

1. ALFIN F233500299
2. ABDULAH FAQIH F233500300
3. Dessy Maryanti F233500326
4. Rizki Seftajanuar F233500310

```
# Import pandas library and give it alias 'pd'
import pandas as pd
```

```
# Membuat DataFrame sederhana
data = pd.DataFrame({
    'Nama': ['Dessy', 'Maryanti', 'Cici'],
    'Umur': [17, 18, 19]
})
# Menampilkan DataFrame
print(data)
```

```
↕
```

	Nama	Umur
0	Dessy	17
1	Maryanti	18
2	Cici	19

data

```
↕
```

	Nama	Umur
0	Dessy	17
1	Maryanti	18
2	Cici	19

Langkah berikutnya: [Buat kode dengan data](#) [Lihat plot yang direkomendasikan](#) [New interactive sheet](#)

```
print(data.describe())
```

```
↕
```

	Umur
count	3.0
mean	18.0
std	1.0
min	17.0
25%	17.5
50%	18.0
75%	18.5
max	19.0

Klik dua kali (atau tekan Enter) untuk mengedit

```
pddk_JAKTAR = pd.read_csv('/content/drive/MyDrive/Bahasa Pemograman/uas/kecamatan_jaktara - Sheet1.csv')
pddk_JAKTAR.head(6)
```

```
↕
```

	Kecamatan	2020	2023
0	Penjaringan	321802	314543
1	Pademangan	169582	163995
2	Tanjung Priok	419795	403467
3	Koja	348817	337685
4	Kelapa Gading	144219	137530
5	Cilincing	440247	436330

Langkah berikutnya: [Buat kode dengan pddk_JAKTAR](#) [Lihat plot yang direkomendasikan](#) [New interactive sheet](#)

```
pddk_JAKTAR['perubahan penduduk'] = pddk_JAKTAR['2023'] - pddk_JAKTAR['2020']
pddk_JAKTAR
```

	Kecamatan	2020	2023	perubahan penduduk	
0	Penjaringan	321802	314543	-7259	
1	Pademangan	169582	163995	-5587	
2	Tanjung Priok	419795	403467	-16328	
3	Koja	348817	337685	-11132	
4	Kelapa Gading	144219	137530	-6689	
5	Cilincing	440247	436330	-3917	

Langkah berikutnya:

[Buat kode dengan pddk_JAKTAR](#)[Lihat plot yang direkomendasikan](#)[New interactive sheet](#)

```
import geopandas as gpd # Make sure to import the necessary library
```

```
JAKTAR_gpd = gpd.read_file('/content/drive/MyDrive/Bahasa Pemograman/uas/jaktara.shp')
```

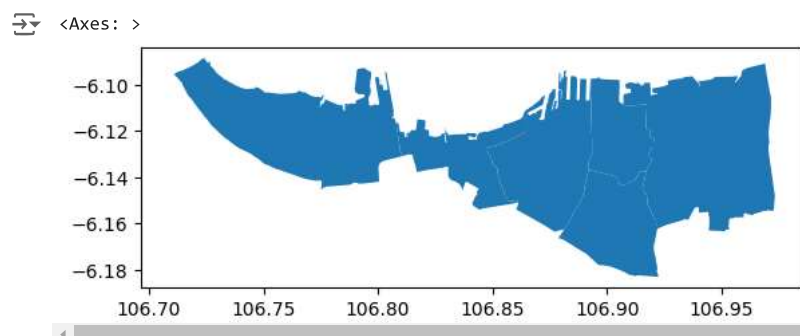
```
JAKTAR_gpd.head(10)
```

	NAMOBJ	REMARK	LCODE	WADMKK	WADMPR	SHAPE_Leng	SHAPE_Area	geometry	
0	Cilincing	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.332229	0.003377	POLYGON Z ((106.92199 -6.16226 0, 106.92199 -6...	
1	Kelapa Gading	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.161562	0.001323	POLYGON Z ((106.91695 -6.13768 0, 106.91689 -6...	
2	Koja	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.152777	0.000922	POLYGON Z ((106.90729 -6.10771 0, 106.90695 -6...	
3	Pademangan	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.291881	0.001005	POLYGON Z ((106.86526 -6.11217 0, 106.86493 -6...	

Langkah berikutnya:

[Buat kode dengan JAKTAR_gpd](#)[Lihat plot yang direkomendasikan](#)[New interactive sheet](#)

```
JAKTAR_gpd.plot()
```



```
JAKTAR_gpd['NAMOBJ'] = JAKTAR_gpd['NAMOBJ'].str.replace('Kecamatan ', '')
```

```
JAKTAR_gpd
```

	NAMOBJ	REMARK	LCODE	WADMKK	WADMPR	SHAPE_Leng	SHAPE_Area	geometry	
0	Cilincing	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.332229	0.003377	POLYGON Z ((106.92199 -6.16226 0, 106.92199 -6...	
1	Kelapa Gading	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.161562	0.001323	POLYGON Z ((106.91695 -6.13768 0, 106.91689 -6...	
2	Koja	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.152777	0.000922	POLYGON Z ((106.90729 -6.10771 0, 106.90695 -6...	
3	Pademangan	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.291881	0.001005	POLYGON Z ((106.86526 -6.11217 0, 106.86493 -6...	

