COMPUTOR EDGE ONLINE

High Tech Predictions

2015

December 26, 2014

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High Tech Predictions for 2015

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Digital Dave

"Digital Dave answers your tech questions." by *Digital Dave*

Flash Drive Backup; Losing Time Over a Bad CMOS Clock; VPN Again and Secure Public Wi-Fi Communications.

Flash Drive Backup

Dear Digital Dave,

I am trying to back up the files in my Windows 7 Libraries folder to a 256GB flash drive. I have separate folders in Documents for Word, Excel, Tax returns, etc and they copied okay as long as I did one folder at a time. I am having problems with all of the others: Pictures, Music, and Videos. Each has multiple folders. I make the copies as before but the pictures cannot be opened, the music files will not play, and the video files are blank. Sometimes it will copy a folder of files but if I navigate up one level and then go back down they all disappear. Any idea what's happening?

Don Hicke
San Diego, CA

Dear Don,

The problem may be related to the fact that Libraries are not actually folders, but rather a series of pointers directed to the real location of the various Picture, Music, and Video folders. These folders may be located anywhere on the computer hard drive, another computer, the Cloud, or the network. When you create the supposed backup, most likely only the pointers were copied. If you try to use a backup of a Library where the original connection no longer exists, the files will not appear.

As you did with the Documents, you will need to copy the folders one at a time. The actual names used for the local folders in Windows 7 are Pictures (faked as My Pictures), Music (faked as My Music), and Video (faked as My Video) and are located in *C:\Users\ [username]* (e.g. *C:\Users\Dave\Pictures*).

If you want regular backup of Libraries you can use the Backup and Restore feature.

However, this will save the files in one large file which is only accessible and restorable through the Backup and Restore program. If you want a backup that is directly accessible on any computer then you will need copy the folders individually. (You can always write a short AutoHotkey script to automate the backup process. Jack wrote a column a while back, "If Copying Files Become Tedious with a Mouse, It May Be Time for AutoHotkey", on how to do this, plus I believe it's included in his Beginner's Guide to AutoHotkey.)

Digital Dave

Losing Time Over a Bad CMOS Clock

Dear Digital Dave,

I have a computer that will not keep the time and date correctly. Every time you shut the computer down and restart it. You have to go to CMOS and reset it. Have changed the battery, but does not help. Any suggestions?

Herb Heizer

Dear Herb,

If replacing the battery didn't fix the problem then I would suspect that there is a problem with the clock itself. Other than replacing the motherboard, I don't know of an easy fix. However, there is a work around that might be better than setting the CMOS time every boot.

There is a feature in Windows which updates the computer time from the Internet. By default, this only runs about once a week, but you can force an update anytime you like.

Click the clock in the lower right-hand corner and select "Change date and time settings…" from the pop-up (or right-click on the clock and select "Adjust time/date" from the menu). Select the Internet Time tab (see Figure 1).
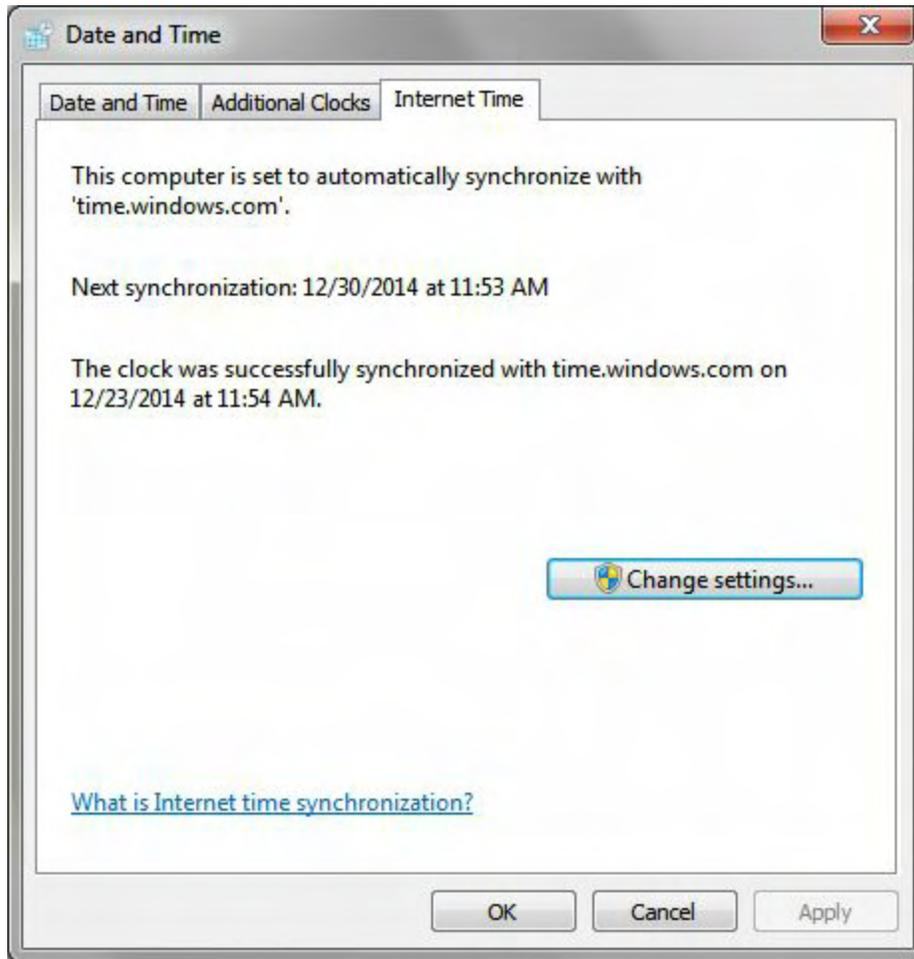
Figure 1. The Internet Time tab in the Date and Time window shows the automatic update settings.

Click on "Change settings…" The Internet Time Settings window will open. The "Synchronize with an Internet time server" box should be checked (see Figure 2).
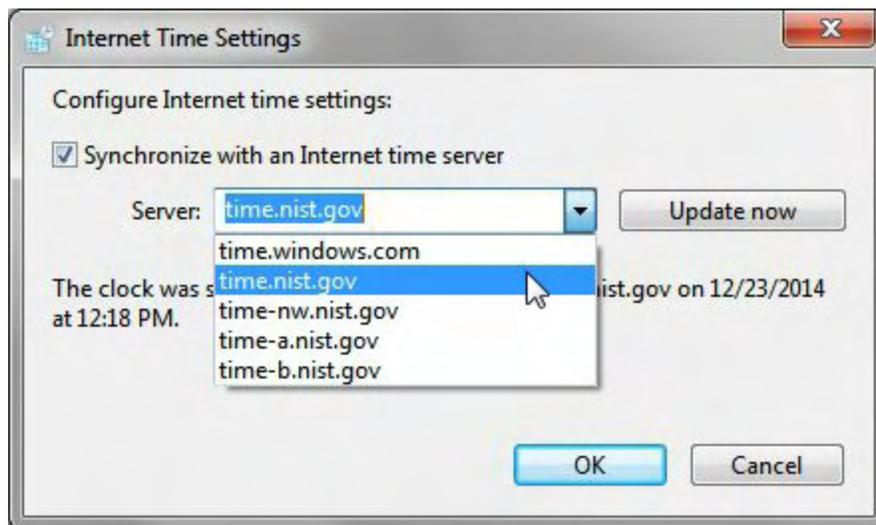

Figure 2. Pick the server you would like to use for time synchronization.

