TÉCNICO LISBOA

E-A Modeling

Lab companion slides

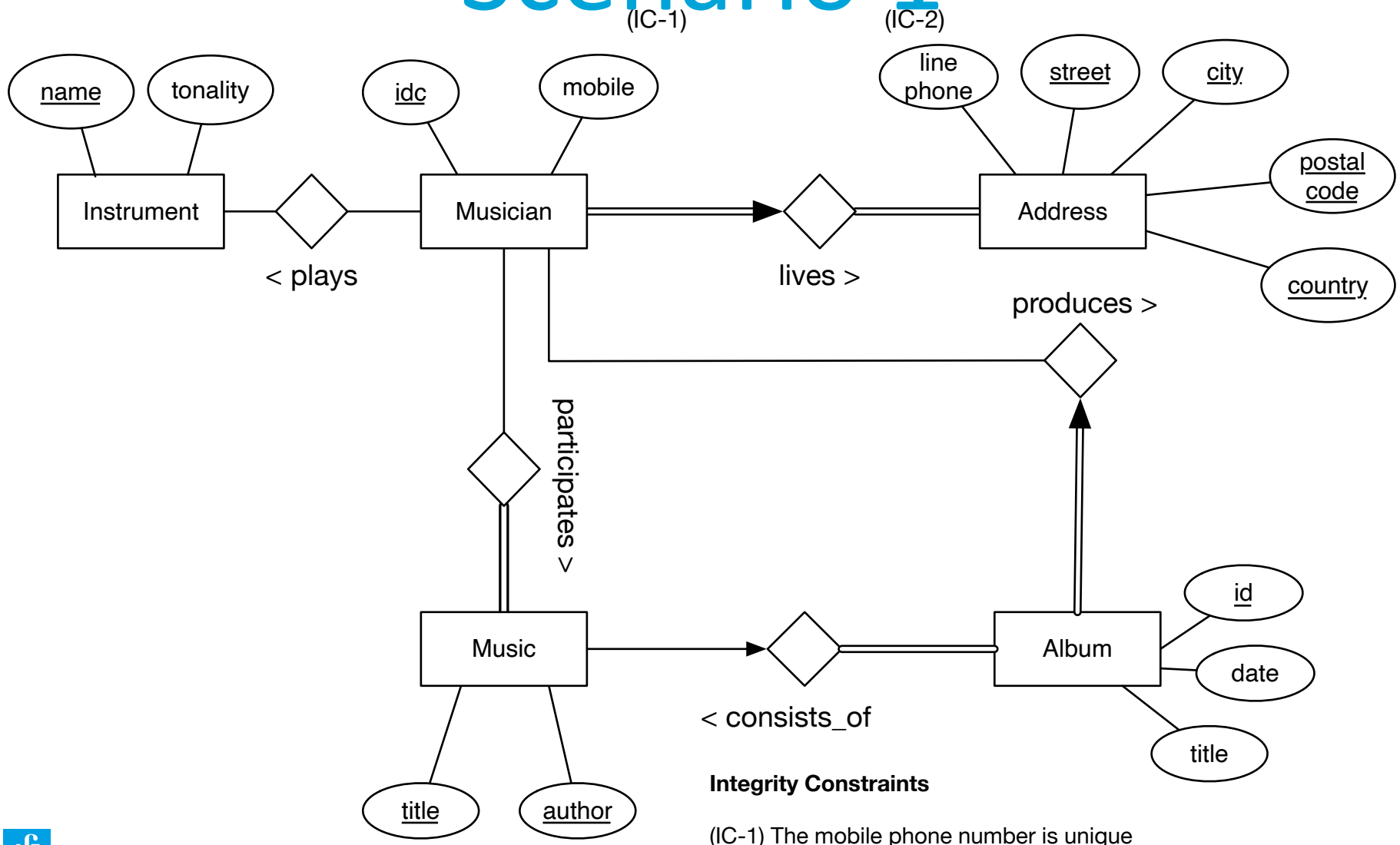
Solution for E-A Scenario 1

Atribute vs. Entity

- Create an entity from an attribute whenever:
  - There is more than one value for the attribute for each instance of the Entity
  - The attribute has its own structure (sub-attributes)
  - The value of the attribute must be shared by multiple entities

