num procedures',
   count(distinct prescription._name) as 'Num medications', count(distinct
   consultation_diagnostic.ID) as 'Num diagnostic codes'
3 from client, consultation, procedure_in_consultation,
   consultation_diagnostic, prescription, appointment
4 where client.VAT=appointment.VAT_client
5 and appointment.VAT_doctor=consultation.VAT_doctor
6 and appointment.date_timestamp=consultation.date_timestamp
7 and consultation.VAT_doctor=procedure_in_consultation.VAT_doctor
8 and consultation.date_timestamp=procedure_in_consultation.date_timestamp
9 and consultation.VAT_doctor=consultation_diagnostic.VAT_doctor
10 and consultation.date_timestamp=consultation_diagnostic.date_timestamp
11 and consultation_diagnostic.VAT_doctor=prescription.VAT_doctor
12 and consultation_diagnostic.date_timestamp=prescription.date_timestamp
13 and consultation_diagnostic.ID=prescription.ID
14 group by procedure_in_consultation._name;
```