

ITC c201 - Database Fundamentals

Inner vs Outer Joins

Prepared by:

Mengvi P. Gatpandan, DIT

Learning Path



Topic

- Database Programming SQL

Mastery Level

- List (describe) and use (apply)

Learning Objective

- Compare and contrast an inner and an outer join
- Construct and execute a query to use a left outer join
- Construct and execute a query to use a right outer join
- Construct and execute a query to use a full outer join
- Construct and execute a SELECT statement to join a table to itself using a self-join

Learning Outcome

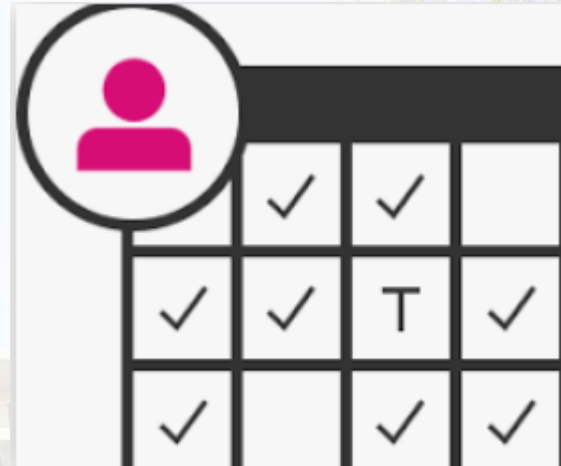
- List and use basic SQL statement to create, manipulate, and query database; and construct one working system using relational database and a front-end language based on the requirements provided by the faculty

Today's Menu



Make everything
as simple as
possible, but not
simpler

Albert Einstein



Weekly Topic: Inner vs Outer Joins

Date	Week	Goal	Essential Questions	Vocabulary	What I learned today?
Nov 16-21, 2020	15	To differentiate the inner join from outer join	When to use left outer join versus inner join?	INNER JOIN, LEFT JOIN, RIGHT JOIN, FULL OUTER JOIN	*Make sure to fill in*

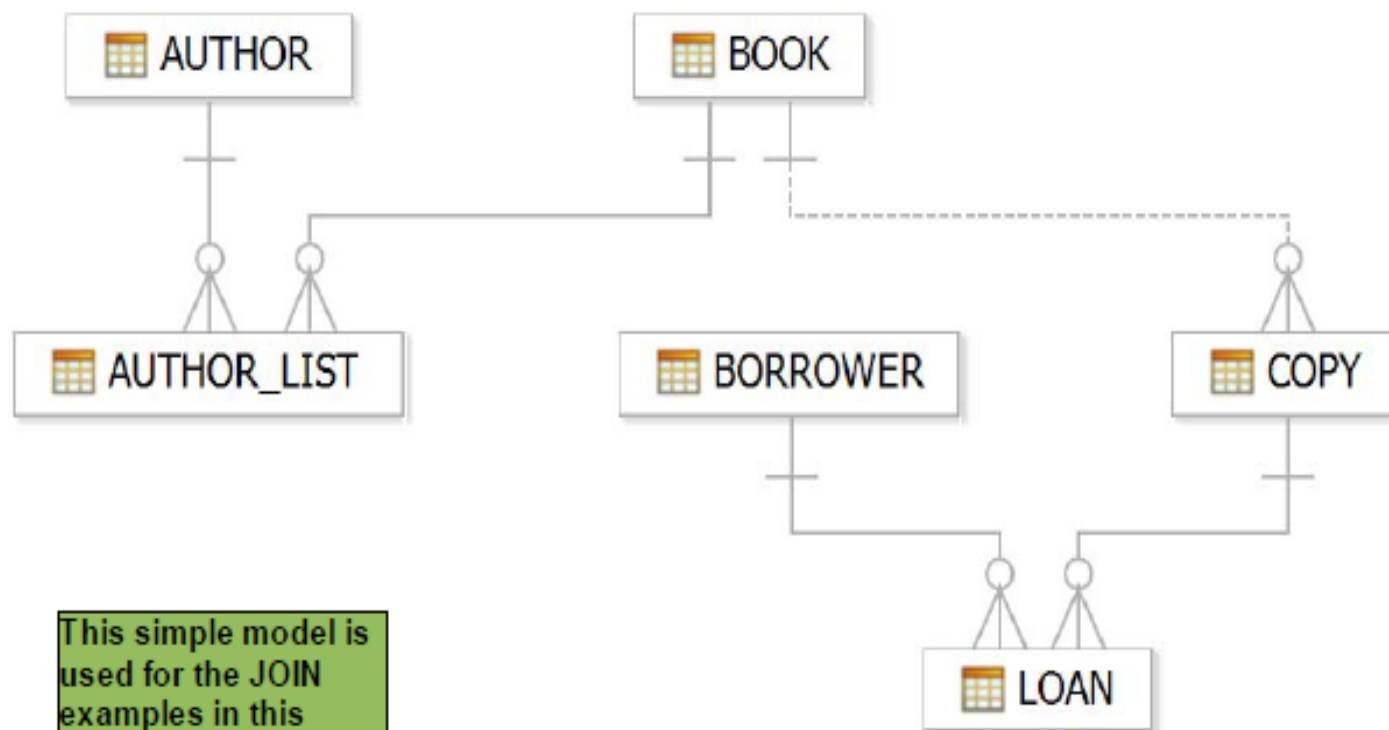
Tweet your self reaction in the topic
140 – 280 characters tweet
Using this format: [Your own word of wisdom]
#innervsouterjoin
[Question] [Answer]

