Attribute Manipulation

Types of Tables

- Standalone tables (.dbf)
- Featureclass tables
Fields & Field Interfaces

Dim pFLayer As IFeatureLayer  
Set pFLayer = pMap.Layer(0)

Dim pFields As IFields  
Dim aField As IField

Set pFields = pFLayer.FeatureClass.Fields  
Debug.Print pFields.FieldCount  
Debug.Print pFields.Field(0)  
Debug.Print pFields.FindField("Area") ' -1 if not found
Add New Fields

Dim aField As IFieldEdit
Set aField = New Field

With aField
  .Name = "FieldName"
  .Type = esriFieldTypeSmallInteger
  .Length = 4
End With

pFLayer.FeatureClass.AddField aField
Field.Type Constants

- esriFieldTypeBlob 8
- esriFieldTypeDate 5
- esriFieldTypeDouble 3
- esriFieldTypeGeometry 7
- esriFieldTypeGlobalID 11
- esriFieldTypeGUID 10
- esriFieldTypeInteger 1
- esriFieldTypeOID 6
- esriFieldTypeRaster 9
- esriFieldTypeSingle 2
- esriFieldTypeSmallInteger 0
- esriFieldTypeString 4

Calculate Field Value

Dim pCursor As ICursor
Dim pCalc As ICalculator
'Prepare a cursor
Set pCursor = pFClass.Update(Nothing, True)
Set pCalc = New Calculator
With pCalc
    Set .Cursor = pCursor
    .Expression = exp_string 'e.g., "[shape_area] * 0.040468"
    .Field = fieldname 'e.g., "area_ha"
    .Calculate
End With

Cursor Recycling:
True: single record process, reuse the same memory space
False: multiple record process, each record has its own memory space
Cursor

- A system that manages a group of records organized in rows.

Dim pCursor As ICursor
Set pCursor = pFClass.Search(Nothing, True)
Dim pFilter As IFeatureCursor
Set pCursor = pFClass.Search(pFilter, False)

Cursor & FeatureCursor Interfaces

Dim pFCursor As IFeatureCursor
Dim pQFilter As IQueryFilter
Dim pFClass As IFeatureClass

Set pQFilter = New QueryFilter
'Set pFClass reference here
pQFilter.WhereClause = "Area < 500"
Set pFCursor = pFClass.Search(pQFilter, False) 'or
Set pFCursor = pFClass.Update(pQFilter, False)

Set pField = pFCursor.Fields
Set aField = pField.Field(1) 'or any field index number
Dim FieldIndex As Integer
FieldIndex = pField.FindField(FieldName)

'access individual features or records
Dim pFeature As IFeature
Set pFeature = pFCursor.NextFeature
'read attribute - search
X = pFeature.Value(FieldIndex)
'update attribute - update
pFeature.Value(FieldIndex) = x
pFCursor.UpdateFeature pFeature
Update Records in a Table

Dim pFClass As IFeatureClass
Dim pQFilter As IQueryFilter
Dim pFCursor As IFeatureCursor
Dim pFields As IFields
Dim pFeature As IFeature

Dim Field_Name As String   'name of the attribute field
Dim izF As Long    'attribute field index number
Dim nf As Long     'number of features (rows)
Dim nfm1 As Long    'nf minus 1
Dim i As Long      'loop counter

Set pQFilter = New QueryFilter 'empty supports: SELECT *, i.e., Nothing
Set pFCursor = pFClass.Update(pQFilter, False)
Set pFields = pFCursor.Fields

nf = pFClass.FeatureCount(pQFilter)
nfm1 = nf - 1
Set pFields = pFCursor.Fields   'QI
izF = pFields.FindField(Field_Name)

For i = 0 To nfm1
  Set pFeature = pFCursor.NextFeature
  pFeature.value(izF) = i
  pFCursor.UpdateFeature pFeature
Next i