Langkah berikutnya:

[Buat kode dengan JAKTAR_gpd](#)[Lihat plot yang direkomendasikan](#)[New interactive sheet](#)

```
JAKTAR_gpd.rename(columns={'NAMOBJ': 'Kecamatan'}, inplace=True)
```

```
JAKTAR_gpd
```

	Kecamatan	REMARK	LCODE	WADMKK	WADMPR	SHAPE_Leng	SHAPE_Area	geometry
0	Cilincing	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.332229	0.003377	POLYGON Z (((106.92199 -6.16226 0, 106.92199 -6...
1	Kelapa Gading	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.161562	0.001323	POLYGON Z (((106.91695 -6.13768 0, 106.91689 -6...
2	Koja	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.152777	0.000922	POLYGON Z (((106.90729 -6.10771 0, 106.90695 -6...
3	Pademangan	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.291881	0.001005	POLYGON Z (((106.86526 -6.11217 0, 106.86493 -6...

Langkah berikutnya:

[Buat kode dengan JAKTAR_gpd](#)[Lihat plot yang direkomendasikan](#)[New interactive sheet](#)

JAKTAR_gpd

	Kecamatan	REMARK	LCODE	WADMKK	WADMPR	SHAPE_Leng	SHAPE_Area	geometry
0	Cilincing	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.332229	0.003377	POLYGON Z (((106.92199 -6.16226 0, 106.92199 -6...
1	Kelapa Gading	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.161562	0.001323	POLYGON Z (((106.91695 -6.13768 0, 106.91689 -6...
2	Koja	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.152777	0.000922	POLYGON Z (((106.90729 -6.10771 0, 106.90695 -6...
3	Pademangan	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.291881	0.001005	POLYGON Z (((106.86526 -6.11217 0, 106.86493 -6...

Langkah berikutnya:

[Buat kode dengan JAKTAR_gpd](#)[Lihat plot yang direkomendasikan](#)[New interactive sheet](#)

```
JAKTARmg_gpd = JAKTAR_gpd.merge(pddk_JAKTAR, on='Kecamatan')
JAKTARmg_gpd
```

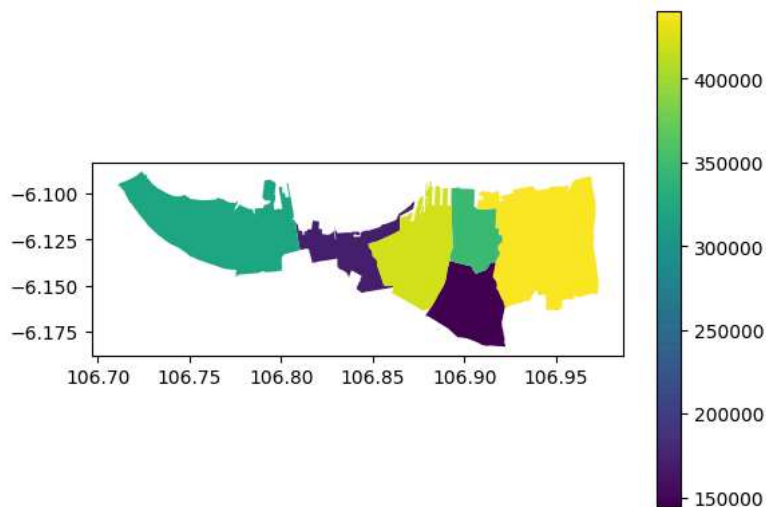
	Kecamatan	REMARK	LCODE	WADMKK	WADMPR	SHAPE_Leng	SHAPE_Area	geometry	2020	2023	perubahan penduduk
0	Cilincing	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.332229	0.003377	POLYGON Z (((106.92199 -6.16226 0, 106.92199 -6...	440247	436330	-3917
1	Kelapa Gading	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.161562	0.001323	POLYGON Z (((106.91695 -6.13768 0, 106.91689 -6...	144219	137530	-6689

Langkah berikutnya:

[Buat kode dengan JAKTARmg_gpd](#)[Lihat plot yang direkomendasikan](#)[New interactive sheet](#)

```
JAKTARmg_gpd.plot(column='2020', legend=True)
```

