CS660 Lab

Relational Algebra

Relational Algebra

Consider the tables:

PERSON (name, state, age)

ITEM (item name, price)

LIKES (name, item name)

Express the following queries in RA:

(a) list the names of people who like 'Harry Potter'

(b) list the names of people who like at least one item that 'Mary' likes

(c) list the pairs of items that have the same price and are liked by two different people with the same age

(d) list the names of people that like ALL the items that 'Mary' likes

Relational Algebra

a) *list the names of people who like 'Harry Potter'*

$$ANSWER:\ \pi_{name}(\sigma_{item\_name='HarryPotter'}(LIKES)),\ also\ correct:$$
$$\pi_{name}(PERSON \bowtie \sigma_{item\_name='HarryPotter'}(LIKES))$$

Relational Algebra

a) *list the names of people who like 'Harry Potter'*

$$ANSWER:\ \pi_{name}(\sigma_{item\_name='HarryPotter'}(LIKES)),\ also\ correct:$$
$$\pi_{name}(PERSON \bowtie \sigma_{item\_name='HarryPotter'}(LIKES))$$

b) *list the names of people who like at least one item that 'Mary' likes*

$$ANSWER:\ \pi_{name}(\pi_{item\_name}(\sigma_{name='Mary'}(LIKES)) \bowtie LIKES),\ also\ correct:$$
$$\pi_{name}(\pi_{item\_name}(\sigma_{name='Mary'}(LIKES)) \bowtie \sigma_{name!='Mary'}(LIKES))$$

Relational Algebra

c) list the pairs of items that have the same price and are liked by two different people with the same age

$$ANSWER:$$
$$\rho(S, \pi_{name,age,item\_name,price}(PERSON \bowtie LIKES \bowtie ITEM))$$
$$\rho(S_1(1 \rightarrow name1, 2 \rightarrow age1, 3 \rightarrow item\_name1, 4 \rightarrow price1), \pi_{name,age,item\_name,price}(PERSON \bowtie LIKES \bowtie ITEM))$$
$$\pi_{item\_name,item\_name1}(S \bowtie_{S.price=S1.price1\ AND\ S.age=S1.age1\ AND\ S.name>S1.name1} S_1)$$

Relational Algebra

c) list the pairs of items that have the same price and are liked by two different people with the same age

$$ANSWER:$$
$$\rho(S, \pi_{name,age,item\_name,price}(PERSON \bowtie LIKES \bowtie ITEM))$$
$$\rho(S_1(1 \rightarrow name1, 2 \rightarrow age1, 3 \rightarrow item\_name1, 4 \rightarrow price1), \pi_{name,age,item\_name,price}(PERSON \bowtie LIKES \bowtie ITEM))$$
$$\pi_{item\_name,item\_name1}(S \bowtie_{S.price=S1.price1\ AND\ S.age=S1.age1\ AND\ S.name>S1.name1} S_1)$$

d) *list the names of people that like ALL the items that 'Mary' likes*

$$ANSWER:\ \ LIKES \div \pi_{item\_name}(\sigma_{name='Mary'}(LIKES))$$
also:
$$LIKES / \pi_{item\_name}(\sigma_{name='Mary'}(LIKES))$$

Clarification – if we do R/S - the division operator will only contain the columns in R that are not in S.