



DATABASE (SECD 2523-10)

LAB EXERCISE 4 (DML3)

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Section 6 Lesson 9 Exercise 1: Joining Tables Using JOIN

Part 1: Creating Natural Joins.

1. Display all of the information about sales representatives and their addresses using a natural join.

The screenshot shows the APEX SQL Workshop interface. The SQL command entered is:

```
1 SELECT *
2 FROM sales_representatives
3 NATURAL JOIN sales_rep_addresses;
```

The results table displays the following data:

ID	EMAIL	FIRST_NAME	LAST_NAME	PHONE_NUMBER	COMMISSION_RATE	SUPERVISOR_ID	ADDRESS_LINE_1	ADDRESS_LINE_2	CITY	ZIP_CODE
sr01	chray@obl.com	Charles	Raymond	0134598761	10	sr01	12 Cherry Lane	Denton	Detroit	DT48211
sr02	vwright@obl.com	Victoria	Wright	0134598762	5	sr01	87 Blossom Hill	Uptown	Detroit	DT52314
sr03	bspeed@obl.com	Barry	Speed	0134598763	5	sr01	12 Junction Row	Skinflats	Detroit	DT52564

3 rows returned in 0.04 seconds

2. Adapt the query from the previous question to only show the id, first name, last name, address line 1, address line 2, city, email and phone_number for the sales representatives.

The screenshot shows the APEX SQL Workshop interface. The SQL command entered is:

```
1 SELECT
2     s.id, s.first_name,
3     s.last_name,
4     a.address_line_1,
5     a.address_line_2,
6     a.city,
7     s.email, s.phone_number
8 FROM
9     sales_representatives s
10 JOIN
11     sales_rep_addresses a ON s.id = a.id;
```

The results table displays the following data:

ID	FIRST_NAME	LAST_NAME	ADDRESS_LINE_1	ADDRESS_LINE_2	CITY	EMAIL	PHONE_NUMBER
sr01	Charles	Raymond	12 Cherry Lane	Denton	Detroit	chray@obl.com	0134598761
sr02	Victoria	Wright	87 Blossom Hill	Uptown	Detroit	vwright@obl.com	0134598762
sr03	Barry	Speed	12 Junction Row	Skinflats	Detroit	bspeed@obl.com	0134598763

3 rows returned in 0.00 seconds

Part 2: Creating Joins with the USING Clause

1. Adapt the previous query answer to use the USING clause instead of a natural join.

APEX

App Builder

SQL Workshop

Team Development

Gallery

Search

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SQL Commands

Schema WKSP_SQLALIF

Language SQL

Rows 10

Clear Command

Find Tables

Save

Run

SQL

SELECT

id,

first_name, last_name,

address_line_1, address_line_2,

city, email,

phone_number

FROM

sales_representatives

JOIN

sales_rep_addresses USING (id);

Results

Explain

Describe

Saved SQL

History

ID	FIRST_NAME	LAST_NAME	ADDRESS_LINE_1	ADDRESS_LINE_2	CITY	EMAIL	PHONE_NUMBER
sr01	Charles	Raymond	12 Cherry Lane	Denton	Detroit	chray@obl.com	0134598761
sr02	Victoria	Wright	87 Blossom Hill	Uptown	Detroit	vwright@obl.com	0134598762
sr03	Barry	Speed	12 Junction Row	Skinflats	Detroit	bspeed@obl.com	0134598763

3 rows returned in 0.01 secondsDownload

2. Display all of the information about items and their price history by joining the items and price_history tables

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SQL Commands

Schema WKSP_SQLALIF

Language SQL

Rows 10

Clear Command

Find Tables

Save

Run

SQL

SELECT

itm_number,

name AS item_name, description,

category, color,

"Size", start_date,

start_time, price

FROM

items i

JOIN

price_history p USING (itm_number);

