



Type Kelompok

Post Test Minggu Ke - 12

Fitra Ilyasa, Andhika Marcelino Purwanto, Rahma Wati

120140048, 120140187, 120140184

fitra.120140048@student.itera.ac.id

andhika.120140187@student.itera.ac.id

rahma.120140184@student.itera.ac.id

27 April 2022

STUDI KASUS (DEADLINE 27)

- Masukkan semua data riil pada tugas anda ke dalam basis data.
- Carilah minimal 10 buah persoalan atau pertanyaan yang mungkin muncul dalam kasus tugas anda. Semakin kompleks dan tepat jawaban anda, maka nilai tugas akan makin tinggi.
- Buatlah solusinya menggunakan SQL dan Aljabar Relasional sekaligus.

1. Operasi UNION

Union (\cup), adalah operasi untuk menghasilkan gabungan table dengan syarat kedua table memiliki atribut yang sama, yaitu domain atribut ke-i masing – masing table harus sama.

$R \cup S = \{x \mid x \in R \text{ atau } x \in S\}$

```
MariaDB [teori_mtk]> select * from r union select * from s;  
+-----+-----+  
| A      | B      |  
+-----+-----+  
| alpha  | 1      |  
| alpha  | 2      |  
| beta   | 1      |  
| beta   | 3      |  
+-----+-----+  
4 rows in set (0.001 sec)
```

2. Operasi INTERSECTION (PERSIMPANGAN)

Set-intersection / Intersection (\cap) termasuk kedalam operator tambahan, karena operator ini dapat diderivikasi dari operator dasar seperti berikut :



$A \cap B = A - (A - B)$, atau $A \cap B = B - (B - A)$

```
MariaDB [teori_mtk]> select * from r intersect select * from
s;
+-----+-----+
| A      | B      |
+-----+-----+
| alpha  | 2      |
+-----+-----+
1 row in set (0.001 sec)

MariaDB [teori_mtk]> select * from r;
```

3. Operasi SET DIFFERENCE (SET PERBEDAAN) / MINUS

Set-intersection / Intersection (\cap) termasuk kedalam operator tambahan, karena operator ini dapat diderivikasi dari operator dasar seperti berikut :

$A \cap B = A - (A - B)$, atau $A \cap B = B - (B - A)$

```
MariaDB [teori_mtk]> select * from r except select * from s;
+-----+-----+
| A      | B      |
+-----+-----+
| alpha  | 1      |
| beta   | 1      |
+-----+-----+
2 rows in set (0.001 sec)
```

4. Operasi CARTESIAN PRODUCT

Cartesian-product (\times), adalah operasi untuk menghasilkan table hasil perkalian kartesian. Sintaks yang digunakan dalam operasi proyeksi ini adalah sebagai berikut :

$R \times S = \{(x,y) \mid x \in R \text{ dan } y \in S\}$



```
MariaDB [teori_mtk]> select * from r cross join s;  
+-----+-----+-----+-----+  
| A      | B      | C      | D      | E      |  
+-----+-----+-----+-----+  
| alpha  | 1      | alpha  | 10     | a      |  
| beta   | 2      | alpha  | 10     | a      |  
| alpha  | 1      | beta   | 10     | a      |  
| beta   | 2      | beta   | 10     | a      |  
| alpha  | 1      | beta   | 20     | b      |  
| beta   | 2      | beta   | 20     | b      |  
| alpha  | 1      | gamma  | 10     | b      |  
| beta   | 2      | gamma  | 10     | b      |  
+-----+-----+-----+-----+  
8 rows in set (0.001 sec)
```

5. Operasi SELECTION / SELECT

Selection / Select (σ), adalah operasi untuk menyeleksi tupel – tupel yang memenuhi suatu predikat, kita dapat menggunakan operator perbandingan ($<$, $>$, $>=$, $<=$, $=$, \neq) pada predikat.