<Axes: >




```
import matplotlib.pyplot as plt
```

```
# Create plot
fig, ax = plt.subplots(1, 1, figsize=(10, 10))
```

```

fig, ax = plt.subplots(1, 1, figsize=(10, 10))
JAKTARmg_gpd.plot(column='perubahan penduduk', ax=ax, cmap='cool', legend=True, legend_kwds={'label': "Perubahan Jumlah Penduduk (Jiwa)"}
# Add title
ax.set_title('Peta Perubahan Jumlah Penduduk Jakart Utara Tahun 2020-2023', fontsize=15)
# Add axis labels
ax.set_xlabel('Longitude', fontsize=12)
ax.set_ylabel('Latitude', fontsize=12)
# Add kecamatan labels
for x, y, label in zip(JAKTARmg_gpd.geometry.centroid.x, JAKTARmg_gpd.geometry.centroid.y, JAKTARmg_gpd['Kecamatan']):
    ax.text(x, y, label, fontsize=8, ha='center', va='center')
plt.savefig('Peta Jml Pddk SMD 2021', dpi=600, bbox_inches='tight')
# Show plot
plt.show()

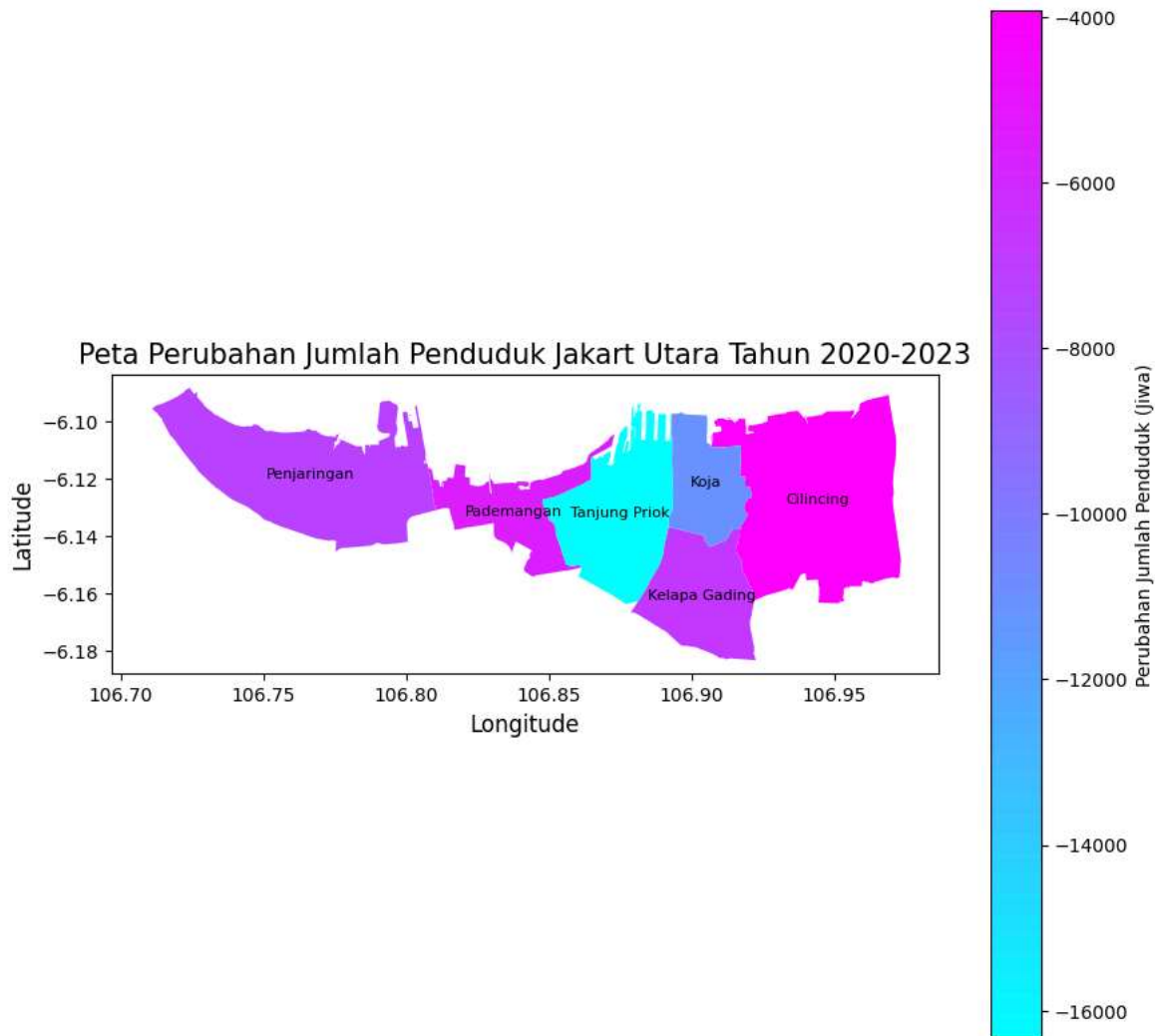
```

 <ipython-input-14-953531033006>:10: UserWarning: Geometry is in a geographic CRS. Results from 'centroid' are likely incorrect. Use

```

for x, y, label in zip(JAKTARmg_gpd.geometry.centroid.x, JAKTARmg_gpd.geometry.centroid.y, JAKTARmg_gpd['Kecamatan']):

