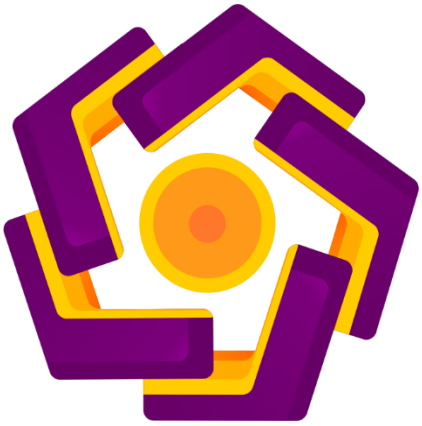
LAPORAN UJIAN AKHIR SEMESTER
PEMROGRAMAN BASIS DATA

Dosen: Novi Prisma Yunita, M.Kom



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PROGRAM STUDI S1 INFORMATIKA, FAKULTAS ILMU KOMPUTER

UNIVERSITAS AMIKOM YOGYAKARTA

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Desain Basis Data Sistem Kost-Al

1.1 Entity Relationship Diagram (ERD)

Penjelasan ERD:

- Pengguna: Tabel ini menyimpan data pengguna (penyewa dan pemilik).
- Detail_Pengguna: Tabel ini menyimpan informasi tambahan mengenai pengguna dan memiliki relasi one-to-one dengan tabel Pengguna.
- Kost: Tabel ini menyimpan data kost yang dimiliki oleh pemilik.
- Kamar: Tabel ini menyimpan data kamar yang ada di kost dan memiliki relasi one-to-many dengan tabel Kost.
- Penyewaan: Tabel ini menyimpan data penyewaan kamar dan memiliki relasi many-to-many dengan tabel Pengguna dan Kamar.
- Fasilitas: Tabel ini menyimpan data fasilitas yang ada di kamar kost.
- Kamar_Fasilitas: Tabel ini menyimpan relasi many-to-many antara tabel Kamar dan Fasilitas.
- Transaksi: Tabel ini menyimpan data transaksi pembayaran penyewaan kamar.

1.2 Struktur Tabel dan Relasi

Pengguna

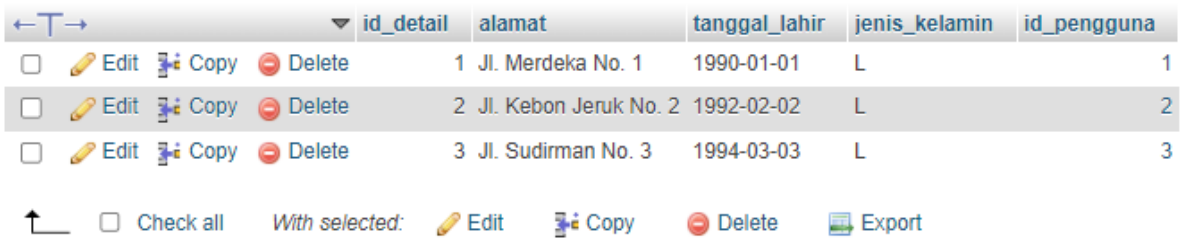
```
CREATE TABLE Pengguna (
    id_pengguna INT AUTO_INCREMENT PRIMARY KEY,
    nama VARCHAR(100),
    email VARCHAR(100),
    password VARCHAR(100),
    no_telepon VARCHAR(15)
);
```

	id_pengguna	nama	email	password	no_telepon
Edit Copy Delete	1	Muhammad Ali	muhammadali@gmail.com	password123	081234567890
Edit Copy Delete	2	Naufal Haidar	naufal@gmail.com	password123	082345678901
Edit Copy Delete	3	Bayu Setya Adjie	bayu@gmail.com	password123	083456789012

Check all With selected: Edit Copy Delete Export

Detail_Pengguna

```
CREATE TABLE Detail_Pengguna (
    id_detail_pengguna INT AUTO_INCREMENT PRIMARY KEY,
    alamat VARCHAR(255),
    tanggal_lahir DATE,
    jenis_kelamin CHAR(1),
    id_pengguna INT,
    FOREIGN KEY (id_pengguna) REFERENCES Pengguna(id_pengguna)
);
```



	id_detail	alamat	tanggal_lahir	jenis_kelamin	id_pengguna
Edit Copy Delete	1	Jl. Merdeka No. 1	1990-01-01	L	1
Edit Copy Delete	2	Jl. Kebon Jeruk No. 2	1992-02-02	L	2
Edit Copy Delete	3	Jl. Sudirman No. 3	1994-03-03	L	3

