Film Expert System
Prolog Programming Project

Problem definition:

Film expert system based on logic rules. The Film Recommendation System is designed to suggest movies to users based on their personal information such as age, gender, mood, and minimum movie rating.

The purpose of this project is to create an expert system in Prolog. It aims to enhance the movie-watching experience by providing personalised recommendations. The program allows you to get film recommendations based on your answer and logic rules with a film database.

System Features:

1. Personalised Recommendations:
   ● The system tailors movie recommendations based on user-specific information such as age, gender, mood, and minimum acceptable movie rating.
2. Two Menus for User Interaction:
   ● Criteria Menu: Users can specify their own criteria for recommendations, such as preferred genre, director, actor, year, and rating.
   ● General Questions Menu: Users answer a series of general questions about their age, gender, mood, and minimum rating to receive recommendations.

System Design:

The system is built using Prolog. The knowledge base consists of facts and rules that define relationships between movies, genres, directors, actors, and ratings.

components of the system include:

- Knowledge Base: Contains facts about films, genres, directors, actors, and ratings.
- Filtering Rules: Various rules to filter films based on user's age, gender, mood, and rating preferences.
- User Interaction: The system interacts with users by asking a series of questions to gather their preferences and then provides recommendations based on the collected data.

Knowledge Base Predicates:
- **film(film name)** → predicates the film name and that it exists in the dataset.
- **genre(film, genre)** → defines different film genres like (drama, comedy, crime, action, thriller, adventure, science fiction, etc.).
- **director(director, film)** → predicates the directors of each film.
- **actor(actor, film)** → predicates the actors in each film.
- **year(film, year)** → predicates the year when the film was published.
- **rating(film, rate)** → predicates the rate of the film according to the global rating system.
- **film_sequel(film1, film2)** → predicates that film2 is the next chapter of film1.
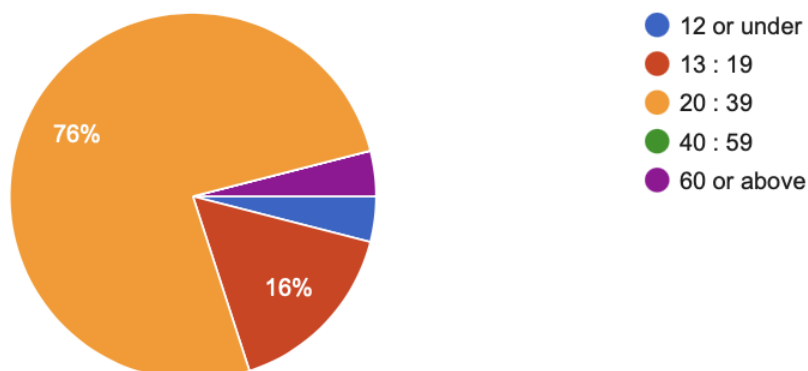
Questionnaire:
We asked people about their favourite genres when they have different moods.
We also asked them about their age, gender, minimum rating that is acceptable to watch a film, and favourite actors and directors.
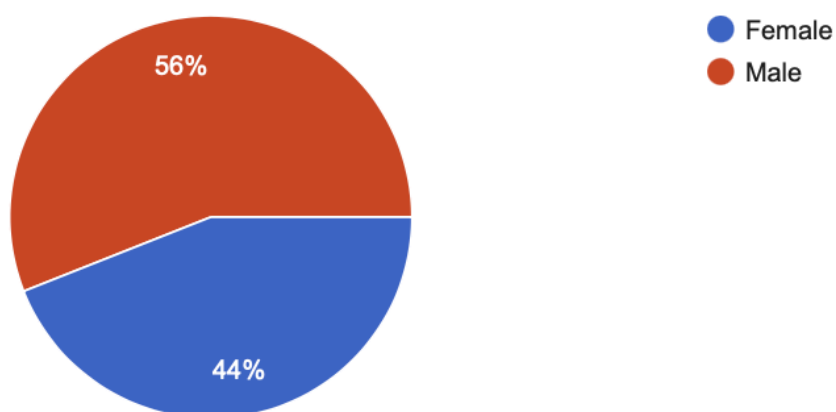
Questions and answers to the questionnaire:
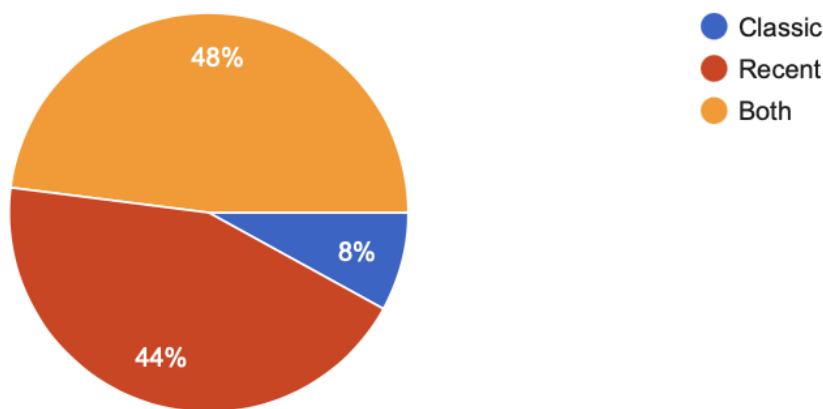
Could you please select your age?

