**GIS5572 Quiz 2**

1. What do rasters and spacetime cubes have in common?
   - Both illustrate data values in grid space
2. 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
3. What is map algebra?
   - Applying mathematical or Boolean operations to single or multiple map rasters to produce values for analysis
4. Who created map algebra?
   - Dana Tomlin
5. What are local operations in map algebra? (provide a picture)
     - Operations on a fixed pixel
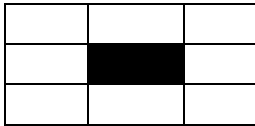
6. What are focal operations in map algebra? (provide a picture)
     - Operations in a fixed neighborhood of pixel
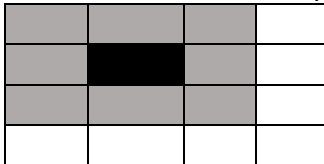
7. What are zonal operation in map algebra? (provide a picture)
     - Operations based on predefined zones

8. 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
9. What is a terrain?
   - TIN based surface that shows 3D values, can be derived into a TIN and vice versa

10. How is a terrain different from a TIN?
   - Data Type: TINs are vectors, Terrains are rasters. Terrains derive Tins on the fly.
11. 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
12. 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.
13. What is a cost surface?
   - Raster grid illustrating the cost to move through each cell based on added rasters of each factor
14. How is a cumulative distance different from Euclidean or straight-line distance?
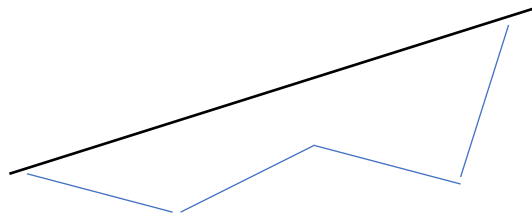
Black line is Euclidian, blue is cumulative. There are many cumulative. Cumulative is distance covered, Euclidean is straight line distance. I.e., you have to go around a lake (cumulative), not straight through (Euclidean)

15. 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