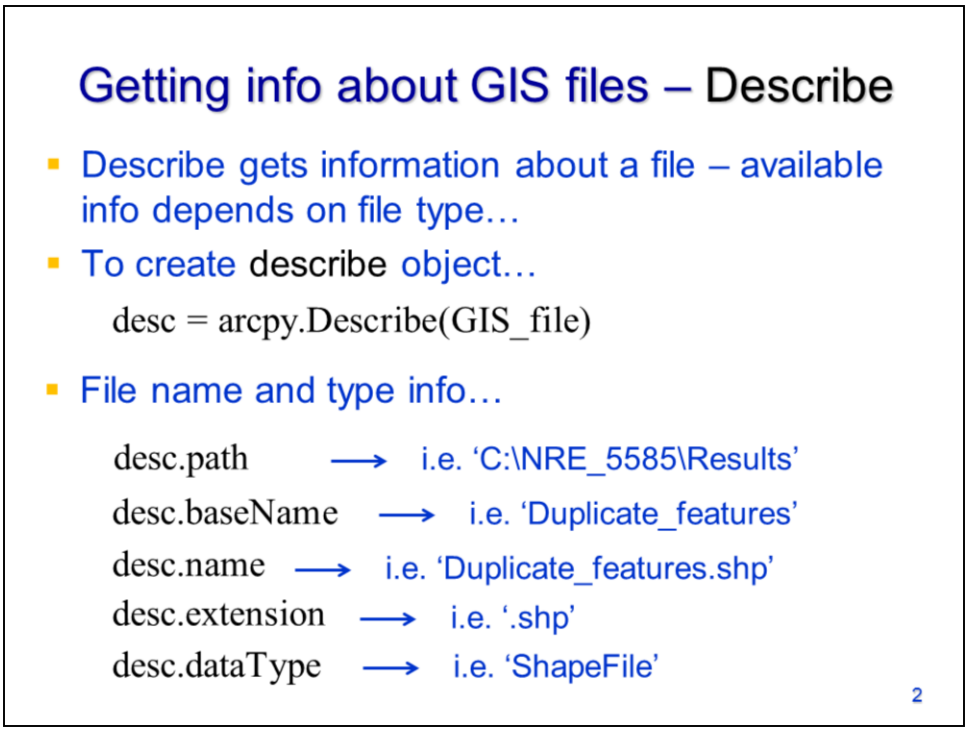
This video will discuss arcpy's Describe and List tools.



The Describe object contains information about the properties of a file – the exact properties available depends on the type of file.

The describe object is created by using arcpy's Describe method. The following properties are available for all file types:

- The workspace location
- The basename, excluding the file extension
- The basename, including the file extension
- The file extension
- And the data type of the file

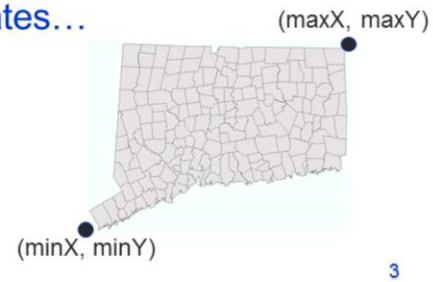
Extent objects

- Extent objects can be retrieved from several different objects (cursor, describe, result, etc.)…
- Get extent object for entire file (using Describe object)…

```
extentObj = desc.extent
```

- To get extent coordinates…

```
minX = extentObj.XMin
minY = extentObj.YMin
maxX = extentObj.XMax
maxY = extentObj.YMax
```



