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UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING
UTM Johor Bahru

SECD 2523 – DATABASE

Lab 4: Data Manipulation Language (DML) 3

Subject Name:	Database
Subject Code:	SECD2523
Semester:	1 - 2023/24
Lab Title:	Data Manipulation Language(DML)
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DML 3 Part 1

Section 6 Lesson 9 Exercise 1: Joining Tables Using JOIN

Write SELECT Statements Using Data From Multiple Tables Using Equijoins and Non-Equijoins (S6L9 Objective 1)

In this exercise you will write SELECT statements to access data from more than one table.

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 top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop', 'Team Development', and 'Gallery'. A search bar and user profile 'TAN HUI QUN' are on the right. The 'SQL Commands' panel shows a query: `SELECT * FROM sales_representatives NATURAL JOIN sales_rep_addresses`. The 'Results' panel displays a table with 11 columns: ID, EMAIL, FIRST_NAME, LAST_NAME, PHONE_NUMBER, COMMISSION_RATE, SUPERVISOR_ID, ADDRESS_LINE_1, ADDRESS_LINE_2, CITY, and ZIP_CODE. The results show 3 rows of data for sales representatives.

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 with a modified query: `SELECT id, first_name, last_name, address_line_1, address_line_2, city, email, phone_number FROM sales_representatives NATURAL JOIN sales_rep_addresses`. The 'Results' panel displays a table with 8 columns: ID, FIRST_NAME, LAST_NAME, ADDRESS_LINE_1, ADDRESS_LINE_2, CITY, EMAIL, and PHONE_NUMBER. The results show 3 rows of data for sales representatives.

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 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

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SQL Commands

SchemaWKSP_HUIQUN1027

LanguageSQL

Rows10

Clear Command

Find Tables

Save

Run

A::

1SELECT id, first_name, last_name, address_line_1, address_line_2, city, email, phone_number

2FROM sales_representatives JOIN sales_rep_addresses

3USING (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

SchemaWKSP_HUIQUN1027

LanguageSQL

Rows10

Clear Command

Find Tables

Save

Run

A::

1SELECT *FROM items JOIN price_history

2USING (itm_number)

Results

Explain

Describe

Saved SQL

History

ITM_NUMBER	NAME	DESCRIPTION	CATEGORY	COLOR	Size	ILT_ID	START_DATE	START_TIME	PRICE	END_DATE	END_TIME
im01101045	under shirt	top worn under the game top	clothing	white	s	il010230125	01/25/2017	01/25/2017	8.99	01/25/2017	01/25/2017
im01101044	gloves	catcher mitt	clothing	brown	m	il010230124	06/17/2017	06/17/2016	4.99	-	-
im01101047	game top	team shirt with emblem	clothing	range	m	il010230127	04/25/2017	04/25/2017	24.99	-	-
im01101045	under shirt	top worn under the game top	clothing	white	s	il010230125	11/25/2016	11/25/2016	14.99	01/25/2017	01/25/2017
im01101045	under shirt	top worn under the game top	clothing	white	s	il010230125	01/26/2017	01/26/2017	15.99	12/16/2023	12/16/2023
im01101046	socks	team socks with emblem	clothing	range	l	il010230126	02/12/2017	02/12/2017	7.99	-	-
im01101048	premium bat	high quaiity baseball bat	equipment	-	-	il010230128	05/31/2017	05/31/2017	149	-	-
im01101048	premium bat	high quaiity baseball bat	equipment	-	-	il010230128	12/16/2023	12/16/2023	99.99	-	-

8 rows returned in 0.04 secondsDownload

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 'TAN HUI QUN' are on the right. The 'SQL Commands' tab is active, showing a SQL query with line numbers 1 through 7. The query selects columns from 'customers' (c) and 'sales_representatives' (s) tables, joined on 'c.tem_id = t.id' and 'c.sre_id = s.id'. The results tab shows a table with 9 columns: CTR_NUMBER, CUSTOMER_FIRST_NAME, CUSTOMER_LAST_NAME, CUSTOMER_PHONE_NUMBER, CUSTOMER_EMAIL, SALES_REP_ID, SALES_REP_FIRST_NAME, SALES_REP_LAST_NAME, and SALES_REP_EMAIL. Three rows of data are displayed.

```
1 SELECT c.ctr_number, 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,
2       s.id AS sales_rep_id, s.first_name AS sales_rep_first_name, s.last_name AS sales_rep_last_name, s.email AS sales_rep_email
3
4 FROM   customers c
5 JOIN   teams t ON c.tem_id = t.id
6 JOIN   sales_representatives s ON c.sre_id = s.id;
7
```

