CIS 550: Database and Information Systems

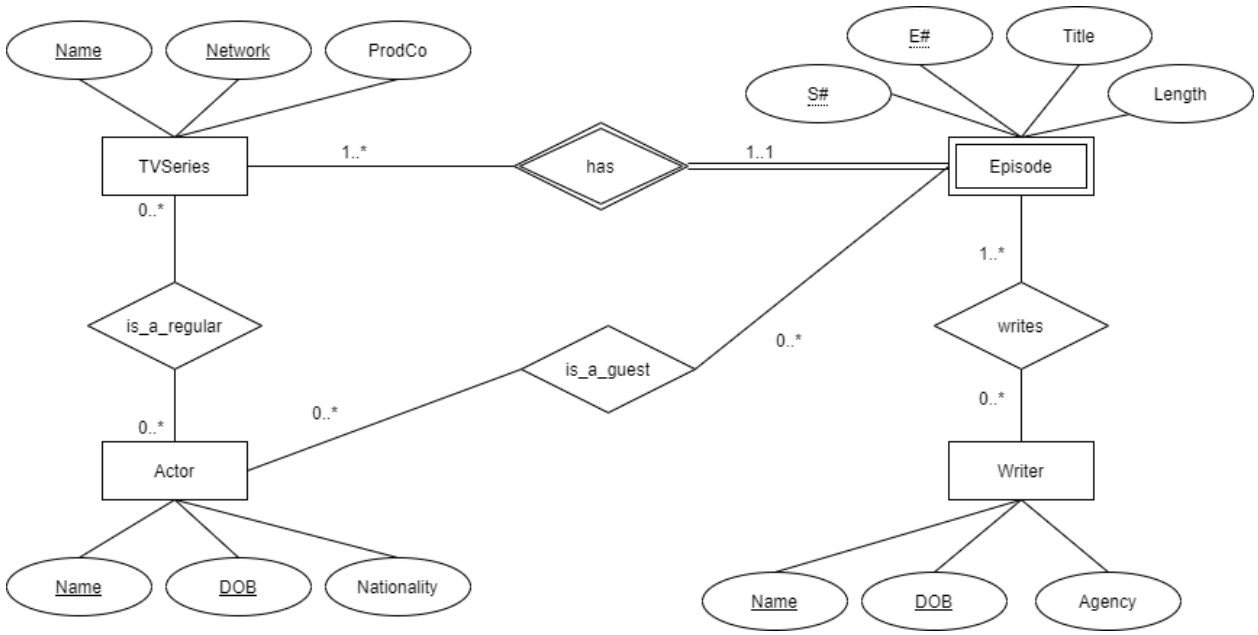
Exercise 4: Entity Relationship Design

Consider the following scenario.

- There are television series, which have names, networks and production companies, and are identified by the name and network.
- A television series has one or more episodes, identified by a season number, episode number, title and length.
- An actor is identified by name and birth date, and also has a nationality.
- A writer is also identified by name and birth date, and has a talent agency that represents him or her.
- An actor can appear as a "regular" on a television series or a guest star on an episode.
- An episode has one or more writers. A writer can write zero or more episodes.

1. Draw an ER diagram that represents this scenario using the notation introduced in lecture (rectangles, diamonds, ovals). Be sure to mark the key attributes and include cardinality constraints on relationships.

ANSWER



2. Translate to a relational model. (Don't worry about the underlying domains, just indicate relations, attributes, keys and foreign keys. You may treat any 1..* relationships in your ER diagram as 0..* in your relational model.)

