

# IT214 Database Project

## Project Title: OTT

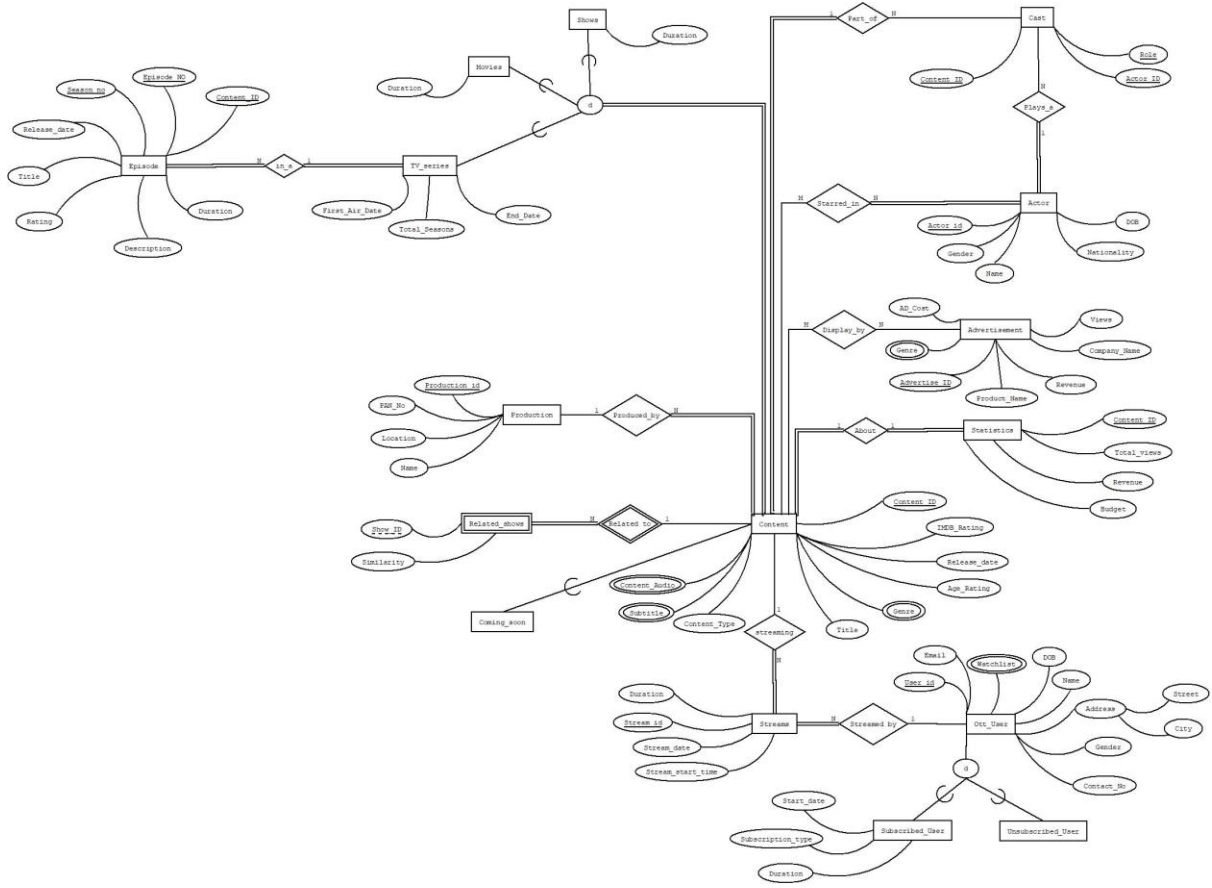
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**Group id:- T211**

