Introduction to PyObjC

Author

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Conference

PyCon DC, March 2005

Intended Audience

- Python developers using Mac OS X 10.3 or later
- Spies from the Linux and Win32 camps
- Hopefully a GNUstep porter/maintainer

Topics

- Installing PyObjC
- Why Bother?
- Objective-C Primer
- Crossing the Bridge
- Interface Builder
- Your First Application
- Help!
- Who's Using This Stuff?

Installing PyObjC

Install Xcode:

http://developer.apple.com/

Install PyObjC:

http://pyobjc.sourceforge.net/

Why Bother?

- You paid for that Mac
- The tools kick ass
- Apple (often) writes good code
- The tools kick ass
- Objective-C and Python are friends

Objective-C

- True superset of C
- Everything is not an object
- Looks kinda like Smalltalk

Classes

- Flat Namespace
- Single Inheritance
- ... with Categories and Protocols
- Classes are objects
- Instance Variables

Objective-C Interface

```
@interface MyClass : NSObject
{
    int myInt;
}
+(id)myClassWithInt:(int)anInt;
-(int)myInt;
@end
```

Objective-C Implementation

```
@implementation MyClass

+(id)myClassWithInt:(int)anInt;
{
    self = [[self alloc] init];
    intInstanceVariable = anInt;
    return self;
}

-(int)myInt
{
    return myInt;
}

@end
```

Objects

- Separate alloc/init
- Everything is an accessor
- ... except when using Key-Value Coding
- Reference counted
- ... but we take care of that
- ... except where Apple doesn't

Messages

- Target
- ... can be nil
- Selector
- Arguments

Exceptions

- Exceptions are exceptional
- Expect bad code to just crash
- ... even from Python

Crossing the Bridge

- unicode, int, long, float work magically
- ... str is not safely bridged!
- None is just like nil
- ... except you can't send messages to it!

Objective-C Messages

Objective-C Message:

[aMutableArray addObject:@"someObject"]

Target:

aMutableArray

Selector:

addObject:

Arguments:

@"someObject"

PyObjC Messages

Python Message:

aMutableArray.addObject_(u'someObject')

Target:

aMutableArray

Selector:

addObject: (with colons replaced by underscores!)

Arguments:

u'someObject' (unicode is equivalent to @"string")

Key-Value Coding

- Kinda like getattr protocol
- ... but it calls accessors for you (like property)
- ... or it will fetch an ivar and convert to an object
- valueForUndefinedKey: (like __getattr__)
- valueForKeyPath: looks like a Python expression
- ... except it will also "map" over arrays
- ... and can do cool things like sum

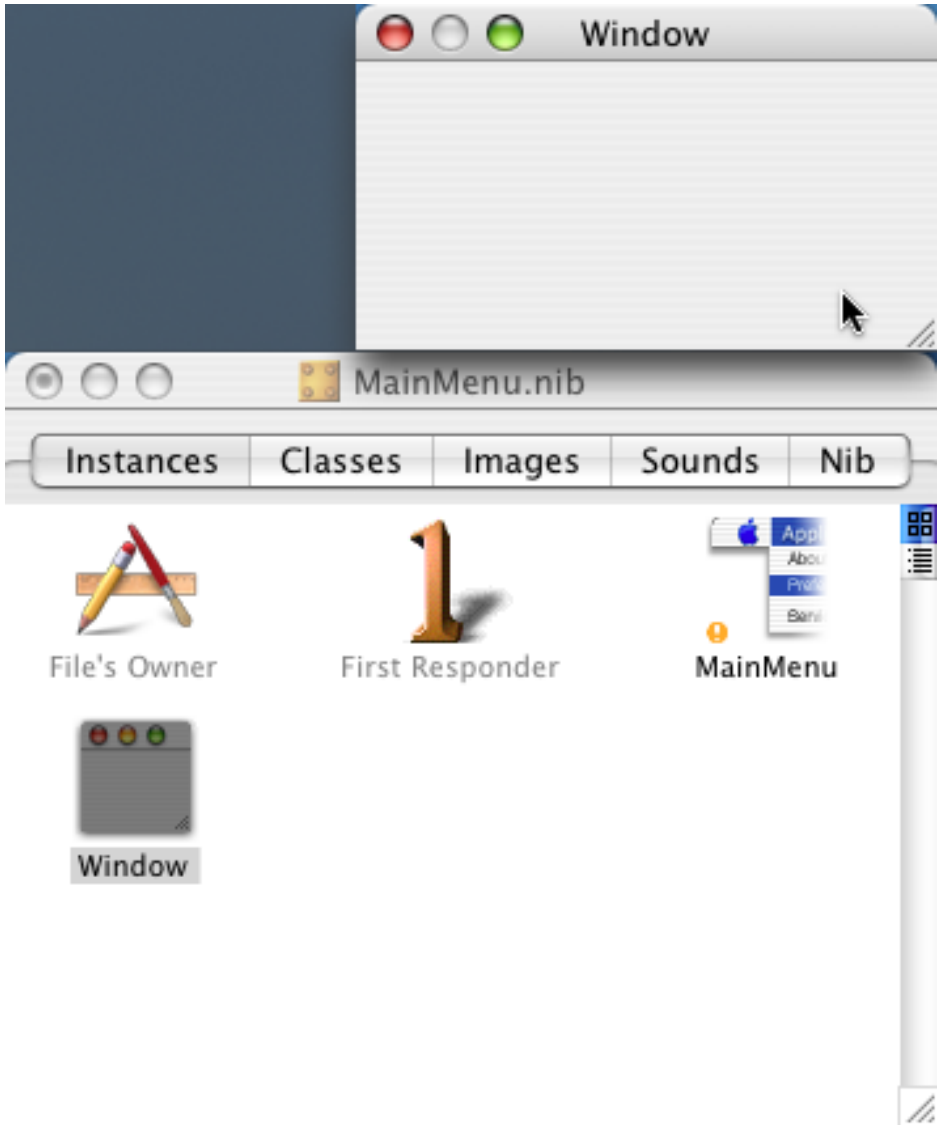
Interface Builder

- Design your interface
- ... using a well designed interface
- Don't write so much code
- Plug objects together
- Manages an *object graph*
- ... think pickle

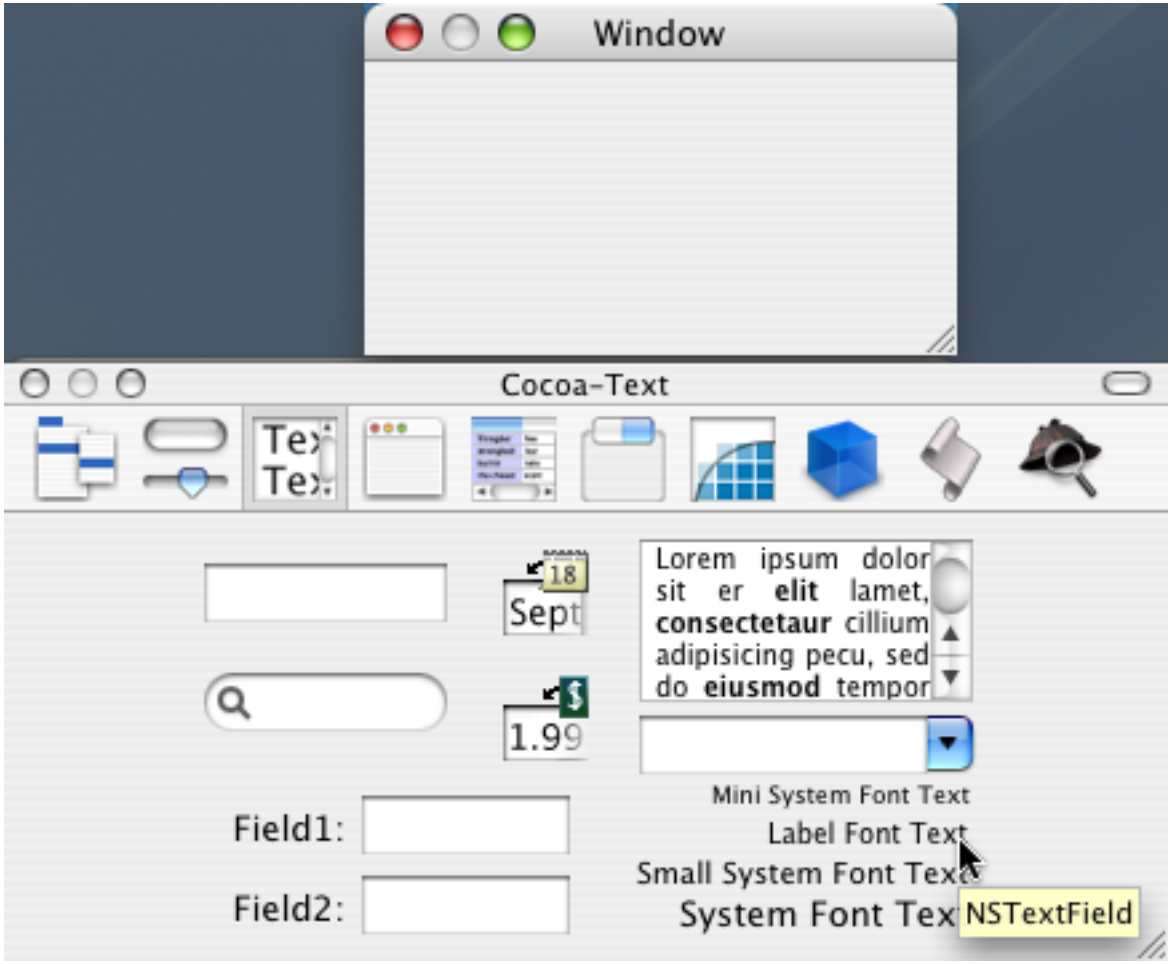
Making Money

- Currency Converter
- Using Cocoa Bindings
- Almost entirely in Interface Builder

