TIN - triangulated irregular network

- Made via **direct** connection of 2D points (features)
- No prior interpolation needed
- Points also carry elevation (z) values
- Delaunay triangulation:
  - Creates a Triangle Irregular Network
  - Optimal triangle shape, uses closest points
  - Avoids very thin (“skinny”) triangles
- ArcGIS: TIN and Terrain format

TIN vs raster for an elevation surface

**TIN:**
- Start with points with x/y/z coordinates
- Connect points to a mesh (network)
- Implies linear interpolation by directly connecting points to triangles
- Usually not a rectangle but a wrapper around points (“convex hull”)
- Can internally incorporate line features (break lines)

**Raster:**
- Always a rectangle filled with cells
- Cells contain z value (but no explicit x/y coordinates)
- Z values were typically interpolated from elevation points

ArcGIS can convert between both
TINs can incorporate lines:

- TIN from masspoints only
- after adding hard lines (lines have elevation!)

TIN exercise

- data is in data/tin_exercise (warning: these points are former contours ...)
- Remember to activate 3D analyst extension and toolbar
- Tools: 3D Analyst Tools - ...
- Create TIN from elevation_points features (Delaunay triangulation)
- Use Create TIN Tool:
  - Output name: tin_pit - cannot be put inside a GeoDB (only terrains can)
  - Spatial Reference: same as elevation_points
  - height field: elevation (attribute)
  - tag field - None

Symbolize with:

- 32 colors - Equal Interval
- Add Renders (“layers”)
- 5.0 m contours (black), every 5. contour as index (red)
- Edges (grey) to
• Symbolize TIN:
  • Add Render ("layer")
  • 0.5 m contours (black) - every 10. contour as index (red)
  • Edges with same symbol (vertex connections) - Grey

• Copy TIN tool - name it tin_pit_hardline (notice version)
• "Upgrade" copied TIN with new lines (mining pit plan)
• Edit Tin Tool - add the pit_lines
• use SF_type hardline!

• optional:
  • subtract Tin_pit_hardline from first TIN
  • visualize in ArcScene

• HW 6:
  • copy data\HW6 - TIN ex
  • instruction (pdf) inside
  • ESRI 3D analyst tutorial exercise 4
  • full 3D analyst tutorial (large!) in data folder