```



```


# Cek Sistem Koordinat

```

```

JAKTARmg_gpd.crs

```

 <Geographic 2D CRS: EPSG:4326>
 Name: WGS 84
 Axis Info [ellipsoidal]:
 - Lat[north]: Geodetic latitude (degree)
 - Lon[east]: Geodetic longitude (degree)
 Area of Use:
 - name: World.
 - bounds: (-180.0, -90.0, 180.0, 90.0)
 Datum: World Geodetic System 1984 ensemble
 - Ellipsoid: WGS 84
 - Prime Meridian: Greenwich

```

# Ubah Sistem Koordinat

```

```

JAKTAR_utm = JAKTARmg_gpd.to_crs(epsg=32750)

```

```


# Cek Sistem Koordinat

```

```

JAKTAR_utm.crs

```

 <Projected CRS: EPSG:32750>
 Name: WGS 84 / UTM zone 50S

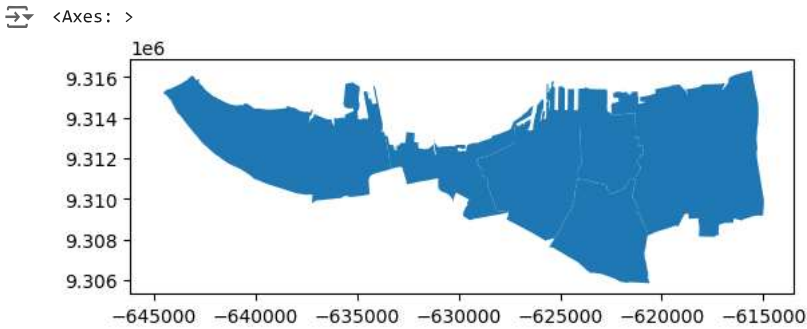
Axis Info [cartesian]:
- E[east]: Easting (metre)
- N[north]: Northing (metre)
Area of Use:
- name: Between 114°E and 120°E, southern hemisphere between 80°S and equator, onshore and offshore. Australia. Indonesia.
- bounds: (114.0, -80.0, 120.0, 0.0)
Coordinate Operation:
- name: UTM zone 50S
- method: Transverse Mercator
Datum: World Geodetic System 1984 ensemble
- Ellipsoid: WGS 84
- Prime Meridian: Greenwich

JAKTAR_utm

	Kecamatan	REMARK	LCODE	WADMKK	WADMPR	SHAPE_Leng	SHAPE_Area	geometry	2020	2023	perubahan penduduk	
0	Cilincing	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.332229	0.003377	POLYGON Z ((-620691.239 9308195.384 0, -620691...	440247	436330	-3917	
1	Kelapa Gading	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.161562	0.001323	POLYGON Z ((-621309.453 9310943.752 0, -621316...	144219	137530	-6689	

Langkah berikutnya: [Buat kode dengan JAKTAR_utm](#) [Lihat plot yang direkomendasikan](#) [New interactive sheet](#)

```
# Cek Plot Peta
JAKTAR_utm.plot()
```



```
# Hitung Luas
JAKTAR_utm['Luas_Ha'] = JAKTAR_utm.area / 10000
JAKTAR_utm
```

	Kecamatan	REMARK	LCODE	WADMKK	WADMPR	SHAPE_Leng	SHAPE_Area	geometry	2020	2023	perubahan penduduk	Luas_Ha	
0	Cilincing	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.332229	0.003377	POLYGON Z ((-620691.239 9308195.384 0, -620691...	440247	436330	-3917	4260.163988	
1	Kelapa Gading	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.161562	0.001323	POLYGON Z ((-621309.453 9310943.752 0, -621316...	144219	137530	-6689	1668.733066	

Langkah berikutnya: [Buat kode dengan JAKTAR_utm](#) [Lihat plot yang direkomendasikan](#) [New interactive sheet](#)

```
# Kerapatan Penduduk
JAKTAR_utm['Krptn Penduduk 23'] = JAKTAR_utm['2023'] / JAKTAR_utm['Luas_Ha']
JAKTAR_utm
```



	Kecamatan	REMARK	LCODE	WADMKK	WADMPR	SHAPE_Leng	SHAPE_Area	geometry	2020	2023	perubahan penduduk	Luas_Ha	Pe
0	Cilincing	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.332229	0.003377	POLYGON Z ((-620691.239 9308195.384 0, -620691...	440247	436330	-3917	4260.163988	102.
1	Kelapa Gading	Wilayah Administrasi Kecamatan	BA0080	Kota Jakarta Utara	DKI Jakarta	0.161562	0.001323	POLYGON Z ((-621309.453 9310943.752	144219	137530	-6689	1668.733066	82.