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

rows returned in 0.01 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 top navigation bar is the same as in Part 3. The 'SQL Commands' tab is active, showing a SQL query with line numbers 1 through 7. The query selects columns from 'customers' (c), 'sales_representatives' (s), and 'teams' (t) tables, joined on 's.id = c.sre_id', 't.id = c.tem_id', and 't.id = s.team_id'. The results tab shows a table with 10 columns: CTR_NUMBER, FIRST_NAME, LAST_NAME, PHONE_NUMBER, EMAIL, ID, FIRST_NAME, LAST_NAME, EMAIL, and Team Name. Three rows of data are displayed.

```
1 SELECT ctr_number, c.first_name, c.last_name, c.phone_number, c.email, s.id, s.first_name, s.last_name, s.email, t.name "Team Name"
2 FROM   customers c
3 JOIN   sales_representatives s
4 ON     ( s.id = c.sre_id)
5 JOIN   teams t
6 ON     (t.id = c.tem_id)
7
```

CTR_NUMBER	FIRST_NAME	LAST_NAME	PHONE_NUMBER	EMAIL	ID	FIRST_NAME	LAST_NAME	EMAIL	Team Name
c00101	John	Doe	03216547808	unknown@here.com	sr01	Charles	Raymond	chray@obl.com	Celtics
c01986	Maria	Galant	01442736589	margal87@delphiview.com	sr03	Barry	Speed	bspeed@obl.com	Rovers
c00001	Robert	Thornberry	01234567898	bob.thornberry@heatmail.com	sr01	Charles	Raymond	chray@obl.com	Rockets

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

Part 5: Applying Additional Conditions to a Join

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

APEX

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SQL Commands

Schema WKSP_HUIQUN1027

Language SQL

Rows 10

Clear Command

Find Tables

Save

Run

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```
1 SELECT ctr_number, c.first_name, c.last_name, c.phone_number, c.email, s.id, s.first_name, s.last_name, s.email, t.name "Team Name"
2 FROM customers c
3 JOIN sales_representatives s
4 ON ( s.id = c.sre_id)
5 JOIN teams t
6 ON (t.id = c.tem_id)
7 WHERE c.ctr_number = 'c00001'
8
```

Results

Explain

Describe

Saved SQL

History

CTR_NUMBER	FIRST_NAME	LAST_NAME	PHONE_NUMBER	EMAIL	ID	FIRST_NAME	LAST_NAME	EMAIL	Team Name
c00001	Robert	Thornberry	01234567898	bob.thornberry@heatmail.com	sr01	Charles	Raymond	chray@obl.com	Rockets

1 rows returned in 0.01 seconds [Download](#)

Part 6: Retrieving Records with Nonequijoins

- Write a query that will display 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

APEX

App Builder

SQL Workshop

Team Development

Gallery

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SQL Commands

Schema WKSP_HUIQUN1027

Language SQL

Rows 10

Clear Command

Find Tables

Save

Run

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```
1 SELECT 'The cost of the ' || i.name || ' on this day was ' || p.price AS "Item Details"
2 FROM items i
3 JOIN price_history p ON i.itm_number = p.itm_number
4 WHERE TO_DATE('12-Dec-2016', 'DD-Mon-YYYY') BETWEEN p.start_date AND p.end_date AND i.itm_number = 'im01101045'
```

Results

Explain

Describe

Saved SQL

History

Item Details
The cost of the under shirt on this day was 14.99

1 rows returned in 0.01 seconds [Download](#)

DML 3 Part 2

Section 6 Lesson 9 Exercise 2: Joining Tables Using JOIN

Write SELECT Statements Using Data From Multiple Tables Using Equijoins and Non-Equijoins (S6L9 Objective 1)

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.

