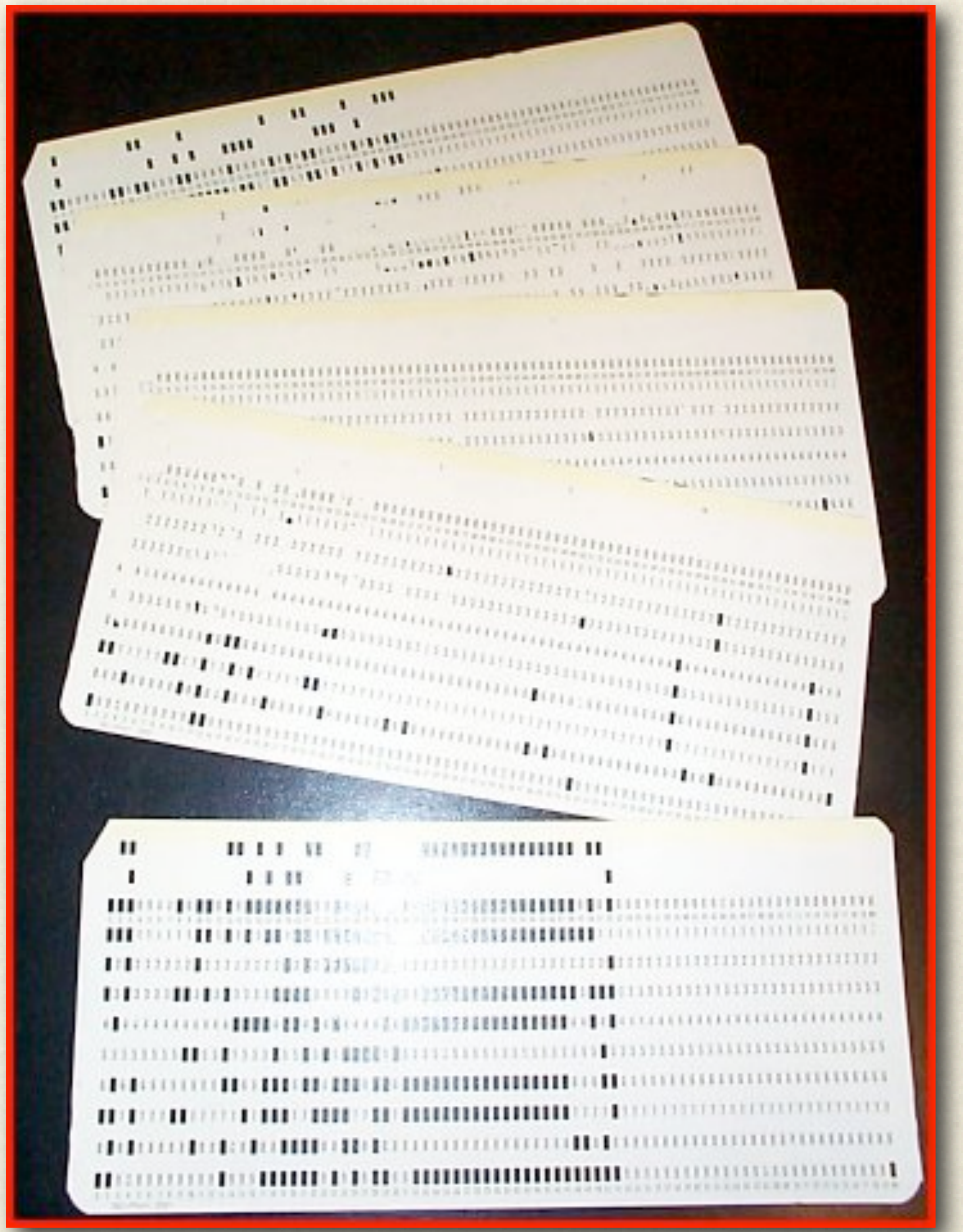
UIDE

User Interface Design Environments

In the Beginning...

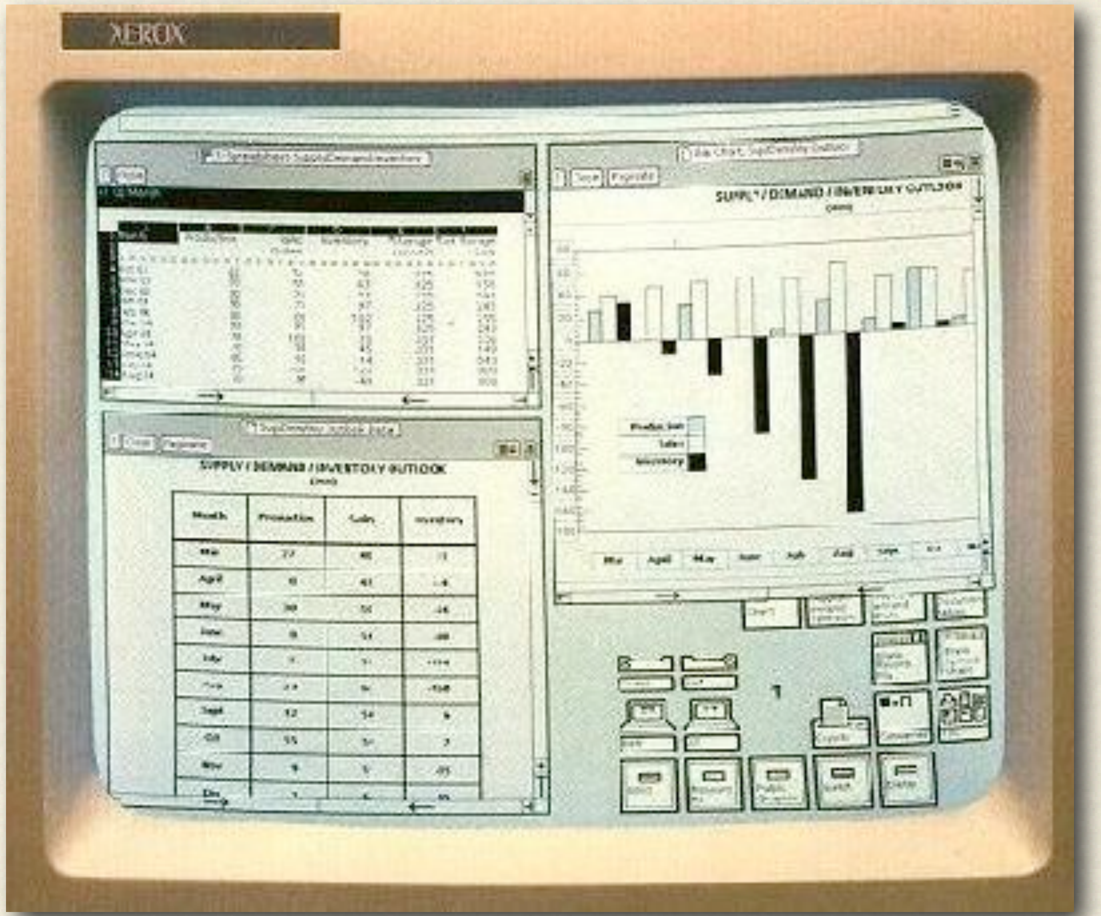
- There were punch cards
- and it was bad



and Then There was Graphics...

and it was good, but there were problems.