Results

Explain

Describe

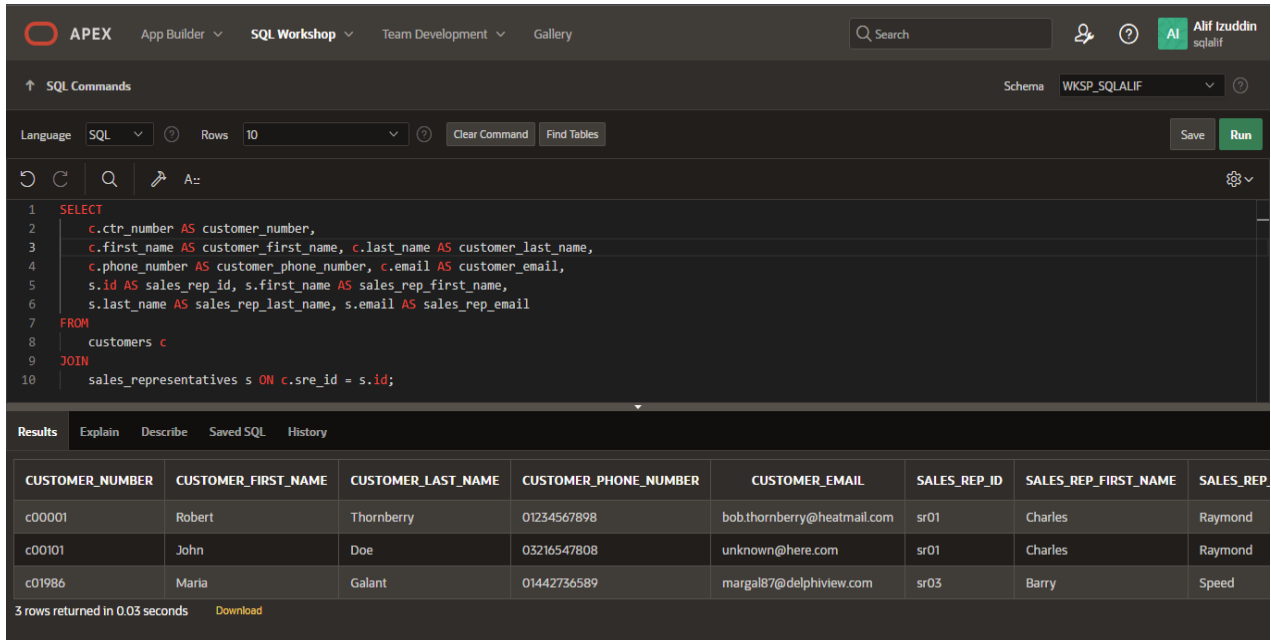
Saved SQL

History

ITM_NUMBER	ITEM_NAME	DESCRIPTION	CATEGORY	COLOR	Size	START_DATE	START_TIME	PRICE
im010101044	gloves	catcher mitt	clothing	brown	m	06/17/2017	06/17/2016	4.99
im010101045	under shirt	top worn under the game top	clothing	white	s	11/25/2016	11/25/2016	14.99
im010101045	under shirt	top worn under the game top	clothing	white	s	01/25/2017	01/25/2017	8.99
im010101045	under shirt	top worn under the game top	clothing	white	s	01/26/2017	01/26/2017	15.99

Part 3: Creating Joins with the ON Clause

1. Use an ON clause to join the customer and sales representative table so that you display the customer number, customer first name, customer last name, customer phone number, customer email, sales representative id, sales representative first name, sales representative last name and sales representative email. You will need to use a table alias in your answer as both tables have columns with the same name.



The screenshot shows the APEX SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop', 'Team Development', and 'Gallery'. A search bar and user profile 'Alif Izuddin' are on the right. The 'SQL Commands' section shows the 'Schema' set to 'WKSP_SQLALIF'. The 'Language' is 'SQL' and 'Rows' are set to '10'. The SQL command area contains the following query:

```
1 SELECT
2   c.ctr_number AS customer_number,
3   c.first_name AS customer_first_name, c.last_name AS customer_last_name,
4   c.phone_number AS customer_phone_number, c.email AS customer_email,
5   s.id AS sales_rep_id, s.first_name AS sales_rep_first_name,
6   s.last_name AS sales_rep_last_name, s.email AS sales_rep_email
7 FROM
8   customers c
9 JOIN
10  sales_representatives s ON c.sre_id = s.id;
```

The 'Results' tab is active, displaying a table with 8 columns: CUSTOMER_NUMBER, CUSTOMER_FIRST_NAME, CUSTOMER_LAST_NAME, CUSTOMER_PHONE_NUMBER, CUSTOMER_EMAIL, SALES_REP_ID, SALES_REP_FIRST_NAME, and SALES_REP_LAST_NAME. The table contains 3 rows of data.