APEX

App Builder

SQL Workshop

Team Development

Gallery

Search

TH

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SQL Commands

SchemaWKSP_HUIQUN1027

LanguageSQL

Rows10

Clear Command

Find Tables

Save

Run

A::

```
1 SELECT r.first_name||' '|| r.last_name AS "Rep", s.first_name||' '|| s.last_name AS"Supervisor"
2 FROM sales_representatives r
3 JOIN sales_representatives s
4 ON (r.supervisor_id = s.id)
```

Results

Explain

Describe

Saved SQL

History

Rep	Supervisor
Charles Raymond	Charles Raymond
Victoria Wright	Charles Raymond
Barry Speed	Charles Raymond

3 rows returned in 0.01 secondsDownload

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).

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SQL Commands

SchemaWKSP_HUIQUN1027

LanguageSQL

Rows10

Clear Command

Find Tables

Save

Run

A:

1SELECT *FROM teams t

2RIGHT OUTER JOIN customers c

3ON (t.id = c.tem_id)

Results

Explain

Describe

Saved SQL

History

ID	NAME	NUMBER_OF_PLAYERS	DISCOUNT	CTR_NUMBER	EMAIL	FIRST_NAME	LAST_NAME	PHONE_NUMBER	CURRENT_BALANCE	SRE_ID	TEM_ID	LOYALTY_CARD
-	-	-	-	c00103	MurciaA@globaltech.com	Andrew	Murcia	07715246890	85	-	-	lc2341
-	-	-	-	c00012	Jjones@freemail.com	Jennifer	Jones	01505214598	0	-	-	lc1015
-	-	-	-	c02001	brianrog@hootech.com	Brian	Rogers	01654564898	50	-	-	lc4587
t002	Celtics	42	20	c00101	unknown@here.com	John	Doe	03216547808	987.5	sr01	t002	-
t003	Rovers	8	-	c01986	margal87@delphiview.com	Maria	Galant	01442736589	125.65	sr03	t003	-
t001	Rockets	25	10	c00001	bob.thornberry@heatmail.com	Robert	Thornberry	01234567898	150	sr01	t001	-

6 rows returned in 0.02 secondsDownload

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

- 1. Create a Cartesian product between the customer and sales representative tables.
Row 1 until Row 11

APEX

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SQL Workshop

Team Development

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Search

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SQL Commands

SchemaWKSP_HUIQUN1027

LanguageSQL

Rows100

Clear Command

Find Tables

Save

Run

A:

1SELECT *FROM customers CROSS JOIN sales_representatives

Results

Explain

Describe




Saved SQL

History

CTR_NUMBER	EMAIL	FIRST_NAME	LAST_NAME	PHONE_NUMBER	CURRENT_BALANCE	SRE_ID	TEM_ID	LOYALTY_CARD_NUMBER	ID	EMAIL	FIRST_NAME	LAST_NAME
c00103	MurciaA@globaltech.com	Andrew	Murcia	07715246890	85	-	-	lc2341	sr01	chray@obl.com	Charles	F
c00103	MurciaA@globaltech.com	Andrew	Murcia	07715246890	85	-	-	lc2341	sr02	vwright@obl.com	Victoria	V
c00103	MurciaA@globaltech.com	Andrew	Murcia	07715246890	85	-	-	lc2341	sr03	bspeed@obl.com	Barry	S
c00012	Jjones@freemail.com	Jennifer	Jones	01505214598	0	-	-	lc1015	sr01	chray@obl.com	Charles	F
c00012	Jjones@freemail.com	Jennifer	Jones	01505214598	0	-	-	lc1015	sr02	vwright@obl.com	Victoria	V
c00012	Jjones@freemail.com	Jennifer	Jones	01505214598	0	-	-	lc1015	sr03	bspeed@obl.com	Barry	S
c02001	brianrog@hootech.com	Brian	Rogers	01654564898	50	-	-	lc4587	sr01	chray@obl.com	Charles	F
c02001	brianrog@hootech.com	Brian	Rogers	01654564898	50	-	-	lc4587	sr02	vwright@obl.com	Victoria	V
c02001	brianrog@hootech.com	Brian	Rogers	01654564898	50	-	-	lc4587	sr03	bspeed@obl.com	Barry	S
c00101	unknown@here.com	John	Doe	03216547808	987.5	sr01	t002	-	sr01	chray@obl.com	Charles	F
c00101	unknown@here.com	John	Doe	03216547808	987.5	sr01	t002	-	sr02	vwright@obl.com	Victoria	V