- Example: address as attribute
  - Employees have more than one address
  - An address consists of the attributes: Street, city, country ...
  - Some Employees share the same address

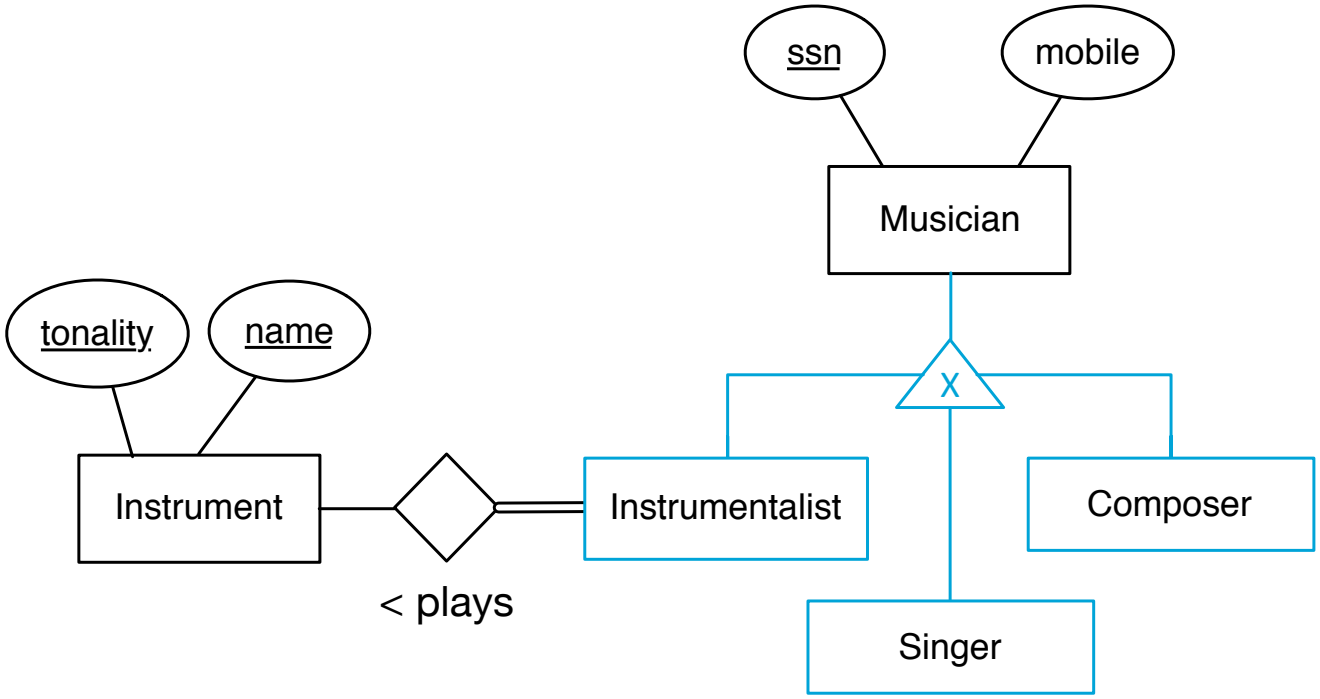
Scenario 1



Integrity Constraints

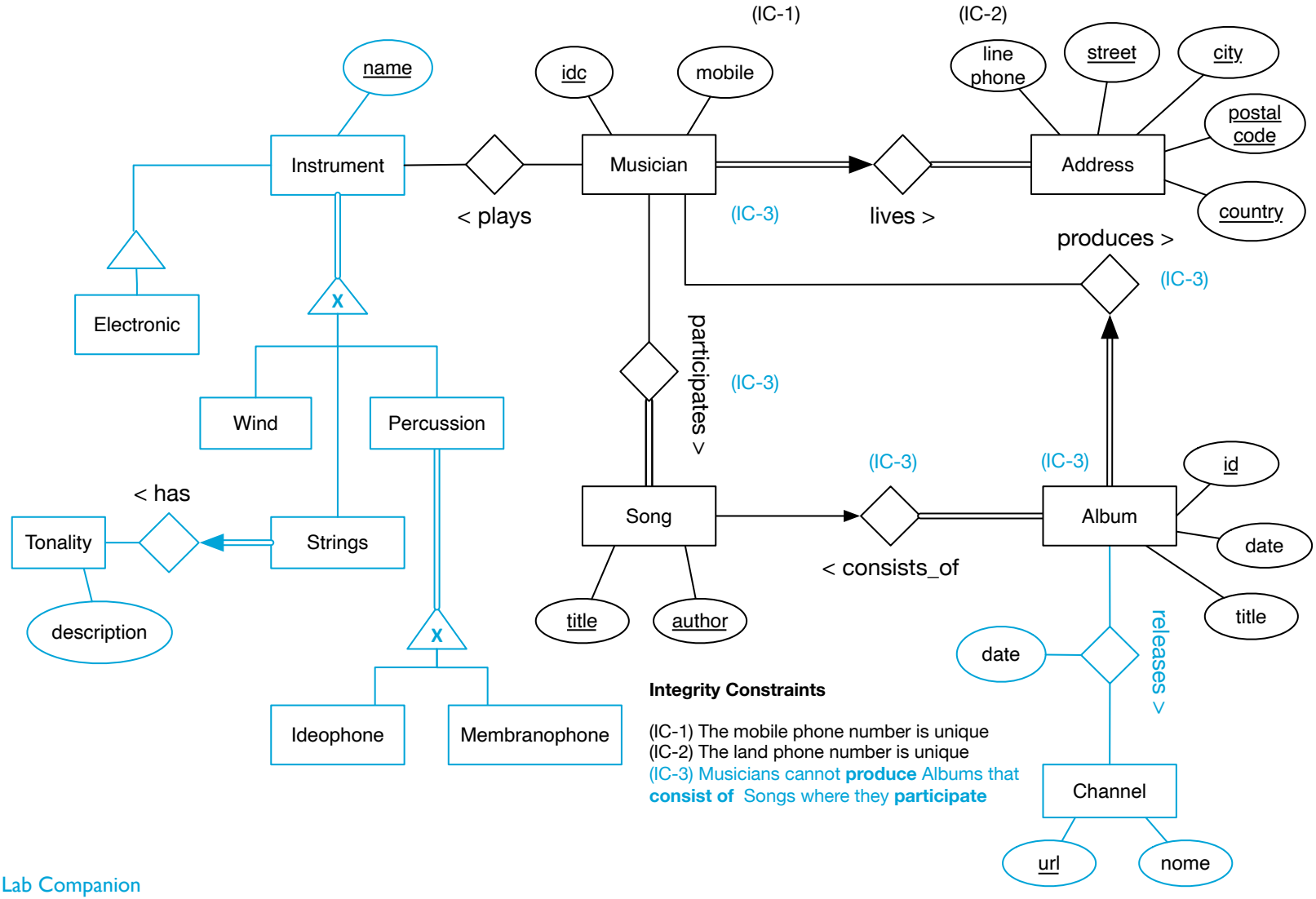
(IC-1) The mobile phone number is unique
(IC-2) The land phone number is unique

