UNIT 1. CONCEPTUAL MODELLING (EER)

Part 2 of 3: ER DIAGRAM

27/09/23

Bases de datos (BD)

CFGS Desarrollo de Aplicaciones Web (DAW)

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UNIT 1. CONCEPTUAL MODELLING (EER)

- PART 1/3

  - UNIT 1.1 ENTITY-RELATIONSHIP DIAGRAM (ER)

    - Modelling a database. Steps to follow.
    - ER conceptual modelling key concepts
  - **Workshop A**: basic-complexity diagrams

- **PART 2/3**

  - UNIT 1.2 ATTRIBUTES IN RELATIONSHIPS & WEAKNESS

    - Attributes in relationships
    - Weak entities
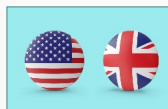 - **Workshop B**: medium-complexity diagrams

- PART 3/3

  - UNIT 1.3 EXTENDED E-R DIAGRAM (**EER**)

    - Generalizations and specializations
    - Aggregations (relationships as entities)
  - **Workshop C**: high-complexity diagrams
  - **Workshop D**: spiders :-)

United States => MODE**L**ING
British English => MODE**LL**ING

UNIT 1. CONCEPTUAL MODELLING (EER)

PART 1

UNIT 1.1 ENTITY-RELATIONSHIP DIAGRAM

Workshop A: basic-complexity diagrams

PART 2

UNIT 1.2 ATTRIBUTES IN RELATIONSHIPS & WEAKNESS

Workshop B: medium-complexity diagrams

PART 3

UNIT 1.3 EXTENDED E-R DIAGRAM

Workshop C: high-complexity diagrams

Workshop D: spiders :-)

UNIT 1. CONCEPTUAL MODELLING (EER)

UNIT 1.2 ATTRIBUTES IN RELATIONSHIPS & WEAKNESS

1.2.1 Attributes in relationships

1.2.2 ER: Weak entities

UNIT 1.2.1 ATTRIBUTES IN RELATIONSHIPS

Let's study this case:

https://www.geeksforgeeks.org/attributes-to-relationships-in-er-model/

UNIT 1. CONCEPTUAL MODELLING (EER)

UNIT 1.2 ATTRIBUTES IN RELATIONSHIPS & WEAKNESS

1.2.1 Attributes in relationships

1.2.2 ER: Weak entities

1.2.2 ER: Weak Entities

A **weak entity** is one that **needs another entity to exist**, that is, if the strong entity does not exist the weak entity could not exist either.
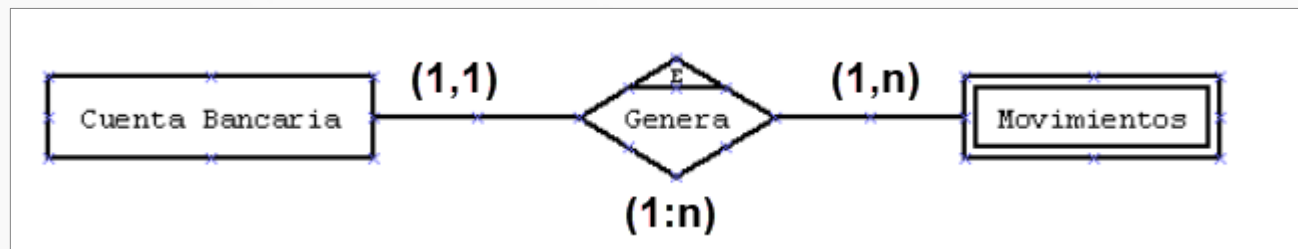
We can recognize a weak entity B by its dependence on the other entity A, for this we can ask ourselves if we delete an occurrence of entity A will it be necessary to also delete the related occurrences of entity B (the weak one)?

At the example below, in a banking environment, we have bank ACCOUNTS and we have bank MOVEMENTS. Obviously, bank MOVEMENTS have no meaning without the existence of bank ACCOUNTS.
* **We'll say MOVEMENTS (acting as weak) has an existence dependency on ACCOUNTS (acting as strong).**

So, an **existence dependency (**from the WEAK entity to the STRONG entity) is represented by **writing an "E"** at the top of the diamond (relationship symbol) and **placing a double line on the weak entity**.

In this case, both entities have a PRIMARY KEY that uniquely identifies each occurrence of the entity (ACCOUNTS could be "account_id" and for MOVEMENTS could be "movement_id").

In this case, we assume that the MOVEMENTS have an attribute that uniquely identifies them in the entire database.

Movement 987329832754
Movement 987329832757
Movement 987329832756

The E can be inside or outside the diamond. Generally at the top of it.

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1.2.2 ER: Weak Entities

When the weak entity cannot identify every one of its instances/occurrences with an unique value, it needs to add the primary key of the strong entity to form its own primary key. In this case, we have **an identity dependency**.

The **identity dependency includes the existence dependency,** since you need to remove all the related instances of the weak one when you remove an instance of the strong one.

This kind of weakness, is represented by **writing "ID"** at the top of the relation, keeping the **double lined rectangle** over the weak entity. Actually, we should write E+ID since ID always includes E, so you can write E+ID o just ID.

