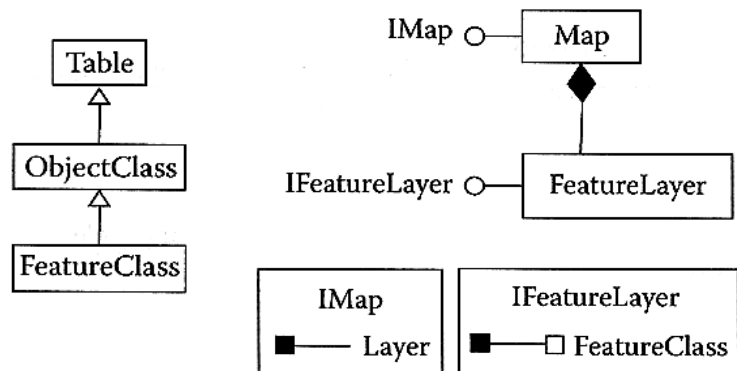


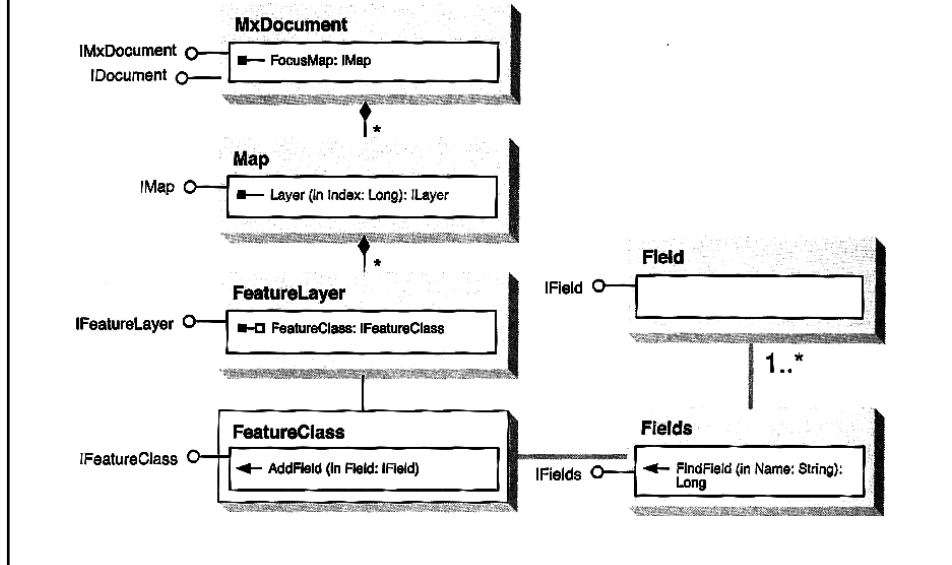
## Attribute Manipulation

## Types of Tables

- Standalone tables (.dbf)
- Featureclass tables



## Fields & Field

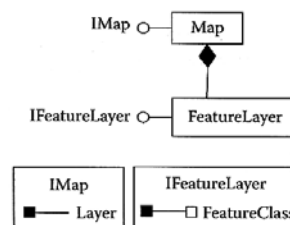


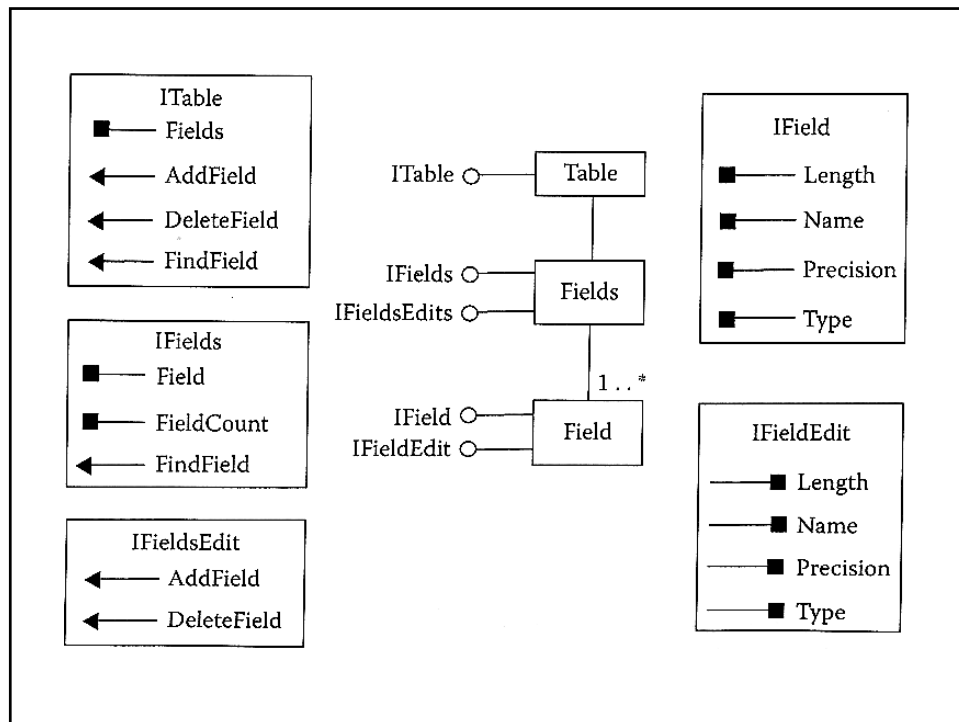
## Fields & Field Interfaces

```
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
```

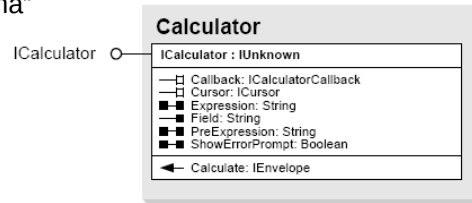
## Field.Type Constants

- [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

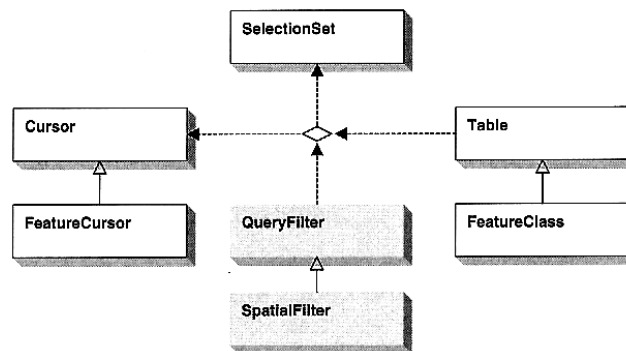
- A system that manages a group of records organized in rows.

Dim pCursor As ICursor

Set pCursor = pFClass.Search(Nothing, True)

Dim pFilter As IFeatureCursor

Set pCursor = pFClass.Search(pFilter, False)



## Cursor & FeatureCursor Interfaces

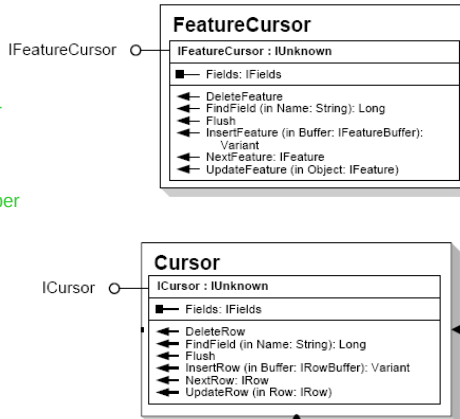
Dim pFCursor As IFeatureCursor  
Dim pQFilter As IQueryFilter  
Dim pFClass As IFeatureClass

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

|    | All <input type="button" value="v"/>   | Description                                                          |
|----|----------------------------------------|----------------------------------------------------------------------|
| ←  | <a href="#">AddField</a>               | Appends a single field name to the list of sub-fields.               |
| ■□ | <a href="#">OutputSpatialReference</a> | The spatial reference in which to output geometry for a given field. |
| ■■ | <a href="#">SubFields</a>              | The comma delimited list of field names for the filter.              |
| ■■ | <a href="#">WhereClause</a>            | The where clause for the filter.                                     |