Learning Objectives



- We are learning to.....
- Compare and contrast an inner and an outer join
- Construct and execute a query to use a left outer join
- Construct and execute a query to use a right outer join
- Construct and execute a query to use a full outer join
- Construct and execute a SELECT statement to join a table to itself using a self-join

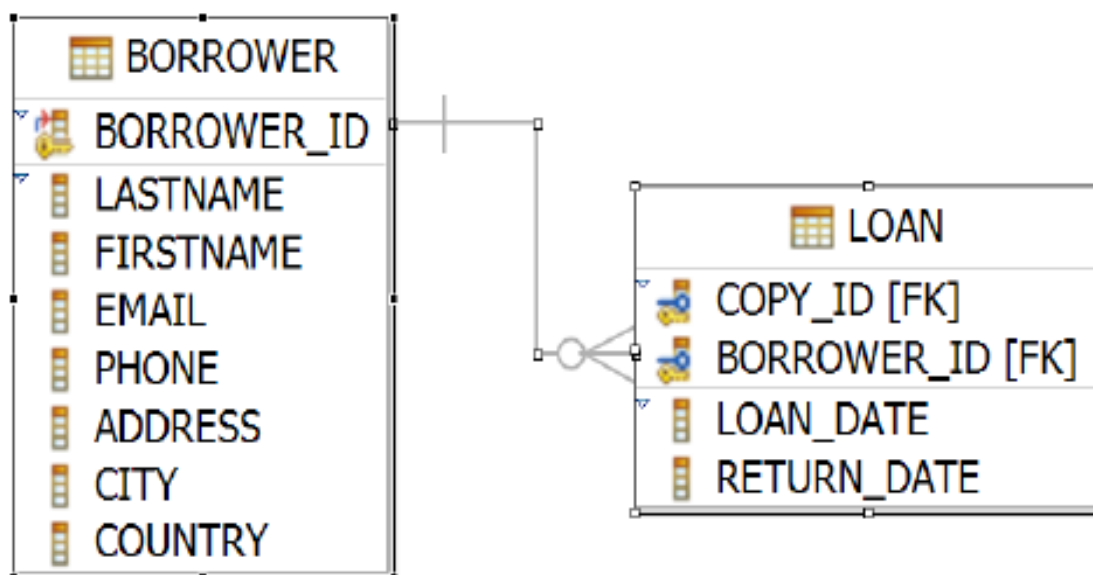
Relational Model – a Database Diagram



This simple model is used for the JOIN examples in this section

A simplified library's database model

Joining Tables – always 2 at a time



Borrower.Borrower_ID = Loan.Borrower_ID

TIP: when writing the SQL statement, use aliases for both tables



TB_BORROWER

Column Name	BORROWER_ID	LASTNAME	FIRSTNAME	ADDRESS	CITY	COUNTRY
Key Type	√					
Required Field		√	√	√	√	√
FK Column						
Data Type	VARCHAR2	VARCHAR2	VARCHAR2	VARCHAR2	VARCHAR2	VARCHAR2
Length	2	30	30	30	50	2