Scenario 1: Alternative



Solution for E-A Scenario 2

Scenario 2

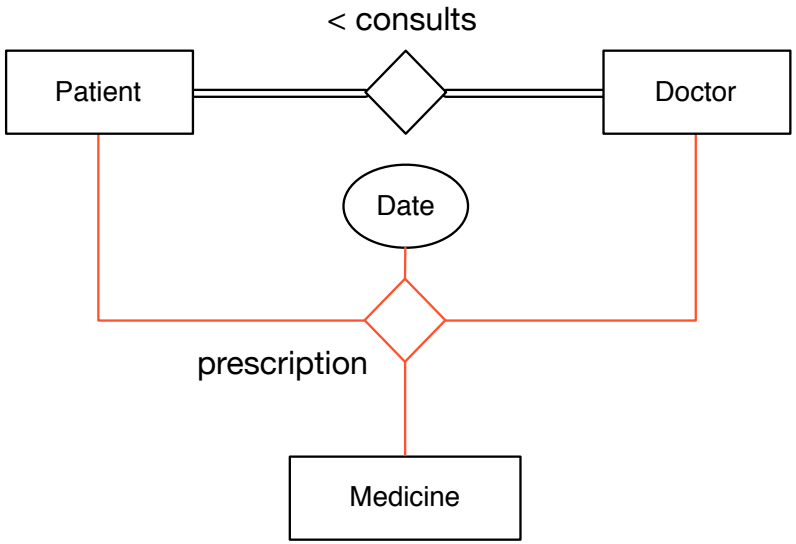


Integrity Constraints

(IC-1) The mobile phone number is unique
(IC-2) The land phone number is unique
(IC-3) Musicians cannot **produce** Albums that **consist of** Songs where they **participate**

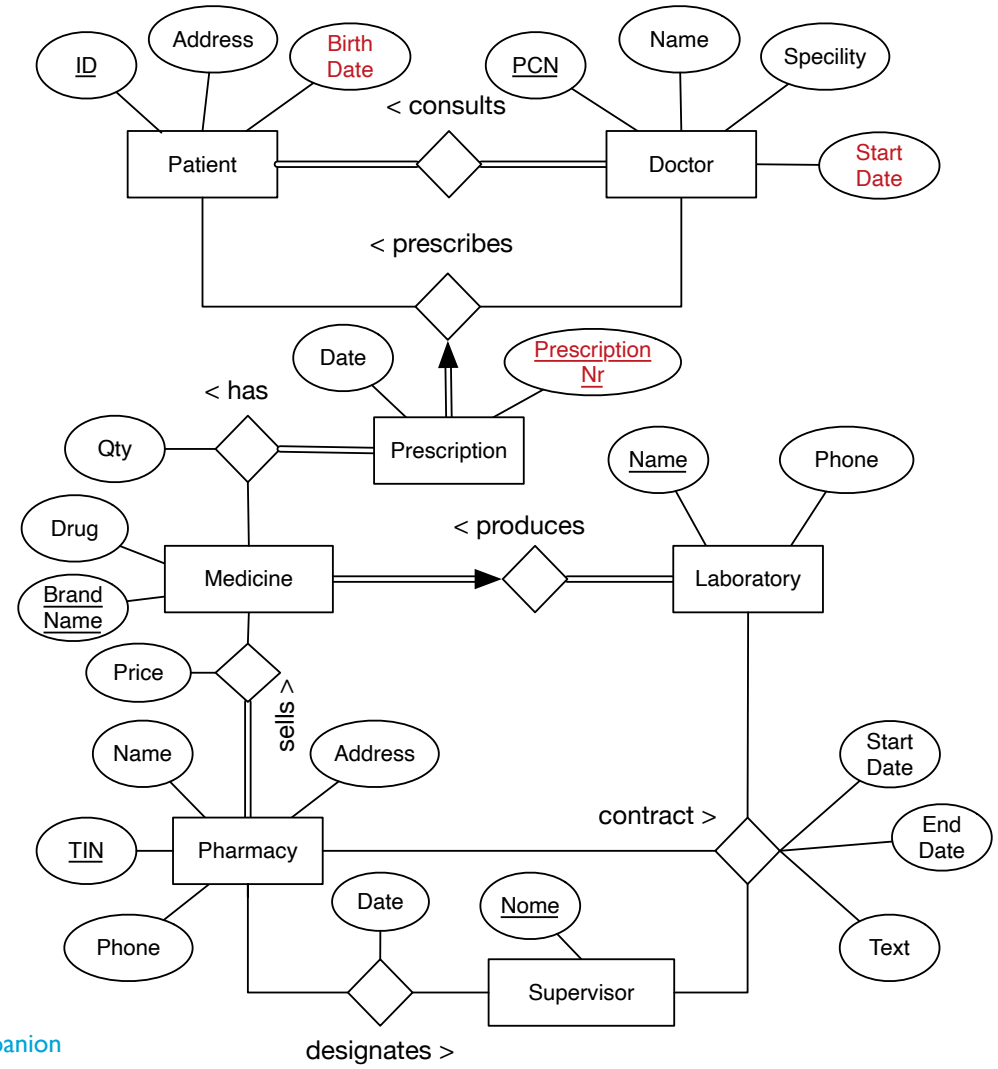
Solution for E-A Scenario 3

Can a receipt be Ternary?



