Aufgabe 4

1. $R := \Pi_{movie\_id}(\sigma_{gengre = Action}\ movie\_genres)$

   $R_1 := \sigma_{year < 2000}\ movies$

   $R_2 := R \bowtie_{R.movie\_id = R_1.id} R_1$

   $R_3 := \Pi_{actor\_id}\ \sigma_{roles.movie\_id = R_2.movie\_id}\ roles$

   $R_4 := \Pi_{first\_name, last\_name}\ \sigma_{R_3.actor\_id = actors.id}\ actors$

2. $R_1 := \sigma_{year > 1980\ AND\ year < 2017}\ movies$

   $R_2 := \Pi_{id}\ \sigma_{first\_name = Martin\ AND\ last\_name = Scorsese}\ directors$

   $R_3 := \Pi_{movie\_id}\ \sigma_{director\_id = R_2.id}\ movies\_directors$

   $R_4 := \Pi_{avg(rank)}\ \sigma_{id = R_3.movie\_id}\ movies$

3. $R := \Pi_{actors.id, first\_name, last\_name, movie\_id}(actors \bowtie_{actors.id = roles.actor\_id} roles)$

   $R_1 := \Pi_{actors.id, first\_name, last\_name, rank}(R \bowtie_{movie\_id = movies.id} movies)$

   $R_2 := \Pi_{first\_name, last\_name, avg(rank)}\ \gamma_{actors.id, first\_name, last\_name, avg(rank)}\ R_1$