IQueryFilter Interface

<table>
<thead>
<tr>
<th>All</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AddField</td>
<td>Appends a single field name to the list of sub-fields.</td>
</tr>
<tr>
<td>OutputSpatialReference</td>
<td>The spatial reference in which to output geometry for a given field.</td>
</tr>
<tr>
<td>SubFields</td>
<td>The comma delimited list of field names for the filter.</td>
</tr>
<tr>
<td>WhereClause</td>
<td>The where clause for the filter.</td>
</tr>
</tbody>
</table>

IFeature Interface

<table>
<thead>
<tr>
<th>All</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
<td>The Object Class for the row.</td>
</tr>
<tr>
<td>Delete</td>
<td>Deletes the row.</td>
</tr>
<tr>
<td>Extent</td>
<td>The extent of the feature.</td>
</tr>
<tr>
<td>FeatureType</td>
<td>The type of the feature.</td>
</tr>
<tr>
<td>Fields</td>
<td>The fields Collection for this row buffer.</td>
</tr>
<tr>
<td>HasOID</td>
<td>Indicates if the row has an OID.</td>
</tr>
<tr>
<td>OID</td>
<td>The OID for the row.</td>
</tr>
<tr>
<td>Shape</td>
<td>A reference to the default shape for the feature.</td>
</tr>
<tr>
<td>ShapeCopy</td>
<td>A cloned copy of the default shape for the feature.</td>
</tr>
<tr>
<td>Store</td>
<td>Stores the row.</td>
</tr>
<tr>
<td>Table</td>
<td>The Table for the row.</td>
</tr>
<tr>
<td>Value</td>
<td>The value of the field with the specified index.</td>
</tr>
</tbody>
</table>
IDataStatistics & IStatisticsResults

Dim pData As IDataStatistics
Dim pResults As IStatisticsResults
Set pData = New DataStatistics
pData.Field = "Area"
Set pData.Cursor = pCursor
Set pResults = pData.Statistics
With pResults
    Debug.Print .Count
    Debug.Print .Maximum
    Debug.Print .Mean
    Debug.Print .Minimum
    Debug.Print .StandardDeviation
    Debug.Print .Sum
End With
Geoprocessing Object

- Corresponds to the tools in ArcToolbox
- Its arguments (i.e., strings or objects) are set through GpDispatch coclass
- A coarse-grained object
- Similar to Arc Macro Language (AML)

Buffer tool

```
'Initialize the Geoprocessor
Dim GP As IGeoProcessor
Set GP = New GeoProcessor

'Set the workspace environment
GP.SetEnvironmentValue "workspace", "C:\temp"

'Set up the array of parameters
Dim Parameters As IVariantArray
Set Parameters = New VarArray
Parameters.Add "road"
Parameters.Add "roads_500"
Parameters.Add "500 Meters"

'Execute the buffer tool
GP.Execute "Buffer_analysis", Parameters, Nothing

Dim GPDisp As Object
Set GPDisp = CreateObject("esriGeoprocessing.GpDispatch.1")
GPDisp.Workspace = "C:\temp"
GPDisp.Buffer_analysis "road", "roads_500", "500 Meters"
```
Add/Delete Fields Using GP

- Add Field and Delete Field tools in ArcToolBox in the Data Management Tools -> Fields toolset.

Dim GP As Object
Set GP = CreateObject("esriGeoprocessing.GpDispatch.1")

GP.Workspace = "C:\Users\test"
GP.DeleteField_management "test.shp", "popu90"
GP.AddField_management "test.shp", "popu90", "SHORT"
Set GP = Nothing

**Command line syntax**

An overview of the command line window

AddField_management <in_table> <field_name> <LONG | TEXT | FLOAT | DOUBLE | SHORT | DATE | BLOB> {field_precision} {field_scale} {field_length} {field_alias} {NULLABLE | NON_NULLABLE} {NON_REQUIRED | REQUIRED} {field_domain}