**Универсальное отношение**:

Ru(actor\_surname, actor\_name, actor\_birth\_year, actor\_country, actor\_role director\_surname, director\_name, director\_birth\_year, director\_country, producer\_surname, producer\_name, producer\_birth\_year, producer\_country, screenwriter\_surname, screenwriter\_name, screenwriter\_birth\_year, screenwriter\_country, film\_name, release\_year, rating, film\_country, genre\_name, genre\_description, Oscar\_rewarding\_year, Oscar\_nomination, review\_name, review\_author, review\_autor\_mark, review\_text)

В данном отношении довольно трудно определить некоторые первичные ключи, возможны неоднозначности.

**Введём идентификаторы** actor\_id, director\_id, producer\_id, screenwriter\_id, genre\_id, film\_id, review\_id для большей точности и удобства, в этом случае

**Универсальное отношение**: Ru2(actor\_surname, actor\_name, actor\_birth\_year, actor\_country, actor\_role director\_surname, director\_name, director\_birth\_year, director\_country, producer\_surname, producer\_name, producer\_birth\_year, producer\_country, screenwriter\_surname, screenwriter\_name, screenwriter\_birth\_year, screenwriter\_country, film\_name, release\_year, rating, film\_country, genre\_name, genre\_description, Oscar\_rewarding\_year, Oscar\_nomination, review\_name, review\_author, review\_autor\_mark, review\_text, actor\_id, director\_id, producer\_id, screenwriter\_id, genre\_id, film\_id, review\_id)

**первичный ключ**: { actor\_id, film\_id, review\_id, Oscar\_rewarding\_year, Oscar\_nomination }

Распишем **зависимости**:

* actor\_id => actor\_name, actor\_surname, actor\_birth\_year, actor\_country
* film\_id => film\_name, release\_year, rating, film\_country, director\_id, producer\_id, producer\_country, screenwriter\_id, genre\_id, director\_surname, director\_name, director\_birth\_year, director\_country, producer\_surname, producer\_name, producer\_birth\_year, producer\_country, creenwriter\_surname, screenwriter\_name, screenwriter\_birth\_year, screenwriter\_country, genre\_name, genre\_discription
* { Oscar\_rewarding\_year, Oscar\_nomination } => film\_id, actor\_id
* { film\_id, actor\_id } => actor\_role
* review\_id => review\_author, review\_name, review\_author\_mark, review\_text, film\_id

Тогда можно перейти ко второй нормальной , выделив неключевые атрибуты, зависящие от части ключа в отдельное отношение:

R0(actor\_id, film\_id, review\_id, Oscar\_rewarding\_year, Oscar\_nomination)

R1(actor\_id, actor\_name, actor\_surname, actor\_birth\_year, actor\_country)

R2(film\_id, film\_name, release\_year, rating, film\_country, director\_id, director\_surname, director\_name, director\_birth\_year, director\_country, producer\_id, producer\_surname, producer\_name, producer\_birth\_year, producer\_country, screenwriter\_id, screenwriter\_surname, screenwriter\_name, screenwriter\_birth\_year, screenwriter\_country, genre\_id, genre\_name, genre\_discription)

R3(Oscar\_rewarding\_year, Oscar\_nomination, film\_id, actor\_id)

Здесь отдельное отношение, так как не все актёры и не за все фильмы получат Оскар

R4(film\_id, actor\_id, actor\_role)

R5(review\_id, review\_author, review\_name, review\_author\_mark, review\_text, film\_id)

Здесь отдельное отношение, так как не на каждый фильм будет написана рецензия

Данные отношения находятся во второй нормальной форме.

Отношение R0сводится к отношениям R3 и R5.

Перейдём к третьей нормальной форме, выделив в отдельные отношения зависимости неключевых атрибтов от неключевых.

Выделяем следующие транзитивные зависимости:

* director\_id => director\_surname, director\_name, director\_birth\_year, director\_country
* producer\_id => producer\_surname, producer\_name, producer\_birth\_year, producer\_country
* screenwriter\_id => screenwriter\_surname, screenwriter\_name, screenwriter\_birth\_year, screenwriter\_country
* genre\_id => genre\_name, genre\_discription

Тогда отношени R2 декомпозируется на 5 отношения: R2, R6, R7, R8, R9.

R1(actor\_id, actor\_name, actor\_surname, actor\_birth\_year, actor\_country)

R2(film\_id, film\_name, release\_year, rating, film\_country, director\_id, producer\_id, screenwriter\_id, genre\_id)

R3(Oscar\_rewarding\_year, Oscar\_nomination, film\_id, actor\_id)

R4(film\_id, actor\_id, actor\_role)

R5(review\_id, review\_author, review\_name, review\_author\_mark, review\_text, film\_id)

R6(director\_id, director\_surname, director\_name, director\_birth\_year, director\_country)

R7(producer\_id, producer\_surname, producer\_name, producer\_birth\_year, producer\_country)

R8(screenwriter\_id, screenwriter\_surname, screenwriter\_name, screenwriter\_birth\_year, screenwriter\_country)

R9(genre\_id, genre\_name, genre\_discription)

Однако, почти в каждом отношении есть атрибут, указывающий на страну, но набор возможных стран постоянный и общий для всех этих отношений. Страну можно вынести в отдельное отношение (так экономится память и появляется возможность добавить какую-то информацию, касающуюся только стран), тогда **конечный набор отношений** имеет вид:

R1(actor\_id, actor\_name, actor\_surname, actor\_birth\_year, country\_id)

R2(film\_id, film\_name, release\_year, rating, film\_country, director\_id, producer\_id, screenwriter\_id, genre\_id)

R3(Oscar\_rewarding\_year, Oscar\_nomination, film\_id, actor\_id)

R4(film\_id, actor\_id, actor\_role)

R5(review\_id, review\_author, review\_name, review\_author\_mark, review\_text, film\_id)

R6(director\_id, director\_surname, director\_name, director\_birth\_year, country\_id)

R7(producer\_id, producer\_surname, producer\_name, producer\_birth\_year, country\_id)

R8(screenwriter\_id, screenwriter\_surname, screenwriter\_name, screenwriter\_birth\_year, country\_id)

R9(genre\_id, genre\_name, genre\_discription)

R10(country\_id, country\_name)