

APPLESCRIPT BASICS

by Jerry Stratton

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<http://www.hoboes.com/NetLife/AppleScript/>

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GETTING STARTED

Why AppleScript

AppleScript can automate monotonous, repetitive tasks, or tasks that need to be performed at a specific time. Mac OS X can (using it's built-in scheduler via programs such as Apple's iCal or Embraceware's Awaken) run any script on the minute you need it to run.

AppleScript makes it easy to “talk” to standard Macintosh applications. It can “glue” applications together so that each application does what it does best.

AppleScript is easy to understand; it's almost English:

```
tell application "Safari" to make new document with properties {URL:"http://  
    www.hoboes.com/"}
```

This is a valid AppleScript statement. If you use it, Safari will create a new document, and inside that document it will open the hoboes.com web site.

Script Editor

Every Macintosh comes with a program called “AppleScript Editor” that allows you to create AppleScripts. AppleScript Editor is in the Applications folder, inside of the Utilities folder.

RECORDING ACTIONS

If an application supports it, recording actions allows you to quickly build up a basic AppleScript. For example, if you go into AppleScript Editor and hit the “Record” button before making a new folder, you might end up with something like:

```
tell application "Finder"
  activate
  make new folder at folder "Desktop" of folder "jerry" of folder "Users" of startup
    disk with properties {name:"untitled folder"}
  set name of folder "untitled folder" of folder "Desktop" of folder "jerry" of
    folder "Users" of startup disk to "Quick New Folder"
end tell
```

This tells the program (“application”) called “Finder” to first activate, then make a new folder, and then change the name of that folder to “Quick New Folder”.

Unfortunately, most applications don’t support recording; if they do, however, it is often the easiest way to make a new script.

Carefully arrange the desktop

Let’s say that you want to always start up your computer with three folders open: your Desktop, your Documents, and your Downloads.

Go into Script Editor and get rid of whatever is currently there. Click “Record” and then switch to the Finder.

Hold down the Option key, pull down the Finder menu, and choose “Close All”.

Use Command-N to open a new window, and from that window open your Desktop folder.

Move your Desktop window to the upper left, and then arrange it to take up a bit less than a quarter of the screen.

Do the same for your Documents folder, but put it in the upper right.

Then do it again for your Downloads folder, but put it in the lower left.

Go back to AppleScript Editor and click “Stop”. You should have something like this:

```

tell application "Finder"
  activate
  close every window
  close Finder window 1
  make new Finder window
  set target of Finder window 1 to folder "Desktop" of folder "jerry" of folder
    "Users" of startup disk
  set position of Finder window 1 to {99, 44}
  set bounds of Finder window 1 to {99, 44, 995, 699}
  make new Finder window
  set position of Finder window 1 to {1008, 44}
  set bounds of Finder window 1 to {1008, 44, 1934, 700}
  set target of Finder window 1 to folder "Documents" of folder "jerry" of folder
    "Users" of startup disk
  make new Finder window
  set target of Finder window 1 to folder "Downloads" of folder "jerry" of folder
    "Users" of startup disk
  set position of Finder window 1 to {102, 730}
end tell

```

Next, test it. There's one odd thing in it: after it closes every window, it tries to close each window individually. But it can't do that, because it just closed all of them.

Delete the lines that look like "Close Finder window 1". Your script will look like:

```

tell application "Finder"
  activate
  close every window
  make new Finder window
  set target of Finder window 1 to folder "Desktop" of folder "jerry" of folder
    "Users" of startup disk
  set position of Finder window 1 to {99, 44}
  set bounds of Finder window 1 to {99, 44, 995, 699}
  make new Finder window
  set position of Finder window 1 to {1008, 44}
  set bounds of Finder window 1 to {1008, 44, 1934, 700}
  set target of Finder window 1 to folder "Documents" of folder "jerry" of folder
    "Users" of startup disk
  make new Finder window
  set target of Finder window 1 to folder "Downloads" of folder "jerry" of folder
    "Users" of startup disk
  set position of Finder window 1 to {102, 730}
end tell

```

You can save this as "Arrange Folders" with File Format "Application", and every time you run it it will close all of your Finder windows and open up just the three you want, arranged the way you want them.