TB_LOAN

Column Name	LOAN_ID	LOAN_DATE	RETURN_DATE	BORROWER_ID
Key Type	√			
Required Field		√	√	
FK Column				√
Data Type	NUMBER	VARCHAR2	VARCHAR2	VARCHAR2
Length	3	30	30	2

MetaData of TB_Borrower and TB_Loan



Column Name	Data Type	Nullable
BORROWER_ID	VARCHAR2(2)	No
LASTNAME	VARCHAR2(30)	No
FIRSTNAME	VARCHAR2(30)	No
ADDRESS	VARCHAR2(50)	No
CITY	VARCHAR2(50)	No
COUNTRY	VARCHAR2(2)	No

Column Name	Data Type	Nullable
LOAN_ID	NUMBER(3,0)	No
LOAN_DATE	DATE	No
RETURN_DATE	DATE	No
BORROWER_ID	VARCHAR2(2)	Yes



TB_BORROWER

BORROWER_ID	LASTNAME	FIRSTNAME	ADDRESS	CITY	COUNTRY
D2	TRINIDAD	AIRIL	ALPINE DRIVE	SAN FRANCISCO	CA
D6	DAVE	VAL	SOUTH DANGLER	SAN FRANCISCO	CA
D7	MORTA	JANELIN	ATLANTIC BLVD	SAN DIEGO	CA
D3	MAYUGA	DAVE	SOUTH MARTEL DRIVE	SAN JOSE	CA
D1	RAMOS	ADRIANNE	NORTH CROFT AVENUE	SAN DIEGO	CA
D4	NAZ	SHERYL	WEST CROFT AVENUE	SAN DIEGO	CA
D5	ROSAS	JUNNIE	WOODS AVENUE	SAN JOSE	CA

TB_LOAN

LOAN_ID	LOAN_DATE	RETURN_DATE	BORROWER_ID
103	02/14/2020	02/29/2020	D4
102	01/15/2020	01/30/2020	D3
104	04/04/2020	04/15/2020	D5
100	02/23/2019	03/10/2019	D1
101	03/15/2020	03/30/2020	D2



INNER and OUTER JOIN

- In ANSI-99 SQL, a join of two or more tables that returns only the matched rows is called an inner join.
- When a join returns the unmatched rows as well as the matched rows, it is called an outer join.
- Outer join syntax uses the terms "left, full, and right".
- These names are associated with the order of the table names in the FROM clause of the SELECT statement.



INNER JOIN

Results is the intersection of the two tables

```
1 SELECT B.BORROWER_ID, B.LASTNAME, B.FIRSTNAME, B.COUNTRY, L.BORROWER_ID, L.LOAN_DATE
2 FROM TB_BORROWER B INNER JOIN TB_LOAN L
3 ON B.BORROWER_ID = L.BORROWER_ID
```

Results Explain Describe Saved SQL History

BORROWER_ID	LASTNAME	FIRSTNAME	COUNTRY	BORROWER_ID	LOAN_DATE
D2	TRINIDAD	AIRIL	CA	D2	03/15/2020
D3	MAYUGA	DAVE	CA	D3	01/15/2020
D1	RAMOS	ADRIANNE	CA	D1	02/23/2019
D4	NAZ	SHERYL	CA	D4	02/14/2020
D5	ROSAS	JUNNIE	CA	D5	04/04/2020

5 rows returned in 0.02 seconds [Download](#)

LEFT OUTER JOIN



SQL Commands

Schema: JRUITCC201GATPANDAN

Rows: 10

Clear Command Find Tables

Save Run

```
1 SELECT B.BORROWER_ID, B.LASTNAME, B.FIRSTNAME, B.COUNTRY, L.BORROWER_ID, L.LOAN_DATE
2 FROM TB_BORROWER B LEFT JOIN TB_LOAN L
3 ON B.BORROWER_ID = L.BORROWER_ID
```

Results Explain Describe Saved SQL History

BORROWER_ID	LASTNAME	FIRSTNAME	COUNTRY	BORROWER_ID	LOAN_DATE
D4	NAZ	SHERYL	CA	D4	02/14/2020
D3	MAYUGA	DAVE	CA	D3	01/15/2020
D5	ROSAS	JUNNIE	CA	D5	04/04/2020
D1	RAMOS	ADRIANNE	CA	D1	02/23/2019
D2	TRINIDAD	AIRIL	CA	D2	03/15/2020
D6	DAVE	VAL	CA	-	-
D7	MORTA	JANELIN	CA	-	-