- View
  - View Creation
  - View Debugging
- Controller
  - Controller Creation
- Model
  - Event debugging
  - Visual Programming


XEROX
SUPPLY / DEMAND / INVENTORY OUTLOOK
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Smalltalk

- No Direct Manipulation
- Separated Classes

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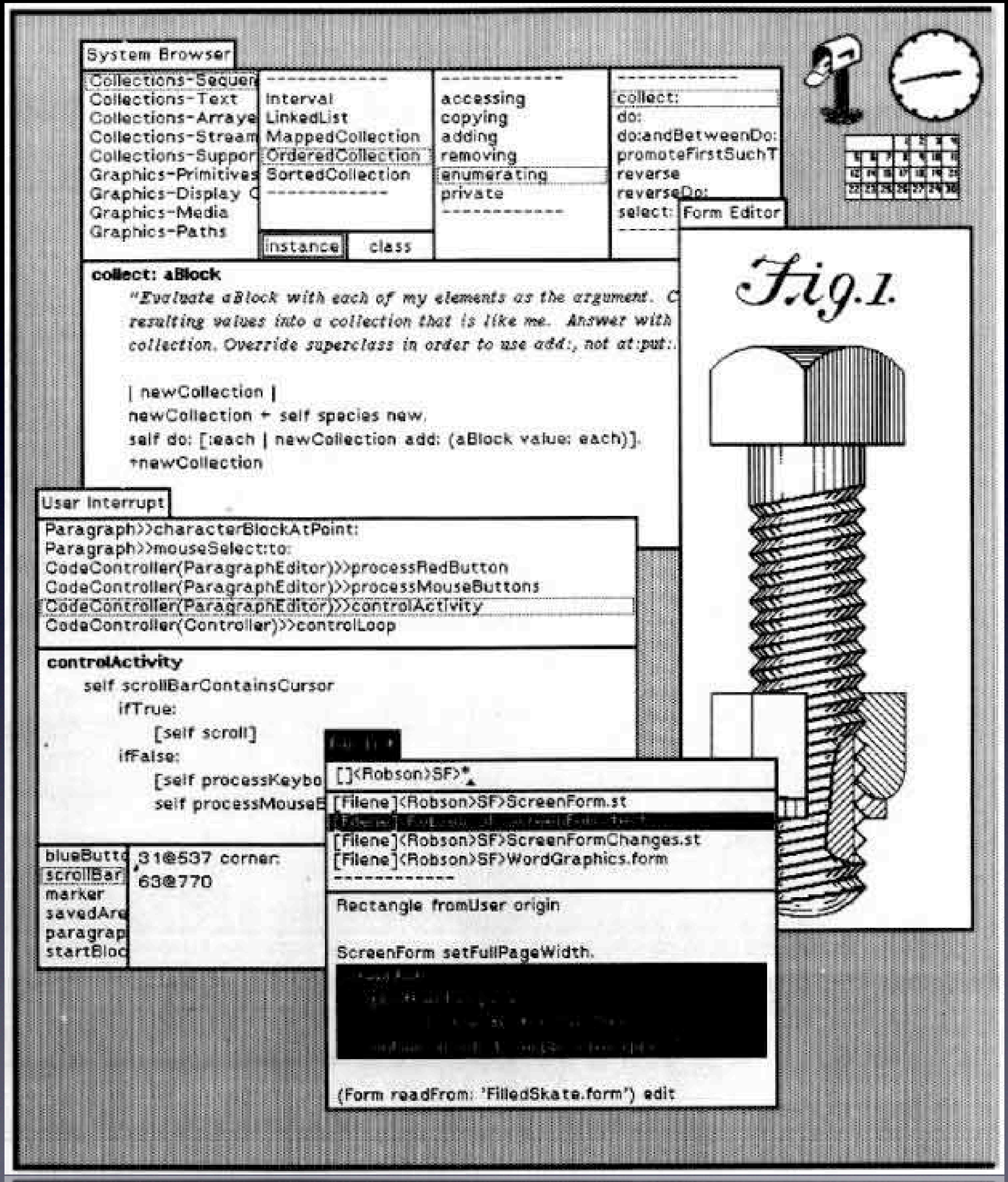


```
Collections-Sequen
Collections-Text
Collections-Arraye
Collections-Stream
Collections-Suppor
Graphics-Primitives
Graphics-Display C
Graphics-Media
Graphics-Paths
```

```
-------------
Interval
LinkedList
MappedCollection
OrderedCollection
SortedCollection
-------------
```

```
-------------
accessing
copying
adding
removing
enumerating
private
-------------
```

```
-------------
collect:
do:
do:andBetweenDo:
promoteFirstSuchT
reverse
reverseDo:
select:
------
```

```
collect: aBlock
    "Evaluate aBlock with each of my elements as the argument. C
    resulting values into a collection that is like me.  Answer with
    collection. Override superclass in order to use add:, not at:put:.

    | newCollection |
    newCollection ← self species new.
    self do: [:each | newCollection add: (aBlock value: each)].
    ↑newCollection
```

```
Paragraph>>characterBlockAtPoint:
Paragraph>>mouseSelect:to:
CodeController(ParagraphEditor)>>processRedButton
CodeController(ParagraphEditor)>>processMouseButtons
CodeController(ParagraphEditor)>>controlActivity
CodeController(Controller)>>controlLoop
```

```
controlActivity
    self scrollBarContainsCursor
        ifTrue:
            [self scroll]
        ifFalse:
            [self processKeybo
            self processMouseB
```

```
blueButto
scrollBar
marker
savedAre
paragrap
startBloc
```