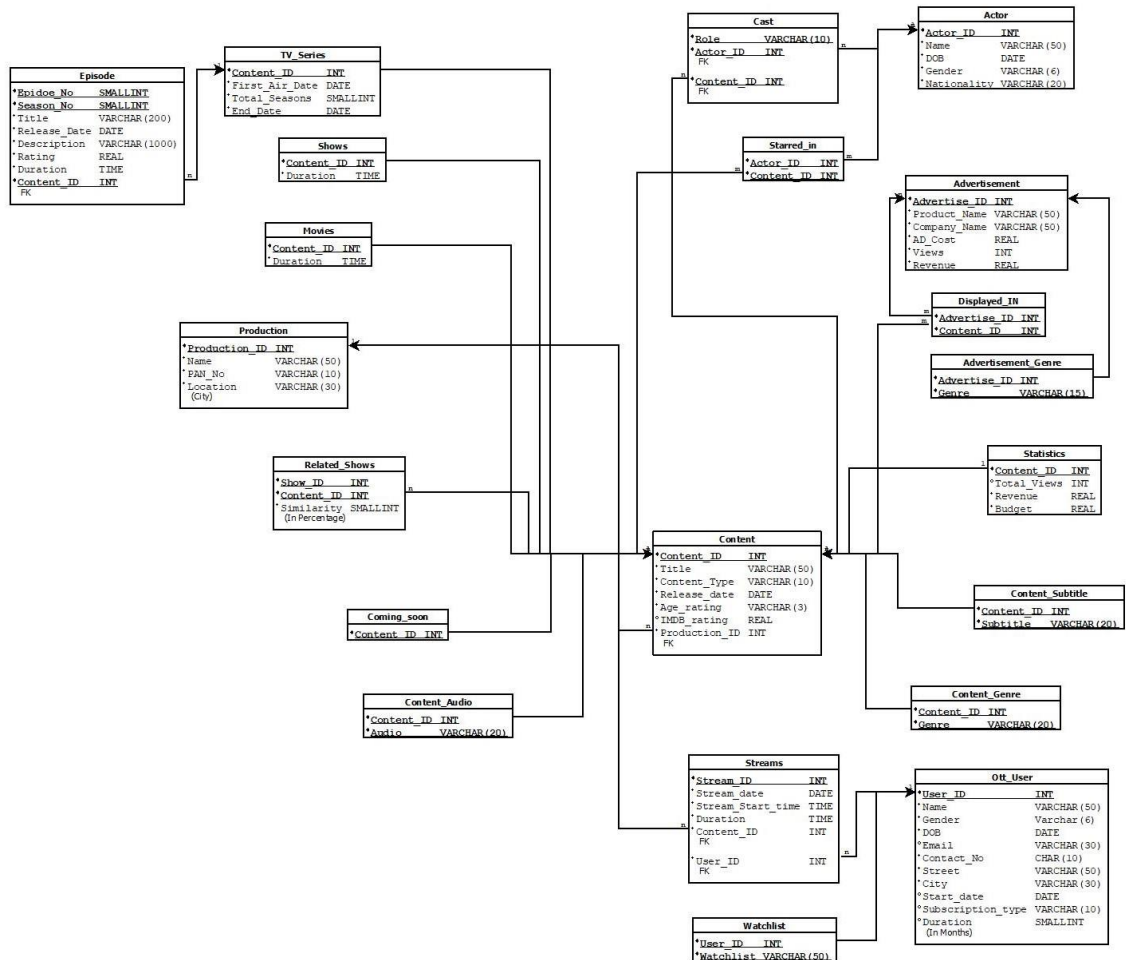
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## ❖ ER Diagram



## ❖ Relational Schema Diagram



## ❖ Proof that all relations are in Boyce-Codd Normal Form

### 1. “Content” Relation:

- **Attributes:**

Content { Content\_ID, Title, Content\_type, Release\_date, Age\_rating, IMDB\_rating, Production\_ID }

- **Minimal set of Functional dependencies:**

Content\_ID  $\rightarrow$  Title

Content\_ID  $\rightarrow$  Content\_type

Content\_ID  $\rightarrow$  Release\_date

Content\_ID  $\rightarrow$  Age\_rating

Content\_ID  $\rightarrow$  IMDB\_rating

Content\_ID  $\rightarrow$  Production\_ID

let  $X = \text{Content\_ID}$ ,

$X^+ = \{ \text{Content\_ID}, \text{Title}, \text{Content\_type}, \text{Release\_date}, \text{Age\_rating}, \text{IMDB\_rating}, \text{Production\_ID} \}$

