

# GIS Features

- Points (X,Y location and attributes)
- Lines or PolyLines (Length, but no width)
- Polygons (Area)

GIS Features are a generic term for points, lines, polygons that might be from arc/info coverages, shapefiles, or arcgis geodatabase feature classes.

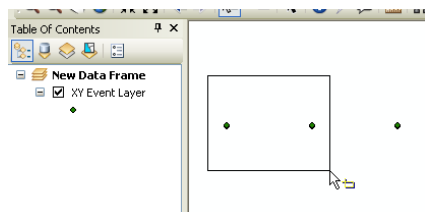
## Creating GIS Data

- Points
- Polylines
- Polygons

Creating points from a text file is a three step process in Arcmap

# Creating Test Points

- Make X,Y Event Layer
- Export or Copy Features tool



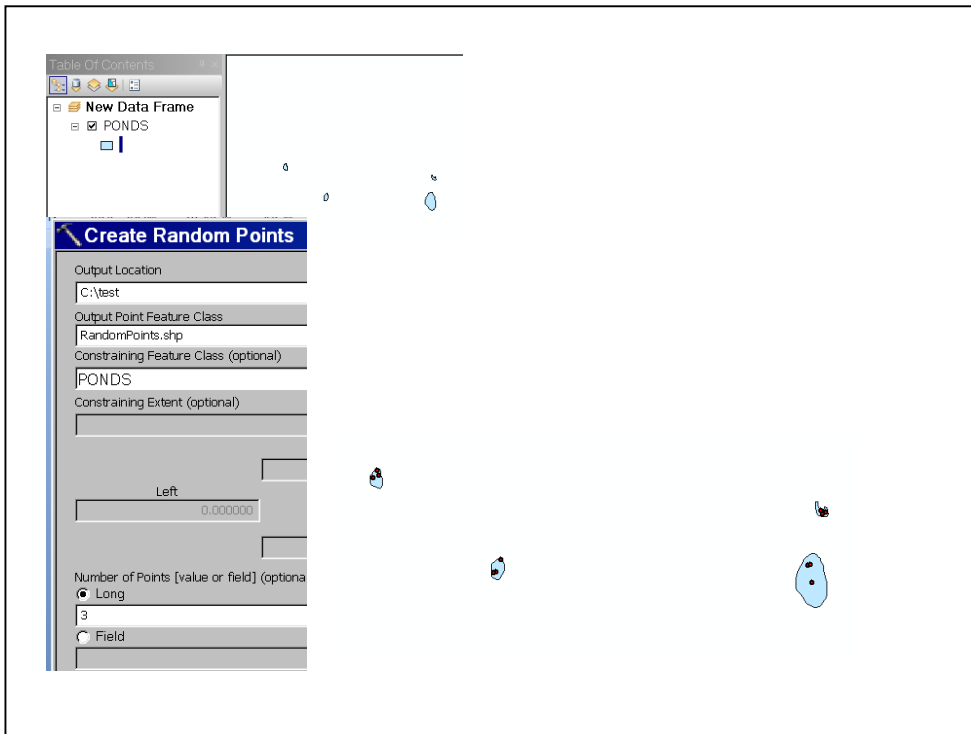
Creating points from a text file is a 2 step process in Arcmap. The select features tool will not work until you export your points to a permanent shapefile.

testpoints_Layer			
Latitude	Longitude	Name	
64.833330	-147.000000	Central Meridian	
64.500000	-144.000000	Eastern_Zone_Boundary	
64.000000	-150.000000	Western_Zone_Boundary	

Attributes of Test_Points_GCSNAD83				
FID	Shape	Latitude	Longitude	Name
0	Point	64.833333	-147	Central_Meridian
1	Point	64	-144	Eastern_Zone_Boundary
2	Point	65	-150	West_Zone_Boundary

**3 Points—3 rows**  
 FID stands for Feature ID  
 (FID values assigned by ArcGIS)

Typically there is a row to contain information for each feature, without a feature ID ArcGIS can not select features....

