NOTES ON THE GRD 657 FINAL

Spring 2006

QUESTION 1

See Section 1.1, pages 1& 2 for a list of six probable reasons

QUESTION 2

a. See Section 2.7, pages 23 & 24 for the two commonly encountered models for spatial data

b. See Section 2.9, page 26 for a list of five problems peculiar to spatial data

QUESTION 3

a. See Section 3.2 (Simple GIS based spatial analysis) and Section 3.3 (Advanced GIS based spatial analysis) for an extensive list of the features and operations of a GIS

b. See Section 3.4 for a discussion of two problems with GIS based analyses

QUESTION 4

a. & b. See the table on page 65

QUESTION 5

a. & b. See the table on page 94

QUESTION 6

All of the required links can be found in the class notes OR you can find each by doing a search on Google for "*package name* index, R". Be sure that you find the URL for the index not just a site to download the software

QUESTION 7

All of the required links can be found in the class notes OR you can find each by doing a search on Google for "*software name*, documentation". Again be sure you find a site for documentation and not just an application or a site for downloading the software.

QUESTION 8

You find the answers to all of these in the class notes. It is also possible to do searches by combining the name of the operation or technique and the name of the software, e.g. "Parallel

coordinate plot, R" will return
http://stat.ethz.ch/R-manual/R-devel/library/MASS/html/parcoord.html

"Parallel coordinate plot, ggobi" will return http://www.ggobi.org/docs/parallel-coordinates/

QUESTION 9

You can find all the answers for these in the class notes OR you can use Google, e.g. a search on "Ripley's K function, Crimestat" will return www.sal.uiuc.edu/stuff/stuff-sum/pdf/points.pdf

QUESTION 10

A search in the index of the text for "geographically weighted regression" will take you to pages 107-128. The equation for the model is (5.30) on page 108 and the estimator for the coefficients is given in (5.31) where X is the "design" matrix, Y the vector of response variable values and W the weight matrix. In general the weights are distance based and might be determined by various choices of the spatial kernel function.

A search in the index of the text for "spatial autoregressive models", i.e., spatial autoregression, will take you to pages 167-169. The equation for the model is given by (7.5) on page 168 or alternatively by (7.8) on the same page. The coefficients and the correlation coefficient are estimated by a two step process described on page 169

A search in the index of the text for "spatial moving average models" will take you to pages 169-171. The equation for the model is given by (7.12) or alternatively by (7.13) Estimating the coefficients and the correlation coefficient is a multi-step process described at the bottom of page 170

A search in the index of the text for "multi-level modeling" will take you to pages 103-106. The equation for the model is given in (5.15), (5.16) and 5.17) or alternatively (5.18)

The spatial expansion model is discussed in Section 5.4.2 and the equation for the model (quadratic and in 2-dimensions) by (5.22), (5.23), (5.24), (5.25) and (5.26) or more generally by (5.27)

All of these models and relevant software are discussed in the classnotes.