



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

SCHOOL OF COMPUTING
SESSION 2023/2024, SEMESTER 1
SECV2113
DATABASE
SECTION 10

LAB 4

LECTURER'S NAME: DR ROZILAWATI BINTI DOLLAH @ MD ZAIN

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|------------|--------------------------------------|-------------------|
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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.
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.

Answer:

1.

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

| 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 |

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2.

```
1 v SELECT id, first_name, last_name, address_line_1, address_line_2, city, email, phone_number
2   FROM sales_representatives
3 NATURAL JOIN sales_rep_addresses;
```

| 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 |

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Part 2: Creating Joins with the USING Clause

1. Adapt the previous query answer to use the USING clause instead of a natural join.
2. Display all of the information about items and their price history by joining the items and price_history tables.

Answer:

1.

```
1 SELECT *
2 FROM sales_representatives JOIN sales_rep_addresses
3 USING (id);
4
5 SELECT id, first_name, last_name, address_line_1, address_line_2, city, email, phone_number
6 FROM sales_representatives JOIN sales_rep_addresses
7 USING (id);
```

| 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 |

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3 rows selected.

| 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 |

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2.

1

SELECT *

2

FROM items JOIN price_history

3

USING (itm_number);

| ITM_NUMBER | NAME | DESCRIPTION | CATEGORY | COLOR | Size | ILT_ID | START_DATE | START_TIME | PRICE | END_DATE | END_TIME |
|------------|-------------|-----------------------------|-----------|-------|------|-------------|------------|------------|-------|-----------|-----------|
| im01101044 | gloves | catcher mitt | clothing | brown | m | il010230124 | 17-JUN-17 | 17-JUN-16 | 4.99 | - | - |
| im01101045 | under shirt | top worn under the game top | clothing | white | s | il010230125 | 25-NOV-16 | 25-NOV-16 | 14.99 | 25-JAN-17 | 25-JAN-17 |
| im01101045 | under shirt | top worn under the game top | clothing | white | s | il010230125 | 25-JAN-17 | 25-JAN-17 | 8.99 | 25-JAN-17 | 25-JAN-17 |
| im01101045 | under shirt | top worn under the game top | clothing | white | s | il010230125 | 26-JAN-17 | 26-JAN-17 | 15.99 | - | - |
| im01101046 | socks | team socks with emblem | clothing | range | l | il010230126 | 12-FEB-17 | 12-FEB-17 | 7.99 | - | - |
| im01101047 | game top | team shirt with emblem | clothing | range | m | il010230127 | 25-APR-17 | 25-APR-17 | 24.99 | - | - |
| im01101048 | premium bat | high quaiity basball bat | equipment | - | - | il010230128 | 31-MAY-17 | 31-MAY-17 | 149 | - | - |

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7 rows selected.

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.

Answer:

```
1 ✓ SELECT c.ctr_number "Customer Number", c.first_name "Customer First Name",  
2       c.last_name "Customer Last Name", c.phone_number "Customer Phone Number",  
3       c.email "Customer Email", s.id "Sales Rep ID", s.first_name "Sales Rep First Name",  
4       s.last_name "Sales Rep Last Name", s.email "Sales Rep Email"  
5  
6 FROM customers c JOIN sales_representatives s  
7 ON (c.sre_id = s.id);
```

| Customer 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 |
|-----------------|---------------------|--------------------|-----------------------|-----------------------------|--------------|----------------------|---------------------|-----------------|
| c00001 | Robert | Thornberry | 01234567898 | bob.thornberry@heatmail.com | sr01 | Charles | Raymond | chray@obl.com |
| 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 |

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3 rows selected.

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.

Answer :

```
1 v SELECT c.ctr_number "Customer Number", c.first_name "Customer First Name",
2       c.last_name "Customer Last Name", c.phone_number "Customer Phone Number",
3       c.email "Customer Email", s.id "Sales Rep ID", s.first_name "Sales Rep First Name",
4       s.last_name "Sales Rep Last Name", s.email "Sales Rep Email", t.name "Team Name"
5
6 FROM customers c JOIN sales_representatives s
7 ON (c.sre_id = s.id)
8 JOIN teams t
9 ON (t.id = t.id);
```

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

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9 rows selected.

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.

Answer:

```
1 v SELECT c.ctr_number "Customer Number", c.first_name "Customer First Name",
2       c.last_name "Customer Last Name", c.phone_number "Customer Phone Number",
3       c.email "Customer Email", s.id "Sales Rep ID", s.first_name "Sales Rep First Name",
4       s.last_name "Sales Rep Last Name", s.email "Sales Rep Email", t.name "Team Name"
5
6 FROM customers c JOIN sales_representatives s
7 ON (c.sre_id = s.id)
8 JOIN teams t
9 ON (t.id = t.id)
10 WHERE c.ctr_number = 'c00001';
```

| Customer 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 | Team Name |
|-----------------|---------------------|--------------------|-----------------------|-----------------------------|--------------|----------------------|---------------------|-----------------|-----------|
| c00001 | Robert | Thornberry | 01234567898 | bob.thornberry@heatmail.com | sr01 | Charles | Raymond | chray@obl.com | Rockets |
| c00001 | Robert | Thornberry | 01234567898 | bob.thornberry@heatmail.com | sr01 | Charles | Raymond | chray@obl.com | Celtics |
| c00001 | Robert | Thornberry | 01234567898 | bob.thornberry@heatmail.com | sr01 | Charles | Raymond | chray@obl.com | Rovers |

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3 rows selected.