7 rows returned in 0.01 seconds Download

RIGHT OUTER JOIN



SQL Commands Schema: JRUITCC201GATPANDAN

Rows: 10 Clear Command Find Tables Save Run

```
1 SELECT B.BORROWER_ID, B.LASTNAME, B.FIRSTNAME, B.COUNTRY, L.BORROWER_ID, L.LOAN_DATE
2 FROM TB_BORROWER B RIGHT JOIN TB_LOAN L
3 ON B.BORROWER_ID = L.BORROWER_ID
```

Results Explain Describe Saved SQL History

BORROWER_ID	LASTNAME	FIRSTNAME	COUNTRY	BORROWER_ID	LOAN_DATE
D2	TRINIDAD	AIRIL	CA	D2	03/15/2020
D3	MAYUGA	DAVE	CA	D3	01/15/2020
D1	RAMOS	ADRIANNE	CA	D1	02/23/2019
D4	NAZ	SHERYL	CA	D4	02/14/2020
D5	ROSAS	JUNNIE	CA	D5	04/04/2020

5 rows returned in 0.01 seconds Download



FULL OUTER JOIN

- It is possible to create a join condition to retrieve all matching rows and all unmatched rows from both tables.
- Using a full outer join solves this problem.
- The result set of a full outer join includes all rows from a left outer join and all rows from a right outer join combined together without duplication.

FULL OUTER JOIN



SQL Commands Schema JRUITCC201GATPANDAN ?

Rows 10 ? Clear Command Find Tables Save Run

```
1 SELECT B.BORROWER_ID, B.LASTNAME, B.FIRSTNAME, B.COUNTRY, L.BORROWER_ID, L.LOAN_DATE
2 FROM TB_BORROWER B FULL JOIN TB_LOAN L
3 ON B.BORROWER_ID = L.BORROWER_ID
```

Results Explain Describe Saved SQL History

BORROWER_ID	LASTNAME	FIRSTNAME	COUNTRY	BORROWER_ID	LOAN_DATE
D2	TRINIDAD	AIRIL	CA	D2	03/15/2020
D6	DAVE	VAL	CA	-	-
D7	MORTA	JANELIN	CA	-	-
D3	MAYUGA	DAVE	CA	D3	01/15/2020
D1	RAMOS	ADRIANNE	CA	D1	02/23/2019
D4	NAZ	SHERYL	CA	D4	02/14/2020
D5	ROSAS	JUNNIE	CA	D5	04/04/2020

7 rows returned in 0.00 seconds Download



CROSS OUTER JOIN

BORROWER_ID	LASTNAME	FIRSTNAME	COUNTRY	BORROWER_ID	LOAN_DATE
D2	TRINIDAD	AIRIL	CA	D4	2/14/2020
D6	DAVE	VAL	CA	D4	2/14/2020
D7	MORTA	JANELIN	CA	D4	2/14/2020
D3	MAYUGA	DAVE	CA	D4	2/14/2020
D1	RAMOS	ADRIANNE	CA	D4	2/14/2020
D4	NAZ	SHERYL	CA	D4	2/14/2020
D5	ROSAS	JUNNIE	CA	D4	2/14/2020
D2	TRINIDAD	AIRIL	CA	D3	1/15/2020
D6	DAVE	VAL	CA	D3	1/15/2020
D7	MORTA	JANELIN	CA	D3	1/15/2020
D3	MAYUGA	DAVE	CA	D3	1/15/2020
D1	RAMOS	ADRIANNE	CA	D3	1/15/2020
D4	NAZ	SHERYL	CA	D3	1/15/2020
D5	ROSAS	JUNNIE	CA	D3	1/15/2020
D2	TRINIDAD	AIRIL	CA	D5	4/4/2020
D6	DAVE	VAL	CA	D5	4/4/2020
D7	MORTA	JANELIN	CA	D5	4/4/2020
D3	MAYUGA	DAVE	CA	D5	4/4/2020
D1	RAMOS	ADRIANNE	CA	D5	4/4/2020
D4	NAZ	SHERYL	CA	D5	4/4/2020
D5	ROSAS	JUNNIE	CA	D5	4/4/2020
D2	TRINIDAD	AIRIL	CA	D1	2/23/2019
D6	DAVE	VAL	CA	D1	2/23/2019
D7	MORTA	JANELIN	CA	D1	2/23/2019
D3	MAYUGA	DAVE	CA	D1	2/23/2019
D1	RAMOS	ADRIANNE	CA	D1	2/23/2019
D4	NAZ	SHERYL	CA	D1	2/23/2019
D5	ROSAS	JUNNIE	CA	D1	2/23/2019
D2	TRINIDAD	AIRIL	CA	D2	3/15/2020
D6	DAVE	VAL	CA	D2	3/15/2020
D7	MORTA	JANELIN	CA	D2	3/15/2020
D3	MAYUGA	DAVE	CA	D2	3/15/2020
D1	RAMOS	ADRIANNE	CA	D2	3/15/2020
D4	NAZ	SHERYL	CA	D2	3/15/2020
D5	ROSAS	JUNNIE	CA	D2	3/15/2020

