

INSTITUTO SUPERIOR TÉCNICO - UL



TÉCNICO
LISBOA

PROJECT1-SIBD

DATABASE MODELING - GROUP 30

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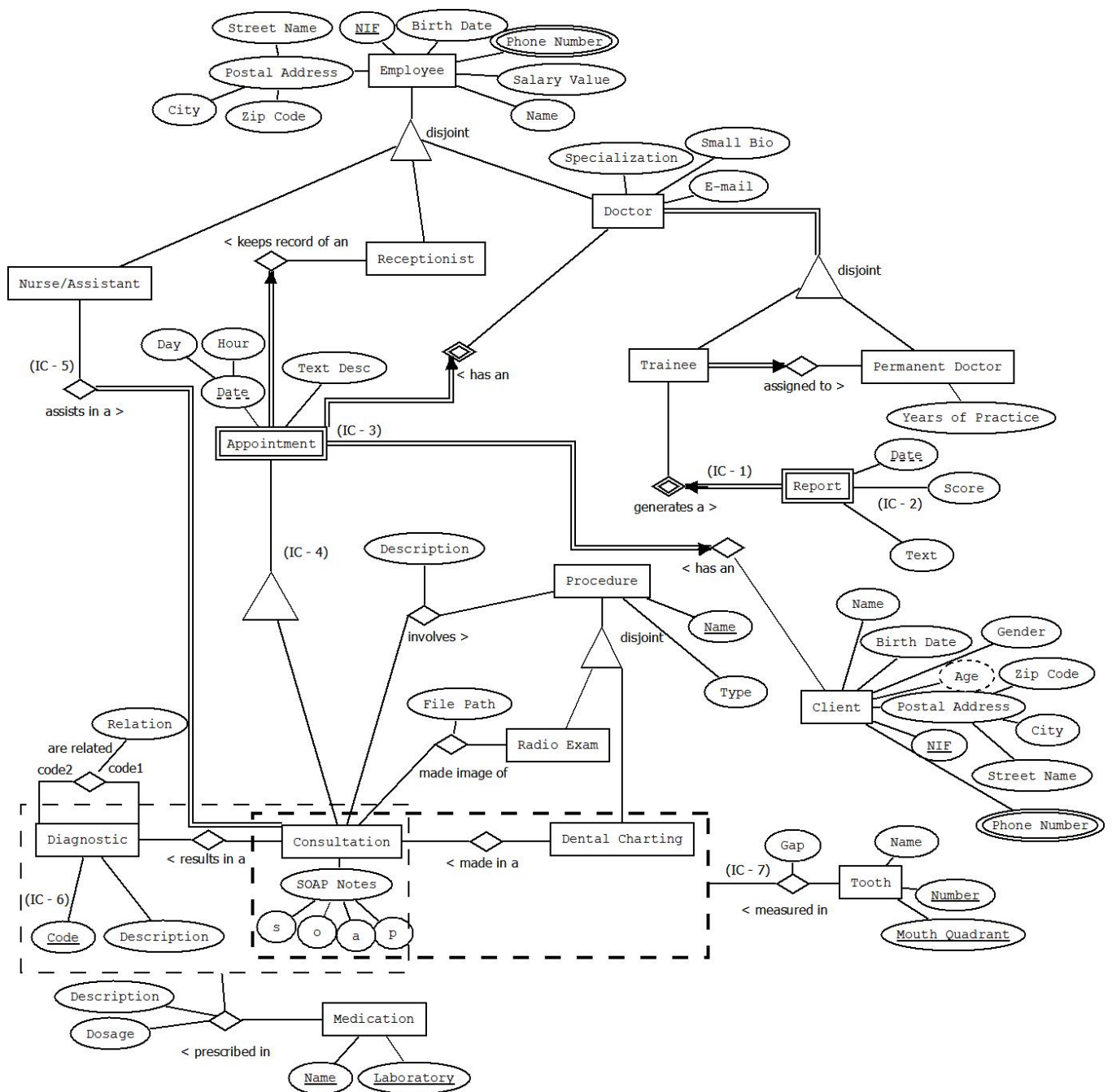
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ER Diagram



Integrity Constraints

- (IC-1) An evaluation Report is written every couple of months, starting on the second month.
- (IC-2) Report scores should be in the Range from one to five.
- (IC-3) In an Appointment the Client and the Doctor can't be the same person.
- (IC-4) An Appointment should only be a Consultation too if the Client doesn't miss his/her Appointment.
- (IC-5) The Nurse(s) assisting the Consultation can't be the Client.
- (IC-6) The Diagnostic codes should be standardized.
- (IC-7) The Gap between the tooth and the gums should be stored in millimeters.

Relational Model

Entities

- employee(nif, birth_date, salary_value, name, street_name, city, zip)

(IC-1): nif must appear only in nurse, receptionist or doctor, but not in more than one of those three.

- nurse(nif)
nif: FK(employee)

- receptionist(nif)
nif: FK(employee)

- doctor(nif, bio_desc, specialization, email)
nif: FK(employee)

(IC-2): nif must appear only in trainee or permanent_doctor

- client(nif, name, birth_date, gender, zip, city, street_name, age)

(IC-3): The age must be calculated automatically making the difference between the actual date and the birth_date.