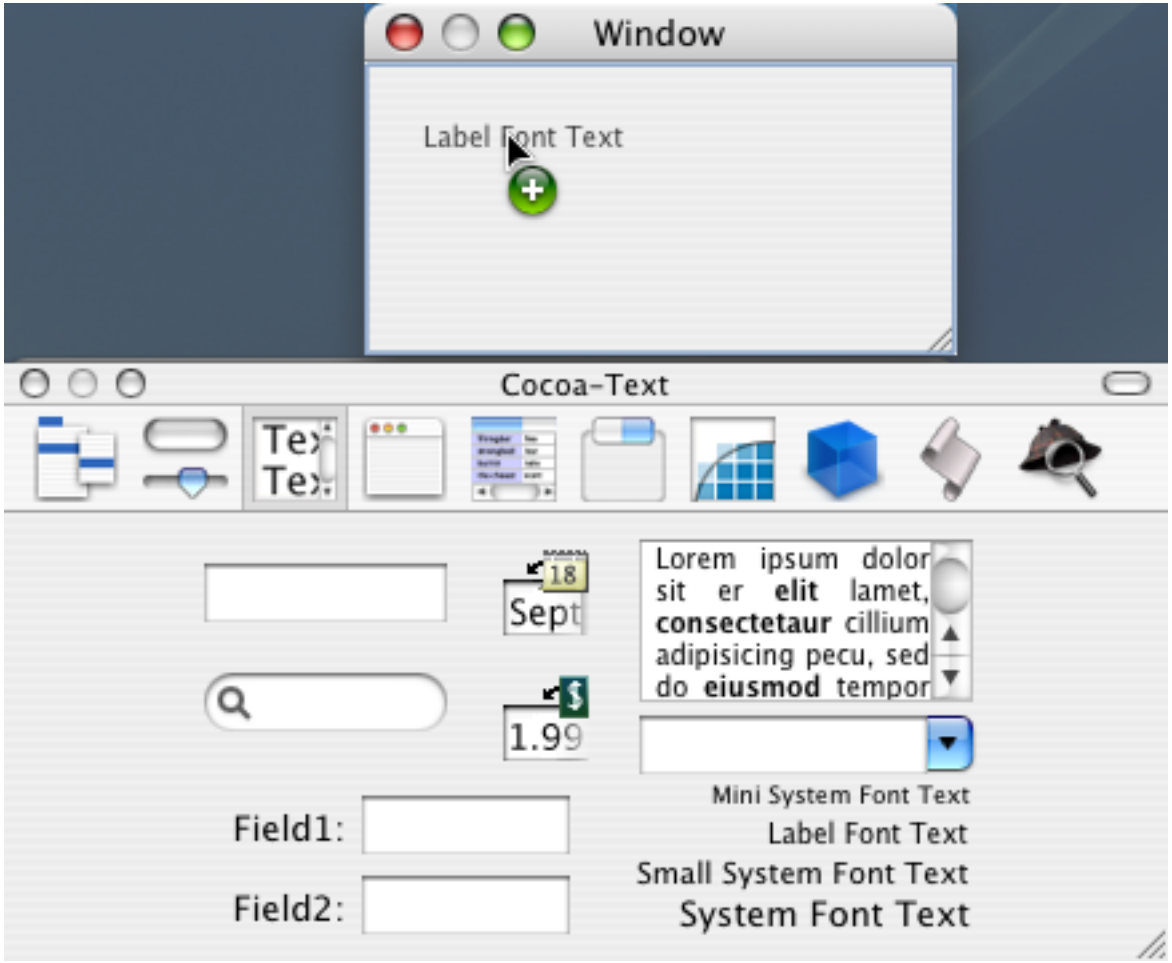
New Application in IB



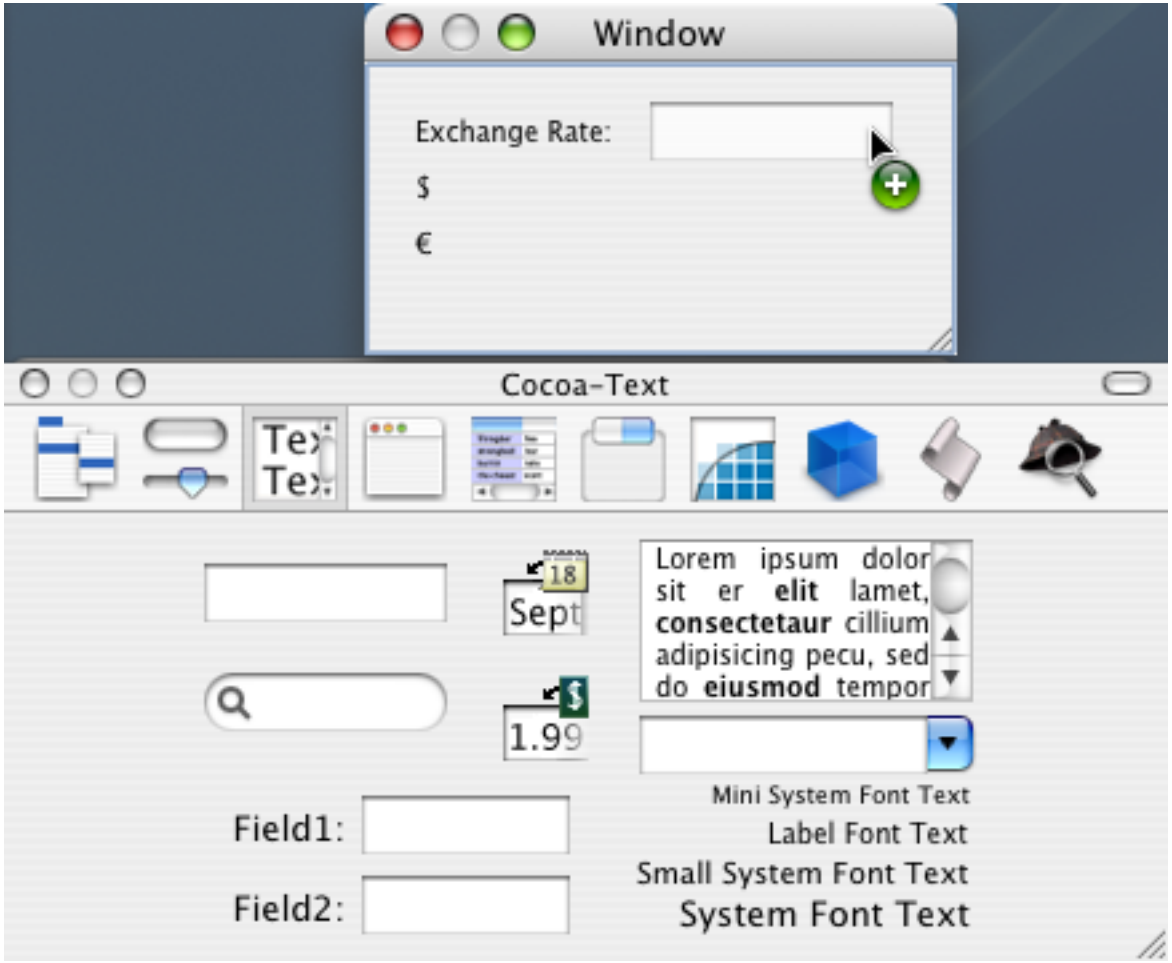
Create an NSTextField



Drag to the NSWindow

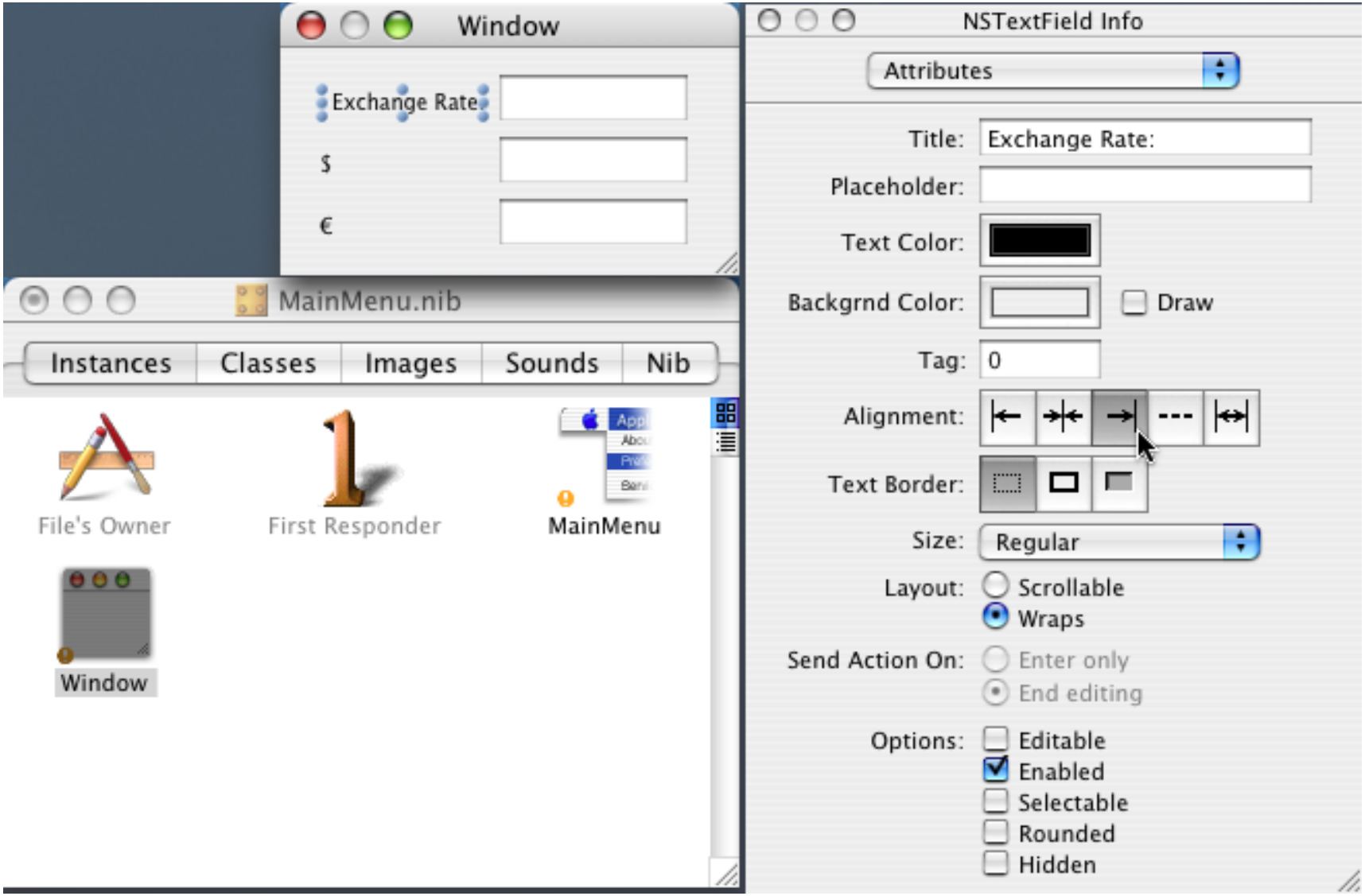


Create the input NSTextFields