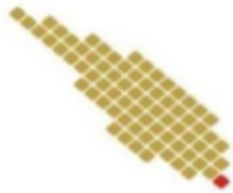
Beberapa predikat dapat dikombinasikan menjadi predikat manjemuk menggunakan penghubung **AND** (\wedge) dan **OR** (\vee).

```
MariaDB [teori_mtk]> select * from s where c='beta';  
+-----+-----+-----+  
| C      | D      | E      |  
+-----+-----+-----+  
| beta   | 10     | a      |  
| beta   | 20     | b      |  
+-----+-----+-----+  
2 rows in set (0.001 sec)
```

6. Operasi PROJECT

Projection / Project (π), adalah operasi untuk memperoleh kolom – kolom tertentu. Operasi project adalah operasi unary yang mengirim relasi argumen dengan kolom – kolom tertentu. Karena relasi adalah himpunan, maka baris – baris duplikasi dihilangkan. Sintaks yang digunakan dalam operasi proyeksi ini adalah sebagai berikut :

π column1,...,column (tabel)



```
MariaDB [teori_mtk]> select C,D from s;
```

C	D
alpha	10
beta	10
beta	20
gamma	10

```
4 rows in set (0.001 sec)
```

7. Operasi JOIN

```
MariaDB [teori_mtk]> select * from r theta join s;
```

A	B	C	D	E
alpha	1	alpha	10	a
beta	2	alpha	10	a
alpha	1	beta	10	a
beta	2	beta	10	a
alpha	1	beta	20	b
beta	2	beta	20	b
alpha	1	gamma	10	b
beta	2	gamma	10	b

```
8 rows in set (0.001 sec)
```

```
MariaDB [teori_mtk]> select * from r equi join s;
```

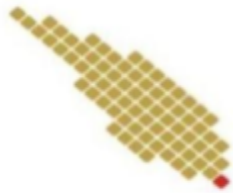
A	B	C	D	E
alpha	1	alpha	10	a
beta	2	alpha	10	a
alpha	1	beta	10	a
beta	2	beta	10	a
alpha	1	beta	20	b
beta	2	beta	20	b
alpha	1	gamma	10	b
beta	2	gamma	10	b

```
8 rows in set (0.001 sec)
```

```
MariaDB [teori_mtk]> select * from r natural join s;
```

A	B	C	D	E
alpha	1	alpha	10	a
beta	2	alpha	10	a
alpha	1	beta	10	a
beta	2	beta	10	a
alpha	1	beta	20	b
beta	2	beta	20	b
alpha	1	gamma	10	b
beta	2	gamma	10	b

```
8 rows in set (0.001 sec)
```



8. Demonstrate queries in the *relational algebra*

```
MariaDB [kel1]> select * from mhs1;
+-----+-----+-----+
| nim   | nama           | prodi           |
+-----+-----+-----+
| 120140187 | Andhika Marcelino | Teknik Informatika |
| 120140048 | Fitra Ilyasa      | Teknik Informatika |
| 120140076 | Murliana          | Teknik Informatika |
+-----+-----+-----+
3 rows in set (0.001 sec)

MariaDB [kel1]> select * from mhs2;
+-----+-----+-----+
| nim   | nama           | prodi           |
+-----+-----+-----+
| 120140184 | Rahma Wati       | Teknik Informatika |
| 120140048 | Fitra Ilyasa      | Teknik Informatika |
| 120140076 | Murliana          | Teknik Informatika |
+-----+-----+-----+
3 rows in set (0.008 sec)

MariaDB [kel1]> select * from mhs1 union select * from mhs2;
+-----+-----+-----+
| nim   | nama           | prodi           |
+-----+-----+-----+
| 120140187 | Andhika Marcelino | Teknik Informatika |
| 120140048 | Fitra Ilyasa      | Teknik Informatika |
| 120140076 | Murliana          | Teknik Informatika |
| 120140184 | Rahma Wati       | Teknik Informatika |
+-----+-----+-----+
4 rows in set (0.051 sec)
```

