Nama: Muhammad Fadhel

Nim: 123140106

Matkul: Sistem Informasi Geografis

Pertemuan 3

1. **Transform data ke EPSG:32748 (UTM Zone 48S)**

   Sql:

```sql
-- Transform fasilitas_publik ke UTM 48S
SELECT
  nama,
  ST_AsText(geom) as koordinat_wgs84,
  ST_AsText(ST_Transform(geom, 32748)) as koordinat_utm48s
FROM fasilitas_publik;
```

   Data Output:

	nama character varying (100)	koordinat_wgs84 text	koordinat_utm48s text
1	RS Abdul Moeloek	POINT(105.2618 -5.4294)	POINT(529002.0557256801 9399863.892506367)
2	SMAN 1 Bandar Lampung	POINT(105.2574 -5.4198)	POINT(528515.0736398131 9400925.295735663)
3	Pasar Tugu	POINT(105.2687 -5.4512)	POINT(529765.3678258538 9397453.758967325)

2. **Hitung jarak 3 cara**
   - Cara 1: Tanpa konversi

   sql:

```sql
-- CARA 1: Tanpa konversi (hasil dalam derajat - SALAH)
SELECT
  a.nama as dari,
  b.nama as ke,
  ST_Distance(a.geom, b.geom) as jarak_derajat
FROM fasilitas_publik a, fasilitas_publik b
WHERE a.nama != b.nama
LIMIT 5;
```

Data Output:

Data Output | Messages | Notifications

	dari character varying (100)	ke character varying (100)	jarak_derajat double precision
1	RS Abdul Moeloek	SMAN 1 Bandar Lampung	0.010560303025950842
2	RS Abdul Moeloek	Pasar Tugu	0.022865913495857
3	SMAN 1 Bandar Lampung	RS Abdul Moeloek	0.010560303025950842
4	SMAN 1 Bandar Lampung	Pasar Tugu	0.033371394936379035
5	Pasar Tugu	RS Abdul Moeloek	0.022865913495857

- Cara 2 Menggunakan geography

Sql:

Query | Query History

```sql
-- CARA 2: Menggunakan geography (hasil dalam meter)
SELECT
  a.nama as dari,
  b.nama as ke,
  ST_Distance(
    a.geom::geography,
    b.geom::geography
  ) as jarak_meter_geography
FROM fasilitas_publik a, fasilitas_publik b
WHERE a.nama != b.nama
LIMIT 5;
```

Data Output:

Data Output | Messages | Notifications

	dari character varying (100)	ke character varying (100)	jarak_meter_geography double precision
1	RS Abdul Moeloek	SMAN 1 Bandar Lampung	1168.24314723
2	RS Abdul Moeloek	Pasar Tugu	2529.1042775
3	SMAN 1 Bandar Lampung	RS Abdul Moeloek	1168.24314723
4	SMAN 1 Bandar Lampung	Pasar Tugu	3691.2619654
5	Pasar Tugu	RS Abdul Moeloek	2529.1042775

- Cara 3: Transform ke UTM dulu

Sql:

Query | Query History

```sql
-- CARA 3: Transform ke UTM dulu (hasil dalam meter)
SELECT
  a.nama as dari,
  b.nama as ke,
  ST_Distance(
    ST_Transform(a.geom, 32748),
    ST_Transform(b.geom, 32748)
  ) as jarak_meter_utm
FROM fasilitas_publik a, fasilitas_publik b
WHERE a.nama != b.nama
LIMIT 5;
```

Data Output:

Data Output | Messages | Notifications

	dari character varying (100)	ke character varying (100)	jarak_meter_utm double precision
1	RS Abdul Moeloek	SMAN 1 Bandar Lampung	1167.7878091142081
2	RS Abdul Moeloek	Pasar Tugu	2528.119664549973
3	SMAN 1 Bandar Lampung	RS Abdul Moeloek	1167.7878091142081
4	SMAN 1 Bandar Lampung	Pasar Tugu	3689.824262152288
5	Pasar Tugu	RS Abdul Moeloek	2528.119664549973

3. Hitung luas wilayah dengan UTM

Sql:

Query | Query History

```
1  SELECT
2    nama,
3    ST_Area(ST_Transform(geom, 32748)) as luas_m2,
4    ST_Area(ST_Transform(geom, 32748)) / 10000 as luas_ha,
5    ST_Area(ST_Transform(geom, 32748)) / 1000000 as luas_km2
6  FROM wilayah;
```

Data Output:

Data Output | Messages | Notifications

	nama character varying (100)	luas_m2 double precision	luas_ha double precision	luas_km2 double precision
1	Kecamatan Sukarame	12940277.740606293	1294.0277740606293	12.940277740606293
2	Sabah Balau	7298195.421065092	729.8195421065092	7.298195421065092