25 responses

- ● 12 or under
- ● 13 : 19
- ● 20 : 39
- ● 40 : 59
- ● 60 or above

76%

16%

25 responses

- ● Female
- ● Male

56%

44%

Do you prefer watching

25 responses

Legend:
- Classic
- Recent
- Both

Pie chart values:
- 48% (Both)
- 44% (Recent)
- 8% (Classic)

What is the minimum rating you can accept?

25 responses

Copy

Rating	Responses
1	1 (4%)
2	0 (0%)
3	0 (0%)
4	0 (0%)
5	0 (0%)
6	4 (16%)
7	11 (44%)
8	7 (28%)
9	1 (4%)
10	1 (4%)
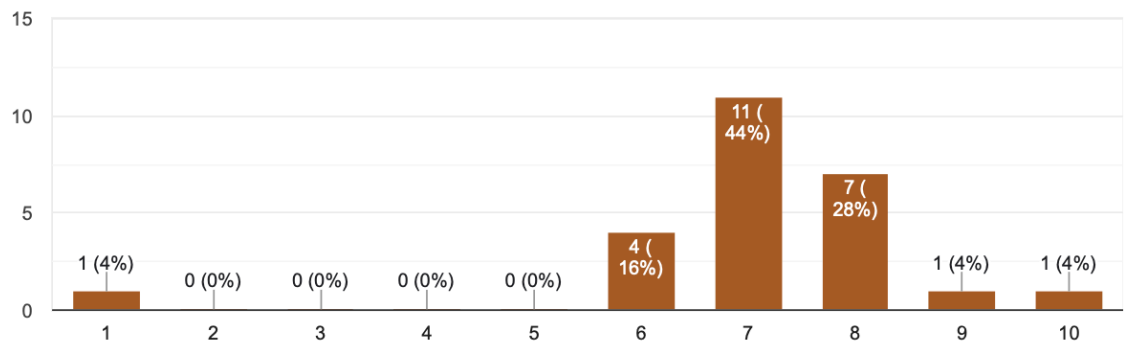
When you are *happy* , what genre of films do you enjoy watching?

25 responses

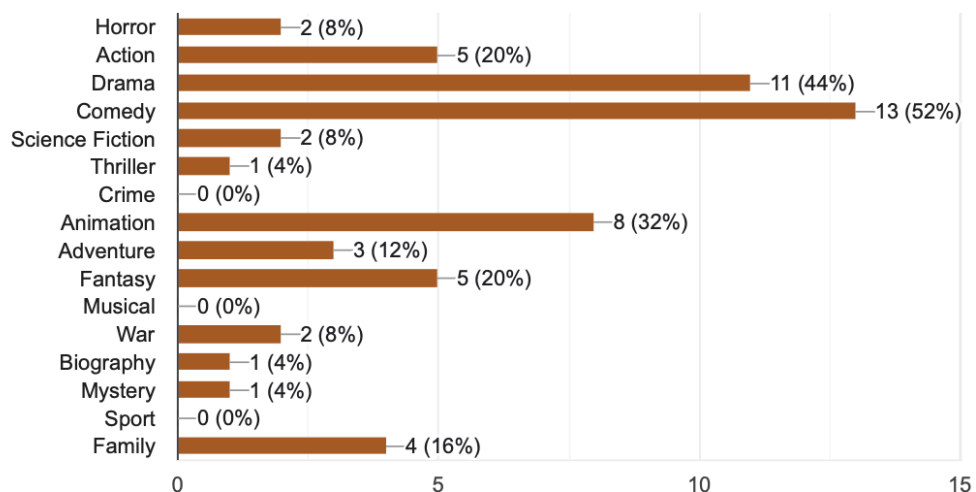| Genre	Count
Horror	2 (8%)
Action	8 (32%)
Drama	13 (52%)
Comedy	13 (52%)
Science Fiction	10 (40%)
Thriller	5 (20%)
Crime	7 (28%)
Animation	11 (44%)
Adventure	7 (28%)
Fantasy	9 (36%)
Musical	2 (8%)
War	3 (12%)
Biography	2 (8%)
Mystery	5 (20%)
Sport	4 (16%)
Family	4 (16%)
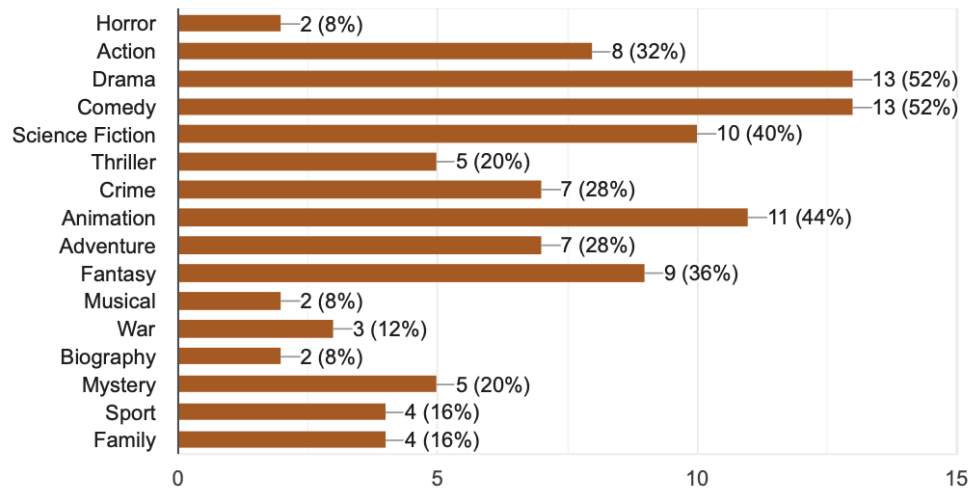
Copy