Pick a server. I found that *time.windows.com* would often timeout without updating, probably due to too much traffic. The *time.nist.gov* server was much more reliable. Press the "Update now" button to test.

This setting will only update once a week unless you do it manually. To force a time update every time you boot up, place a shortcut in your Startup folder (*Run => shell:startup*, then right-click *New => Shortcut*) with the following location (target):

```
w32tm /resync
```

This will re-sync the time with the above settings. To test the icon, manually reset the clock to another time, then double-click the icon. The system clock should update. Once the icon is located in the Startup folder your time should automatically reset whenever you start the computer.

While this doesn't fix the CMOS clock problem, it should resolve any time issues while running Windows. (I assumed that yours is a Windows computer, although the fixes for other operating systems are similar.)

Digital Dave

VPN Again and Secure Public Wi-Fi Communications

Dear Digital Dave,

I hope the answers pertaining to the issue of [VPN or SSL (HTTPS) security on a public Wi-Fi network](#) are of interest to your other readers, as well as myself.

You previously did a great job at examining the use of VPN on a Public Wi-Fi "hot spot," but one issue still seems to come to mind:

Since a VPN or SSL swaps encryption keys from the destination server to the user's PC, in order to encrypt and decrypt properly, why could a hacking interloper near me at a Starbucks, for instance, not be able to intercept the same Encryption Keys as I get when I'm using VPN or SSL (HTTPS) just by them using relatively simple software?

Unless there is something I'm missing here, hypothetically, neither VPN nor SSL would be very safe on a Public Wi-Fi network. Could you elaborate on this aspect?

The reason for my question is that I have a high-speed Internet at home, but only occasionally, I have needed to pay a bill online or check a bank balance while away from home, but I don't want to spend $700 a year to have a full mobile account (like Verizon or ATT) for the few times a year I'd use it. (Note: I use a regular dumb phone on a cheap "talk"

plan for mobile voice/texting.) So, I am trying to find a very secure way to use Public (open) Wi-Fi to fill-in for me at those few times. Any Suggestions?

In advance, thanks for all your good help and we all "luv-ya" out here!

AJ Dalton
Bonsall, CA

Dear AJ,

That's an excellent question which deserves some attention. You're absolutely right! When a connection is first established with a secure site a key does need to be sent in the clear during the handshake routine. How can that be done without compromising the encryption?

The SSL encryption system uses two keys: a public key which is shared (anyone can download and view it) and a private key on the server which is never shared with anyone or sent over any connection in the clear. What is shared is a unique key which is generated for each session and used only during that session. While this unique key is sent in the clear and can be intercepted, it is virtually useless to anyone other than the Web server or user's browser since it is also encrypted prior to the client sending it to the server.

When the server is contacted by the browser, it sends over its public key as part of its certificate. The client uses the server's public key to encrypt a symmetric key that will be used for the rest of the session's encryption and sends it to the server. The server uses its private key to decrypt the symmetric key. So, both machines have the encryption key and it was never publicly exposed.

The beauty of this is the one way algorithm. It is very easy to encrypt with the public key and decrypt with the private key, but it is very difficult to decrypt knowing only the public key.

It doesn't have to be a symmetric key you send back either, you could just communicate using public/private keypair encryption, but symmetric encryption is less overhead.

Since this unique shared key is generated for each session it highly improbable that anyone would break the unique key. Even then the hacker would need the private key (which is never transmitted) to decode any transmissions. Therefore while there is some data transmitted in the clear (the public key) at the beginning of an HTTPS session, its shared key is encrypted. This make HTTPS communications safe from beginning to end—even at coffee shops.

Having said all that, there are additional cautions worth mentioning. HTTPS connections are not always safe. One of the misconceptions about Security Certificates which are required for HTTPS communications is that they are safe if you don't get any warnings from your browser. (At the same time, there is nothing saying that a site isn't safe if you do get a browser warning.) This is all part of the scam promulgated by the Security Certificate industry. The only thing that a HTTPS tells you is that the communications are encrypted (not vulnerable to

open interception), not that they are safe from abuse.

This particular problem has nothing to do with the encryption/decryption system discussed above. If you're using HTTPS with a Security Certificate (trusted or not), then you should be safe from prying eyes. The problem is with whomever is on the other end.

Anyone can generate a Security Certificate to use on their Web site. Jack has done that for the *ComputorEdge* Web site for behind the scene administration. It works fine, but the problem is that if *ComputorEdge* tries to use it for the regular Web site, everyone would get a warning stating that *ComputorEdge* is not a trusted site. To avoid that warning which turns visitors away, the certificate must be installed in the browser as a "trusted" site. The companies that sell Security Certificates make sure that they are on this list of trusted certificates pre-installed in the browsers. This is the hook. Most Web sites that want to do business either are forced to buy a "trusted" certificate or fight a losing battle.

Why is this a scam? Because a "trusted" certificate gives you no more protection from nefarious Web sites than an "untrusted" certificate. Both offer all the necessary encryption, but neither guarantees that the person on the other end has good intentions. The people who sell "trusted" certificates do absolutely no checking on the the people who are buying them. Anyone with a credit card can get a "trusted" certificate regardless of their motivations. That means you must ensure that you are communicating with the right Web site before you attempt any sensitive transactions—including entering passwords. The unscrupulous will try to trick you by using URLs very close to the real ones. Everything may look safe ("trusted" Security Certificate), but you better make sure that you have the right site—right down to the last letter in the address.

That's why as a rule it is unsafe to use links in any e-mail and always better to directly access your private account Web sites through a browser. Adding those important sites to your Internet Favorites/Bookmarks will help to get you to the right place. Even if I receive a legitimate e-mail from one of my accounts, just to be safe, I still use a Favorites link.

Even though you use HTTPS at open Wi-Fi locations which will protect you from nosy lurkers with encryption, that won't protect you from unscrupulous people on the other end of the connection.

Digital Dave

Predictions 2015

"It's Time to Pull Out the Crystal Ball and Look into Our High Tech Future" by Jack
Dunning
Big Data and the Internet of Things (IoT) makes it look like we have a pretty boring New Year in store.
But maybe there will be something coming that we really care about in high tech? Or not!