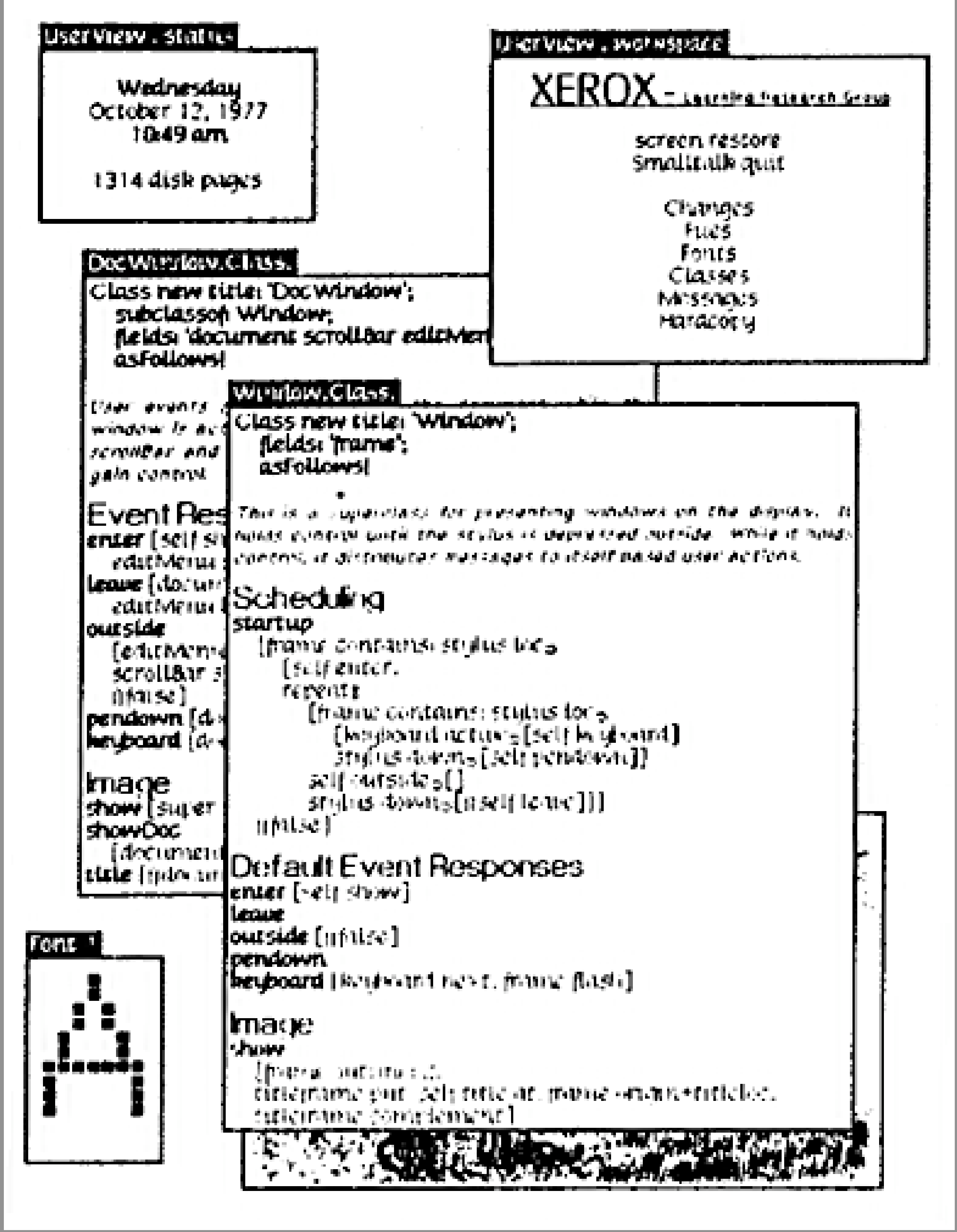
```
31@537 corner:
63@770
```

```
[]<Robson>SF>*
[Filene]<Robson>SF>ScreenForm.st
[illegible]
[Filene]<Robson>SF>ScreenFormChanges.st
[Filene]<Robson>SF>WordGraphics.form
-------------
```

```
Rectangle fromUser origin

ScreenForm setFullPageWidth.
[illegible]

(Form readFrom: 'FilledSkate.form') edit
```



UserView . status

Wednesday
October 12, 1977
10:49 am

1314 disk pages

UserView . workspace

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screen restore
Smalltalk quit

Changes
Files
Fonts
Classes
Messages
Hardcopy

DocWindow.Class.

```
Class new title: 'DocWindow';
    subclassof: Window;
    fields: 'document scrollbar editMen
    asFollows!

User events a
window is acc
scrollbar and
gain control

Event Res
enter [self s
    editMenu
leave [docum
    editMenu
outside
    [editMenu
    scrollbar s
    ⇑false]
pendown [d
keyboard [d

Image
show [super
showDoc
    [documen
title [⇑docum
```

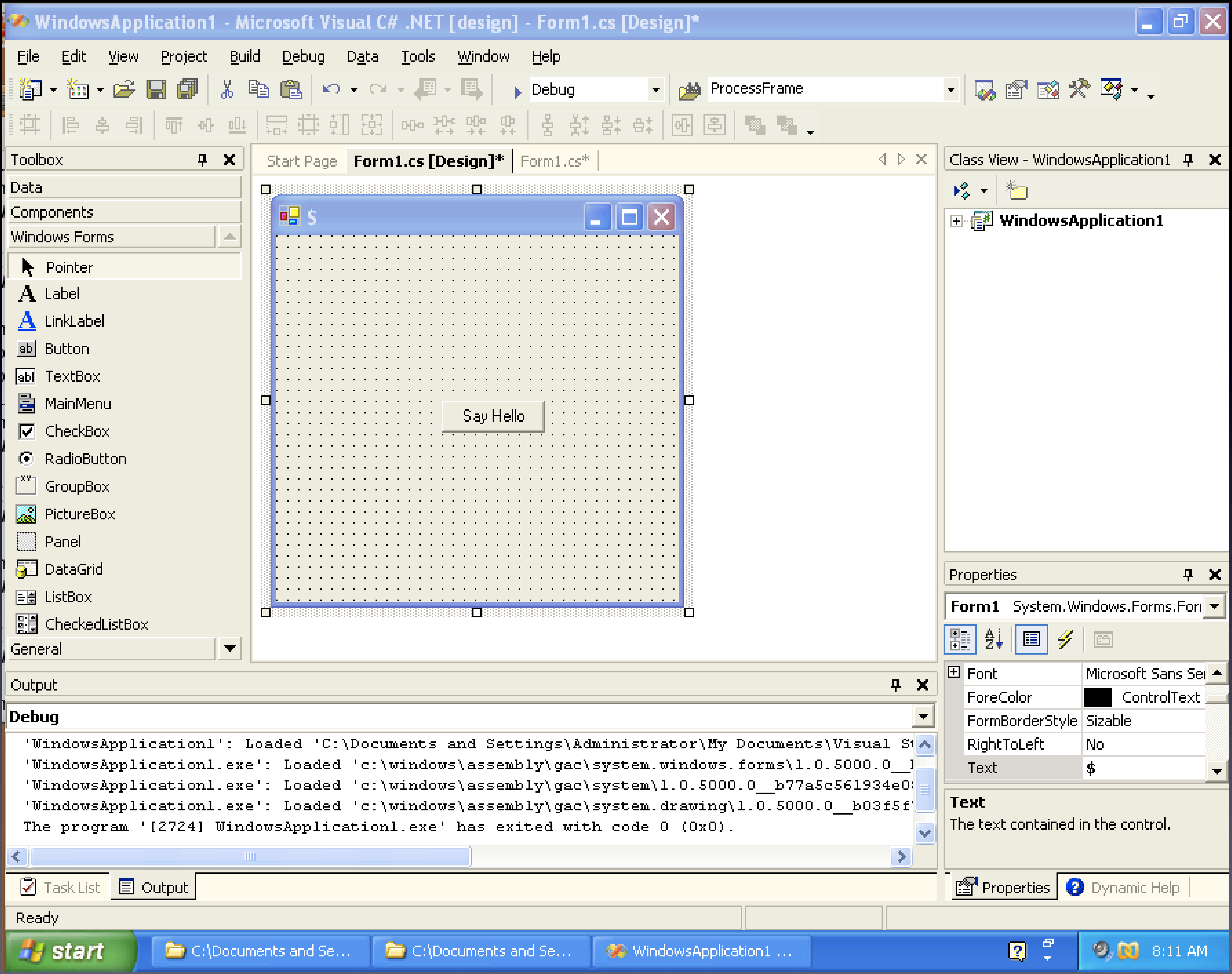
Window.Class.

```
Class new title: 'Window';
    fields: 'frame';
    asFollows!

This is a superclass for presenting windows on the display.  It
holds control until the stylus is depressed outside.  While it holds
control, it distributes messages to itself based user actions.

Scheduling
startup
    [frame contains: stylus loc ⇒
        [self enter.
        repeat:
            [frame contains: stylus loc ⇒
                [keyboard active ⇒ [self keyboard]
                stylus down ⇒ [self pendown]]
            self outside ⇒ []
            stylus down ⇒ [⇑self leave]]]
    ⇑false]

Default Event Responses
enter [self show]
leave
outside [⇑false]
pendown
keyboard [keyboard next. frame flash]

Image
show
    [frame outline.
    titleframe put: self title at: frame origin+titleloc.
    titleframe complement]
```

