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. entitiy)
        * Is not used to represent class
        * Is represented by rectangles

Entity Sets

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

Attributes

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:

This means each group of stars and movies can have AT MOST one studio

This also means each studio can represent many combination of stars and movies

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 sementics of relationship

Example:

Means for each sequel, there is only one original

And for each movies, there are many sequels

Figure 4.5: A relationship with roles

Example 2:

This means for each combination of stars and movies, there can be a one stduio for star, and one studio for movie

Has columns (Studio of Star, Studio of Movies, Stars, Movies)

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:

    Price is a function of both the bar and the beer, not of one alone.
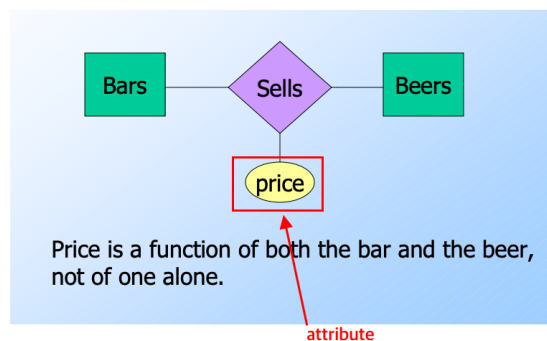
    attribute

Bar	Beers	Price
Bar 1	Canadian	10.99
Bar 2	Budwiser	20.99
Bar 1	Hite	4.99
Bar 1	Cass	15.99

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

    Example:
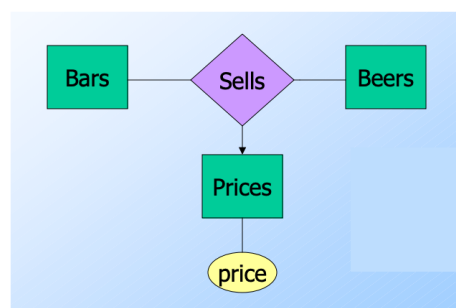
- Conversting Multiway Relationships to Binary

  Example:

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

  Example:

subclasses

2. a)

Correct Solution:

b)

Correct Solution:

c)

Correct Solution:

City Street State   Primary Secondary

Address —— Phone of ——> Phone

Name Numbers Address of Customer Phone of Customer SSN

Customer

Bank

Accounts

Number Types Balance

d)

Correct Solution:

13

Captain

Name

Name

Team

Players

Player

Favourite
Team

Favourite
Player

Colors

Fans

Favourite
Color

Name

3.

Correct Solution

4. a)

b)

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

<u>Notes:</u>

- I should ask professor about this :'(

Team
Played

Start
Date

End
Date

Name

history

history
of -

Name

Captain

Team

Players

Player

Favourite
Team

Favourite
Player

Colors

Favourite
Color

Fans

Name

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)

<u>Notes:</u>

- 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. **Notes:**

- Design Principles
    1. Faithfulness
        - means design should make sense and meet its specification
        - e.g. Adding attribute *number-of-cylinders* to *Stars* $\rightarrow$ NONO
    2. Avoiding Redundancy
    3. Simplicty Counts
    4. Choosing the Right Relationships
    5. Picking the Right Kind of Element