



**UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

**Faculty of Computing**

**SECD2523 : Database**

**LAB 4**

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**SECTION : 08**

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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.

```
1 SELECT * FROM sales_representatives 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 | D148211  |
| sr02 | vwright@obl.com | Victoria   | Wright    | 0134598762   | 5               | sr01          | 87 Blossom Hill | Uptown         | Detroit | D152314  |
| sr03 | bspeed@obl.com  | Barry      | Speed     | 0134598763   | 5               | sr01          | 12 Junction Row | Skinflats      | Detroit | D152564  |

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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.

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

| FIRST_NAME | LAST_NAME | ADDRESS_LINE_1  | ADDRESS_LINE_2 | CITY    | EMAIL           | PHONE_NUMBER |
|------------|-----------|-----------------|----------------|---------|-----------------|--------------|
| Charles    | Raymond   | 12 Cherry Lane  | Denton         | Detroit | chray@obl.com   | 0134598761   |
| Victoria   | Wright    | 87 Blossom Hill | Uptown         | Detroit | vwright@obl.com | 0134598762   |
| 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.

```
1 SELECT first_name, last_name, address_line_1, address_line_2, city, email, phone_number
2 FROM sales_representatives JOIN sales_rep_addresses
3 using (id);
```

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

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

```
1 SELECT * FROM items JOIN price_history
2 using (itm_number);
```

| ITM_NUMBER | NAME        | DESCRIPTION                 | CATEGORY  | COLOR | Size | ILT_ID      | START_DATE | START_TIME | PRICE | END_DATE   | END_TIME   |
|------------|-------------|-----------------------------|-----------|-------|------|-------------|------------|------------|-------|------------|------------|
| im0101045  | 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 |
| im0101045  | 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 |
| im0101045  | under shirt | top worn under the game top | clothing  | white | s    | il010230125 | 01/26/2017 | 01/26/2017 | 15.99 | -          | -          |
| im0101046  | socks       | team socks with emblem      | clothing  | range | l    | il010230126 | 02/12/2017 | 02/12/2017 | 7.99  | -          | -          |
| im0101047  | game top    | team shirt with emblem      | clothing  | range | m    | il010230127 | 04/25/2017 | 04/25/2017 | 24.99 | -          | -          |
| im0101048  | premium bat | high quality baseball bat   | equipment | -     | -    | il010230128 | 05/31/2017 | 05/31/2017 | 149   | 12/18/2023 | 12/18/2023 |
| im0101048  | premium bat | high quality baseball bat   | equipment | -     | -    | il010230128 | 12/18/2023 | 12/18/2023 | 99.99 | -          | -          |
| im0101044  | gloves      | catcher mitt                | clothing  | brown | m    | il010230124 | 06/17/2017 | 06/17/2016 | 4.99  | -          | -          |

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

## 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.

```
1 SELECT
2   c.ctr_number AS "Customer number",
3   c.first_name AS "Customer first name",
4   c.last_name AS "Customer last name",
5   c.phone_number AS "Customer phone number",
6   c.email AS "Customer Email",
7   sr.id AS "Sales Representatives ID",
8   sr.first_name AS "Sales Representatives first name",
9   sr.last_name AS "Sales Representatives last name",
10  sr.email AS "Sales Representatives Email"
11 FROM customers c JOIN sales_representatives sr
12 ON (c.sre_id = sr.id);
```

| Customer number | Customer first name | Customer last name | Customer phone number | Customer Email              | Sales Representatives ID | Sales Representatives first name | Sales Representatives last name | Sales Representatives 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              |

3 rows returned in 0.02 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.

```
4   c.last_name AS "Customer last name",
5   c.phone_number AS "Customer phone number",
6   c.email AS "Customer Email",
7   sr.id AS "Sales Representatives ID",
8   sr.first_name AS "Sales Representatives first name",
9   sr.last_name AS "Sales Representatives last name",
10  sr.email AS "Sales Representatives Email"
11 FROM customers c JOIN sales_representatives sr
12 ON (c.sre_id = sr.id)
13 JOIN teams t
14 ON (c.tem_id = t.id);
```

| Customer number | Customer first name | Customer last name | Customer phone number | Customer Email              | Sales Representatives ID | Sales Representatives first name | Sales Representatives last name | Sales Representatives 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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## 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.