Font 1

Visualizing the View

- For IDE’s the first thing that was done to help program development
- Used widely for rapid prototyping
- Demo of .Net
- Demo of JSpy



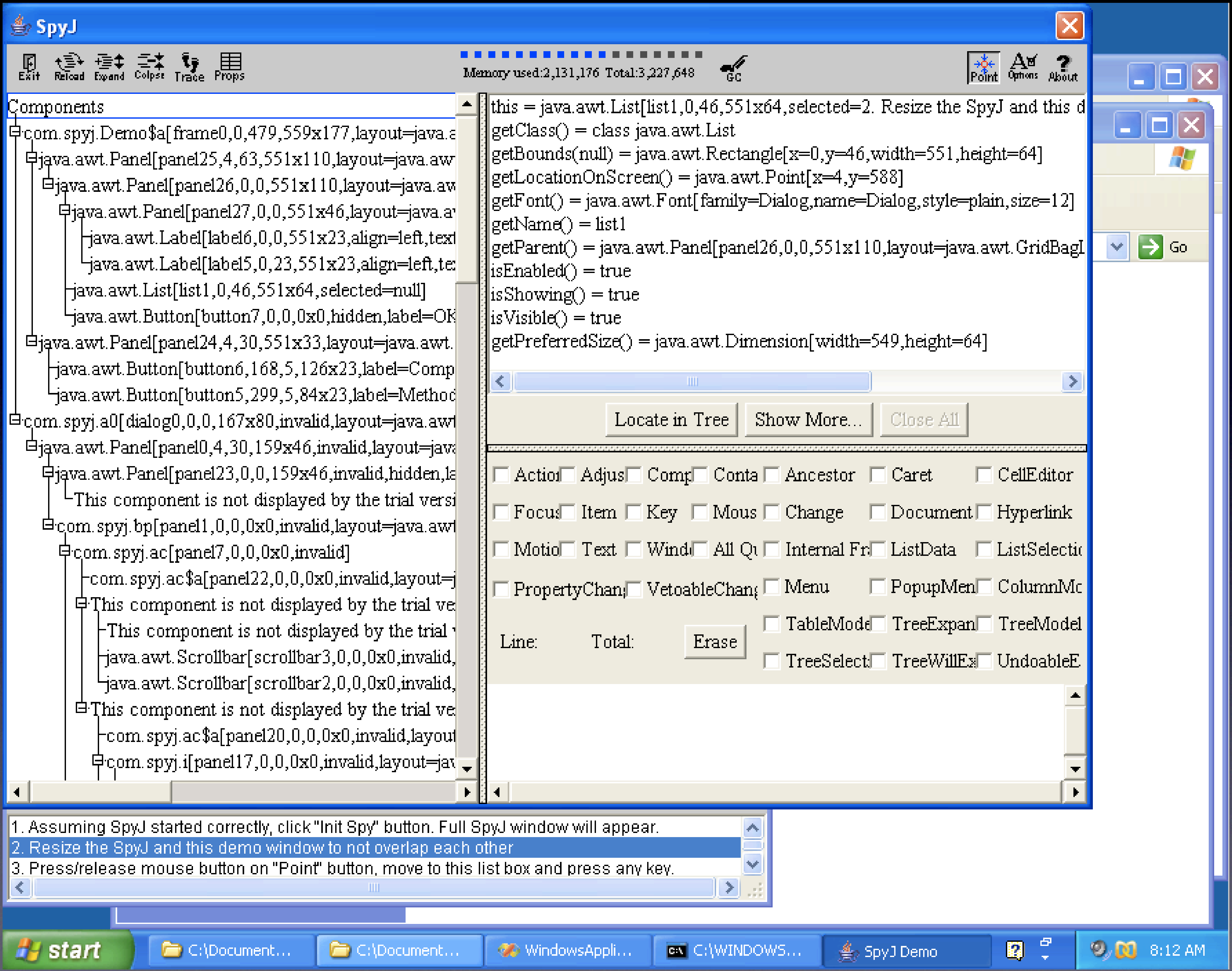
Font	Microsoft Sans Se
ForeColor	■ ControlText
FormBorderStyle	Sizable
RightToLeft	No
Text	$

Text
The text contained in the control.

Output

Debug

```
'WindowsApplication1': Loaded 'C:\Documents and Settings\Administrator\My Documents\Visual St
'WindowsApplication1.exe': Loaded 'c:\windows\assembly\gac\system.windows.forms\1.0.5000.0__1
'WindowsApplication1.exe': Loaded 'c:\windows\assembly\gac\system\1.0.5000.0__b77a5c561934e0
'WindowsApplication1.exe': Loaded 'c:\windows\assembly\gac\system.drawing\1.0.5000.0__b03f5f
The program '[2724] WindowsApplication1.exe' has exited with code 0 (0x0).
```



```
Memory used:2,131,176 Total:3,227,648
```

```
Components
com.spyj.Demo$a[frame0,0,479,559x177,layout=java.a
 java.awt.Panel[panel25,4,63,551x110,layout=java.aw
  java.awt.Panel[panel26,0,0,551x110,layout=java.aw
   java.awt.Panel[panel27,0,0,551x46,layout=java.a
    java.awt.Label[label6,0,0,551x23,align=left,text
    java.awt.Label[label5,0,23,551x23,align=left,te
   java.awt.List[list1,0,46,551x64,selected=null]
   java.awt.Button[button7,0,0,0x0,hidden,label=OK
 java.awt.Panel[panel24,4,30,551x33,layout=java.awt.
  java.awt.Button[button6,168,5,126x23,label=Comp
  java.awt.Button[button5,299,5,84x23,label=Method
com.spyj.a0[dialog0,0,0,167x80,invalid,layout=java.awt
 java.awt.Panel[panel0,4,30,159x46,invalid,layout=java
  java.awt.Panel[panel23,0,0,159x46,invalid,hidden,la
   This component is not displayed by the trial versi
  com.spyj.bp[panel1,0,0,0x0,invalid,layout=java.awt
   com.spyj.ac[panel7,0,0,0x0,invalid]
    com.spyj.ac$a[panel22,0,0,0x0,invalid,layout=j
    This component is not displayed by the trial ve
     This component is not displayed by the trial v
     java.awt.Scrollbar[scrollbar3,0,0,0x0,invalid,
     java.awt.Scrollbar[scrollbar2,0,0,0x0,invalid,
    This component is not displayed by the trial ve
     com.spyj.ac$a[panel20,0,0,0x0,invalid,layout
     com.spyj.i[panel17,0,0,0x0,invalid,layout=jav
```

```
this = java.awt.List[list1,0,46,551x64,selected=2. Resize the SpyJ and this d
getClass() = class java.awt.List
getBounds(null) = java.awt.Rectangle[x=0,y=46,width=551,height=64]
getLocationOnScreen() = java.awt.Point[x=4,y=588]
getFont() = java.awt.Font[family=Dialog,name=Dialog,style=plain,size=12]
getName() = list1
getParent() = java.awt.Panel[panel26,0,0,551x110,layout=java.awt.GridBagL
isEnabled() = true
isShowing() = true
isVisible() = true
getPreferredSize() = java.awt.Dimension[width=549,height=64]
```