In the example below, to identify any INVOICE LINE we'll need an INVOICE. So, the PRIMARY KEY for the INVOICE LINE will be the **composite attribute "invoice number" of the strong entity + the "line number" of the weak one.**
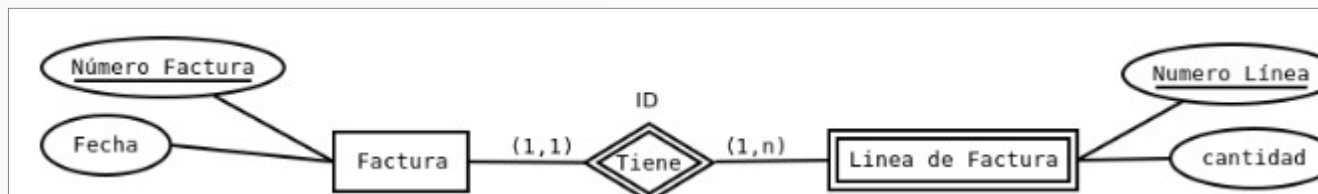
Tip: Add an E next to the ID text to remind you that the IDENTITY DEPENDENCY includes the EXISTENCE DEPENDENCY
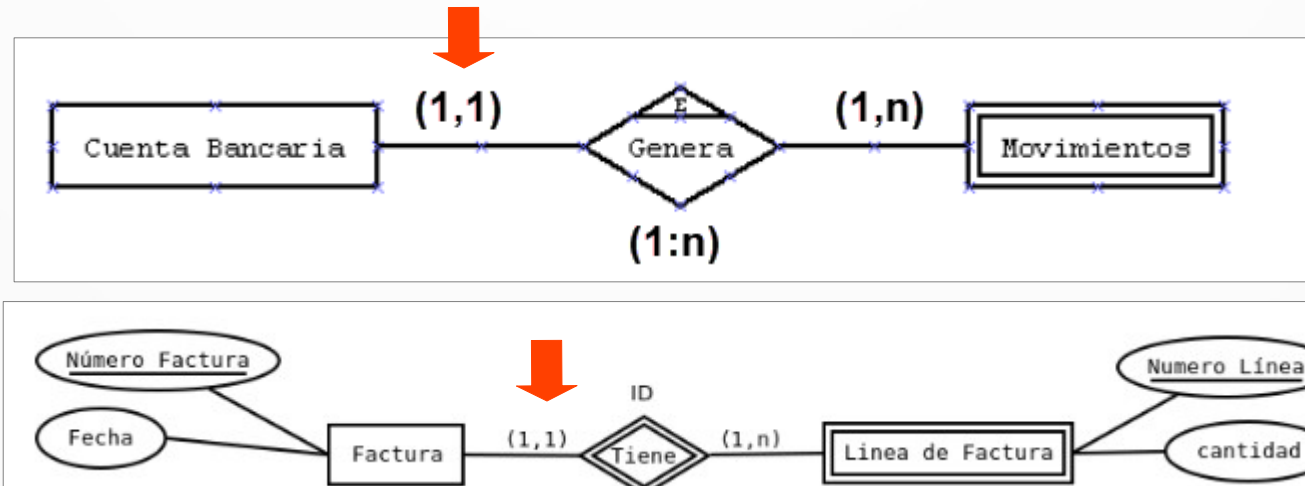
The diamond of the relationship can be single or double-lined in both types of weak relationships. What determines if it is of one type or another are the letters that you put above it (only E, E+ID or just ID)

1.2.2 ER: Weak Entities

**Be aware, in a weakness scenario, the STRONG entity is always participating with 1,1**!

Why? You should know the answer (at this point)…

1.2.2 ER: Weak Entities

Have a look at these examples and **try to guess the PARTICIPATION, CARDINALITY and if they are E+ID (IDENTITY) or just E (EXISTENCE):**