CUSTOMER_NUMBER	CUSTOMER_FIRST_NAME	CUSTOMER_LAST_NAME	CUSTOMER_PHONE_NUMBER	CUSTOMER_EMAIL	SALES_REP_ID	SALES_REP_FIRST_NAME	SALES_REP_LAST_NAME
c00001	Robert	Thornberry	01234567898	bob.thornberry@heatmail.com	sr01	Charles	Raymond
c00101	John	Doe	03216547808	unknown@here.com	sr01	Charles	Raymond
c01986	Maria	Galant	01442736589	margal87@delphiview.com	sr03	Barry	Speed

3 rows returned in 0.03 seconds [Download](#)

Part 4 : Creating Three-Way Joins with the ON Clause

1. Using the answer to Task 3 add a join that will allow the team name that the customer represents to be included in the results.

The screenshot shows the APEX SQL Workshop interface. The SQL command window contains the following query:

```
1 SELECT
2   c.ctr_number AS customer_number,
3   c.first_name AS customer_first_name, c.last_name AS customer_last_name, c.phone_number AS customer_phone_number, c.email AS customer_email,
4   s.id AS sales_rep_id, s.first_name AS sales_rep_first_name, s.last_name AS sales_rep_last_name,
5   s.email AS sales_rep_email,
6   t.name AS team_name
7 FROM
8   customers c
9 JOIN
10  sales_representatives s ON c.sre_id = s.id
11 LEFT JOIN
12  teams t ON c.tem_id = t.id ;
```

The Results tab shows the following data:

CUSTOMER_LAST_NAME	CUSTOMER_PHONE_NUMBER	CUSTOMER_EMAIL	SALES_REP_ID	SALES_REP_FIRST_NAME	SALES_REP_LAST_NAME	SALES_REP_EMAIL	TEAM_NAME
Thornberry	01234567898	bob.thornberry@heatmail.com	sr01	Charles	Raymond	chray@obl.com	Rockets
Doe	03216547808	unknown@here.com	sr01	Charles	Raymond	chray@obl.com	Celtics
Galant	01442736589	margal87@delphiview.com	sr03	Barry	Speed	bspeed@obl.com	Rovers

Part 5: Applying Additional Conditions to a Join

1. Using the answer to Task 4 add an additional condition to only show the results for the customer that has the number - c00001

The screenshot shows the APEX SQL Workshop interface. The SQL command window contains the following query:

```
1 SELECT
2   c.ctr_number AS customer_number, c.first_name AS customer_first_name,
3   c.last_name AS customer_last_name,
4   c.phone_number AS customer_phone_number, c.email AS customer_email,
5   s.id AS sales_rep_id, s.first_name AS sales_rep_first_name,
6   s.last_name AS sales_rep_last_name, s.email AS sales_rep_email, t.name AS team_name
7 FROM
8   customers c
9 JOIN
10  sales_representatives s ON c.sre_id = s.id
11 LEFT JOIN
12  teams t ON c.tem_id = t.id
13 WHERE
14   c.ctr_number = 'c00001';
15
```

The Results tab shows the following data:

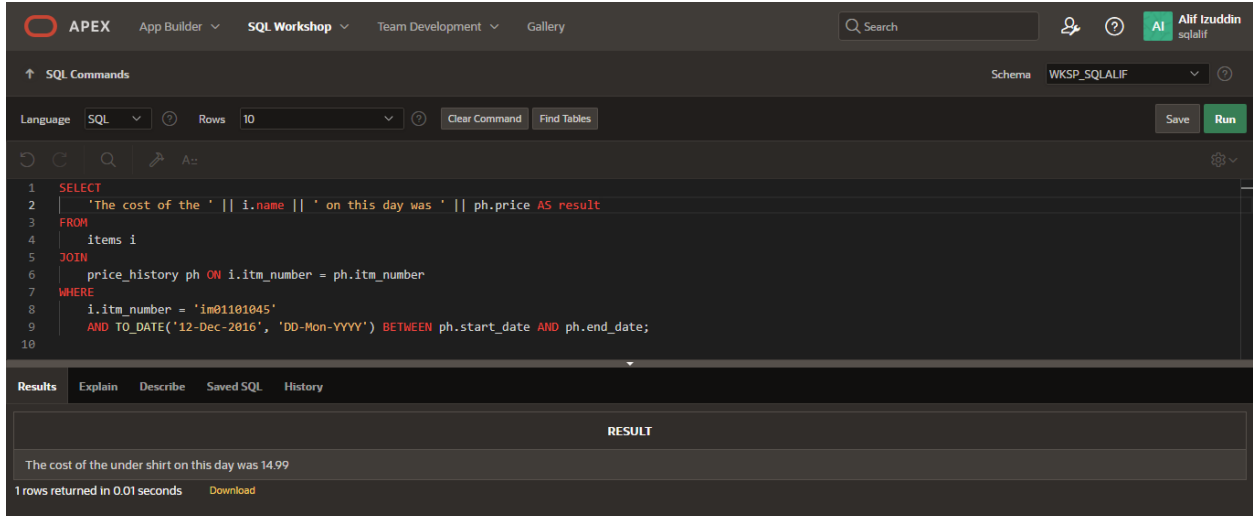
CUSTOMER_NUMBER	CUSTOMER_FIRST_NAME	CUSTOMER_LAST_NAME	CUSTOMER_PHONE_NUMBER	CUSTOMER_EMAIL	SALES_REP_ID	SALES_REP_FIRST_NAME	SALES_REP_LAST_NAME
c00001	Robert	Thornberry	01234567898	bob.thornberry@heatmail.com	sr01	Charles	Raymond

1 rows returned in 0.00 seconds [Download](#)

Part 6: Retrieving Records with Nonequi Joins

1. Write a query that will display the name and cost of the item with the number im01101045 on the 12th of December 2016. The output of the query should look like this:

The cost of the under shirt on this day was 14.99



The screenshot shows the APEX SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop', 'Team Development', and 'Gallery'. A search bar and user profile 'Alif Izuddin sqlalif' are on the right. The 'SQL Commands' tab is active, showing a query editor with the following SQL code:

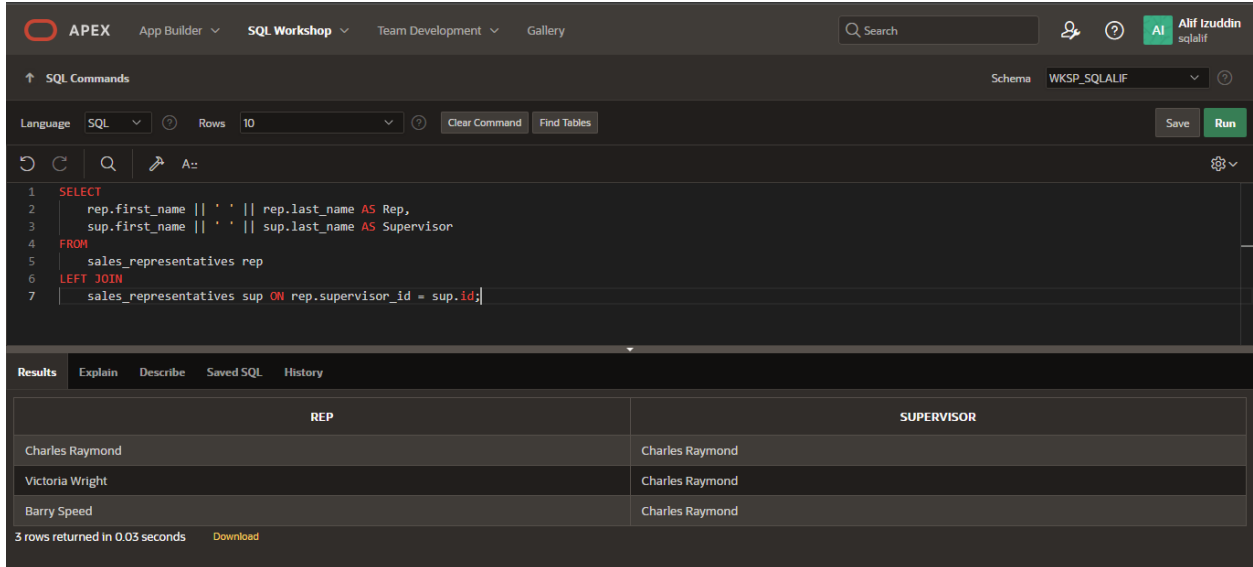
```
1 SELECT
2   'The cost of the ' || i.name || ' on this day was ' || ph.price AS result
3 FROM
4   items i
5 JOIN
6   price_history ph ON i.itm_number = ph.itm_number
7 WHERE
8   i.itm_number = 'im01101045'
9   AND TO_DATE('12-Dec-2016', 'DD-Mon-YYYY') BETWEEN ph.start_date AND ph.end_date;
```

The 'Results' tab is selected, displaying a single row with the text: 'The cost of the under shirt on this day was 14.99'. Below the result, it states '1 rows returned in 0.01 seconds' and provides a 'Download' link.

