HW13b

Tuesday, March 7, 2023 9:01 AM

Q:

A	B
5	1
6	1
4	2
3	4

R:

B	C
1	4
2	4
2	5
3	6
3	9

S:

C	D	E
4	1	1
4	2	1
3	3	2
2	4	2

U:

C	D
1	2
2	4

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2. Use the relations given above in problem 1 to evaluate the relational expressions or explain why the expression is invalid.

a) $\pi_E S \,|\times|\, U$

b) $Q \,|\times|\, R$

c) $\sigma_{B<2} Q \,|\times|\, R \,|\times|\, \rho_{C \leftarrow B} U$

a)

$\pi_E S$

E
1
2

$\pi_E S \;|x|\; U$

C	D	E
1	2	1
1	2	2
2	4	1
2	4	2

since neither tables have any common rows, its basically just doing the product of them

b)

$Q \;|x|\; R$

A	B	C
5	1	4
6	1	4
4	2	4
4	2	5

c)

$\sigma_{B<2} Q$

A	B
5	1
6	1

$\rho_{C \leftarrow B} U$

B	D
1	2
2	4

$\sigma_{B<2} Q \;|x|\; R$

A	B	C
5	1	4
6	1	4

$\sigma_{B<2} Q \;|x|\; R \;|x|\; \rho_{C \leftarrow B} U$

A	B	C	D
5	1	4	2
6	1	4	2

3. Using the database instance below and for each query to the right, give: (i) a relational algebra expression; (ii) an SQL query*; and (iii) a Datalog query and rule**.

*Execute SQL queries against the SnoopyDatabase, and hand in screenshots of your queries and the results of running your queries. (For details about how to do this, see http://students.cs.byu.edu/~cs236ta/sharedLib/homework/SQLite3Essentials.html)

**Enter rules and execute Datalog queries against the SnoopyDatabase and hand in screenshots of your queries and the results of running your queries. (Use the Datalog interpreter at: http://students.cs.byu.edu/~cs236ta/sharedLib/homework/DatalogInterpreter.html)

SNAP

StudentID	Name	Address	Phone
12345	C. Brown	12 Apple St.	555-1234
67890	L. Van Pelt	34 Pear Ave.	555-5678
22222	P. Patty	56 Grape Blvd.	555-9999
33333	Snoopy	12 Apple St.	555-1234

CR

Course	Room
CS101	Turing Aud.
EE200	25 Ohm Hall
PH100	Newton Lab.

CDH

Course	Day	Hour
CS101	M	9AM
CS101	W	9AM
CS101	F	9AM
EE200	Tu	10AM
EE200	W	1PM
EE200	Th	10AM
PH100	Tu	11AM

CSG

Course	StudentID	Grade
CS101	12345	A
CS101	67890	B
EE200	12345	C
EE200	22222	B+
EE200	33333	B
CS101	33333	A-
PH100	67890	C+

CP

Course	Prerequisite
CS101	CS100
EE200	EE005
EE200	CS100
CS120	CS101
CS121	CS120
CS205	CS101
CS206	CS121
CS206	CS205

a) List the names of students whose phone number is 555-1234.

Name
C. Brown
Snoopy

i)

b) Find the names and corresponding course numbers of all students who have a class in the Turing Aud.

Name	Course
C. Brown	CS101
L. Van Pelt	CS101
Snoopy	CS101

i)

c) Find the name and phone number of students taking any of the immediate prerequisites of CS120.

Name	Phone
C. Brown	555-1234
L. Van Pelt	555-5678
Snoopy	555-1234

i)

a)

$\pi_{N}\, \sigma_{P=555\text{-}1234}\, SNAP$

b)

$\pi_{N,C}\, \sigma_{R\,=\,\text{Turing Aud.}}\, (CR \mid x \mid CSG \mid x \mid SNAP)$

c)

$\pi_{N,P}\, \sigma_{C\,=\,CS120}\, ((\rho_{C \leftarrow Prereq} CSG \mid x \mid CP) \mid x \mid SNAP)$