Outer Joins

Database Development 2021
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Keywords

- LEFT
- RIGHT
- OUTER JOIN
- FULL
- +

Why

- In a standard JOIN we need to to only get the elements from the specified tables that match exactly on the PRIMARY KEY / FOREIGN KEY path.
- Sometimes we need to get the ones from the other table that don't have a corresponding match.
- We are creating gaps in the resulting data
- These gaps can help us identify patterns in our data because of the inconsistencies.

LOJ

- We generally do these as LEFT OUTER JOIN simply because the first table specified or derived resultset is the one that has ALL the matching conditions and you are performing the JOIN to get what matches in the next table as well as explicitly identify what is NOT included.

How

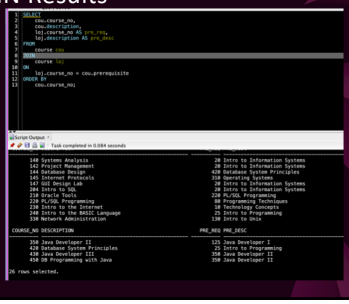
- Same basic JOIN structure just adding the directionality then the OUTER keyword to the JOIN clause
  - SELECT … table_a LEFT OUTER JOIN table_b …
  - SELECT … table_a RIGHT OUTER JOIN table_b …

Demo Query

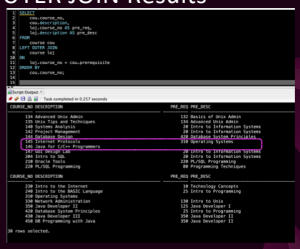
```
SELECT
    cou.course_no,
    cou.description,
    loj.course_no AS pre_req,
    loj.description AS pre_desc
FROM
    course cou
LEFT OUTER JOIN
    course loj
ON
    loj.course_no = cou.prerequisite
ORDER BY
    cou.course_no;
```

```
SELECT
    stu.first_name,
    stu.last_name,
    zip.city
FROM
    student stu
RIGHT OUTER JOIN
    zipcode zip
ON
    stu.zip = zip.zip;
```

JOIN Results



LEFT OUTER JOIN Results



Alternatives to LOJ

- The results of an OUTER JOIN can also be achieved by using the less wieldy method of doing separate queries (one with a correlated subquery), and then performing a UNION ALL on the results
- This can make the resulting query more confusing to read by humans because of the combination of inner/outer across multiple values

FULL OUTER

- Say you want to get all the matching rows AND all the incomplete matches from both the left and right tables
- This calls for the FULL OUTER JOIN

Oracle Special 🤮🤮

- Oracle has a special operator just for OUTER JOIN
- You use the + sign in the WHERE clause on the side that will have the non matching values
- This is instead of the LEFT or RIGHT keyword
- You also do not use the JOIN keyword 🤮
  - This means no ON clause either!!

```sql
SELECT
    cou.course_no,
    cou.description,
    loj.course_no AS pre_req,
    loj.description AS pre_desc
FROM
    course cou
LEFT OUTER JOIN
    course loj
ON
    loj.course_no = cou.prerequisite
ORDER BY
    cou.course_no;
```

Script Output

Task completed in 0.257 seconds

COURSE_NO	DESCRIPTION	PRE_REQ	PRE_DESC
134	Advanced Unix Admin	132	Basics of Unix Admin
135	Unix Tips and Techniques	134	Advanced Unix Admin
140	Systems Analysis	20	Intro to Information Systems
142	Project Management	20	Intro to Information Systems
144	Database Design	420	Database System Principles
145	Internet Protocols	310	Operating Systems
146	Java for C/C++ Programmers		
147	GUI Design Lab	20	Intro to Information Systems
204	Intro to SQL	20	Intro to Information Systems
210	Oracle Tools	220	PL/SQL Programming
220	PL/SQL Programming	80	Programming Techniques

COURSE_NO	DESCRIPTION	PRE_REQ	PRE_DESC
230	Intro to the Internet	10	Technology Concepts
240	Intro to the BASIC Language	25	Intro to Programming
310	Operating Systems		
330	Network Administration	130	Intro to Unix
350	Java Developer II	125	Java Developer I
420	Database System Principles	25	Intro to Programming
430	Java Developer III	350	Java Developer II
450	DB Programming with Java	350	Java Developer II

30 rows selected.