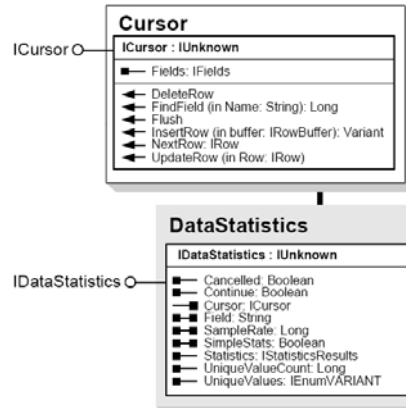
## IFeature Interface

|    | All <input type="button" value="v"/> | Description                                         |
|----|--------------------------------------|-----------------------------------------------------|
| ■← | <a href="#">Class</a>                | The Object Class for the row.                       |
| ←  | <a href="#">Delete</a>               | Deletes the row.                                    |
| ■← | <a href="#">Extent</a>               | The extent of the feature.                          |
| ■← | <a href="#">FeatureType</a>          | The type of the feature.                            |
| ■← | <a href="#">Fields</a>               | The fields Collection for this row buffer.          |
| ■← | <a href="#">HasOID</a>               | Indicates if the row has an OID.                    |
| ■← | <a href="#">OID</a>                  | The OID for the row.                                |
| ■□ | <a href="#">Shape</a>                | A reference to the default shape for the feature.   |
| ■← | <a href="#">ShapeCopy</a>            | A cloned copy of the default shape for the feature. |
| ←  | <a href="#">Store</a>                | Stores the row.                                     |
| ■← | <a href="#">Table</a>                | The Table for the row.                              |
| ■■ | <a href="#">Value</a>                | The value of the field with the specified index.    |

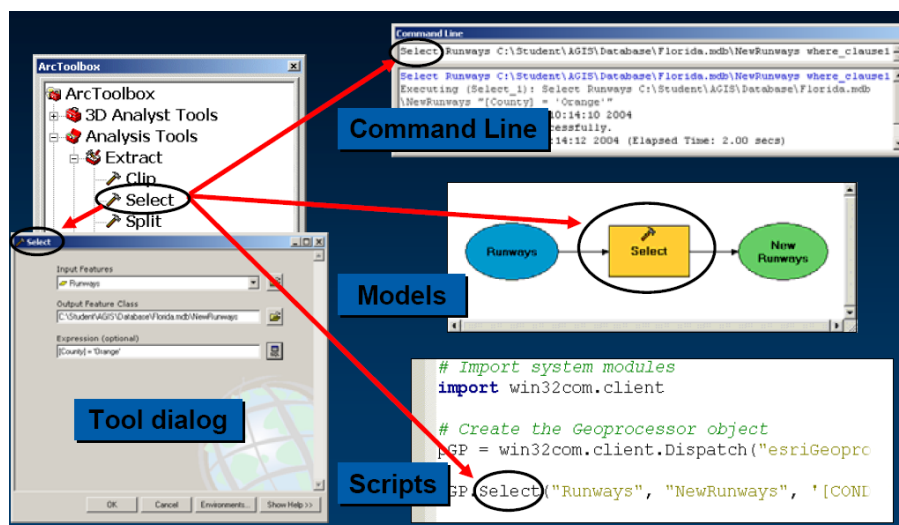
# IDataStatistics & IStatisticsResults

```

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
    
```



# ArcGIS Geoprocessing



# 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"
```

### Command line syntax

[An overview of the command line window](#)

Buffer\_analysis <in\_features> <out\_feature\_class> <buffer\_distance\_or\_field> {FULL | LEFT | RIGHT | OUTSIDE\_ONLY} {ROUND | FLAT} {NONE | ALL | LIST} {dissolve\_field;dissolve\_field...}

# 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}