C8. SQL Join.

The SQL JOIN clause is used to combine rows from two or more tables, based on logical links (e.g. common fields) between them. Usually the foreign key from a table is linked with the primary key of another table.

1.1. JOIN syntax

Two syntaxes are permitted by SQL.

The first one is called implicit JOIN. It require multiple tables in the FROM clause. The join condition is in this case embedded in the WHERE condition.

The general syntax for implicit join is:

SELECT $t1.column_m,...,t2.column_n,...$

FROM table1 t1, table2 t2 ...

WHERE $t1.column_i = t2.column_i$

[AND select_conditions];

The second syntax is for explicit JOIN. In that case both tables and join conditions are embedded into the FROM clause.

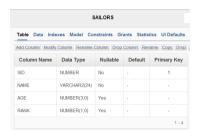
ACTIVITY 1: Using SQL Workshop -> SQL Commands run the following SQL command:

SELECT p.*, d.*

FROM Persons p, Departments d

WHERE $p.dep_id = d.id$;

ACTIVITY 2: Using SQL Workshop -> Object Browser -> Create -> Table create and populate following tables:









| EDIT | BID | NAME | COLOR |
|------|-----|----------|--------|
| Z. | 102 | Gazelle | Red |
| Ø. | 103 | Poseidon | Green |
| B | 101 | Cleo | Blue |
| Ø. | 104 | Athena | Yellow |

| EDIT | SID | BID | RDATE | |
|-------------------|-----|-----|------------|--|
| Ø. | 22 | 102 | 10/08/2014 | |
| Ø. | 58 | 101 | 10/03/2014 | |
| Z ² | 58 | 102 | 10/12/2014 | |
| ذ | 58 | 103 | 11/23/2014 | |
| Ø. | 900 | 101 | 07/09/2014 | |
| row(s) 1 - 5 of 5 | | | | |

Note: the default format for dates is Month/Day/Year.

1.2. Types of JOIN

• INNER JOIN - returns all rows when there is at least one match in both tables. Implicit syntax imply inner join. For explicit syntax use:

```
SELECT column_name(s)
FROM table1 [INNER] JOIN table2
ON table1.PK=table2.FK ...
[WHERE selection condition...]:
```

- LEFT (OUTER) JOIN return all rows from the left table, and the matched rows from the right table.
 NULL for missing corresponding fields
- RIGHT (OUTER) JOIN return all rows from the right table, and the matched rows from the left table
- FULL (OUTER) JOIN return all rows when there is a match in at least one of the tables

```
FROM table1

LEFT/RIGTH/FULL [OUTER]

JOIN table2

ON table1.PK=table2.FK ...

[WHERE selection_condition...];
```

ACTIVITY 3: Using SQL Workshop -> SQL Commands run the following SQL commands:

SELECT s.name, s.rank, r.rdate, b.name AS boat

FROM ((Sailors s RIGHT JOIN Reserves r

ON s.sid=r.sid) INNER JOIN Boats b

ON r.bid=b.bid);

- Question: what happened when add a selection condition WHERE age>25?
- Exercise: list all boats. If a boat was reserved add reserves and sailors information.

1.3. Oracle Syntax for Outer Join

Oracle defines an outer join operator (+) that can be included in WHERE condition to specify an LEFT or RIGHT JOINS instead a default INNER join. However, it cannot be used to implement FULL JOIN.

The syntax for LEFT JOIN is:

SELECT s.name, s.rank, r.date FROM Sailors s, Reserves r WHERE s.sid = r.sid(+);

For RIGHT JOIN the syntax is: s.sid(+) = r.sid.

ACTIVITY 4: Using SQL Workshop -> SQL Commands run the following SQL command:

SELECT s.name, s.rank, r.date FROM Sailors s, Reserves r WHERE s.sid = r.sid(+);

ACTIVITY 5: Create an interactive report to display reserves. The report will display all reserves made for all boats in a given color. It will contain the sailor name, the reserve date and the boat name. For reading the color add an input field and a validation button to the report.

Note: APEX regions do not support duplicate name fields. To add both sailors.name and boat.name, use AS keyword to rename one of them. (Otherwise the system display an error that say "APEX: unique constraint APEX_040200.WWV_FLOW _WORKSHEET_COLUMNS_UK2 violated")

