

CSC343 Worksheet 14 Solution

July 8, 2020



1.

Correct Solution:

**Notes:**

- E/R Model
 - Means **Entity Relationship Model**
 - Entity Relationship Model(ER Modeling) is a graphical approach to database design.
 - Is comparable to class diagram in UML
 - Uses three principle element types:
 1. Entity sets
 - * Is an abstract object of some sort (i.e. entity)
 - * Is not used to represent class
 - * Is represented by rectangles



2. Attributes

- * Are properties of entities in a set (i.e. column name)
- * Each has its own primitive data types (e.g. String, integers, Reals)
- * Is represented by ovals



3. Relationships

- * Are connections among two or more entity sets (e.g. intermediary Relations like Stars In)
- * Is represented by diamond



Example:



- Multiway Relationships
 - Connects more than two relationship sets
 - Enables to represent relationships that otherwise is difficult in binary relationship
 - Arrow → 'one'
 - No arrow → 'many'

Example:



Example 2:



Figure 4.4: A three-way relationship

- Roles in Relationships
 - Is the label of edges between the entity set and relationship
 - Are used to clarify the semantics of relationship

Example:



Figure 4.5: A relationship with roles

Example 2:

Figure 4.6: A four-way relationship

- Attributes on Relationships

- can be thought as a property of tuples in the relationship set (i.e. String, Integer, Float, Boolean)

Example:

- Can be removed by creating an entity set with the attribute

Example:

- Converting Multiway Relationships to Binary

Example:



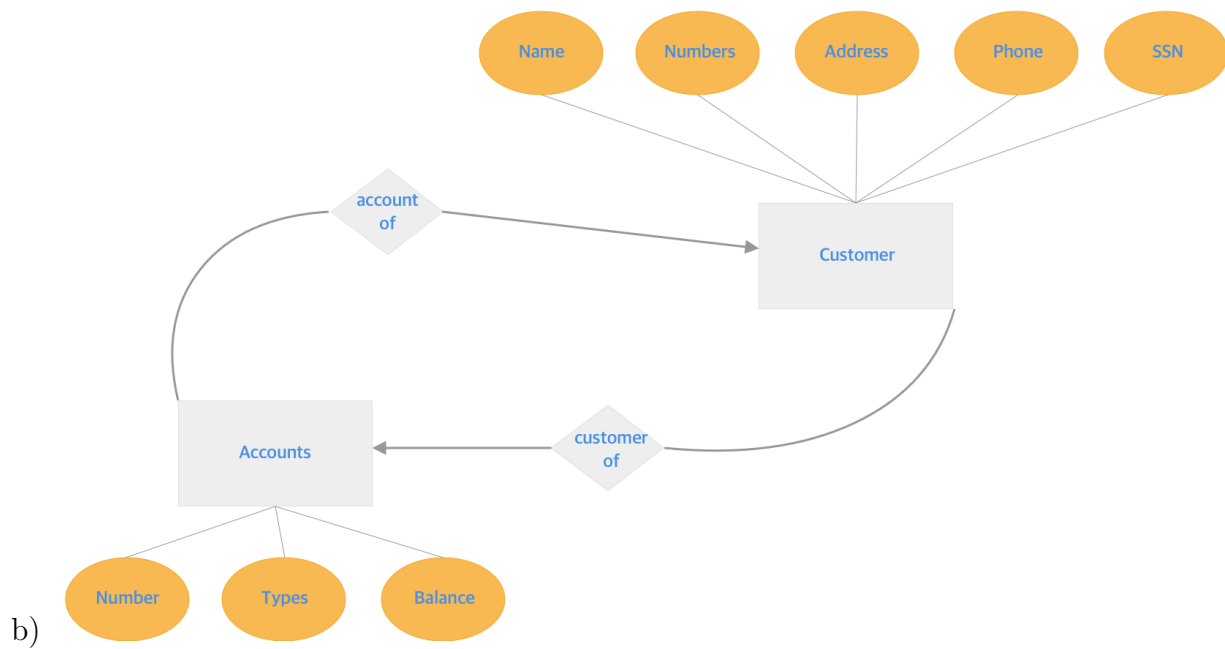
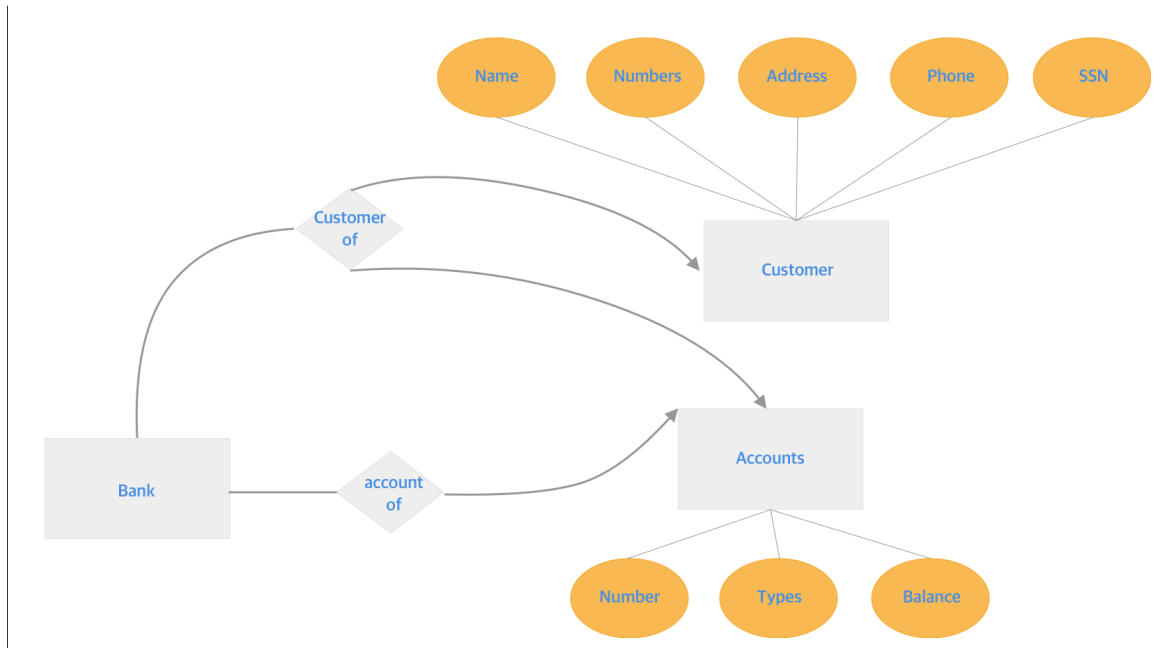
- Subclasses in the E/R Model
 - Has its own special attributes and/or relationships
 - All 'isa' relationship is one to one
 - Is represented by triangle with label 'isa' followed by entity set