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
Results													Explain	Describe	Saved SQL	History
AME	PHONE_NUMBER	CURRENT_BALANCE	SRE_ID	TEM_ID	LOYALTY_CARD_NUMBER	ID	EMAIL	FIRST_NAME	LAST_NAME	PHONE_NUMBER	COMMISSION_RATE	SUPERVISOR_ID				
	07715246890	85	-	-	lc2341	sr01	chray@obl.com	Charles	Raymond	0134598761	10	sr01				
	07715246890	85	-	-	lc2341	sr02	vwright@obl.com	Victoria	Wright	0134598762	5	sr01				
	07715246890	85	-	-	lc2341	sr03	bspeed@obl.com	Barry	Speed	0134598763	5	sr01				
	01505214598	0	-	-	lc1015	sr01	chray@obl.com	Charles	Raymond	0134598761	10	sr01				
	01505214598	0	-	-	lc1015	sr02	vwright@obl.com	Victoria	Wright	0134598762	5	sr01				
	01505214598	0	-	-	lc1015	sr03	bspeed@obl.com	Barry	Speed	0134598763	5	sr01				
	01654564898	50	-	-	lc4587	sr01	chray@obl.com	Charles	Raymond	0134598761	10	sr01				
	01654564898	50	-	-	lc4587	sr02	vwright@obl.com	Victoria	Wright	0134598762	5	sr01				
	01654564898	50	-	-	lc4587	sr03	bspeed@obl.com	Barry	Speed	0134598763	5	sr01				
	03216547808	987.5	sr01	t002	-	sr01	chray@obl.com	Charles	Raymond	0134598761	10	sr01				
	03216547808	987.5	sr01	t002	-	sr02	vwright@obl.com	Victoria	Wright	0134598762	5	sr01				

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Row 12 until Row 18

c00101	unknown@here.com	John	Doe	03216547808	987.5	sr01	t002	-	sr03	bspeed@obl.com	Barry	S
c01986	margal87@delphiview.com	Maria	Galant	01442736589	125.65	sr03	t003	-	sr01	chray@obl.com	Charles	R
c01986	margal87@delphiview.com	Maria	Galant	01442736589	125.65	sr03	t003	-	sr02	vwright@obl.com	Victoria	V
c01986	margal87@delphiview.com	Maria	Galant	01442736589	125.65	sr03	t003	-	sr03	bspeed@obl.com	Barry	S
c00001	bob.thornberry@heatmail.com	Robert	Thornberry	01234567898	150	sr01	t001	-	sr01	chray@obl.com	Charles	R
c00001	bob.thornberry@heatmail.com	Robert	Thornberry	01234567898	150	sr01	t001	-	sr02	vwright@obl.com	Victoria	V
c00001	bob.thornberry@heatmail.com	Robert	Thornberry	01234567898	150	sr01	t001	-	sr03	bspeed@obl.com	Barry	S

18 rows returned in 0.01 seconds [Download](#)

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	03216547808	987.5	sr01	t002	-	sr03	bspeed@obl.com	Barry	Speed	0134598763	5	sr01
	01442736589	125.65	sr03	t003	-	sr01	chray@obl.com	Charles	Raymond	0134598761	10	sr01
	01442736589	125.65	sr03	t003	-	sr02	vwright@obl.com	Victoria	Wright	0134598762	5	sr01
	01442736589	125.65	sr03	t003	-	sr03	bspeed@obl.com	Barry	Speed	0134598763	5	sr01
rry	01234567898	150	sr01	t001	-	sr01	chray@obl.com	Charles	Raymond	0134598761	10	sr01
rry	01234567898	150	sr01	t001	-	sr02	vwright@obl.com	Victoria	Wright	0134598762	5	sr01
rry	01234567898	150	sr01	t001	-	sr03	bspeed@obl.com	Barry	Speed	0134598763	5	sr01

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