

GI 313 – Spatial Modeling and Analysis

Test-1

Full Marks: 30

Question 1:

Discuss the attribute and spatial information of a particular palm tree below, and how it is created/represented and build in the GIS environment. Provide diagrams to assist your discussions.

At first, your discussion must capture the differentiation of what attribute and spatial data is.



(marks: 5)

The attributes refer to the properties of spatial entities. They are often referred to as non-spatial data since they do not in themselves represent location information.

Attribute data is information appended in tabular format to spatial features. The Spatial data is the 'where' and attribute data can contain information about the 'what', 'where', and 'why'. Attribute data provides characteristics about spatial data

The attribute information of the particular Palm tree are:

- Number of leaves
- Diameter of the palm tree
- The Height of Palm tree

- Fruits/Nuts

It can be spatially represented by doing point digitization of each palm tree using ArcGIS or other GIS software. After doing Point digitization to represent this particular palm tree, the attribute information as listed above is enter by creating field/column name in the attribute table in line to above listed attribute information. The data can be presented via maps and graph and charts.

Question 2:

ArcMap Provides two (2) methods to associate data or establish relationship between data stored in tables with geographic features. State down this two (2) methods and provide clear and full differentiation between them.

1. **Joins**
2. **relates.**

Joins are used for 1-to-1 relationships, or many-to-1 relationships between the attribute table and an external table.

Relates are used for 1-to-many relationships, or many-to-many relationships between the attribute table and an external table.

When you join two tables, you append the attributes from one onto the other based on a field common to both.

Relating tables defines a relationship between two tables—also based on a common field—but doesn't append the attributes of one to the other; instead, you can access the related data when necessary.

(marks: 8)

Question 3:

When doing digitization in ArcGIS software, we create a vector data formats. The most common vector data formats created was shapefile (ESRI Shapefiles).

The shapefile we just created, consist of multiple files. Two (2) of these are.avl (Arcview legend file) and. sbn (shapefile –internal).

Fully state down the most essential and important one that you can think of.

The Essential Parts are:

- .shp: Shapefile geometry data
- .dbf: database data
- . Shx: shapefile index

The Important parts is:

- prj: projection file with coordinate reference system info,

(Marks: 6)

Question 4:

The Raster data Models can both represents continuous and discrete phenomena. Give two (2) each example of continuous and discrete phenomena that it can represents.

Raster data models represent continuous phenomena or spatial features

E.g. Elevation/DEM, bathymetry, precipitation, slope, etc.

Raster data model may also be used to represent discrete data

E.g. Land cover: forest, wetlands, urban areas

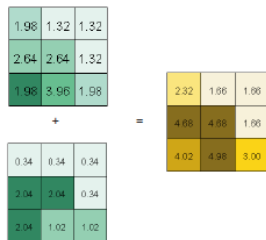
Marks: 4

Question 5:

When doing analysis for least cost path, we normally prepare cost raster. In your own understanding, discuss with diagram what you understand of cost raster and how it is prepared and utilize for least cost path analysis.

The cost Raster identifies cost of travel to every cell.
Weight values assigned to each class level.
Higher the weight value, more the cost.

When adding the weighted data sets together, the result is the final cost raster
Example: land use land cover and Slope



The cost raster created is the result of;

- reclassifying done between two data sets (for example: Slope and Land use).
- weighting each by % influence
- finally combining them using Weighted sum/weighted overlay/union tool in ArcGIS.

Then use cost raster to create cost weighted Distance.

In order to calculate least cost path and shortest part between source and destination location, the Direction raster and cost weighted distance raster are use as input.

(Marks: 7)