

Sprawozdanie - Zaawansowane technologie bazodanowe

Laboratorium 1 - 11.10.2019

PostGIS i dane geograficzne

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Zadanie 1

-- Zadanie 1.1

```
CREATE TABLE miasta (  
    id SERIAL PRIMARY KEY,  
    nazwa VARCHAR(64),  
    location geometry(POINT,4326)  
);
```

-- Zadanie 1.2

```
INSERT INTO miasta (nazwa, location) VALUES ('Krakow', ST_GeomFromText('POINT(19.938333 50.061389)', 4326));  
INSERT INTO miasta (nazwa, location) VALUES ('Warszawa', ST_GeomFromText('POINT(21.008333 52.232222)', 4326));
```

-- zadanie 1.3

```
SELECT ST_DISTANCE(  
    krakow.location, warszawa.location  
    ) as degDistance  
FROM miasta krakow, miasta warszawa  
WHERE krakow.nazwa = 'Krakow' AND warszawa.nazwa = 'Warszawa';
```

```
wrobdom1=> \i zad1_3.sql  
degdistance  
-----  
2.42020989046178  
(1 row)
```

```
-- zadanie 1.4

SELECT ST_Distance(
    ST_Transform(
        krakow.location, 2178
    ),
    ST_Transform(
        warszawa.location, 2178
    )
) as meterDistance
FROM miasta krakow, miasta warszawa
WHERE krakow.nazwa = 'Krakow' AND warszawa.nazwa = 'Warszawa';
```

```
wrobdom1=> \i zad1_4.sql
meterdistance
-----
252826.599011547
(1 row)
```

Zadanie 2

```
-- Zadanie 2.1
```

```
CREATE TABLE geomiasta (
    id SERIAL PRIMARY KEY,
    nazwa VARCHAR(64),
    location geography(POINT,4326)
);
```

```
-- Zadanie 2.2
```

```
INSERT INTO geomiasta (nazwa, location) VALUES ('Krakow', ST_GeomFromText('POINT(19.938333 50.061389)', 4326) );
INSERT INTO geomiasta (nazwa, location) VALUES ('Warszawa', ST_GeomFromText('POINT(21.008333 52.232222)', 4326) );
```

```
-- zadanie 2.3
```

```
SELECT ST_DISTANCE(
    krakow.location, warszawa.location
) as metdistance
FROM geomiasta krakow, geomiasta warszawa
WHERE krakow.nazwa = 'Krakow' AND warszawa.nazwa = 'Warszawa';
```

Dla typu Geometry:

```
wrobdom1=> \i zad1_4.sql
meterdistance
-----
252826.599011547
(1 row)
```

Dla typu Geography:

```
wrobdom1=> \i zad2_3.sql
metdistance
-----
252840.13360491
(1 row)
```

Zadanie 3

Zamiana plików .shp na pliki .sql:

```
wrobdom1@charon:~/ZTBrepo/ZTB/lab1/krakow$ shp2pgsql -s 3785 admin.shp public.ad
min -> admin.sql
```

```
wrobdom1@charon:~/ZTBrepo/ZTB/lab1/krakow$ shp2pgsql -s 3785 amenities.shp publ
c.amenities -> amenities.sql
```

```
wrobdom1@charon:~/ZTBrepo/ZTB/lab1/krakow$ shp2pgsql -s 3785 roads.shp public.ro
ads -> roads.sql
```

Tworzenie baz danych z wygenerowanych plików .sql:

```
wrobdom1@charon:~/ZTBrepo/ZTB/lab1/krakow$ psql -f admin.sql
```

```
wrobdom1@charon:~/ZTBrepo/ZTB/lab1/krakow$ psql -f amenities.sql
```

```
wrobdom1@charon:~/ZTBrepo/ZTB/lab1/krakow$ psql -f roads.sql
```

Dodanie kolumny do utworzonych baz danych:

```
ALTER TABLE admin ADD geo geography(MULTIPOLYGON, 4326);
ALTER TABLE amenities ADD geo geography(POINT, 4326);
ALTER TABLE roads ADD geo geography(MULTILINESTRING, 4326);
```

Przepisanie danych z kolumny z typem Geometry do nowo utworzonej kolumny z typem Geography:

```
UPDATE admin SET geo=ST_TRANSFORM(geom, 4326);
UPDATE amenities SET geo=ST_TRANSFORM(geom, 4326);
UPDATE roads SET geo=ST_TRANSFORM(geom, 4326);
```

```
wrobdom1=> \i zad3_3.sql
UPDATE 1
UPDATE 421
UPDATE 37318
```

Zadanie 4

Wikipedia:

2013	326,85 km²
------	------------

Baza danych:

```
wrobdom1=> SELECT ST_Area(ST_Transform(krakow.geom, 2180)) FROM admin krakow;
          st_area
-----
326399267.424197
(1 row)

wrobdom1=> SELECT ST_Area(krakow.geo) FROM admin krakow;
          st_area
-----
326816324.798849
(1 row)
```

Zadanie 5

```
wrobdom1=> SELECT SUM(ST_LENGTH(r.geom)) FROM roads r, admin a WHERE ST_Covers(a
          .geom, r.geom);
          sum
-----
6675812.12702389
(1 row)

wrobdom1=> SELECT SUM(ST_LENGTH(r.geo)) FROM roads r WHERE class='motorways';
          sum
-----
141987.110175961
(1 row)
```

Zadanie 6

```
wrobdom1=> SELECT TYPE, count(*)
FROM amenities
WHERE ST_DISTANCE(
  ST_TRANSFORM( ST_GeomFromText('POINT(19.945901 50.065920)', 4326), 2180),
  ST_TRANSFORM(amenities.geom, 2180)
) <= 2000
GROUP BY TYPE ORDER BY count desc;
   type  | count
-----+-----
school   |    23
university |     8
fuel     |     7
library  |     5
police   |     3
townhall |     2
hospital |     1
(7 rows)
```

Zadanie 7

```
wrobdom1=> SELECT r.name, SUM(ST_LENGTH(r.geom))
wrobdom1-> FROM roads r, admin a
wrobdom1-> WHERE r.name IS NOT NULL AND class != 'railways' AND ST_CONTAINS(a.g
eom, r.geom)
wrobdom1-> GROUP BY r.name ORDER BY 2 DESC LIMIT 10;
```

name	sum
Wielicka	23089.9049583034
Aleja Jana Pawła II	19272.3060469718
Igołomska	18895.8596010858
Zakopiańska	17310.8305005971
Księcia Józefa	16337.4671103219
Aleja Pokoju	14993.6576338457
Tyniecka	14061.0347760473
Nowohucka	12940.7754792948
Henryka Kamieńskiego	11564.6830311515
Armii Krajowej	11266.5063153468

(10 rows)

Zadanie 8

```
wrobdom1=> \o out2.geojson
wrobdom1=> select ST_AsGeoJSON(ST_Buffer(a.geo, 3000)) from admin a;
```

