ISYS2120 Assignment 1 (sem1, 2022)

Due: Sunday 28 August, 11:59pm Sydney time
Value: 10%
This assignment is done in **groups of up to 5students** (aim for exactly 4 members, but it may happen that sometimes a group is smaller or larger, eg if there are not enough students in a lab, or someone needs to be added after the arrangements are initially made). We ask that all students in a group be attending the same lab session, so you can work together more easily [exceptions are possible in cases where a students timetable is changing, or will change; eg a student whose return to Sydney will be a week or so late in semester]

Special note about NTEU strike: In week 3, the union (NTEU) that represents lecturers and casual tutors is holding a strike on Wednesday. Because I will not ask students or casuals to cross picket lines; all labs in week 3 are cancelled (even the online ones, to ensure equality of situation). The check on individual progress in week 3 will therefore be done though each student uploading a document with their progress as explained below.

Procedure: In week 2 lab, you should form a group. If necessary, the demonstrator may allocate or rearrange group membership. One person in the group should go to the "People" page of the unit's Canvas site, and then on the "Groups" tab of that page, pick an empty group for asst1, and join it. The "leader" can inform the others of the group name, and the other members can then use this page and join the same group.

If, during the course of the assignment work, there is a dispute among group members that you can't resolve, or that will impact your group's capacity to complete the task well, you need to inform the unit coordinator, alan.fekete@sydney.edu.au. Make sure that your email names the group, and is explicit about the difficulty; also make sure this email is copied to all the members of the group. We need to know about problems in time to help fix them, so set early deadlines for group members, and deal with non-performance promptly (don't wait till a few days before the work is due, to complain that someone is not doing their share). If necessary, the coordinator will split a group, and leave anyone who doesn't participate effectively in a group by themself.

How to submit your work: produce a text file, whose name is <group_name>_Asst1.sql. It should contain the SQL commands to create the appropriate tables. After the commands, there should be some comments, which show how the SQL relates to the presence or absence of particular constraints on the real world (details of which situations need comments, can be found below). The commands and comments should be valid in the precise syntax that is supported on the Grok SQL system (use a Grok window to check it works). This file should be submitted by only one member of the group, through the Canvas assignment link.

The task: Below we show a conceptual data model, for a system to track the devices (smartphones, laptops etc) that are owned by a company and provided for the employees to use. Each device can be issued to an employee who is responsible for it, and it may also be used by an employee at some time (a user need not be the person to whom the device is issued, though typically, the person issued the device is also using it), Devices are sometimes sent for repair, and each repair is done by a service provider (external to the company that owns the devices).

The task for the group is to produce a relational schema that corresponds to the ER conceptual data model we provide; you must express your relational schema using SQL CREATE TABLE statements, and make sure that all the constraints from the conceptual model are captured in the constraints of the schema. Some aspects of the conceptual model are not specified (for example, it does not indicate the data type for attributes); you need to make sensible choices for these, so that the SQL statements can be executed by the PostgreSQL system used by GrokLearning for its SQL code windows.

We also ask, that your submitted file follow the DDL statements by some SQL comments (that is, either from -- till end of line, or else from /* till */). The comments must explain for each of the following situations , *what clause or aspect of the table definition* allows or prevents that situation (whether it is allowed or prevented, is as indicated by the ER diagram)

Here are the situations for you to comment on (each may be prevented, or not)

A particular device was repaired twice.
A particular device was never repaired.
One repair fixed two devices.
A particular repair is not done on any device.
There is a device which is not a phone.
A particular device was issued to three employees.
A particular employee was issued two devices.
A particular device was not issued to any employee.
A particular employee has not been issued with any device.
A particular device was issued to one employee.
A particular device was used by three employees.
A particular employee used two devices.
A particular device was not used by any employee.
A particular employee has not used any device.
A particular device was used by one employee.
Two models were allocated to the same department.
A particular model was allocated to three departments.
Two models were allocated to the same department.
A particular department has not had any model allocated to it.
A particular model has not been allocated to any department.