**SELECT B.BORROWER_ID, B.LASTNAME,
B.FIRSTNAME, B.COUNTRY, L.BORROWER_ID,
L.LOAN_DATE
FROM TB_BORROWER B CROSS JOIN TB_LOAN L**



SELF JOIN

TB_EMPLOYEES				
Column Name	EMP_ID	LASTNAME	FIRSTNAME	MNGR_ID
Key Type	√			
Required Field		√	√	
FK Column				√
Data Type	NUMBER	VARCHAR2	VARCHAR2	NUMBER
Length	3	30	30	3

Column Name	Data Type	Nullable
EMP_ID	NUMBER(3,0)	No
LASTNAME	VARCHAR2(30)	No
FIRSTNAME	VARCHAR2(30)	No
MNGR_ID	NUMBER(3,0)	Yes

SELF JOIN



TB_EMPLOYEES

EMP_ID	LASTNAME	FIRSTNAME	MNGR_ID
114	TALAG	JOY	113
112	BERMUDEL	RUDY	111
115	ASIS	ROLLY	111
111	SEVILLA	MARIE	-
116	HERRERA	ETHEL	113
113	DE LOS SANTOS	ERIC	-



SELF JOIN

- To join a table to itself, the table is given two names or aliases. This will make the database "think" that there are two tables.

TB_EMPLOYEES (WORKER)				TB_EMPLOYEES (MANAGER)	
EMP_ID	LASTNAME	FIRSTNAME	MNGR_ID	EMP_ID	LASTNAME
114	TALAG	JOY	113	114	DE LOS SANTOS
112	BERMUDEL	RUDY	111	112	SEVILLA
115	ASIS	ROLLY	111	115	SEVILLA
111	SEVILLA	MARIE		111	
116	HERRERA	ETHEL	113	116	DE LOS SANTOS
113	DE LOS SANTOS	ERIC		113	

- MNGR_ID in the worker table is equal to EMP_ID in the manager table.

SELF JOIN



SQL Commands

Schema JRUITCC201GATPANDAN

Rows 10 Clear Command Find Tables

Save Run

Q A::

```
1 SELECT WORKER.LASTNAME, WORKER.FIRSTNAME, WORKER.MNGR_ID, MANAGER.LASTNAME AS "MANAGER NAME"
2 FROM TB_EMPLOYEES WORKER JOIN TB_EMPLOYEES MANAGER
3 ON (WORKER.MNGR_ID=MANAGER.EMP_ID)
```

Results Explain Describe Saved SQL History

LASTNAME	FIRSTNAME	MNGR_ID	MANAGER NAME
BERMUDEL	RUDY	111	SEVILLA
ASIS	ROLLY	111	SEVILLA
TALAG	JOY	113	DE LOS SANTOS
HERRERA	ETHEL	113	DE LOS SANTOS

4 rows returned in 0.02 seconds Download





- Answer the excel worksheet and save it as ***LastNameFirstname_code§ion_Assessment15*** and submit to canvas

Student Name	
3	Things I learned today...
2	Things I found interesting...
1	Question I still have...

- Capture your tweet and save it as ***LastNameFirstname_code§ion_Assessment16*** and submit to canvas



Tweet your self reaction in the topic
140 – 280 characters tweet
Using this format: [Your own word of wisdom]
#innervsouterjoin
[Question] [Answer]

- Laboratory Activity to Activity
- Use the naming conventions
- ***LastNameFirstname_code§ion_Act13,***
and submit it to canvas





Thank you

Have a nice day everyone. *Stay safe* and
Best of *health* to *all* of *us*.