Publish your SOLUTION PROPOSAL in the **UNIT 1 FORUM,** creating a new post with the subject WEAKNESS EXAMPLES: DIAGRAM X ... if no one has created it before :-)
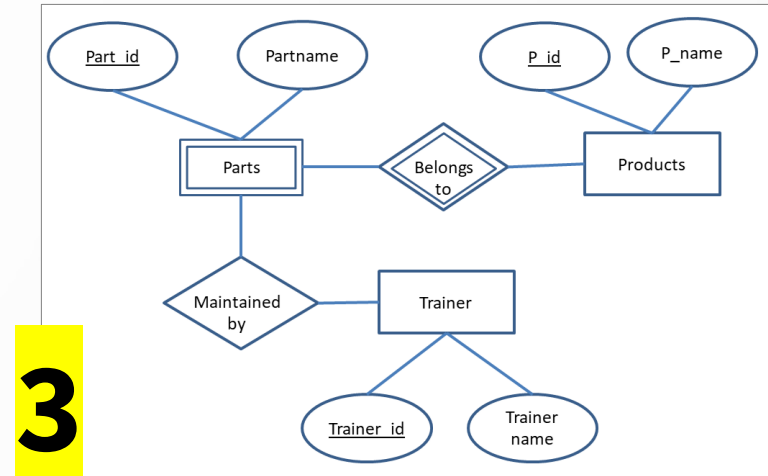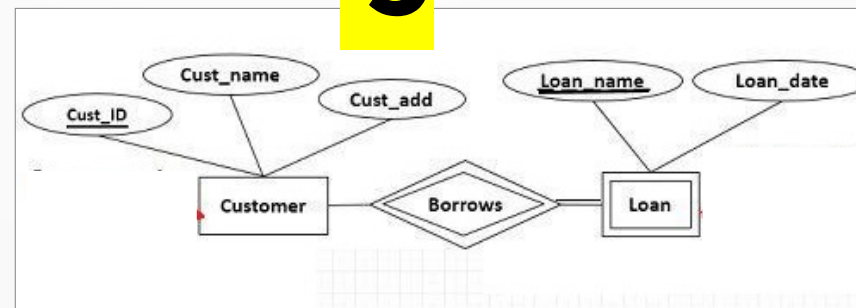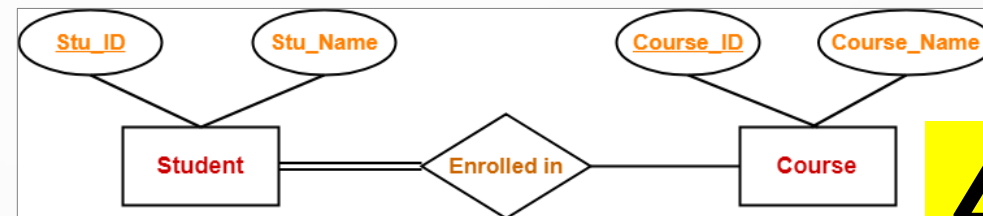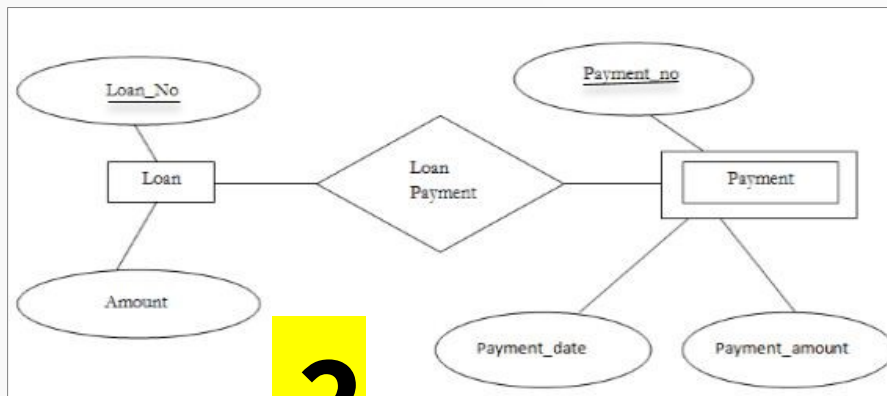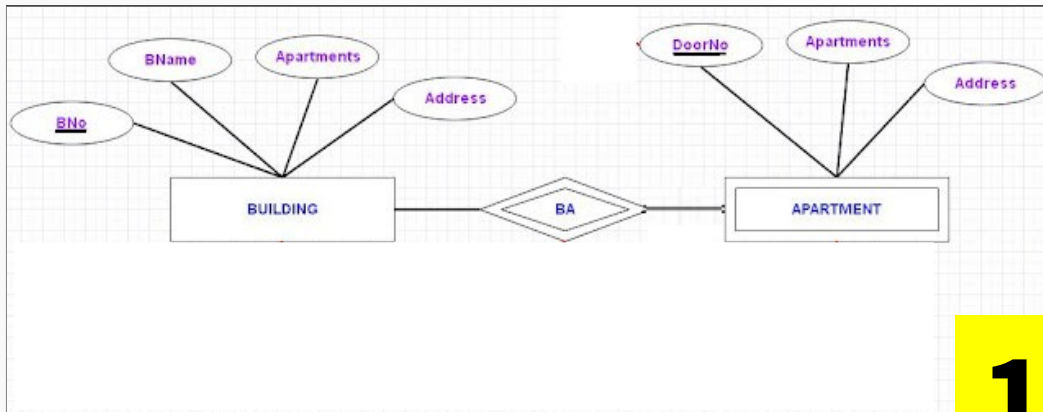
1