Wow, after writing this article I decided to look back at my [2014 predictions](#) from last year.
I actually got one right. In December of 2013, I prognosticated that "the growth of the
handheld devices [specifically tablet computers] will slow significantly. Not because there
will be a decreased interest in using tablets, but because there is a limit on how many of
these handheld devices you can have lying around the house or office." I nailed it! (See
"[Tablet Sadness](#)") [Excuse my gloating, but I so rarely get one right.]

*   *   *

In my annual review of other people's predictions (OPP) for the year 2015 I found that, if you
go by them, it's going to be a pretty boring year. I commonly found the terms "big data" and
"Internet of Things" (IoT) used in the top ten impact players for next year. Then there are
"container" apps (?) which I guess offer an easier, more secure way to develop programs. Of
course, there are the inevitable predictions of more cyber attacks—low hanging fruit. Let's not
forget the annual predictions about mobile computing and the Cloud (they're going to explode
next year…again).

To be fair, making predictions is a pretty rough business. I have a fairly dismal record myself.

(That's why I merely make snarky comments about OPP.) The easiest thing to do is look at the last year and project it into the future, but in high tech that often doesn't work.

Tablets Will Continue to Languish

This time one year ago everything was rosy for the iPad and other tablet computers. Their skyrocketing growth was inevitable into 2014 and beyond. Look now. Today, most of the people who ever wanted a tablet now own one. The market is saturated and the new technology (bigger screen and better resolution) is going unnoticed. The sales of the king of tablets, iPad, have slowed and show few signs of reinvigoration.

Even a larger 12"(?) iPad in 2015 may not help tablet sales.

While no one is optimistic about tablet computer sales, I predict that my iPad 1 will continue to get good use—although I now find myself using my recently acquired smartphone to cheat on crossword puzzles at the breakfast table rather than pulling out the old tablet. It's just as well, since my spouse is usually on the iPad reading the local newspaper on those now defunct paper days (Monday, Tuesday, and Thursday). Ironically, I now need to print the New York Times crossword on those same days making my printer more necessary in this now newspaper-less society. Nothing is better than paper and pencil for a crossword.

I Give in and Use the Word "Phablet"

One common prediction is that "phablets will be the mobile growth engine."

"Sales of smartphones and tablets will slow down from the pace of recent years, reaching $484 billion and accounting for 40% of all IT spending growth. Chinese vendors will capture 15% or more of worldwide mobile growth. Phablet sales will grow 60%, cannibalizing the tablet market. Wearables will disappoint, with *only* 40-50 million units sold in 2015. A wrist-phone will ship and flop. Mobile app downloads will slow in 2015, reaching $150 billion, with Chinese independent app stores accounting for 18%. But enterprise mobile app development will more than double."

This prediction is sufficiently dark for me to buy into it. There is a limiting factor on the phablet (phone/tablet) which is the size of shirt pockets. While people are dumping their smaller smartphones for larger screens, the phablet may be a little too large for most. This seems to bear out. Reportedly, the iPhone 6 is outselling the larger phablet iPhone 6 Plus by three-to-one—85% of which were purchased by iPhone owners. The phablet will not significantly cannibalize either the smartphone market or the sagging tablet market. It's a little too big to be the best smartphone and a little to small to be a decent tablet.

I do believe that people are getting used to instant access to information. The smartphone has embedded itself into many of our lives. While it is not the best or easiest platform for surfing the Web and getting information, the smartphone is certainly the most convenient.

ComputorEdge *Note: I recently made a change to the mobile version of* ComputorEdge. *The Table of Contents already pops-up on mobile devices without the space consuming navigation pane on the left side. (The navigation pane can be removed on PCs by adding* ? nonav=1 *to the URL. See "How to Remove the ComputorEdge Navigation Menu— Permanently!") This change will work better for smartphones and tablets because the article columns will flow more freely into the screen windows making it easier to read without scrolling, pinching, and reverse pinching.*

Bitcoin Will Die

I wrote two article in 2014 about Bitcoin: "[Bitcoin: The New Cyber Currency: Bitcoin Made Millionaires from Nothing](#)" and "[The Real Future of Cryptocurrencies: Bitcoin, Litecoin, Dogecoin, and Many Other Virtual Coins Are Flooding the Cyber Currency Market](#)." The next one I write will be about its demise. There is no doubt that Bitcoin is a fiction (as are all currencies), but its usefulness is in question for anyone other than those flying beneath the radar. (See "[Bitcoin backer gets two years prison for illicit transfers](#).")

It's not that cyber-currencies (money literally made out of nothing) don't have a useful purpose. The issue is that they are a problem for governments. While I've always believed that these virtual currencies would collapse on their own—once people discovered that they don't actually have any real value or backing—the world authorities will hasten the death of Bitcoin. Don't worry. There will always be another new cyber-currency that people will temporarily glom onto. Some will make money, others will lose an equivalent amount.

Faster, More Powerful PCs

Another easy one. Since first arriving on the market, when have PCs not become more powerful and faster in any given year? This year there are [more technologies](#) contributing to the upgraded capabilities. It looks like it will be a [good year for Intel processors](#):

"Nearly every PC maker will release new products using the fifth generation of Intel's Core i3/i5/i7 processors, code-named Broadwell. Additionally, many existing product lines will be updated to Broadwell chips. After being pushed back more than once, these new processors are going to be available in shipping products in early 2015, and promise improvements to overall performance (frankly not that important) and battery life (very important)."

Windows 10

Along with faster PCs, Windows 10 will arrive and be hailed as the next Windows 7. Most people won't be aware (nor care) that it is actually a repaired version of Windows 8 which is superstitiously skipping the Windows 9 label. Windows 10 will become the mainstay for future PCs while Windows 7 becomes the next XP—sticking around much longer than anyone expected. Despite the Windows 8 blunder, few users will seek alternative operating systems. It won't be seen as worth the effort—even if the alternative *is* better. It seems that Microsoft can make no mistake which will not be forgiven by Windows users.

"While Windows 8 is still going to be on most of the computers showcased at CES, it's Windows 10 that will really be on everyone's mind. By skipping a version number, Microsoft is clearly putting some major distance between Windows 8 and its successor. The company is hosting its own Windows 10 event later in January, so don't expect to see much of the upcoming OS in person, but it'll certainly be talked about extensively behind closed doors.

By the way, I played with a [Surface Pro 3](#) at Costco this week. What impressed me most was the effectiveness of the pencil-like stylus. It not only did everything that you might want to do with a mouse, but I could actually do my scrawl on the screen. This is impossible with the signature displays at a checkout counter. Not that I want to do anything with handwriting. Based upon recent numbers, the [Surface Pro 3](#) could be the surprise success for 2015.