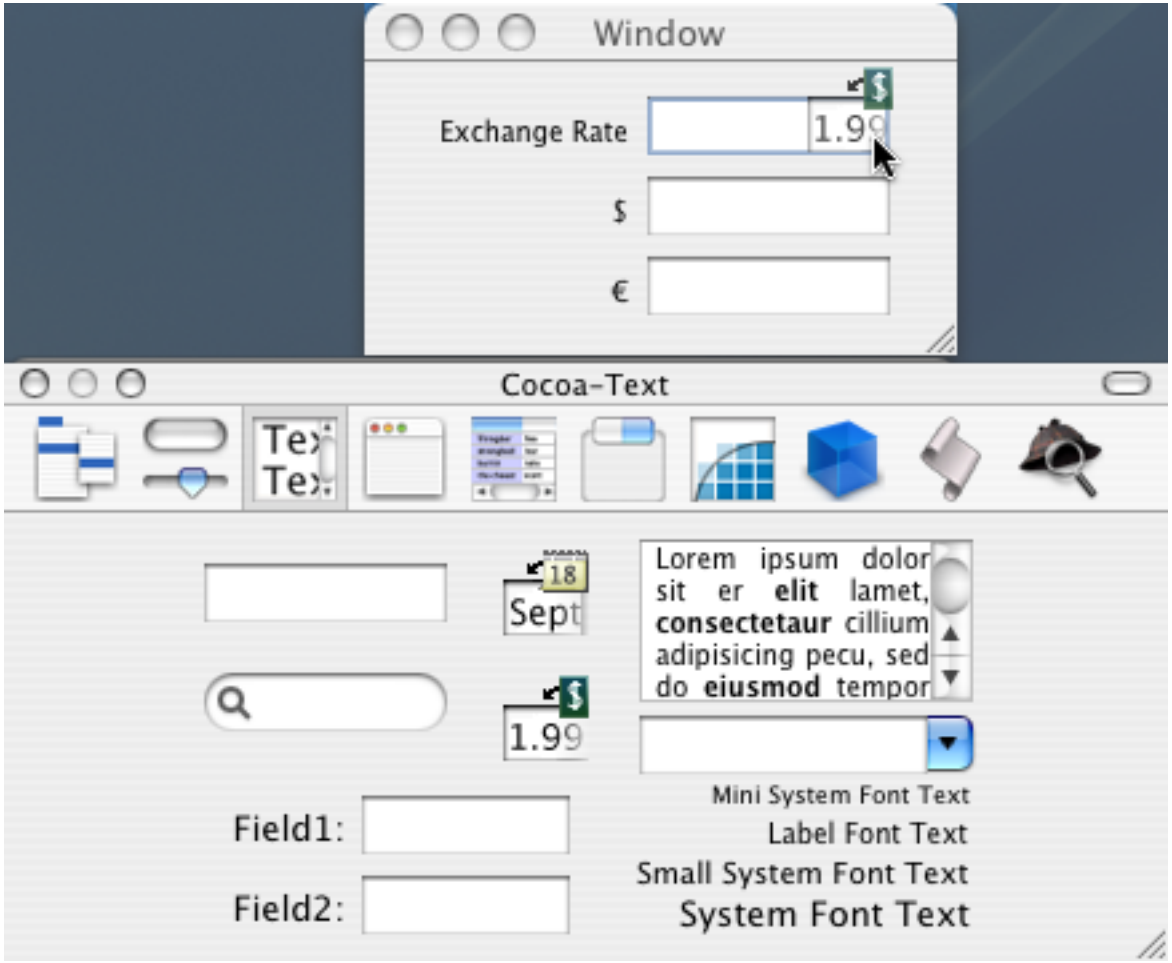


Almost finished UI Layout

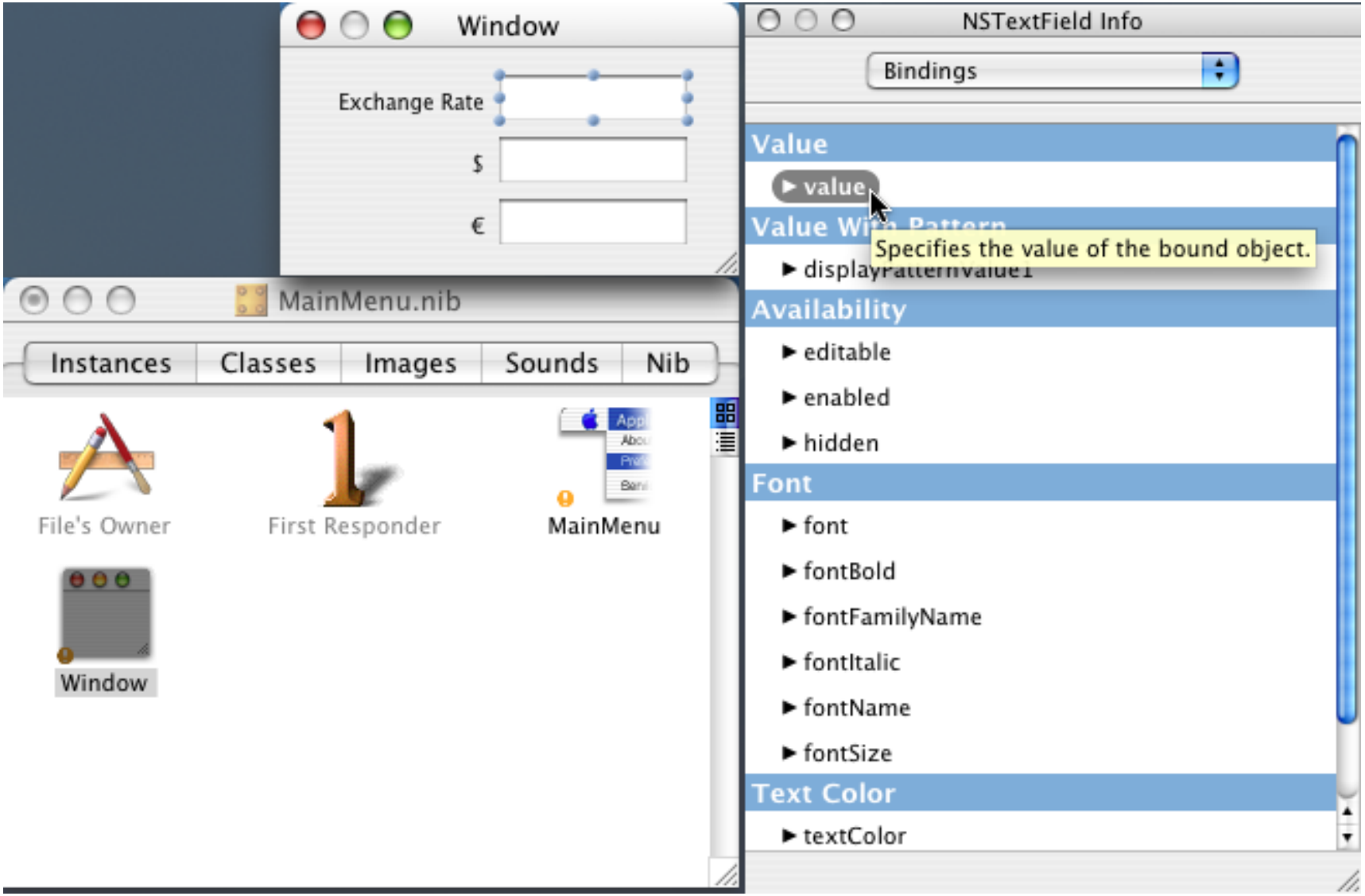
Align the labels



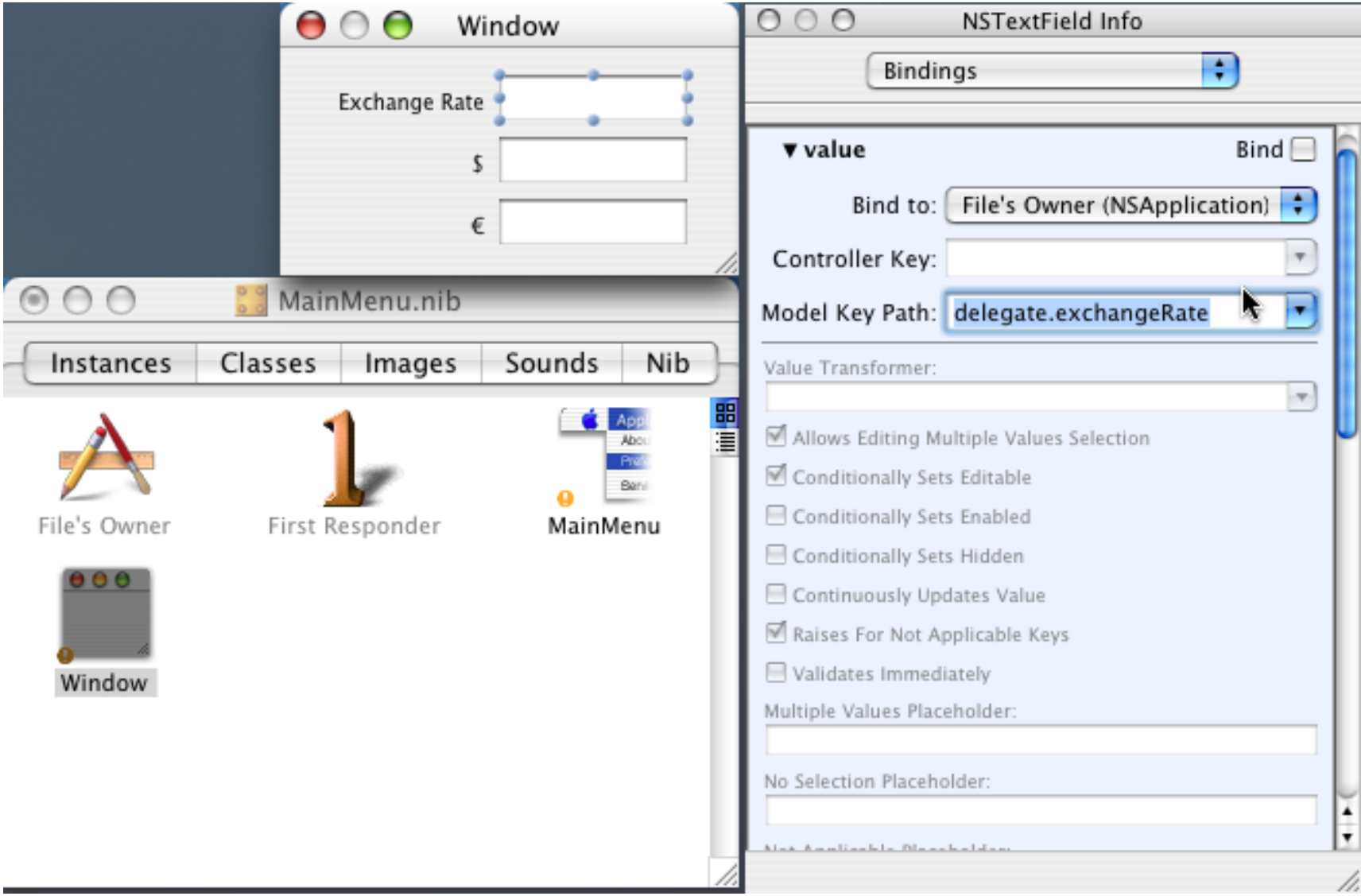
Use currency NSNumberFormatters



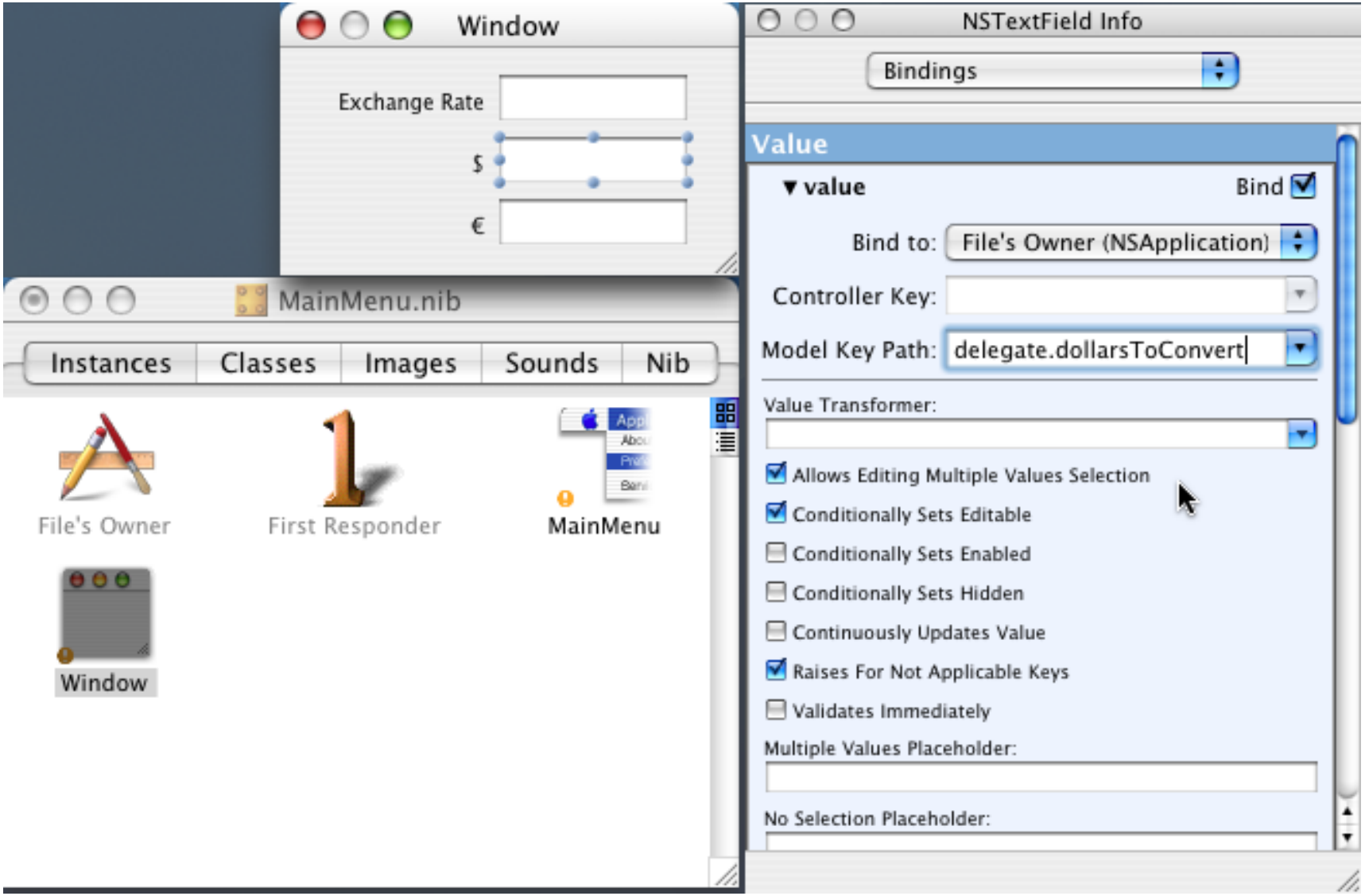