2

3

4

5

6

1.2.2 ER: Weak Entities

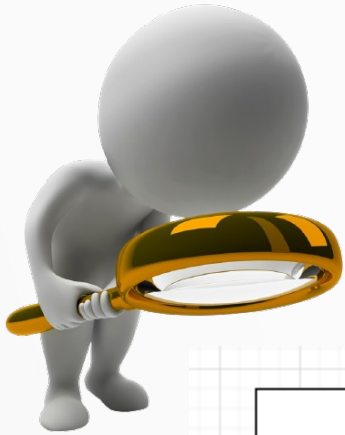Sometimes, an entity can act as STRONG and WEAK depending on the relationship….
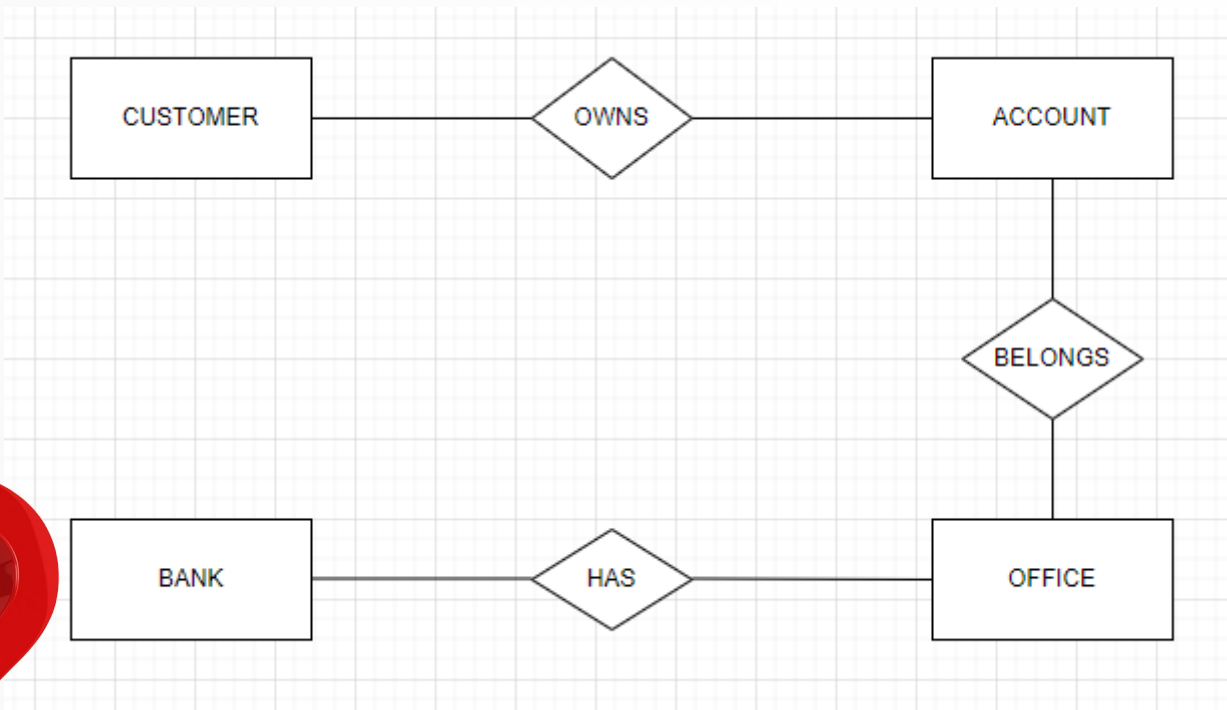
Write the participations knowing that:
- A customer **can** own more than one account
- An account **must** have a **single** customer (as owner)
- An account **must** belong to a **single** office
- An office **can** have more than one account
- An office **must** belong to a **single** bank
- A bank **can** have more than one offices

