

- * Buttons and Tools review
- * Using existing ArcGIS commands
- * Defining an area on a map (IEnvelope)
- * Working with graphic map elements

GEOG 4/590: GIS Programming

Buttons and Tools

- Use the wizard to generate a .vb class file that inherits ESRI Button or Tool class
- Button and tool images are packaged with the add-in; cannot be uploaded later
- Buttons/Tools can be added to toolbars, menus, or tool palettes in Config.esriaddinx
- Users can add to their toolbars through Customize... dialog





Button behavior

- Add your code to OnClick() sub to respond to user clicks

```
Protected Overrides Sub OnClick()
    My.ArcMap.Application.CurrentTool = Nothing
    ' Declare the IDockableWindow class
    Dim dockWindow As ESRI.ArcGIS.Framework.IDockableWindow
    ' Declare the UID class
    Dim dockWinID As ESRI.ArcGIS.esriSystem.UID = New ESRI.ArcGIS.esriSystem.UID
    ' Set value property of UID to the form we wish to display
    dockWinID.Value = My.ThisAddIn.IDs.FrmLam
    ' Get the dockable window containing the form frm the DockableWindowManager
    dockWindow = My.ArcMap.DockableWindowManager.GetDockableWindow(dockWinID)
    ' Toggle the dockable window visible/invisible depending on current setting
    dockWindow.Show((Not dockWindow.IsVisible()))
End Sub
```

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Tool behaviors

	OnActivate	Occurs when the tool is set to be the current tool.
	OnContextMenu	Occurs when the right mouse button is pressed when this tool is the active tool.
	OnDeactivate	Occurs when the tool is no longer the current tool.
	OnDoubleClick	Occurs when a mouse button is double clicked when this tool is active.
	OnKeyDown	Occurs when a key on the keyboard is pressed when this tool is active.
	OnKeyUp	Occurs when a key on the keyboard is released when this tool is active.
	OnMouseDown	Occurs when a mouse button is pressed when this tool is active.
	OnMouseMove	Occurs when the mouse is moved when this tool is active.
	OnMouseUp	Occurs when a mouse button is released when this tool is active.
	OnRefresh	Occurs when a screen display in the application is refreshed.
	OnUpdate	Called periodically by the framework once the tool has been created.

- Most tool methods are intended to track the user interacting with the map

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OnMouseDown()

- Add your code to the user action you want to respond to

```
Protected Overrides Sub OnMouseDown(ByVal arg As ESRI.ArcGIS.Desktop.AddIns.Tool.MouseEventArgs)
    MyBase.OnMouseDown(arg)
    'Get the active view from the ArcMap static class.
    Dim activeView As IActiveView = My.ArcMap.Document.ActiveView
    'If it's a polyline object, get from the user's mouse clicks.
    Dim polyline As IPolyline = GetPolylineFromMouseClicks(activeView)
    'Make a color to draw the polyline.
    Dim rgbColor As IRgbColor = New RgbColorClass()
    rgbColor.Red = 255
    'Add the user's drawn graphics as persistent on the map.
    AddGraphicToMap(activeView.FocusMap, polyline, rgbColor, rgbColor)
    'Best practice: Redraw only the portion of the active view that contains graphics.
    activeView.PartialRefresh(esriViewDrawPhase.esriViewGraphics, Nothing, Nothing)
End Sub
```

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Tools (cursor property)

- Setting the cursor property sets the mouse pointer of the tool
- See Windows.Forms.Cursors in MSDN for cursor choices
 - [http://msdn.microsoft.com/en-us/library/system.windows.forms.cursors\(v=VS.90\).aspx](http://msdn.microsoft.com/en-us/library/system.windows.forms.cursors(v=VS.90).aspx)
- You can update the cursor in tool event subroutines (OnMouseDown(), OnDoubleClick(), etc.)

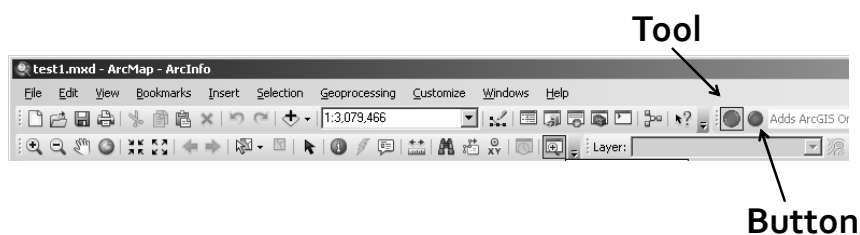
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Setting the cursor to crosshair

```
Public Sub New()
    Me.Cursor = Windows.Forms.Cursors.Cross
End Sub
```

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Button or Tool ?



- Buttons trigger single actions
- Tools stay active until a different tool is selected
- Use a tool if you need to respond to the user's actions (mouse/keyboard)

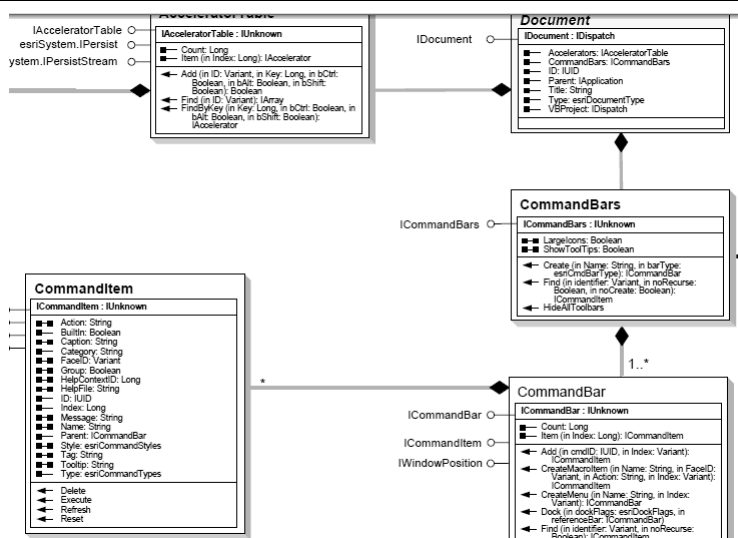
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Using existing ArcGIS commands