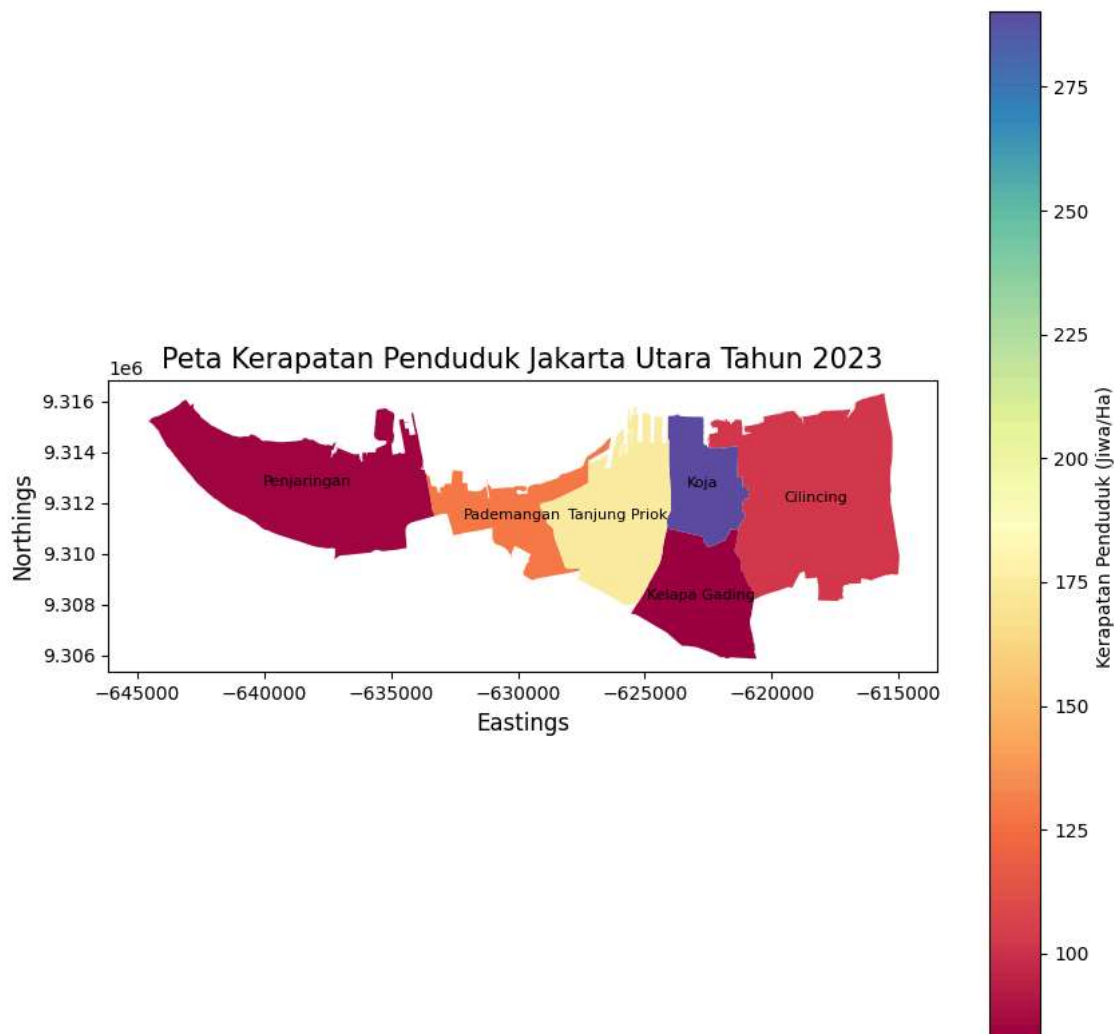
Langkah berikutnya:

[Buat kode dengan JAKTAR_utm](#)[Lihat plot yang direkomendasikan](#)[New interactive sheet](#)

```

# Create plot
fig, ax = plt.subplots(1, 1, figsize=(10, 10))
JAKTAR_utm.plot(column='Krptn Penduduk 23', ax=ax, cmap='Spectral', legend=True, legend_kwds={'label': "Kerapatan Penduduk (Jiwa/Ha)"})
# Add title
ax.set_title('Peta Kerapatan Penduduk Jakarta Utara Tahun 2023', fontsize=15)
# Add axis labels
ax.set_xlabel('Eastings', fontsize=12)
ax.set_ylabel('Northings', fontsize=12)
# Add kecamatan labels
for x, y, label in zip(JAKTAR_utm.geometry.centroid.x, JAKTAR_utm.geometry.centroid.y, JAKTAR_utm['Kecamatan']):
    ax.text(x, y, label, fontsize=8, ha='center', va='center')
plt.savefig('Peta Jml Pddk JAKTAR 2023', dpi=600, bbox_inches='tight')
# Show plot
plt.show()