1.2.2 ER: Weak Entities

Sometimes, an entity can act as STRONG and WEAK depending on the relationship….
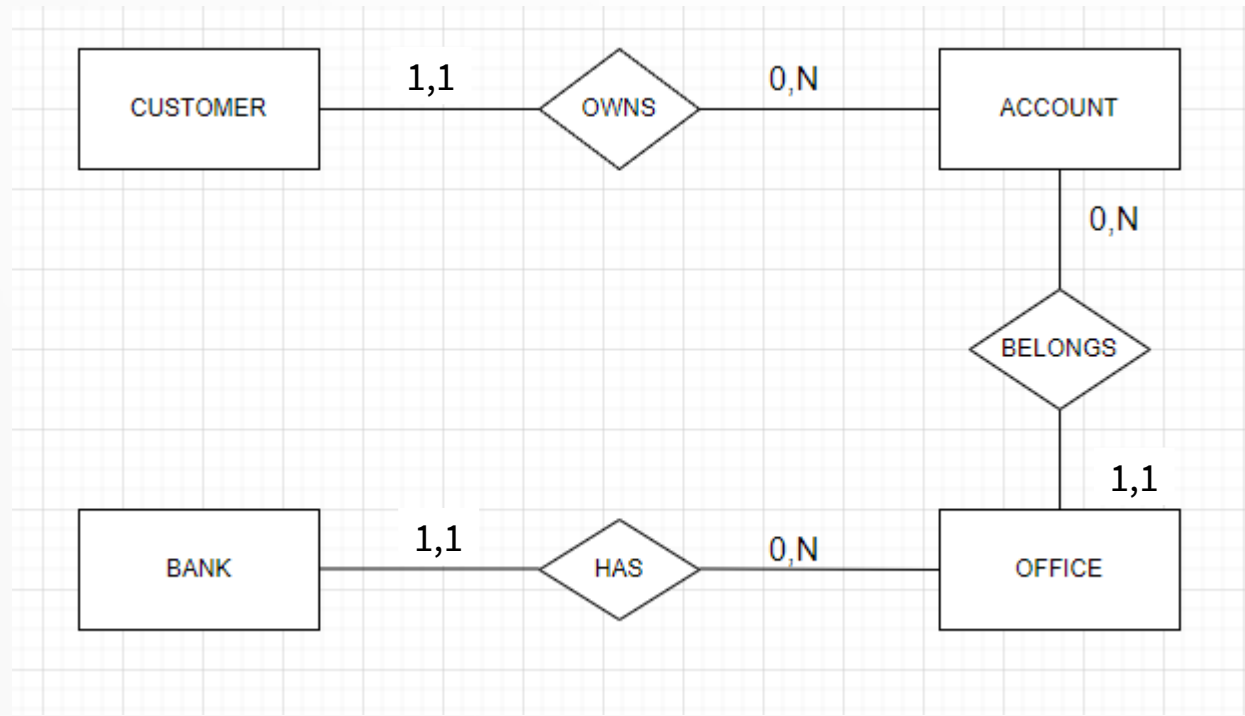
Detect the weakness knowing that:
- An account doesn't need a customer to be identified, but **does need** to be deleted if the customer is deleted.
- An account **does need** an office to be identified, and **does need** to be deleted if the office is deleted.
- An office **does need** a bank to be identified, and **does need** to be deleted if the bank is deleted.
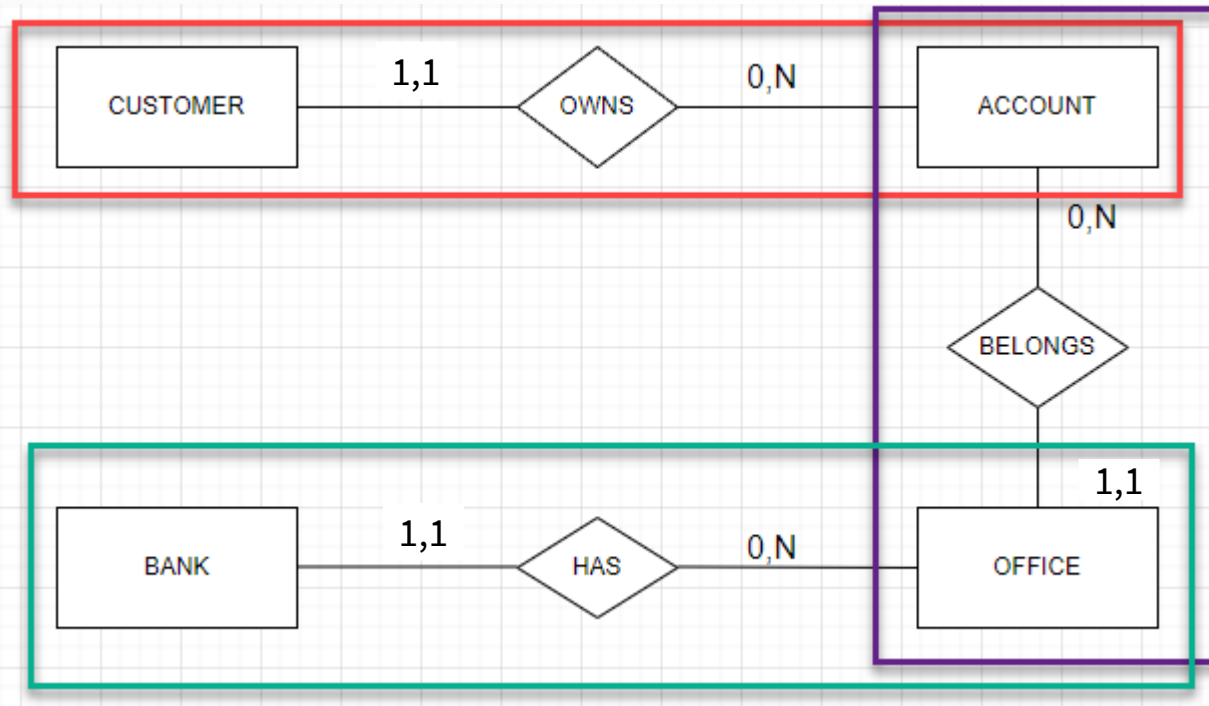
ATTENTION:
You should detect each weakness, setting a STRONG entity and a WEAK entity **for EACH WEAKNESS!**

1.2.2 ER: Weak Entities

Sometimes, an entity can act as STRONG and WEAK depending on the relationship….