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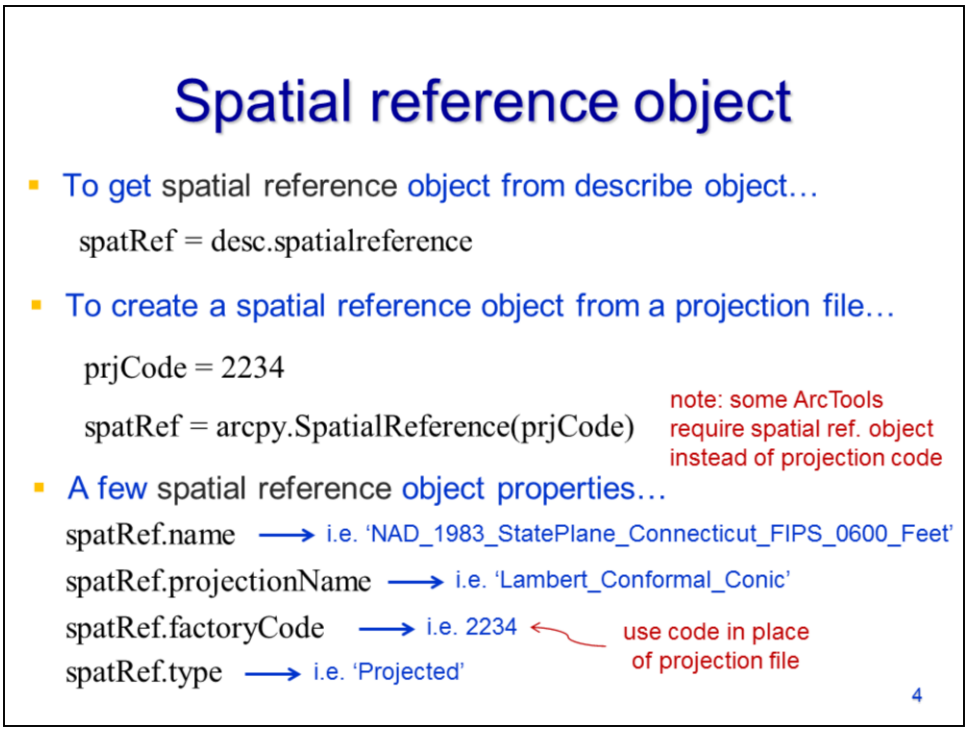
The extent object can also be retrieved for all file types using several different methods.

In this case, we'll use the describe object to get the extent of a dataset. The extent object is retrieved as a property of the describe object.

The extent object contains the coordinates of the minimum and maximum X and Y coordinates of a dataset.

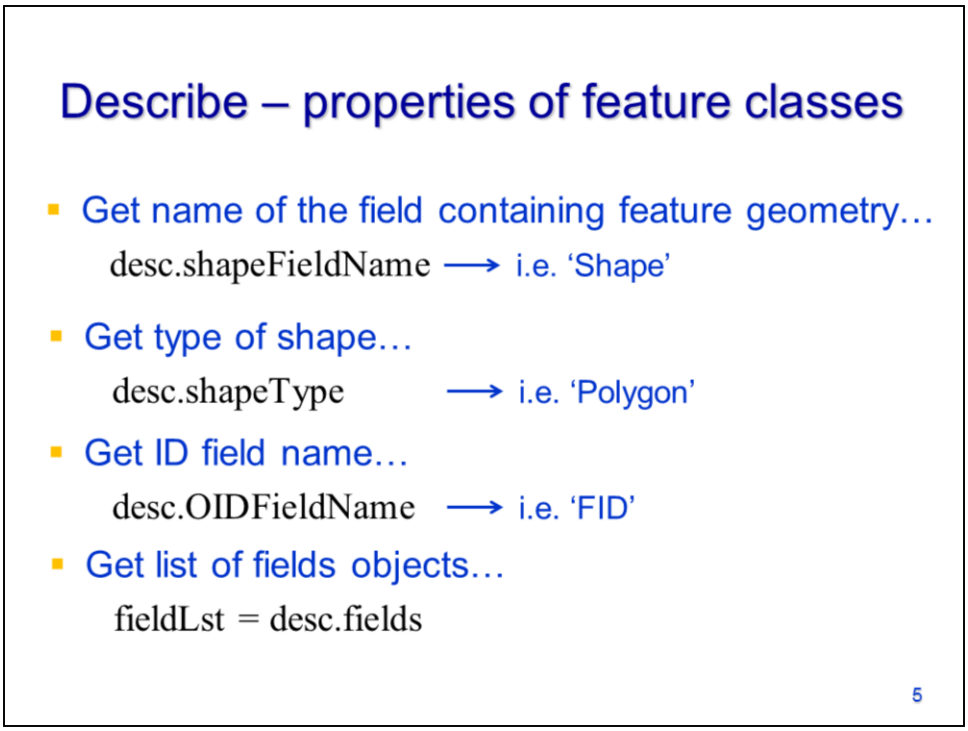
These coordinates are retrieved as properties of the extent object.



