Instituto Superior Técnico

Mestrado Integrado em Engenharia Electrotécnica e de Computadores

Sistemas de Informação e Bases de Dados

2015/2016

Project Assignment

(part 1)

Group: 16

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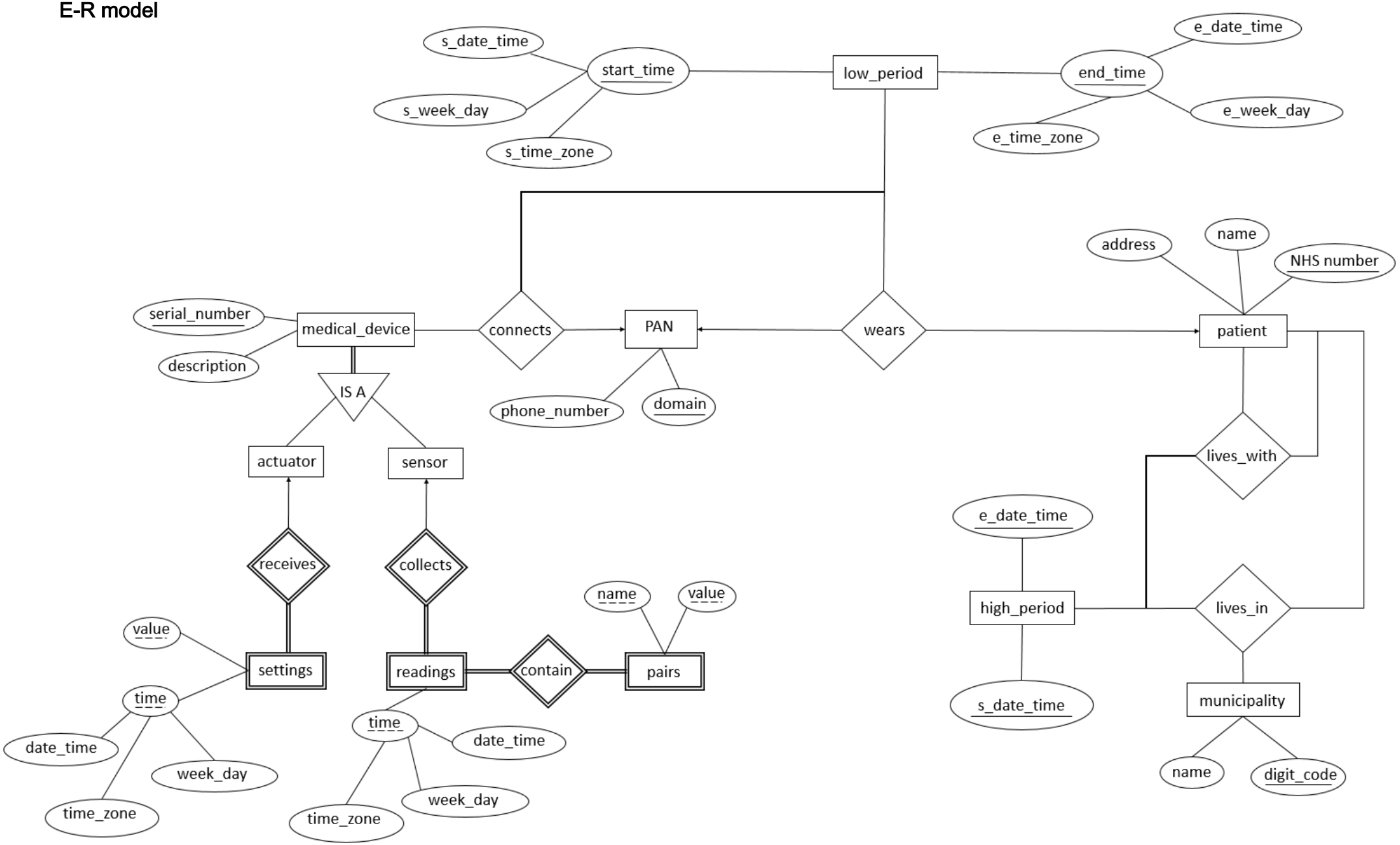
E-R model


s_date_time
start_time
s_week_day
s_time_zone
low_period
end_time
e_date_time
e_week_day
e_time_zone
address
name
NHS number
patient
serial_number
medical_device
description
connects
PAN
wears
IS A
phone_number
domain
actuator
sensor
lives_with
e_date_time
receives
collects
high_period
lives_in
value
name
value
settings
readings
contain
pairs
time
date_time
week_day
time_zone
time
date_time
week_day
time_zone
s_date_time
municipality
name
digit_code

Notes about the ER-Model:

- Medical devices connect to a patient through the PAN, and not directly. This makes sense to us because a patient doesn't have a medical device by itself but only in the context of being connected to a PAN.
- We have two different time resolutions: a high level one and a low level one. The time period that defines the connection between a medical device and a PAN and also the one that defines the connection between the patient and the PAN should be descriptive, i.e., include hours, day of the week, time zone and date. However to know the time period in which two patients lived together it doesn't make sense to have that low a resolution, we think that the date is enough.
- We considered that a patient can live in two municipalities. Consider the example of a student that is studying away from home and he might want to register both addresses.
- One thing that cannot be captured in the ER-Model regards time overlaps. Let's consider the example: a medical device connects to a certain PAN from 01-01-2015 to 30-01-2015. However, the same medical device can be connected to another PAN from 02-01-2015 to 31-01-2015 and our ER-Model cannot prevent this from happening.

Entities

medical_device (serial_number, description)

actuator (serial_number)

serial_number: FK (medical device)

sensor (serial_number)

serial_number: FK (medical device)

low_period (s_week_day, s_time_zone, s_date_time, e_week_day, e_time_zone, e_date_time)

high_period (s_date_time, e_date_time)

PAN (domain, phone_number)

patient (NHS_number, name, address)

municipality (digit_code, name)

Weak entities

settings (week_day, time_zone, date_time, value, serial_number)

serial_number: FK (actuator)

readings (week_day, time_zone, date_time, serial_number)

serial_number: FK (sensor)

pairs (name, value, week_day, time_zone, date_time, serial_number)

week_day, time_zone, date_time, serial_number: FK (readings)

Relationships

connects (serial_number, s_week_day, s_time_zone, s_date_time, e_week_day, e_time_zone, e_date_time, domain)

serial_number: FK (medical_device)

s_week_day, s_time_zone, s_date_time, e_week_day, e_time_zone, e_date_time: FK (low_period)

domain: FK (PAN)

wears (NHS_number, s_week_day, s_time_zone, s_date_time, e_week_day, e_time_zone, e_date_time, domain)

or

wears (domain, s_week_day, s_time_zone, s_date_time, e_week_day, e_time_zone, e_date_time, NHS_number)

NHS_number: FK (patient)

s_week_day, s_time_zone, s_date_time, e_week_day, e_time_zone, e_date_time: FK (low_period)

domain: FK (PAN)

lives_with (NHS_number1, NHS_number2, s_date_time, e_date_time)

NHS_number1: FK (patient)

NHS_number2: FK (patient)

s_date_time, e_date_time: FK (high_period)

lives_in (NHS_number, digit_code, s_date_time, e_date_time)

NHS_number: FK (patient)

domain: FK (municipality)

s_date_time, e_date_time: FK (high_period)