Exercise 1 (SQL queries). We start with Ex. 4.2 from exercise sheet 4: Consider the following SQL queries over the film schema. What is their meaning? Translate them into equivalent relational algebra expressions.

a)  
SELECT DISTINCT title  
FROM (film JOIN show ON ID = film) JOIN cinema ON cinema.ID = cinema  
WHERE name = ‘Metropol’

b)  
SELECT DISTINCT person.name, person.firstname  
FROM film, person, cinema, participation, show  
WHERE film.ID = participation.film AND film.ID = show.film  
AND person.ID = person AND cinema.ID = cinema  
AND date = ’2016-11-23’

Exercise 2 (SQL queries). We now continue with the remaining subtasks of Ex. 4.1: Formulate SQL queries answering the following questions using the schema about films.

film:  {{ID, title, year, genre}}  
person:  {{ID, name, firstname}}  
cinema:  {{ID, name, city}}  
participation:  {{film, person, function}}  
show:  {{film, date, cinema}}

c) List all shows of “Alice in Wonderland”.
d) Who acted in his/her own film?  
e) Which cinemas show films with Kate Winslet?  
f) Which films have more than one director?  
i) Who directed at least two different films in the same year?
k) Are there persons having the same name (name and first name)?

g) Which films have not been presented in a cinema yet?

h) Who hasn’t participated in a film yet?

There are various ways to answer g) and h). Please use a join first, then reformulate your query using the keywords EXISTS and/or IN.

Exercise 3 (EXISTS and IN). Take another closer look at the SQL keywords EXISTS and IN by formulating the following two queries using 1. a join, 2. the keyword EXISTS and 3. the keyword IN. What can be said about the performance of these variant

a) Who participated in a film that was shown in cinema?

b) Who participated in a film that was not shown in cinema yet?

Exercise 4 (“All” in SQL). Formulate SQL queries answering the following questions:

a) Who participated in all films?

b) Which film was shown in all cinemas?

c) Which cinemas show all films?