

For the first pattern, we need to get titles, release\_year, rating, rental\_rate, and rental\_duration of satisfied films given a film category. I merged the datasets film, film\_category and category locally and find the mapping relationship of categories and films and other information of films, such as rating, release\_year, rental\_duration, rental\_rate and title. I create a new json file film\_db1 that stores the data of each category and its related film information. Then I uploaded this json data to firebase. So when I want to query the information of the films of each category, I only need to send one request for this category, then the firebase will send me the relevant data that I want. The response did not contain any irrelevant data because each category is only associated with their related movies.

For the second pattern, we need to get title, release years of appropriate films given the actor's name in the film. I merged the datasets film, actor, and film\_actor and find the relationship of actors and the specific information about the films that this actor acted in. I created a new json file film\_db2 that stores the data of each actor and the information of the movies that this actor has acted in. And there are two actors with same name but different actor id, so I also store actor\_id in my database to distinguish them. Then I uploaded this json file into firebase. So when I want to get the information of the title and release\_year of the movies that some certain actor once acted in, I just need to send a request to the firebase for this actor, then I can get the data that I want. The response did not contain irrelevant data because each actor is only associated with their related movies.