avatarpiratesofthecaribeanspectrethedarkknightrisesstarwarsjohncarterspiderman3thegodfatheravengersharrypotterbatmanvssupermansupermanreturnsquantumofsolacepiratesofcaribeanthelonerangermanofsteelthechroniclesofnarnimeninblackavegerssncgmlvkfnsrqwertyuthehobbitthelonerangerthechroniclesofnarniathegoldencompassinceptiontitanicse7eninterstellarjurassicworldskyfalltheshawshankredemptiontroythesecretlifeofwaltermittycarsgreenlanterntoystorytheperksofbeingawallflowerterminatorsalvationstartrekwallerushhourthegreatgatsby47ronnintomorrowlandhowtotrainyourdragonshutterislanddunkirkalienthelionkingamericanhustleargocaptiainphilipscasinogonegirl

|  |
| --- |
| Database Management System  Movie and TV Show Guide  8/21/2017  Yash Saboo, 15070121170 |

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# Problem Selection

Today's entertainment sector is constantly coming up with a wide variety of movies and TV shows. It has now become harder to find a TV show that you may like. With the help of The Internet Movie Database, IMDB, we have a record of all of the movies produced up to date, as well as those which are releasing in the near future.

The problem comes when we would need to find a show or a movie that we may like to watch. For solving this we have decided to work on the IMDB's own data-sets consisting of more than 5 thousand movies.

## Approach to Solving the Problem

BROWSER  
  
The user will be interacting with the system here.  
  
The input from the user will be taken here  
The output to the user will be displayed here

MYSQL DATABASE

Knowledge is extracted from the database

JSP - Java Server Page  
  
The data entered will be converted to queries to be searched in the database

1

2

3

4

# Functional Requirements

1. Searching for movies or TV shows based upon
   * Genres
   * Plot/Keywords
   * Popularity (based on the number of FaceBook likes)
   * Year of Release
2. Suggesting recommendations based on the same genre
3. Suggesting recommendations based on the same plot
4. Inserting Movie or TV show records into the database (by the database administrator)
5. Updating FB Likes
6. The user would be able to search for data from the user interface (browser)
7. All the search results and predictions would also be shown on the user interface (browser)

# Entities and their Relationships

## Entities

1. Movie

This entity would include those attributes which talk about the main details of the movie which could be used to uniquely identify the movie. These are as follows:

* Title
* Year
* Duration
* Color
* Aspect Ratio
* Movie FaceBook Likes
* Number of Faces in Poster

1. TV Show Episode Guide

This entity would include those attributes which talk about the main details of each Television Show such as the following:

* TV Show Title
* Season Number
* Episode Number
* Episode Title
* Aspect Ratio
* Gross
* Budget
* Duration
* Color
* FaceBook Likes
* Faces in Poster

1. Specialization

This entity would include the attributes of the movies which would allow us to be able to make suggestions of which movie to recommend the user. The attributes of these include:

* ID
* Genres
* Plot/keywords
* Content Ratings

1. Director

This entity has to do with the Director of the movie and the details about the Director. Some attributes that fall under this entity are:

* ID
* Name
* Number of FaceBook Likes

1. Cast
   1. Actors

Actors would become a weak entity which is a part of the stronger entity 'Cast'. This entity consists of all of the three main actors along with their FaceBook likes.

1. IMDB

Entity consisting of attributes:

* IMDB Score
* Number of User Reviews
* IMDB Link
* Number of Critics for Reviews

# Extended Entity Relationship Diagram

# erdplus-diagram.png

# Database Relational Schema

Movies(ID, title, aspect ratio, gross, budget, duration, color, FaceBook likes, number of faces in poster, Did, Sid, Eid, IMDbID )

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ID | Title | Aspect Ratio | Gross | Budget | Duration | Color | FaceBook Likes | Faces in Poster | Did | Sid | Eid | IMDbID |

TV Episode Guide(ID, title, season number, episode number, Episode title, aspect ratio, gross, budget, duration, color, FaceBook likes, number of faces in poster, Did, Sid, Eid, IMDbID)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ID | Title | Season No | Episode No | Episode Title | Aspect Ratio | Gross | Budget | Duration | Color | Face Book Likes | Faces in Poster | Did | Sid | Eid | IMDbID |