Section 6 Lesson 9 Exercise 2: Joining Tables Using JOIN

Part 1 : Use a Self-Join to Join a Table to Itself (S6L9 Objective 2)

1. Write a query that will display who the supervisor is for each of the sales representatives. The information should be displayed in two columns, the first column will be the first name and last name of the sales representative and the second will be the first name and last name of the supervisor. The column aliases should be Rep and Supervisor.



The screenshot shows the APEX SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop', 'Team Development', and 'Gallery'. A search bar and user profile 'Alif Izuddin' are on the right. The 'SQL Commands' panel is active, showing a query with line numbers 1 through 7. The query is a self-join on the 'sales_representatives' table. Below the query editor, the 'Results' tab is selected, displaying a table with two columns: 'REP' and 'SUPERVISOR'. The table contains three rows of data. At the bottom, a status bar indicates '3 rows returned in 0.03 seconds' and a 'Download' link.

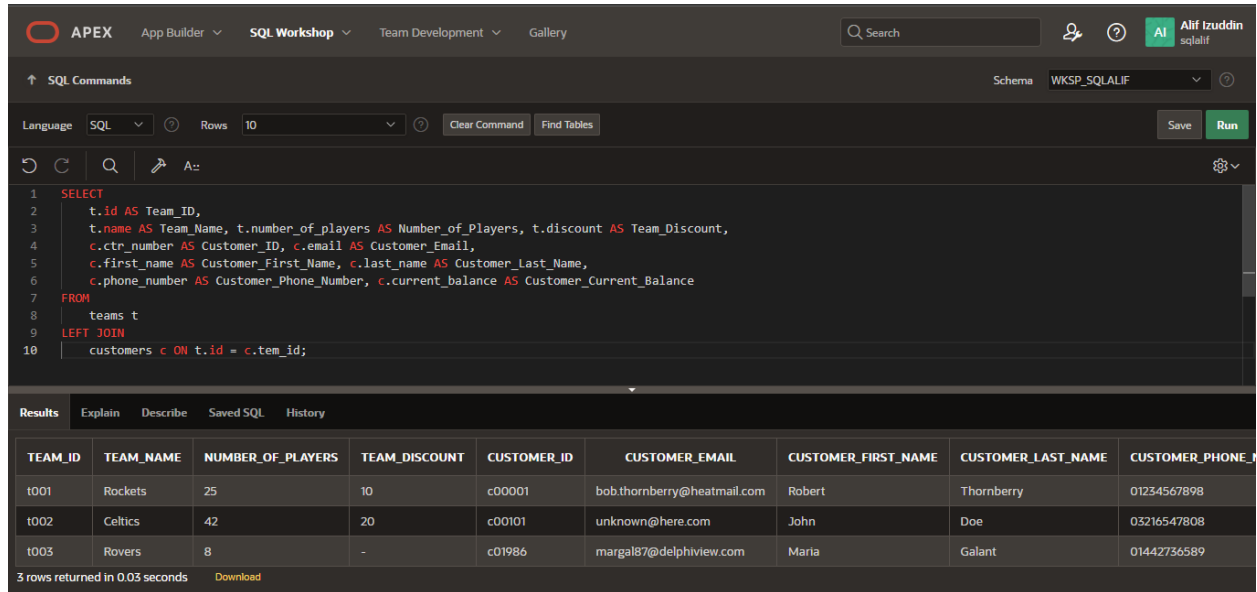
```
1 SELECT
2   rep.first_name || ' ' || rep.last_name AS Rep,
3   sup.first_name || ' ' || sup.last_name AS Supervisor
4 FROM
5   sales_representatives rep
6 LEFT JOIN
7   sales_representatives sup ON rep.supervisor_id = sup.id;
```

REP	SUPERVISOR
Charles Raymond	Charles Raymond
Victoria Wright	Charles Raymond
Barry Speed	Charles Raymond

3 rows returned in 0.03 seconds [Download](#)

Part 2 : Use OUTER joins (S6L9 Objective 3)

1. Write a query that will display all of the team and customer information even if there is no match with the table on the left (team).



