

Spatial Modeling and Analysis

Test-2

Full Marks: 30

Answer all 5 Questions

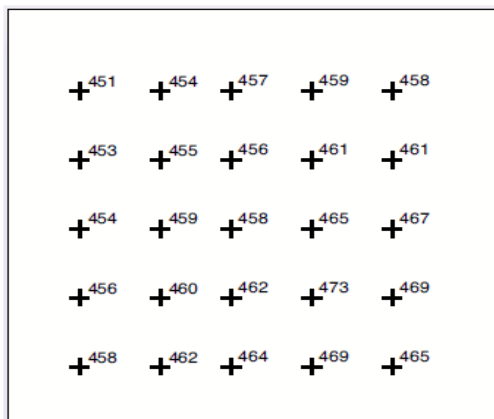
Question 1:

Within the concept of Interpolation techniques, Raster and TIN are two representations to model surfaces that is use by ArcInfor/other GIS software.

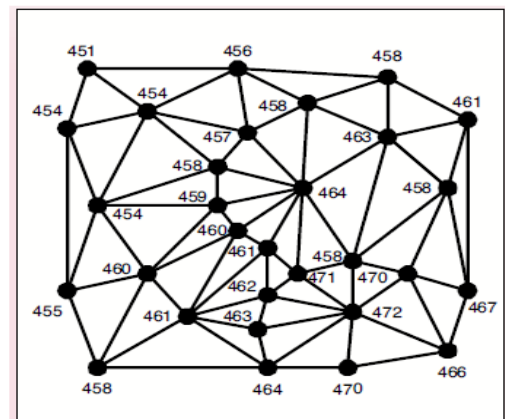
In your own understanding, briefly discuss with diagram the common difference between raster and TIN in representing surface.

Raster represent a surface as a regular grid of locations with sampled or interpolated z-values.

TINs represent a surface as a set of irregularly located points that form a network of triangles with z-values at each node.



Raster Representation of a surface



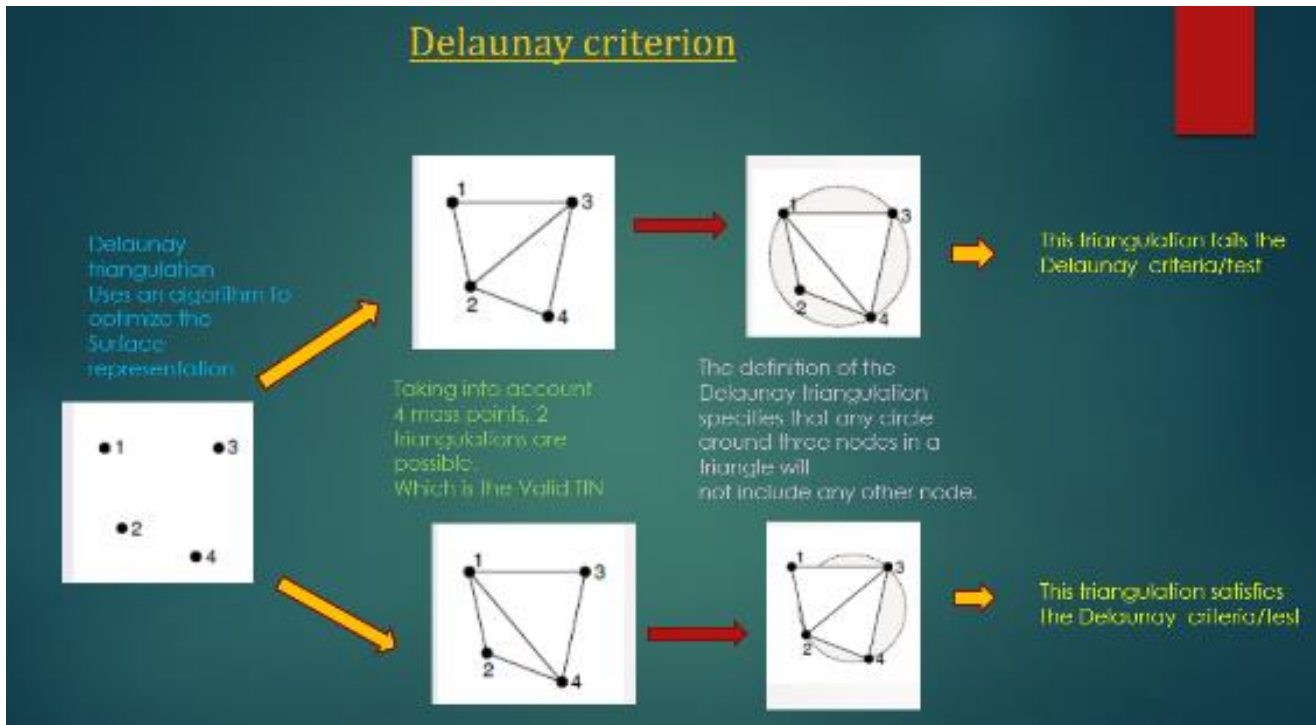
TIN Representation of a surface

(marks: 5)

Question 2:

Delaunay Criterion is emphasized during the creation of TIN where every node is joined with its nearest neighbors by edges to form triangles, which satisfy the Delaunay criterion.

Fully discuss with diagram the Delaunay Criterion, how it is tested.



(marks: 8)

Question 3:

Aspect is one of the surface analysis Method. In your own words, discuss with diagrams how you understand Aspect. Your discussion must also include at least one (1) application part of it.

Aspect identifies the steepest down slope direction from each cell to its neighbors.

It can be thought of as slope direction or the compass direction a hill faces.

Aspect is measured clockwise in degrees from 0, due north, to 360, again due north, coming full circle.

The value of each cell in an aspect dataset indicates the direction the cell's slope faces.

Flat areas having no downslope direction are given a value of -1.



Application part of it:

You may be a farmer interested in locating a field on an area with a Southerly aspect.

Find all north-facing slopes on a mountain as part of a search for the best slopes for ski runs.

Calculate the solar illumination for each location in a region as part of a study to determine the diversity of life at each site.

Find all southerly slopes in a mountainous region to identify locations where the snow/ice is likely to melt first as part of a study to identify those residential locations likely to be hit by runoff first.

Identify areas of flat land to find an area for a plane to land in an emergency.

(marks: 6)

Question 4:

The Hillshade is one of surface analysis method. It can be created to serve two main purpose. List them down and briefly explain the type of purpose it serve.

You can create a hillshade for two purpose:

1. Analytical Purpose
2. Graphical Purpose

Graphically, a hillshade can provide an attractive and realistic backdrop in a map or while you prepare maps for presentation.

From an analytical point of view, you can analyze how the landscape is illuminated at various times of the day by lowering and raising the sun angle used in the analysis

(Marks: 5)

Question 5:

Through understanding of how Neighborhood operation function, calculate the output focal cell value and write it down in its correct box/cell.

Taking into consideration the Neighborhood size: 3x3 rectangle, red circle = focal cell and grey cells = no value

		2	4	1
2	1	7	3	3
3	5	4	1	0
4	7	2	4	

=

	24		26	
		34		

(Marks: 6)