Director(Did, Director Name, Director FB Likes)

|  |  |  |
| --- | --- | --- |
| DID | Director Name | Director FaceBook Likes |

Specification(Sid, Content Ratings)

|  |  |
| --- | --- |
| SID | Content Ratings |

Genres(GID, Genre Name, SID)

|  |  |  |
| --- | --- | --- |
| GID | Genre Name | SID |

Plot Keywords(PKID, Plot Keywords, SID)

|  |  |  |
| --- | --- | --- |
| PKID | Plot Keywords | SID |

Ethnicity(Eid, country, language)

|  |  |  |
| --- | --- | --- |
| EID | Country | Language |

IMDb Ratings(IMDbID, imdb score, number of user reviews, link, number of critic reviews, number of voted users)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IMDbID | IMDb Score | Number of User Reviews | Link | Number of Critic Review | Number of Voted Users |

Actor(Aid ,Actor Name, Actor Facebook Likes)

|  |  |  |
| --- | --- | --- |
| AID | Actor Name | Actor FaceBook Likes |

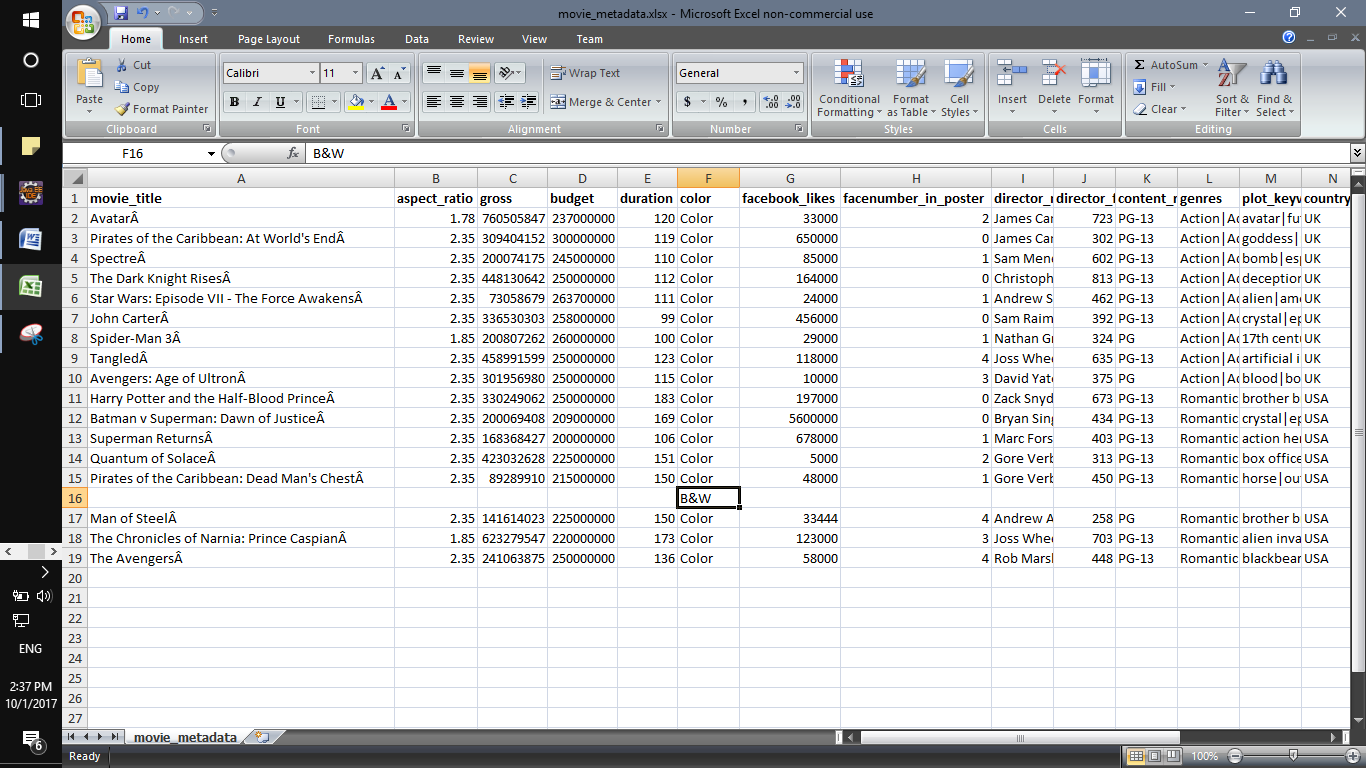
PerformRelat(PRID, Aid, ID )

