Homework no. 2: Relational algebra queries

1. Given the following relational schema (primary keys are underlined, optional attributes are indicated with '*', attributes with the same name in different relationships indicate a referential integrity constraint):

CUSTOMER (TaxID, Name, Surname, Address, City, Email)
RESTAURANT (RID, NameR, CityR, Cuisine)
MENU_ITEM (RID, MID, Description, Vegetarian, Price)
DELIVERY (RID, MID, TaxID, Date)

Write the following query in relational algebra:

- Find the name and surname of customers who have ordered from at least two different restaurants located in Turin, of which at least one is a Chinese restaurant (attribute Cuisine)

2. Given the following relational schema (primary keys are underlined, optional attributes are indicated with '*', attributes with the same name in different relationships indicate a referential integrity constraint):

INSTRUCTOR (InstID, NameI, SurnameI, CityI)
MARTIAL_ART_TRAINING_CENTER (CID, NameC, CityC, Address)
LESSON (CID, Date, Hour, Type, InstID)

Write the following query in relational algebra:

- Find the name and surname of the instructors from Turin who have taught at least one lesson for each type of martial art (attribute 'Type'), considering all martial arts taught in at least one center

3. Given the following relational schema (primary keys are underlined, optional attributes are indicated with '*', attributes with the same name in different relationships indicate a referential integrity constraint):

PATIENT (SSN, Name, Surname, City)
DOCTOR (DID, Name, Surname, Specialization)
SURGERY (SSN, Date, Type, Report, Priority, DID)

Write the following query in relational algebra:

- View the name and surname of doctors with a Cardiology specialization who performed only one high priority surgery on patients living in the city of Turin.

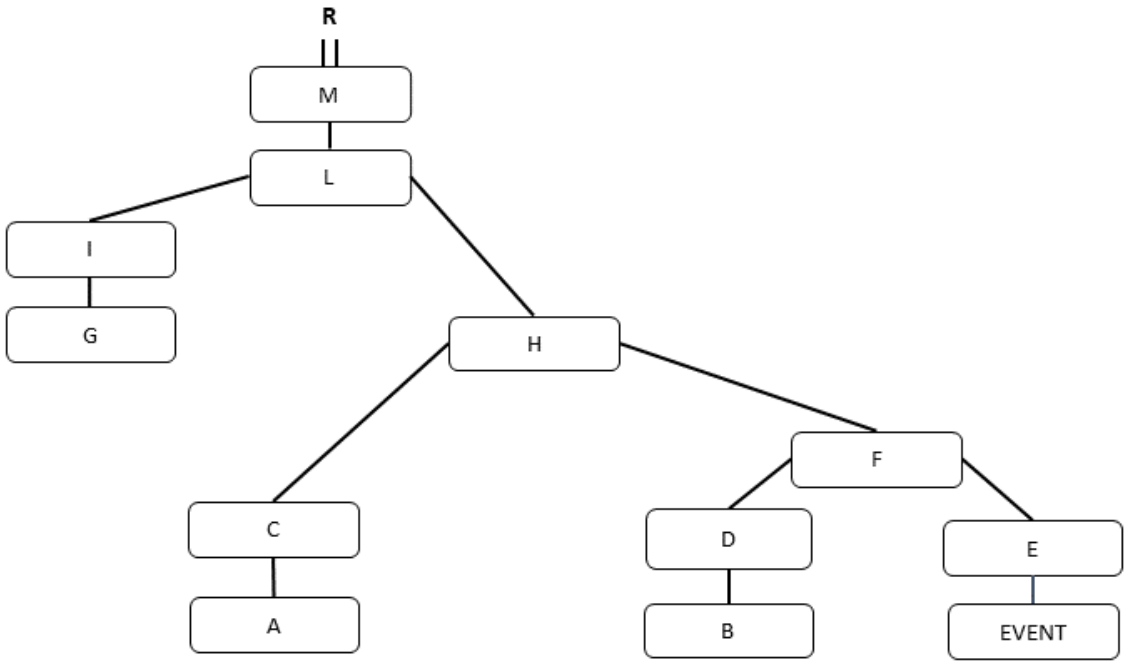
4. Given the following relational schema (primary keys are underlined, optional attributes are indicated with '*', attributes with the same name in different relationships indicate a referential integrity constraint):

LOCATION (CodL, Name, City, MaxCapacity)
EVENT (CodE, Title, Type)
EDITION (CodE, Date, CodL)

Write the following query in relational algebra:

- Display name and city of locations with maximum capacity higher than 500 that hosted *only* events of type "fair" in the first half of 2019.

Assignment for the exercise:
The following query tree graphically represents the requested algebraic query. You are requested to indicate, for each box in the query tree (i.e., boxes from A to L), the relational table or the corresponding algebraic operator.
Note: each box in the query tree is associated with only one relational table or one algebraic operator.



5. Given the following relational schema (primary keys are underlined, optional attributes are indicated with '*', attributes with the same name in different relationships indicate a referential integrity constraint):

HAIR_SALON (HSID, Name, Address, City)
SERVICE (HSID, SID, Description, Price)
PERSON (CodP, Name, Surname, Telephone, Email)
RESERVATION (CodP, Month, Day, SID, HSID, TotalCost)

Write the following query in relational algebra:

- Show the name and surname of people who, in the same month, have made at least a reservation for services costing more than 50 euros, in *two different hair salons* in the city of Milan.

Assignment for the exercise:
The following query tree graphically represents the requested algebraic query. You are requested to indicate, for each box in the query tree (i.e., boxes from A to S), the relational table or the corresponding algebraic operator.
Note: each box in the query tree is associated with only one relational table or one algebraic operator.