The **spatial reference** object can be retrieved as a property from the describe object.

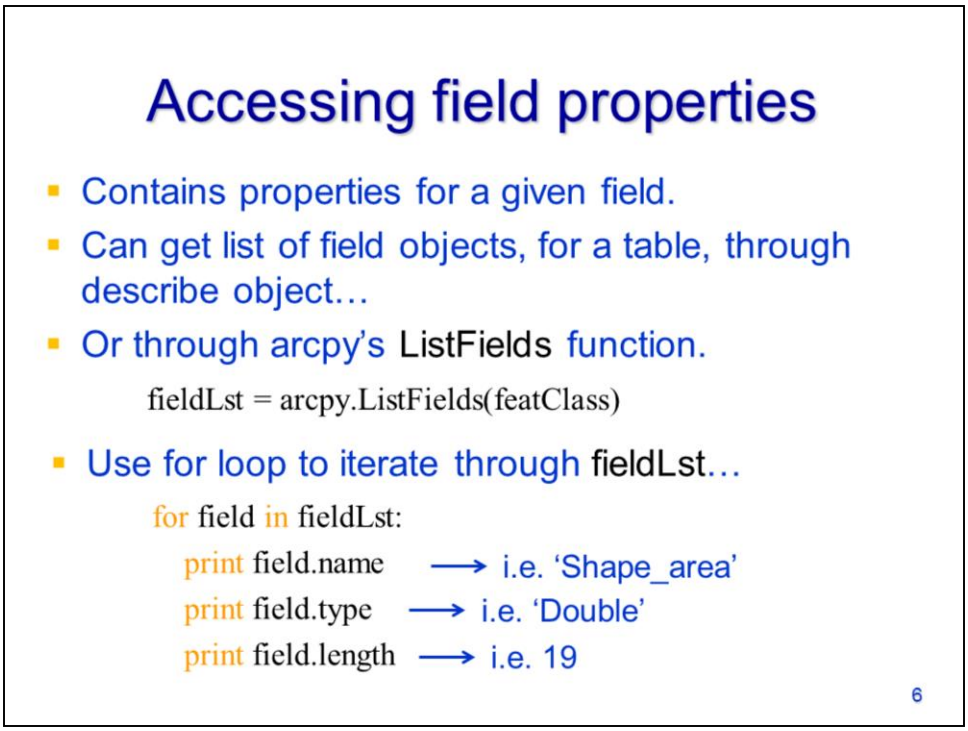
The spatial reference object can also be created using arcpy's SpatialReference method. This method requires a factory code which corresponds to a specific coordinate system – a .pdf with the factory codes can be found in the ArcGIS > Desktop 10.x > Documentation folder. Certain ArcTools require a spatial reference object rather than a simple projection code.

Some of the more commonly used properties of the spatial reference object include the coordinate system name, the projection name, the factory code, and the coordinate system type. A convenient method of looking up the factory code of a given coordinate system is to use the spatial reference object's factoryCode property.