Set up the Bindings



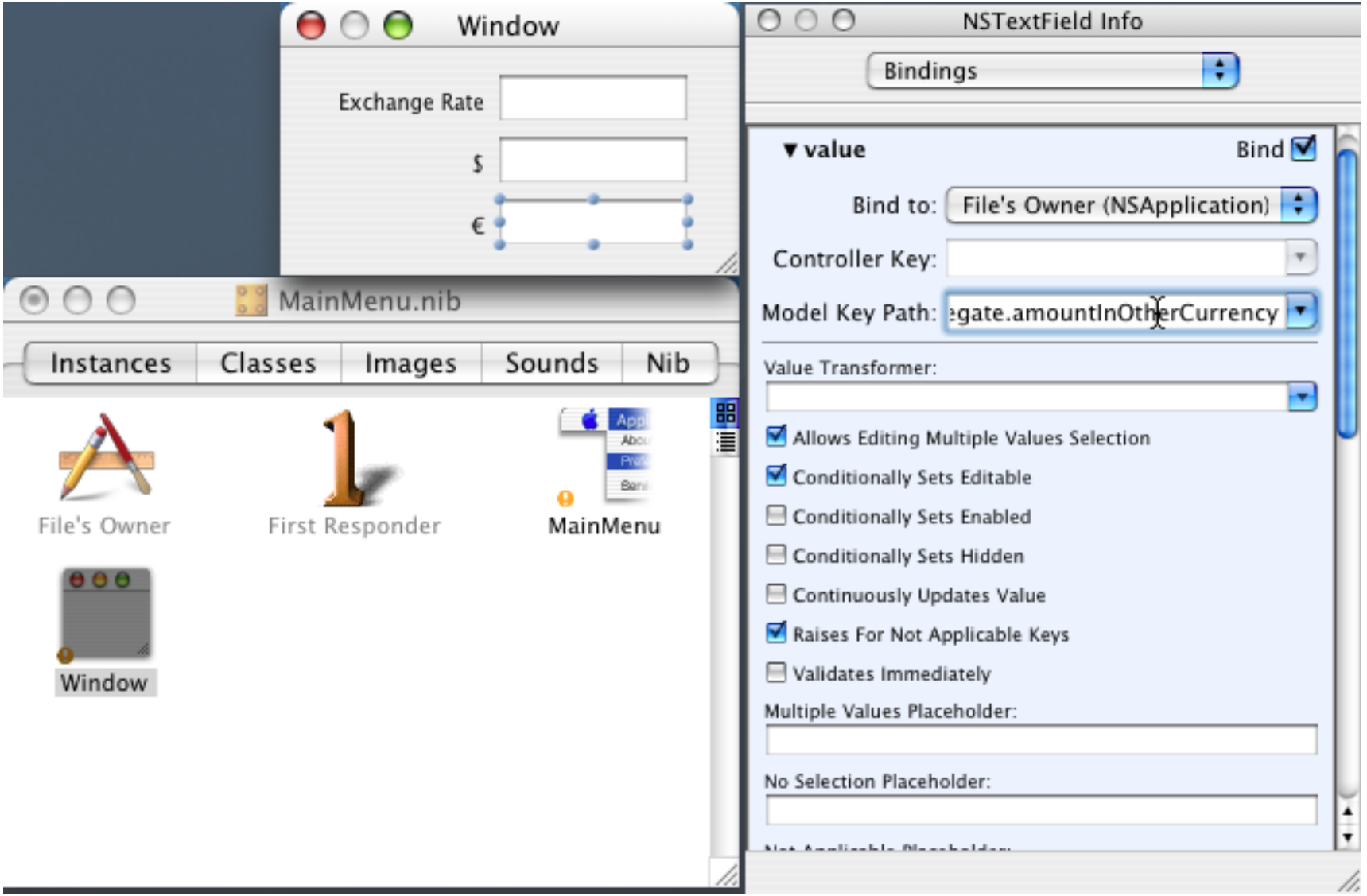
To point to your delegate



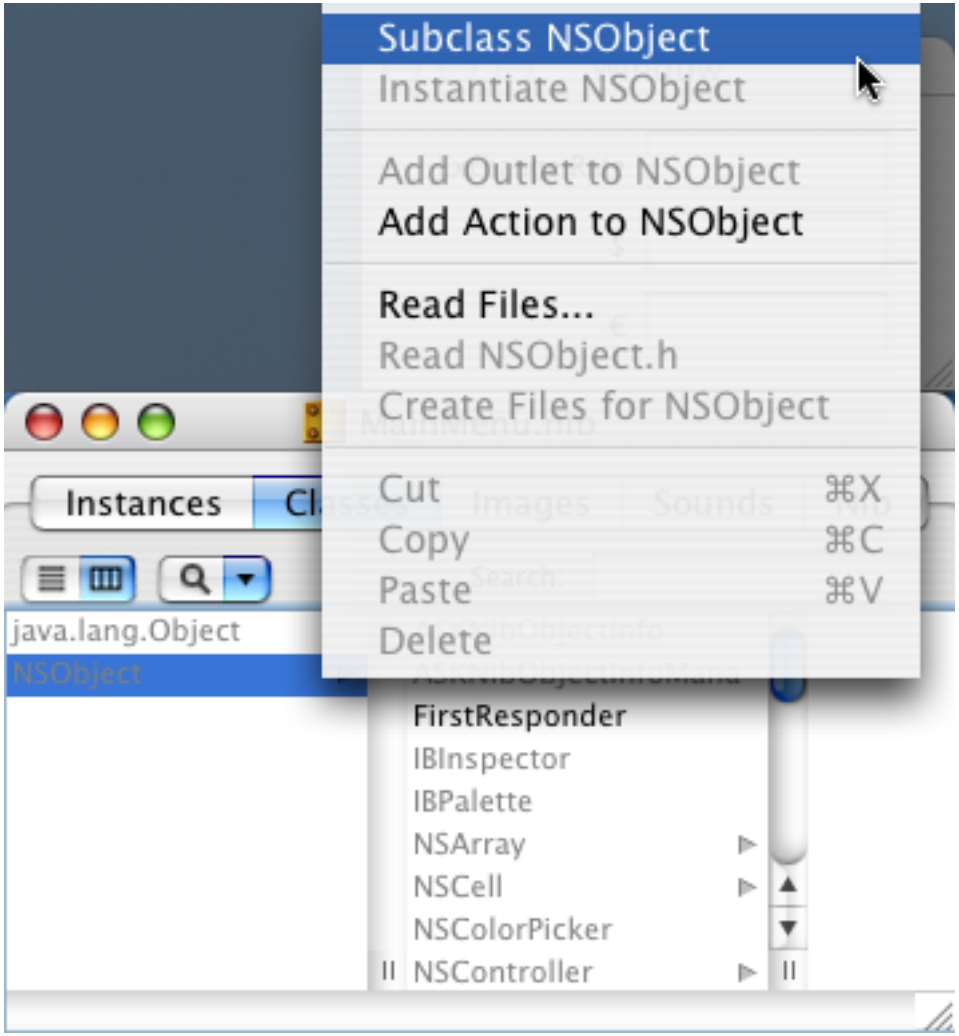
Dollars binding...



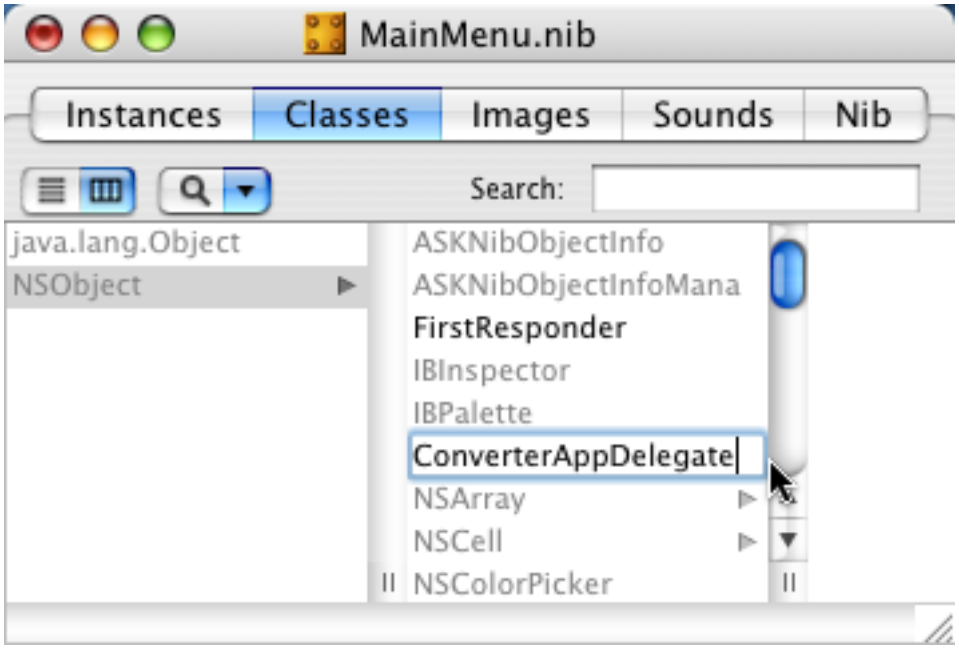
Other Currency Binding...