|  |  |  |
| --- | --- | --- |
| PRID | AID | ID |

# Anomalies

## Insert Anomaly

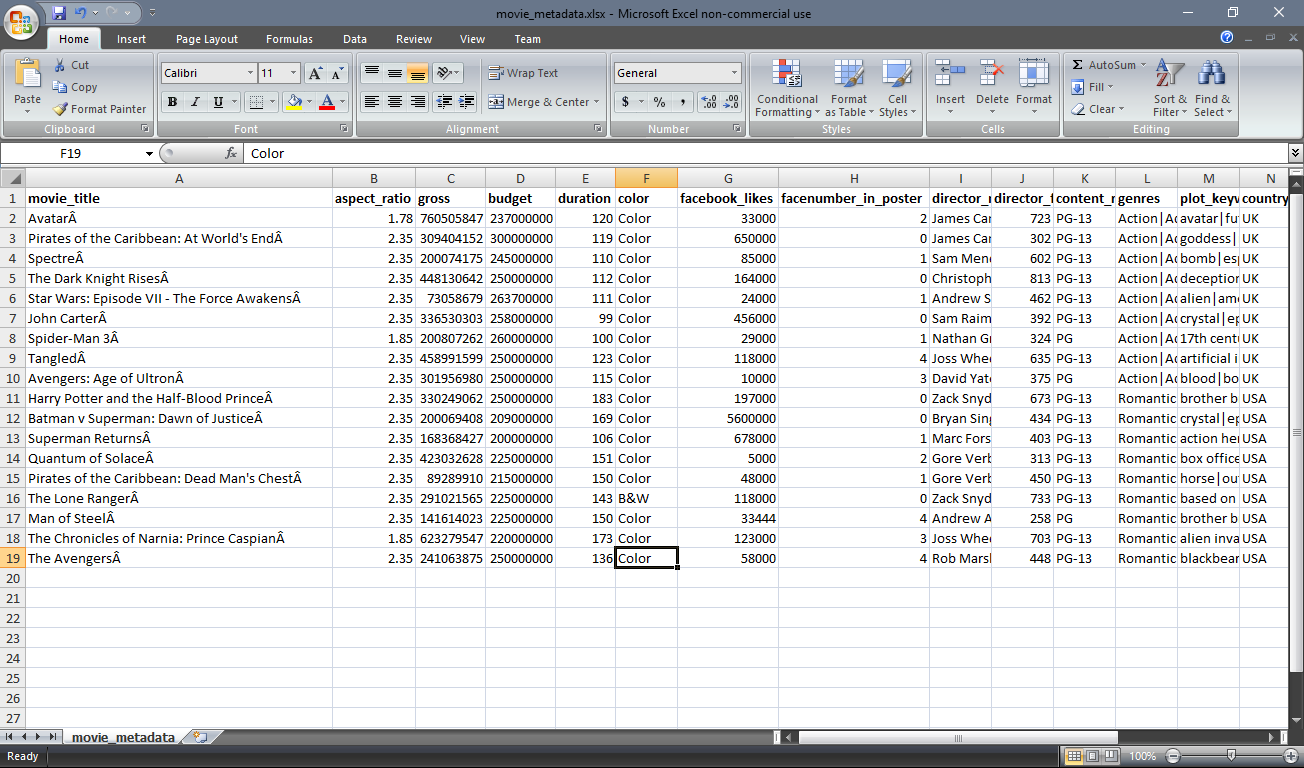
In our database, we have the Color attribute which is used to describe if the Movie/ TV Show is available in color or in black and white. For an insert anomaly if the movies present in the database instance contains only the Movies/ TV Shows in color, and if we want to insert an option for movies to be in black and white we cannot directly add the black and white option in the table like in the below picture.



However the above picture causes an insert anomaly, and therefore it must be normalized.

## Delete Anomaly

Similarly in the Movies & TV Show Guide table deletion then a delete anomaly can occur. For example consider the following database instance:



If we delete the record of the Movie Title 'The Lone Ranger' which is in Black & White (B&W) then we will end up deleting the Black & White option for the attribute Color in the entire relation. This causes the deletion anomaly.