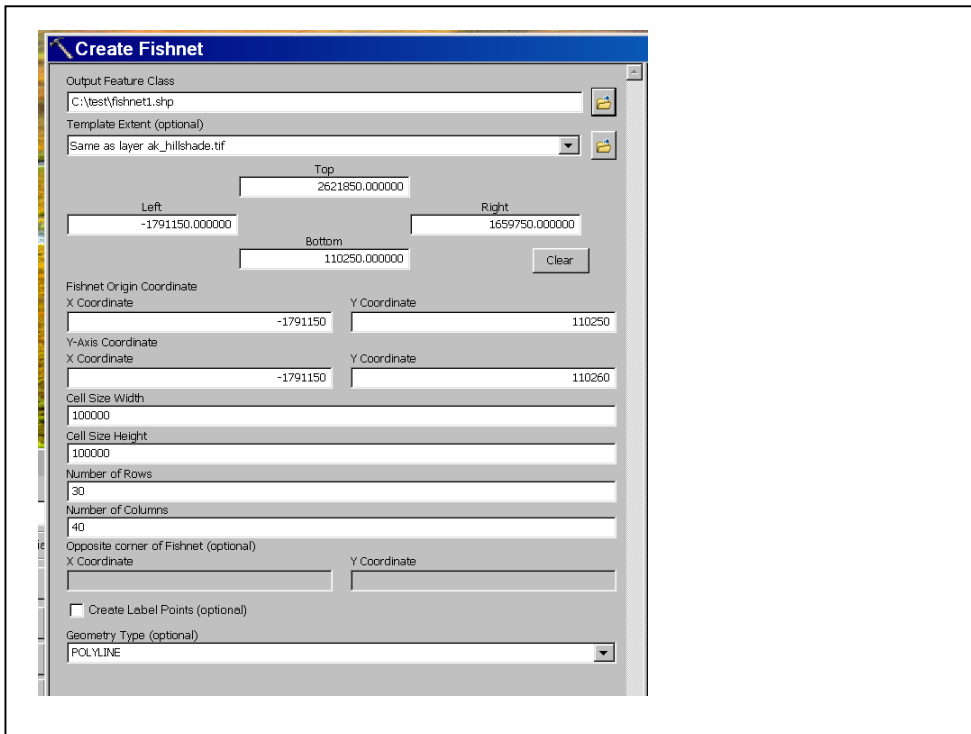


You can create random points inside of polygons.

