

Tuesday 24/3/2015 SQL DML

Lecture Topics

- Multisets
- Nulls
- Typical queries
- Aggregates
- Duplicates
- Subqueries
- Insertion
- Deletion
- Update
- Division

SQL

- SEQUEL by IBM in early 1970's (Structured English Query Language)
- Used commercially in DB2 (based on System R)
- Standardized by ANSI in 1986, ISO 1987 SQL-86
- ⋮
- SQL 2011
- Many commercial implementation "close" to standard

Differences between SQL and Relational Algebra

- SQL based on multiset, not a set
- No order among rows (for both)
- We can remove/not remove duplicates
- can count duplicates
- SQL has many redundant operators
- SQL provides aggregates
- Domains add notion of NULL
- Operations for insert, delete, update

Multisets

Note that the following are Not equal:

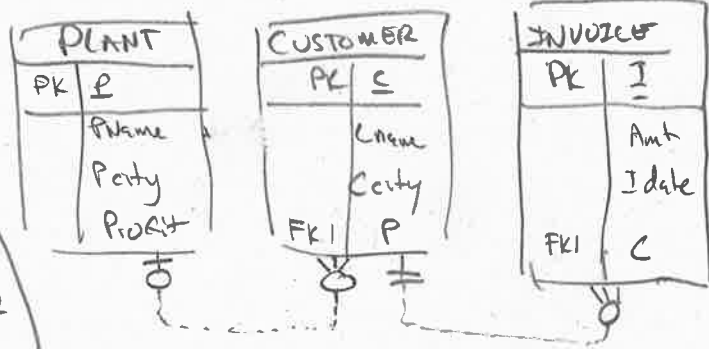
R	A	B
	1	10
	2	20
	2	20

S	A	B
	1	10
	2	20

In sets, and Relational Algebra, the would be.

- SEE SQL examples for UNION vs. UNION ALL, etc.

SAMPLE DB



Modelling a company that manufactures a single product that is supplied to customers by plants.

- each customer is assigned to a plant.
- each order (invoice) is placed by a customer

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Dealing with NULLs

- different for DML vs. DDL
- NULL can mean different things
 - Value unknown
 - Value not permitted
 - Value not applicable
- Select ...
FROM ...
WHERE CONDITION
- $x=5$, what if x is a column name, and value is NULL?
- $x=5$ OR $x \neq 5$, should this always be true?

Need 3 valued logic:

True
False
Unknown

	NOT				
F	T	OR	F	U	T
U	U	F	F	U	T
T	F	U	U	U	T
		T	T	T	T

	AND	F	U	T
F	F	F	F	F
U	F	U	U	U
T	F	U	T	T

ORDER OF EXECUTION

WHERE
FROM
SELECT

- if condition is true, tuple passed to select.
- Otherwise, not
- ANY comparison in which one side is NULL is unknown.
- Arithmetic = if operand is NULL, result is NULL

see sql examples for other topics