☐ Actio ☐ Adjus ☐ Comp ☐ Conta ☐ Ancestor ☐ Caret ☐ CellEditor
☐ Focu ☐ Item ☐ Key ☐ Mous ☐ Change ☐ Document ☐ Hyperlink
☐ Motio ☐ Text ☐ Wind ☐ All Q ☐ Internal Fr ☐ ListData ☐ ListSelecti
☐ PropertyChan ☐ VetoableChan ☐ Menu ☐ PopupMen ☐ ColumnMo
☐ TableMode ☐ TreeExpan ☐ TreeModel
☐ TreeSelect ☐ TreeWillEx ☐ UndoableE

Line: Total:

```
1. Assuming SpyJ started correctly, click "Init Spy" button. Full SpyJ window will appear.
2. Resize the SpyJ and this demo window to not overlap each other
3. Press/release mouse button on "Point" button, move to this list box and press any key.
```

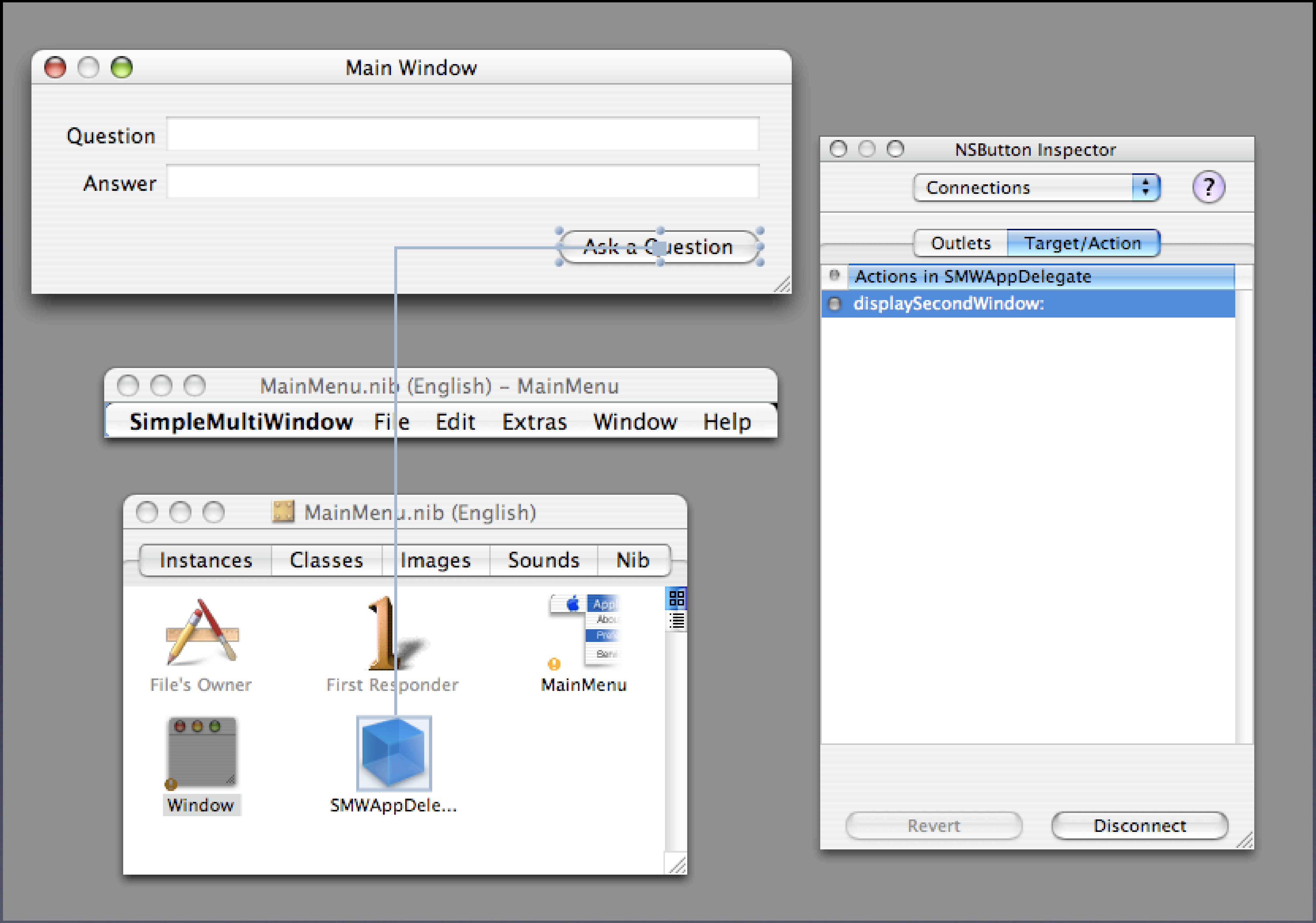
C:\Document... C:\Document... WindowsAppli... C:\WINDOWS...