3D Printing

I include [3D printing](#) because it involves making things that you can hit with a hammer. (See "[Gartner lays out its top 10 tech trends for 2015](#)") How cool is that? The concept brings back the home garage inventor. This appeals to the creativity in all of us. "Let's pump one out with your 3D printer and see how it works." Even if you don't know how you would use it, you know you want one.

"3D printing. The technology has been around since 1984, but is now maturing and shipments are on the rise. While consumer 3D printing gets a lot of attention, it's really the enterprise use that can deliver value." I don't agree with that last line. The innovation will come from the home projects, then big business (enterprise) steals it.

People Get Bored with Groupon and LivingSocial Disappears

Who knew? After my raving a few years agoe about the use of e-mail to [deliver incredible deals](#) to consumers, these cyber-coupon companies are rapidly becoming yesterday's news—often flowing immediately to the Junk Mail folder. It looks like LivingSocial, my first introduction to the market, may soon be history. (See "[Year in Review 2014: Change at the top at LivingSocial](#).") It seems that there are too many good deals, retailers have been burned too

many times, and there are just so many facials you can get.

Facebook Becomes Even More Annoying

Admittedly I rarely visit Facebook anymore—maybe once a month. Apparently, I'm not the only one. Teens are opting to visit other social networking sites in greater numbers—although they continue with to patronize Facebook. The number of teens using Facebook has only dropped to 88%.

The problem I have with Facebook (and many other sites) is that it is a pig of a Web site. It can take forever to load with so many picture videos and other extras (ads) that it's frustrating to even log in. I know that they need to make money somehow, but when a site becomes more effort than it's worth, people will just go away. However, my guess is that when Facebook does fail, it will be a catastrophic event caused by an employee misstep or getting hacked. People will just stop going to Facebook and the end will occur practically overnight. But, that's the nature of Internet businesses.

Wearable Computing Devices—Yawn

There is some agreement with me in the tech press that smartwatches and other add-ons will meet with mild to low interest from the market. Most devices will disappoint… then disappear. I base this prediction on gut feeling. (If I'm not interested, how could anyone else be interested?) If the display of the iPhone 5 is already too small, how can any smartwatch's tiny screen survive?

Your Predictions for the Next Year

Have I missed anything? Probably so. Please let us hear your favorite predictions (or disagreements with my predictions) by leaving a comment.

Jack is the publisher of ComputorEdge Magazine. He's been with the magazine since first issue on May 16, 1983. Back then, it was called The Byte Buyer. His Web site is www.computoredge.com. He can be reached at ceeditor@computoredge.com. Jack is now in the process of updating and compiling his hundreds of articles and columns into e-books. Currently available:

Recently released is Jack's FREE AutoHotkey book, [AutoHotkey Tricks You Ought to Do with Window](#), available exclusively at ComputorEdge E-Books in the EPUB for e-readers and tablets, MOBI for Kindle, and PDF for printing formats.

ComputorEdge E-books is offering his [AutoHotkey Applications](#), an idea-generating intermediate level e-book about using the AutoHotkey Graphical User Interface (GUI) command to write practical pop-up apps for your Windows computer. (It's not as hard as it sounds.)

[Hidden Windows Tools for Protecting, Problem Solving and Troubleshooting Windows 8, Windows 7, Windows Vista, and Windows XP Computers](#).

Jack's *[A Beginner's Guide to AutoHotkey, Absolutely the Best Free Windows Utility Software Ever!: Create Power Tools for Windows XP, Windows Vista, Windows 7 and Windows 8](#)* and *[Digging Deeper Into AutoHotkey](#)*.

Our second compilation of stupid *ComputorEdge* cartoons from 2011 and 2012 is now available at Amazon! *[That Does Not Compute, Too! ComputorEdge Cartoons, Volume II: "Do You Like Windows 8 or Would You Prefer an Apple?"](#)*

Special Free Offer at ComputorEdge E-Books! *[Jack's Favorite Free Windows Programs: What They Are, What They Do, and How to Get Started!](#)*.

[Misunderstanding Windows 8: An Introduction, Orientation, and How-to for Windows 8 (Seventh Edition)](#)!

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[Getting Started with Windows 7: An Introduction, Orientation, and How-to for Using Windows 7](#),
[Sticking with Windows XP—or Not? Why You Should or Why You Should Not Upgrade to Windows 7](#),
and *[That Does Not Compute!](#)*, brilliantly drawn cartoons by Jim Whiting for really stupid gags by Jack about computers and the people who use them.

Free App for Extending Your Keyboard, Plus More RegEx Mysteries

"If You Use Those Crazy Letters Found Around the World, You're Going to Love This One" by Jack Dunning

This free app written in AutoHotkey is one of the best I've seen for adding special characters to any document. Plus, a look at the confusing world of look-ahead and look-behind assertions in AutoHotkey RegEx. What?

The Third Edition of A Beginner's Guide to AutoHotkey *is now available. The entire book has been scoured for accuracy with many new tips added. If you previously purchased an earlier edition from ComputorEdge E-Books and have run out of downloads, contact us at* ComputorEdge E-Books *with your invoice number and we will give you new downloads for the current edition.*

<p align="center">*   *   *</p>

If in your computer work you use a lot of funky characters not found on your keyboard, then you're going to like this one. This AutoHotkey app called WinCompose: a Robust Compose Key for Windows by Sam Hocevar includes over 1700 key combinations which add special characters to any document with just a few, usually intuitive keystrokes. Maybe you merely want to insert a Spanish style upside down question mark, *¿Quién es?*, or exclamation point *¡Qué hermoso!* Or perhaps you need the £ sign on your keyboard. WinCompose makes it much easier to add those needed symbols to your work.

If there are only a few symbols that you need to include in your repertoire, you may prefer to add them as AutoHotkey hotkeys as discussed in *A Beginner's Guide to AutoHotkey* or turn them into hotstrings in your personal AutoCorrect list as discussed in the *Digging Deeper into AutoHotkey* e-book or the free *AutoHotkey Tricks You Ought To Do With Windows*! But, if you regularly dabble in foreign languages with extreme spelling and letters, then I don't know of anything as comprehensive or easy as this WinCompose app.

WinCompose for Intuitive Special Character Insertion

Unlike AutoHotkey hotkeys where keys are depressed simultaneously or most AutoHotkey hotstrings which display the typed keys before the transformation, WinCompose uses a compose key (default right ALT key) which allows the entry of the special combination for a short period of time (default five seconds). Nothing appears on the screen until either the combination strikes gold and enters the special character or it times out—exposing the entered keystrokes.