```



```

# install Library
!pip install contextily

```



```

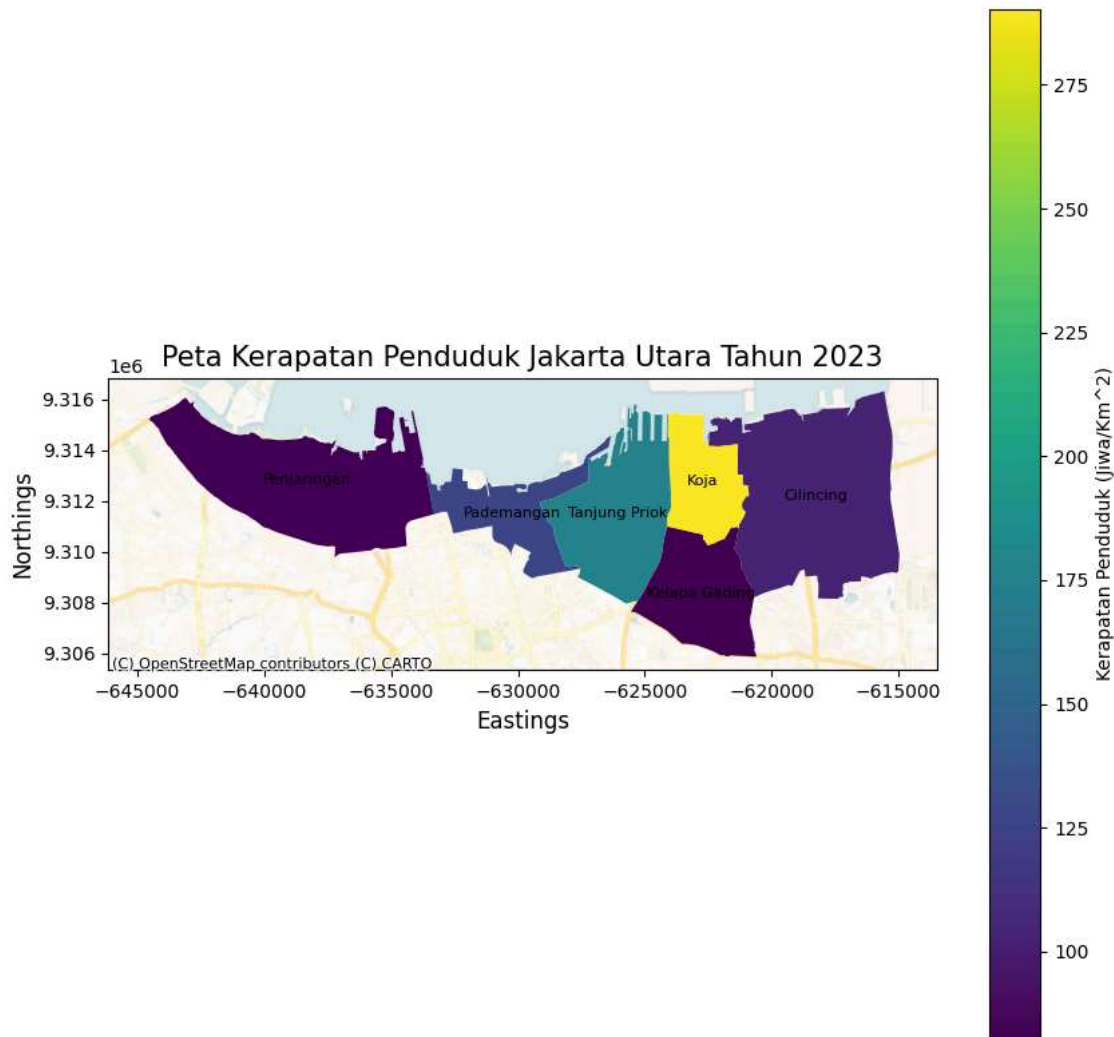
Requirement already satisfied: contextily in /usr/local/lib/python3.10/dist-packages (1.6.2)
Requirement already satisfied: geopy in /usr/local/lib/python3.10/dist-packages (from contextily) (2.4.1)
Requirement already satisfied: matplotlib in /usr/local/lib/python3.10/dist-packages (from contextily) (3.8.0)
Requirement already satisfied: mercantile in /usr/local/lib/python3.10/dist-packages (from contextily) (1.2.1)