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Kost

```
CREATE TABLE Kost (
    id_kost INT AUTO_INCREMENT PRIMARY KEY,
    nama_kost VARCHAR(100),
    alamat VARCHAR(255),
    pemilik_id INT,
    FOREIGN KEY (pemilik_id) REFERENCES Pengguna(id_pengguna)
);
```

id_kost	nama_kost	alamat	pemilik_id
1	Kost Indah	Jl. Mawar No. 10	1
2	Kost Mewah	Jl. Melati No. 20	2

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Kamar

```
CREATE TABLE Kamar (
    id_kamar INT AUTO_INCREMENT PRIMARY KEY,
    nomor_kamar VARCHAR(10),
    ukuran VARCHAR(10),
    harga DECIMAL(10, 2),
    status VARCHAR(20),
    id_kost INT,
    FOREIGN KEY (id_kost) REFERENCES Kost(id_kost)
);
```

id_kamar	nomor_kamar	ukuran	harga	status	id_kost
1	101	3x4	1500000.00	tidak tersedia	1
2	102	3x4	1500000.00	tidak tersedia	1
3	201	3x4	2000000.00	tidak tersedia	2
4	202	3x4	2000000.00	tidak tersedia	2

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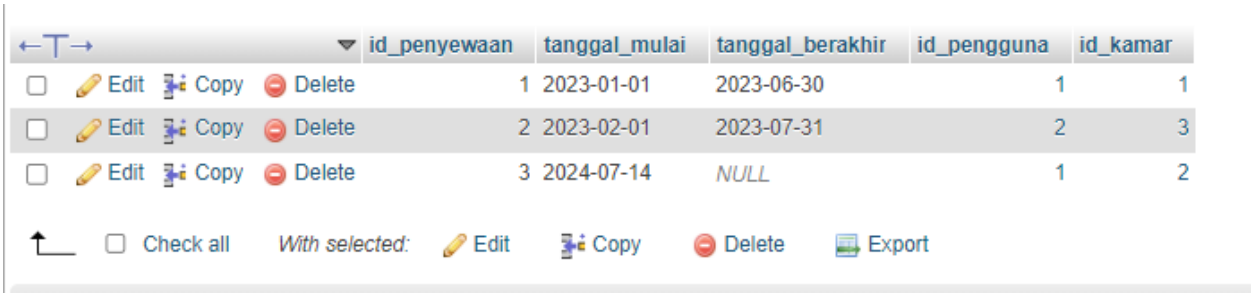
Penyewaan

```
CREATE TABLE Penyewaan (
    id_penyewaan INT AUTO_INCREMENT PRIMARY KEY,
    tanggal_mulai DATE,
```

```
    tanggal_berakhir DATE,
    id_pengguna INT,
    id_kamar INT,
    FOREIGN KEY (id_pengguna) REFERENCES Pengguna(id_pengguna),
    FOREIGN KEY (id_kamar) REFERENCES Kamar(id_kamar)
);
```



	id_penyewaan	tanggal_mulai	tanggal_berakhir	id_pengguna	id_kamar
Edit Copy Delete	1	2023-01-01	2023-06-30	1	1
Edit Copy Delete	2	2023-02-01	2023-07-31	2	3
Edit Copy Delete	3	2024-07-14	NULL	1	2

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Fasilitas

```
CREATE TABLE Fasilitas (
    id_fasilitas INT AUTO_INCREMENT PRIMARY KEY,
    nama_fasilitas VARCHAR(100)
);
```

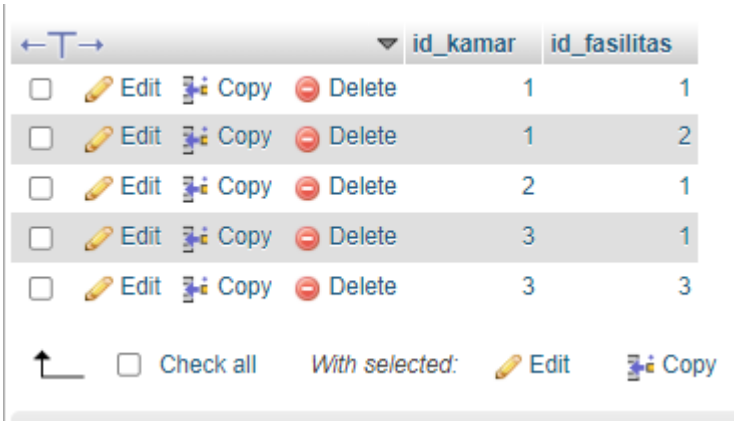
	id_fasilitas	nama_fasilitas
Edit Copy Delete	1	WiFi
Edit Copy Delete	2	AC
Edit Copy Delete	3	Kamar Mandi Dalam

