

## Homework no. 2: Relational algebra queries

**1. Given the following relational schema (primary keys are underlined, optional attributes are denoted by \*):**

GUEST (GID, Name, Surname, DateOfBirth)

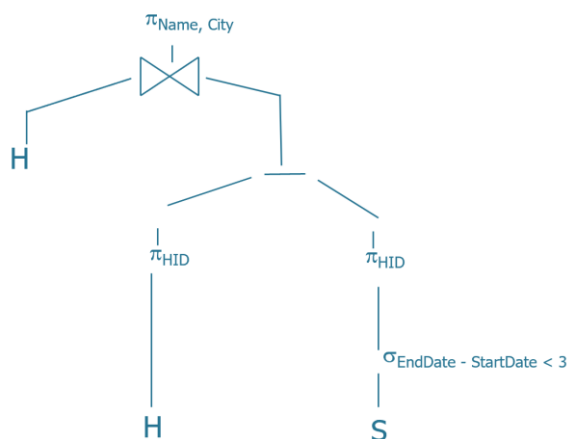
HOTEL (HID, Name, City, Region, #Stars)

STAY (GID, HID, StartDate, EndDate)

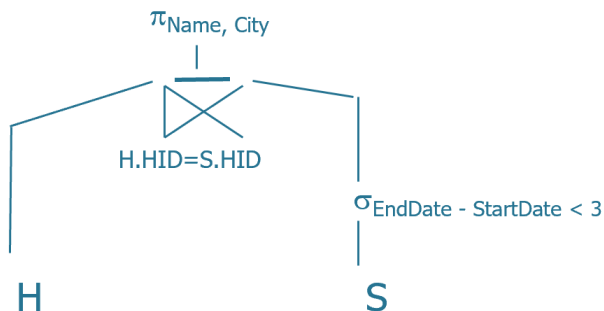
Write the following query in relational algebra:

- Show name and city of hotels that have *never* hosted clients for stays shorter than 3 days (difference between StartDate and EndDate).

Solution 1



Solution 2



2. Given the following relational schema (primary keys are underlined, optional attributes are denoted by \*):

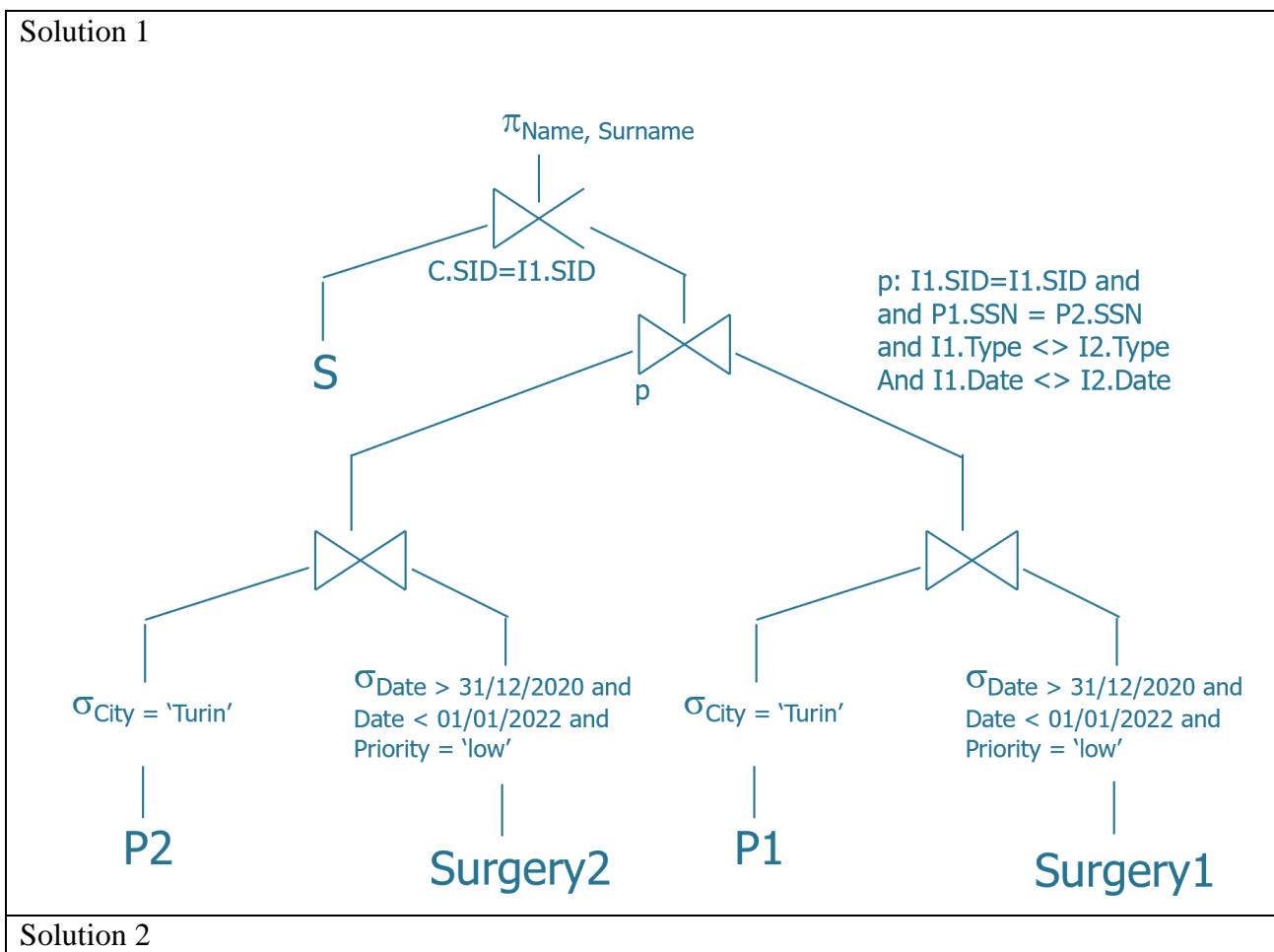
PATIENT (SSN, Name, Surname, City)