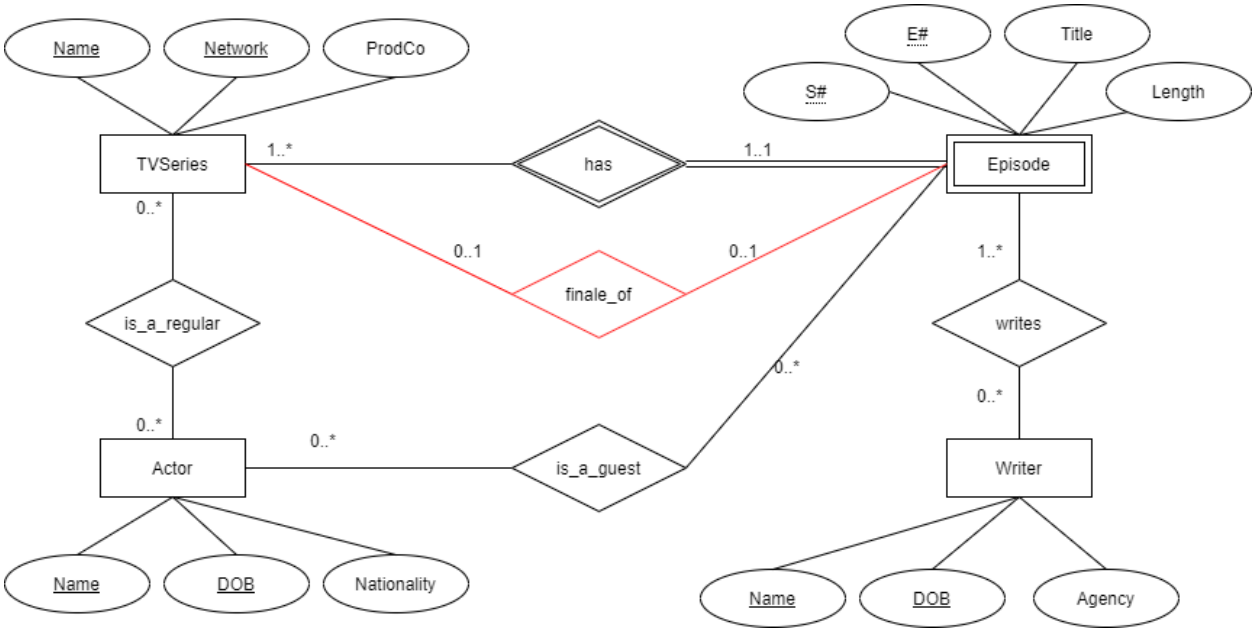
ANSWER

TVSeries(Name, Network, ProdCo)
Episode(Name, Network, S#, E#, Title, Length) :
    (Name, Network) foreign key
    referencing TVSeries(Name, Network)
Actor(Name, DOB, Nationality)
Writer(Name, DOB, Agency)
AppearsReg(AName, DOB, NName, Network)
    (AName, DOB) foreign key referencing Actor(Name, DOB)
    (NName, Network) foreign key
    referencing TVSeries(Name, Network)
AppearsGuest(AName, DOB, NName, Network, S#, E#) :
    (AName, DOB) foreign key referencing Actor(Name, DOB)
    (NName, Network, S#, E#) foreign key
    referencing Episode(Name, Network, S#, E#)
Writes(WName, DOB, NName, Network, S#, E#)
    (WName, DOB) foreign key referencing Writer(Name, DOB)
    (NName, Network, S#, E#) foreign key
    referencing Episode(Name, Network, S#, E#)

3. Modify your ER diagram to capture the following: an episode can be the finale for a series where a series can have at most one finale episode. A finale is the last episode ever for a TV Series, i.e., the last episode of the last season.

Just draw the part of the diagram that changes, and describe the effect on the relational schema. State any constraint(s) that cannot be captured by keys, foreign keys, or domain constraints.

ANSWER



See red in the picture above. This adds a new relation, Finale, between TVSeries and Episode. Note that since the relationship is 1:1 we can choose either the key of TVSeries or Episode as primary key -- but since the key of Episode includes that of TVSeries (it is a weak entity), it is best to choose TVSeries.

Finale(Name, Network, S#, E#) foreign key (Name, Network) references TVSeries(Name, Network)

A reasonable constraint is that the finale comes after all other episodes of the TVSeries. We cannot really enforce that unless we have checked that there are no higher number episodes for the series than the finale.

Mandatory participation of TVSeries and Episode in the “has” relationship also cannot be handled using just keys and foreign keys; insertions into those relations must be done at the same time within a transaction.