ATTENTION:
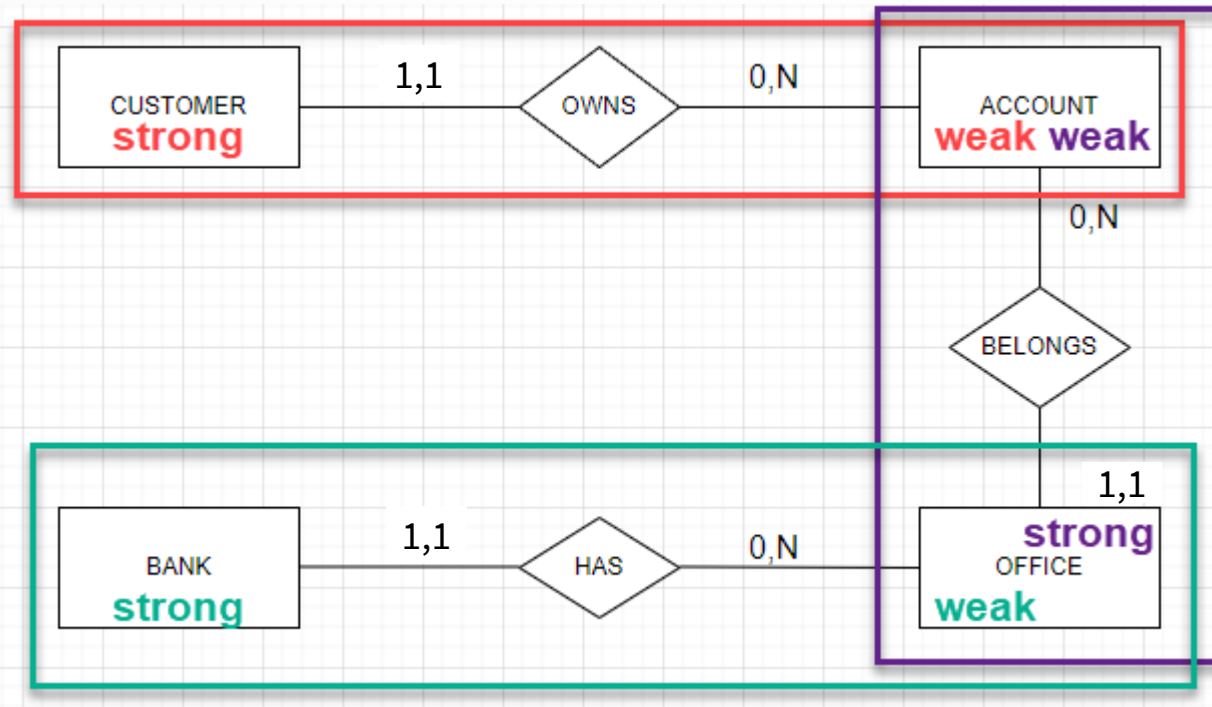We have THREE weakness! Detect now the STRONG and the WEAK in each one…

TIP:
Look at the participations…

1.2.2 ER: Weak Entities

Sometimes, an entity can act as STRONG and WEAK depending on the relationship….

ATTENTION :
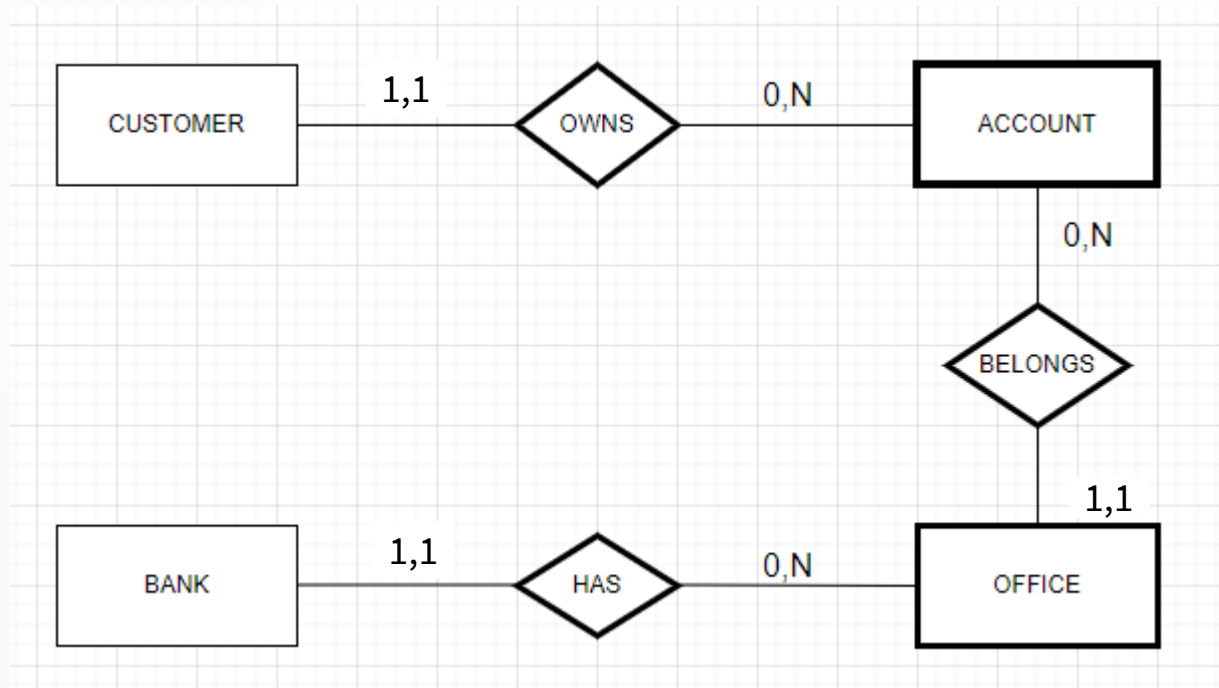Last step… is to draw the double lines over the diamonds and the rectangles.

TIP:
If an entity is acting as WEAK anytime, it should be double lined.