Check all With selected: Edit Copy Delete Export

Kamar_Fasilitas

```
CREATE TABLE Kamar_Fasilitas (
    id_kamar INT,
```

```
    id_fasilitas INT,
    PRIMARY KEY (id_kamar, id_fasilitas),
    FOREIGN KEY (id_kamar) REFERENCES Kamar(id_kamar),
    FOREIGN KEY (id_fasilitas) REFERENCES
Fasilitas(id_fasilitas)
);
```



Transaksi

```
CREATE TABLE Transaksi (
    id_transaksi INT AUTO_INCREMENT PRIMARY KEY,
    tanggal_transaksi DATE,
    jumlah DECIMAL(10, 2),
    metode_pembayaran VARCHAR(50),
    id_penyewaan INT,
    FOREIGN KEY (id_penyewaan) REFERENCES
Penyewaan(id_penyewaan)
);
```

	id_transaksi	tanggal_transaksi	jumlah	metode_pembayaran	id_penyewaan
Edit Copy Delete	1	2023-01-01	1500000.00	Transfer	1
Edit Copy Delete	2	2023-02-01	2000000.00	Cash	2

1.3 Insert Data

Pengguna

```
INSERT INTO Pengguna (nama, email, password, no_telepon) VALUES
('Muhammad Ali', 'muhammadali@gmail.com', 'password123',
'081234567890'),
('Naufal Haidar', 'naufal@example.com', 'password123',
'082345678901'),
('Bayu Setya Adjie', 'bayu@example.com', 'password123',
'083456789012');
```

Detail Pengguna

```
INSERT INTO Detail_Pengguna (alamat, tanggal_lahir,
jenis_kelamin, id_pengguna) VALUES
('Jl. Merdeka No. 1', '1990-01-01', 'L', 1),
('Jl. Kebon Jeruk No. 2', '1992-02-02', 'L', 2),
('Jl. Sudirman No. 3', '1994-03-03', 'L', 3);
```

Kost

```
INSERT INTO Kost (nama_kost, alamat, pemilik_id) VALUES
('Kost Indah', 'Jl. Mawar No. 10', 1),
('Kost Mewah', 'Jl. Melati No. 20', 2);
```

Kamar

```
INSERT INTO Kamar (nomor_kamar, ukuran, harga, status, id_kost)
VALUES
```

```
('101', '3x4', 1500000, 'tersedia', 1),
('102', '3x4', 1500000, 'tersedia', 1),
('201', '3x4', 2000000, 'tidak tersedia', 2),
('202', '3x4', 2000000, 'tersedia', 2);
```

Penyewaan

```
INSERT INTO Penyewaan (tanggal_mulai, tanggal_berakhir,
id_pengguna, id_kamar) VALUES
('2023-01-01', '2023-06-30', 1, 1),
('2023-02-01', '2023-07-31', 2, 3);
```

Fasilitas

```
INSERT INTO Fasilitas (nama_fasilitas) VALUES
('WiFi'),
('AC'),
('Kamar Mandi Dalam');
```

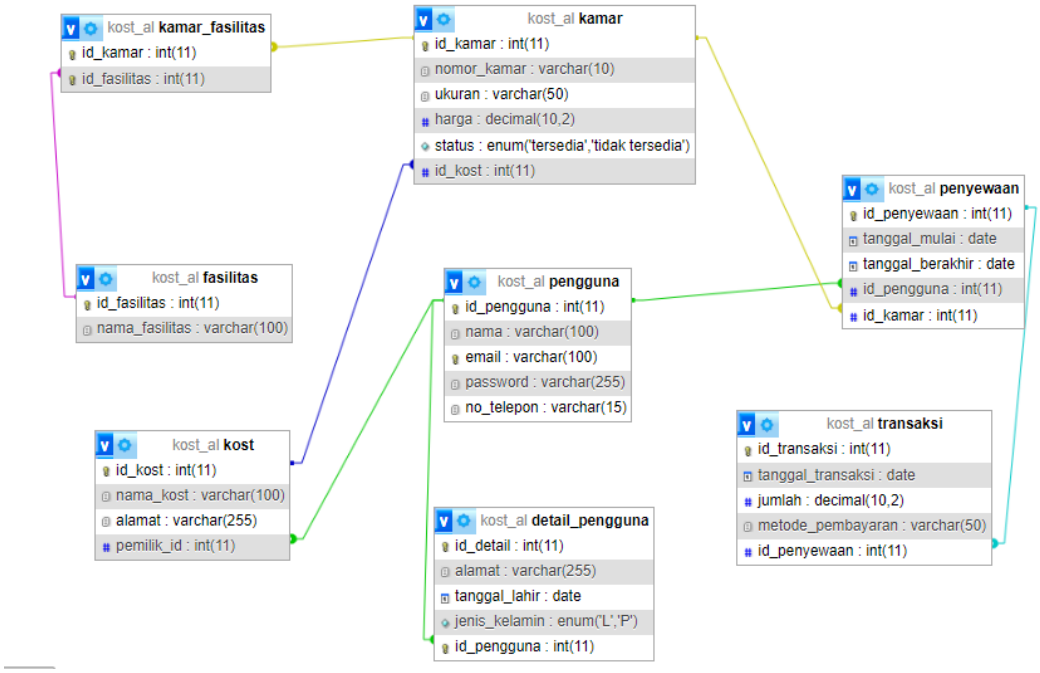
Kamar_Fasilitas

```
INSERT INTO Kamar_Fasilitas (id_kamar, id_fasilitas) VALUES
(1, 1),
(1, 2),
(2, 1),
(3, 1),
(3, 3);
```