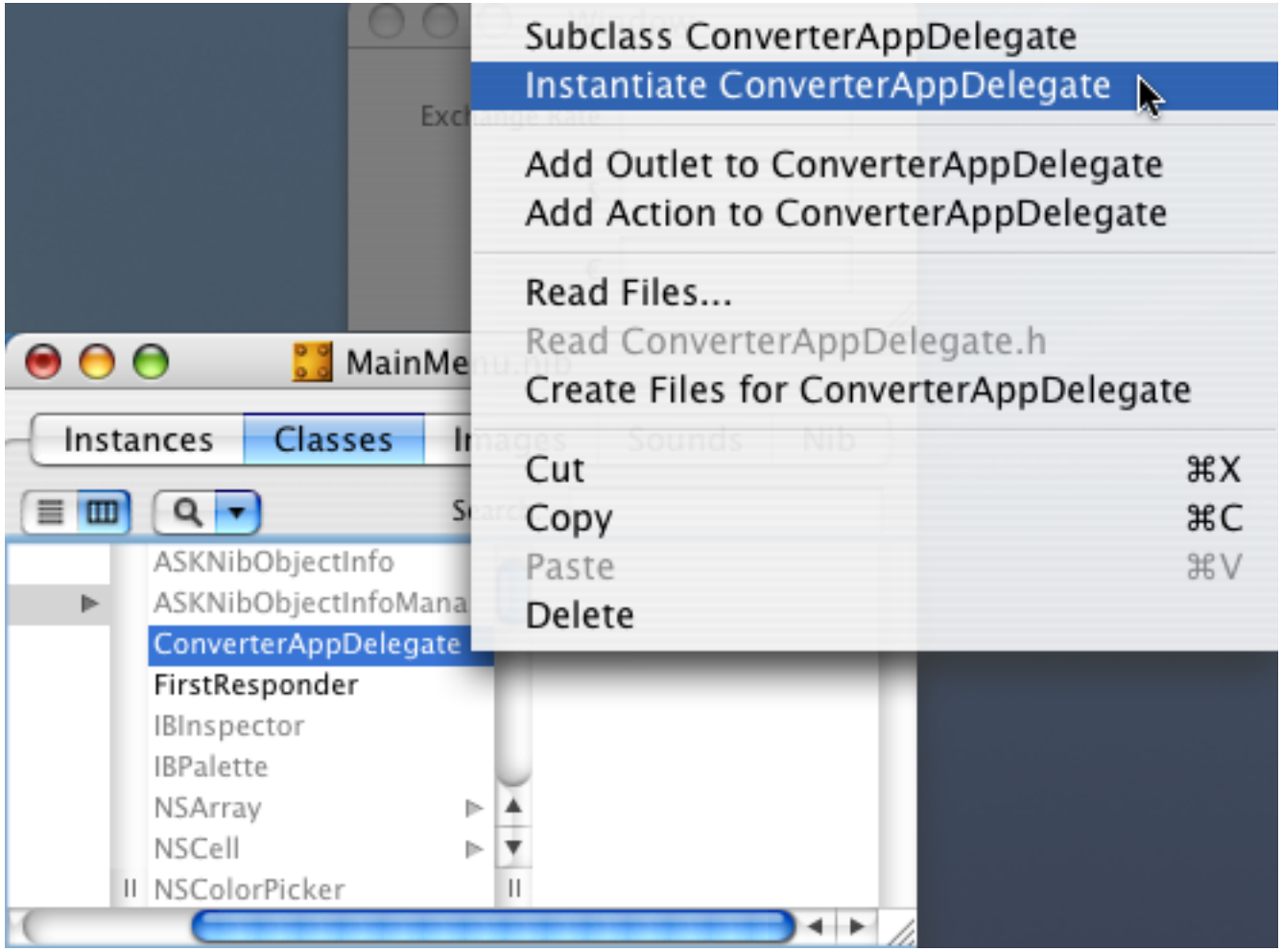
Subclass NSObject



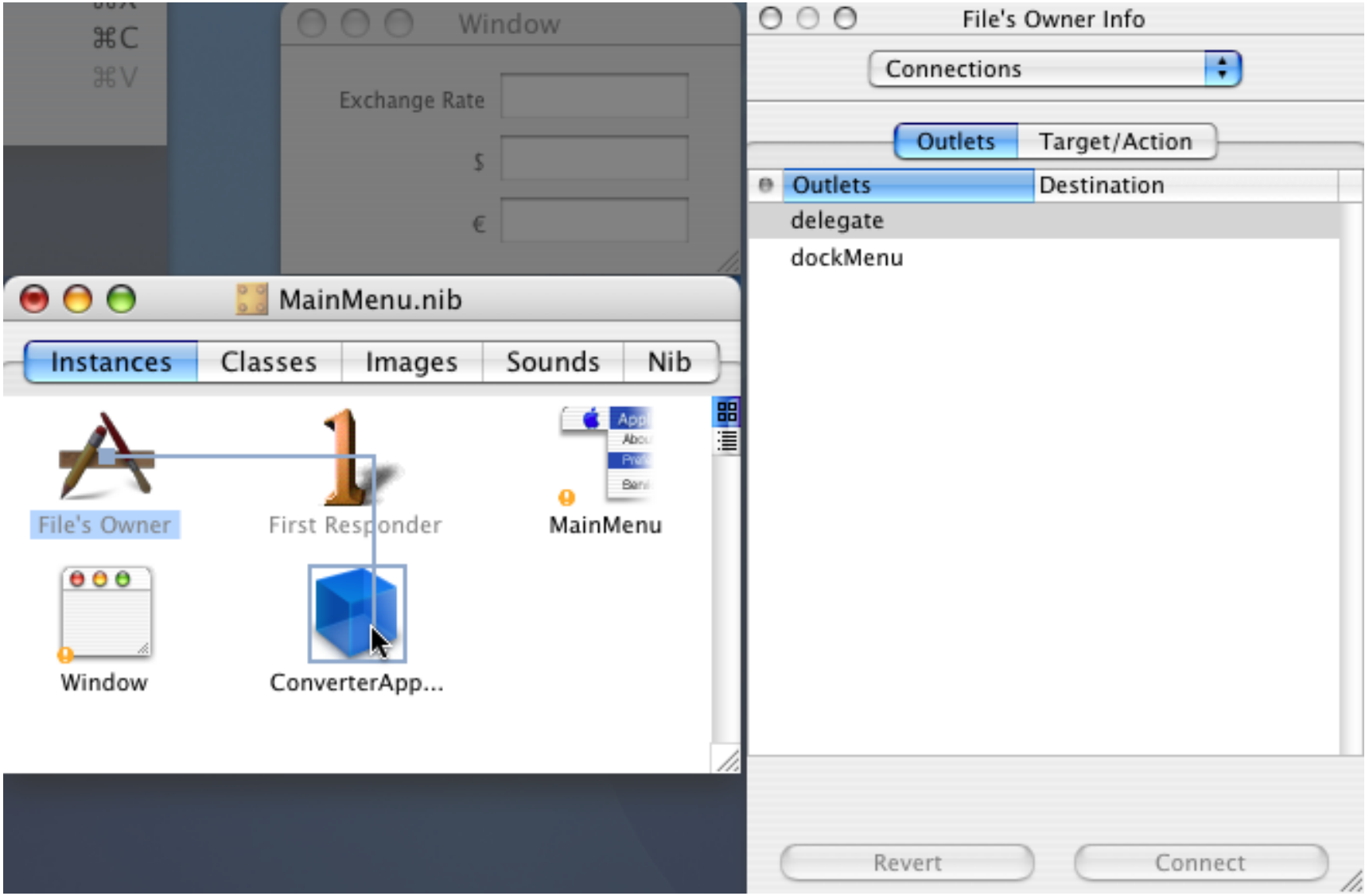
To create your delegate class



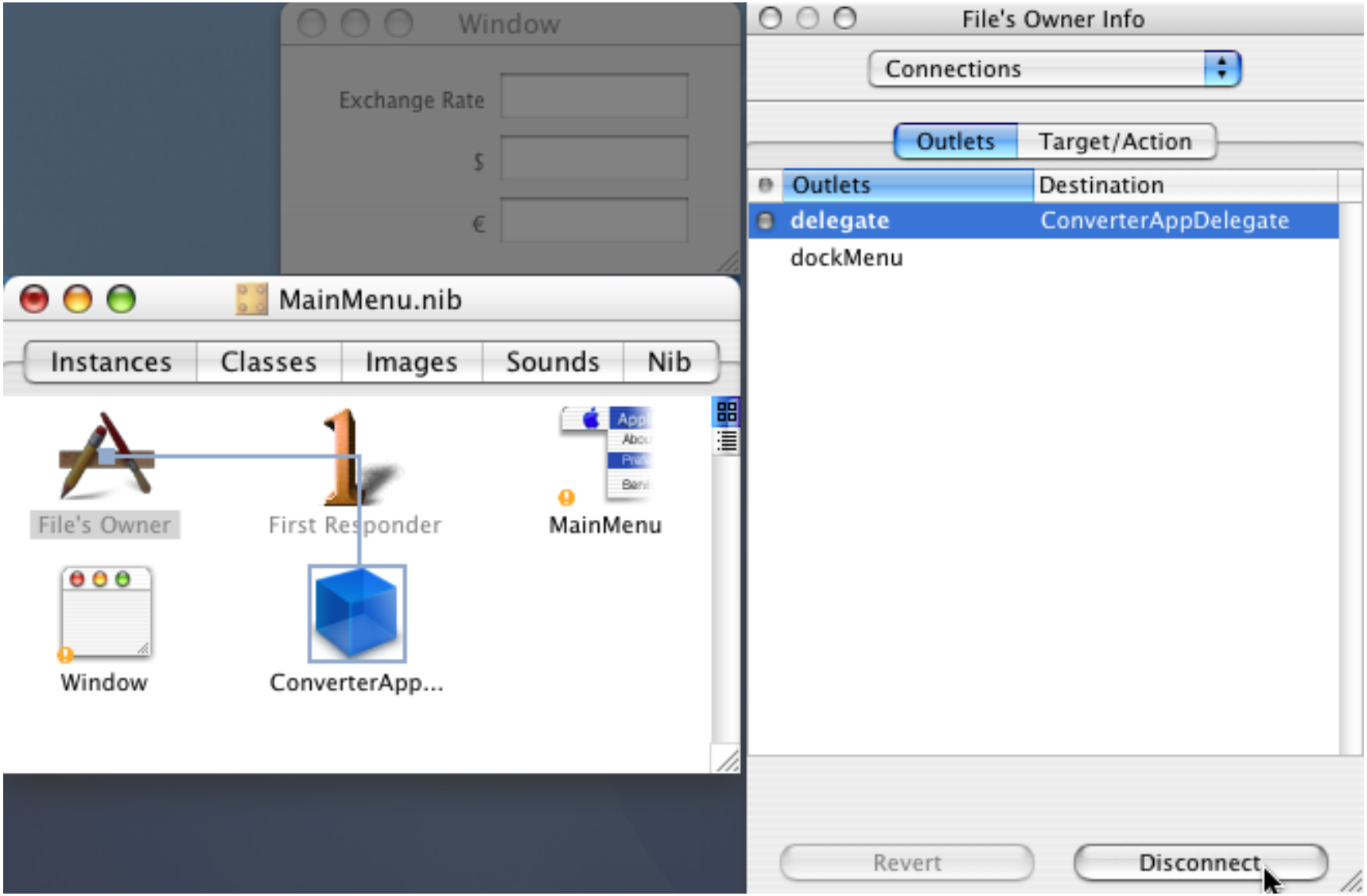
Instantiate it in your nib



Create a connection



To the NSApplication



ConverterAppDelegate.py Class

```
from Foundation import *
from AppKit import *
import objc

class ConverterAppDelegate(NSObject):
    def init(self):
        self = super(ConverterAppDelegate, self).init()
        self.exchangeRate = 3
        self.dollarsToConvert = 4
        return self

    def amountInOtherCurrency(self):
        return self.dollarsToConvert * self.exchangeRate

    def setAmountInOtherCurrency_(self, amt):
        self.dollarsToConvert = amt / self.exchangeRate

# shamelessly preventing line wrapping
cls = ConverterAppDelegate
cls.setKeys_triggerChangeNotificationsForDependentKey_(
    [u'dollarsToConvert', u'exchangeRate'],
    u'amountInOtherCurrency',
)
```

Converter.py script

```
from PyObjCTools import AppHelper
import ConverterAppDelegate
if __name__ == '__main__':
    AppHelper.runEventLoop()
```

Converter setup.py script

```
from distutils.core import setup
import py2app
setup(
    app = ['Converter.py'],
    data_files = ['MainMenu.nib'],
)
```

Build and Run

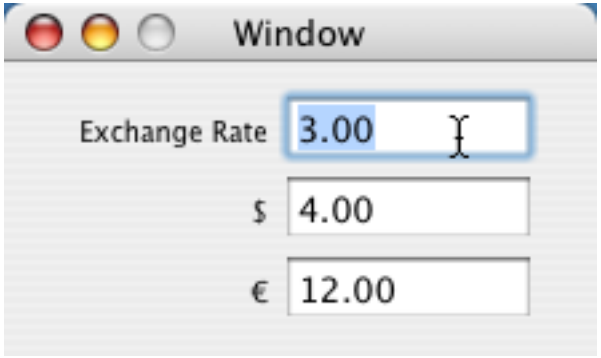
Build:

```
% python setup.py py2app --alias
```

Run:

```
% open dist/Converter.app
```

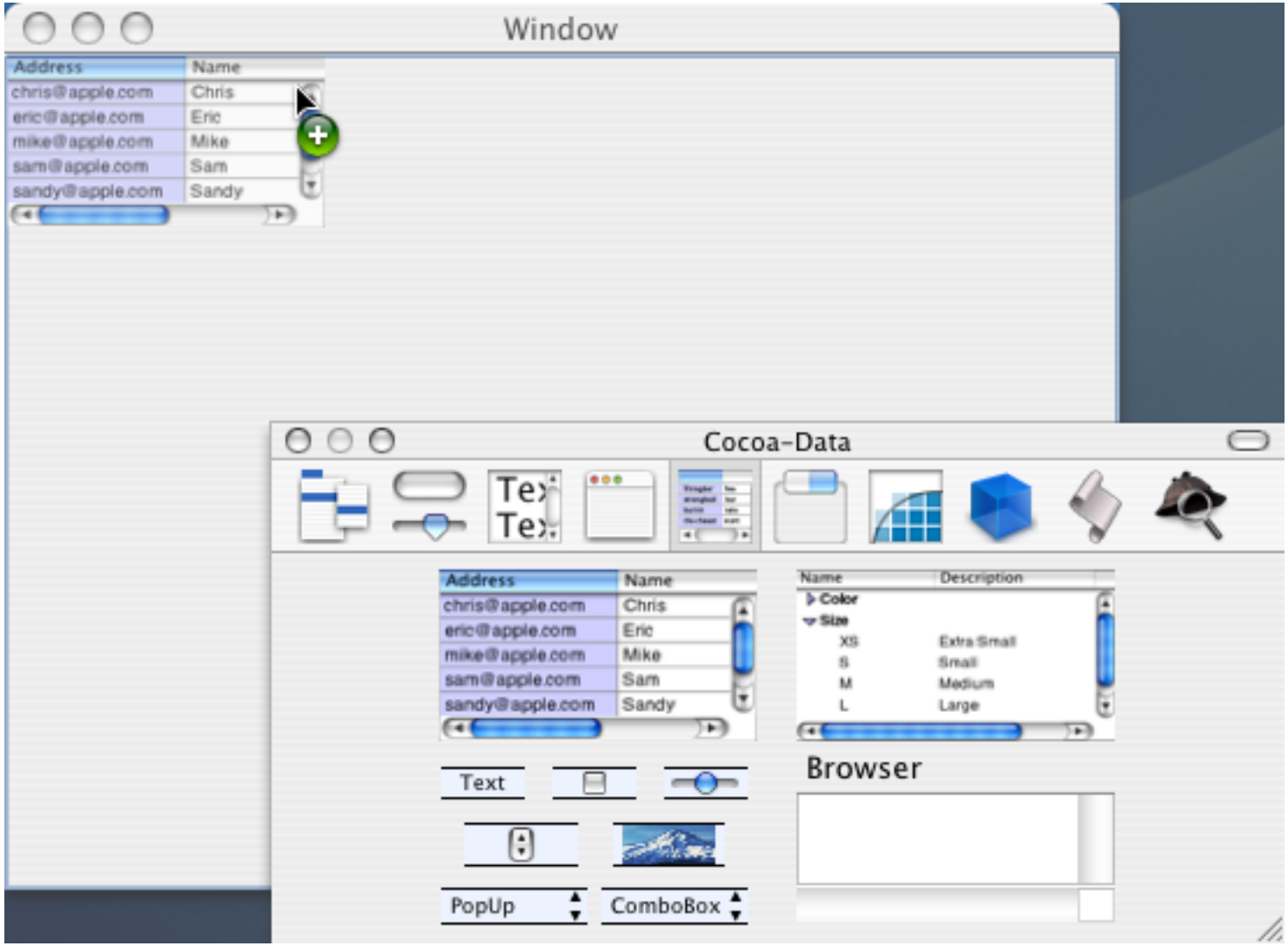
Done:



Hack the Gibson

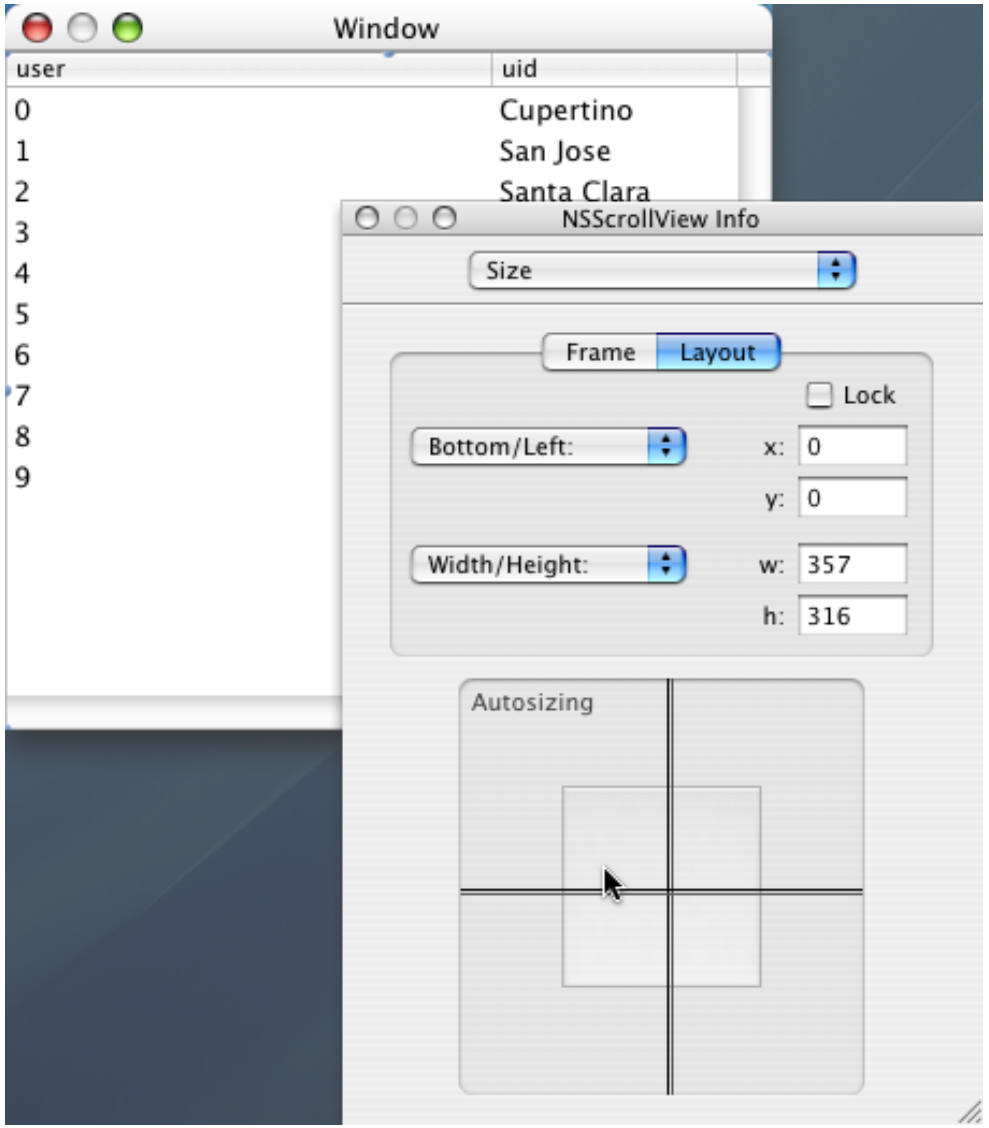
- Views password file
- ... using nidump utility
- In a table view