What is your favorite film genre that you turn to when you're feeling *sad* or need a pick-me-up?

25 responses

Genre	Count
Horror	2 (8%)
Action	5 (20%)
Drama	11 (44%)
Comedy	13 (52%)
Science Fiction	2 (8%)
Thriller	1 (4%)
Crime	0 (0%)
Animation	8 (32%)
Adventure	3 (12%)
Fantasy	5 (20%)
Musical	0 (0%)
War	2 (8%)
Biography	1 (4%)
Mystery	1 (4%)
Sport	0 (0%)
Family	4 (16%)

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Do you have a go-to film genre for when you're seeking *inspiration* or *motivation*?   Copy

25 responses
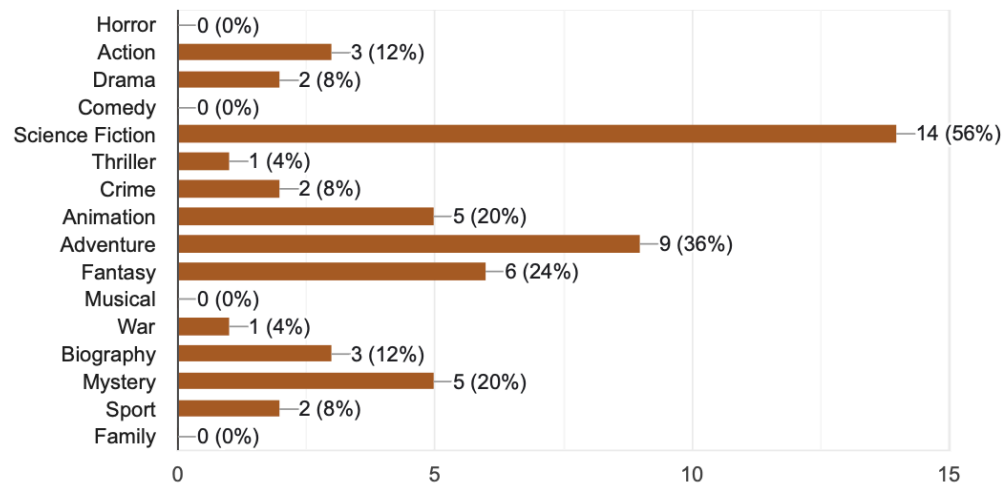
Genre	Value
Horror	0 (0%)
Action	3 (12%)
Drama	2 (8%)
Comedy	0 (0%)
Science Fiction	14 (56%)
Thriller	1 (4%)
Crime	2 (8%)
Animation	5 (20%)
Adventure	9 (36%)
Fantasy	6 (24%)
Musical	0 (0%)
War	1 (4%)
Biography	3 (12%)
Mystery	5 (20%)
Sport	2 (8%)
Family	0 (0%)

Are there specific movie genres you prefer watching when you're in the mood for a   Copy
good laugh?