Transaksi

```
INSERT INTO Transaksi (tanggal_transaksi, jumlah,
metode_pembayaran, id_penyewaan) VALUES
('2023-01-01', 1500000, 'Transfer', 1),
```

```
('2023-02-01', 2000000, 'Cash', 2);
```



Gambar Entity Relationship Diagram

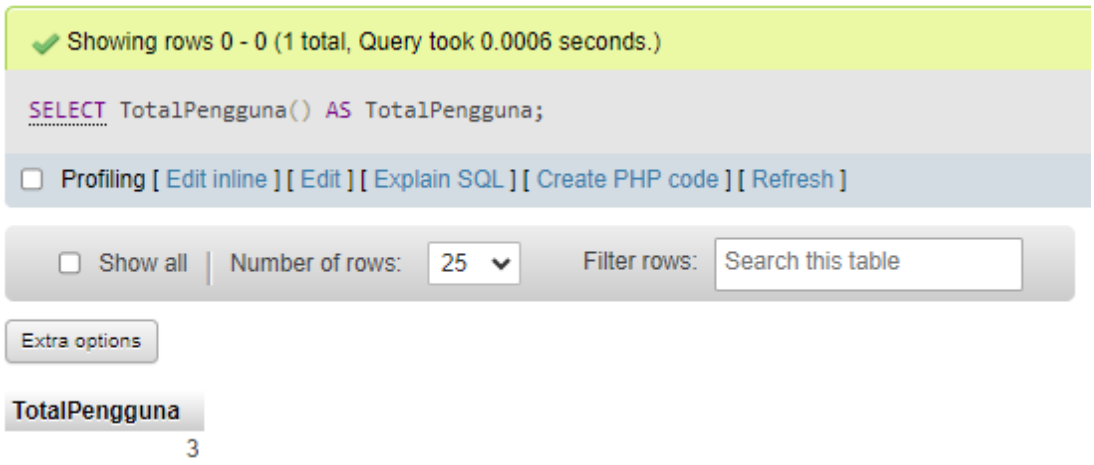
Implementasi Perintah-Perintah SQL

2.1 Function

Function dengan parameter kosong

```
CREATE FUNCTION TotalPengguna()
RETURNS INT
BEGIN
    DECLARE total INT;
    SELECT COUNT(*) INTO total FROM Pengguna;
    RETURN total;
END;
```