- appointment(nifdoctor, day, hour, nifclient, nifreceptionist, text_desc)
nif: FK(doctor)

(IC-4): nifdoctor can't be the same as the nifclient in an appointment.

nifclient: FK(client)

nifreceptionist: FK(receptionist)

- permanent_doctor(nif, years_practice)
nif: FK(doctor)

- trainee(nif, nifdoctor)
nif: FK(doctor)
nifdoctor: FK(permanent_doctor)

(IC-5): a report must be written every two months, starting two months after the trainee appeared on the table.

- report(nif, date, score, text)

nif: FK(trainee)

(IC-6): date must be recorded as a timestamp.

(IC-7): score must be limited to a number from one to five.

- consultation(nif, day, hour, s, o, a, p)

nif, day, hour: FK(appointment)

(IC-8): every pair nif, date present in consultation must be present in table assists too.

- diagnostic(code, description)

(IC-9): the diagnostic codes should obey to a standard.

- procedure(name, type)

(IC-10): name must appear only in radio_exam or dental_charting, but not both.

(IC-11): if type is "radio_exam", name must appear on table radio_exam.

(IC-12): if type is "dental_charting", name must appear on table dental_charting.

- radio_exam(name)

- dental_charting(name)

- medication(name, laboratory)

- tooth(number, mouth_quadrant, name)

Relations

- assists(nifnurse, nifdoctor, day, hour)

nifnurse: FK(nurse)

nifdoctor, day, hour: FK(consultation)

- relation(codeone, codetwo, description)

codeone: FK(diagnostic)

codetwo: FK(diagnostic)

- results(code, nifdoctor, day, hour)

code: FK(diagnostic)

nifdoctor, day, hour: FK(consultation)

- prescribed(code, nifdoctor, day, hour, name, laboratory, description, dosage)
code, nifdoctor, day, hour: FK(results)
name, laboratory: FK(medication)
- involve(nifdoctor, day, hour, procedure_name, description)
nifdoctor, day, hour: FK(consultation)
procedure_name: FK(procedure)
- image(nifdoctor, day, hour, procedure_name, file_path)
nifdoctor, day, hour: FK(consultation)
procedure_name: FK(radio_exam)
- made(nifdoctor, day, hour, procedure_name)
nifdoctor, day, hour: FK(consultation)
procedure_name: FK(dental_charting)
- measured_in(number, mouth_quadrant, nifdoctor, day, hour, procedure_name, gap)
number, mouth_quadrant: FK(tooth)
nifdoctor, day, hour, procedure_name: FK(made)

Multi-value Attributes

- phonesemployee(nif, phonenumber)
nif: FK(employee)
- phonesclient(nif, phonenumber)
nif: FK(client)

Notes

- Firstly, it was considered that an Employee doesn't need to be a Doctor, a Receptionist or a Nurse/Assistant (e.g. he can be a cleaner), and he can't have more than one role (e.g. a Doctor can't be a Receptionist or an Assistant).
- The phone number is a multivalued attribute, because an employee can have multiple phone numbers.
- A Doctor has to be a Trainee or a Permanent Doctor, but he can't be both. If the Doctor is a Trainee he has to be necessarily assigned to one (and only one) Permanent Doctor.
- Since there can't be any report of the same trainee from the same date, Report can't be identified by itself, so it's assumed as weak entity and associated with Trainee as strong entity, being identified by the trainee nif and the date.
- Although a doctor can have many appointments, he can't have them simultaneously, so the Appointment needs to be identified by a date and a doctor NIF. To specify this through the E-R model, Appointment was considered as weak entity of Doctor. On the other hand, clients can have more than one appointment at the same time.
- An Appointment needs to have one (and only one) Client, and needs to be reported by one (and only one) Receptionist.
- In an Appointment, the Client can't be the Doctor and, in a Consultation, the Client can't be the Nurse/Assistant(s) assisting it. Consequently, two Integrity Constraints were added to prevent this from happening (IC-3 and IC-5).
- Client wasn't associated with Employee, since they have different attributes being not all of them common, and it was also considered that were already available enough examples of specializations. The Age is a derived attribute of Client, because it can be calculated from the Birth Date attribute.
- A Consultation is recorded in the database, only if an Appointment goes according to plan. Consequently, one Integrity Constraint was added (IC-4).
- Consultation SOAP notes are not mandatory although strongly recommended.
- In the relation between diagnostics it was left on a many to many relation so a diagnostic can have multiple relations and vice versa. In this relation there is also not always a cause and an

effect or an hierarchical superior to the other, because it is said in the assignment that these diagnostics can establish many relations between each others.

- A Consultation can only be associated with a prescription, if it results in at least one Diagnostic. For this reason, Consultation and Diagnostic were aggregated and the prescription relation is represented between the aggregation and the Medication entity. This way, a consultation can result in multiple prescriptions each one from a specific diagnostic.
- For the Medication entity, it's necessary to have a set as primary key, because it was assumed that there is medication with the same name, from different laboratories, but no medication with the same name and same laboratory exists. As a result, the primary key is the set: Name and Laboratory.
- A Procedure is identified by a name and has a type. A specialization was added to this entity, to add more information about two specific types of Procedure (Radiography Exams and Dental Charting).
- Consultation and Dental Charting entities were aggregated, so this way, for each Consultation in which this procedure happens, it is possible to store multiple Gap measures, one for each tooth.
- For the Tooth entity, the primary key chosen was the set: Mouth Quadrant and Number, since they are both needed to identify a tooth, according to the Palmer Notation Numbering System.