1.2.2 ER: Weak Entities

Sometimes, an entity can act as STRONG and WEAK depending on the relationship….

ATTENTION :
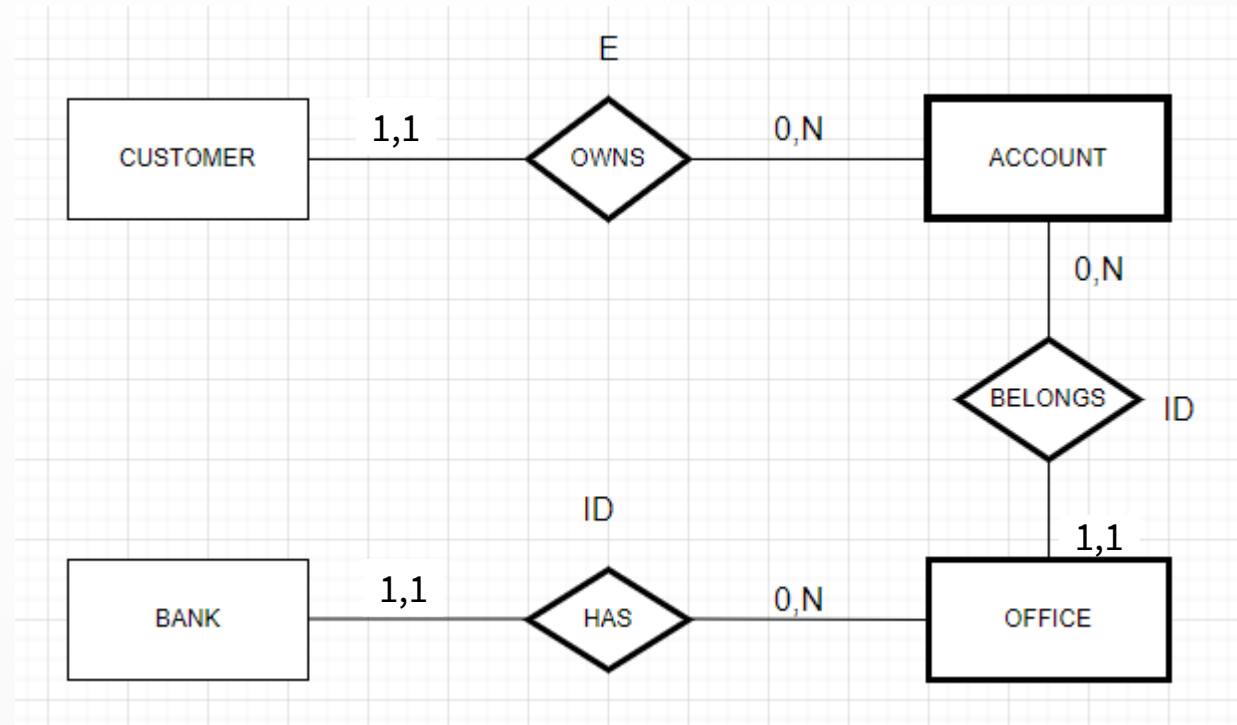Last step… is to set the type of weakness for each relationship.
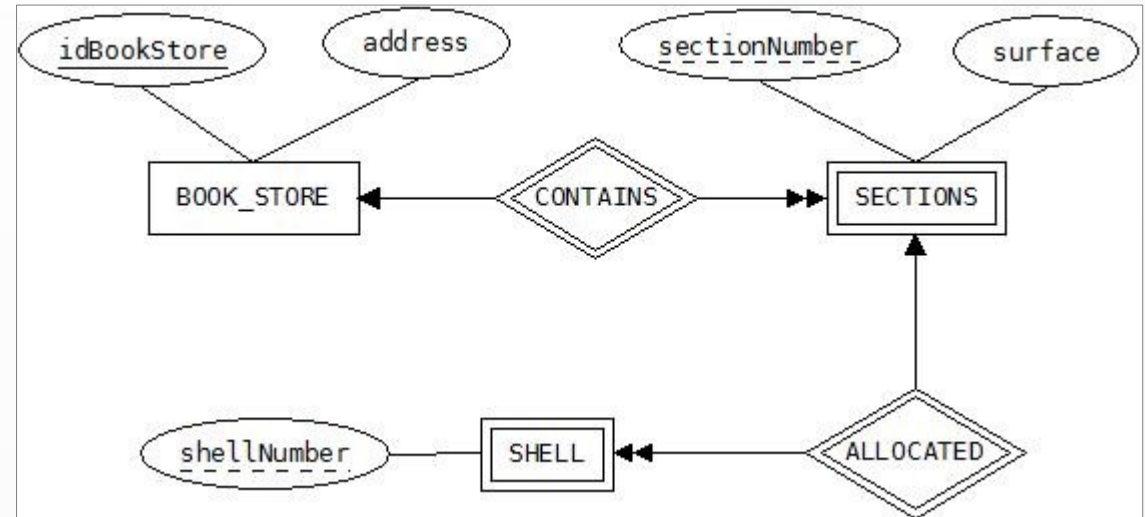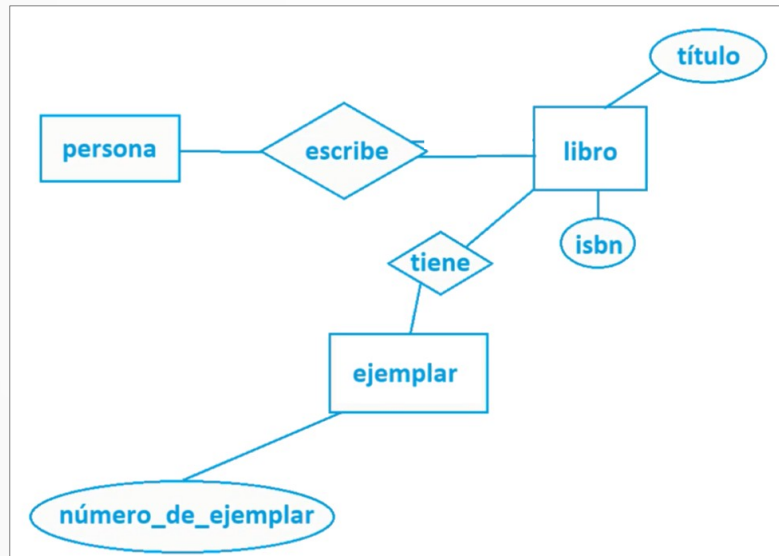
TIP:
Go back and check the specifications.

