

## **Lab Session 7**

### **3D Analysis**

#### **Preparation**

Data set : C:\esri\av\_gis30\avtutor\3d\  
Extension ArcView.: Select Extension 3D Analyst

#### **1. 3D Analyst**

- Start ArcView. Select *Extension* 3D Analyst
- **Exercise 1: Creating and populating a 3D scene**
  - ◇ Open the **new 3D scene**
  - ◇ Add *avtutor\3d\site1\brklinz.shp*  
*avtutor\3d\site1\masspntz.shp*  
*avtutor\3d\site1\perim.shp*
  - ◇ Make 3 themes active
  - ◇ Go to menu **Surface** Select **Create TIN From Features**
  - ◇ Look at the default setting of these themes
  - ◇ Press OK. Now, there is a TIN theme
  - ◇ Add *avtutor\3d\site1\bldg.shp*
  - ◇ Display *bldg.shp*. Compare with TIN theme
  - ◇ Go to **View** menu and select **Create 3d scene** and press **OK**
  - ◇ Go to **Theme** menu and Select **3D properties**
  - ◇ Select Surface in Assign base height
  - ◇ Build expression *[stories]\*10* in Extrude features
  - ◇ Set Extrude feature to Add to **min z value**
  - ◇ Examine Navigate tool (left button for navigation, right button for zooming, both of them pressed for panning)
  - ◇ Examine Rotate button
  - ◇ Use Identify tool to identify the information
  - ◇ Examine 3D scene properties (background color, sun azimuth, sun altitude)
- **Exercise 2: Creating 3D shapes**
  - ◇ Open the project *tutor3.apr*
  - ◇ Create 3D points using an attribute representing height
    - Make *wells.shp* active
    - Go to **Theme** menu select **Convert to 3D shapefile**
    - Set the Get Z value to **Attribute**
    - Select *Gl\_elev* field for Z values
    - Name the output and press **OK**
  - ◇ Create 3D lines by overlaying features on a surface model
    - Make *road.shp* active
    - Go to **Theme** menu select **Convert to 3D shapefile**
    - Set the Get Z value to **Surface** and press **OK**
    - and select *Dtm\_tin* and press **OK**
    - Name the output and press **OK**
  - ◇ Create 3D shape interactively

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### **3D Analysis**

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- Make *Dtm\_tin* active
- **Copy Themes** from Edit menu
- **Open the new view**
- **Paste** from Edit menu
- Select Interpolate tool and draw some lines in the view
- Select All graphic from Edit menu
- Copy Graphics from Edit menu
- Paste in the previous 3D scene
- Now there are 3D lines
  
- **Exercise 3: Analyzing surfaces**
  - ◇ Use Identify tool to query information on a surface (TIN or grid)
  - ◇ Create slope, aspect themes and contour lines (like Spatial Analyst)
  - ◇ Measuring area and volume (created when a virtual flat surface with specified height cut selected surface)
    - Make a TIN theme active
    - Select Area and Volume Statistics from the Surface menu
    - Specify the base height
    - Specify whether area and volume above or below the surface
  - ◇ Determine cut and fill (how much material is lost or gained by comparing two surfaces model)
    - Add two surfaces and make both active
    - Select Cut-Fill from the Surface menu
    - Specify the before surface
    - Specify the cell size
  - ◇ Analyzing visibility
    - Line of sight
      - Add a grid or theme to view
      - Select Line of Sight tool
      - Specify the offset above the surface of the observer and target
      - Move the cursor from the observer to the target location (green means visible and red mean invisible)
    - Viewshed
      - Add a grid or theme to view
      - Add a point or a line theme which will be used for observation point
      - Make both themes active
      - Select Calculate Viewshed option from the Surface menu