Example:



2. a)

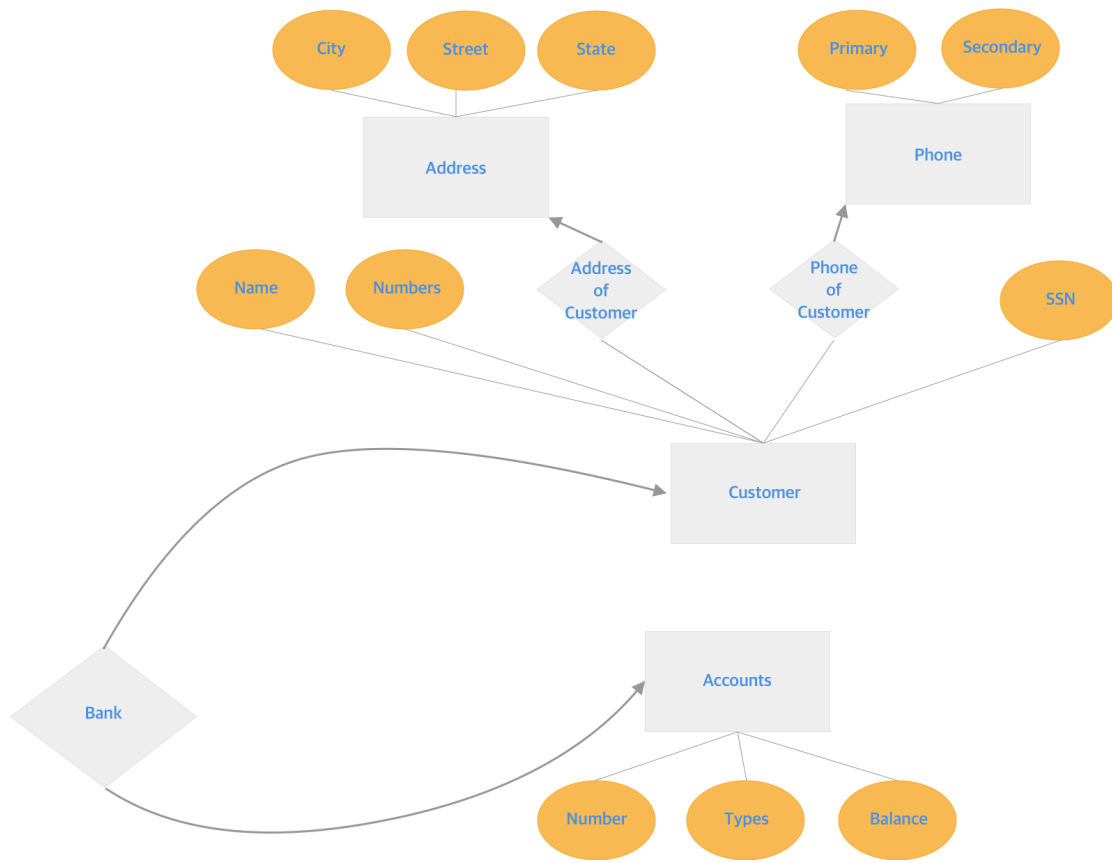
Correct Solution:



Correct Solution:



c)

Correct Solution:



Correct Solution:





3.

Correct Solution





4. a)



b)

c) They are the same. (I need more work on providing reason).

Notes:

- I should ask professor about this :'(



5.



6.

Correct Solution:



7.

Notes:

- I feel the need to clarify with professor if two parent subclasses can exist
- I feel the need to ask professor whether this design is valid



8. a)



b)

Notes:

- I need to clarify with professor on one-to-many relationship.

Is it correct that the 'one' side of 'one-to-many' relationship represent foreign key in terms of SQL?

But how about the many side? What does it mean it to be many? so for example, ('Josh', 'Neville the father', 'Mary the mother'), ('Jay', 'Neville the father', 'Mary the mother'), is this one to many relationship?

In tabular terms / example what does one-to-many relationship represent in this context?



9.



10.

Correct Solution:



11. Simplicity count is violated. There is more than necessary number of entity sets and attributes for address and accounts.



Notes:

- Design Principles

1. Faithfulness

- means design should make sense and meet its specification
- e.g. Adding attribute *number-of-cylinders* to *Stars* → NONO

2. Avoiding Redundancy

- *Redundancy* means saying the same thing in two (or more) different ways

Example (The good example):



Example (The bad example):

3. Simplicity Counts

- Avoid adding more more elements than necessary

4. Choosing the Right Relationships

- Don't add relationships more than necessary

5. Picking the Right Kind of Element

- Many of the choices are between using attributes and using entity set / relationship combinations