This slide shows some properties of the Describe object that are available only for feature classes. These properties include:

- The shape field name which contains the feature geometry
- The shape type
- The FID field name
- A list containing the fields in the attribute table.



The fields are returned from the Describe tool as a list of **field objects**. The field objects contain properties such as the field name and type.

A list of field objects can also be obtained using arcpy's **ListFields** method.

Use a for loop to iterate through a list of field objects. The properties of the field object include the field name, type, and length.

ArcGIS help

For further info, search ArcGIS's help documentation…

Describe…

SpatialReference…

ListFields…

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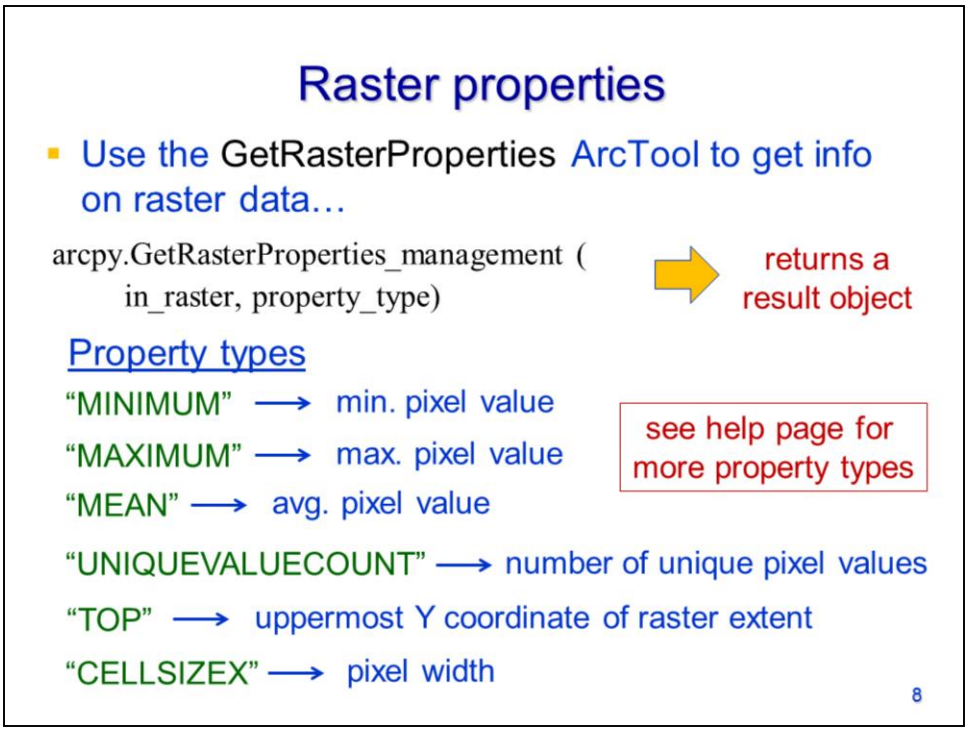
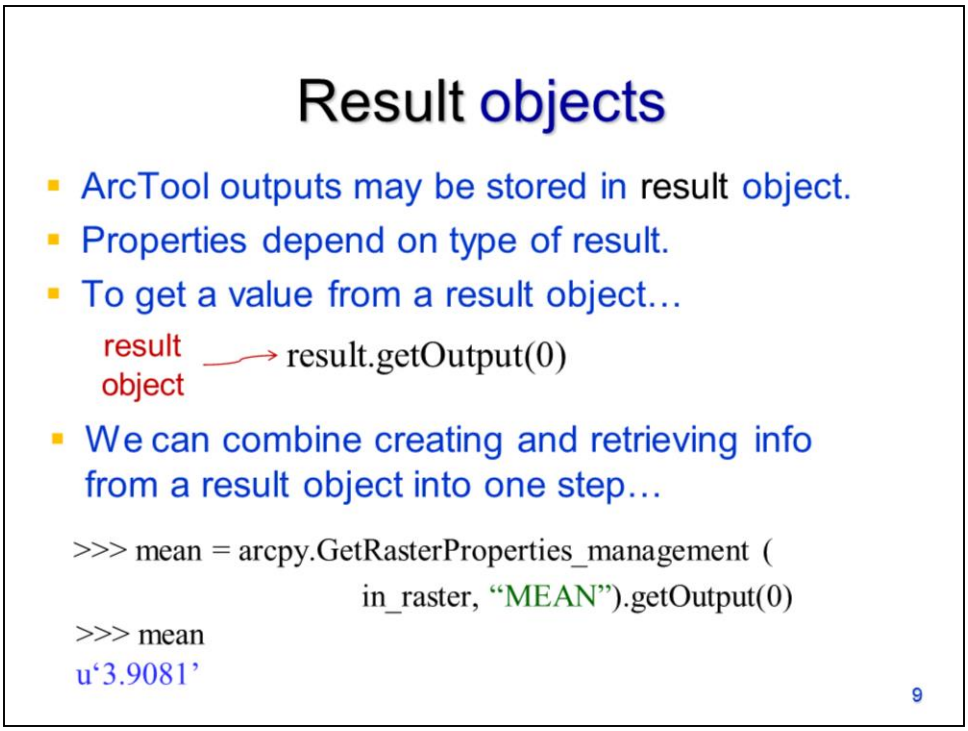
Refer to ArcGIS's documentation for further information on the Describe and Spatial Reference objects and on the ListFields method.