New NSTableView

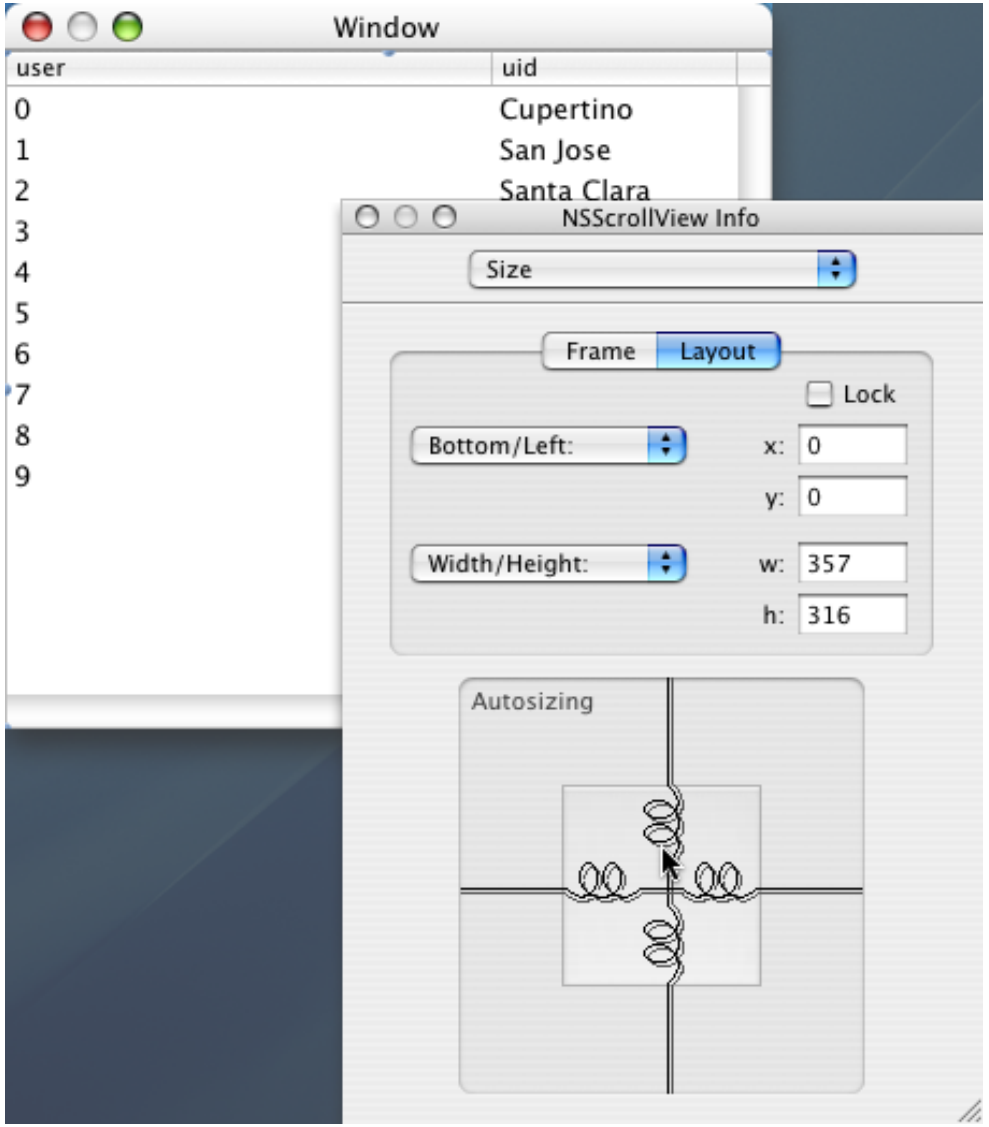


Name the columns

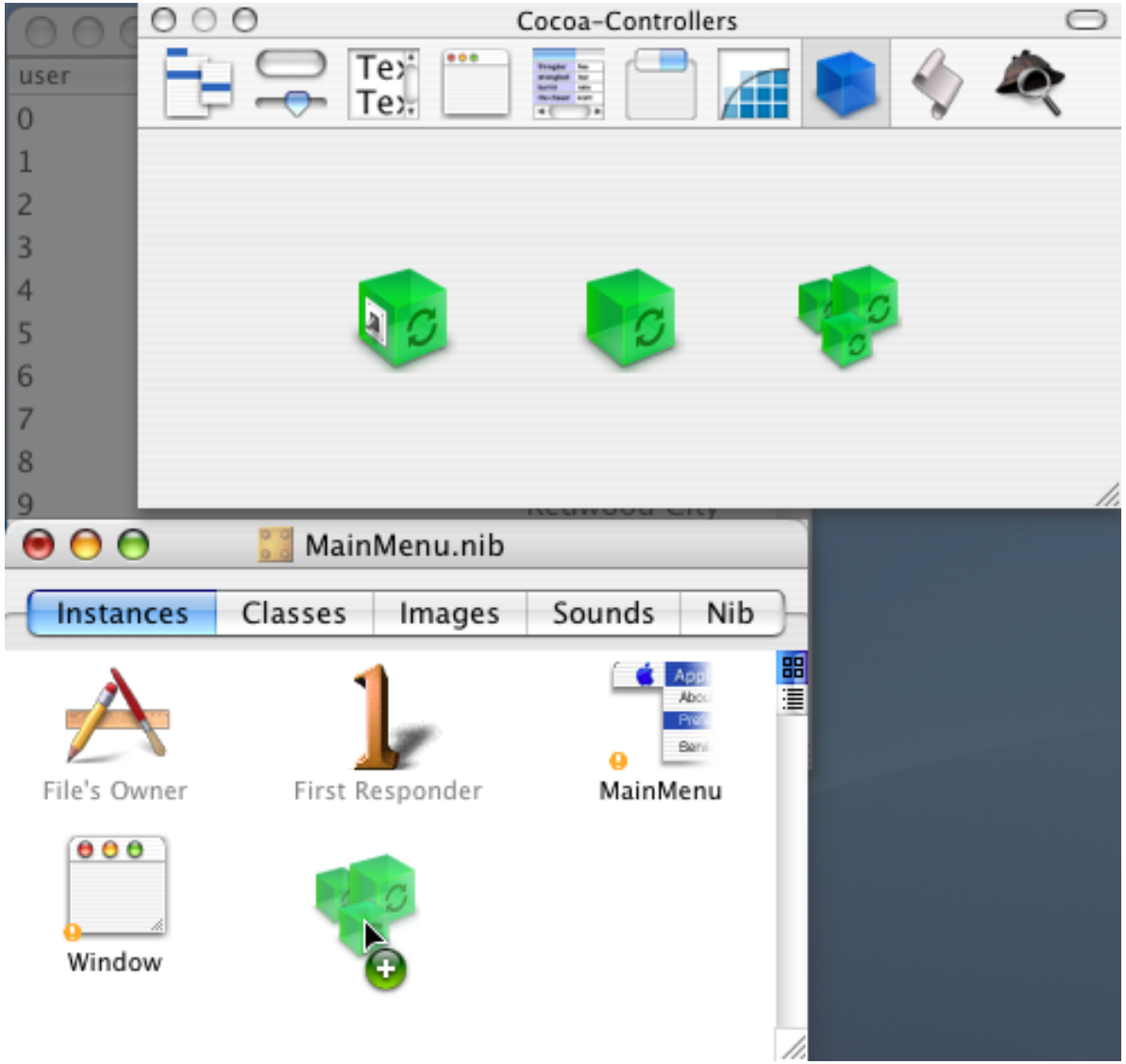
Change the resize behavior



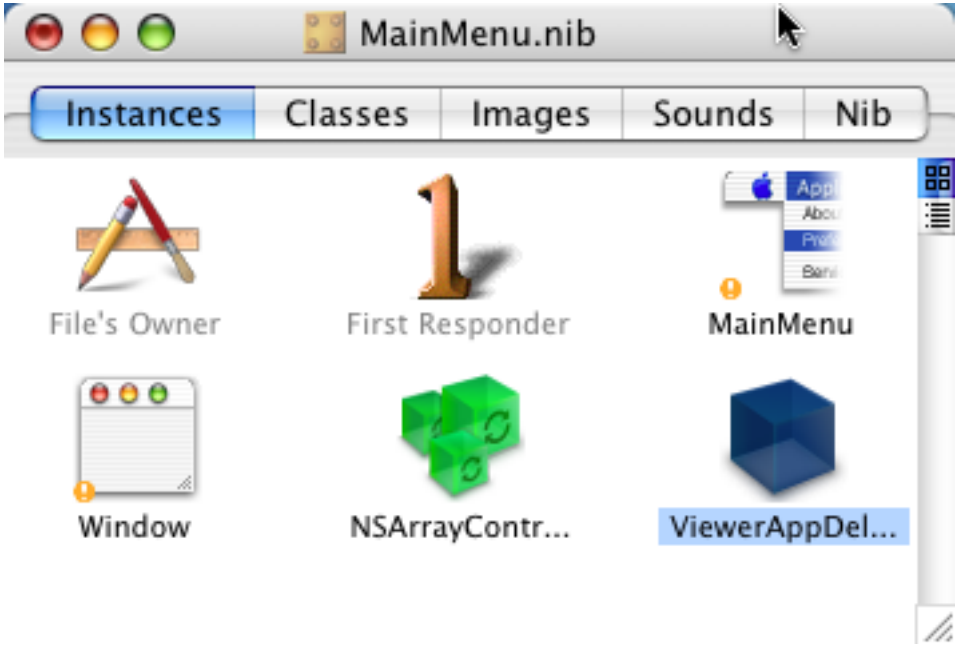
To expand with the NSWindow



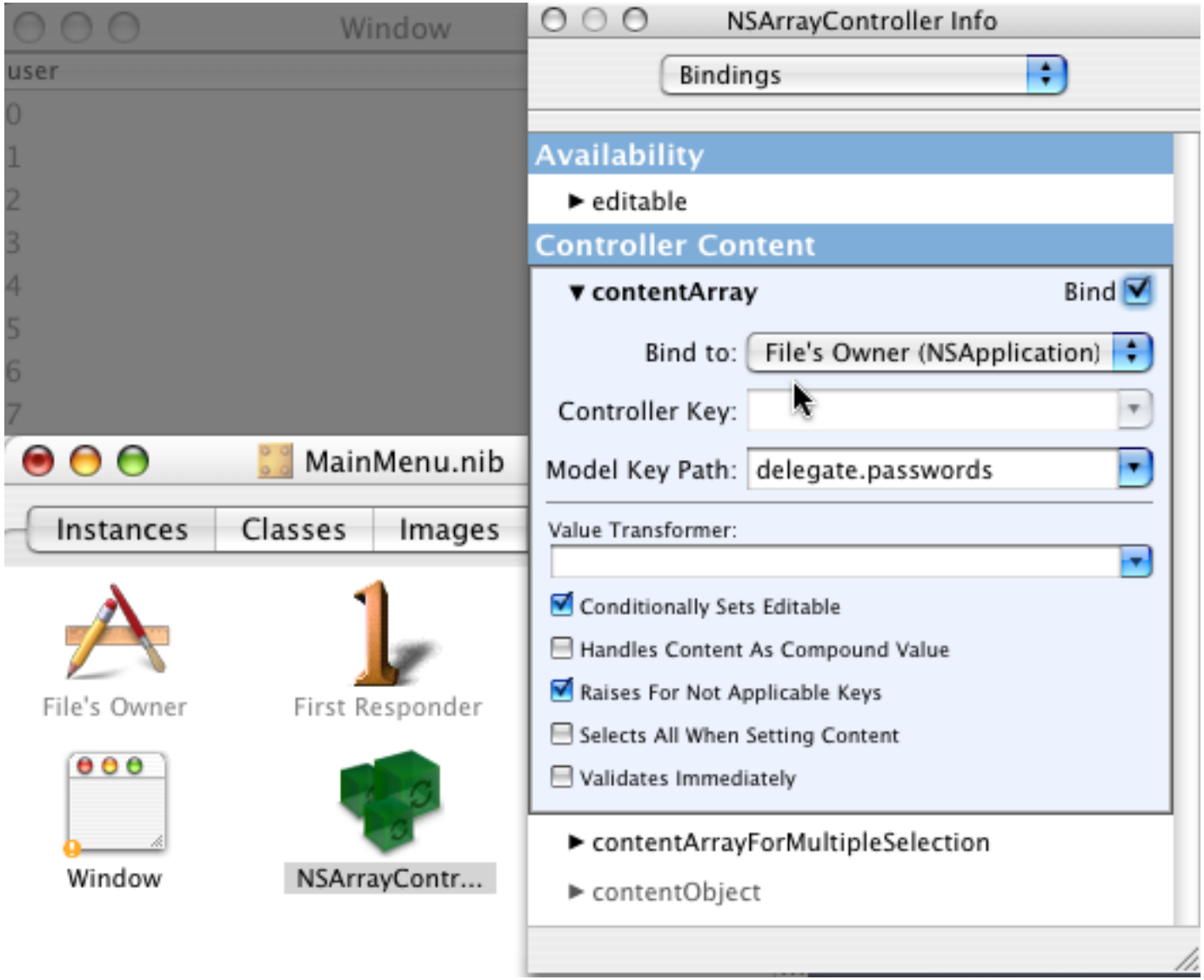
Create an NSArrayController



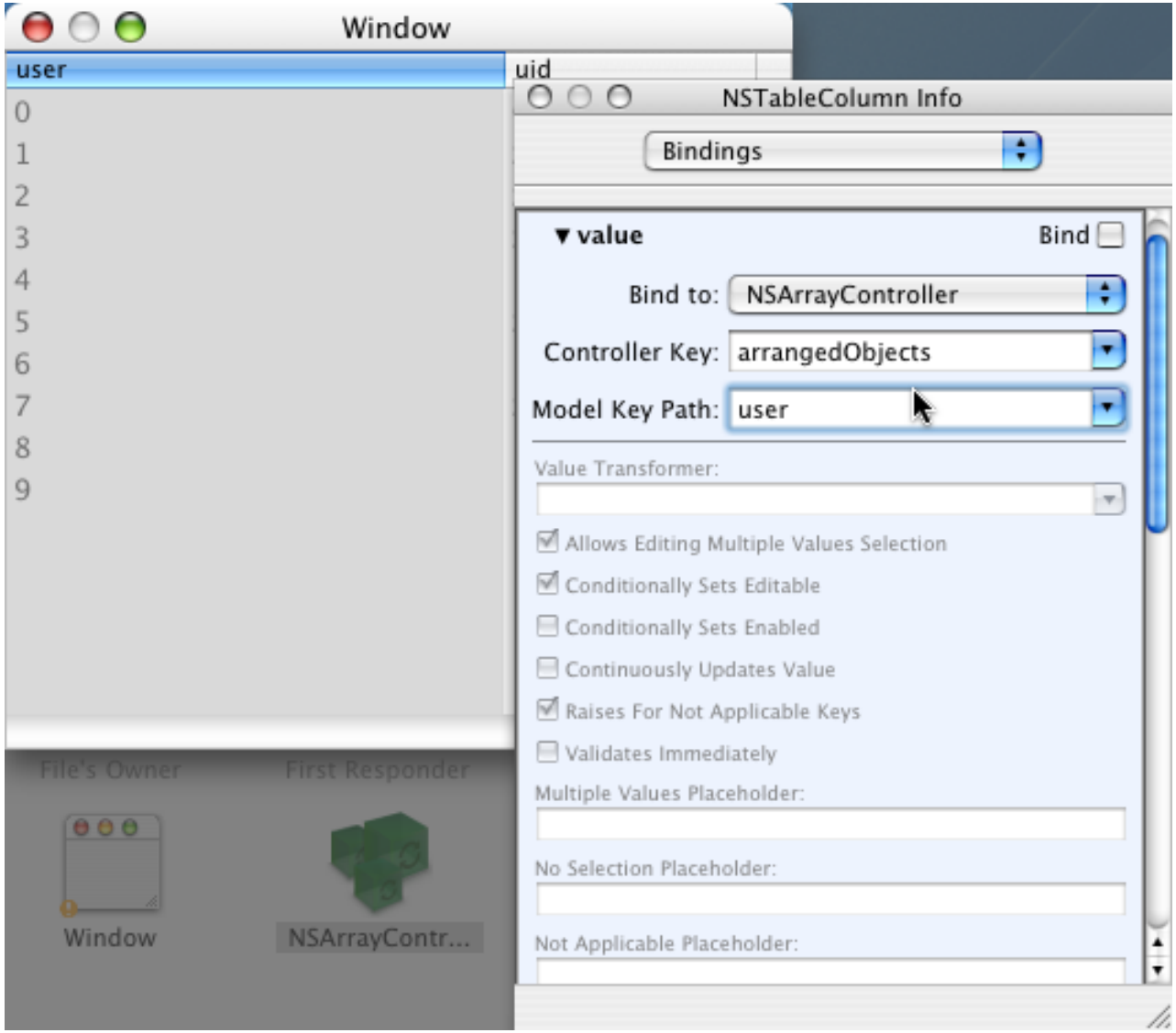
Create the ViewerAppDelegate



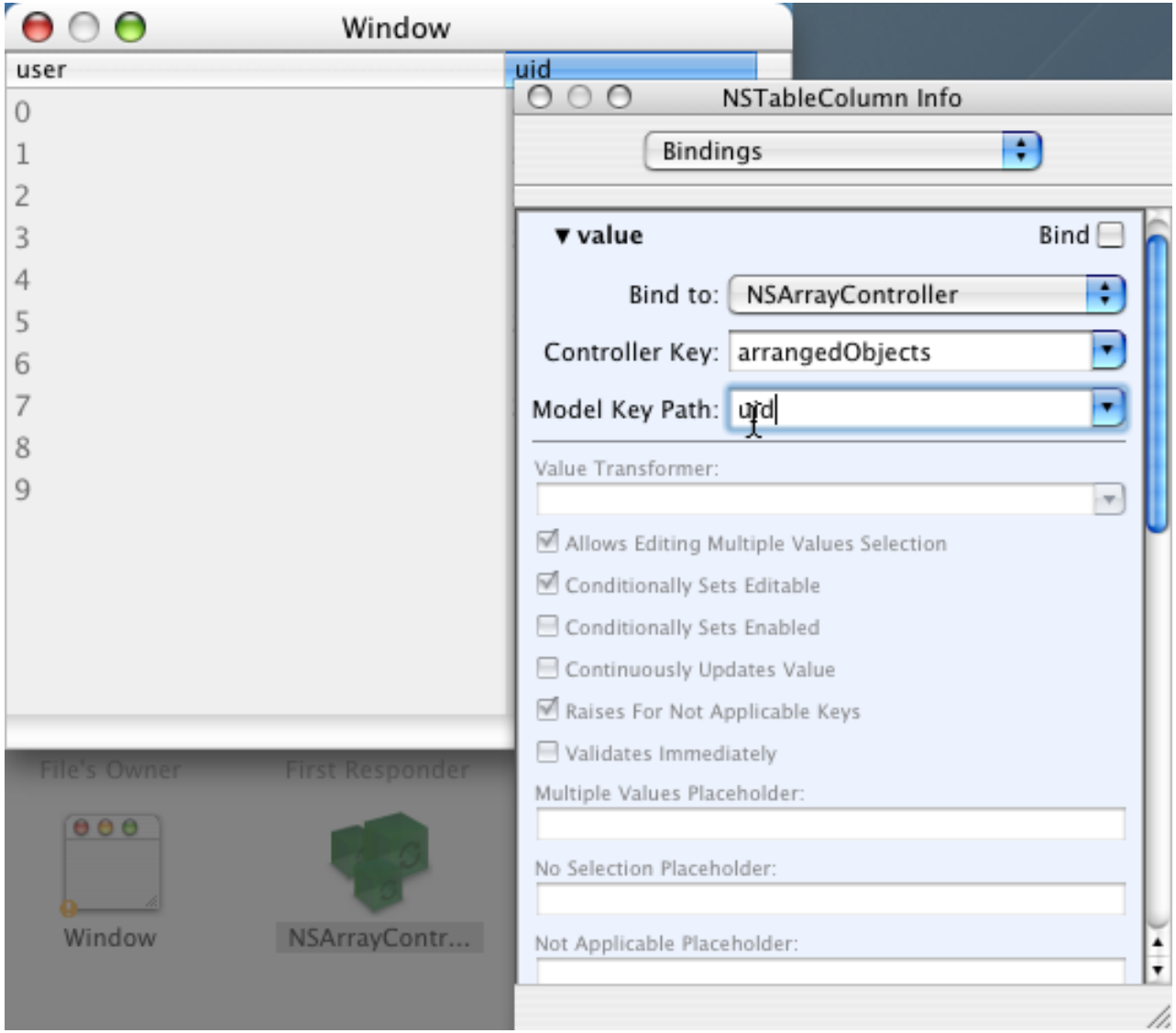
Bind the NSArrayController



Bind the user column



Bind the uid column



Viewer.py

```
from PyObjCTools import AppHelper
from Foundation import *
from AppKit import *
import os

# another shameless anti-line-wrapping hack
FIELDS = """