4. Tabel perbandingan 3 cara sekaligus

Sql:

Query | Query History

```sql
SELECT
  a.nama as dari,
  b.nama as ke,
  -- Cara 1: tanpa konversi
  ST_Distance(a.geom, b.geom) as jarak_derajat,
  -- Cara 2: geography
  ST_Distance(
    a.geom::geography,
    b.geom::geography
  ) as jarak_geography_m,
  -- Cara 3: UTM
  ST_Distance(
    ST_Transform(a.geom, 32748),
    ST_Transform(b.geom, 32748)
  ) as jarak_utm_m,
  -- Selisih cara 2 dan 3
  ABS(
    ST_Distance(a.geom::geography, b.geom::geography) -
    ST_Distance(ST_Transform(a.geom, 32748), ST_Transform(b.geom, 32748))
  ) as selisih_m
FROM fasilitas_publik a, fasilitas_publik b
WHERE a.nama != b.nama
LIMIT 10;
```

Data Output:

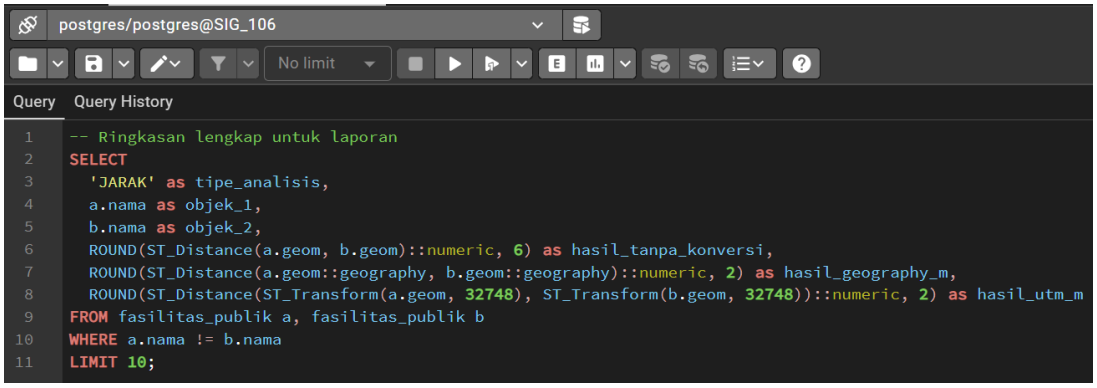
Data Output | Messages | Notifications

SQL | Showing rows: 1 to 6

	dari character varying (100)	ke character varying (100)	jarak_derajat double precision	jarak_geography_m double precision	jarak_utm_m double precision	selisih_m double precision
1	RS Abdul Moeloek	SMAN 1 Bandar Lampung	0.010560303025950842	1168.24314723	1167.7878091142081	0.4553381157918466
2	RS Abdul Moeloek	Pasar Tugu	0.022865913495857	2529.1042775	2528.119664549973	0.9846129500269853
3	SMAN 1 Bandar Lampung	RS Abdul Moeloek	0.010560303025950842	1168.24314723	1167.7878091142081	0.4553381157918466
4	SMAN 1 Bandar Lampung	Pasar Tugu	0.033371394936379035	3691.2619654	3689.824262152288	1.4377032477118519
5	Pasar Tugu	RS Abdul Moeloek	0.022865913495857	2529.1042775	2528.119664549973	0.9846129500269853
6	Pasar Tugu	SMAN 1 Bandar Lampung	0.033371394936379035	3691.2619654	3689.824262152288	1.4377032477118519

5. Tampilkan semua hasil dalam 1 laporan

Sql:



Data Output:

Data Output | Messages | Notifications

SQL

Showing

	tipe_analisis text	objek_1 character varying (100)	objek_2 character varying (100)	hasil_tanpa_konversi numeric	hasil_geography_m numeric	hasil_utm_m numeric
1	JARAK	RS Abdul Moeloek	SMAN 1 Bandar Lampung	0.010560	1168.24	1167.79
2	JARAK	RS Abdul Moeloek	Pasar Tugu	0.022866	2529.10	2528.12
3	JARAK	SMAN 1 Bandar Lampung	RS Abdul Moeloek	0.010560	1168.24	1167.79
4	JARAK	SMAN 1 Bandar Lampung	Pasar Tugu	0.033371	3691.26	3689.82
5	JARAK	Pasar Tugu	RS Abdul Moeloek	0.022866	2529.10	2528.12
6	JARAK	Pasar Tugu	SMAN 1 Bandar Lampung	0.033371	3691.26	3689.82