For example, after opening the WinCompose sequence list (see Figure 1), the first special character is the upside down exclamation point (¡) used in Spanish. It is added by first striking and releasing the right ALT key, then sequentially entering two exclamation points (*!!*) (*right ALT then !! yields ¡*). Intuitively if *!!* is ¡, then *??* should be ¿. And it is!
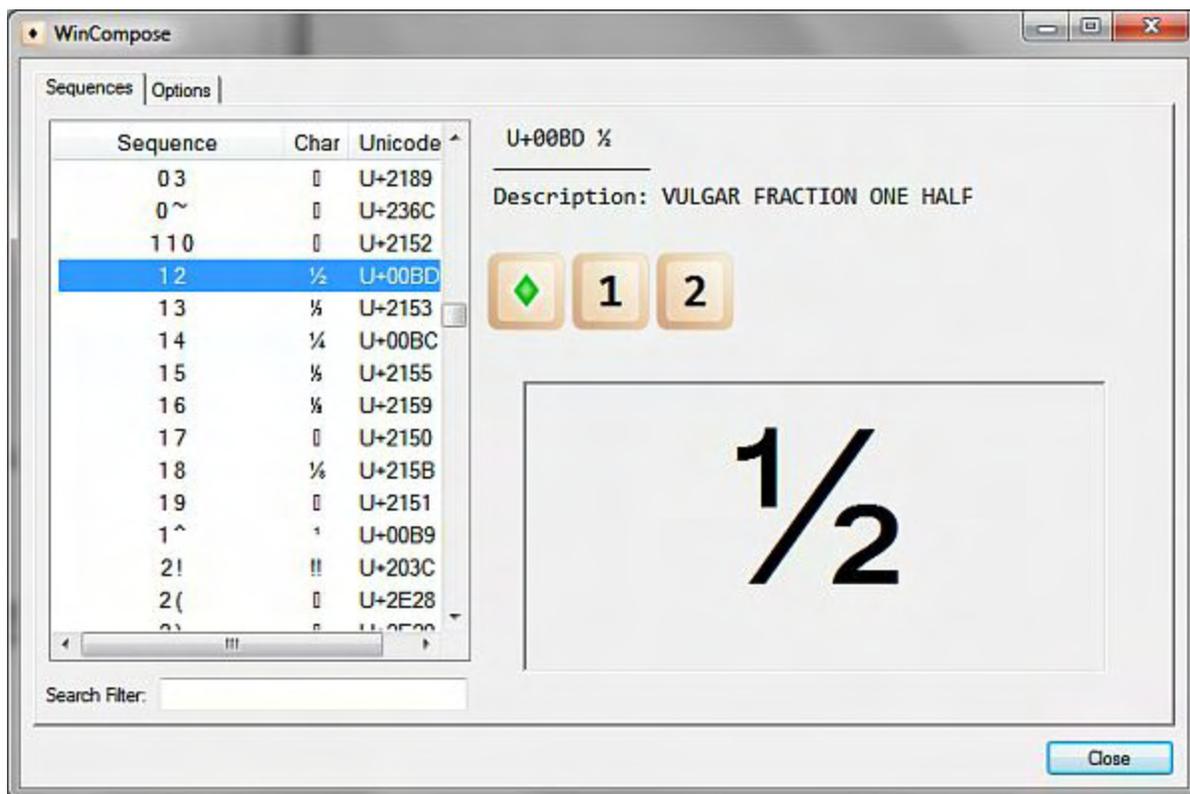
Figure 1. The WinCompose sequence list includes over 1700 combinations for inserting special characters.

As shown in Figure 1, the fraction ½ can be inserted with *RALT-1-2* sequentially. From there it's not hard to figure out that ¾ is *RALT-3-4* and ¼ is *RALT-1-4*. By typing "pound" into the Search Filter I saw that *RALT-hyphen-l* will insert the £ sign. In fact any combination of *-l*, *l-*, *-L* or *L-* would give the same result. I didn't even need to remember the order. On a hunch I tried *RALT-hyphen-y* and got ¥, the Yen sign. Pretty cool!

One of the advantages to the special compose key approach to inserting special characters with WinCompose is that it is unlikely that any of the combinations will interfere with other AutoHotkey hotkeys or hotstrings you've previously implemented in your scripts—unless you make liberal use of the right ALT key. (The default compose key can always be changed in the setup options.)

No AutoHotkey Needed for WinCompose

Even though WinCompose is written in AutoHotkey, you don't need AutoHotkey installed to use it. In fact, although the source code is available, most people, even if they regularly use AutoHotkey, will probably be better off downloading the running the compiled version. The download file will install in a manner similar to most new Windows apps. There is a special version available for thumb drive installation which you can load only when you need it.

Once WinCompose is installed and loaded an icon which looks a little like the ace of diamonds (only black) will appear in the System Tray (see Figure 2 which was taken from Sam Hocevar's WinCompose page).
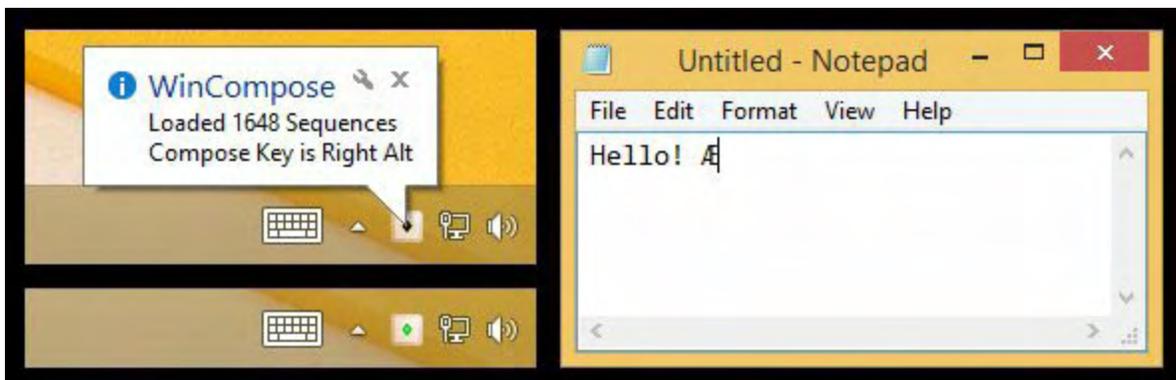
Figure 2. When the compose key is pressed (default right ALT) the black diamond (top left) inside the icon in the System Tray turns green (bottom left) until either the combination executes or the activation times out (default five seconds). You guessed it! The special character entered into the Notepad window (right) used the RALT-A-E combination.

To open the WinCompose window merely click on the icon in the System Tray (or right-click and select it from the pop-up menu). If you want to temporarily stop the function of WinCompose select Disable from the right-click menu.

If WinCompose is right for you, I would guess that you already realize it. The fact that it is written in AutoHotkey is almost incidental. (Of course, if it wasn't written in AutoHotkey I wouldn't be highlighting it here.)