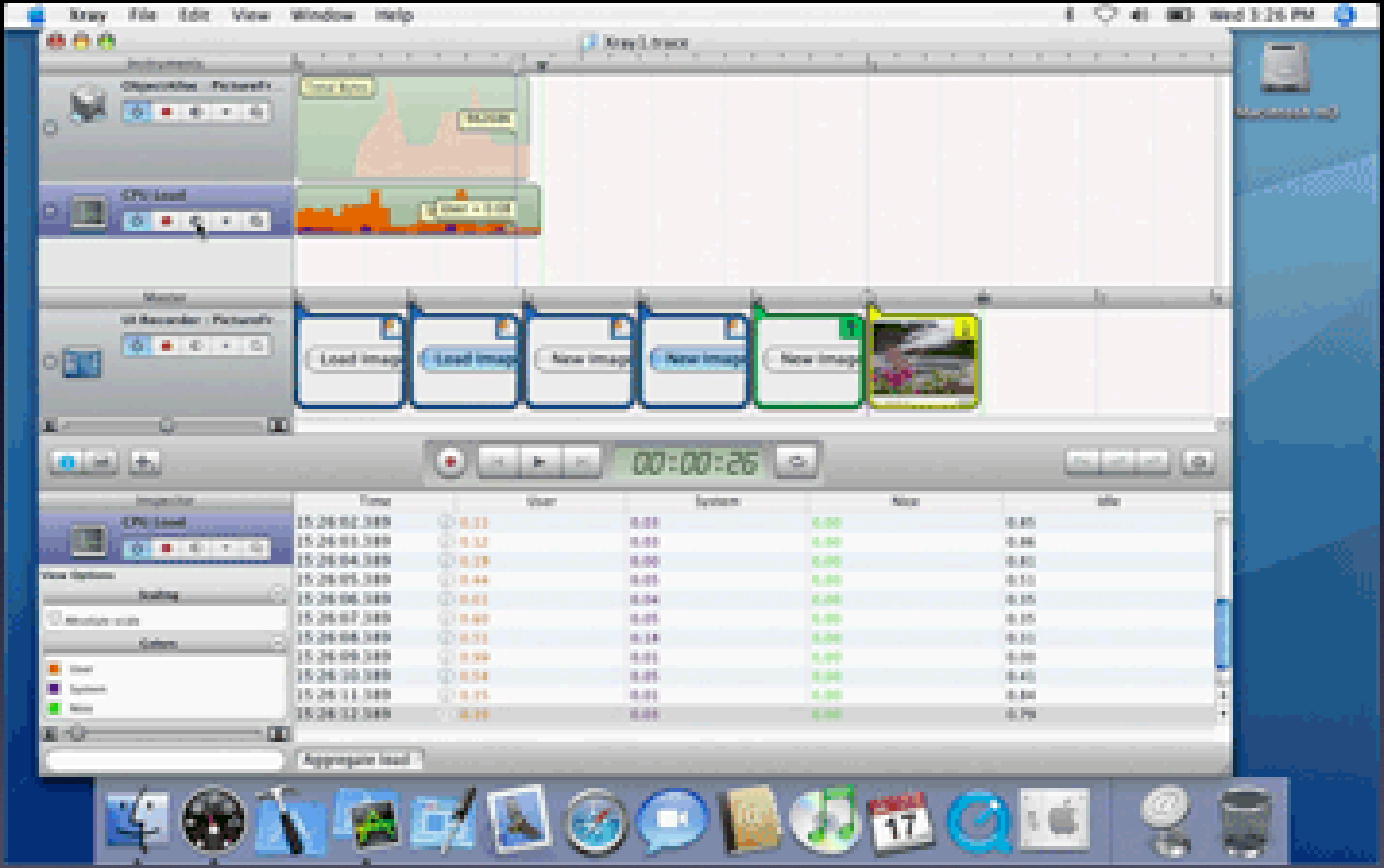
Problems with using a Graphical View

- Keeping code and internal model of view synchronized
- Editing code that is machine generated
- Creating a prototype view can lead people to think the application is closer to completion then reality.

Visualizing Controller

- First Done with NeXT
- Demo with Interface Builder
- No known software for visual controller testing


Main Window
Question
Answer
Ask a Question
MainMenu.nib (English) – MainMenu
SimpleMultiWindow
File
Edit
Extras
Window
Help
MainMenu.nib (English)
Instances
Classes
Images
Sounds
Nib
File's Owner
First Responder
MainMenu
Window
SMWAppDele...
NSButton Inspector
Connections
Outlets
Target/Action
Actions in SMWAppDelegate
displaySecondWindow:
Revert
Disconnect



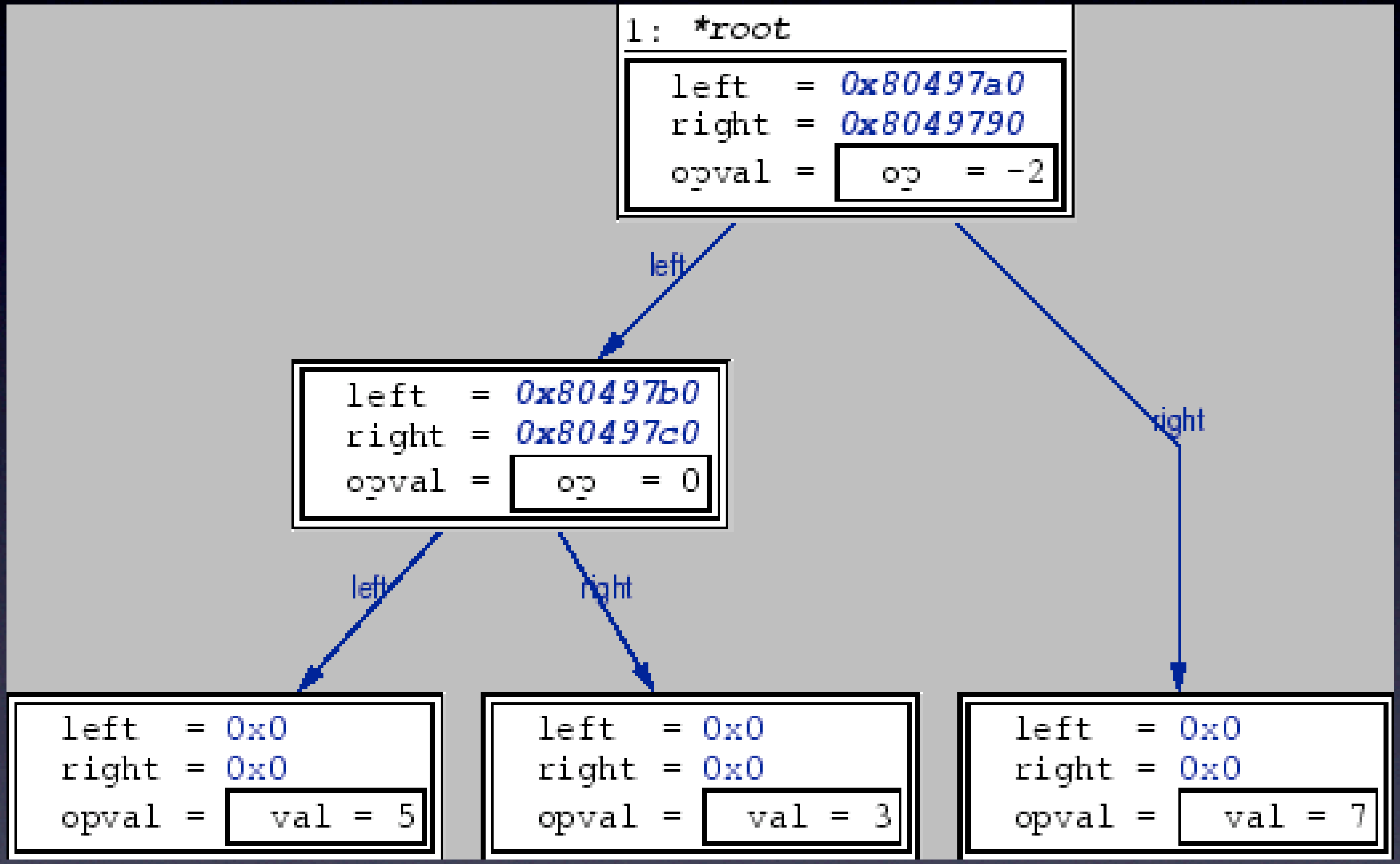
Time	User	System	Nice	Idle
15:26:02.389	0.11	0.03	0.00	0.85
15:26:03.389	0.12	0.03	0.00	0.86
15:26:04.389	0.19	0.00	0.00	0.81
15:26:05.389	0.44	0.05	0.00	0.51
15:26:06.389	0.61	0.04	0.00	0.35
15:26:07.389	0.60	0.05	0.00	0.35
15:26:08.389	0.51	0.14	0.00	0.35
15:26:09.389	0.99	0.01	0.00	0.00
15:26:10.389	0.54	0.05	0.00	0.41
15:26:11.389	0.15	0.01	0.00	0.84
15:26:12.389	0.19	0.03	0.00	0.79

