

Airport

airportId	name	city
LHR	Heathrow	London
LGW	Gatwick	London
CDG	Charles de Gaulle	Paris
ORY	Orly	Paris

Flight

flightNo	flightCompany	depAirport	arrAirport
AF1231	Air France	LHR	CDG
AF1232	Air France	CDG	LHR
AF1234	Air France	LGW	CDG
AF1235	Air France	CDG	LGW
BA2943	British Airways	LGW	ORY
BA2944	British Airways	ORY	LGW
BA4059	British Airways	LHR	CDG
BA4060	British Airways	CDG	LHR

Booking

ticketNo	name	nationality	flightNo	seatNo
EAG129489	John Jones	British	AF1232	12D
EAF123456	Fraser McEwan	British	AF1232	30E
ABS958332	Mathilde Duval	French	BA2944	10A
ORE394895	Fiona Stewart	British	BA4060	5D
EYR149583	Karen Woods	British	BA4059	14B
EAG348595	Pierre Fontaine	French	BA2944	30D

Seat

seatNo	flightNo	class
12D	AF1232	Business
30E	AF1232	Economy
10A	BA2944	Business
5D	BA4060	Business
14B	BA4059	Economy
30D	BA2944	Economy

For each of the following queries in relational algebra, calculate the output table and give a brief statement of what query it answers.

(a) $\sigma_{\text{class}=' \text{ Business' }}(\text{Seat})$

(b) $\pi_{\text{nationality}}(\text{Booking})$

(c) $\sigma_{\text{nationality}=' \text{ French' }}(\text{Booking}) \times \sigma_{\text{class}=' \text{ Business' }}(\text{Seat})$

(d) $\text{Booking} \bowtie \text{Seat}$

(e) $\pi_{\text{name}}(\sigma_{\text{class}=' \text{ Business' }}(\text{Booking} \bowtie \text{Seat}))$

(f) $\text{Airport} \cup \text{Seat}$

Consider the following schema:

Student(name, age, gender, studium)

Eats_at(name, restaurant)

Eats(name, dish)

Serves(restaurant, dish, price, type)

In the relation Serves, type refers to one of the following: "meat", "turkey", "chicken", "seafood"

Write relational algebra expression for the following queries.

1. Show all the restaurants frequented by at least one student who is at least 19 years old and studies "Informatik". (2 points)
2. Show the names of all female students who eat seafood or turkey (or both) (2 points)
3. Show the names of all male students who eat "curry wurst" (2 points)
4. Show the name of the youngest male student who is studying "Psychology" (2 points)
5. Show on price average of the dishes of type "meat" (2 points)
6. Show all the restaurants that serve at least one dish that Sophie eats for more than € 16.00 (2 points)
7. Show the restaurant that serves the cheapest "Linsensuppe". (3 points)