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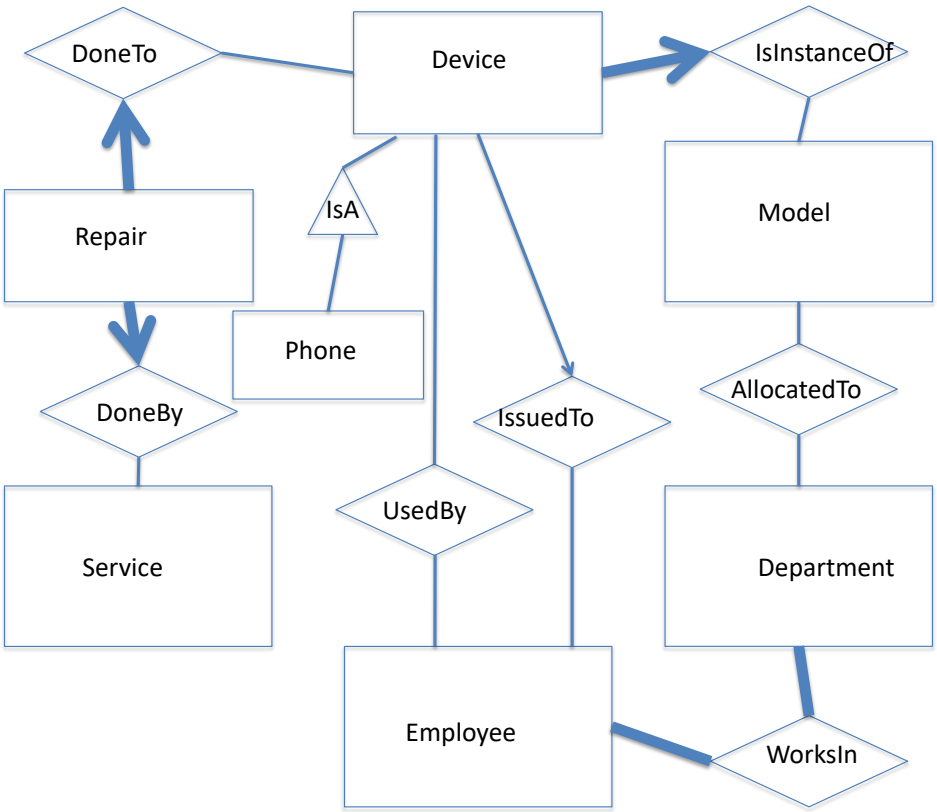
Week 3 Progress:
Well before the time when your week 3 lab is scheduled, the group should allocate 4 of the statements in the list above to each member (no overlap among members, please; it is OK if some statements are not allocated to anyone). The member will write a document which gives these situations, and for each one, it should give a view as to whether this situation is allowed or prevented, according to the ER diagram. Note that the contribution mark is based on writing a reasonable attempt; there is no penalty for being wrong, as long as you tried.

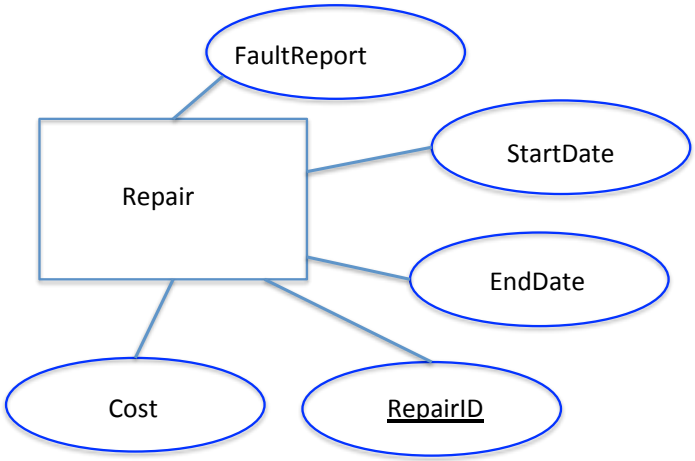
Week 4 progress:
Before your week 4 lab, the group should have agreed on the overall structure of the relational schema, and produced a diagram showing the table names, and the columns for each table. The group should allocate one table to each member, and the member will bring to week 4 lab, a CREATE TABLE statement for this table. Note that the contribution mark is based on bringing a reasonable attempt; there is no penalty for being wrong, as long as you can explain your reasoning. If a member can't participate in the week 4 lab (for example, they are ill), then they should send their answers with another member, and the contribution can still be assessed.