user password uid gid class change
expire gecos home_dir shell
""".split()

class ViewerAppDelegate(NSObject):
    def init(self):
        self = super(ViewerAppDelegate, self).init()
        self.passwords = [
            dict(zip(FIELDS, line.rstrip().split(':')))
            for line in os.popen('/usr/bin/nidump passwd .')
            if line and not line.startswith('#')
        ]
        return self

if __name__ == '__main__':
    AppHelper.runEventLoop()
```

Build and Run Viewer

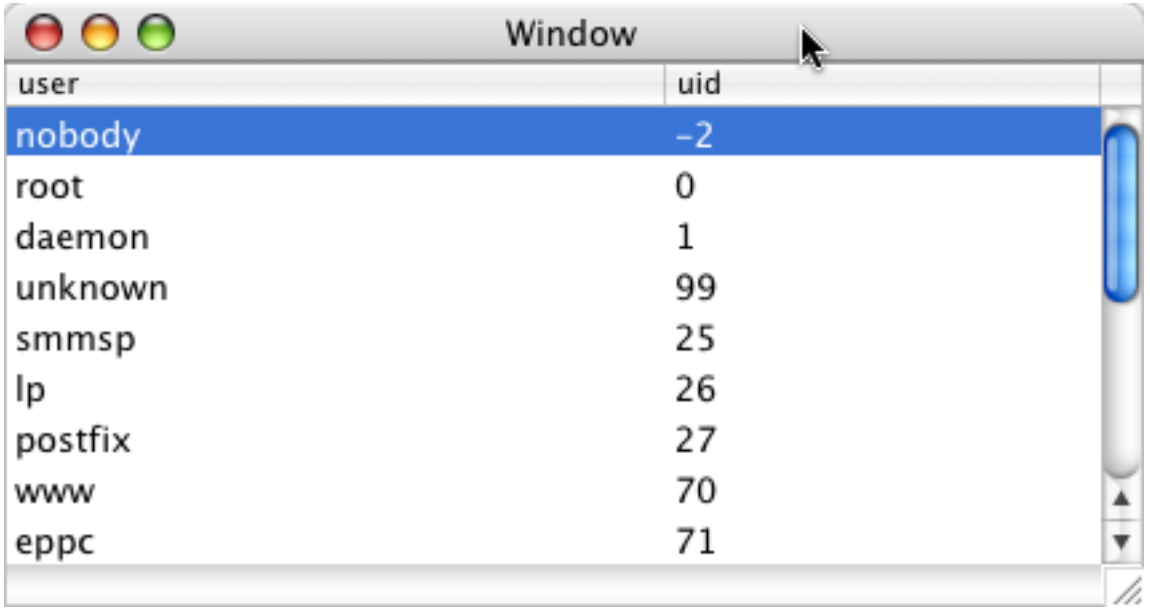
Build (redistributable!):

```
% py2applet Viewer.py MainMenu.nib
```

