

## Lab Assignment Guidelines

### GIS Modeling – GEOG 3110, Geography, University of Denver

[<click here>](#) for a printer-friendly version of the guidelines (.pdf)

## Guidelines for Preparing and Submitting Homework Assignments

Homework assignments use course software to address a series of questions that illustrate and demonstrate GIS modeling concepts, procedures, applications, considerations and issues. The questions form a *Word* template for the lab report you will prepare as teams (see below). You are encouraged to use screen captured images and embed them as figures that structure your answer. Your responses should be as succinct as possible while developing clear, well organized and complete answers to the questions. You should use spell and grammar check tools to insure clarity in the text and presentation.

A high degree of professionalism in preparing your lab reports is expected. Generally speaking...

- an A grade on the labs requires work beyond the basic question
- a B grade has a good answer to the question, demonstrates an understanding of the basic material and is well organized and presented
- a C and lower grades indicate incorrect answers and/or less than expected demonstration of understanding, organization or presentation.

The *lab assignments* are worth 50 points each and represent nearly half of your grade. In addition, student teams will complete a *mini-GIS Modeling Project* worth 150 points in the sixth week (7 reports \* 50 points = 350 + 150 = 450 of 900 total points). *Optional Questions* can be investigated in groups but write-ups are submitted individually.

**Submitting Lab Assignments:** Store your completed exercises as *Word* documents (.doc) in *Web Layout View* and place in the class BlackBoard Dropbox and then email a note that you have submitted it to the instructor. Do not worry about page breaks or other printer formatting as all exchange of the labs will be in electronic form. Grading will use the “*Track changes*” tool in *Word* to grade, make comments then return the document.

Homework exercises will be completed in two or three member teams. To help us keep track, please name your homework files with the exercise number followed by the team member names separated by an underscore (e.g., **Exercise0\_Smith\_Jones\_Brown.doc**). The phrase “\_graded” will be added when it is graded and returned to each of the members on the team (e.g., Exercise0\_Smith\_Jones\_Brown\_graded.doc).

Homework assignments are expected by the next class meeting but absolutely **due by 5:00pm on the second Friday following class** (two extra days to complete if needed; send the instructor an email if extra time is needed). This allows an opportunity to discuss concerns during office hours and after class on Thursday if you have difficulties in completing an assignment. In addition, the class GTA is available for assistance in the lab as arranged and both the instructor and the GTA are available for assistance via email.

Unexcused late homework assignments without prior notification receive a maximum possible of 45 points (10% penalty) if turned in prior to the next class meeting, and will not be accepted (0 points) if more than one week late.

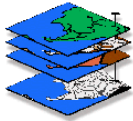
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**Example Question and Response:** An example question and response is shown below. It illustrates a very good response (B+) addressing the basic question in a clear and concise manner. Outstanding responses (A+) usually go beyond the minimal bounds of a question by expanding the answer to include information from the readings and/or your own thoughts.

**For example**, an interesting extension to the example question would be...

- 1) Capturing vertical 3D views of both displays (use the “Rotate” button to place the view point directly down on the plot) then describe/explain the differences in the “induced” 2-D plots and the vertical views of the 3-D surface.
- 2) Or you might investigate the Shading Manager controls on your own and generate displays with different “contour” color assignments and discuss the visual impact of the changes.

...however Exercise #0 will not be graded.



## **Exercise #0 — Displaying Map Surfaces** (MapCalc) *GIS Modeling, GEOG 3110, University of Denver, Spring Term, 2006*

**Name:** \_\_\_\_<enter name>\_\_\_\_

**Date:** \_\_\_\_<enter date>\_\_\_\_

**Email Address:** \_\_<insert response>\_\_

**Degree Program:** \_\_<insert response>\_\_

**Department:** \_\_<insert response>\_\_

**Professional Interests:** \_\_<insert response>\_\_

**Course Goals:** \_\_<insert response>\_\_

**General Computer Proficiency/Experience:** \_\_<insert response>\_\_

**Math/Stat Proficiency/Experience:** \_\_<insert response>\_\_

**GIS Proficiency/Experience:** \_\_<insert response>\_\_

Note: this Word document is in “Web Layout” format (from the main menu, select **View** → **Web Layout** to verify). Instructions and questions for your response are in blue 10-point type. **Yellow highlighted** areas are for your answers; just highlight and begin typing. When you enter your responses, they will automatically be in black 12-point type. Grading notes will be made in **Red 12-point** type when electronically returned to you. The exercise document will never be printed as it saves trees, formatting headaches on your part and grading headaches on the instructor’s part ...it’s a step toward your generation’s “paperless society.”

