$$\{ \ 'cod' : ['c', 'r', 'm']$$

The file Etnicity.csv contains data on the population by ethnicity at the locality level according to the 2011 Population and Housing Census. The file CoduriRomania.xlsx contains the codifications of the localities (settlements), counties, regions and macro-regions of Romania.

1. Calculate and save the population by ethnicity at the level of counties, regions and macro-regions

2. To calculate and save the indications of ethnic segregation at the counties level. The following indices will be used:

$$n - len(+\_dict.Keys())$$

The dissimilarity index,

$$D = \frac{1}{2} \sum_{i=1}^{n} \left| \frac{x_i}{T_x} - \frac{r_i}{T_r} \right|$$

$$X_i - +\_dict[A]['eth']$$

$$r_i - +\_dict[A] \ POP - X_i$$

Shannon-Weaver,

$$H = -\sum_{i=1}^{n} p_i log_2 p_i$$

$$T_x - +\_dict[i...]['eth']$$

$$\nearrow A$$

where n is the number of administrative-territorial units, x_i is the population of a certain ethnicity, r_i is the rest of the population, T_x is the total population of that ethnicity, T_r is the total of the rest of the population, p_i is the share of ethnicity in the administrative-territorial unit i.

$$T_r - +\_dict[i...] \ POP - T_x$$

$$p_i - \frac{\boxed{X_i}}{r_i + X_i}$$