





CSE3103 : Database FALL 2020

Nazmus Sakib
Assistant Professor
Department of Computer Science and Engineering
Ahsanullah University of Science and Technology

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		Loan		
Name	Loan_no	Loan_No	Branch	Amount
Mr. Kamal	L-17	L-14	Banani	75,000
Mr. Jamal	L-23	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:

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

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

Borrower X Loan = Result_table [Optional]

Conditions:

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

$\Pi \text{ name } (\sigma_{\text{Borrow.Loan_No} = \text{Loan.Loan_No} \wedge \text{Branch} = \text{"Gulshan"}} (\text{result_table}))$

Natural Join Operation

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

$\text{Faculty} \bowtie \text{Head}$

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

Example:

Natural Join Operation

Borrower		Loan		
Name	Loan_no	Loan_No	Branch	Amount
Mr. Kamal	L-17	L-14	Banani	75,000
Mr. Jamal	L-23	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:

$\text{Borrower} \bowtie \text{Loan} = \text{Result_table}$ [Optional]

Conditions:

- Branch = "Gulshan"

$\Pi \text{ name } (\sigma \text{ Branch} = \text{"Gulshan"} (\text{result_table}))$

$\Pi \text{ name } (\sigma \text{ Branch} = \text{"Gulshan"} (\text{Borrower} \bowtie \text{Loan}))$

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 (⋈_L)
 - 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 (⋈_R)
 - 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 (⋈_F)
 - 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

