Minimal FD sets and Normalization Proofs

Minimal FD Set

User_Id -> {username,sex }

SubsType -> {Price, No_of_devices, ads_shown}

{UserID ,Substype} -> {start_date, end_date}

{UserID,Content_ID} -> {rating, watch_time}

CID -> {IMDB, Release_year, Content_type, Language, Cname, PHID}

PHID -> { PHName, Founded_in}

{Episode_no, Content ID} -> {Run_time, Release_date}

Actor_ID -> {Name, Birthdate, Relationship_status}

Award_ID -> {Name, presented_by}

{Actor_id, Award_id} -> {Year}

AdId -> {Category, Duration, number_of_times_displayed, Advc_id}

Advc_id -> {Advc-Name}

Proof of the fact that all the relations are in BCNF

User relation

The FD set for the user relation is as follows:
User_Id -> {username, sex}
Here the key is the user ID.
Since all other attributes are determined by the key attribute only the relation is in BCNF.

Genre Preferences Relation

Since all the attributes of this relation are prime (i.e part of the key), the relation is in BCNF.

Language Preferences Relation

Since all the attributes of this relation are prime (i.e part of the key), the relation is in BCNF.

User Rating

The FD set for the episodes relation is as follows:
{User_id, Content_id} -> {rating, watch_time}
Here the key is the User_id, Content_id which is a composite key.
Since all other attributes are determined by the composite key attribute only the relation is in BCNF.

User Subscription

The FD set for the user subscription relation is as follows:
{User_id, Subscription_type} -> {start_date, end_date}
Here the key is the User_id, Subscripion_type which is a composite key.
Since all other attributes are determined by the composite key attribute only the relation is in BCNF.

Subscription Type

The FD set for the user relation is as follows:
Subs Type -> {Price,No_of_devices, ads_shown}
Here the key is the Subs_type.
Since all other attributes are determined by the key attribute only the relation is in BCNF.

Content Relation

The FD set for the content relation is as follows:
CID -> {IMDB, Release_year, Content_type, Language, Cname, PHID}
Here the key is the CID.

Since all other attributes are determined by the key attribute only the relation is in BCNF.

Content Genre Relation

Since all the attributes of this relation are prime (i.e part of the key), the relation is in BCNF.

Episodes Relation

The FD set for the episodes relation is as follows:
{Episode_no, ContentID} -> {Run_time, Release_date}
Here the key is the Episode_no, ContentID which is a composite key.
Since all other attributes are determined by the composite key attribute only the relation is in BCNF.

Production House relation

The FD set for the production house relation is as follows:
PHID -> { PHName, Founded_in}
Here the key is PHID.
Since all other attributes are determined by the key attribute only the relation is in BCNF.

Content Advertisement Relation

Since all the attributes of this relation are prime (i.e part of the key), the relation is in BCNF.

Advertisement Relation

The FD set for the advertisement relation is as follows:
AdID -> {Category, Duration, number of times displayed, advc_id}
Here the key is AdID.
Since all other attributes are determined by the key attribute only the relation is in BCNF.

Advertising Company Relation

The FD set for the advertisement relation is as follows:
Advc_ID -> {Advc_Name}
Here the key is Advc_ID.
Since all other attributes are determined by the key attribute only the relation is in BCNF.

Series Actors Relation

Since all the attributes of this relation are prime (i.e part of the key), the relation is in BCNF.

Actors Relation

The FD set for the actors relation is as follows:
Actor_ID -> {Name, Birthdate, Relationship_status}
Here the key is Actor_ID.
Since all other attributes are determined by the key attribute only the relation is in BCNF.

Awards recieved relation

The FD set for the actors relation is as follows:
{Actor_id, Award_id} -> {Year}
Here the key is {Actor_id, Award_id} which is a composite key.
Since all other attributes are determined by the key attribute only the relation is in BCNF.

Award relation

The FD set for the actors relation is as follows:
Award id -> {Name, presented_by}
Here the key is Award_ID.
Since all other attributes are determined by the key attribute only the relation is in BCNF.

Roles played relation
Since all the attributes of this relation are prime (i.e part of the key), the relation is in BCNF.