Thus, **The primary key is Content\_ID.**

The left side of all the FDs in the minimal set of FDs for the relation ‘Content’ is Content\_ID, which is the primary key of this relation,  
**So “Content” is in BCNF.**

### 2. “Content\_Subtitle” Relation:

- **Attributes:**

Content\_Subtitle {Content\_ID, Subtitle}

Here **Primary key = {Content\_ID, Subtitle}**

According to theorem, all attribute primary key relation is always in BCNF.

Hence **“Content\_Subtitle” is in BCNF.**

### 3. "Content\_Genre" Relation:

- **Attributes:**

Content\_Genre {Content\_ID, Genre}

Here **Primary key** = {Content\_ID, Genre}

According to theorem, all attribute primary key relation is always in BCNF.

Hence **"Content\_Genre"** is in BCNF.

### 4. "Content\_Audio" Relation:

- **Attributes:**

Content\_Audio {Content\_ID, Audio}

Here **Primary key** = {Content\_ID, Audio}

According to theorem, all attribute primary key relation is always in BCNF.

Hence **"Content\_Audio"** is in BCNF.

### 5. "Streams" Relation:

- **Attributes:**

Streams {Stream\_ID, Stream\_date, Stream\_Start\_time, Duration, Content\_ID, User\_ID}

- **Minimal set of Functional dependencies:**

Stream\_ID  $\rightarrow$  Stream\_date

Stream\_ID  $\rightarrow$  Stream\_Start\_time

Stream\_ID  $\rightarrow$  Duration

Stream\_ID  $\rightarrow$  Content\_ID

Stream\_ID  $\rightarrow$  User\_ID

Take X = Stream\_ID,

$X^+ = \{\text{Stream\_ID, Stream\_date, Stream\_Start\_time, Duration, Content\_ID, User\_ID}\}$

That's why, **The primary key is Stream\_ID.**

The left side of all the FDs in the minimal set of FDs for the relation 'Streams' is Stream\_ID, which is the primary key of this relation,  
**So "Streams" is in BCNF.**

## 6. "Watchlist" Relation:

- **Attributes:**

Watchlist {User\_ID, Watchlist}

Here **Primary key = {User\_ID, Watchlist}**

According to theorem, all attribute primary key relation is always in BCNF.

Hence **"Watchlist" is in BCNF.**

## 7. "Statistics" Relation:

- **Attributes:**

Statistics {Content\_ID, Total\_views, Revenue, Budget}

- **Minimal set of Functional dependencies:**

Content\_ID  $\rightarrow$  Total\_views

Content\_ID  $\rightarrow$  Revenue

Content\_ID  $\rightarrow$  Budget

Take X = Content\_ID,

$X^+ = \{\text{Content\_ID, Total\_views, Revenue, Budget}\}$

That's why, **The primary key is Content\_ID.**

The left side of all the FDs in the minimal set of FDs for the relation 'Statistics' is Content\_ID, which is the primary key of this relation,  
**So "Statistics" is in BCNF.**

## 8. “Related\_Shows” Relation:

- **Attributes:**

Related\_Shows {Show\_ID, Content\_ID, Similarity}

- **Minimal set of Functional dependencies:**

{ Show\_ID, Content\_ID }  $\rightarrow$  Similarity

Take  $X = \{\text{Show\_ID}, \text{Content\_ID}\}$

$X^+ = \{\text{Show\_ID}, \text{Content\_ID}, \text{Similarity}\}$

That’s why, **The key is {Show\_ID, Content\_ID}.**

The left side of all the FDs in the minimal set of FDs for the relation ‘Related\_Shows’ is {Show\_ID, Content\_ID}, which is the key of this relation,