# Functional Dependencies

Movies

**full dependency**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ID | Title | Aspect Ratio | Gross | Budget | Duration | Color | FaceBook Likes | Faces in Poster | Did | Sid | Eid | IMDbID |

Functional Dependencies for Movies{  
 ID 🡪 Title  
 ID 🡪 Aspect Ratio  
 ID 🡪 Gross  
 ID 🡪 Budget  
 ID 🡪 Duration  
 ID 🡪 Color  
 ID 🡪 FaceBook Likes  
 ID 🡪 Number of faces in poster  
 ID 🡪 DID (Director ID)  
 ID 🡪 SID (Specifications ID)  
 ID 🡪 EID (Ethnicity ID)  
 ID 🡪 IMDbID  
}

TV Episode Guide

**full dependency**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ID | Title | Season No | Episode No | Episode Title | Aspect Ratio | Gross | Budget | Duration | Color | Face Book Likes | Faces in Poster | Did | Sid | Eid | IMDbID |

**transitive dependency**

Functional Dependencies for TV Episode Guide{  
 ID 🡪 Title  
 ID 🡪 Season Number  
 Season Number 🡪 Episode Number  
 Season Number, Episode Number 🡪 Episode Title  
 ID 🡪 Aspect Ratio  
 ID 🡪 Gross  
 ID 🡪 Budget  
 ID 🡪 Duration  
 ID 🡪 Color  
 ID 🡪 FaceBook Likes  
 ID 🡪 Number of Faces in Poster  
 ID 🡪 DID (Director ID)  
 ID 🡪 SID (Specification ID)  
 ID 🡪 EID (Ethnicity ID)  
 ID 🡪 IMDbID  
}

Director

**full dependency**

|  |  |  |
| --- | --- | --- |
| DID | Director Name | Director FaceBook Likes |

Functional Dependencies for Director {  
 DID 🡪Director Name  
 DID 🡪 Director FB Likes  
}

Specification

**full dependency**

|  |  |
| --- | --- |
| SID | Content Ratings |

Function Dependencies for Specification{  
 SID 🡪 Content Ratings  
}

Genres

**full dependency**

|  |  |  |
| --- | --- | --- |
| GID | Genre Name | SID |

Functional Dependencies for Genres{  
 GID 🡪 Genre Name  
 GID 🡪 SID  
}

Plot Keywords

**full dependency**

|  |  |  |
| --- | --- | --- |
| PKID | Plot Keywords | SID |

Functional Dependencies for Plot Keywords{  
 PKID 🡪 Plot Keywords  
 PKID 🡪 SID  
}

Ethnicity

**full dependency**

|  |  |  |
| --- | --- | --- |
| EID | Country | Language |

Functional Dependencies for Ethnicity{  
 EID 🡪 Country  
 EID 🡪 Language  
}

IMDb Ratings

**full dependency**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IMDbID | IMDb Score | Number of User Reviews | Link | Number of Critic Review | Number of Voted Users |

Functional Dependencies for IMDb Ratings{  
 IMDbID 🡪 IMDb Score  
 IMDbID 🡪 Number of User Reviews  
 IMDbID 🡪 Link  
 IMDbID 🡪 Number of Critic Reviews  
 IMDbID 🡪 Number of Voted Users  
}

Actor

**full dependency**

|  |  |  |
| --- | --- | --- |
| AID | Actor Name | Actor FaceBook Likes |

Functional Dependencies for Actors{  
 AID 🡪 Actor Name  
 AID 🡪 Actor FaceBook Likes  
}

PerformRelat

**full dependency**

|  |  |  |
| --- | --- | --- |
| PRID | AID | ID |

Functional Dependencies for PerformRelat{  
 PRID 🡪 AID  
 PRID 🡪 ID  
}

# Normalizing Relations

## Converting all relations to 3NF

The table TV Show episode guide is in 2NF form since it consists of a transitive dependency and must be normalized.

TV Show Episode Guide:

**full dependency**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ID | Title | Season No | Episode No | Aspect Ratio | Gross | Budget | Duration | Color | FaceBook Likes | Faces in Poster | Did | Sid | Eid | IMDbID |

Episode Title:

**full dependency**

|  |  |  |
| --- | --- | --- |
| Season No | Episode No | Episode Title |

Now all Tables are in 3NF form with every attribute containing full dependency.

## Normalizing Anomalies

Since we noticed an insert & delete anomaly in the 'Color' attribute in both the Movie and TV Show relations, we will require to normalize the relations. We can do this by doing the following:

Movie

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ID | Title | Aspect Ratio | Gross | Budget | Duration | Color ID | FaceBook Likes | Faces in Poster | Did | Sid | Eid | IMDbID |

TV Show

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ID | Title | Season No | Episode No | Aspect Ratio | Gross | Budget | Duration | Color ID | FaceBook Likes | Faces in Poster | Did | Sid | Eid | IMDbID |

Colors

|  |  |
| --- | --- |
| Color ID | Color |