CE 547 – GIS in Water Resources

Final Exam – May 11, 2011

I. (6 pts) What do the following acronyms stand for and how are they related to ArcGIS? Be as complete as possible.

1. IDW

2. GPS

II. (6 pts) For what table cardinality would it be inappropriate to use ‘Join’ because it would cause a loss of information?
III. (12 pts) Sketch the earth and associated shape for the following projections. Then give an example area for which you would choose said projection. Briefly explain.

*tangent transverse cylindrical projection*

*secant conic projection*

IV. (4 pts) What is a domain? In what sort of geographic dataset can a domain be used?
V. (15 pts) Given 25 points where a z-value is known, you will make several surfaces. Describe the steps to create a TIN. Likewise, describe the steps to create a raster. Comment on the difference between the output from the two methods. If you could choose the location of the 25 points where the z-value was measured, what would be considered? Would the location of the 25 points vary depending on your method for creating a surface?

VI. (10 pts) Please comment on which class website you think is the best and why.
VII. (11 pts) What procedure should be followed to create a new layer that contains both landuse and vegetation types within the city perimeter (given 3 feature classes: landuse, vegetation, and citybdry)?

VIII. (11 pts) Suppose you were to use the ModelBuilder to automate the process above. Show below what would be seen in the display of the ModelBuilder window.
IX. (25 pts) Use ArcMap (with the Spatial Analyst Extension) and the DEM named ‘elevation’ (arcgis\ArcTutor\Spatial Analyst\Stowe.gdb) to solve the following problems.

What is the predominant flow direction (N, S, E, W, NE, NW, SE, SW)?

What is the maximum number of cells flowing out of the grid at any one point?

What is the maximum number of cells flowing out of the grid if it is filled?

Explain why there is such a big difference.

Consider a rainstorm where 2 cm runs off all cells with an elevation greater than 2000 and 1 cm runs off all the other cells. What is the maximum runoff in m$^3$ flowing out of the grid at any one point? (Use the filled DEM.)

If I had not specified the runoff grid, what information would you want to create one?