Arcpy's **GetRasterProperties** tool can be used to get information on raster datasets.

The information that can be retrieved by the GetRasterProperties tool includes:

- The minimum pixel value,
- The maximum pixel value
- The average pixel value
- The number of unique pixel values
- The extent coordinates
- And the cell size in both the x and y directions. There are a number of additional properties that can be retrieved – see the tool's help page for details.



The outputs of certain ArcTools are stored in a **result object**.

The properties of a results object depend on the tool that created it.

To get the value from a results object, use the **getOutput** method of the result object.

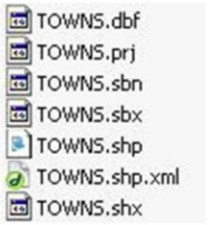
Retrieving info from the result object can be combined into the same statement that created the result object. In this example, the value is retrieved from the result object created by the GetRasterProperties tool.

The result in this case is returned as a string value. The "u" that precedes the string in this case indicates that it is unicode – these strings can be converted to a python string using the **str** function although this is usually not necessary.

Listing files in a workspace

- For GIS data, the listdir function (in the os module) retrieves the component files.

```
>>> os.listdir(wksp)
['TOWNS.dbf', 'TOWNS.prj', 'TOWNS.sbn', 'TOWNS.sbx',
'TOWNS.shp', 'TOWNS.shp.xml', 'TOWNS.shx']
```



- This works well for zip file operations…
- But not convenient for most geoprocessing tasks.

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As we've seen previously, the **os** modules **listdir** function gets a list of the files located in the specified workspace.