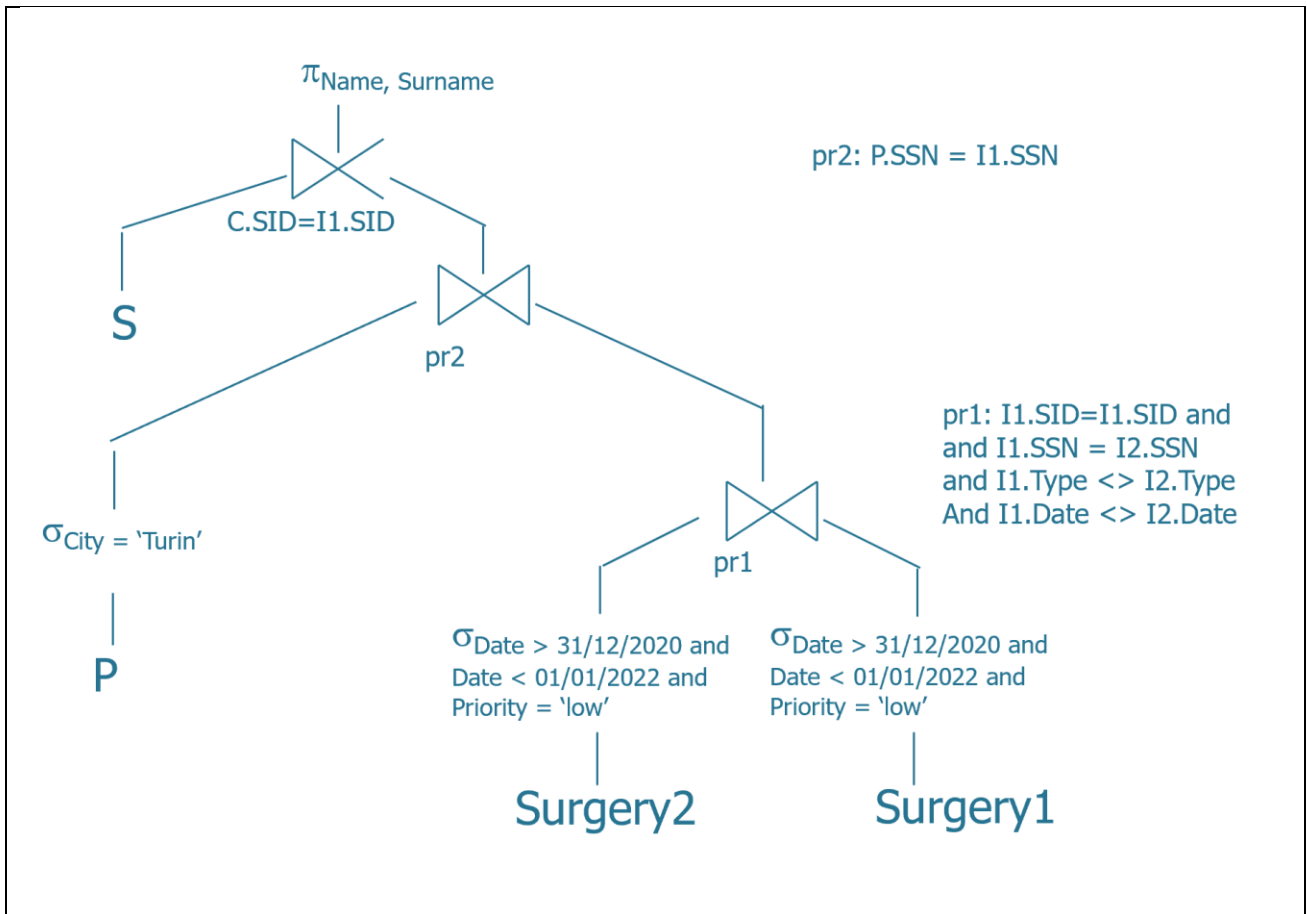
SURGEON (SID, Name, Surname, Specialty)