25 responses

Genre	Value
Horror	0 (0%)
Action	1 (4%)
Drama	1 (4%)
Comedy	23 (92%)
Science Fiction	1 (4%)
Thriller	1 (4%)
Crime	1 (4%)
Animation	7 (28%)
Adventure	2 (8%)
Fantasy	3 (12%)
Musical	1 (4%)
War	1 (4%)
Biography	2 (8%)
Mystery	2 (8%)
Sport	0 (0%)
Family	3 (12%)
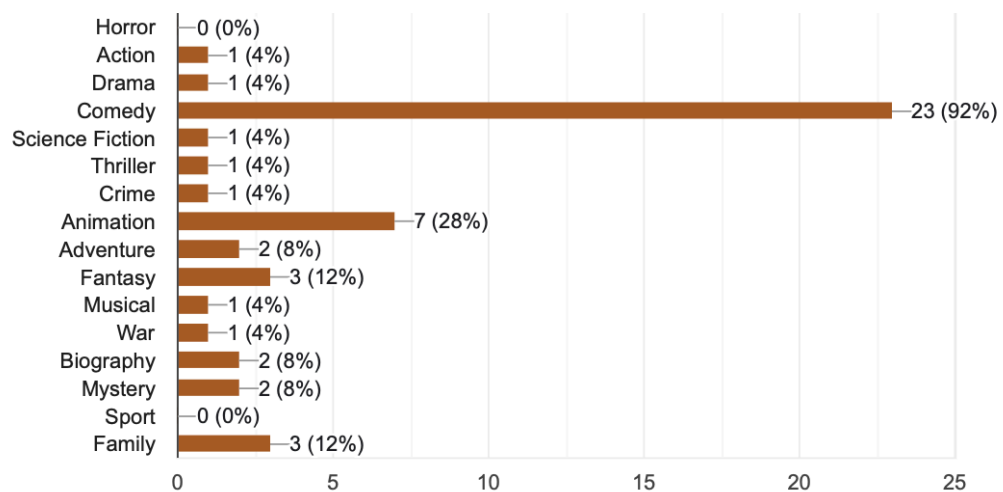
When you're feeling *curious* or *adventurous*, what types of films do you tend to explore?

25 responses

Genre	Count
Horror	1 (4%)
Action	4 (16%)
Drama	3 (12%)
Comedy	0 (0%)
Science Fiction	4 (16%)
Thriller	7 (28%)
Crime	4 (16%)
Animation	6 (24%)
Adventure	16 (64%)
Fantasy	4 (16%)
Musical	0 (0%)
War	4 (16%)
Biography	1 (4%)
Mystery	7 (28%)
Sport	0 (0%)
Family	0 (0%)
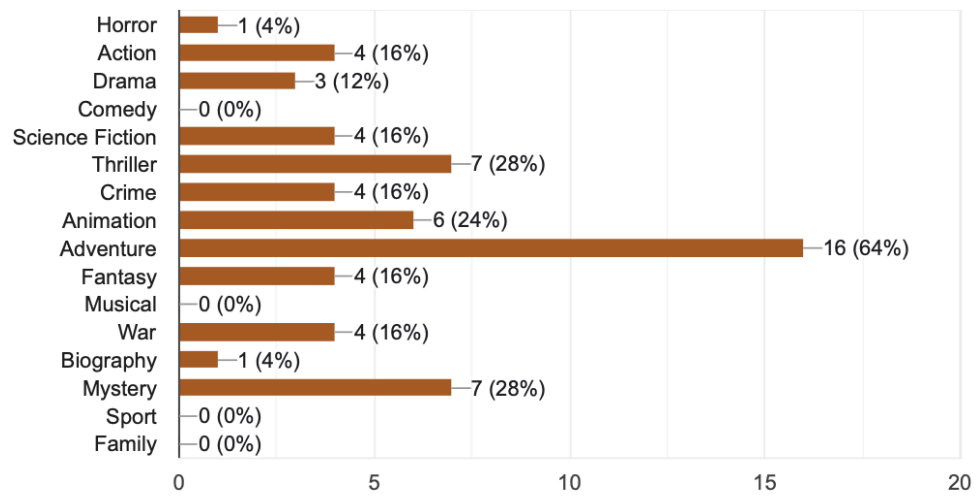
Are there specific movie genres you prefer watching when you're in the mood for *excitement*?