```

```
Requirement already satisfied: pillow in /usr/local/lib/python3.10/dist-packages (from contextily) (11.0.0)
Requirement already satisfied: rasterio in /usr/local/lib/python3.10/dist-packages (from contextily) (1.4.2)
Requirement already satisfied: requests in /usr/local/lib/python3.10/dist-packages (from contextily) (2.32.3)
Requirement already satisfied: joblib in /usr/local/lib/python3.10/dist-packages (from contextily) (1.4.2)
Requirement already satisfied: xyzservices in /usr/local/lib/python3.10/dist-packages (from contextily) (2024.9.0)
Requirement already satisfied: geographiclib<3,>=1.52 in /usr/local/lib/python3.10/dist-packages (from geopy->contextily) (2.0)
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib->contextily) (1.3.1)
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.10/dist-packages (from matplotlib->contextily) (0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib->contextily) (4.55.0)
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib->contextily) (1.4.7)
Requirement already satisfied: numpy<2,>=1.21 in /usr/local/lib/python3.10/dist-packages (from matplotlib->contextily) (1.26.4)
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib->contextily) (24.2)
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib->contextily) (3.2.0)
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.10/dist-packages (from matplotlib->contextily) (2.8.2)
Requirement already satisfied: click>=3.0 in /usr/local/lib/python3.10/dist-packages (from mercantile->contextily) (8.1.7)
Requirement already satisfied: affine in /usr/local/lib/python3.10/dist-packages (from rasterio->contextily) (2.4.0)
Requirement already satisfied: attrs in /usr/local/lib/python3.10/dist-packages (from rasterio->contextily) (24.2.0)
Requirement already satisfied: certifi in /usr/local/lib/python3.10/dist-packages (from rasterio->contextily) (2024.8.30)
Requirement already satisfied: cligj>=0.5 in /usr/local/lib/python3.10/dist-packages (from rasterio->contextily) (0.7.2)
Requirement already satisfied: click-plugins in /usr/local/lib/python3.10/dist-packages (from rasterio->contextily) (1.1.1)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests->contextily) (3.4)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests->contextily) (3.10)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests->contextily) (2.2.3)
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.7->matplotlib->contexti
```

```
# contextily untuk menambahka base map
import contextily as cx
```

```
# Create plot
fig, ax = plt.subplots(1, 1, figsize=(10, 10))
JAKTAR_utm.plot(column='Krpptn Penduduk 23', ax=ax, cmap='viridis', legend=True, legend_kwds={'label': "Kerapatan Penduduk (Jiwa/Km^2)"}
# Add title
ax.set_title('Peta Kerapatan Penduduk Jakarta Utara Tahun 2023', fontsize=15)
# Add axis labels
ax.set_xlabel('Eastings', fontsize=12)
ax.set_ylabel('Northings', fontsize=12)
# Add kecamatan labels
for x, y, label in zip(JAKTAR_utm.geometry.centroid.x, JAKTAR_utm.geometry.centroid.y, JAKTAR_utm['Kecamatan']):
    ax.text(x, y, label, fontsize=8, ha='center', va='center')
# Menambahkan basemap
cx.add_basemap(
    ax,
    crs="EPSG:32750",
    source=cx.providers.CartoDB.VoyagerNoLabels
)
plt.savefig('Peta Keraptn Penduduk 2023', dpi=600, bbox_inches='tight')
# Show plot
plt.show()
```



```
import folium
```