Hasil Eksekusi

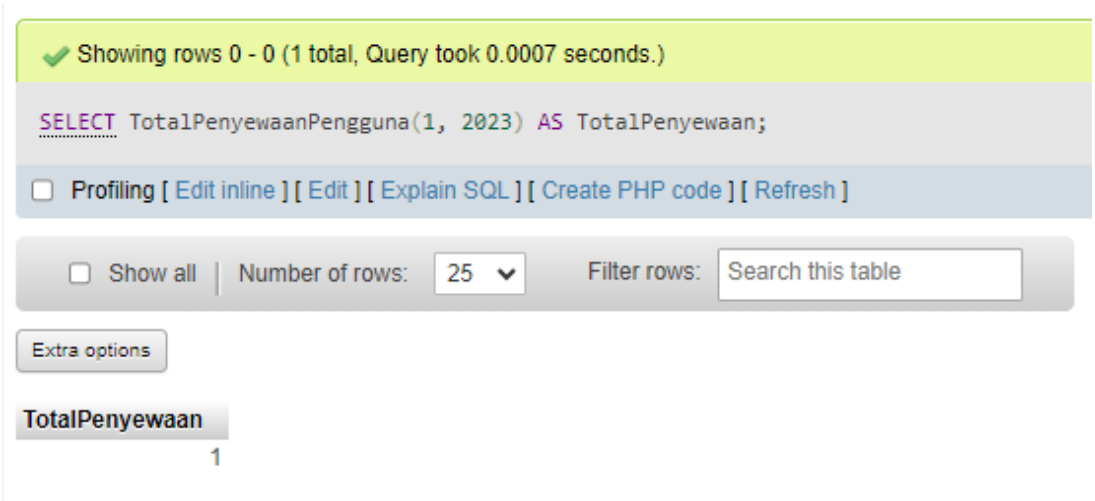


Function dengan dua parameter

```
CREATE FUNCTION TotalPenyewaanPengguna(id INT, tahun INT)
RETURNS INT
BEGIN
    DECLARE total INT;
    SELECT COUNT(*) INTO total
    FROM Penyewaan
    WHERE id_pengguna = id AND YEAR(tanggal_mulai) = tahun;
```

```
    RETURN total;
END;
```

Hasil Eksekusi



Daftrar Function

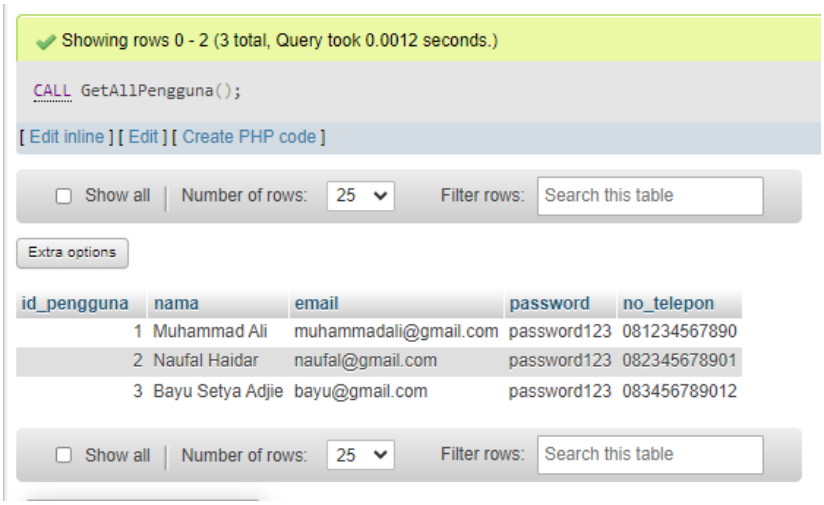
```
SHOW FUNCTION STATUS WHERE Db = 'kost_al';
```

2.2 Procedure

Procedure dengan parameter kosong

```
CREATE PROCEDURE GetAllPengguna()
BEGIN
    SELECT * FROM Pengguna;
END;
```

Hasil Eksekusi

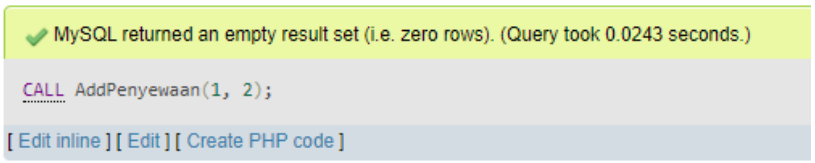


Function dengan dua parameter

```
CREATE PROCEDURE AddPenyewaan(id_pengguna INT, id_kamar INT)
BEGIN
    DECLARE kamar_status VARCHAR(20);
    SELECT status INTO kamar_status FROM Kamar WHERE id_kamar = id_kamar;

    IF kamar_status = 'tersedia' THEN
        INSERT INTO Penyewaan (tanggal_mulai, id_pengguna, id_kamar)
        VALUES (CURDATE(), id_pengguna, id_kamar);
        UPDATE Kamar SET status = 'tidak tersedia' WHERE id_kamar = id_kamar;
    ELSE
        SELECT 'Kamar tidak tersedia' AS pesan;
    END IF;
END;
```

