Exercise 1 (RA operators in SQL). Transform the following relational algebra expressions from the first exercise sheet into equivalent SQL queries.

a) $\sigma_{\text{price}\leq 2.00} (\text{Sells})$

b) $\sigma_{\text{bar}='Sue's'} (\text{Bars})$

c) $\pi_{\text{beer, price}} (\text{Sells})$

d) $\pi_{\text{beer}} (\sigma_{\text{price}\geq 5.00} (\text{Sells}))$

e) $\sigma_{\text{address}='River Rd.' \lor \text{address}='Maple St.'} (\text{Bars})$

f) $\text{Bars} \times \text{Sells}$

g) $\text{Bars} \bowtie \text{Sells}$

h) $\text{Sells} - \sigma_{\text{beer}='Bud'} (\text{Sells})$

i) $\pi_{\text{bar}} (\sigma_{\text{address}='River Rd.'} (\text{Bars})) \cup \pi_{\text{bar}} (\sigma_{\text{price}=2.00} (\text{Sells}))$

Exercise 2 (SQL queries). In this exercise, we consider the following schema about films:

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

The IDs are unique identifiers for films, persons and cinemas stored in the respective relation. They form the primary key for their relation. The attributes film, person and cinema of the relations participation and show reference them as foreign keys.

The attribute function of the relation participation is either 'actor' or 'director'.

Formulate SQL queries answering the following questions:

a) What is the genre of “Titanic”?  
b) What is the ID of Angelina Jolie?  
c) Which action movies were produced in 2010?  
d) List all cinemas located in Bonn.  
e) List all actors who acted in at least one movie.  
f) Who directed the film “The Da Vinci Code”?  
g) Where can you watch the new Dan Brown film “Inferno”?  
h) Who participated in “Inferno”?  