HW 2

Tuesday, September 29, 2020 11:54 PM

1. Expression in relational algebra the foreign key constraint: CUSTOMER.Zip Code references LOCATION.Zip Code

$\pi_{zip\_code}(customer) \subseteq \pi_{zip\_code}(location)$

2. Expression in relational algebra the constraint that Zip Code is the primary key of the LOCATION relation

$\pi_{zip\_code}(location)$

3. Expression in relational algebra the constraint that multiple cities within the same state must not share the same name.

$\sigma_{c1.city \neq c2.city}(\sigma(\rho_{L1}(location) \bowtie_{L1.state = L2.state} \rho_{L2}(location)$

4. Define an additional constraint that might apply to the LOCATION, CUSTOMER, or ORDER relations (individually, or in some combination). Include the following in your response:

(a) Describe your constraint as an English-language statement
(b) Construct a relational algebra formula that represents your constraint.
(c) Provide relation instances (sample LOCATION, CUSTOMER, and/or ORDER tables) that demonstrate a violation of your constraint.

a.) customer must have a unique ID / key.

b.) π id (customer)

c.) customer (3, Steve, Jobs, 42069), customer (3, Bob, Saget, 80084)

5. For each of the constraints above (1-4) indicate how you would enforce the constraint if you were using a relational database. Options include: SQL Data Definition Language (DDL), database trigger, or application code. (You do not need to provide any SQL statements or other code, simply indicate the best general approach for each of the four constraints above.)

1.) → SQL Data Definition Language (DDL)
2.) → SQL Data Definition Langage (DDL)
3.) → Database trigger
4.) → SQL Data Definition Language (DDL)

6. Given the relational algebra constraint: πZip Code(CUST OMER) = πZip Code(LOCAT ION) (a) Translate this constraint into an English-language statement. (b) Does this constraint differ in any way from the foreign key constraint you defined in question 1? If so, briefly describe a scenario that would meet the constraint from question 1, but would not meet this new constraint.

a.) Customer and location have the same zip code

b.) Yes, location has greater cardinality in this constraint, location cardinality = customer's