Look-Ahead and Look-Behind Assertions in

AutoHotkey Regular Expressions (RegEx)

Look-ahead and look-behind assertions in AutoHotkey Regular Expressions (RegEx) is not a topic for the faint of heart. It took me a while to wrap my brain around this one, but I can see some practical applications for it. If you check out the [AutoHotkey RegEx Quick Reference](#), you will see "Look-ahead and look-behind assertions" discussed toward the end of the page. I had to do additional digging and testing, but there are definitely worthwhile uses for these operators. The examples I use only offer a glimpse into the possibilities when included in an AutoHotkey script.

(If you've never done anything with RegEx before, then you might want to check out the column "[Easy Regular Expressions (RegEx) in AutoHotkey](#)" for a simplified introduction to AutoHotkey Regular Expressions. It's safer than tackling this one without any equipment.)

To understand look-ahead and look-behind assertions, we need to remember how the RegEx engine works. It starts at the left end of a text string and proceeds to the right while looking for matches. That means if RegEx is looking ahead, it is looking to the right of the current match. If RegEx is looking behind, it is looking to the left of the current match. These look-ahead and look-behind expressions do not become part of the match nor save any characters. Look-ahead is merely another way of saying, "If you can see a particular pattern ahead (to the right), then the match is valid—even though that pattern is not part of the match." Look-behind is another way of saying, "If you can see a particular pattern behind (to the left), then the match is valid—even though that pattern is not part of the match."

Each look-ahead and look-behind assertion also can be negative, meaning the pattern in *not* ahead or the pattern is *not* behind respectively. The look-behind assertion is more limited since the wildcards (*, +, and *?*) cannot be used.

To test and demonstrate these expressions, I used [Robert Ryan's RegEx Tester](#) This RegEx Tester is one of the best ways to play with a RegEx. As you make changes to the expression the results instantly appear in the lower pane. Once the RegEx is working, simply copy-and-paste it into the [RegExMatch() function](#) or the [RegExReplace() function](#) in your AutoHotkey script. (Remember, if there are any double quote marks in the RegEx, they will need to be escaped in the function with another preceding double quote mark.)

The text used in these examples was simply copied (CTRL+C) from this [City Data page](#) and pasted (CTRL+V) into the top pane of Ryan's RegEx Tester (see Figure 3).

How Look-ahead Assertions Work

Each assertion is composed of a set of parentheses with a question mark as the first character inside. (This is yet another usage of parentheses and the question mark.) The look-ahead

assertion takes the form *(?=...)* and always follows the primary expression, e.g. *(\w[\w\s]+)(?=, California)*. Notice the equal sign following the question mark. This tells RegEx that the main expression must be followed by a comma, a space, and the word "California" to return a valid match as shown in Figure 3.
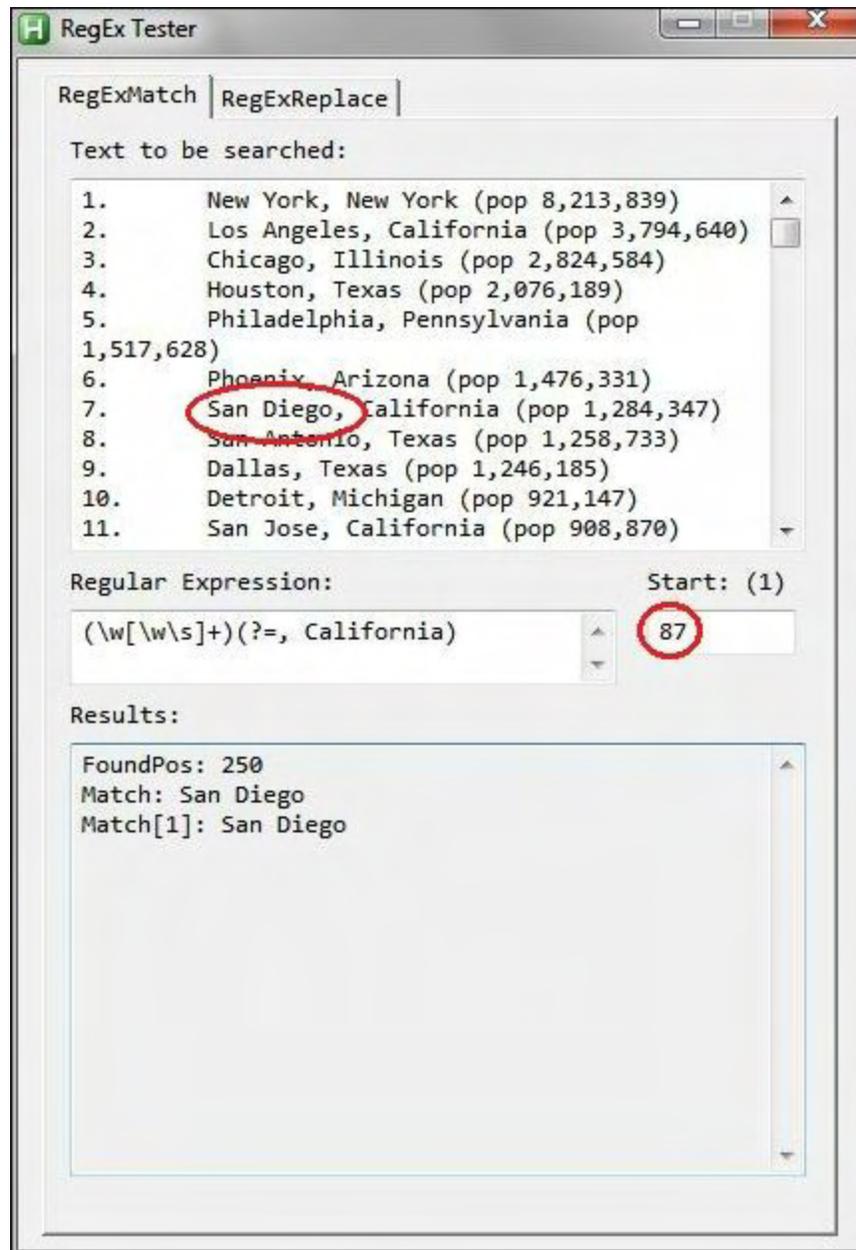

Figure 3. This look-ahead assertion finds a city in California.

The RegEx used in this Figure 3 is:

```
(\w[\w\s]+)(?=, California)
```

The primary part of the expression *(\w[\w\s]+)* must start with any letter or digit *\w* and will continue matching letters, digits, or spaces *\s* until something else is encountered—in this case a comma. But the match is only valid *(?=, California)* if it is followed by a comma, space and

the word "California" combination. However, since the match starts at position 87 (circled in Figure 3), Los Angeles is skipped returning San Diego.