Hasil Eksekusi



Daftrar Procedure

```
SHOW PROCEDURE STATUS WHERE Db = 'kost_al';
```

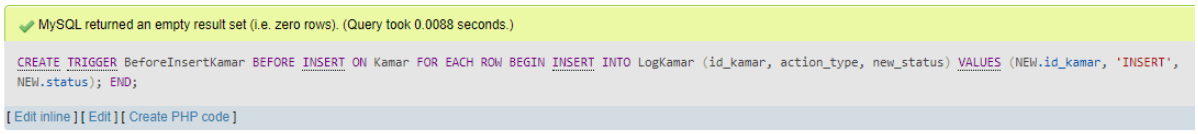
2.3 Trigger

Membuat Tabel Log

```
CREATE TABLE LogKamar (
    id_log INT AUTO_INCREMENT PRIMARY KEY,
    id_kamar INT,
    action_type VARCHAR(50),
    old_status VARCHAR(20),
    new_status VARCHAR(20),
    timestamp TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);
```

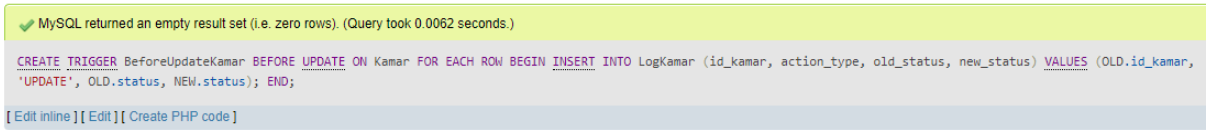
Trigger BEFORE INSERT

```
CREATE TRIGGER BeforeInsertKamar
BEFORE INSERT ON Kamar
FOR EACH ROW
BEGIN
    INSERT INTO LogKamar (id_kamar, action_type, new_status)
    VALUES (NEW.id_kamar, 'INSERT', NEW.status);
END;
```



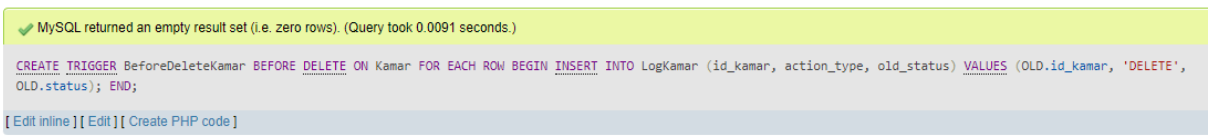
Trigger BEFORE UPDATE

```
CREATE TRIGGER BeforeUpdateKamar
BEFORE UPDATE ON Kamar
FOR EACH ROW
BEGIN
    INSERT INTO LogKamar (id_kamar, action_type, old_status, new_status)
    VALUES (OLD.id_kamar, 'UPDATE', OLD.status, NEW.status);
END;
```



Trigger BEFORE DELETE

```
CREATE TRIGGER BeforeDeleteKamar
BEFORE DELETE ON Kamar
FOR EACH ROW
BEGIN
    INSERT INTO LogKamar (id_kamar, action_type, old_status)
    VALUES (OLD.id_kamar, 'DELETE', OLD.status);
END;
```

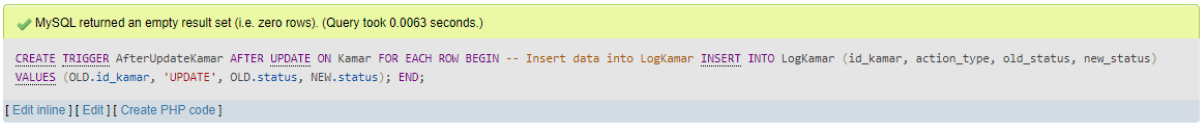


Trigger AFTER INSERT

```
CREATE TRIGGER AfterInsertKamar
AFTER INSERT ON Kamar
FOR EACH ROW
BEGIN
    INSERT INTO LogKamar (id_kamar, action_type, new_status)
    VALUES (NEW.id_kamar, 'INSERT', NEW.status);
END;
```

Trigger AFTER UPDATE

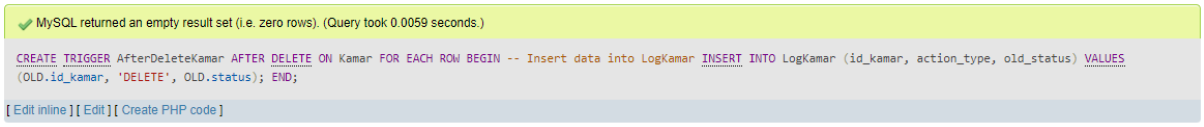
```
CREATE TRIGGER AfterUpdateKamar
AFTER UPDATE ON Kamar
FOR EACH ROW
BEGIN
    INSERT INTO LogKamar (id_kamar, action_type, old_status,
new_status)
    VALUES (OLD.id_kamar, 'UPDATE', OLD.status, NEW.status);
END;
```