Worksheet | Query Builder

```
1  SELECT
2      cou.course_no,
3      cou.description,
4      CASE
5          WHEN loj.course_no IS NULL THEN 'n/a'
6          ELSE TO_CHAR(loj.course_no)
7      END AS pre_req
8      ,
9      CASE
10         WHEN loj.description IS NULL THEN 'none'
11         ELSE loj.description
12     END AS pre_desc
13 FROM
14     course cou
15 LEFT OUTER JOIN
16     course loj
17 ON
18     loj.course_no = cou.prerequisite
19 ORDER BY
20     cou.course_no;
```

Script Output

Task completed in 0.091 seconds

COURSE_NO	DESCRIPTION	PRE_REQ	PRE_DESC
134	Advanced Unix Admin	132	Basics of Unix Admin
135	Unix Tips and Techniques	134	Advanced Unix Admin
140	Systems Analysis	20	Intro to Information S
142	Project Management	20	Intro to Information S
144	Database Design	420	Database System Princi
145	Internet Protocols	310	Operating Systems
146	Java for C/C++ Programmers	n/a	none
147	GUI Design Lab	20	Intro to Information S
204	Intro to SQL	20	Intro to Information S
210	Oracle Tools	220	PL/SQL Programming
220	PL/SQL Programming	80	Programming Techniques

COURSE_NO	DESCRIPTION	PRE_REQ	PRE_DESC
230	Intro to the Internet	10	Technology Concepts
240	Intro to the BASIC Language	25	Intro to Programming
310	Operating Systems	n/a	none
330	Network Administration	130	Intro to Unix
350	Java Developer II	125	Java Developer I
420	Database System Principles	25	Intro to Programming
430	Java Developer III	350	Java Developer II

```sql
SELECT
    stu.first_name,
    stu.last_name,
    zip.city
FROM
    student stu
RIGHT OUTER JOIN
    zipcode zip
ON
    stu.zip = zip.zip;
```

Script Output

Task completed in 0.128 seconds

```
                                                   Middlefield
                                                   New York
                                                   New Milford
                                                   Jackson Heights
                                                   Hackensack
                                                   Jackson Heights
                                                   Central Islip

FIRST_NAME                LAST_NAME                CITY
------------------------- ------------------------ ------------------
                                                   E. Cliffs
                                                   Oradell
                                                   West Islip
                                                   Rego Park
                                                   Fair Lawn
                                                   Bergenfield
                                                   Norwood
                                                   Astoria
                                                   Weston

350 rows selected.
```

Worksheet | Query Builder

```
 1  SELECT
 2      cou.course_no,
 3      cou.description,
 4      loj.course_no AS pre_req,
 5      loj.description AS pre_desc
 6  FROM
 7      course cou
 8  FULL OUTER JOIN
 9      course loj
10  ON
11      loj.course_no = cou.prerequisite
12  ORDER BY
13      cou.course_no;
```

Script Output

Task completed in 0.1 seconds

```
       430 Java Developer III                                 350 Java Developer II
       450 DB Programming with Java                           350 Java Developer II
                                                              230 Intro to the Internet
                                                              240 Intro to the BASIC Languag
                                                              147 GUI Design Lab

 COURSE_NO DESCRIPTION                                    PRE_REQ PRE_DESC
---------- ---------------------------------------------- ---------- --------------------
                                                              146 Java for C/C++ Programmers
                                                              330 Network Administration
                                                              124 Advanced Java Programming
                                                              430 Java Developer III
                                                              450 DB Programming with Java
                                                              145 Internet Protocols
                                                              100 Hands-On Windows
                                                              144 Database Design
                                                              142 Project Management
                                                              210 Oracle Tools
                                                              135 Unix Tips and Techniques

44 rows selected.
```