DnA: Homework 2

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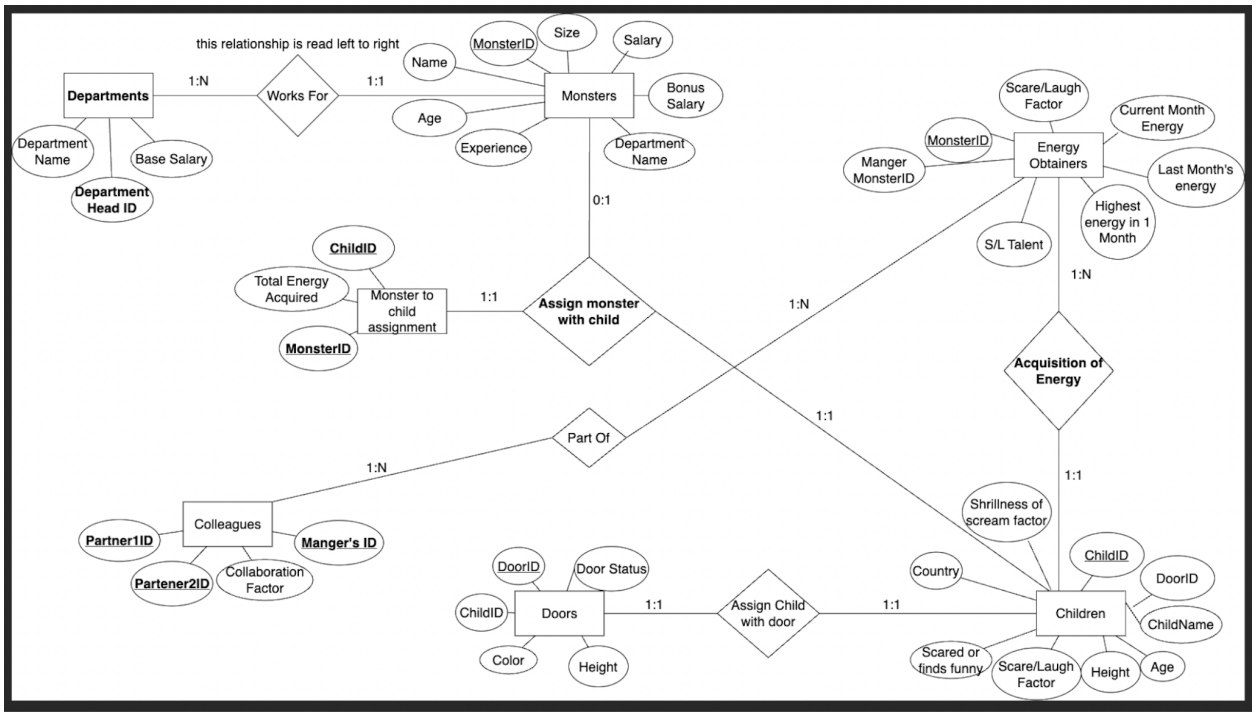
1. ER Diagram

- bolded words mean it is mentioned in the requirements document and is incorrect (example: multiple primary keys in the “colleagues” entity type) we have still mentioned the incorrect things in the ER diagram, but can be easily identified because they are bolded.
- the given document also had incorrect min max ratios which are corrected in the ER diagram followed.
- if there are no pre mentioned assumptions, we are either following the things shown in the movie to form both the constraints or mentioning our assumptions here:
    - in the works for relationship, we have assumed that each monster has to work for at least one department and can work for at max one department. Each department needs to have at least one monster working for it. The relationship is read right to left in the diagram.
    - Each energy obtainer can be assigned to N children, but each child can have only one monster assigned to it.



2. **Missing**
    a. Haven't included the attribute types such as composite, multivalued, and simple attributes.
    b. weak entity type "departments" is missing a partial key.
    c. analysis is missing from retrievals in the functional requirements.
3. **Incorrect**
    a. **multiple primary keys:**
    in "Colleagues" and "Monster to child assignment" entities, multiple attributes have been marked as the primary key (it is ambiguous which one is the actual primary key) , which is incorrect as an entity type can only have a single primary key. Instead this can be modified to select one of the attributes as the primary key and mention the other as candidate keys.
    b. in the "works for" relationship, **the min max ratio and cardinality ratio convey two different things.** the cardinality ratio says one department can have N monsters, but the min max constraint says that each department can participate in the relationship at max only one time i.e. each department can have at max only one monster.
    c. "monster to child assignment": ternary relationship.
    d. the search operation in retrievals doesn't do partial text matching and searches for an entire country instead.
    e. in the "Acquisition of Energy" relationship type, it is mentioned that one energy obtainer can only have one child assigned to it, but we know that a energy obtainer can obtain energy from multiple children **according to the movie.**
    f. two assumptions violate each other
        - The database can only include either monsters that scare or monsters that make the children laugh.

    the following assumption implies that managers and ceos can also be scarers or monsters that make children laugh. which means that ceo is a colleague which not only violates the assumption:

    CEO is the boss of the "manager" (the colleague entity type includes the "manager" and the "pair").

    but also violates a lot of things up as it is recursive.

g. In the child entity the doorID is an attribute, in the door entity ChildID is an attribute, hence the relationship “Assign Child with Door” is redundant, unnecessary, and incorrect cause the attributes are sufficient.

4. **Ambiguous**
    a. **weak entity has a primary key**
    in the weak entity “Departments”, the attribute department head ID can act as a primary key, unless specified otherwise that one monster with unique ID can be the department head of multiple departments, which was not done.
    b. **primary key is incorrect**
    in the strong entity “Colleagues”, Manager ID cannot be the primary key because one manager can manage more than one pair unless specified otherwise, which was not done.
    c. STRING is not a valid datatype, “VARCHAR” can be used instead.
    d. the functional requirements have not been mentioned point-wise as given in the moodle post and it's not clear what the specific operations for projections, selections, aggregate functions etc. are.
5. **Modifications**
    a. “monster to child assignment”: strong entity type and a relationship.
    Why do we need to modify it?:
    its redundant “monster to child assignment” is an entity and has a relationship called “Assign Monster with a child” defined which does a similar job.
    How do we modify it?”
    we can instead remove both the entity type and the ternary relationship and define another two degree relationship which maps a monster to a child. the new relationship can also have “total energy acquired” as its attribute.
    b. Include attribute details such as composite, simple, and multivalued for each attribute.
    c. Mention a partial key for all key weak entities that we have.
    d. Use VARCHAR in place of STRING datatype.
    e. Works For: Relationship
    min max: (1,1) -> (1,N)
    f. Acquisition of energy

min max: (1,N) -> (1,1)

g. Since we have previously refuted their assumptions, we concluded that the ceo cannot be a scarer or a laugher.
   hence, the min max ratios change to: (0, 1) → (1, 1) ← (1, 1)
   and the participation constraints change accordingly.
h. Part of
   min max: (1,N) -> (1,N)

6. **How easy was it to draw an ER diagram?**
   Drawing the ER diagram was comparatively easier than understanding how the database was structured.
   We did need to modify a lot of constraints in order for the relationships to make more sense. All the modifications have been mentioned above.