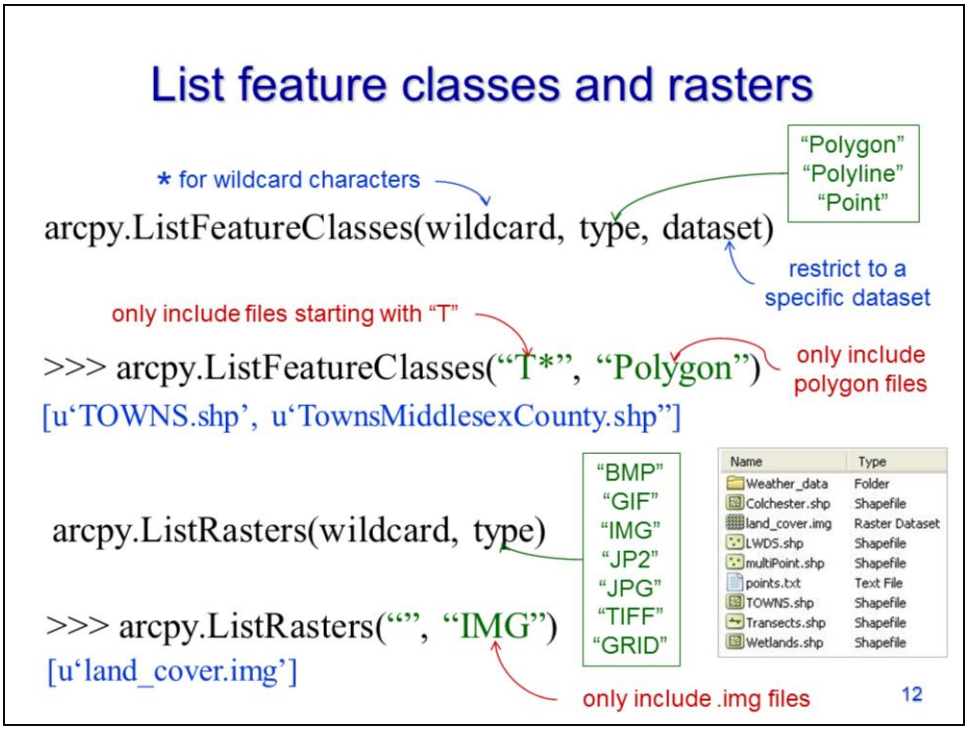
This can be inconvenient for GIS datasets which typically contain several file components.

Arcpy contains several methods getting lists of specific types of GIS files located in a workspace.

These methods are convenient because they do not retrieve the file components and are restricted to a specific type of file.

The arcpy workspace needs to be set before using the list methods.

The list functions will create a python list that contains the results. Wildcards can be used to restrict the names of files returned.



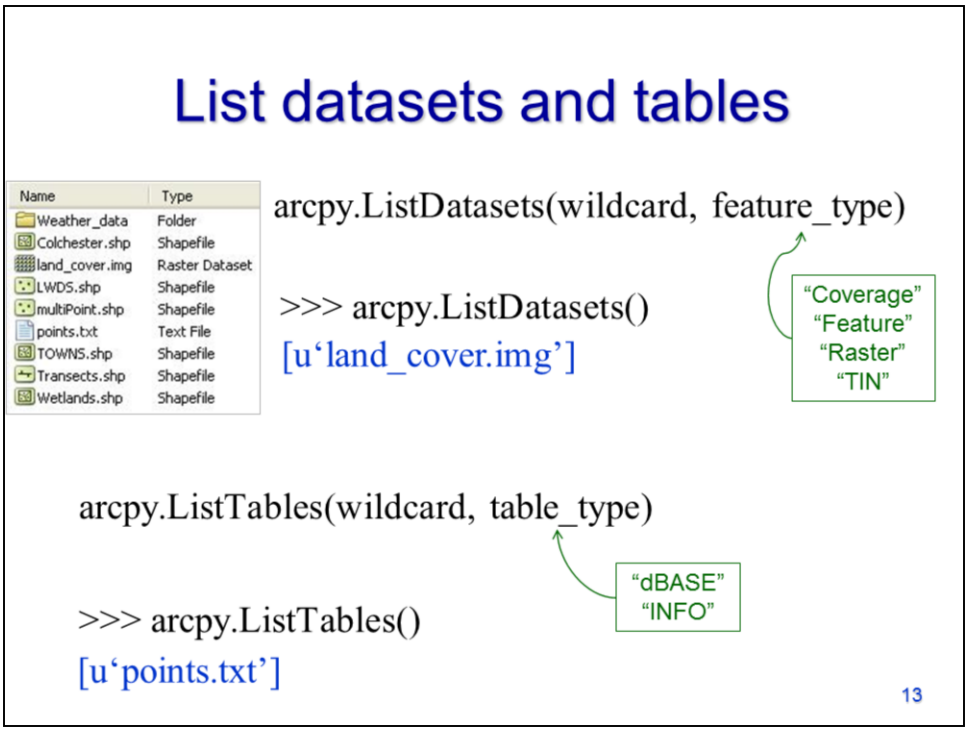
The **ListFeatureClasses** tool will only return feature classes. A wildcard can be used to restrict the results to file names that contain a certain character or sequence of characters – an asterisk is used to represent any number of characters in the wildcard. The type of feature class can be set as well as the dataset in which the tool will search.