Trigger AFTER DELETE

```
CREATE TRIGGER AfterDeleteKamar
```

```
AFTER DELETE ON Kamar
FOR EACH ROW
BEGIN
    -- Insert data into LogKamar
    INSERT INTO LogKamar (id_kamar, action_type, old_status)
    VALUES (OLD.id_kamar, 'DELETE', OLD.status);
END;
```



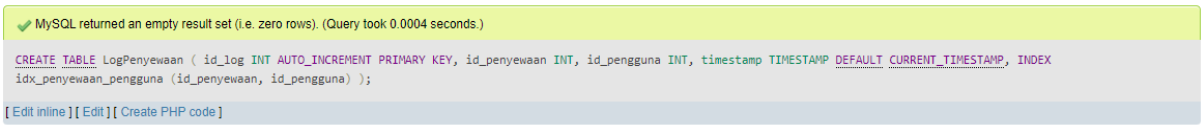
Daftar TRIGGER

```
SHOW TRIGGERS WHERE `Table` = 'Kamar';
```

2.4 Idex

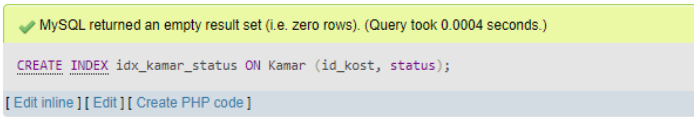
Membuat index saat membuat tabel baru

```
CREATE TABLE LogPenyewaan (
    id_log INT AUTO_INCREMENT PRIMARY KEY,
    id_penyewaan INT,
    id_pengguna INT,
    timestamp TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    INDEX idx_penyewaan_pengguna (id_penyewaan, id_pengguna)
);
```



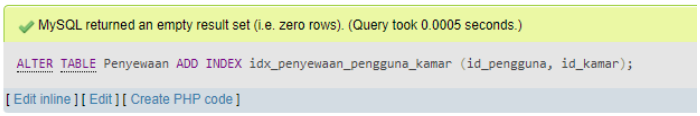
Membuat index dengan CREATE INDEX

```
CREATE INDEX idx_kamar_status ON Kamar (id_kost, status);
```



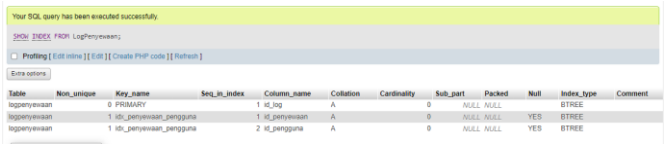
Membuat index dengan ALTER TABLE

```
ALTER TABLE Penyewaan
ADD INDEX idx_penyewaan_pengguna_kamar (id_pengguna, id_kamar);
```



Dafter Index

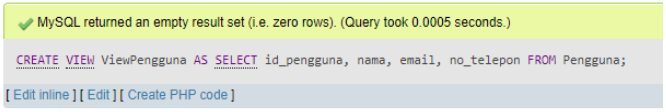
```
SHOW INDEX FROM LogPenyewaan;
SHOW INDEX FROM Kamar;
SHOW INDEX FROM Penyewaan;
```



2.5 View

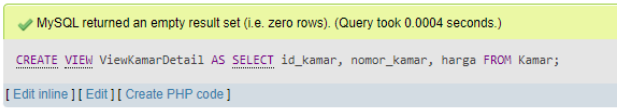
Horizontal View

```
CREATE VIEW ViewPengguna AS
SELECT id_pengguna, nama, email, no_telepon FROM Pengguna;
```



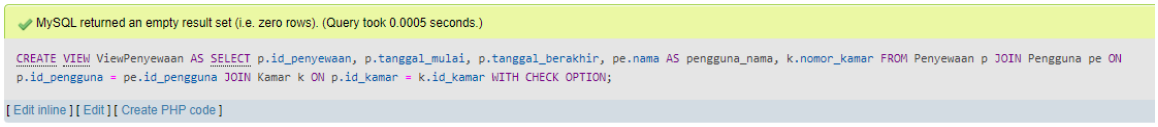
Vertikal View

```
CREATE VIEW ViewKamarDetail AS
SELECT id_kamar, nomor_kamar, harga FROM Kamar;
```