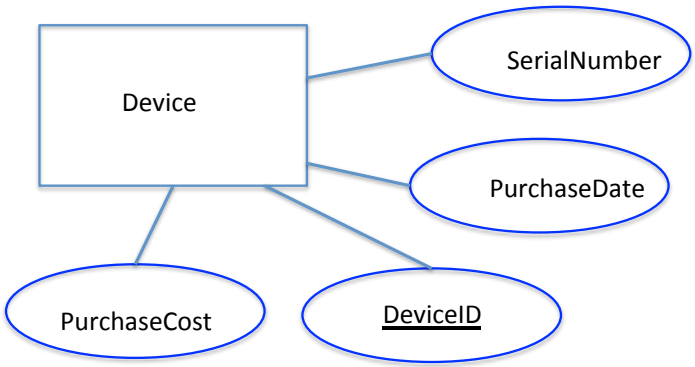
What the group must submit by the due date:
You must upload in Canvas a plain text file (.sql extension please), You should produce a relational schema that can capture the same information . Express it using SQL CREATE TABLE statements, and make sure that all the constraints from the conceptual model are captured in the constraints of the schema.

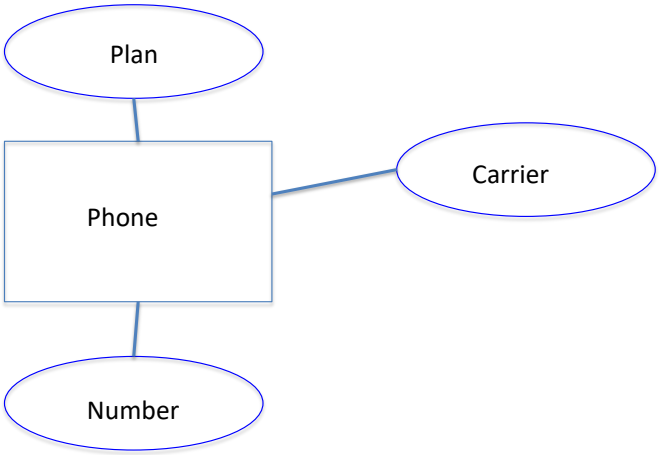
The conceptual model is expressed in an ER diagram, but due to its complexity, we show it in pieces. First is a high-level diagram, showing the entities and relationships, but not the attributes.

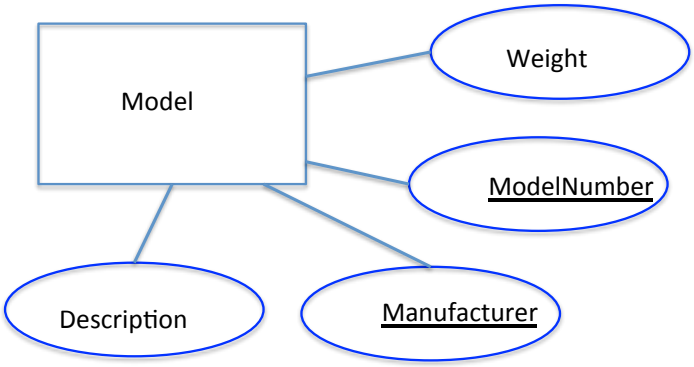

DoneTo
Device
IsInstanceOf
Repair
IsA
Model
Phone
DoneBy
IssuedTo
AllocatedTo
UsedBy
Service
Department
Employee
WorksIn

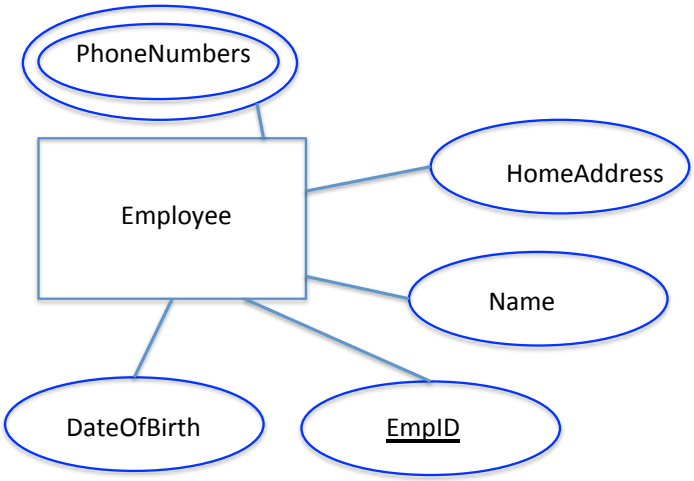
Next we give diagrams showing individual entity or relationship shapes, each with its attributes. If we don't show the relationship here, that means there are no attributes.