SIMPLE SCRIPTS

Comments

When you are writing your scripts, you will want to leave comments for yourself. You can preface any line with two dashes and that line will be ignored by AppleScript. You can write whatever you want on that line.

You can surround any set of lines with an open parentheses and two asterisks (close with two asterisks and a close parentheses) to cause AppleScript to ignore all of those lines.

```
(**
  This is a comment.
  None of this is AppleScript
**)
make new document
--close all of the windows we've opened
close all windows
```

Dictionaries

A useful feature of AppleScript Editor is the ability to look at the “dictionary” of scriptable applications. If you look at the dictionary for Safari, Word, or Finder, you can see what things those programs can do, and what commands it takes to get them to do those things.

Create a news screen

We can do the same with web browser windows that we did with Finder windows. Type the following script into your AppleScript Editor and save it as an application called “Open News Overview”:

```

tell application "Safari"
  activate
  --{xStart, yStart, xEnd, yEnd}

  --open CNN news in upper left
  set CNN to make new document
  set CNNWindow to window 1
  set bounds of CNNWindow to {10, 25, 600, 600}
  set URL of CNN to "http://www.cnn.com/"

  --open Google news in upper right
  set Google to make new document
  set GoogleWindow to window 1
  set bounds of GoogleWindow to {610, 25, 1210, 600}
  set URL of Google to "http://news.google.com/"

  --open Memeorandum in lower left
  set Memeorandum to make new document
  set MemeorandumWindow to window 1
  set bounds of MemeorandumWindow to {10, 625, 600, 1200}
  set URL of Memeorandum to "http://www.memeorandum.com/"

  --open blog in lower right
  set Blog to make new document
  set BlogWindow to window 1
  set bounds of BlogWindow to {610, 625, 1210, 1200}
  set URL of Blog to "http://www.hoboes.com/Mimsy/"
end tell

```

This will open four windows arranged in a four-part square. You can edit the “bounds” of each window as you see fit.

Automatically Reload Web Pages

If you’ve paid attention to the “Save” screen for your scripts, there is an option which by default is unchecked called “Stay Open”. If you check this, your script will not quit when it is done. It will stay open, and can continue working.

AppleScripts work by sending and receiving “messages”. When we “told” Safari to make new documents and open URLs, our script sent the appropriate messages from our script to Safari.

If our script stays open, the system will also send it messages. Whenever an application “quits”, the system sends it a “quit” message. Our script gets that also (it automatically knows what to do when it receives that message: it quits). Another message our script receives is the “idle” message. The script receives the idle message when it isn’t doing anything.

Add the following lines to your “Open News Overview”:

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```
on idle
  tell application "Safari"
    repeat with overviewWindow in every window
      tell document of overviewWindow
        set URL to URL
      end tell
    end repeat
  end tell
  return 60
end idle
```

This is what is called a “handler” in AppleScript. It “handles” messages. When you handle a message, you can send a return message. In this case, we’re telling the system that we’re done with our idle, and we would like to have another idle message in 60 seconds (“return 60”). By default, idle times are in 30-second increments. The first idle message is sent immediately after the script first goes idle in order to set the idle time to a different default.

This just repeats through every window of Safari and tells the document in that window to reload its URL (“set URL to URL”).

Shell Tell

You’ll notice that we have two tells, one inside of the other. First, we tell Safari to do something, and inside of that we are telling one of Safari’s documents to do something.

Repetitive Tasks

One of the things you can use scripts for is to automate boring and repetitive tasks. One of the features that AppleScript has to make it easy to automate repetitive tasks is the “repeat” structure. (Other scripting languages might call it “while”, “for”, or “foreach”, among other names.)

Everything between “repeat” and “end repeat” will be repeated until our instructions are done. We told it to repeat “with overviewWindow in every window”. Within that repeat “block”, the variable “overviewWindow” will start with Safari’s first window the first time through, and then repeat for each of Safari’s windows, until there are no more windows left.

We could have done the same thing by typing those lines between the “repeat” four times, as we did when we opened the windows to load the web pages. But this makes it a lot easier. And it means that if we later add a fifth web page (we’ll need an awfully big monitor) we won’t need to change this part of the script at all.

Talking Clock

One of the features of the standard additions is the current date and the ability to speak out loud.