Part 6: Retrieving Records with Nonequijoins

1. 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

Answer:

```
1 v SELECT 'The cost of the' || i.name || ' on this day was ' || h.price
2 FROM items i JOIN inventory_list I
3 ON (i.ilt_id = I.id)
4 JOIN price_history h
5 ON (i.itm_number = h.itm_number)
6 WHERE i.itm_number = 'im01101045' AND h.start_date < '12-Dec-2016' AND h.end_date > '12-Dec-2016';
```

'THECOSTOFTHE' || I.NAME || 'ONTHISDAYWAS' || H.PRICE

The cost of theunder shirt on this day was 14.99

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.

Answer:

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

| Representatives | Supervisor |
|-----------------|----------------|
| CharlesRaymond | CharlesRaymond |
| VictoriaWright | CharlesRaymond |
| BarrySpeed | CharlesRaymond |

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3 rows selected.

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).

Answer:

```
1 SELECT *
2 FROM teams t LEFT OUTER JOIN customers c
3 ON (t.id = c.id);
```

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

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

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

Answer:

```
1 SELECT *
2 FROM customers c, sales_representatives r;
```

| CTR_NUMBER | EMAIL | FIRST_NAME | LAST_NAME | PHONE_NUMBER | CURRENT_BALANCE | SRE_ID | TEM_ID | LOYALTY_CARD_NUMBER | ID | EMAIL | FIRST_NAME | LAST_NAME |
|------------|-----------------------------|------------|------------|--------------|-----------------|--------|--------|---------------------|------|-----------------|------------|-----------|
| c00001 | bob.thornberry@heatmail.com | Robert | Thornberry | 01234567898 | 150 | sr01 | t001 | - | sr01 | chray@obl.com | Charles | Raymond |
| c00012 | Jjones@freemail.com | Jennifer | Jones | 01505214598 | 0 | - | - | lc1015 | sr01 | chray@obl.com | Charles | Raymond |
| c00101 | unknown@here.com | John | Doe | 03216547808 | 987.5 | sr01 | t002 | - | sr01 | chray@obl.com | Charles | Raymond |
| c00103 | MurciaA@globaltech.com | Andrew | Murcia | 07715246890 | 85 | - | - | lc2341 | sr01 | chray@obl.com | Charles | Raymond |
| c01986 | margal87@delphiview.com | Maria | Galant | 01442736589 | 125.65 | sr03 | t003 | - | sr01 | chray@obl.com | Charles | Raymond |
| c00001 | bob.thornberry@heatmail.com | Robert | Thornberry | 01234567898 | 150 | sr01 | t001 | - | sr02 | vwright@obl.com | Victoria | Wright |
| c00012 | Jjones@freemail.com | Jennifer | Jones | 01505214598 | 0 | - | - | lc1015 | sr02 | vwright@obl.com | Victoria | Wright |
| c00101 | unknown@here.com | John | Doe | 03216547808 | 987.5 | sr01 | t002 | - | sr02 | vwright@obl.com | Victoria | Wright |
| c00103 | MurciaA@globaltech.com | Andrew | Murcia | 07715246890 | 85 | - | - | lc2341 | sr02 | vwright@obl.com | Victoria | Wright |
| c01986 | margal87@delphiview.com | Maria | Galant | 01442736589 | 125.65 | sr03 | t003 | - | sr02 | vwright@obl.com | Victoria | Wright |
| c00001 | bob.thornberry@heatmail.com | Robert | Thornberry | 01234567898 | 150 | sr01 | t001 | - | sr03 | bspeed@obl.com | Barry | Speed |
| c00012 | Jjones@freemail.com | Jennifer | Jones | 01505214598 | 0 | - | - | lc1015 | sr03 | bspeed@obl.com | Barry | Speed |
| c00101 | unknown@here.com | John | Doe | 03216547808 | 987.5 | sr01 | t002 | - | sr03 | bspeed@obl.com | Barry | Speed |
| c00103 | MurciaA@globaltech.com | Andrew | Murcia | 07715246890 | 85 | - | - | lc2341 | sr03 | bspeed@obl.com | Barry | Speed |
| c01986 | margal87@delphiview.com | Maria | Galant | 01442736589 | 125.65 | sr03 | t003 | - | sr03 | bspeed@obl.com | Barry | Speed |

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