In this example, the ListFeatureClass tool is restricted to feature classes that start with the letter "T" and are a polygon type.

Note that the result is a list containing the file basenames that satisfied the wildcard and feature type restrictions.

The **ListRasters** tool also allows a wildcard and raster extension can be specified.

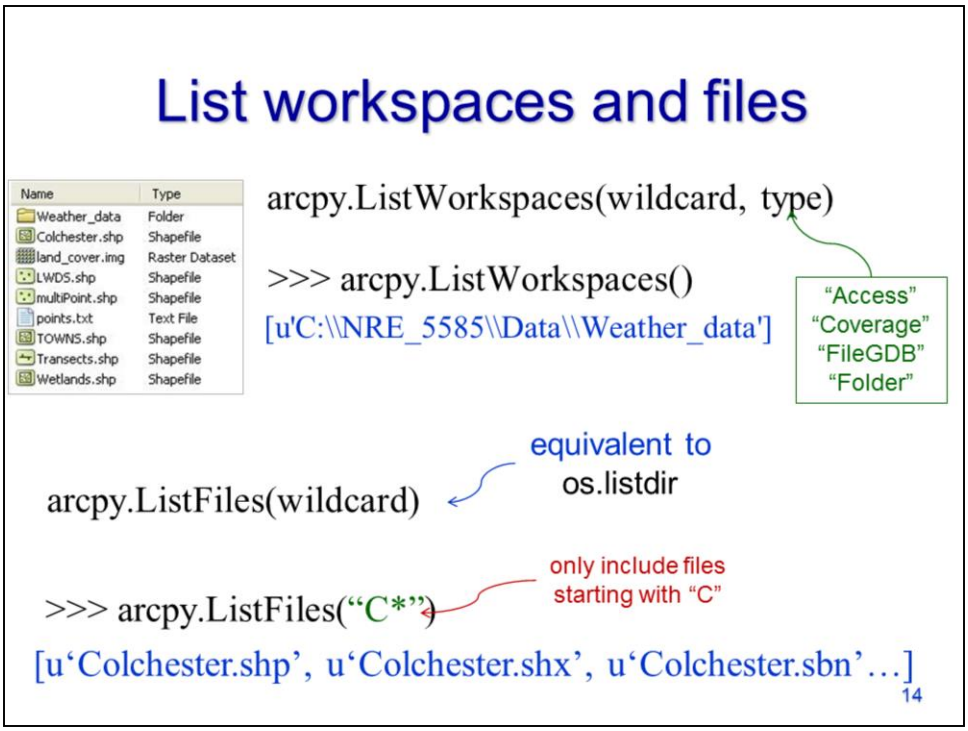
In this example, ListRaster tool is restricted to .img files.



The **ListDatasets** tool will get all dataset types that satisfy the wildcard and feature type parameters.

In this example, the only dataset in the workspace is the “land_cover.img”.

The **ListTables** tool will list tables in the workspace. Note that this tool will also return .txt files.



The **ListWorkspaces** tool will list all folders, geodatabases, and other workspaces located within arcpy's default workspace.

The **ListFiles** tool will list all file types in the workspace that satisfy the wildcard (if specified). This tool is equivalent to the os module's listdir function.