
DATABASE

CSE3103 : Database

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Use Cartesian Product and Join Operation

- Table with small data set.
- Number of columns is not many.
- No common Columns. Common can be taken also.
- Many row returns unused.
- Need to rename columns name if they are same.

- Table with large data set.
- A lots of columns can be there.
- A least one columns should be same to perform operation.
- Useful row returns.
- No need to rename columns as they are in common merge.

Example: Cartesian Product

Borrower	
Name	Loan_no
Mr. Kamal	L-17
Mr. Jamal	L-23

Loan		
Loan_No	Branch	Amount
L-14	Banani	75,000
L-23	Gulshan	50,000

Result_Table				
Name	Borrow.Loan_no	Loan.Loan_No	Branch	Amount
Mr. Kamal	L-17	L-14	Banani	75,000
Mr. Kamal	L-17	L-23	Gulshan	50,000
Mr. Jamal	L-23	L-14	Banani	75,000
Mr. Jamal	L-23	L-23	Gulshan	50,000

Question:
Find the names of the customers of a Bank who have a Loan at Gulshan Branch?

Answer:

$\rho_{\text{Loan\_No} \rightarrow \text{Borrow. Loan\_No}}$ (Borrower)

$\rho_{\text{Loan\_No} \rightarrow \text{Loan. Loan\_No}}$ (Loan)

Borrower X Loan = Result_table [Optional]

Conditions:

- Borrow. Loan_No = Loan. Loan_No
- Branch = "Gulshan"

Π name (σ Borrow. Loan_No = Loan. Loan_No $\wedge$ Branch = "Gulshan" (result_table))

Natural Join Operation

Faculty	
Name	Department
Smith	CSE
John	EEE
Paul	EEE

Head	
Department	Head
EEE	Brown
CSE	Alen
MCE	White

Result_Table		
Name	Department	Head
Smith	CSE	Alen
John	EEE	Brown
Paul	EEE	Brown

Syntax :
If R and S two relation with a natural Join.

$R \bowtie S$

Now if we join faculty and Head Table the result_table will be in below by joining

Faculty ⋈ Head

The row that is lost for the join operation in the resulting table is called dangling tuple.

Example:
Natural Join Operation

Borrower	
Name	Loan_no
Mr. Kamal	L-17
Mr. Jamal	L-23

Loan		
Loan_No	Branch	Amount
L-14	Banani	75,000
L-23	Gulshan	50,000

Result_Table			
Name	Loan_No	Branch	Amount
Mr. Jamal	L-23	Gulshan	50,000

Question:
Find the names of the customers of a Bank who have a Loan at Gulshan Branch?

Answer:

Borrower ⋈ Loan = Result_table [Optional]

Conditions:

- Branch = “Gulshan”

Π name (σ Branch = “Gulshan” (result_table))

Π name (σ Branch = “Gulshan” (Borrower ⋈ Loan))

Both correct form.

Theta Join Operation

Join with comparison Operator.

Notation:

$$(R \bowtie S)_{\theta}$$

Or

$$\sigma_{\text{condition}}(R \bowtie S)$$

Example:

Depositor (Customer_no, Name, Account_No)
Account (Account_no, Branch, Balance)

Question:
Find the names of the customers who have an account in the bank having balance greater than 5000?

Answer:

Conditions:

- Balance > 5000

$$\Pi_{\text{name}}(\sigma_{\text{Balance} > 5000}(\text{Depositor} \bowtie \text{Account}))$$

$$\Pi_{\text{name}}(\text{Depositor} \bowtie \text{Account})_{\text{Balance} > 5000}$$

Both correct form.

Outer Join Operation

- Left Outer Join (⟕)
  - Priority on the left table.
  - Matching the data from the left table, that only return from right table.
  - If the data not matched than that value of the right table is NULL.
- Right Outer Join (⟖)
  - Priority on the right table.
  - Matching the data from the right table, that only return from left table.
  - If the data not matched than that value of the left table is NULL.
- Full Outer Join (⟗)
  - Combine operation of the left outer join and right outer join.

Left Outer Join

Faculty	
Name	Department
Smith	CSE
John	EEE
Paul	BBA

Head	
Department	Head
EEE	Brown
CSE	Alen
MCE	White

If Faculty and Head two relation with a Left Outer Join.

Faculty ⟕ Head

Left Outer Join		
Name	Department	Head
Smith	**CSE**	**Alen**
John	EEE	Brown
Paul	BBA	NULL

Right Outer Join

Faculty	
Name	Department
Smith	CSE
John	EEE
Paul	BBA

Head	
Department	Head
EEE	Brown
CSE	Alen
MCE	White

If Faculty and Head two relation with a Right Outer Join.

Faculty ⟖ Head

Right Outer Join		
Name	Department	Head
John	**EEE**	**Brown**
Smith	CSE	Alen
NULL	MCE	White

Full Outer Join

Faculty	
Name	Department
Smith	CSE
John	EEE
Paul	BBA

Head	
Department	Head
EEE	Brown
CSE	Alen
MCE	White

If Faculty and Head two relation with a Full Outer Join.

Faculty ⟗ Head

Full Outer Join		
Name	Department	Head
Smith	**CSE**	**Alen**
John	EEE	Brown
Paul	BBA	NULL
NULL	MCE	White


DBMS
data
database
distributed
parallel
shared
system
architecture
systems
network
processing
performance
Distributed
DDBMS
DBMSs
memory
centralized
access
processors
multiple
sites
Parallel
processor
single
sometimes
computer
disk
nothing
application
bottleneck
interconnection
Figure
organizational
administered
management
transparent
technology
local
large
provide
decentralized
logically
number
site
users
require
physically
applications
computers
Database
Shared
logical
distinction
definition
development
nodes
may
major
fragments
typically
also
replicated
make
one
split
computing
communication
distribution
eliminates
reliability
stored
global
directly
disks
islands
resources
remote
defined
controlled
based
structure
collection
incompatible
associated
partitioned
used
least
consists
mode
must
System
capable
databases
share
control
scalability
approach
improve
within
machines
like
across
fact
many
discuss
often
com
Date
order
scalable
architectures
referred
operational
per
makes
Management
user
way
provides