9. Demonstrate queries in the *domain relational calculus (DRC)*

```
MariaDB [kel_1]> select * from konsumen;
+-----+-----+-----+
| Nama_konsumen | alamat_konsumen | kota_konsumen |
+-----+-----+-----+
| Andika         | Kedaton          | Bandarlampung |
| Fitra          | Simpang Jaya     | Garut          |
| Murliana       | Seyegan          | Yogyakarta     |
| Rahma          | Pahoman          | Bandarlampung |
+-----+-----+-----+
4 rows in set (0.004 sec)
```

```
MariaDB [kel_1]> select * from loan;
+-----+-----+-----+
| nomor_loan | branch | amount |
+-----+-----+-----+
| L01        | Sub    | 230    |
| L02        | Main   | 75     |
| L03        | Main   | 150    |
| L04        | Sub    | 90     |
+-----+-----+-----+
4 rows in set (0.000 sec)
```



```
MariaDB [kel_1]> select * from peminjam;
```

nama_konsumen	nomor_loan
Fitra	L01
Rahma	L02
Murliana	L03
Andika	L04

```
4 rows in set (0.000 sec)
```

Query-1:

Mencari nomor_loan, branch, loan lebih besar dari atau sama dengan 100

$$\{ \langle l, b, a \rangle \mid \langle l, b, a \rangle \in \text{loan} \wedge (a \geq 100) \}$$

Untuk menampilkan nomor_loan, branch, dan loan kita menggunakan table loan dengan syntax select dengan kondisi amount ≥ 100 .

```
MariaDB [kel_1]> select * from loan;
```

nomor_loan	branch	amount
L01	Sub	230
L02	Main	75
L03	Main	150
L04	Sub	90

```
4 rows in set (0.001 sec)
```

```
MariaDB [kel_1]> select * from loan where amount >= 100;
```

nomor_loan	branch	amount
L01	Sub	230
L03	Main	150

```
2 rows in set (0.006 sec)
```

```
MariaDB [kel_1]>
```

Query-2:

Temukan nomor_loan untuk setiap pinjaman dengan amount yang lebih besar atau sama dengan 150

$$\{ \langle l \rangle \mid \exists b, a (\langle l, b, a \rangle \in \text{loan} \wedge (a \geq 150)) \}$$

*Menampilkan data nomor_loan menggunakan syntax select from loan yang memiliki amount ≥ 150



```
MariaDB [kel_1]> select nomor_loan from loan where amount >= 150;
+-----+
| nomor_loan |
+-----+
| L01        |
| L03        |
+-----+
2 rows in set (0.000 sec)
```

Query-3:

Temukan nama_konsumen yang memiliki pinjaman di branch "Main" dan temukan amount

$$\{ \langle c, a \rangle \mid \exists l (\langle c, l \rangle \in \text{borrower} \wedge \exists b (\langle l, b, a \rangle \in \text{loan} \wedge (b = \text{"Main"}))) \}$$

Untuk menampilkan nama_konsumen dan amount memerlukan dua table, yaitu table loan untuk mencari nomor_konsumen yang memiliki pinjaman di branch "Main". Kemudian ke table peminjam untuk mencari nama_konsumen dan amountnya dengan menggunakan nomor_konsumen yang sudah ditemukan tadi.

```
MariaDB [kel_1]> select nomor_loan, amount from loan where branch = "Main";
+-----+-----+
| nomor_loan | amount |
+-----+-----+
| L02        | 75     |
| L03        | 150    |
+-----+-----+
2 rows in set (0.000 sec)

MariaDB [kel_1]> select nama_konsumen from peminjam where nomor_loan between "L02" and "L03";
+-----+
| nama_konsumen |
+-----+
| Murliana      |
| Rahma         |
+-----+
2 rows in set (0.000 sec)
```