- Prescription cannot be ternary association because, if that is the case, then each recipe can only have one Medicine associated.
- Prescribing multiple medicines would require instantiating the association several times, therefore implicitly creating multiple prescriptions

Scenario 3



Depending on the interpretation of the problem, the attributes in red could be added to the entities

What is missing?

ICs are missing

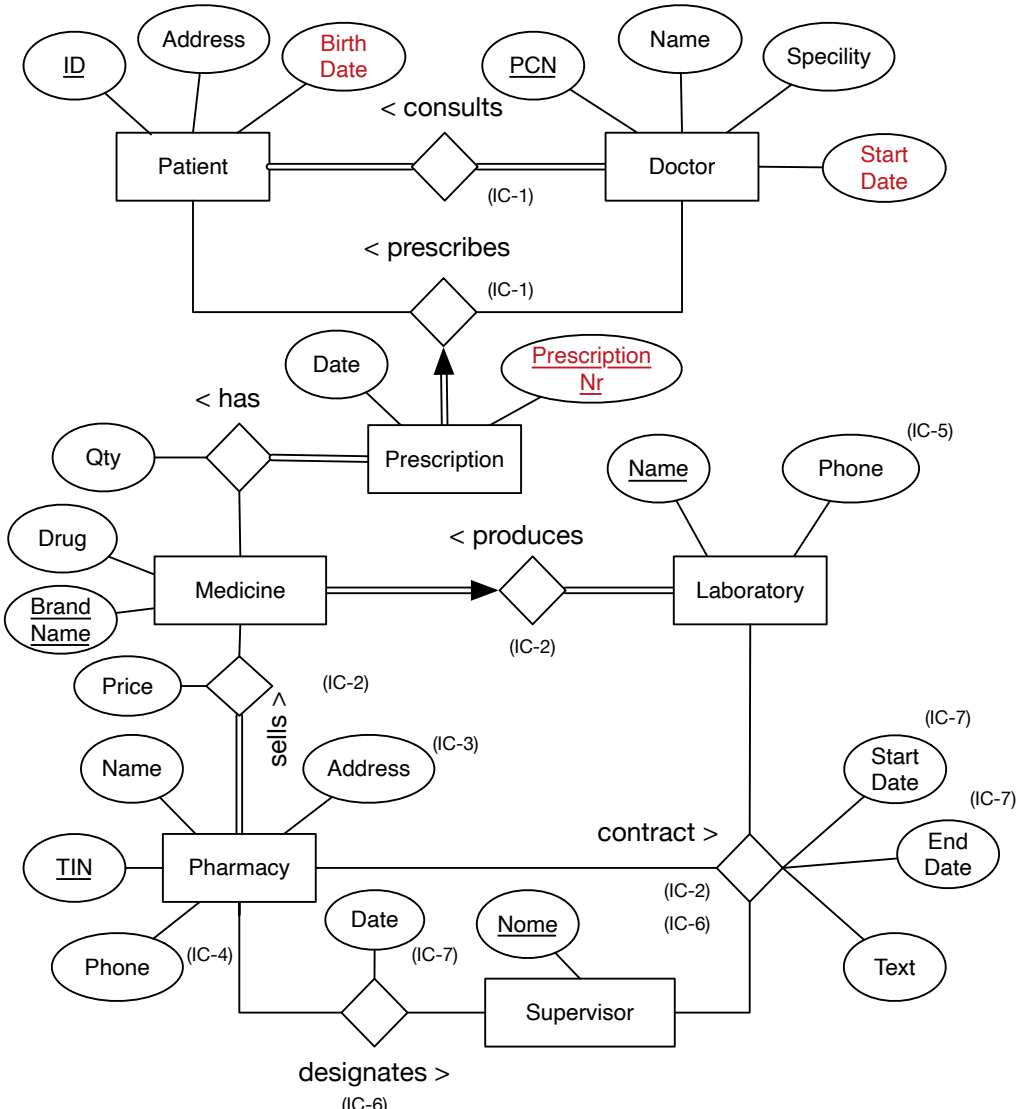
Integrity Constraints

- IC-1: A Prescription can only be **prescribed** to a Patient by a Doctor who **consults** it