**So “Related\_Shows” is in BCNF.**

## 9. “Production” Relation:

- **Attributes:**

Production {Production\_ID, Name, PAN\_No, Location}

- **Minimal set of Functional dependencies:**

Production\_ID  $\rightarrow$  Name

Production\_ID  $\rightarrow$  PAN\_No

Production\_ID  $\rightarrow$  Location

Take  $X = \text{Production\_ID}$

$X^+ = \{\text{Production\_ID}, \text{Name}, \text{PAN\_No}, \text{Location}\}$

That’s why, **The primary key is Production\_ID.**

The left side of all the FDs in the minimal set of FDs for the relation ‘Production’ is Production\_ID, which is the primary key of this relation, **So “Production” is in BCNF.**

## 10. “Advertisement” Relation:

- **Attributes:**

Advertisement {Advertise\_ID, Product\_Name, Company\_Name, AD\_cost, Views, Revenue}

- **Minimal set of Functional dependencies:**

Advertise\_ID  $\rightarrow$  Product\_name

Advertise\_ID  $\rightarrow$  Company\_name

Advertise\_ID  $\rightarrow$  AD\_cost

Advertise\_ID  $\rightarrow$  Views

Advertise\_ID  $\rightarrow$  Revenue

Take  $X = \text{Advertise\_ID}$

$X^+ = \{\text{Advertise\_ID}, \text{Production\_Name}, \text{Company\_Name}, \text{AD\_cost}, \text{Views}, \text{Revenue}\}$

That’s why, **The primary key is Advertise\_ID.**

The left side of all the FDs in the minimal set of FDs for the relation ‘Advertisement’ is Advertise\_ID, which is the primary key of this relation, **So “Advertisement” is in BCNF.**

## 11. “Advertisement\_Genre” Relation:

- **Attributes:**

Advertisement\_Genre {Advertise\_ID, Genre}

Here **Primary key = {Advertise\_ID, Genre}**

According to theorem, all attribute primary key relation is always in BCNF.

Hence **“Advertisement\_Genre” is in BCNF.**



## 12. “Actor” Relation:

- **Attributes:**

Actor {Actor\_ID, Name, DOB, Gender, Nationality}

- **Minimal set of Functional dependencies:**

Actor\_ID  $\rightarrow$  Name

Actor\_ID  $\rightarrow$  DOB

Actor\_ID  $\rightarrow$  Gender

Actor\_ID  $\rightarrow$  Nationality

Take  $X = \text{Actor\_ID}$

$X^+ = \{\text{Actor\_ID, Name, DOB, Gender, Nationality}\}$

That’s why, **The primary key is Actor\_ID.**

The left side of all the FDs in the minimal set of FDs for the relation ‘Actor’ is Actor\_ID, which is the primary key of this relation,

**So “Actor” is in BCNF.**

## 13. “Tv\_Series” Relation:

- **Attributes:**

Tv\_Series {Content\_ID, First\_Air\_Date, Total\_seasons, End\_Date}

- **Minimal set of Functional dependencies:**

Content\_ID  $\rightarrow$  First\_Air\_Date

Content\_ID  $\rightarrow$  Total\_seasons

Content\_ID  $\rightarrow$  End\_Date

Take  $X = \text{Content\_ID}$

$X^+ = \{\text{Content\_ID, First\_Air\_Date, Total\_seasons, End\_Date}\}$

That’s why, **The primary key is Content\_ID.**

The left side of all the FDs in the minimal set of FDs for the relation 'TV\_Series' is Content\_ID, which is the primary key of this relation,  
**So "TV\_Series" is in BCNF.**

#### 14. "Episodes" Relation:

- **Attributes:**

Episodes {Episode\_No, Season\_No, Title, Release\_Date, Discription, Rating, Duration, Content\_ID}

- **Minimal set of Functional dependencies:**

{ Episode\_No, Season\_No, Content\_ID }  $\rightarrow$  Release\_Date

{ Episode\_No, Season\_No, Content\_ID }  $\rightarrow$  Discription

{ Episode\_No, Season\_No, Content\_ID }  $\rightarrow$  Rating

{ Episode\_No, Season\_No, Content\_ID }  $\rightarrow$  Duration

{ Episode\_No, Season\_No, Content\_ID }  $\rightarrow$  Title

Take  $X = \{ \text{Episode\_No, Season\_No, Content\_ID} \}$

$X^+ = \{ \text{Episode\_No, Season\_No, Title, Release\_Date, Discription, Rating, Duration, Content\_ID} \}$