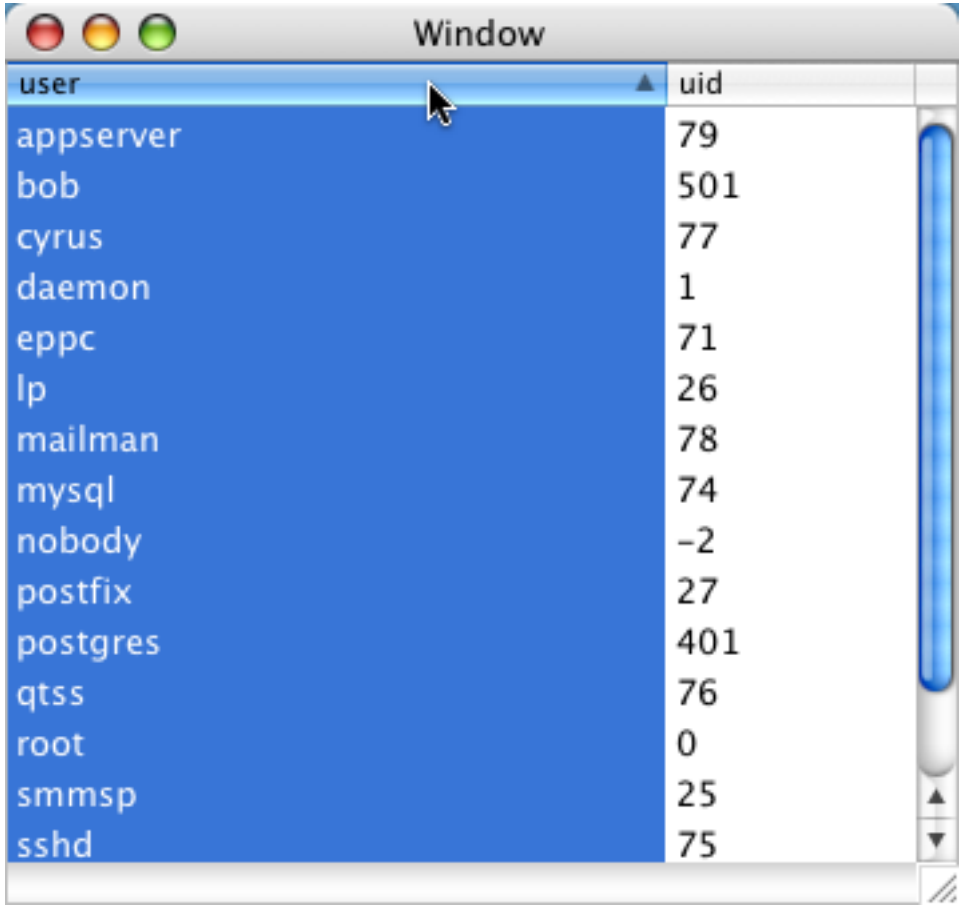
Run:

```
% open Viewer.app
```

Done:



Bindings give you sorting for free!



Help!

Documentation:

/Developer/Python/PyObjC/Documentation

Examples:

/Developer/Python/PyObjC/Examples

Wiki:

http://pythonmac.org/wiki

IRC:

#macpython (on freenode)

Mailing Lists:

- pyobjc-dev@lists.sourceforge.net
- pythonmac-sig@python.org

Help! (Objective-C)

Documentation:

http://developer.apple.com/

Examples:

/Developer/Examples/AppKit

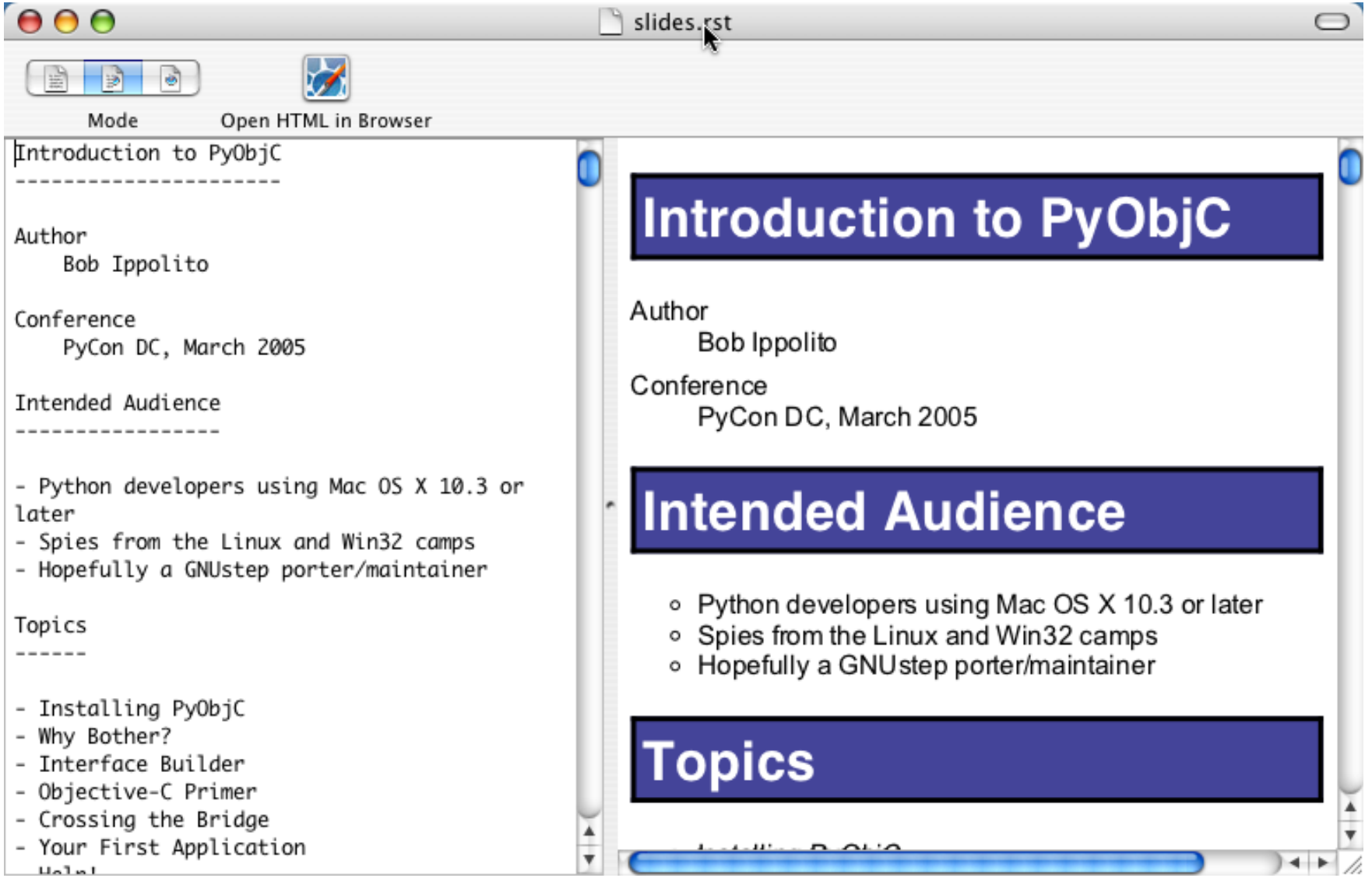
Wiki:

http://cocoadev.com/

Mailing List:

cocoa-dev@lists.apple.com

ReSTedit


slides.rst
Mode
Open HTML in Browser
Introduction to PyObjC
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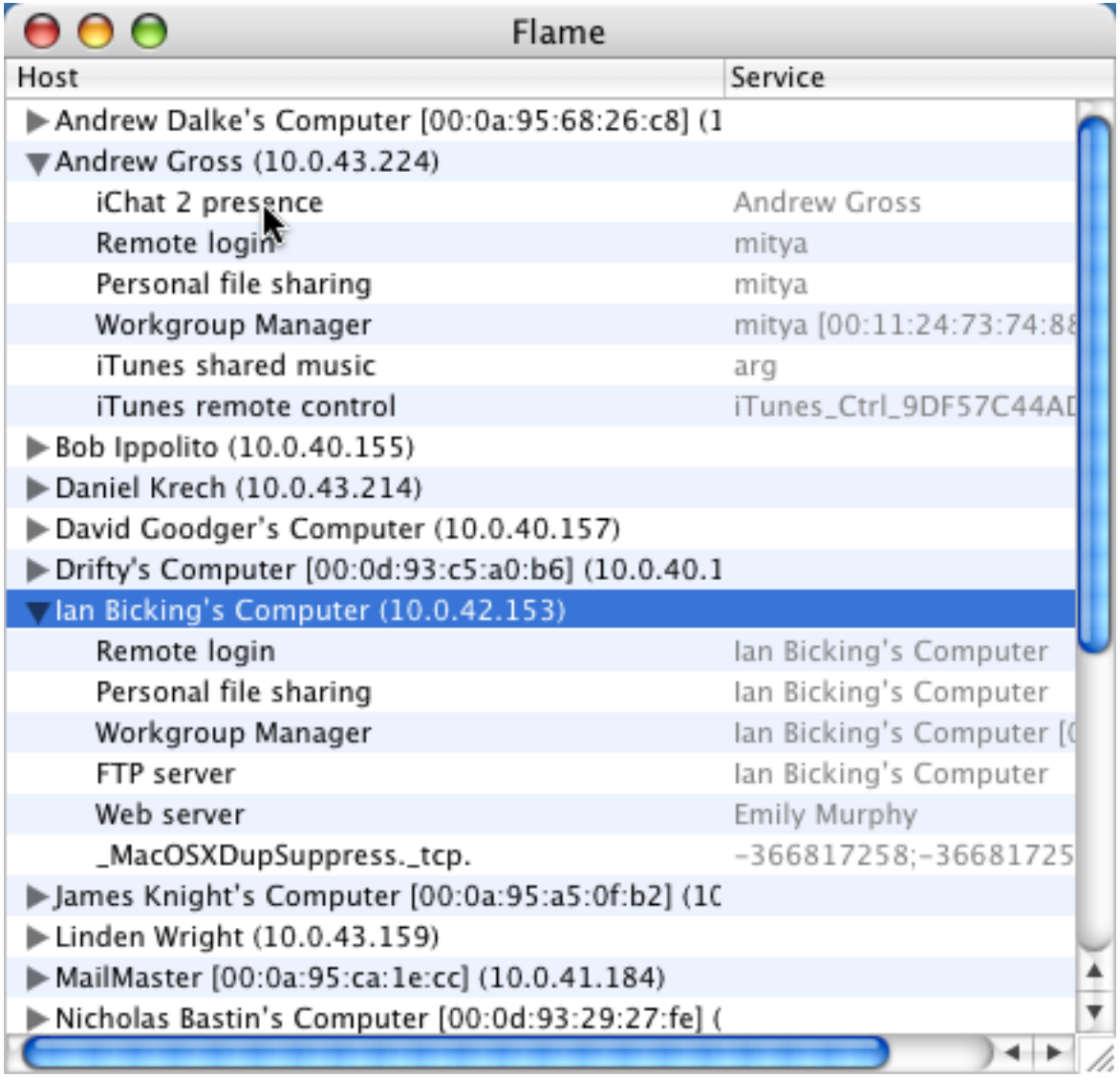
Flame


Flame
Host
Service
Andrew Dalke's Computer [00:0a:95:68:26:c8] (1
Andrew Gross (10.0.43.224)
iChat 2 presence
Andrew Gross
Remote login
mitya
Personal file sharing
mitya
Workgroup Manager
mitya [00:11:24:73:74:88
iTunes shared music
arg
iTunes remote control
iTunes_Ctrl_9DF57C44AD
Bob Ippolito (10.0.40.155)
Daniel Krech (10.0.43.214)
David Goodger's Computer (10.0.40.157)
Drifty's Computer [00:0d:93:c5:a0:b6] (10.0.40.1
Ian Bicking's Computer (10.0.42.153)
Remote login
Ian Bicking's Computer
Personal file sharing
Ian Bicking's Computer
Workgroup Manager
Ian Bicking's Computer [(
FTP server
Ian Bicking's Computer
Web server
Emily Murphy
_MacOSXDupSuppress._tcp.
-366817258;-36681725
James Knight's Computer [00:0a:95:a5:0f:b2] (1C
Linden Wright (10.0.43.159)
MailMaster [00:0a:95:ca:1e:cc] (10.0.41.184)
Nicholas Bastin's Computer [00:0d:93:29:27:fe] (

NodeBox

Copyrights.py

```
size(300, 300)

white = color(1,1,1,0.9)
red = color(1,0,0,0.9)
black = color(0,0,0,0.9)

for i in range(100):
    fill(choice((white,red,black)))
    font("Arial Bold")
    fontsize(random(300))
    text(u"™", random(250),random(200))
    text(u"®", random(250),random(200))
    text(u"©", random(250),random(200))
```

Questions?

Go ahead, ask.