- IC-2: A Pharmacy can only **sell** Medicines **manufactured** by Laboratories with which it has **contracts**
- IC-3: The address of a Pharmacy is unique
- IC-4: The phone number of a Pharmacy is unique
- IC-5: The phone number of the Laboratory is unique

Integrity Constraints

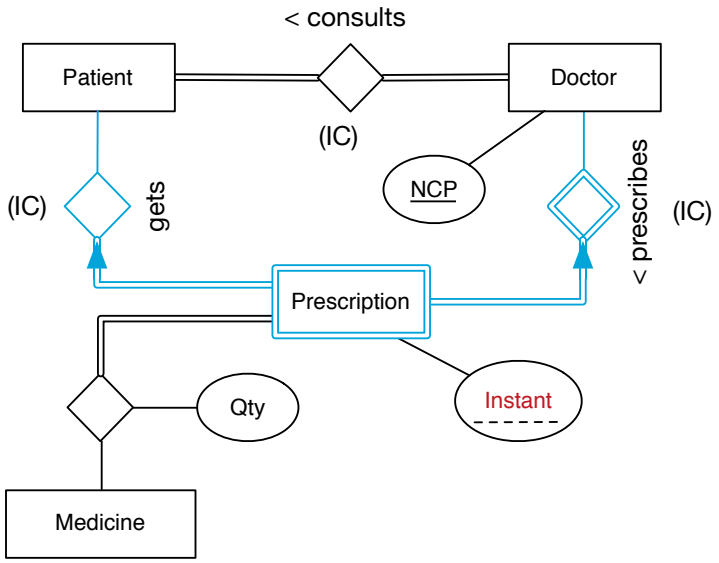
- IC-6: A Supervisor may only be **designated** by a Pharmacy for **contracts** established with the Pharmacy
- IC-7: The **start date** of the designation can not be earlier than the **start date** of the contract nor later than the **end date** of the contract