Problems with using a Graphical Controller

- No code to edit
- Separation from program code
- Accessibility problems

Visualizing the Model

- Model usually seen as storage of memory
- Debugging tracks memory usage
- Demo of DDD (Data Display Debugger)



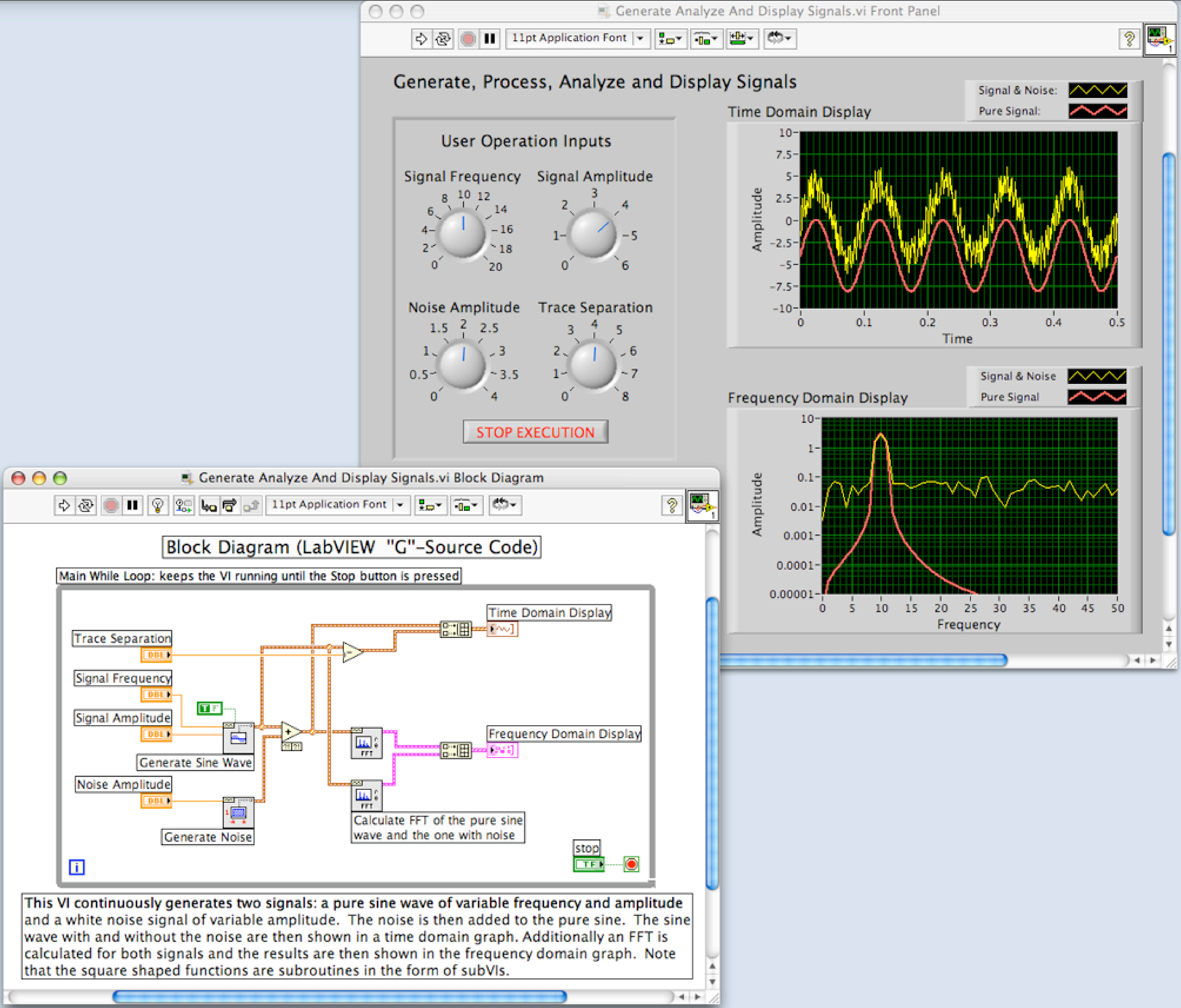
1: *root
left = 0x80497a0
right = 0x8049790
opval = op = -2
left
right
left = 0x80497b0
right = 0x80497c0
opval = op = 0
left
right
left = 0x0
right = 0x0
opval = val = 5
left = 0x0
right = 0x0
opval = val = 3
left = 0x0
right = 0x0
opval = val = 7

Problems with using a Graphical Model

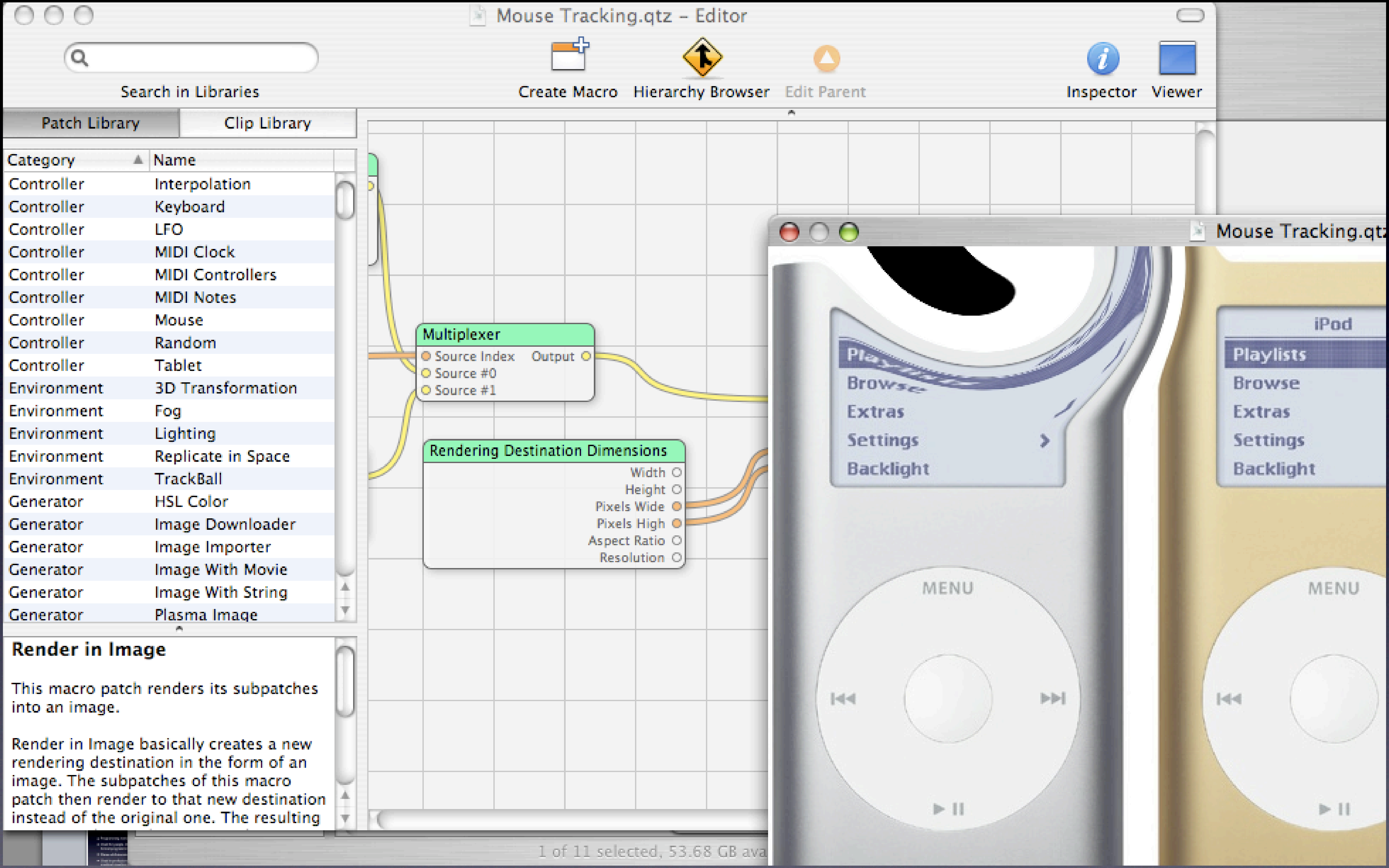
- A lot of information to view at one time. Usually only viewing part of the model.
- A lot of algorithms do not have a understandable visual model yet.