SURGERY (SSN, Date, Type, Report, Priority, SID)

Express the following query in relational algebra:

- Considering only the surgeries carried out in the year 2021 on patients in the city of Turin, view the name and surname of the surgeons who have performed *at least two* different types of surgery, both with low priority, to the same patient but on different dates.





**3. Given the following relational schema (primary keys are underlined, optional attributes are denoted by \*):**

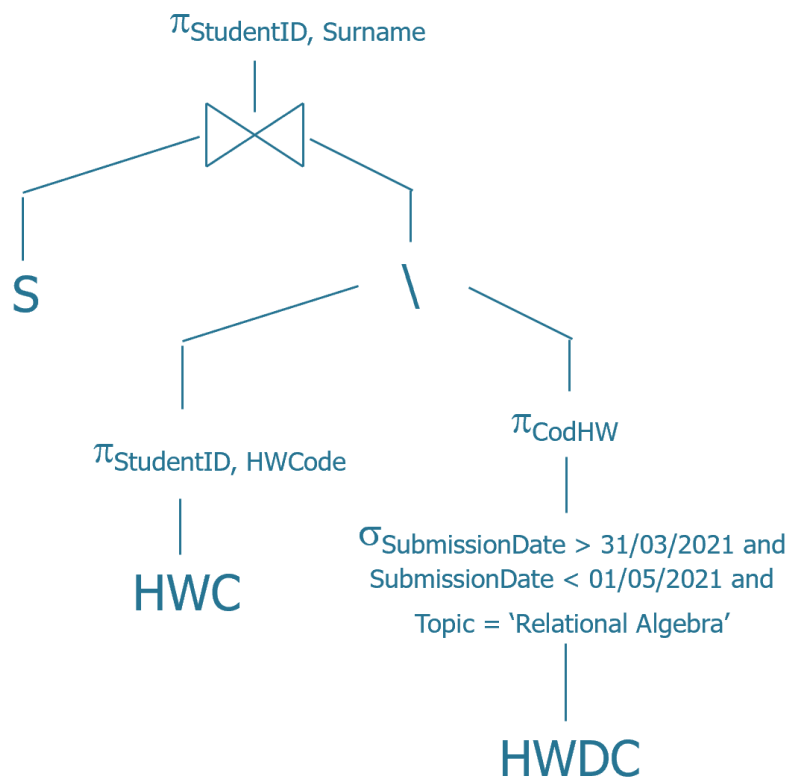
STUDENT (StudentID, Name, Surname, Degree)

HOMEWORK\_TO\_SUBMIT (HWCode, Title, Topic, ExpectedDueDate)

SUBMITTED\_HOMEWORK (StudentID, HWCode, SubmissionDate)

Write the following query in relational algebra:

- Display student ID and last name of students which submitted all the homeworks on “Relational algebra” topic that were due in April 2021 (that is, the expected due date falls in April 2021).