That's why, **The key is = { Episode\_No, Season\_No, Content\_ID }.**

The left side of all the FDs in the minimal set of FDs for the relation 'Episodes' is = { Episode\_No, Season\_No, Content\_ID }, which is the key of this relation,

**So "Episodes" is in BCNF.**

#### 15. "Cast" Relation:

- **Attributes:**

Cast {Role, Actor\_ID, Content\_ID}

Here **Primary key = { Role, Actor\_ID, Content\_ID }**

According to theorem, all attribute primary key relation is always in BCNF.

Hence **"Cast" is in BCNF.**

## 16. “Shows” Relation:

- **Attributes:**  
Shows {Content\_ID, Duration}
- **Minimal set of Functional dependencies:**  
 $\text{Content\_ID} \rightarrow \text{Duration}$

Take  $X = \text{Content\_ID}$

$X^+ = \{\text{Content\_ID}, \text{Duration}\}$

That’s why, **The primary key is Content\_ID.**

The left side of all the FDs in the minimal set of FDs for the relation ‘Shows’ is Content\_ID, which is the primary key of this relation,  
**So “Shows” is in BCNF.**

## 17. “Movies” Relation:

- **Attributes:**  
Movies {Content\_ID, Duration}
- **Minimal set of Functional dependencies:**  
 $\text{Content\_ID} \rightarrow \text{Duration}$

Take  $X = \text{Content\_ID}$

$X^+ = \{\text{Content\_ID}, \text{Duration}\}$

That’s why, **The primary key is Content\_ID.**

The left side of all the FDs in the minimal set of FDs for the relation ‘Movies’ is Content\_ID, which is the primary key of this relation,  
**So “Movies” is in BCNF.**

## 18. "Ott\_User" Relation:

- **Attributes:**

Ott\_User {User\_ID, Name, Gender, DOB, Email, Contact\_No, Street, City, Start\_date, Subscription\_type, Duration}

- **Minimal set of Functional dependencies:**

User\_ID  $\rightarrow$  Name

User\_ID  $\rightarrow$  Gender

User\_ID  $\rightarrow$  DOB

User\_ID  $\rightarrow$  Email

User\_ID  $\rightarrow$  Contact\_No

User\_ID  $\rightarrow$  Street

User\_ID  $\rightarrow$  City

User\_ID  $\rightarrow$  Start\_date

User\_ID  $\rightarrow$  Subscription\_type

User\_ID  $\rightarrow$  Duration

Take X = User\_ID

$X^+ = \{ \text{User\_ID, Name, Gender, DOB, Email, Contact\_No, Street, City, Start\_date, Subscription\_type, Duration} \}$

That's why, **The primary key is User\_ID.**

The left side of all the FDs in the minimal set of FDs for the relation 'Ott\_User' is User\_ID, which is the primary key of this relation, so **"Ott\_User" is in BCNF.**

## 19. "Starred\_in" Relation:

- **Attributes:**

Starred\_in {Actor\_ID, Content\_ID}

Here **Primary key = { Actor\_ID, Content\_ID }**

According to theorem, all attribute primary key relation is always in BCNF.

**So "Starred\_in" is in BCNF.**

## 20. “Displayed\_in” Relation:

- **Attributes:**

Displayed\_in {Advertise\_ID,Content\_ID}

Here **Primary key** = { Actor\_ID,Content\_ID }

According to theorem, all attribute primary key relation is always in BCNF.

**So “Displayed\_in” is in BCNF.**

## 21. “Coming\_soon” Relation:

- **Attributes:**

Coming\_soon {Content\_ID}

Here **Primary key** = { Content\_ID }

According to theorem, all attribute primary key relation is always in BCNF.

**So “Coming\_soon” is in BCNF.**