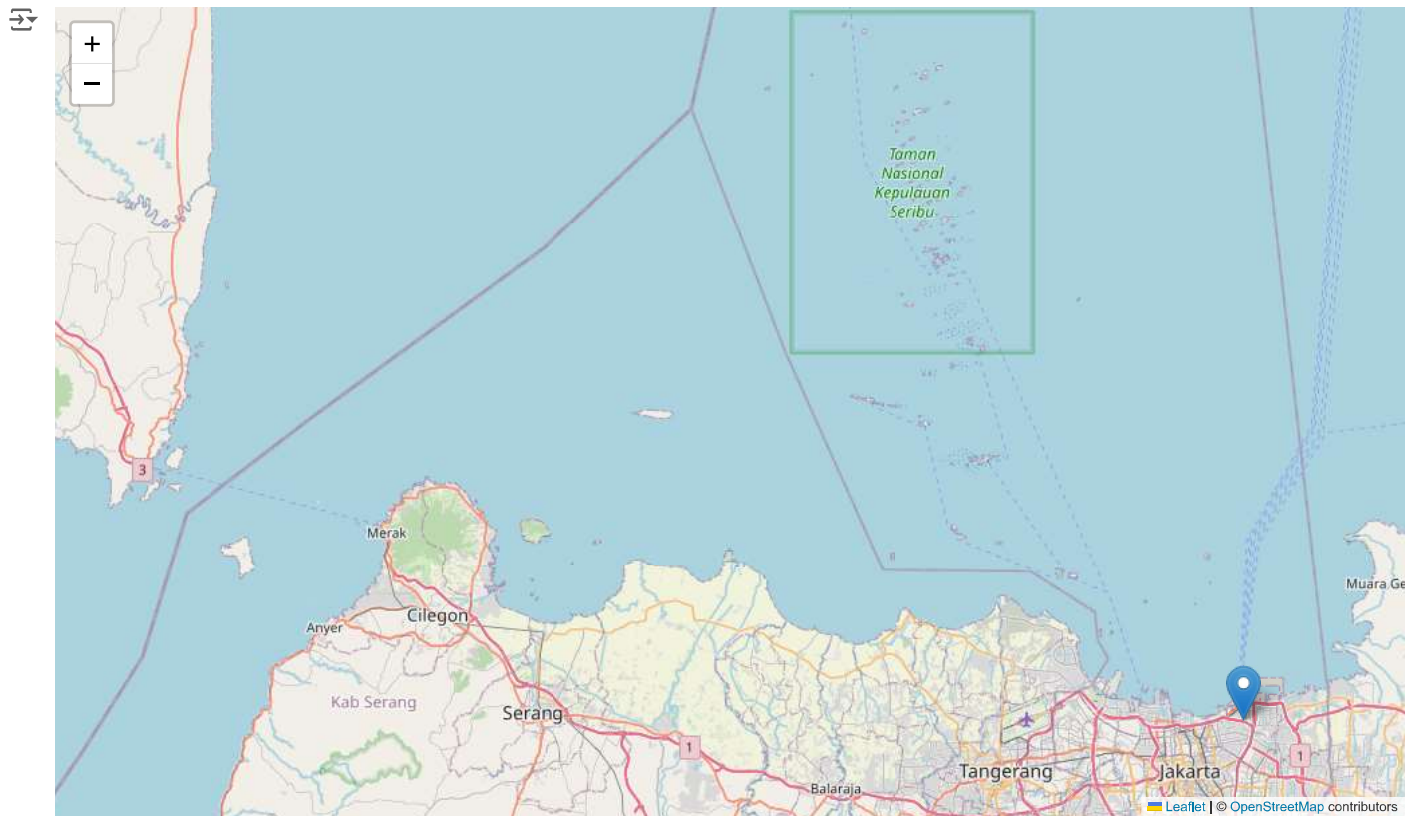
```
# Membuat peta dasar dengan titik pusat dan tingkat zoom awal
peta = folium.Map(location=[-6.125, 106.882], zoom_start=10)
```

```
# Menampilkan peta
peta
```




```
# Menambahkan marker di lokasi tertentu
folium.Marker(
    location=[-6.125, 106.8823],
    popup="Ini adalah Jakarta Utara, DKI Jakarta",
    tooltip="Klik untuk info"
).add_to(peta)

# Menampilkan peta dengan marker
peta
```



```

...
# Membuat FeatureGroup untuk layer GeoJson
JAKTAR_layer = folium.FeatureGroup(name="Jakarta Utara")

# Menambahkan GeoDataFrame ke FeatureGroup
folium.GeoJson(JAKTAR_utm).add_to(JAKTAR_layer)

# Menambahkan FeatureGroup ke peta
JAKTAR_layer.add_to(peta)

# Menambahkan kontrol layer
folium.LayerControl().add_to(peta)
peta
...

'''
'''

# Adjust the number of colors and the colormap as needed
colormap = cm.linear.YlGnBu_09.scale(0, len(JAKTAR_utm['Kecamatan'].unique()))

```

```

# Style function for GeoJson layer
def style_function(feature):
    kecamatan = feature['properties']['Kecamatan']
    color = colormap(JAKTAR_utm['Kecamatan'].unique().tolist().index(kecamatan))
    return {
        'fillColor': color,
        'color': 'black',
        'weight': 1,
        'fillOpacity': 0.7
    }

# Create GeoJson layer for kecamatan colors
folium.GeoJson(
    JAKTAR_utm,
    name="Kecamatan Colors",
    style_function=style_function,
).add_to(peta)

# Add layer control
folium.LayerControl().add_to(peta)

# Create GeoJson layer for kecamatan colors
geojson_layer = folium.GeoJson(
    JAKTAR_utm,
    name="Kecamatan Colors",
    style_function=style_function,
).add_to(peta)

# Create custom legend HTML
legend_html = """
<div style="position: fixed;
        bottom: 50px; left: 50px; width: 150px; height: auto;
        border: 2px solid grey; z-index: 9999; font-size: 14px;
        background-color: white; padding: 5px;">
    <h4 style="text-align: center; margin-bottom: 5px;">Kecamatan</h4>
    {}
</div>
"""

# Generate legend entries
legend_entries = ""
for kecamatan in JAKTAR_utm['Kecamatan'].unique():
    color = colormap(JAKTAR_utm['Kecamatan'].unique().tolist().index(kecamatan))
    legend_entries += f"<p style='margin: 0;'><i style='background: {color}; display: inline-block; width: 10px; height: 10px;'></i> ({

# Add legend to map
peta.get_root().html.add_child(folium.Element(legend_html.format(legend_entries)))

# Display the map
peta
'''

''' \n# Adjust the number of colors and the colormap as needed\n colormap = cm.linear.YlGnBu_09.scale(0, len(JAKTAR_utm[['Kecamatan'] .
unique()))\n\n# Style function for GeoJson layer\ndef style_function(feature):\n    kecamatan = feature[['properties']['Kecamat
'''

```