```
set volume 1
copy the (current date) to theDate
say theDate as string
```


This makes your computer quiet (so you don't bother other people near where you are using this tutorial), and then it copies the current date into a "variable" called "theDate". Finally, it says whatever is in the variable "theDate". The "say" command can only say text. If you try to say something other than text, AppleScript tries to send that thing a message called "say" instead of sending that item to "say". So you need to tell AppleScript to convert that thing to text first. This is why we put the "as string" after "say theDate".

You can look at what it is speaking by adding "get theDate" to the end of your script and then looking at your window titled "the result" (pull down the Windows menu to see this listed).

What it is speaking is a overly complex. It is reading the numbers without recognizing what they are. For example, it is reading 2002 as "twenty zero two" on the computer on which I'm writing this, and it is trying to speak the letters "AM" as a word "am". We'll need to help it along.

```
--be nice to our neighbors
set volume 1

on idle
  --get the current date and time
  copy the (current date) to theDate

  --get the weekday
  copy the weekday of theDate as string to theDay

  --the hours (from 1 to 12)
  copy the hours of theDate to theHour
  if theHour is greater than 12 then
    --13:00 to 23:00
    set theHour to theHour - 12
    set theAMPM to "PM"
  else if theHour is "12" then
    --12:00
    set theAMPM to "PM"
  else if theHour is "0" then
    --00:00
    set theHour to "12"
    set theAMPM to "AM"
  else
    --01:00 to 11:00
    set theAMPM to "AM"
  end if

  --the minutes (including preceding zero)
  copy the minutes of theDate to theMinutes
  if theMinutes is less than 10 then
    set theMinutes to "0" & theMinutes
  end if

  say theDay & ", " & theHour & ":" & theMinutes & " " & theAMPM

  return 60
end idle
```

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The “ampersand” or “&” character glues together two pieces of text. In this case, we’re putting our variable “theHour” after our variable “theDay” and putting a comma and space between them. Then, adding theMinutes with a colon in front of it, and then theAMPM with a space in front of it. So it will end up looking like “Wednesday, 6:21 PM”.

Which then gets spoken.

Make sure you save your talking clock as an “Application” that will “Stay Open”.

Drag and Drop

When you drop a file onto a program, that program gets a message explaining what happened. You can let your AppleScripts accept those messages with the “open” handler. Make a script with nothing but:

```
on open (theItems)
  repeat with anItem in theItems
    tell application "Finder"
      copy the name of item anItem to theName
    end tell
    display dialog theName
  end repeat
end open
```

Save this as an Application called “Uploader”. Then, drop a few files on it. It should name each file in a dialog box.

You could use this feature to “tell” an FTP program such as Fetch or Interarchy to upload files automatically to your web site. When we do our upload, we’ll want to make sure we don’t upload things accidentally that we don’t want. Usually, we just want to upload images and text files (html files are usually text). Change your Uploader script to:

```
property allowedTypes : {"JPEG", "TEXT", "HTML"}

on open (theItems)
  repeat with anItem in theItems
    tell application "Finder"
      copy the name of item anItem to theName
      copy the file type of item anItem to theType
    end tell

    if theType is not in allowedTypes then
      display dialog theType & " (" & theName & ") is not allowed for upload."
    end if
  end repeat
end open
```

We created a property (very much like a variable) that contains our allowed types. If the file is not an allowed type, we display a warning message. This allows you to add that type to the list of allowed types if you wish to.

Finally, we need to tell Fetch to upload the file. You may wish to look at Fetch’s dictionary.

