Databases

Customer (c_name, age, sex)	c_name is the key
Frequents (c_name, coffeehouse)	(c_name, coffehouse) is the key
Drinks (c_name, coffee)	(c_name, coffee) is the key
Serves (coffehouse, coffee, price)	(coffehouse, coffee) is the key

a. Find all coffeehouses frequented by at least one customer under the age of 18

$\pi_{coffeehouse}(\sigma_{age<18}(Customer) \bowtie Frequents)$

b. Find the customer names of all females who drink either Capuccino or Flat White coffee (or both).

$\pi_{c\_name}(\sigma_{sex=\text{"female" and (coffee = "capuccino" or coffee="Flat White)}}(Drinks \bowtie Customer))$

c. Find the customer names of all females who drink either Capuccino or Flat White coffee (or both).

$\pi_{c\_name}(\sigma_{sex=\text{"female" and coffee = "capuccino"}}(Drinks \bowtie Customer)) \cap \pi_{c\_name}(\sigma_{sex=\text{"female" and coffee = "Flat White"}}(Drinks \bowtie Customer))$

d. Find all coffehouses that serve at least one coffee that Magda drinks for less than 10 PLN

$\pi_{coffeehouse}(\sigma_{c\_name=\text{"Magda"}}(Drinks) \bowtie \sigma_{price<10}(Serves))$

e. .Find all coffehouses that are frequented by only females or only males

$\pi_{coffeehouse}(\sigma_{sex=\text{"female"}}(Customer) \bowtie Frequents) - \pi_{coffeehouse}(\sigma_{sex=\text{"male"}}(Customer) \bowtie Frequents)$

f. . For each customer, find all coffee the customer drinks that are not served by any coofeehouse the customer frequents. Return all such customer (name) / coffee pairs

Drinks - $\pi_{\text{coffehouse, coffee}}$ (Frequents ⋈ Serves)

g. .Find the names of all customers who frequent only coffeehouses serving at least one coffee they drink.

$\pi_{\text{c\_name}}$ (Customer) - $\pi_{\text{c\_name}}$ (Frequents - $\pi_{\text{c\_name, coffee}}$ (Drinks ⋈ Serves))

h. Find the names of all customers who frequent every coffeehouse serving at least one coffee they drink

$\pi_{\text{c\_name}}$ (Customer) - $\pi_{\text{c\_name}}$ ($\pi_{\text{c\_name, coffee}}$ (Drinks ⋈ Serves) - Frequents)