The screenshot shows the APEX SQL Workshop interface. The SQL command area contains a query that performs a LEFT JOIN between the 'teams' table (aliased as 't') and the 'customers' table (aliased as 'c'). The query selects various columns from both tables, including team ID, name, number of players, discount, customer ID, email, first name, last name, phone number, and current balance. The results section displays a table with 3 rows, showing the data for teams 'Rockets', 'Celtics', and 'Rovers' along with their associated customer information.

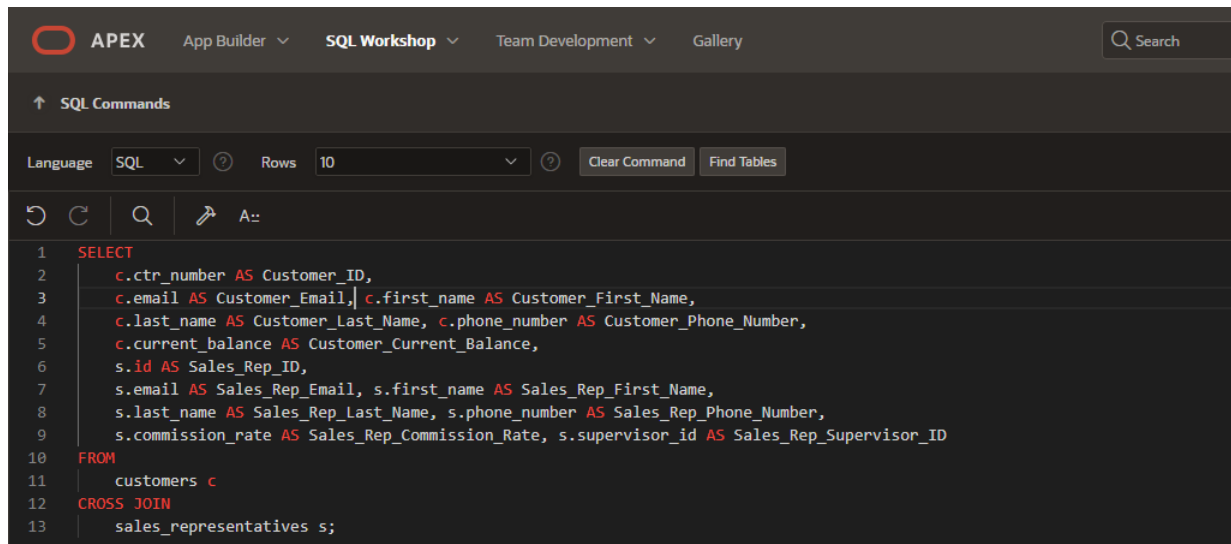
```
1 SELECT
2   t.id AS Team_ID,
3   t.name AS Team_Name, t.number_of_players AS Number_of_Players, t.discount AS Team_Discount,
4   c.ctr_number AS Customer_ID, c.email AS Customer_Email,
5   c.first_name AS Customer_First_Name, c.last_name AS Customer_Last_Name,
6   c.phone_number AS Customer_Phone_Number, c.current_balance AS Customer_Current_Balance
7 FROM
8   teams t
9 LEFT JOIN
10  customers c ON t.id = c.tem_id;
```

TEAM_ID	TEAM_NAME	NUMBER_OF_PLAYERS	TEAM_DISCOUNT	CUSTOMER_ID	CUSTOMER_EMAIL	CUSTOMER_FIRST_NAME	CUSTOMER_LAST_NAME	CUSTOMER_PHONE
t001	Rockets	25	10	c00001	bob.thornberry@heatmail.com	Robert	Thornberry	01234567898
t002	Celtics	42	20	c00101	unknown@here.com	John	Doe	03216547808
t003	Rovers	8	-	c01986	margal87@delphiview.com	Maria	Galant	01442736589

3 rows returned in 0.03 seconds

Part 3 : Generating a Cartesian Product (S6L9 Objective 4)

