Graduate Urban Economics, Shanghai University of Finance and Economics

Spatial Methods in QGIS, Spring 2022

1. Start up QGIS and add provinces and prefectures
    a. Practice zooming, selecting, and identifying features
    b. Practice changing the layer opacity to see how prefectures have changed over time
2. Look at prefecture changes over time
    a. First click Settings->Options->Processing and under "General" change to "ignore features with invalid geometries"
    b. Then play around with the graphical intersection tools under the Vector menu
        i. See here: https://docs.qgis.org/3.16/en/docs/user_manual/processing_algs/qgis/vectoroverlay.html#
3. Add **inflow.csv** using delimited text layer
    a. Click Layer->Add Layer->Add Delimited Text Layer
    b. Select "inflow.csv" using file dialog (click box on right with three dots)
    c. Make sure "decimal separator is comma" is ***not clicked***
    d. Under "Geometry Definition" select "No geometry", then click "Add" button at bottom
4. Merge on the "inflow.csv" data (more detailed explanation here)
    a. Right click on 2000 provinces layer and select properties, then click Joins
    b. Click green plus (+) sign in bottom left-hand corner
    c. Join layer is "**inflow.csv**", join field is **prov5yr_code**, target field is **PROV2000**
5. Draw a choropleth map showing migration shares from each province, into one particular province (ex: share of migrants into Beijing coming from each province)
    a. Right click on 2000 provinces layer, click Properties, then select "Symbology"
    b. Change the symbol to "Graduated"
    c. In the "Value" box, select the variable you want to color provinces by (ex: in_Beijing00)
    d. Select a "color ramp" (ex: Blues)
    e. Select the number of classes (color increments) in lower right hand corner
    f. Click OK
6. Test yourself: add the **outflow.csv** and create a choropleth map showing outflows from a specific province
7. Georeference the SUFE map
    a. Open Raster->georeferencer (enable plug-in if not already enabled; "plugins" menu)
    b. Import the file "new_sufe_map.jpg"
    c. Add four points using lat/lon below:
        i. Zhengli road and Guoding road: 31.30991, 121.49859
        ii. Zhengli and Wuchuan: 31.30998, 121.49179
        iii. Wudong and Wuchuan: 31.30503,121.49074
        iv. Wudong and Jipu: 31.30645, 121.48580
    d. Then in Georeferencer click Settings->Transformation Settings
        i. Transformation type is "thin plate spline"
        ii. Choose an output file name (or accept default)
        iii. Click load in QGIS when done, then OK

    e. Then File->Start Georeferencer
8. Add SUFE OSM map tiles to check the accuracy: add layer “SUFE_map.osm”
    a. Can also add the QuickMapServices plugin
        i. Plugins->Manage and Install Plugins
        ii. Search for QuickMapServices and click install
        iii. This will add a new toolbar with several buttons. Click the button with a plus sign on a globe and then select OSM->OSM Standard. This will add a base layer map.
9. Try calculating the area of the School of Economics building. What are the dimensions of the soccer field?
10. Add some of the data from Baum-Snow, Brandt, Henderson, Turner, Zhang ReStat 2017
    a. Plan5_7
    b. Rivers
    c. 2010bshp (highways, railroads)