

```
In [1]: # Використовуючи запропоновані дані, створіть складне представлення даних з наступними елементами  
#- карта, котра відображає рівень приросту / скорочення населення за регіонами станом на останній доступний рік  
#- лінійний графік, котрий відображає рівень приросту / скорочення населення за регіонами за всіма роками (одні  
#В якості прикладу можете використовувати приєднане зображення
```

```
In [2]:  


```
import altair as alt
import pandas as pd
import numpy as np

import geopandas as gpd
alt.data_transformers.disable_max_rows()
```


```

```
Out[2]: DataTransformerRegistry.enable('default')
```

```
In [3]:  


```
cor = gpd.read_file('ukraine.json')
cor.head()

df = pd.read_csv('population_trends.csv')
df = df[df['region']!='Ukraine']

print(df)
```


```

```
[837 rows x 3 columns]
```

```
In [4]:  


```
df1 = df[df['year']==2019]
print(cor)
```


```

```
GID_0 NAME_0 GID_1 NAME_1 \
0 UKR Ukraine UKR.1_1 Cherkasy
1 UKR Ukraine UKR.2_1 Chernihiv
2 UKR Ukraine UKR.3_1 Chernivtsi
3 UKR Ukraine UKR.4_1 Crimea
4 UKR Ukraine UKR.5_1 Dnipropetrovsk
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9 UKR Ukraine UKR.10_1 Khmel'nyts'kyy
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12 UKR Ukraine UKR.13_1 Kirovohrad
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14 UKR Ukraine UKR.15_1 Luhans'k
15 UKR Ukraine UKR.16_1 Mykolayiv
16 UKR Ukraine UKR.17_1 Odesa
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18 UKR Ukraine UKR.19_1 Rivne
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22 UKR Ukraine UKR.23_1 Transcarpathia
23 UKR Ukraine UKR.24_1 Vinnytsya
24 UKR Ukraine UKR.25_1 Volyn
25 UKR Ukraine UKR.26_1 Zaporizhzhya
26 UKR Ukraine UKR.27_1 Zhytomyr

           VARNAME_1 NL_NAME_1 \
0 Cherkas'ka Oblast'|Cherkasskaya Oblast'|Cherkassy None
1 Chernigov|Tschernigow None
2 Chernivets'ka Oblast'|Chernovitskaya Oblast'|C... None
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6 Ivano-Frankovsk|Ivanovo-Frankovskaya Oblast'|Sta... None
7 Charkow|Jarkov|Karkov|Khar'kov None
8 Cherson|Kherson's'ka Oblast' None
9 Khmelnitsky|Khmelnytskyi|Chmelnizkij|Hmelnicki... None
10 Kiev Oblast|Kiew|Kijew|Kyiv|Kijev|Kyiv|K... None
11 Kyiv None
12 Kirovograd|Kirovogradskaya Oblast' None
13 Lemberg|Llvov|L'vov|Lwow|L'vivs'ka Oblast' None
14 Luhansk|Lugansk|Luhans'ka Oblast'|Voroshilovgrad None
15 Mykolajiv|Nikolajew|Nikolayev None
16 Odesa|Odes'ka Oblast'|Odesskaya Oblast' None
17 Rovno|Rivnens'ka Oblast'|Rovenskaya Oblast' None
18 Ternopol|Ternopol' None
21 Transcarpathian|Zakarpattia|Ruthenia|Zakarpats... None
23 Vinnytsia|Vinnitskaya Oblast'|Vinnyts'a Oblas... None
24 Volhynia|Volyns'ka Oblast'|Volyns'ka Oblast'|... None
25 Saporoshje|Zaporizhzhia|Zaporiz'ka Oblast'|Zapor... None
26 Zhitomir|Jitomir|Shitomir|Zhitomirskaya Oblast' None

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23 Oblast' Region None UA.VI
24 Oblast' Region None UA.VO
25 Oblast' Region None UA.ZP
26 Oblast' Region None UA.ZT

           geometry
0 MULTIPOLYGON (((31.32614 48.74507, 31.31716 48...
1 MULTIPOLYGON (((33.09283 50.50966, 33.09261 50...
2 MULTIPOLYGON (((24.93280 47.72794, 24.93301 47...
3 MULTIPOLYGON (((33.79291 44.39153, 33.79465 44...
4 MULTIPOLYGON (((33.93176 47.48407, 33.92332 47...
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13 MULTIPOLYGON (((23.96410 50.41843, 23.96423 50...
14 MULTIPOLYGON (((39.91058 48.16798, 39.90993 48...
15 MULTIPOLYGON (((31.41125 46.60264, 31.41125 46...
16 MULTIPOLYGON (((30.20708 45.25764, 30.20708 45...
17 MULTIPOLYGON (((35.51211 49.55266, 35.46757 49...
18 MULTIPOLYGON (((26.30246 50.20480, 26.29387 50...
19 MULTIPOLYGON (((33.80236 44.39421, 33.80236 44...
20 MULTIPOLYGON (((34.96434 50.14548, 34.94647 50...
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22 MULTIPOLYGON (((23.89934 47.94503, 23.89867 47...
23 MULTIPOLYGON (((29.96737 48.61654, 29.96781 48...
24 MULTIPOLYGON (((24.58838 50.44717, 24.58535 50...
25 MULTIPOLYGON (((35.05986 46.15125, 35.05986 46...
26 MULTIPOLYGON (((29.46955 49.81223, 29.46984 49...
```

```
In [5]:  


```
df1.index = np.arange(0, len(df1))
df1=df1.rename(columns={"region": "NAME_1"})

cor= cor.merge(df1, on = "NAME_1")

cor.fillna(value=-15, inplace=True)

print(cor)
```


```

```
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11 Kyiv -15
12 Kirovograd|Kirovogradskaya Oblast' -15
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16 Odesa|Odes'ka Oblast'|Odesskaya Oblast' -15
17 Rovno|Rivnens'ka Oblast'|Rovenskaya Oblast' -15
18 Ternopol|Ternopol' -15
21 Transcarpathian|Zakarpattia|Ruthenia|Zakarpats... -15
23 Vinnytsia|Vinnitskaya Oblast'|Vinnyts'a Oblas... -15
24 Volhynia|Volyns'ka Oblast'|Volyns'ka Oblast'|... -15
25 Saporoshje|Zaporizhzhia|Zaporiz'ka Oblast'|Zapor... -15
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```
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0 MULTIPOLYGON (((31.32614 48.74507, 31.31716 48... 2019 -10.0
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```

```
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```
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```


```

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10 Kiev Oblast|Kiew|Kijew|Kyiv|Kijev|Kyiv|K... -15
11 Kyiv -15
12 Kirovograd|Kirovogradskaya Oblast' -15
13 Lemberg|Llvov|L'vov|Lwow|L'vivs'ka Oblast' -15
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24 Volhynia|Volyns'ka Oblast'|Volyns'ka Oblast'|... -15
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