25 responses

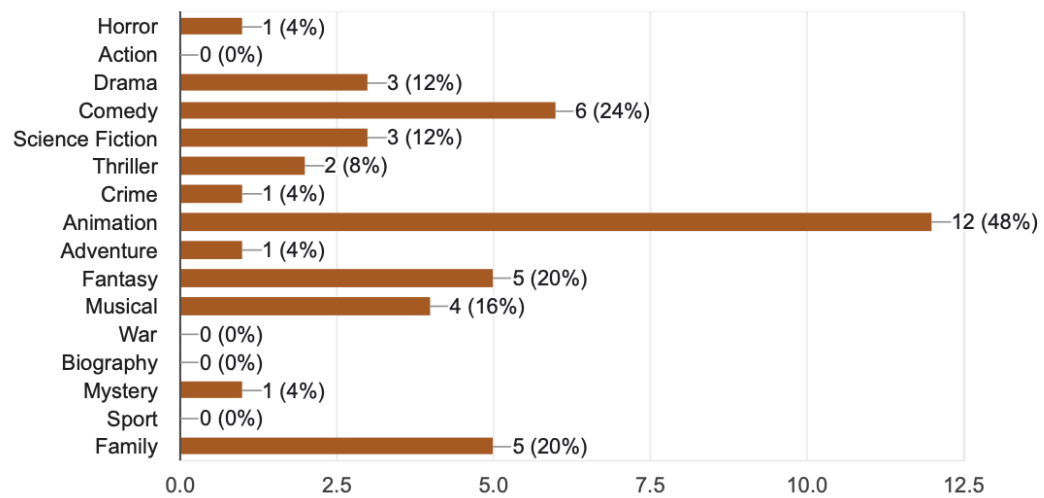| Genre	Count
Horror	4 (16%)
Action	10 (40%)
Drama	3 (12%)
Comedy	2 (8%)
Science Fiction	7 (28%)
Thriller	5 (20%)
Crime	3 (12%)
Animation	6 (24%)
Adventure	7 (28%)
Fantasy	3 (12%)
Musical	0 (0%)
War	3 (12%)
Biography	3 (12%)
Mystery	8 (32%)
Sport	0 (0%)
Family	0 (0%)
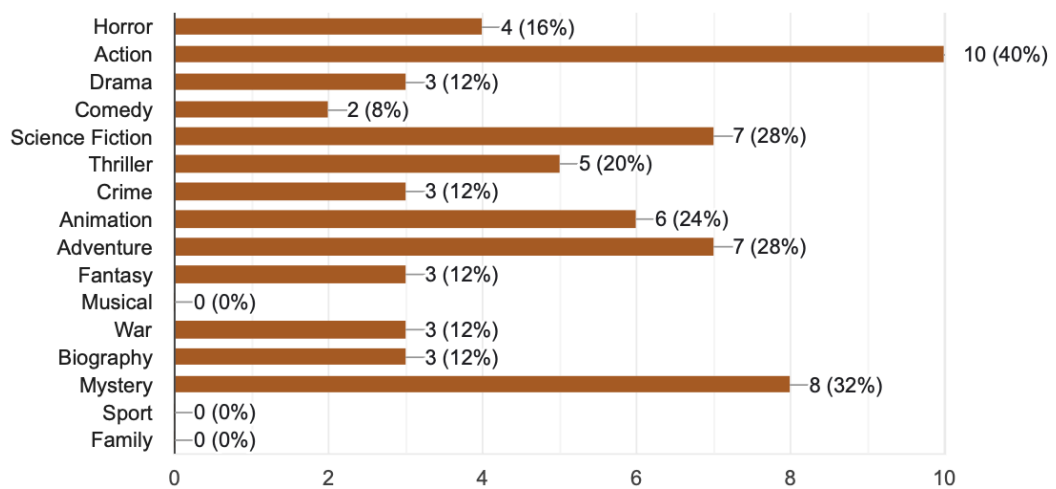
If you're feeling *stressed* or overwhelmed, is there a particular film genre that helps you relax?
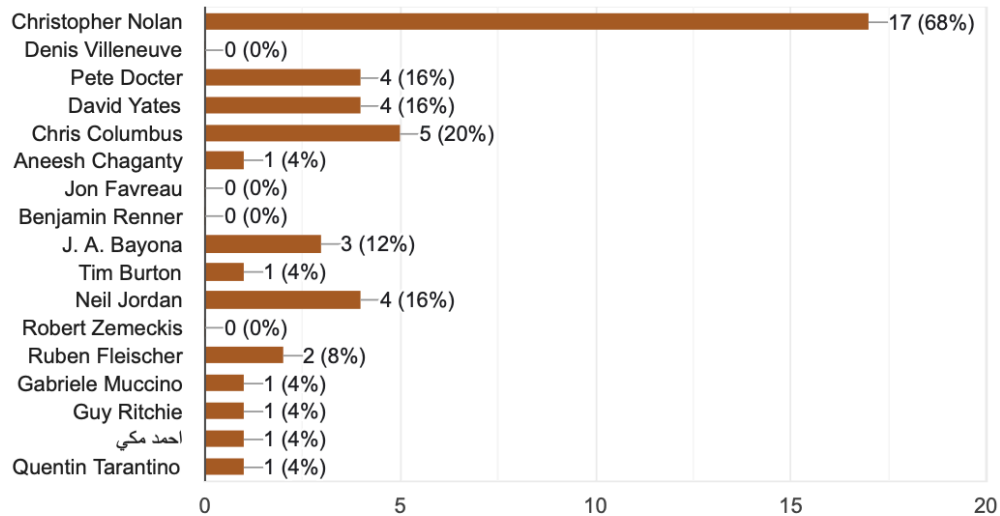
25 responses

Genre	Count
Horror	1 (4%)
Action	0 (0%)
Drama	3 (12%)
Comedy	6 (24%)
Science Fiction	3 (12%)
Thriller	2 (8%)
Crime	1 (4%)
Animation	12 (48%)
Adventure	1 (4%)
Fantasy	5 (20%)
Musical	4 (16%)
War	0 (0%)
Biography	0 (0%)
Mystery	1 (4%)
Sport	0 (0%)
Family	5 (20%)

Do you have favorite stars?