Solution with ICs



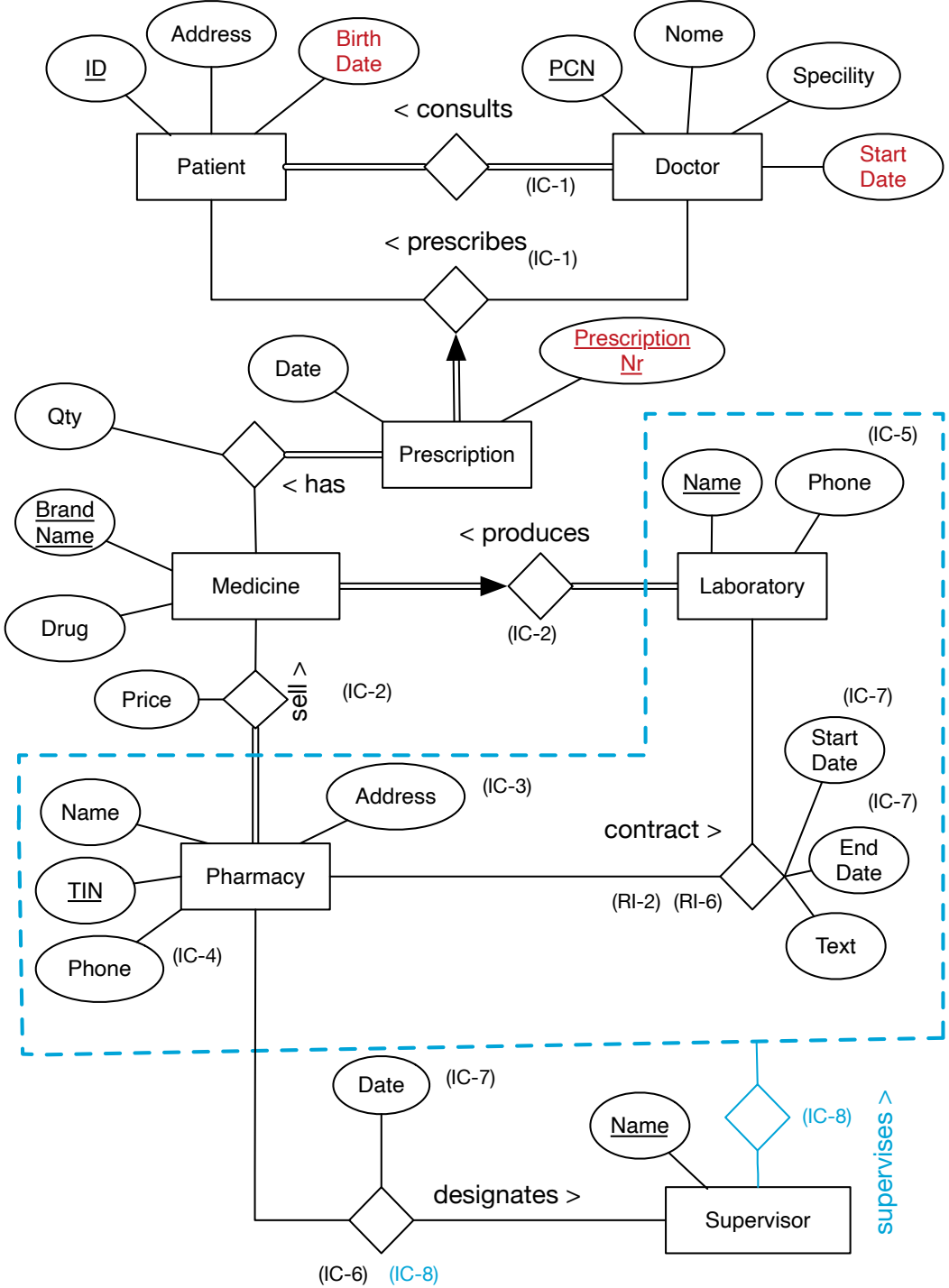
Depending on the interpretation of the problem, the attributes in red could be added to the entities

Receipt as a Weak Entity



- The prescription is “comes" from a doctor
- The prescription can be a weak entity of Doctor because no doctor can prescribe two prescriptions at the same time
- The date is actually date + time (instant)
- IC: A Patient can only receive a **prescription** form the a doctor who follows it

