

**Exercise 4: Valued Graphs (L), 20 pts**

Valued graphs differs from both connectivity and Shimbel distances. Rather than using topologic distance (e.g. 1 for a connection and 0 for no connection), valued graphs use actual route distances in either miles or kilometers. In much the same manner as Shimbel distance, valued graphs determines the shortest possible route needed to connect one node to all other nodes. Therefore, smaller valued graph results signify higher accessibility, and larger valued graph results signify lower accessibility. However, instead of having the results in 'number of steps' the results are in distance units. For this exercise you will need to create a new matrix, entering the actual routes distances between directly connected place and leaving the non-connected node pairs blank.

Once you have created your matrix in Excel, save a copy of the spreadsheet as a comma separated file (.CSV). Make sure to call the file something such as VALUED.CSV. Remember that first you must highlight the area that you want to save (highlight the whole matrix, including the row and column node numbers), then go to **File > Save as** and set the file type to .CSV. This is a text file and can be examined in Notepad. I suggest opening your .CSV file in Notepad and looking for stray commas at the bottom of the file. If there are any, delete them as they will cause problems later.

Now comes the easy part... running the valued graph program. Put a copy of your .CSV file and the program **Network Analyzer Updated-xxxxx.R** in a separate folder somewhere where you have write privileges (your thumb drive, a Zip disk, or C:\Geotemp). The **Network Analyzer Updated-xxxxx.R** program can be downloaded from the Transportation Geography webpage site under *Exercises*. You will need to right-click on the **Valued.R** link and choose *Save Link As...* make sure to copy the program to the same location as your matrix (.CSV file).

From the Start Menu, select **R > R2.6.0 (or the version on that computer)**. This will open the RGui and the RConsole. In the RConsole there will be a red cursor. From the **File** menu, first select **Change dir...** and navigate to the location where you have saved your matrix. Click **Ok**. Again from the **File** menu select **Source R Code...** go to the bottom of the popup menu and change the file type to **All Files...** and then navigate to the location of the **Network Analyzer Updated-xxxxx.R** program. Click on the program and then **Ok**. Click on Valued in the popup window and select you .csv when prompted.

The program runs very quickly, and you will get three forms of output. The first output type is sent to the RConsole, an example of which appears below:

```
Valued Graph L-Matrix Analyzer
Enter INPUT filename [assumes .CSV]: L1770    ← Name of the input matrix

Output file: L1770 Valued Results.csv    ← The results matrix.
```

**Note: There are no network measurements associated with valued graphs.**

There is only output file produced by the program. This is a .CSV file which can be imported into Excel. This file contains all of the connections between nodes and the total connections for each node. The L matrix output has to be edited slightly, since it adds an X to the column headings (which should be removed), and it shifts those headings to the left (they need to be shifted one cell to the right). The last row of the matrix is the column totals, which can be deleted. ***The last column is the most important...*** it is the total connectivity results. It is this last column that you will need to map. The third output type is a text file containing all of the network measurements that appear in the RConsole. Save both of these files, you will be using them.

***Assignment:***

Using the .CSV file you save from the L matrix based on working map below, run the ***Network Analyzer Updated-xxxxx.R*** program and map the total valued results for each named town (disregard mapping the nodes you added). Use the three category legend to map the results putting approximately 1/3 of the towns into each category (Low = 14, Med = 13, High = 13). Color code the categories are High = RED, Medium = BLUE, and Low = GREEN. Label the most and least accessible nodes (either populated or non-populated) on your results map. Color in the symbols in the appropriate manner based on your results. Make sure your map is neat and legible, poor looking maps will lose points. Hand in the following **stapled** together: your results map, your working map, and a printout of the node numbers, town names, and their individual valued results.