**4. Given the following schema:**

LOCATION (CodL, Name, City, MaxCapacity)

EVENT (CodE, Title, Type)

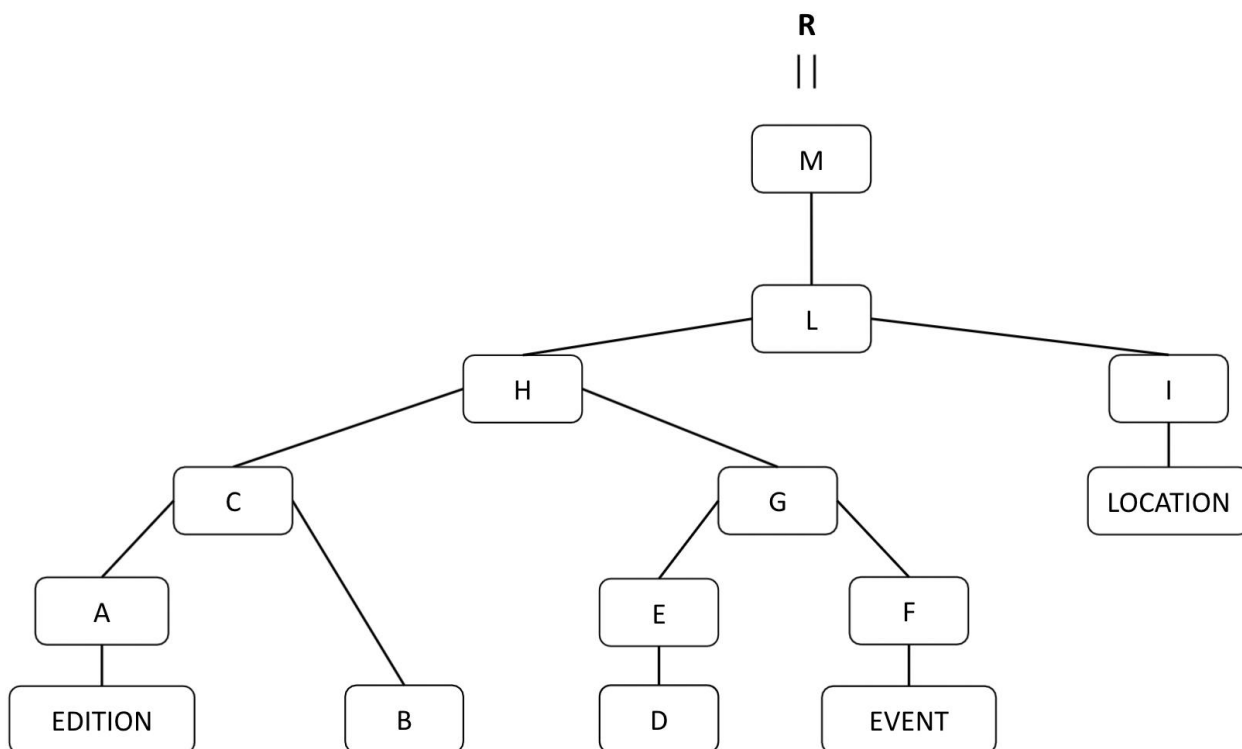
EDITION (CodE, Date, CodL)

Display name and city of locations with maximum capacity lower than 1000 that hosted *only* events of type "concert" 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., A, B, C, D, E, F, G, H, I, L, M box), the relational table or the corresponding algebraic operator. Use the text box below to provide your solution.

