

# ArcGIS Desktop: Automating Geoprocessing Tasks with Scripts

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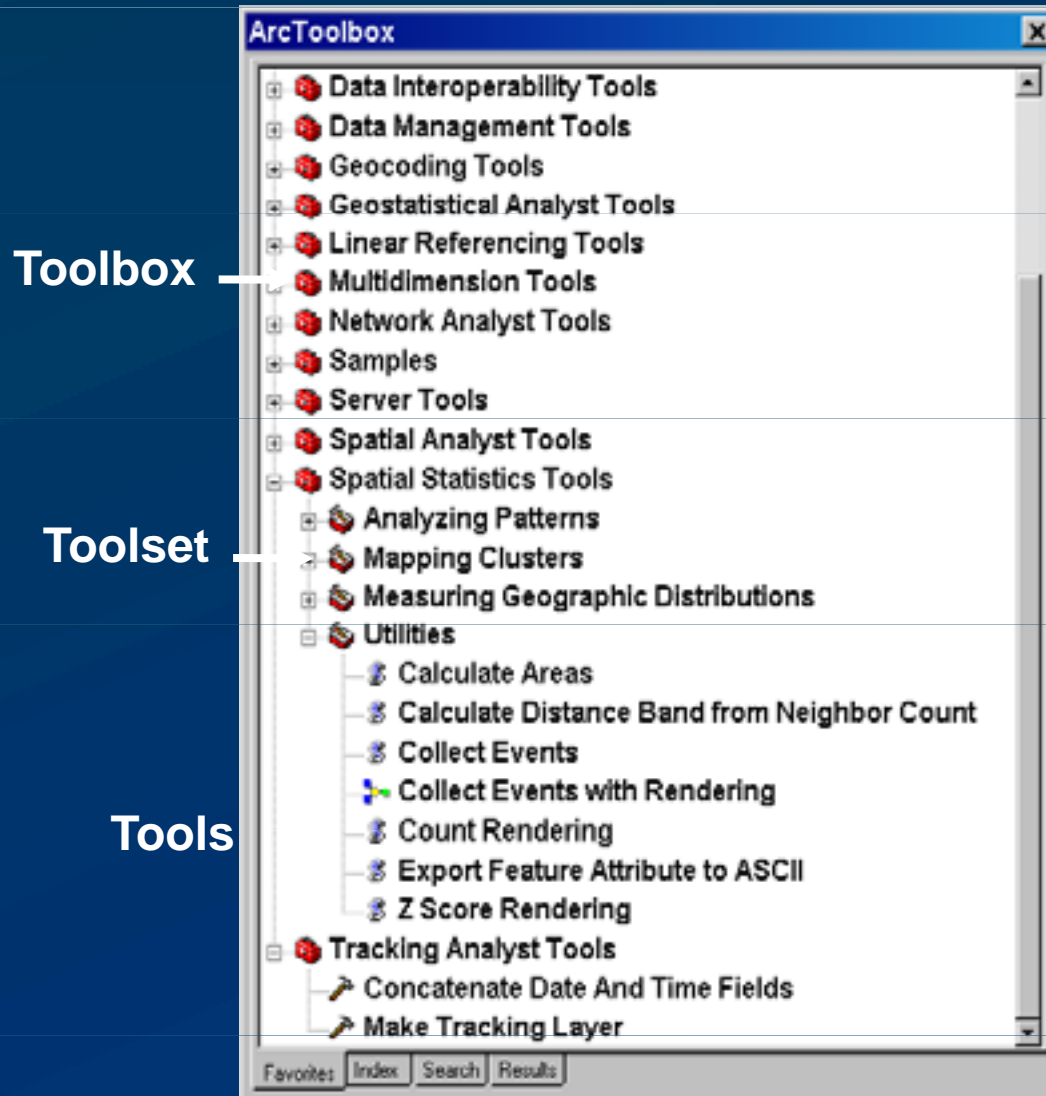


# Why write scripts?

- **Automate workflow**
  - Copy all incoming data into a geodatabase
  - Perform project, clip, buffer operations on multiple data sets
- **Run code at specific dates and times**
  - Windows AT command
  - Windows scheduler
- **Easily distribute code**
  - A script is a self-contained, single file
  - Scripts can be added to the ArcToolbox and run as a tool
- **Manipulate features and records**
  - Write tabular values and geometry (Create points, lines & polygons)
  - Read tabular values and geometry
  - Add and delete records and geometry