25 responses

Star	Count
Matthew McConaughey	8 (32%)
Zendaya	6 (24%)
Timothée Chalamet	0 (0%)
Ed Asner	0 (0%)
Daniel Radcliffe	7 (28%)
Sarah Paulson	2 (8%)
Will Smith	9 (36%)
Donald Glover	0 (0%)
Kumail Nanjiani	0 (0%)
Naomi Watts	2 (8%)
Anne Hathaway	9 (36%)
Johnny Depp	8 (32%)
Leonardo DiCaprio	9 (36%)
Chloë Grace Moretz	0 (0%)
Tom Hanks	11 (44%)
Jamie Foxx	0 (0%)
Tom Hardy	5 (20%)
Mena Massoud	2 (8%)

Do you have favorite directors?

25 responses

Director	Count
Christopher Nolan	17 (68%)
Denis Villeneuve	0 (0%)
Pete Docter	4 (16%)
David Yates	4 (16%)
Chris Columbus	5 (20%)
Aneesh Chaganty	1 (4%)
Jon Favreau	0 (0%)
Benjamin Renner	0 (0%)
J. A. Bayona	3 (12%)
Tim Burton	1 (4%)
Neil Jordan	4 (16%)
Robert Zemeckis	0 (0%)
Ruben Fleischer	2 (8%)
Gabriele Muccino	1 (4%)
Guy Ritchie	1 (4%)
احمد مكي	1 (4%)
Quentin Tarantino	1 (4%)

Questionnaire Results:

We created the mood-to-genre mapping based on the results of the questionnaire.

```
mood_genres(happy, [comedy, adventure, thriller, musical, drama, science_fiction, animation, fantasy]).
mood_genres(sad, [comedy, drama, romance, fantasy, animation]).
mood_genres(bored, [science_fiction, action, animation, adventure, fantasy, mystery]).
mood_genres(normal, [thriller, action, comedy, romance, animation, biography]).
mood_genres(adventurous, [adventure, thriller, mystery]).
mood_genres(excited, [action, science_fiction, mystery, adventure]).
mood_genres(stressed, [animation, comedy, family]).
```

Also, the questionnaire results were used to determine the gender-to-genre mapping.

```
gender_genres(female, [drama, comedy, romance, science_fiction, adventure]).
gender_genres(male, [action, thriller, crime, comedy, adventure, science_fiction]).
```

And by adding many films for the actors and directors who were most chosen in the questionnaire.

Recursive Relationships:

1. **Sequel Relation:** keeps recursing and adding to the list till it finds all sequels of a series
2. **Sequel Length:** keeps recursing and incrementing length till it covers all films available in series.
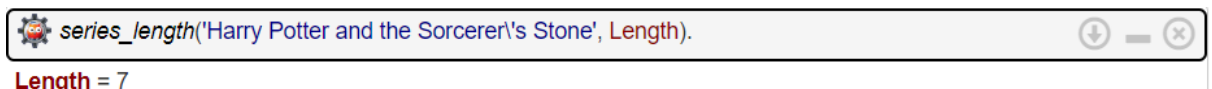
```prolog
sequel(_,[]).
sequel(X,[Head|Tail]) :-
    film_sequel(X, Head),
    sequel(Head, Tail).

series_length(Movie, Length) :-
    series_length_calc(Movie, 0, Length).

series_length_calc(Movie, Acc, Length) :-
    film_sequel(Movie, Sequel),
    NewAcc is Acc + 1,
    series_length_calc(Sequel, NewAcc, Length).
series_length_calc(_, Length, Length).
```
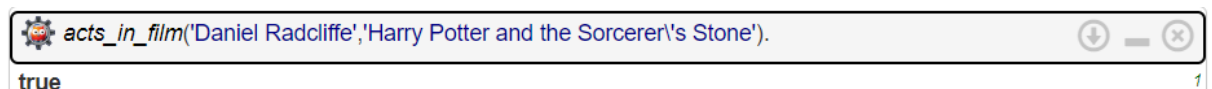
Queries Examples:

- series_length('Harry Potter and the Sorcerer\'s Stone',Length).

> series_length('Harry Potter and the Sorcerer\'s Stone', Length).
>
> Length = 7

- acts_in_film('Daniel Radcliffe','Harry Potter and the Sorcerer\'s Stone').

> acts_in_film('Daniel Radcliffe','Harry Potter and the Sorcerer\'s Stone').
>
> true

- get_rating('Up', Rate).