If used in an AutoHotkey script, California cities could be extracted from the text by placing the *RegExMatch()* function inside a *Loop* and incrementing the starting position to a point past the last match. Examples of this *Loop* technique appear in previous AutoHotkey columns.

The same thing can be done with two sub-expressions:

```
(\w[\w\s]+), (California)
```

but the word *California* would be retained in the match—which depending upon what you're trying to accomplish is not necessarily bad. The look-ahead assertion automatically dumps the word *California* from each match.

How Negative Look-ahead Assertions Work

The negative look-ahead assertion takes the form *(?!...)* and always follows the primary expression, e.g. *(\w[\w\s]+)(?!, California)*. The equal sign is replaced with the not *!* operator making the expression a negative, as shown in Figure 4.
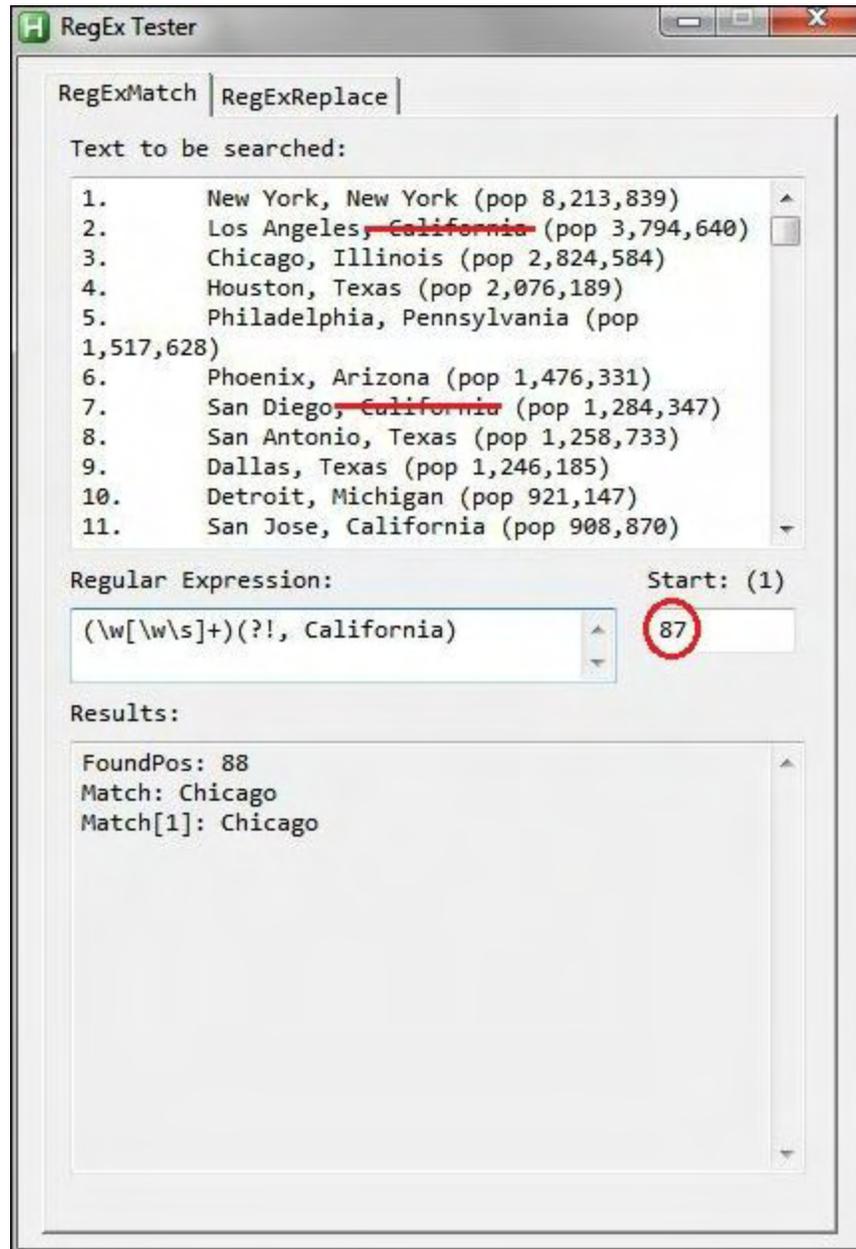
Figure 4. This look-ahead assertion finds a city not in California.

By making the expression a negative:

```
(\w[\w\s]+)(?!, California)
```

RegEx looks for the first match which is not followed by a comma, space and the word *California*. This would be useful for an AutoHotkey script which list cities that are *not* in California. In this case, it's unlikely that you would want to capture the look-ahead expression since it is a negative and by definition missing.

How Look-behind Assertions Work

The primary difference between the look-ahead assertions (which always follows the main expression) and the look-behind assertions (which always preceded the main expression) is a left arrow (or arrow bracket) inserted just after the question mark *(?<=...)* indicating that the RegEx must look back or to the left, e.g. *(?<=8.\t\s)([\w\s]+)*, as shown in Figure 5.
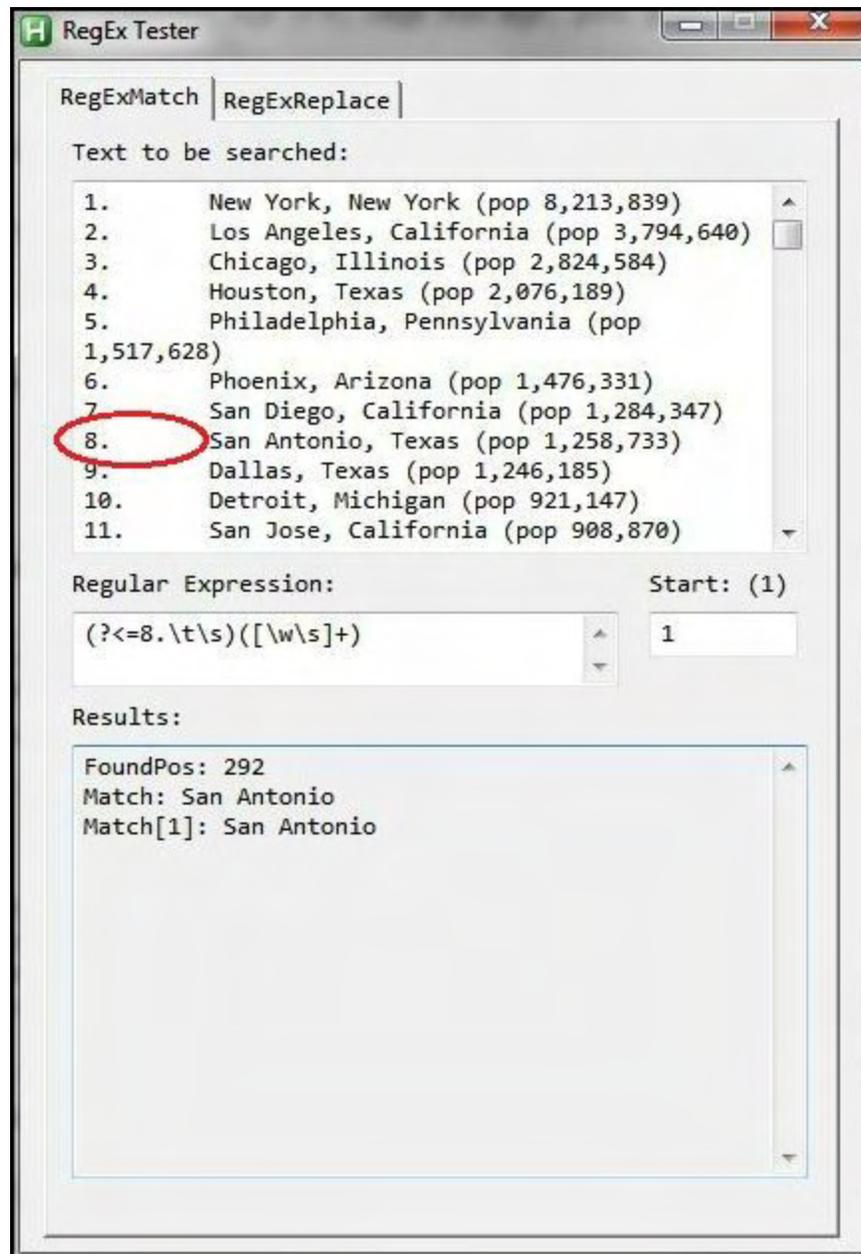
Figure 5. This look-behind assertion finds the eight (number 8) city on the list.