Keterangan simbol yang digunakan pada rumus:

l : nomor_loan

b : Branch

a : Amount

c : nama_konsumen

\wedge : and/dan



10. Demonstrate queries in the tuple relational calculus (TRC).

Tabel-tabel pada database peminjaman

```
MariaDB [peminjaman]> select * from customer;
+-----+-----+-----+
| customer_name | street | city |
+-----+-----+-----+
| Rahma         | A5     | Jakarta |
| Andika        | A7     | Jakarta |
| Fitra         | B6     | Garut   |
| Murli         | D9     | Lampung |
+-----+-----+-----+
4 rows in set (0.001 sec)
```

```
MariaDB [peminjaman]> select * from branch;
+-----+-----+
| branch_name | branch_city |
+-----+-----+
| ABC         | Jakarta    |
| DEF         | Lampung    |
| GHI         | Garut      |
+-----+-----+
3 rows in set (0.005 sec)
```

```
MariaDB [peminjaman]> select * from account;
+-----+-----+-----+
| account_number | branch_name | balance |
+-----+-----+-----+
| 1111           | ABC         | 50000   |
| 1112           | DEF         | 10000   |
| 1113           | GHI         | 9000    |
| 1114           | ABC         | 7000    |
+-----+-----+-----+
4 rows in set (0.031 sec)
```

```
MariaDB [peminjaman]> select * from loan;
+-----+-----+-----+
| loan_number | branch_name | amount |
+-----+-----+-----+
| L33         | ABC         | 10000   |
| L35         | DEF         | 15000   |
| L49         | GHI         | 9000    |
| L98         | DEF         | 65000   |
+-----+-----+-----+
4 rows in set (0.001 sec)
```

```
MariaDB [peminjaman]> select * from loan;
+-----+-----+-----+
| loan_number | branch_name | amount |
+-----+-----+-----+
| L33         | ABC         | 10000   |
| L35         | DEF         | 15000   |
| L49         | GHI         | 9000    |
| L98         | DEF         | 65000   |
+-----+-----+-----+
4 rows in set (0.001 sec)
```




```
MariaDB [peminjaman]> select * from depositor;
+-----+-----+
| customer_name | account_number |
+-----+-----+
| Andika        | 1111           |
| Fitra         | 1113           |
| Murli         | 1114           |
+-----+-----+
3 rows in set (0.001 sec)
```

- Queries 1 : Temukan loan number, branch, amount ≥ 10000

$$\{t \mid t \in \text{loan} \wedge t[\text{amount}] \geq 10000\}$$

```
MariaDB [peminjaman]> select * from loan where amount >=10000;
+-----+-----+-----+
| loan_number | branch_name | amount |
+-----+-----+-----+
| L33         | ABC         | 10000  |
| L35         | DEF         | 15000  |
| L98         | DEF         | 65000  |
+-----+-----+-----+
3 rows in set (1.543 sec)
```

Pada query diatas t [amount] sebagai variabel tuple

- Queries 2 : temukan loan number dengan jumlah amount ≥ 10000

$$\{t \mid \exists s \in \text{loan} (t[\text{loan number}] = s[\text{loan number}] \wedge s[\text{amount}] \geq 10000)\}$$

```
MariaDB [peminjaman]> select loan_number from loan where amount >= 10000;
+-----+
| loan_number |
+-----+
| L33         |
| L35         |
| L98         |
+-----+
3 rows in set (0.158 sec)

MariaDB [peminjaman]> _
```

- Queries 3 : temukan semua nama pada customer_name yang memiliki loan number dari depositor

$$\{t \mid \exists s \in \text{borrower} (t[\text{customer-name}] = s[\text{customer-name}]) \wedge \exists u \in \text{depositor} ([\text{customer-name}] = u[$$



KEMENTERIAN PENDIDIKAN, KEBUDAYAAN,
RISET, DAN TEKNOLOGI

INSTITUT TEKNOLOGI SUMATERA

JURUSAN TEKNOLOGI PRODUKSI DAN INDUSTRI

Jalan Terusan Ryacudu Way Hui, Kecamatan Jati Agung, Lampung Selatan 35365

Telepon: (0721) 8030188

Email: jtpi@itera.ac.id, Website : <http://itera.ac.id>

```
MariaDB [peminjaman]> select customer.customer_name from depositor natural join customer;
+-----+
| customer_name |
+-----+
| Andika        |
| Fitra         |
| Murli         |
+-----+
3 rows in set (0.391 sec)
```