1. Create a Cartesian product between the customer and sales representative tables.



The screenshot shows the APEX SQL Workshop interface. The SQL command area contains a query that performs a CROSS JOIN between the 'customers' table (aliased as 'c') and the 'sales_representatives' table (aliased as 's'). The query selects various columns from both tables, including customer ID, email, first name, last name, phone number, current balance, sales representative ID, email, first name, last name, phone number, commission rate, and supervisor ID. The results section is currently empty, indicating that the query has not yet been executed.

```
1 SELECT
2   c.ctr_number AS Customer_ID,
3   c.email AS Customer_Email, c.first_name AS Customer_First_Name,
4   c.last_name AS Customer_Last_Name, c.phone_number AS Customer_Phone_Number,
5   c.current_balance AS Customer_Current_Balance,
6   s.id AS Sales_Rep_ID,
7   s.email AS Sales_Rep_Email, s.first_name AS Sales_Rep_First_Name,
8   s.last_name AS Sales_Rep_Last_Name, s.phone_number AS Sales_Rep_Phone_Number,
9   s.commission_rate AS Sales_Rep_Commission_Rate, s.supervisor_id AS Sales_Rep_Supervisor_ID
10 FROM
11   customers c
12 CROSS JOIN
13   sales_representatives s;
```


Output :

APEX

App Builder

SQL Workshop

Team Development

Gallery

Search

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SQL Commands

Schema: WKSP_SQLALIF

Language: SQL

Rows: 20

Clear Command

Find Tables

Save

Run

Results

Explain

Describe

Saved SQL

History

CUSTOMER_ID	CUSTOMER_EMAIL	CUSTOMER_FIRST_NAME	CUSTOMER_LAST_NAME	CUSTOMER_PHONE_NUMBER	CUSTOMER_CURRENT_BALANCE	SALES_REP_ID	SALES_RE
c02001	brianrog@hoootech.com	Brian	Rogers	01654564898	50	sr01	chray@obl
c00001	bob.thornberry@heatmail.com	Robert	Thornberry	01234567898	150	sr01	chray@obl
c00012	ljones@freemail.com	Jennifer	Jones	01505214598	0	sr01	chray@obl
c00101	unknown@here.com	John	Doe	03216547808	987.5	sr01	chray@obl
c00103	MurciaA@globaltech.com	Andrew	Murcia	07715246890	85	sr01	chray@obl
c01986	margal87@delphiview.com	Maria	Galant	01442736589	125.65	sr01	chray@obl
c02001	brianrog@hoootech.com	Brian	Rogers	01654564898	50	sr02	vwright@c
c00001	bob.thornberry@heatmail.com	Robert	Thornberry	01234567898	150	sr02	vwright@c
c00012	ljones@freemail.com	Jennifer	Jones	01505214598	0	sr02	vwright@c
c00101	unknown@here.com	John	Doe	03216547808	987.5	sr02	vwright@c

APEX

App Builder

SQL Workshop

Team Development

Gallery

Search

Alif Izuddin

sqlalif

SQL Commands

Schema: WKSP_SQLALIF

Language: SQL

Rows: 20

Clear Command

Find Tables

Save

Run

Results

Explain

Describe

Saved SQL

History

ALANCE	SALES_REP_ID	SALES_REP_EMAIL	SALES_REP_FIRST_NAME	SALES_REP_LAST_NAME	SALES_REP_PHONE_NUMBER	SALES_REP_COMMISSION_RATE	SALES_REP_SUPERVISOR_ID
	sr01	chray@obl.com	Charles	Raymond	0134598761	10	sr01
	sr01	chray@obl.com	Charles	Raymond	0134598761	10	sr01
	sr01	chray@obl.com	Charles	Raymond	0134598761	10	sr01
	sr01	chray@obl.com	Charles	Raymond	0134598761	10	sr01
	sr01	chray@obl.com	Charles	Raymond	0134598761	10	sr01
	sr01	chray@obl.com	Charles	Raymond	0134598761	10	sr01
	sr02	vwright@obl.com	Victoria	Wright	0134598762	5	sr01
	sr02	vwright@obl.com	Victoria	Wright	0134598762	5	sr01
	sr02	vwright@obl.com	Victoria	Wright	0134598762	5	sr01
	sr02	vwright@obl.com	Victoria	Wright	0134598762	5	sr01