# Scripts & models can execute any tool in the toolbox



Over 500 tools are available to models and scripts



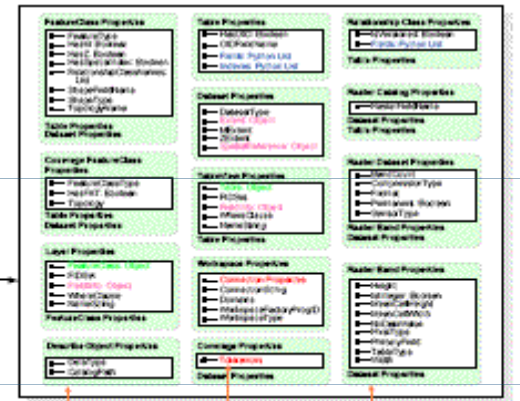
# The Geoprocessor Programming Model



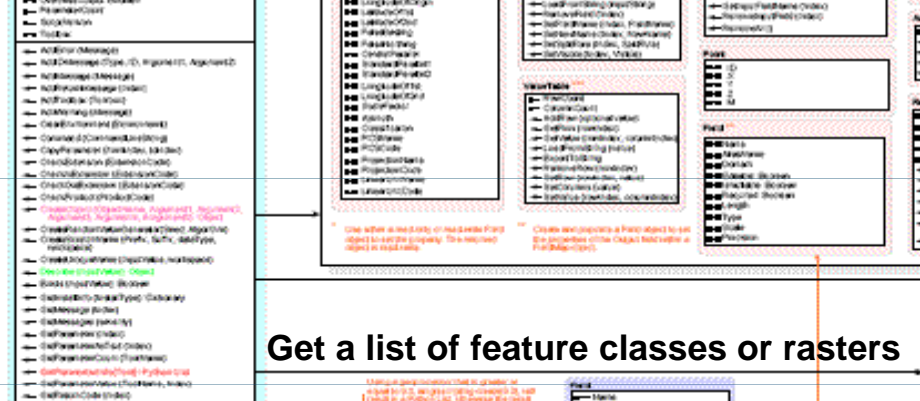
Geoprocessor Programming Model

ArcGIS 9.3

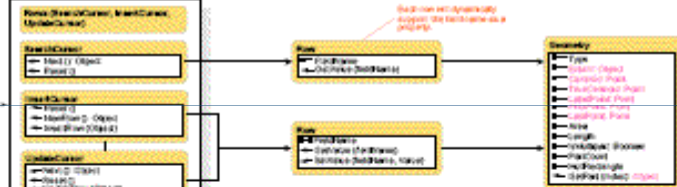
## Get Information about Data



## Get a list of feature classes or rasters



## Access records, fields & values in a table



## Get Information about geometry



# Points of interest

- Scripting ArcObjects do **not** replace standard ArcObjects
- Can use many scripting/programming languages
  - VBScript, JScript, Perl, Python, VBA, VB, C++, etc.
  - Anything that supports COM
  - Users do not have to learn a proprietary language
- ESRI primarily supports Python
  - Installed with ArcGIS 9
  - Samples, documentation, help
- Scripting is cross platform
  - Windows, Linux, Unix



# Geoprocessing script limitations

- **Geoprocessing scripts cannot...**
  - **Customize or interact with the interface**
  - **Manipulate the table of contents or change symbology**
  - **Limited user interaction**
- **Geoprocessing scripts can...**
  - **Be Created by exporting a model**
  - **Be executed from the toolbox**
  - **Run any tool in the toolbox and any method in the GP object model**
  - **Launch other applications including ArcObjects scripts**



# Demo: Describe feature classes & Write to .txt file

```
DescribeWrite.py
1 import arcpy, sys, string
2 gp=arcpy.create()
3
4 gp.workspace = r"c:\unionco\union.gdb"
5 fcs=gp.listfeatureclasses("*", "all")
6 fc=fcs.Next()
7 count = 1
8 fName = sys.argv[1]
9 f=open(fName, "w")
10 f.write("FCName, Type, Xmin, Ymax, Xmax, Ymin\n")
11 -while fc:
12     dsg = gp.describe(fc)
13     ext = string.replace(dsg.Extent, " ", ",")
14     f.write(fc+",")
15     f.write(dsg.shapetype+",")
16     f.write(ext+"\n")
17     fc=fcs.Next()
18     count = count +1
19 f.write("There are "+str(count)+" feature classes in "+gp.workspace)
20 f.close()
21
22
```



# Demonstrations

- Find the nearest fire hydrant to every building for each city
- Describe feature classes and write the info to a .txt file
- Edit the coordinates of points in a feature class (Edit geometry)
- Draw a line from point to point (Read and write geometry)
- Write sequential ID numbers





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# Geoprocessing script strengths & limitations

- **Geoprocessing scripts can...**
  - Be executed from the toolbox (Easy to use)
  - Run any tool in the toolbox and any method in the GP object model
  - Launch other applications including ArcObjects scripts
  - Help you become quickly productive
- **Geoprocessing scripts cannot...**
  - Customize or interact with the interface
  - Manipulate the table of contents or change symbology
  - Limited user interaction



# How to get started

- **Familiarize yourself with the Geoprocessing toolbox**
  - Use ArcGIS help to learn the Geoprocessing tools
  - Start with the Data Management and Analysis toolboxes
- **Create a model and export it as a script**
- **Take a Geoprocessing scripting class**
  - Introduction to Geoprocessing Scripts Using Python (2 days)
  - Writing Advanced Geoprocessing Scripts Using Python (3 days)
  - Geoprocessing with ArcGIS Desktop (15 hour virtual campus class)
  - <http://training.esri.com>