```
6   c.email AS "Customer Email",
7   sr.id AS "Sales Representatives ID",
8   sr.first_name AS "Sales Representatives first name",
9   sr.last_name AS "Sales Representatives last name",
10  sr.email AS "Sales Representatives Email"
11 FROM customers c JOIN sales_representatives sr
12 ON (c.sre_id = sr.id)
13 JOIN teams t
14 ON (c.tem_id = t.id)
15 AND c.ctr_number = 'c00001';
```

| Customer number | Customer first name | Customer last name | Customer phone number | Customer Email              | Sales Representatives ID | Sales Representatives first name | Sales Representatives last name | Sales Representatives Email |
|-----------------|---------------------|--------------------|-----------------------|-----------------------------|--------------------------|----------------------------------|---------------------------------|-----------------------------|
| c00001          | Robert              | Thornberry         | 01234567898           | bob.thornberry@heatmail.com | sr01                     | Charles                          | Raymond                         | chray@obl.com               |

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## 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 12<sup>th</sup> of December 2016. The output of the query should look like this:

The cost of the under shirt on this day was 14.99

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

| Results  | Explain | Describe | Saved SQL | History |
|--|---------|----------|-----------|---------|
| <b>Items Description</b>                                 |         |          |           |         |
| The cost of theunder shirt on this day was 14.99         |         |          |           |         |
| 1 rows returned in 0.02 seconds <a href="#">Download</a> |         |          |           |         |

## 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.

```
1 SELECT sr.first_name || ' ' || sr.last_name AS "Rep", c.first_name || ' ' || c.last_name AS "Supervisor"
2 FROM sales_representatives sr
3 JOIN customers c
4 ON sr.supervisor_id = c.sre_id;
```

| Rep             | Supervisor        |
|-----------------|-------------------|
| Charles Raymond | Robert Thornberry |
| Victoria Wright | Robert Thornberry |
| Barry Speed     | Robert Thornberry |
| Charles Raymond | John Doe          |
| Victoria Wright | John Doe          |
| Barry Speed     | John Doe          |

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### 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).

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

| CTR_NUMBER | EMAIL                       | FIRST_NAME | LAST_NAME  | PHONE_NUMBER | CURRENT_BALANCE | SRE_ID | TEM_ID | LOYALTY_CARD_NUMBER | ID   | NAME    | NUMBER_OF_PLAYERS | DISCOUNT |
|------------|-----------------------------|------------|------------|--------------|-----------------|--------|--------|---------------------|------|---------|-------------------|----------|
| c00001     | bob.thornberry@heatmail.com | Robert     | Thornberry | 01234567898  | 150             | sr01   | t001   | -                   | t001 | Rockets | 25                | 10       |
| c00012     | j.jones@freemail.com        | Jennifer   | Jones      | 01505214598  | 0               | -      | -      | lc1015              | -    | -       | -                 | -        |
| c00101     | unknown@here.com            | John       | Doe        | 03216547808  | 987.5           | sr01   | t002   | -                   | t002 | Celtics | 42                | 20       |
| c00103     | MurciaA@globaltech.com      | Andrew     | Murcia     | 0775246890   | 85              | -      | -      | lc2341              | -    | -       | -                 | -        |
| c01986     | margal87@delphiview.com     | Maria      | Galant     | 01442736589  | 125.65          | sr03   | t003   | -                   | t003 | Rovers  | 8                 | -        |
| c02001     | brianrog@hootech.com        | Brian      | Rogers     | 01654564898  | 50              | -      | -      | lc4587              | -    | -       | -                 | -        |

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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.

```
1 SELECT *
2 FROM customers c,sales_representatives sr
```

| CTR_NUMBER | EMAIL                       | FIRST_NAME | LAST_NAME  | PHONE_NUMBER | CURRENT_BALANCE | SRE_ID | TEM_ID | LOYALTY_CARD_NUMBER | ID   | EMAIL           | FIRST_NAME | LAST_N  |
|------------|-----------------------------|------------|------------|--------------|-----------------|--------|--------|---------------------|------|-----------------|------------|---------|
| c00001     | bob.thornberry@heatmail.com | Robert     | Thornberry | 01234567898  | 150             | sr01   | t001   | -                   | sr01 | chray@obl.com   | Charles    | Raymond |
| c00012     | j.jones@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     | 0775246890   | 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 |
| c02001     | brianrog@hootech.com        | Brian      | Rogers     | 01654564898  | 50              | -      | -      | lc4587              | sr01 | chray@obl.com   | Charles    | Raymond |
| c00001     | bob.thornberry@heatmail.com | Robert     | Thornberry | 01234567898  | 150             | sr01   | t001   | -                   | sr02 | vwright@obl.com | Victoria   | Wright  |
| c00012     | j.jones@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     | 0775246890   | 85              | -      | -      | lc2341              | sr02 | vwright@obl.com | Victoria   | Wright  |