**Note:** each box in the query tree is associated with only one relational table or one algebraic operator.



**SOLUTION EXERCISE 4**

A= Selection: date  $\geq$  01/07/2020 and date  $\leq$  31/12/2020

B= EVENT2

C= natural join

D=EDITION2

E= Selection : date  $\geq$  01/07/2020 and date  $\leq$  31/12/2020

F= Selection : Type  $\in$  'concert'

G= Natural join

H= Anti semi-join (CodL)

I= Selection: MaxCapacity < 1000

L = Natural join

M= Projection: Name, City

**5. Given the following schema:**

CUSTOMER (SSN, Name, Surname, BirthDate, City)

HOLIDAY-HOUSE (HID, Name, Type, Address, City, WeeklyRentPrice)

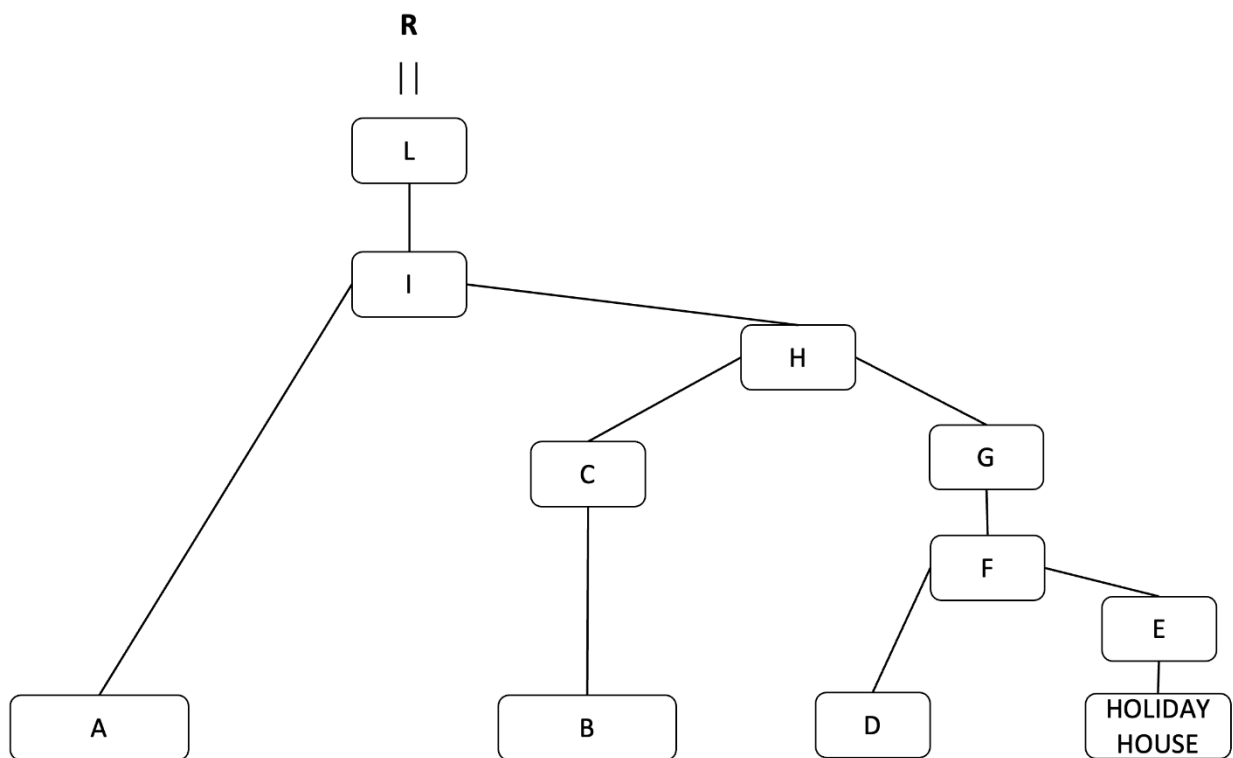
REVIEW (SSN, HID, Date, Text, Score)

Display name and surname of customers who reviewed only holiday houses of type "studio".

**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., A, B, C, D, E, F, G, H, I box), the relational table or the corresponding algebraic operator. Use the text box below to provide your solution.

**Note:** each box in the query tree is associated with only one relational table or one algebraic operator.



### SOLUTION EXERCISE 5

A= CUSTOMER C1

B= REVIEW R1

C= Projection: SSN

D= REVIEW R2

E= Selection: Type<>'Studio'

F= Natural join or Theta-join(semi-join): R2.HID= HOLIDAY-HOUSE.HID

G= Projection: SSN

H= Difference

I= Natural join or Theta-join on C1.SSN = R1.SSN

L = Projection: Name, Surname