View inside View

```
CREATE VIEW ViewPenyewaan AS
SELECT p.id_penyewaan, p.tanggal_mulai, p.tanggal_berakhir,
pe.nama AS pengguna_nama, k.nomor_kamar
FROM Penyewaan p
JOIN Pengguna pe ON p.id_pengguna = pe.id_pengguna
JOIN Kamar k ON p.id_kamar = k.id_kamar
WITH CHECK OPTION;
```

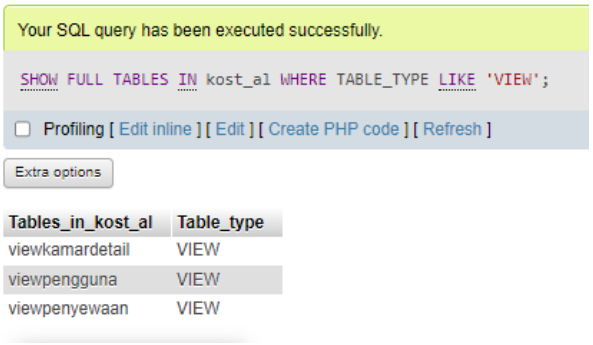


Eksekusi Perintah untuk Melakukan Update dan Insert Menggunakan View

```
INSERT INTO ViewPenyewaan (id_pengguna, id_kamar,
tanggal_mulai) VALUES (1, 2, '2023-07-01');
UPDATE ViewPenyewaan SET tanggal_berakhir = '2023-12-31' WHERE
id_penyewaan = 1;
```

Daftar View

```
SHOW FULL TABLES IN kost_al WHERE TABLE_TYPE LIKE 'VIEW';
```



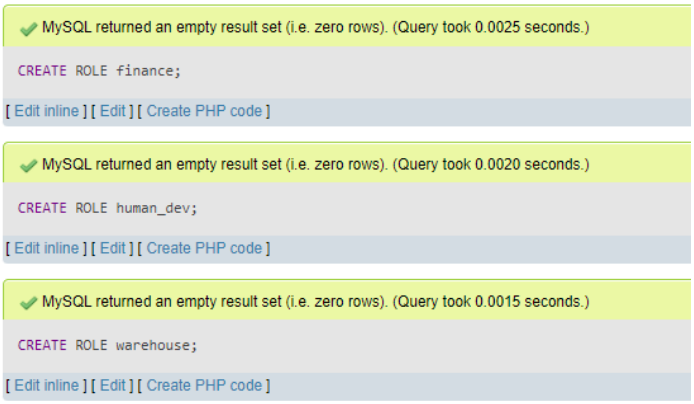
2.6 Database Security

Membuat User Baru

```
CREATE USER 'user1'@'localhost' IDENTIFIED BY 'password1';
CREATE USER 'user2'@'localhost' IDENTIFIED BY 'password2';
CREATE USER 'user3'@'localhost' IDENTIFIED BY 'password3';
```

Membuat Role Baru

```
CREATE ROLE finance;
CREATE ROLE human_dev;
CREATE ROLE warehouse;
```



Memberikan Privilege kepada User dan Role

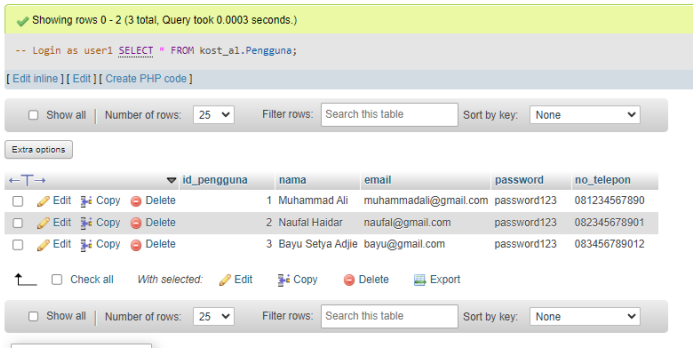
```
GRANT SELECT ON kost_al.Pengguna TO 'user1'@'localhost';
GRANT SELECT ON kost_al.ViewPengguna TO 'user2'@'localhost';
GRANT EXECUTE ON PROCEDURE kost_al.AddPenyewaan TO finance;
```

Eksekusi untuk Membuktikan Privilege

```
-- Login as user1
SELECT * FROM kost_al.Pengguna;


-- Login as user2
SELECT * FROM kost_al.ViewPengguna;
```

```
-- Login as a user with the finance role
CALL kost_al.AddPenyewaan(1, 2);
```



Daftar User dan Privilege

```
SELECT User, Host FROM mysql.user;
SHOW GRANTS FOR 'user1'@'localhost';
SHOW GRANTS FOR 'user2'@'localhost';
SHOW GRANTS FOR 'finance';
```