```

property allowedTypes : {"JPEG", "TEXT", "HTML"}

--replace the following with your host's information
property remoteHost : "hostname.example.com"
property remotePass : "password"
property remoteUser : "username"
property basePath : "/path/to/upload/"

on open (theItems)
  repeat with anItem in theItems
    tell application "Finder"
      copy the name of item anItem to theName
      copy the file type of item anItem to theType
    end tell

    if theType is in allowedTypes then
      copy basePath & theName to fullPath
      tell application "Fetch"
        activate
        store anItem host remoteHost path fullPath user remoteUser password remotePass
          with sftp
        end tell
      else
        display dialog theType & " (" & theName & ") is not allowed for upload."
      end if
    end repeat
  end open

```

The same script should work with Interarchy.

We're using an "if" structure in this script. The "if" structure performs everything between "if" and "end if" depending on certain conditions. Often, there will be one set of statements before an "else" for if the condition works out, and another set of statements after an "else" for if the condition does not work out.

If "theType" is in the list of "allowedTypes", we work with Fetch. Otherwise, we inform the user that this is not an allowed type.

Other Things You Might Do

Create a simple alarm clock: ask for a message, a time, and then sleep to that time and speak that message.

Publish a word processing document as RTF, HTML, and PDF--then automatically upload it using the other scripts.

Grab and write a random quote from a database of quotes.

Combine multiple PDF files into a single file.

APPLESCRIPT AND THE COMMAND LINE

If you use OS X and you use OS X's command line or cron scripts, you can combine AppleScript with the command line. If you have no idea what that last sentence means, you can safely skip this chapter. This is not a tutorial on using the command line or on using Unix.

Running AppleScript from the Command Line

The easiest way to add an AppleScript to your command line application is through the “open” command. If you type “open ~/Documents/MyAppleScript” on the command line, your AppleScript called “MyAppleScript” in your Documents folder will run. You can use “open” in conjunction with cron, with Perl scripts, or with any of the shell scripting languages. Call it as you would any other command line utility.

You can also call—and create—AppleScripts with the “osa” commands. These are “osascript”, “osacompile”, and “osalang”. In some versions of OS X, you will need to call these by using the full path to the command, that is, “/usr/bin/osascript”. If you simply type “osascript” on the command line, it will give you an obscure error. The “osa” commands cannot be used via cron if you intend to call another application, such as Microsoft Word or FileMaker. Due to the internal workings of Mac OS X's version of Unix, cron does not have permission to call GUI applications (this is a horribly simplified reason, look on the newsgroups if you want more information). The “open” command will work from cron, however.

And, of course, remember that if you plan on calling an application from AppleScript, that application must be able to run. If it is a GUI application, then your GUI must be running: you must be logged into your computer. If you leave OS X turned on but logged out, GUI applications will be unable to open.

AppleScript is great for those scripting tasks for which the Unix “pipeline” metaphor doesn't make sense.

Calling the Command Line from AppleScript

You can also call your command-line scripts and utilities from within your AppleScripts. Use the “do shell script” command for that. For example, if you have a Perl script called “makeHTML” in “/usr/local/bin” you could use

```
do shell script "/usr/local/bin/makeHTML"
```

to run the command.

MORE INFORMATION

AppleScript: The Definitive Guide

<http://www.hoboes.com/Mimsy/hacks/applescript-definitive/>

AppleScript is an extremely useful tool for automating the repetitive things you do in Mac OS X applications, as well as for tying a long workflow together into a double-clickable icon. This Definitive Guide is a great reference for the AppleScript scripting language.

AppleScript on Negative Space

<http://www.hoboes.com/Search/tags/AppleScript/>

I've written several application-specific tutorials and examples on my blog and web site.

Introduction to AppleScript Overview

<http://developer.apple.com/library/mac/>

This is Apple's guide to AppleScript. It's more than a bit technical, but also comprehensive.

“The best book on programming for the layman is *Alice in Wonderland*; but that's because it's the best book on anything for the layman.”

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