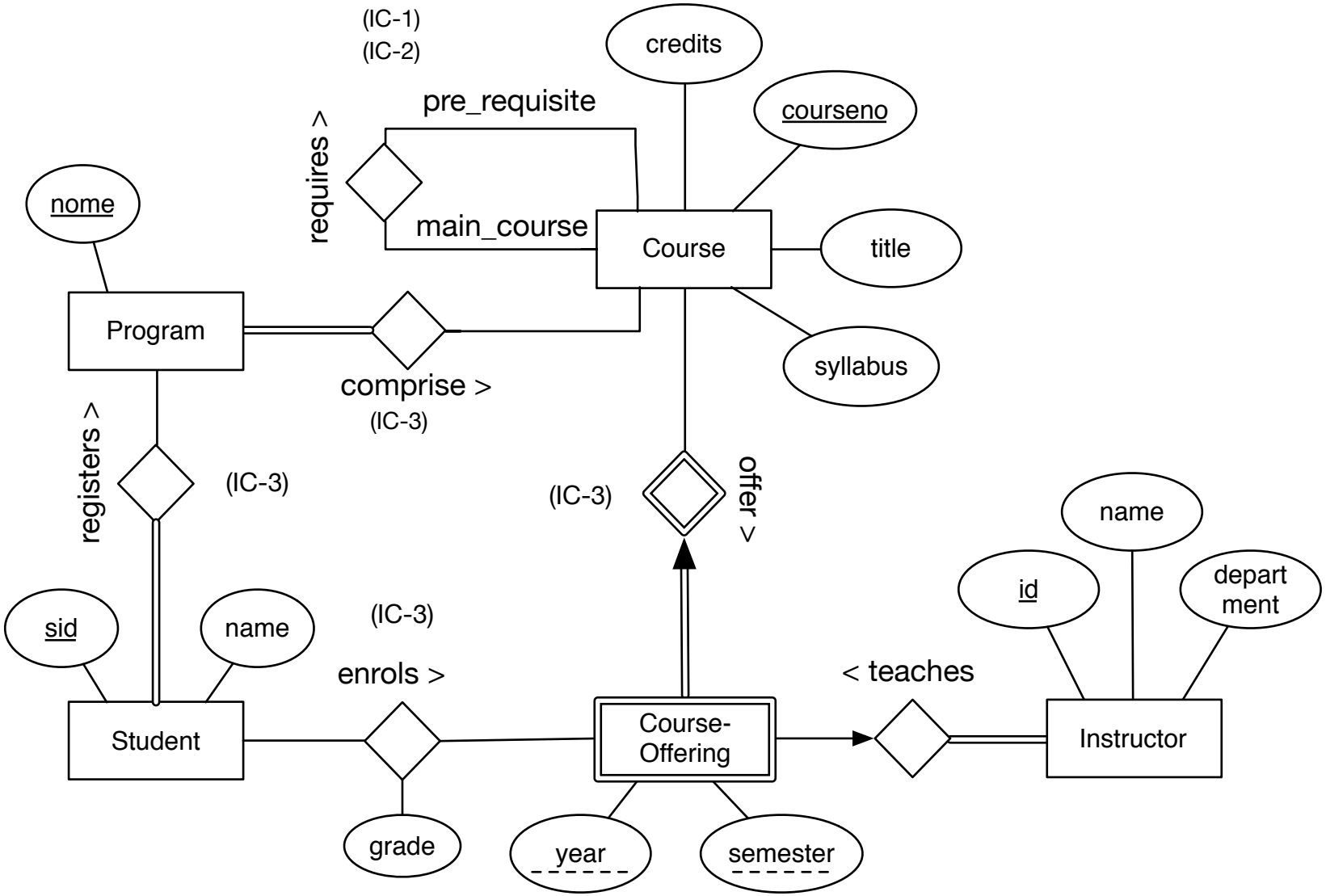
Solution for E-A Scenario 4


Address
ID
Birth Date
Patient
< consults
(IC-1)
Nome
PCN
Specility
Doctor
Start Date
< prescribes
(IC-1)
Date
Prescription Nr
Prescription
Qty
< has
(IC-5)
Name
Phone
Laboratory
Brand Name
Medicine
Drug
< produces
(IC-2)
Price
sell >
(IC-2)
(IC-7)
Start Date
(IC-7)
End Date
Name
Address
(IC-3)
TIN
Pharmacy
Phone
(IC-4)
contract >
(RI-2) (RI-6)
Text
Date
(IC-7)
Name
(IC-8)
supervises >
designates >
Supervisor
(IC-6) (IC-8)

Integrity Constraints

- IC-8: A Supervisor may only **supervise contracts** for Pharmacy for which he/she has been designated.

Solution for E-A Scenario 5


(IC-1)
(IC-2)
credits
pre_requisite
courseno
requires >
nome
main_course
Course
title
Program
comprise >
(IC-3)
syllabus
registers >
(IC-3)
(IC-3)
offer >
name
id
depart
ment
sid
name
(IC-3)
enrols >
< teaches
Student
Course-
Offering
Instructor
grade
year
semester

Integrity Constraints

- IC-1: A Course cannot **require** itself
- IC-2: Courses cannot **require** one another circularly
- IC-3: A Student can only **enrol** in Course Offerings **offered** from Courses **comprised** by the Program where he/she is **registered**.