1.2.2 ER: Weak Entities

Sometimes, an entity can act as STRONG and WEAK depending on the relationship….
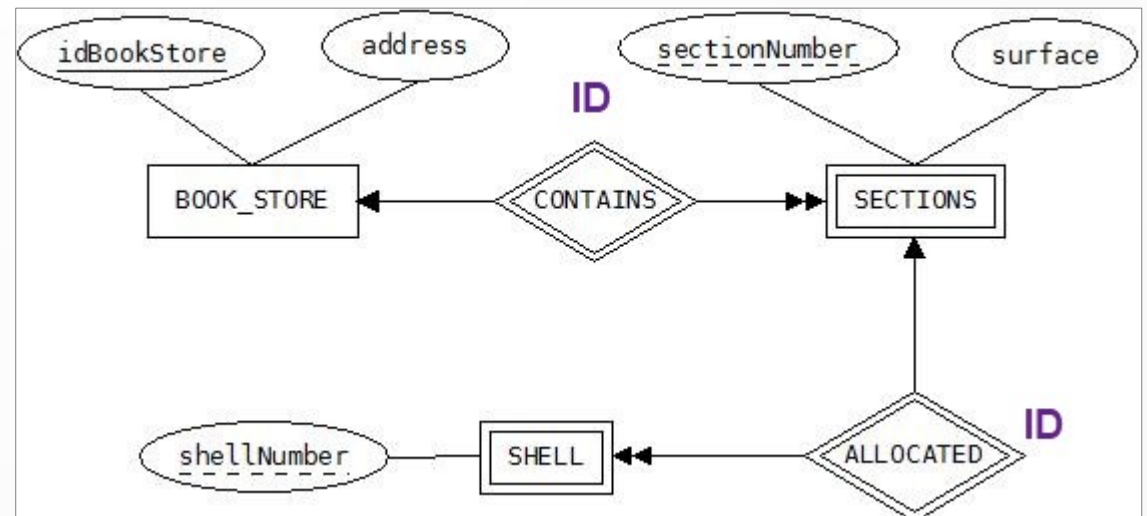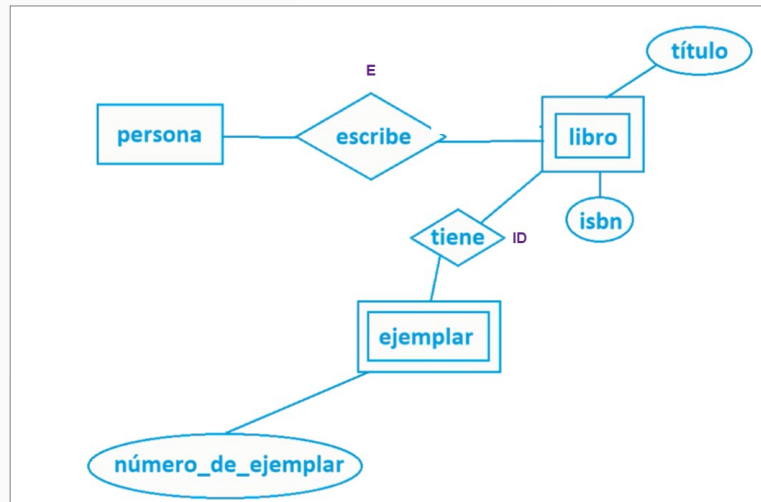
1.2.2 ER: Weak Entities

Try to guess the type of each weakness in these examples (ignore the arrows):

1.2.2 ER: Weak Entities

Try to guess the type of each weakness in these examples (<mark>ignore the arrows</mark>):

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CONCEPTUAL MODELING (EER)

	BASES DE DATOS 2022/2023
	CFGS DAW

WORKSHOP B: MEDIUM LEVEL ER

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