1.1 Model 1 – Pizzeria

Consider a database with the following relational model (schema):
Person (name, age, gender)
Frequents (name, pizzeria)
Eats (name, pizza)
Serves (pizzeria, pizza, price)

a) Find all pizzerias frequented by at least one person under the age of 18.
$\pi_{pizzeria}(\sigma_{age<18}(Person) \bowtie Frequents)$

b) Find the names of all females who eat either mushroom or pepperoni pizza (or both).
$\pi_{name}(\sigma_{gender='female' \text{ AND } (pizza='mushroom' \text{ OR } pizza='pepperoni')}(Person \bowtie Eats))$

c) Find the names of all females who eat both mushroom and pepperoni pizza.
$\pi_{name}(\sigma_{gender='female' \text{ AND } pizza='mushroom'}(Person \bowtie Eats))$
$\cap$
$\pi_{name}(\sigma_{gender='female' \text{ AND } pizza='pepperoni'}(Person \bowtie Eats))$

d) Find all pizzerias that serve at least one pizza that Amy eats for less than $10.00.
$\pi_{pizzeria}(\sigma_{name='Amy'}(Eats) \bowtie \sigma_{price<10}(Serves))$

e) Find all pizzerias that are frequented by only females or only males.
$[\pi_{pizzeria}(\sigma_{gender='female'}(Person) \bowtie Frequents) - \pi_{pizzeria}(\sigma_{gender='male'}(Person) \bowtie Frequents)] \cup$
$[\pi_{pizzeria}(\sigma_{gender='male'}(Person) \bowtie Frequents) - \pi_{pizzeria}(\sigma_{gender='female'}(Person) \bowtie Frequents)]$

f) For each person, find all pizzas the person eats that are not served by any pizzeria the person frequents. Return all such person (name) / pizza pairs.
$Eats - \pi_{name,pizza}(Frequents \bowtie Serves)$