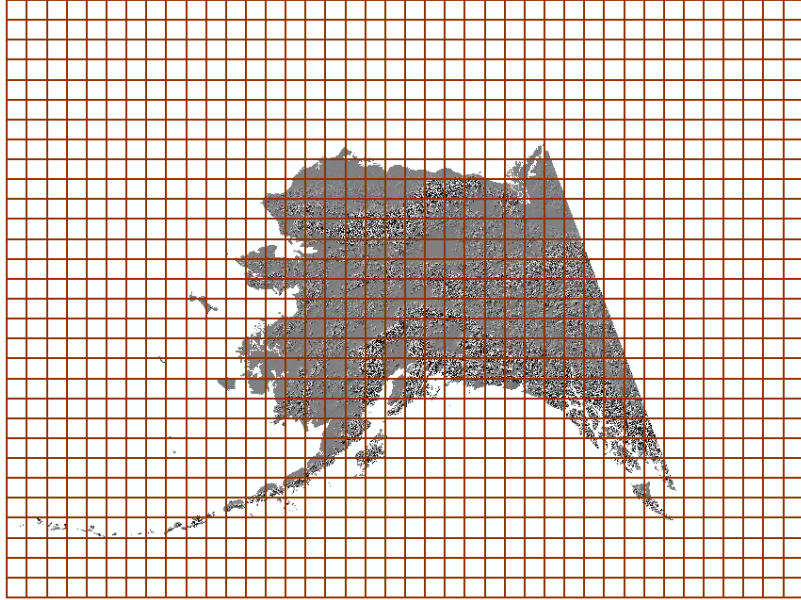
## Creating Lines and Polygons

- Create Fishnet tool
- Points to Line tool
- Feature to Polygon tool

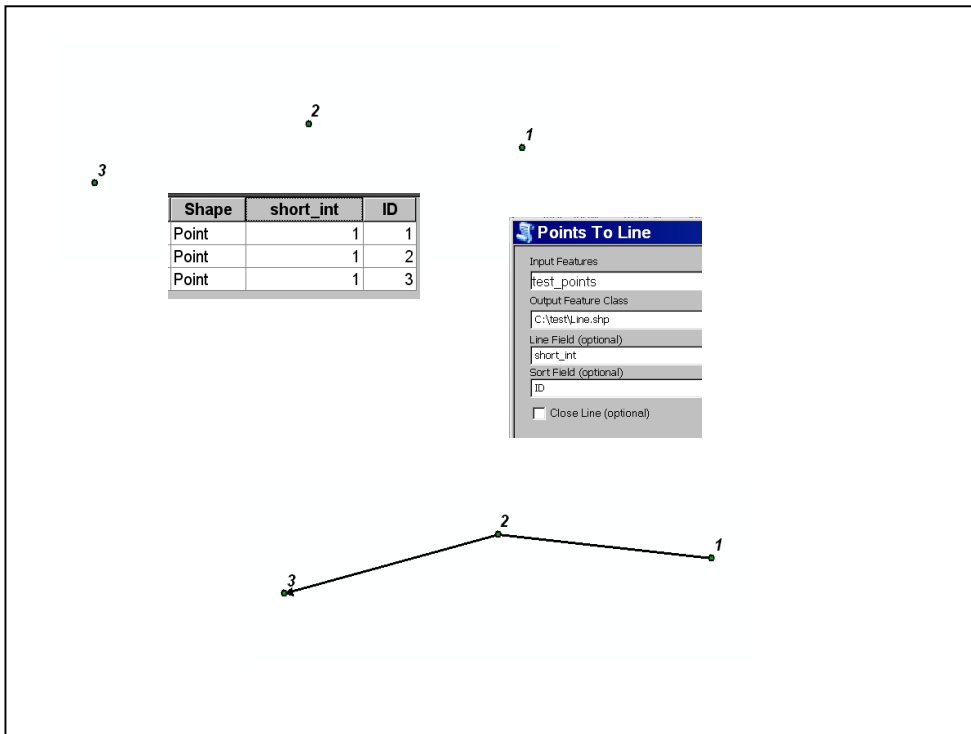
The Create Fishnet tool lets you specify rectangular lines that you could later convert to polygons using the Feature to Polygon tool.



Here we create a fishnet with lines 100 km spaced (100,000 meters).