- Find the command CLSID or ProgID
 - http://help.arcgis.com/en/sdk/10.0/arcobjects_net/conceptualhelp/index.html#//00010000029s000000
- ICommandBars
 - Collection of all the toolbars available to a document
 - Find() method with CLSID or ProgID retrieves a built-in command
 - Call execute() to run

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CommandBars object diagram



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Example

```

Private Sub FindCommandAndExecute(ByVal application As ESRI.ArcGIS.Framework.IApplication, B
    ' Casting MxDocument to IDocument
    Dim document As ESRI.ArcGIS.Framework.IDocument = My.ArcMap.Document
    ' Get the commandBars object from the IDocument
    Dim commandBars As ESRI.ArcGIS.Framework.ICommandBars = document.CommandBars
    ' Instantiate a UIDClass
    Dim uid As UID = New UIDClass()
    ' Set the value property of uid to the command name we are looking for
    ' Example: "esriFramework.HelpContentsCommand" or "{D74B2F25-AC90-11D2-87F8-0000F8751720
    uid.Value = commandName
    ' Use ICommandBars.Find to find the command
    Dim commandItem As ESRI.ArcGIS.Framework.ICommandItem = commandBars.Find(uid, False, Fal
    If Not (commandItem Is Nothing) Then
        'Execute the command
        commandItem.Execute()
    End If
End Sub

```

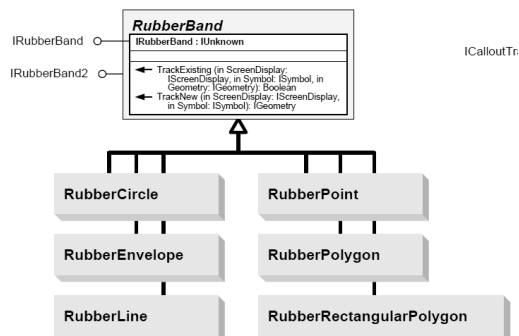
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Defining an area on a map

```

Public Function GetEnvelopeFromMouseClicks(ByVal activeView As IActiveView, As IEnvelope?
    'get the screenDisplay from the activeView which comes from My.Document.ActivatedView
    Dim screenDisplay As IScreenDisplay = activeView.ScreenDisplay
    'Use the RubberBand object to track the movement of mouse cursor
    Dim rubberBand As IRubberBand? = New RubberEnvelope
    'RubberBand.TrackNew() returns an IGeometry object
    Dim geometry As IGeometry? = RubberBand.TrackNew(screenDisplay, Nothing)
    'Cast IGeometry to Envelope; Envelope implements IGeometry5
    Dim env As IEnvelope? = CType(geometry, Envelope)
    Return env
End Function

```



Formatting the graphic element

```

Private Function GetRectangleFromEnvelope(ByVal env As IEnvelope) As IRectangleElement
    'Create new Rectangle object
    Dim pElem As IElement = New RectangleElement
    'Set IEnvelope as the geometry
    pElem.Geometry = env
    'Create interface so we can set the fill symbol for the rectangle
    Dim pFillShapeElem As IFillShapeElement = pElem
    'Create interface so we can access the fill symbol
    Dim pFillSymbol As IFillSymbol = pFillShapeElem.Symbol
    Dim pColor As IColor = pFillSymbol.Color
    Dim pLineStyle As ILineStyle = pFillSymbol.Outline
    pColor.Transparency = 0 'set background to transparent
    pColor.RGB = RGB(255, 0, 0) 'color is red
    pLineStyle.Width = 0.1
    pFillSymbol.Color = pColor
    pFillSymbol.Outline = pLineStyle
    pFillShapeElem.Symbol = pFillSymbol
    Return pElem
End Function

```

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IGraphicsContainer

- Interface implemented by the Map
- Manages graphic elements of Map
 - .AddElement(), .DeleteElement()
 - .DeleteAllElements()
 - Move through elements using .Next(), .Reset() (like a cursor)

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Add element to IGraphicsContainer

```
'graphics container
Dim pGContainer As IGraphicsContainer
pGContainer = My.Document.ActivatedView
pGContainer.DeleteAllElements()
'add pElem with default order
pGContainer.AddElement(pElem, 0)
'My.Document.ActivatedView.Refresh()
My.Document.ActivatedView.PartialRefresh(esriViewDrawPhase.esriViewGraphics, pGContainer, Not
```

- Where pElem is the IRectangleElement we formatted earlier

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Redrawing the display

- IActiveView.Refresh()
- IActiveView.PartialRefresh()
 - Specify which part to redraw by passing in draw phase, graphic element or layer, and envelope
 - Faster and more efficient than full refresh
 - Thus recommended
- Implemented by Document.ActivatedView

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PartialRefresh()

http://help.arcgis.com/en/sdk/10.0/arcobjects_net/conceptualhelp/index.html#/How_to_redraw_the_display/000100000242000000/

The following table shows the arguments for PartialRefresh and their effect on the view (Map or PageLayout) in which they are called:

Draw phase	Map	PageLayout
esriViewBackground	Unused	Page/snap grid
esriViewGeography	Layers	Unused
esriViewGeoSelection	Feature selection	Unused
esriViewGraphics	Labels/graphics	Graphics
esriViewGraphicSelection	Graphic selection	Element selection
esriViewForeground	Unused	Map guides

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