> get_rating('Up', Rate).
>
> Rate = 8.2

- get_actor('Interstellar', Actor).

```
get_actor('Interstellar', Actor).
```
Actor = jessica_chastain
Actor = matthew_mcConaughey
Actor = anne_hathaway

- get_film('jessica_chastain', Film).

```
get_film('jessica_chastain', Film).
```
Film = 'Interstellar'

- get_film('Emma Watson', Film).

```
get_film('Emma Watson', Film).
```
Film = 'Harry Potter and the Sorcerer\'s Stone'
Film = 'Harry Potter and the Chamber of Secrets'
Film = 'Harry Potter and the Prisoner of Azkaban'
Film = 'Harry Potter and the Goblet of Fire'
Film = 'Harry Potter and the Order of the Phoenix'
Film = 'Harry Potter and the Half-Blood Prince'
Film = 'Harry Potter and the Deathly Hallows: Part 1'
Film = 'Harry Potter and the Deathly Hallows: Part 2'

- series_length('Harry Potter and the Sorcerer\'s Stone',Length).

```
series_length('Harry Potter and the Sorcerer\'s Stone', Length).
```
Length = 7

- h

```
sequel('Harry Potter and the Sorcerer\'s Stone', List).
```
List = []
List = ['Harry Potter and the Chamber of Secrets']
List = ['Harry Potter and the Chamber of Secrets', 'Harry Potter and the Prisoner of Azkaban']
List =
['Harry Potter and the Chamber of Secrets', 'Harry Potter and the Prisoner of Azkaban',
'Harry Potter and the Goblet of Fire']
List =
['Harry Potter and the Chamber of Secrets', 'Harry Potter and the Prisoner of Azkaban',
'Harry Potter and the Goblet of Fire', 'Harry Potter and the Order of the Phoenix']
List =
['Harry Potter and the Chamber of Secrets', 'Harry Potter and the Prisoner of Azkaban',
'Harry Potter and the Goblet of Fire', 'Harry Potter and the Order of the Phoenix',
'Harry Potter and the Half-Blood Prince']
List =
['Harry Potter and the Chamber of Secrets', 'Harry Potter and the Prisoner of Azkaban',
'Harry Potter and the Goblet of Fire', 'Harry Potter and the Order of the Phoenix',
'Harry Potter and the Half-Blood Prince', 'Harry Potter and the Deathly Hallows: Part 1']
List =
['Harry Potter and the Chamber of Secrets', 'Harry Potter and the Prisoner of Azkaban',
'Harry Potter and the Goblet of Fire', 'Harry Potter and the Order of the Phoenix',
'Harry Potter and the Half-Blood Prince', 'Harry Potter and the Deathly Hallows: Part 1',
'Harry Potter and the Deathly Hallows: Part 2']
false
```

- worked_together('christopher_nolan','jessica_chastain', Film).

## Recommendations:

- Mood/Genre Mapping based on the mood the user chose and adding the gender into consideration → outputting a result of a recommendation, then the user can choose "next" to keep outputting other recommendations.

## Examples:

Test 1:

⚙ recommendation_system.  ⊕

Welcome to the Film Recommendation System!
Could You please enter your name ??

> youssef

Helloooooo, youssef !
Please choose one of the following :
1-Menu to choose your own criteria.
2-General questions recommendations.

> 2

Enter Your Age :

> 21

Enter Your gender :

> male

What is your mood right now (happy - sad - bored - normal - adventurous - excited - stressed) ?

> adventurous

What is the minimum Movie Rating you normally watch ?

> 7

current recommendation is:
Inception
thriller 2010 8.8
actors: leonardo_dicaprio, joseph_gordon_levitt, ellen_page
directors: christopher_nolan

If you have watched that film before or need another recommendation, write next.
Else, write done.

> done

Finished
true

## Test 2:

recommendation_system.

Welcome to the Film Recommendation System!
Could You please enter your name ??

> ahmed

Helloooooo, ahmed !
Please choose one of the following :
1-Menu to choose your own criteria.
2-General questions recommendations.

> 2

Enter Your Age :

> 52

Enter Your gender :

> male

What is your mood right now (happy - sad - bored - normal - adventurous - excited - stressed) ?

> normal

What is the minimum Movie Rating you normally watch ?

> 8

current recommendation is:
The Matrix
action 1999 8.7
actors: keanu_reeves, laurence_fishburne, carrie_anne_moss
directors: the_wachowskis

If you have watched that film before or need another recommendation, write next.
Else, write done.

> done

Finished

## Test 3:

Welcome to the Film Recommendation System!
Could You please enter your name ??
*mervat*

Helloooooo, mervat !
Please choose one of the following :
1-Menu to choose your own criteria.
2-General questions recommendations.
*2*

Enter Your Age :
*30*

Enter Your gender :
*female*

What is your mood right now (happy - sad - bored - normal - adventurous - excited - stressed) ?
*stressed*

What is the minimum Movie Rating you normally watch ?
*5*

current recommendation is:
Bridesmaids
comedy 2011 6.8
actors: Kristen Wiig, Maya Rudolph, Rose Byrne
directors: Paul Feig

If you have watched that film before or need another recommendation, write next.
Else, write done.
*next*

current recommendation is:
The Hangover
comedy 2009 7.7
actors: Bradley Cooper, Ed Helms, Zach Galifianakis
directors: Todd Phillips

If you have watched that film before or need another recommendation, write next.
Else, write done.
*done*

Test 4:

Welcome to the Film Recommendation System!
Could You please enter your name ??

*yomna*

Hellooooo, yomna !
Please choose one of the following :
1-Menu to choose your own criteria.
2-General questions recommendations.

*1*

Choose a field to filter by:
1. Genre
2. Director
3. Actor
4. Year
5. Minimum Rating
6. Done

*1*

Enter the genre:

*comedy*

Choose a field to filter by:
1. Genre
2. Director
3. Actor
4. Year
5. Minimum Rating
6. Done

*1*

Enter the genre:

*adventure*

Choose a field to filter by:

Choose a field to filter by:
1. Genre
2. Director
3. Actor
4. Year
5. Minimum Rating
6. Done

*5*

Enter the rating:

*7*

Choose a field to filter by:
1. Genre
2. Director
3. Actor
4. Year
5. Minimum Rating
6. Done

*6*

current recommendation is:
Finding Nemo
animation 2003 8.1
actors: Albert Brooks, Ellen DeGeneres, Alexander Gould
directors: Andrew Stanton

If you have watched that film before or need another recommendation, write next.
Else, write done.

*next*

current recommendation is:
Toy Story
animation 1995 8.3
actors: Tom Hanks, Tim Allen, Don Rickles
directors: John Lasseter

Test 5:

Welcome to the Film Recommendation System!
Could You please enter your name ??

omnia

Helloooooo, omnia !
Please choose one of the following :
1-Menu to choose your own criteria.
2-General questions recommendations.

1

Choose a field to filter by:
1. Genre
2. Director
3. Actor
4. Year
5. Minimum Rating
6. Done

2

Enter the director:

'Todd Phillips'

Choose a field to filter by:
1. Genre
2. Director
3. Actor
4. Year
5. Minimum Rating
6. Done

4

Enter the year:

2009

Choose a field to filter by:

4

Enter the year:

2009

Choose a field to filter by:
1. Genre
2. Director
3. Actor
4. Year
5. Minimum Rating
6. Done

6

current recommendation is:
The Hangover
comedy 2009 7.7
actors: Bradley Cooper, Ed Helms, Zach Galifianakis
directors: Todd Phillips

