The 'Space Syntax Toolkit' - Exercise

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This exercise offers the experience of a complete workflow of space syntax axial and segment analysis using the Space Syntax Toolkit for QGIS. It's a set of minimal instructions, assuming basic familiarity with the QGIS environment and the space syntax (depthmapX) terminology.
Participants can work through the various steps in pairs.

Model preparation

1. **Prepare the project**
   1. Open the sample data project (sample_data.qgs)
   2. Change the project properties
   3. Set the background black
   4. Set the selection colour magenta
   5. Hide all the layers
2. **Make an axial map**
   1. Add a Google maps physical layer (Web menu > Open Layers plugin)
   2. Create a new vector layer (shape file format)
   3. Select 'Line' type
   4. Call it 'axial_new'
   5. Set the CRS to: EPSG 27700
   6. Draw some axial lines, zooming into the Barnsbury area (defined by other layers)
3. **Make unlinks**
   1. Create a new vector layer (shape file format)
   2. Select 'Ppoint' type
   3. Call it 'unlinks_new'
   4. Set the CRS to: EPSG 27700
   5. Draw some unlink objects where some axial lines intersect
4. **Update axial “id” column**
   1. Select the axial layer
   2. Choose the field calculater (abacus tool)
   3. Update the existing id column
   4. Use the expression “$rownum” (function in the Record group)

Model verification

5. **Verify the axial map**
   1. Hide the “_new” layers
   2. Display the “axial_errors” and “unlinks_errors” layers
   3. Start the “Graph analysis” tool from SST
   4. Choose the Map tab
   5. select the “axial_map_errors” layer
   6. Click the Verify button
6. **Correct the axial errors**
   1. Make the “axial_map_errors” layer editable
   2. Select each error from the report
   3. Edit the axial line accordingly (delete, extend, move)
   4. Save the “axial_map_errors” layer edits
6. **Verify the unlinks**
   1. Choose the Unlinks tab
   2. select the “unlinks_errors” layer
   3. Verify the unlinks > Notice error message
   4. Update the unlink IDs
   5. Click the Verify button
7. **Correct the unlinks errors**
   1. Make the “unlinks_errors” layer editable
   2. Select each error from the report
   3. Edit the unlink point accordingly (delete, move)
   4. Save the “unlinks_errors” layer edits
8. **Iterate verification process**
   1. Choose the Map tab
   2. Verify the axial map again
   3. Correct errors if necessary
   4. The verification process is only complete when there are **no errors** on **both layers**

Model analysis

9. **Run axial analysis**
    1. In the “Map” tab select the “axial_map” layer (no errors)
    2. In the “Unlinks” tab select the “unlinks” layer (no errors)
    3. Select the “depthmapX remote” tab
    4. Type values in the Radius field: “2, 4,n”
    5. Type new name for the Output table (optional)
    6. Click Calculate
    7. Notice the warning message
    8. Start the depthmapX software
    9. Click Calculate
    10. Open the Attribute Table of the axial layer or the newly created layer

10. **Run segment analysis**
    1. Still in the “depthmapX remote” tab...
    2. Select the segment option
    3. Type values in the Radius field: “400, 800” (not n, it's slow)
    4. Check the “Weight” box and select “Segment Length”
    5. Click the Settings button
    6. Check the “Calculate full set of measures” (optional)
    7. Click “Ok” to close the “Advance Settings” dialog
    8. Type new name for the Output table (optional)
    9. Click “Calculate”
    10. Wait...
    11. Open the Attribute Table of the newly created layer
    12. Switch off all “axial” map layers, leaving only the segment layer
    13. Notice the difference in the model: trimmed line ends
    14. Select individual axial sements (Select Features tool)

11. **Analysis of the axial_map results**
    1. Close the “Graph Analysis” SST tool
    2. Open the “Attributes Explorer” SST tool
    3. Select the “axial_map” layer to explore
    4. Select the “INTrN” attribute
    5. Select the charts tab
    6. Select Scatter plot
    7. Set “Connectivity” in the Y axis (Inteligibility plot)
    8. Right click the chart and export the plot as image file

12. **Analysis of the axial_map_segment results**
    1. Select the “axial_map_segment” to explore
    2. Select the “CHr400m” attribute
    3. Increase the line width to 0.75
    4. Set intervals to “Custom (Equal)”
    5. Change the Top value to 20
    6. Click the “Apply Symbology” button
    7. This is the standard depthmapX display for the Choice measure
    8. Save an image of the map window

    Alternative methods:
    9. Select the “Charts” Tab
    10. Move the selection line to highlight the tail of the distribution
    11. Select the Stats tab
    12. Take note of the minimum value (e.g. 2500)
    13. Return to the Symbology Tab
    14. Set the Top value to the number you noted
    15. Click the “Apply Symbology” button
    16. Click the “Deselect features” button in the main toolbar

    17. Set intervals to “Natural breaks”
    18. Click the “Apply Symbology” button
    19. Save an image of the map window