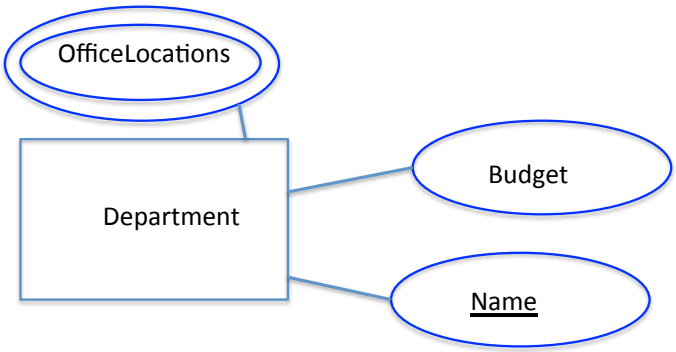


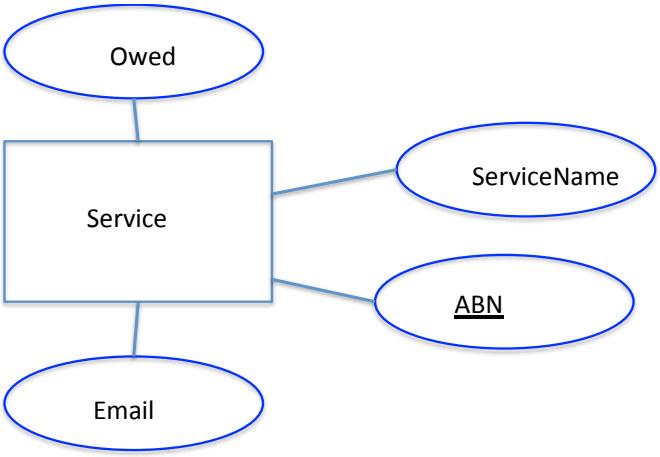


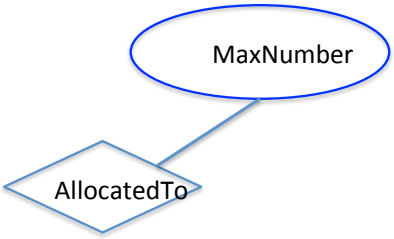

Plan
Phone
Carrier
Number

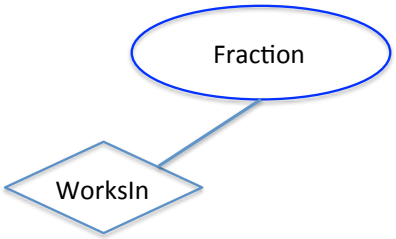

Model
Weight
ModelNumber
Description
Manufacturer


PhoneNumbers
Employee
HomeAddress
Name
DateOfBirth
EmpID


OfficeLocations
Department
Budget
Name


Owed
Service
ServiceName
ABN
Email


MaxNumber
AllocatedTo



Marking scheme:

Submitted report (all members get the same mark)/4
4: valid SQL DDL statements that accurately reflect what is in the ER diagram, and accurately explain how the DDL permits or forbids each of the list of situations mentioned in the instructions
3: valid SQL DDL statements that produce tables that can store all of the information about any state on the world that is consistent with the diagram and that also capture a broad variety of the constraints shown in the diagram, together with comments that identify relevant features of DDL for the majority of the list of situations mentioned in the instructions
2: valid SQL DDL statements that produce tables that can store most of the information about any state on the world that is consistent with the diagram
1: valid SQL CREATE TABLE statements that are relevant for the domain

Individual contribution based on the student's progress contributions in week 3 and week4)/1
0.5 for showing progress in week 3
0.5 for showing progress in week 4