```
189  genre('Bridesmaids', comedy).
190  genre('The Hangover', comedy).
191  genre('The Grand Budapest Hotel', comedy)
```

Test 6:

recommendation_system.

Welcome to the Film Recommendation System!
Could You please enter your name ??

> rawan

Helloooooo, rawan !
Please choose one of the following :
1-Menu to choose your own criteria.
2-General questions recommendations.

> 2

Enter Your Age :

> 21

Enter Your gender :

> female

What is your mood right now (happy - sad - bored - normal - adventurous - excited - stressed) ?

> stressed

What is the minimum Movie Rating you normally watch ?

> 8.5

current recommendation is:
Spirited Away
animation 2001 8.6
actors: Rumi Hiiragi, Miyu Irino, Mari Natsuki
directors: Hayao Miyazaki

If you have watched that film before or need another recommendation, write next.
Else, write done.

> next

current recommendation is:
The Intouchables
biography 2011 8.5
actors: François Cluzet, Omar Sy, Anne Le Ny
directors: Olivier Nakache, Éric Toledano

Test 7:

Welcome to the Film Recommendation System!
Could You please enter your name ??

mostafa

Helloooooo, mostafa !
Please choose one of the following :
1-Menu to choose your own criteria.
2-General questions recommendations.

1

Choose a field to filter by:
1. Genre
2. Director
3. Actor
4. Year
5. Minimum Rating
6. Done

5

Enter the rating:

4

Choose a field to filter by:
1. Genre
2. Director
3. Actor
4. Year
5. Minimum Rating
6. Done

1

Enter the genre:

crime

Choose a field to filter by:
1. Genre
2. Director
3. Actor
4. Year
5. Minimum Rating
6. Done

6

current recommendation is:
The Godfather
crime 1972 9.2
actors: marlon_brando, al_pacino, james_caan
directors: francis_ford_coppola

If you have watched that film before or need another recommendation, write next.
Else, write done.

next

current recommendation is:
Pulp Fiction
crime 1994 8.9
actors: john_travolta, uma_thurman, samuel_l_jackson
directors: quentin_tarantino

If you have watched that film before or need another recommendation, write next.
Else, write done.

next

current recommendation is:
The Dark Knight
action 2008 9.0
actors: Christian Bale, Heath Ledger, Aaron Eckhart
directors: Christopher Nolan