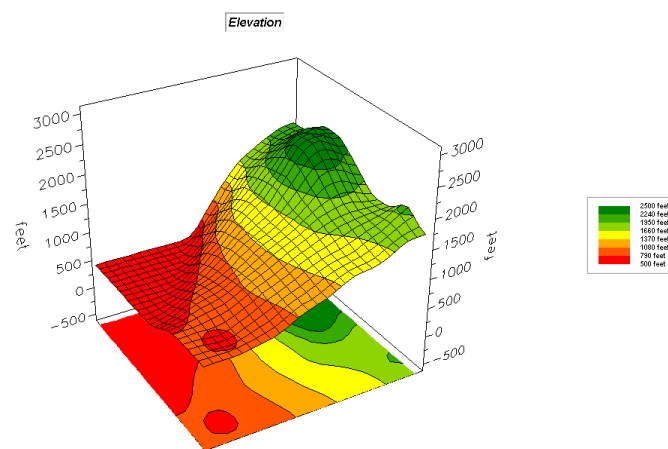
Access the MapCalc system using the TUTOR25 database as described by the instructor.

Use the following procedures to generate a 3D display of the Elevation map:

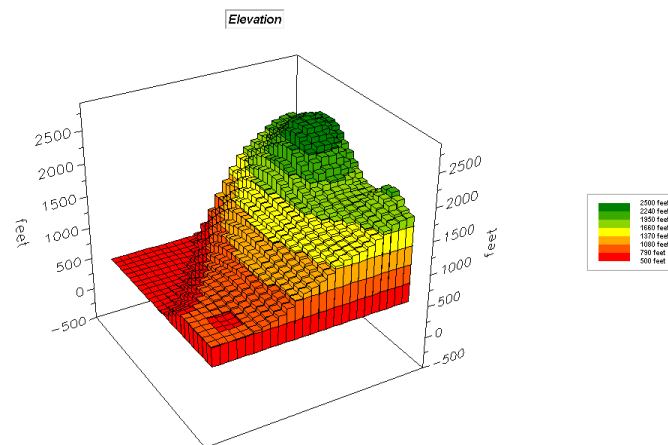
- ✓ From the Main Menu select **Window** → **Elevation**
- ✓ Press the **3-D Toggle view** button to display the elevation surface as a 3D plot
- ✓ Press the **Layer Mesh** button to superimpose the grid lines on the plot
- ✓ Press the **Use cells** button to toggle between *lattice* and *grid* displays of the elevation data.

**Question 1.** Screen capture and paste 3D "lattice" and "grid" displays of the Elevation map below (be sure to include a title and caption for each of the figures).

Insert figures...



**Figure 1-1.** 3D Lattice Display. Note the smooth appearance of the plot that "stretches" the grid pattern by pushing up the intersections of the grid lines.



**Figure 1-2.** 3D Grid Display. Note the chunky appearance of the plot pushes up the "pillars" representing each grid cell border.

In your own words describe the major differences between "lattice" and "grid" displays of mapped data?

Insert your answer...

A 3D representation of lattice data is analogous to draping a fishnet over the map values. Each intersection is raised to a relative height based on the value at the location. A perspective drawing of the fishnet is achieved by making the lengths of the lines correspond to the relative differences in the stored map values. Note the pronounced diamond shapes in the steep areas, while the flat areas form smaller square-like shapes.

The three-dimensional effect in a *3D Grid* map is achieved by “extruding” each cell to a height based on its stored map value. Hidden line removal retains only the visible faces of the “bars” depending on viewer position and the spatial patterns in the data.

Also it is important to note that the “lattice” and “grid” 3-D displays in figure 1-1 and figure 1-2 use the same data layer that is stored as 25 columns by 25 rows (625 cells). The differences in appearance are due to display technique, not changes in the underlying data.

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