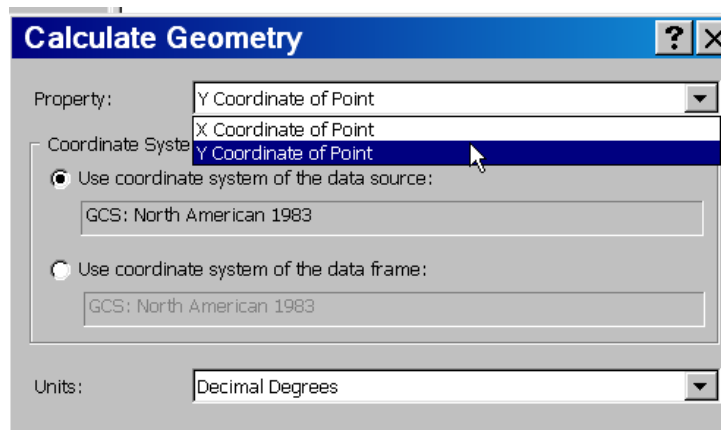






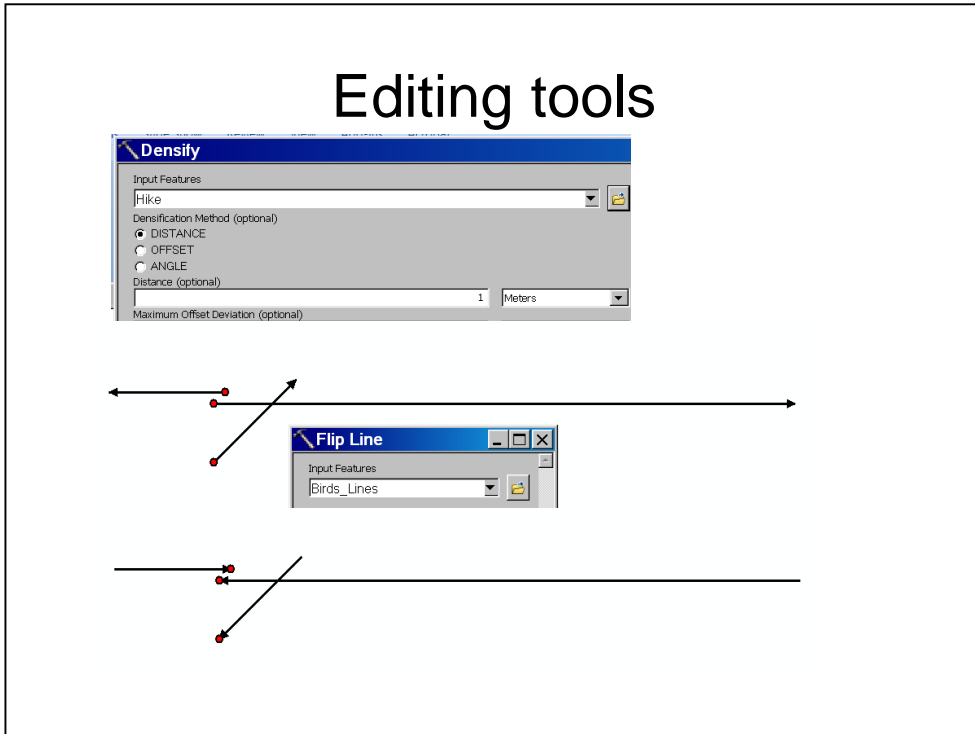
The Points to Line tool “connects the dots” in this case all points with the same short\_int field value will belong to the same line  
And the order is determined by the ID field.

# Line Geometry



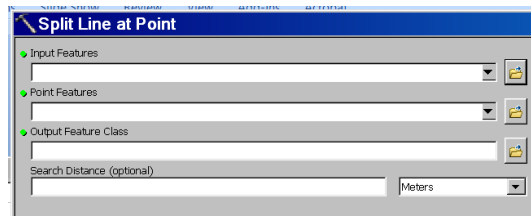
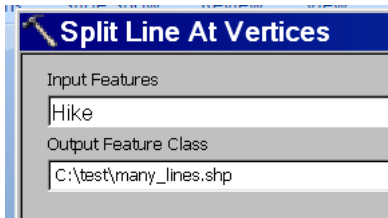
Notice that lines have length, but not area. Length is disabled if the coordinate system is GCS because the X,Y coordinates are spherical and not planar (meters or feet for example)

# Editing tools



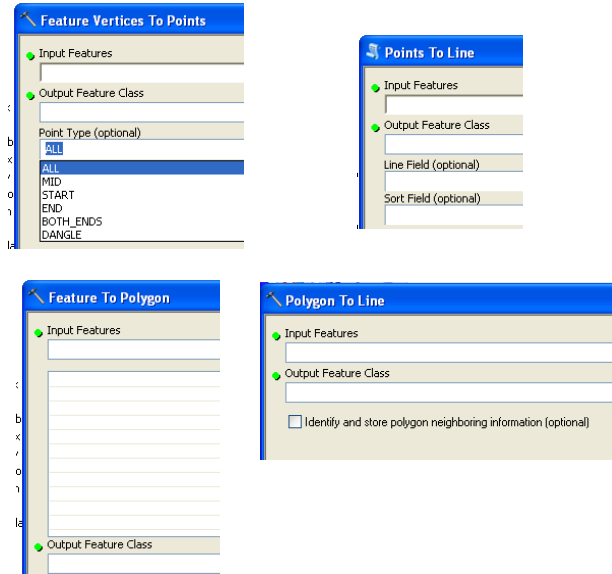
Here we use the Density tool to put a vertex every 1 meters along the lines. We use Flip Line to change the direction of each line.

# Splitting Lines



You can split line using point features, or split line at every line vertex. You can also output line vertices to a point feature class, either all the vertices, the start and/or ending vertex, dangling vertices, etc. You can convert a polygon to a polyline then convert the polyline to points.