Visual Programming

- Programming without syntax
- Used for people that don’t understand formal programming
- Demo of Automator
- Used in professional programming for wen graphical visualization works better
- Demo of Quartz Composer



This VI continuously generates two signals: a pure sine wave of variable frequency and amplitude and a white noise signal of variable amplitude. The noise is then added to the pure sine. The sine wave with and without the noise are then shown in a time domain graph. Additionally an FFT is calculated for both signals and the results are then shown in the frequency domain graph. Note that the square shaped functions are subroutines in the form of subVIs.

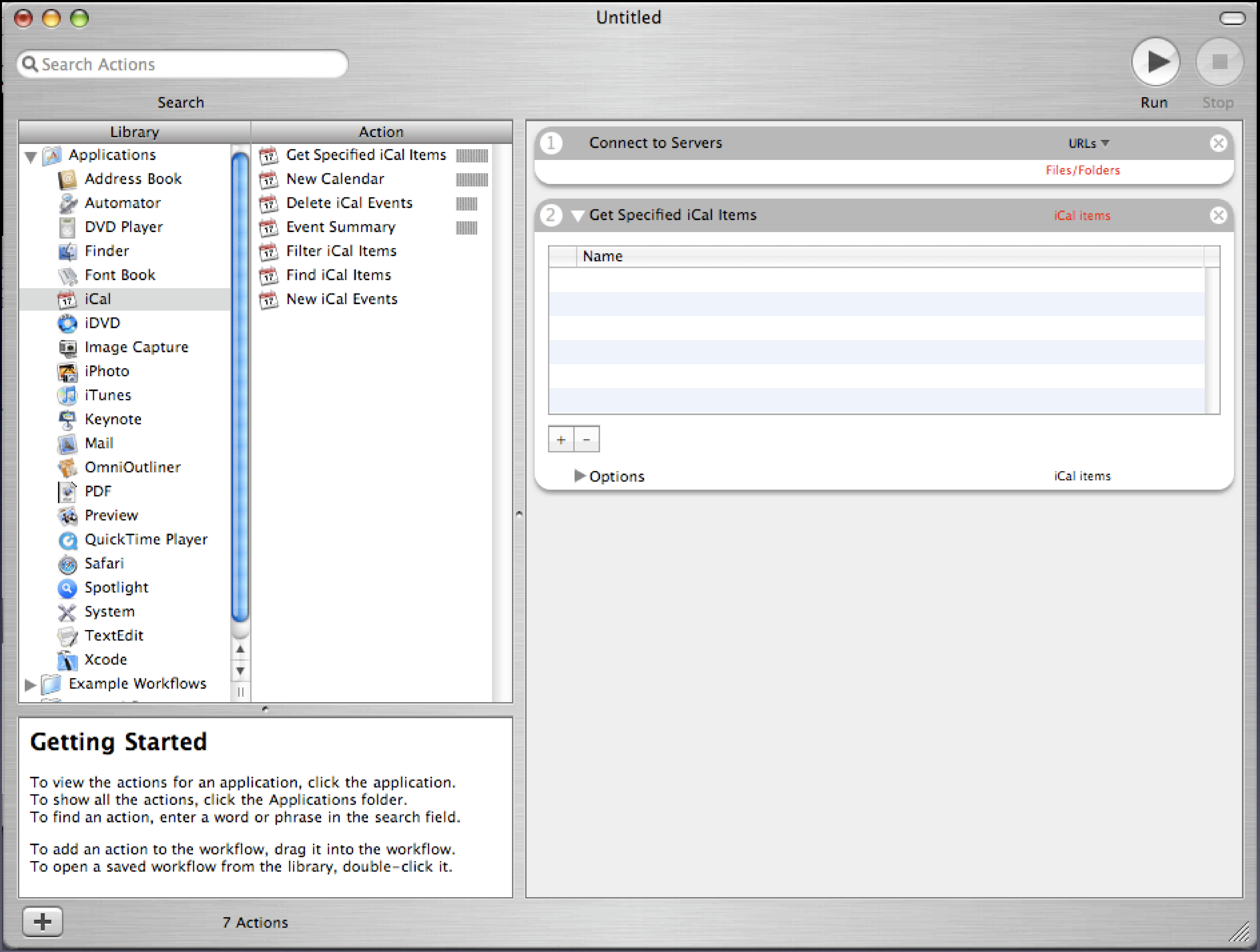


Category	Name
Controller	Interpolation
Controller	Keyboard
Controller	LFO
Controller	MIDI Clock
Controller	MIDI Controllers
Controller	MIDI Notes
Controller	Mouse
Controller	Random
Controller	Tablet
Environment	3D Transformation
Environment	Fog
Environment	Lighting
Environment	Replicate in Space
Environment	TrackBall
Generator	HSL Color
Generator	Image Downloader
Generator	Image Importer
Generator	Image With Movie
Generator	Image With String
Generator	Plasma Image

Render in Image

This macro patch renders its subpatches into an image.

Render in Image basically creates a new rendering destination in the form of an image. The subpatches of this macro patch then render to that new destination instead of the original one. The resulting



Getting Started

To view the actions for an application, click the application.
To show all the actions, click the Applications folder.
To find an action, enter a word or phrase in the search field.

To add an action to the workflow, drag it into the workflow.
To open a saved workflow from the library, double-click it.

Problems with Visual Programming

- Hard to reproduce “code”
- Some problems hard to understand visually

Programs

- View
  - Creation- .Net (Visual Studio)
  - Debugging- jSpy
- Controller
  - Creation- Interface Builder
  - Debugging- Nothing Yet
- Model
  - Creation- Visual Programming
  - Debugging- DDD

Conclusion

- Problem of double learning visual path & code path
- Accessibility problems
- Problem of trying to keep machine and developer code synchronized

Questions?