**GIS5572 Quiz 2**

1. What do rasters and spacetime cubes have in common?

* Both illustrate data values in grid space

1. How are rasters and spacetime cubes different?

* Rasters can just show coordinates and values
* Spacetime cubes can show those coordinates and values through time
  + Stacked rasters, essentially
* So, the dimensionality is higher in cubes.
* Operations are extended to 3d space

1. What is map algebra?

* Applying mathematical or Boolean operations to single or multiple map rasters to produce values for analysis

1. Who created map algebra?

* Dana Tomlin

1. What are local operations in map algebra? (provide a picture)

* Operations on a fixed pixel

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1. What are focal operations in map algebra? (provide a picture)

* Operations in a fixed neighborhood of pixel

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1. What are zonal operation in map algebra? (provide a picture)

* Operations based on predefined zones

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1. What does TIN stand for and what is it?

* Triangular irregular network. Used to show a continuous elevated surface contours using triangles between data points. Vector

1. What is a terrain?

* TIN based surface that shows 3D values, can be derived into a TIN and vice versa

1. How is a terrain different from a TIN?

* Data Type: TINs are vectors, Terrains are rasters. Terrains derive Tins on the fly.

1. Describe a basic suitability model (e.g. data flow diagram with operations) to identify a housing location for Jacob. Jacob is terrified of heights or sudden drop offs, but he loves to live Minneapolis and wants to be along the river.

* Define pixels nearer to river as higher values. 1 @ river
* Define pixels higher up as lower values 1 @ river level
* Define pixels with steep slope as lower values. 1 @ zero slope, towards zero as increases up/down
* Pixels in Minneapolis have higher values. 1 in, 0 out
* Standardize to same scale values
* Add rasters together
* Find highest value

1. What type of suitability model did you choose? Why?

* Rate suitable options
* Weighted rasters are used, not true/false logic. None of the statements seem like complete absolutes, though I suppose they could be difined that way. ‘Steep slope’ sort of has a range of values inside it.

1. What is a cost surface?

* Raster grid illustrating the cost to move through each cell based on added rasters of each factor

1. How is a cumulative distance different from Euclidean or straight-line distance?

Black line is Euclidian, blue is cumulative. There are many cumulative. Cumulative is distance covered, Euclidean is straight line distance. I.e., you have to go around a lake (cumulative), not straight through (Euclidean)

1. Describe the general data flow model for calculating a least cost path analysis from a start and end points

* Reclassify all rasters to be included, ie, height and water to common scale to find equivalent costs for each raster.
* Overlay all of these reclassified rasters to build a cost surface
* Define a route origin point and use it with the cost surface in a cost accumulation function, and to create a back raster
* Define a route destination point and use it with both the back raster and cost accumulation output in optimal path function
* Output: final route