# Conversion Tools



There are geoprocessing tools to convert to and from polygons, lines, points

# Arc/Info Coverages

- Data Format from 1970s/80s
- Attribute table in INFO format
- One folder for feature coordinates
- One INFO folder for all attribute tables
- Points, lines, polygons in one coverage



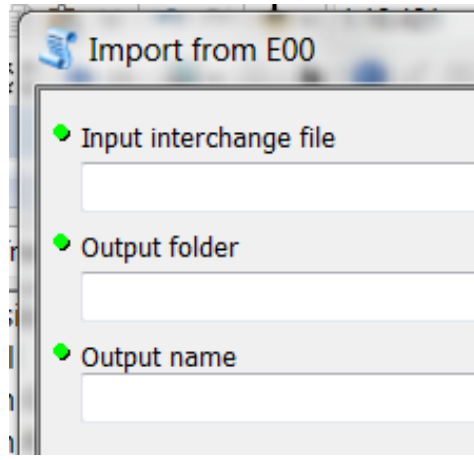
A screenshot of a software interface showing a table with two columns: 'Name' and 'Type'. The table lists four feature classes: 'tic', 'polygon', 'label', and 'arc'. Each name is preceded by a small icon representing its geometry type (point, polygon, label, and arc respectively).

Name	Type
tic	Tic Feature Class
polygon	Polygon Feature Class
label	Label Feature Class
arc	Arc Feature Class

## ArcInfo Coverages in ArcGIS

- Can not edit points, lines or polygons with ArcGIS
- Can export to shapefile
- Can not edit INFO table
- Can export INFO table to dbf or excel table

- Sometimes unzipped as .e00 files



Import from E00 creates an arc/info coverage from the .e00 file

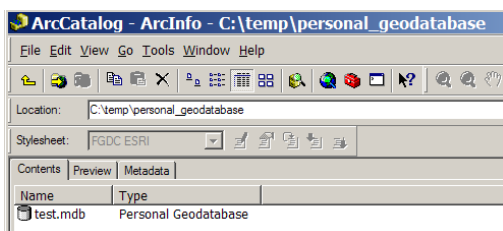
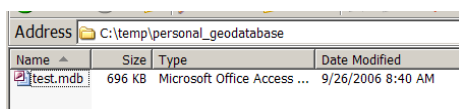


# ShapeFiles

- Misnomer...actually many companion files
- Attribute tables are **.dbf** files
- X,Y coordinates in **.shp** file
- coordinates index **.shx** file
- Projection information in **.prj** file
- Metadata information in **.xml** file

# Geodatabase

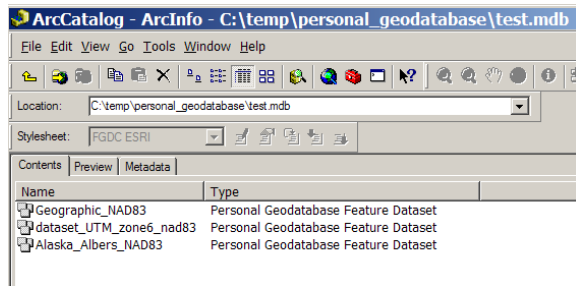
- Container for spatial/non-spatial data
- Personal or File-Based Geodatabase



A geodatabase created in ArcGIS version 10.5 will not work with ArcGIS version 9.0

# Feature Dataset

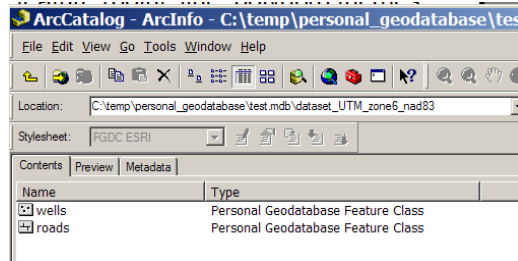
- Folder with data all in same coordinate system



A geodatabase feature dataset is a container inside the geodatabase for GIS data having the same extent and coordinate system.

# Feature Classes

- GIS feature (point, line, polygon) themes



Geodatabase feature classes are typically inside the feature dataset container.