In this case the RegEx:

```
(?<=8.\t\s)([\w\s]+)
```

finds the city which is ranked eighth (8) on the list. For the match to be valid, the main expression *([\w\s]+)* which can be any continuous set of letters, digits, or spaces must be preceded *?<=* by the number *8*, any character (here the . represents any character), a tab *\t*,

and a space \s. This only works for number 8 on the list. Change the number and a different city will be found. (To force the . to represent a period it must be escaped \. by placing a backslash in front of it.)

There is another operator \K which acts in a manner similar to the look-behind assertion. The RegEx demands that the portion before the \K be matched, but it is not included in the match, as shown in Figure 6.
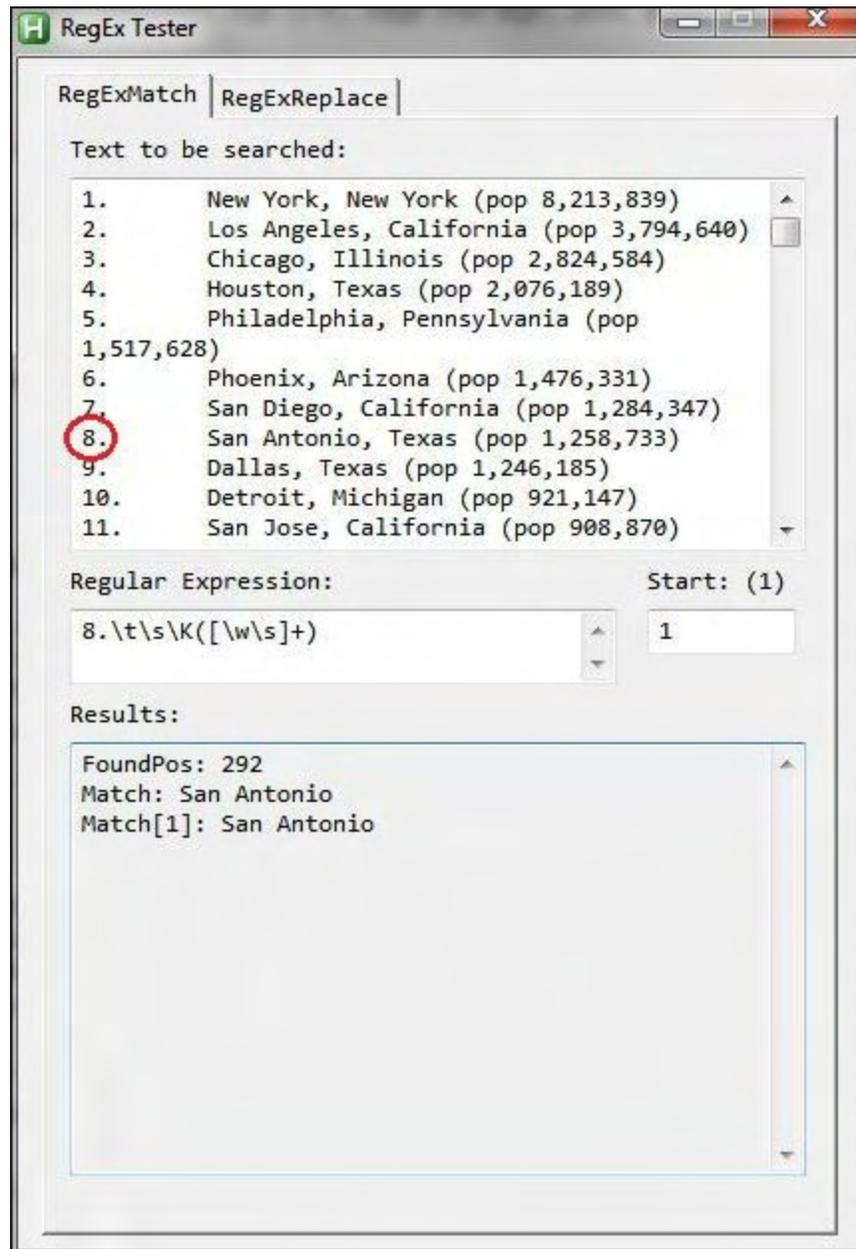

Figure 6. The \K escape sequence acts like a look-behind assertion returning the number eight (8) city on the list.

The primary difference when using the \K is the look-behind values can be saved as a sub-expression:

```
(8.)\t\s\K([\w\s]+)
```

By placing the desired portion of the look-behind in parentheses, it becomes the first back reference. While the total *Match* would remain only *San Antonio*, *Match[1]* would be *8.* and *Match[2]* would be *San Antonio*. This adds a little more flexibility to the look-behind assertion, plus, unlike the standard look-behind assertion *(?<=...)* the wild card operators **, +,* and *?* can be used with the *\K* operator.

How Negative Look-behind Assertions Work

The negative look-behind assertion takes the form *(?<!...)* and always precedes the primary expression, e.g. *(?<!Los Angeles,)(California .*?\))*. The equal sign is replaced with the not *!* operator making the expression a negative, as shown in Figure 7.
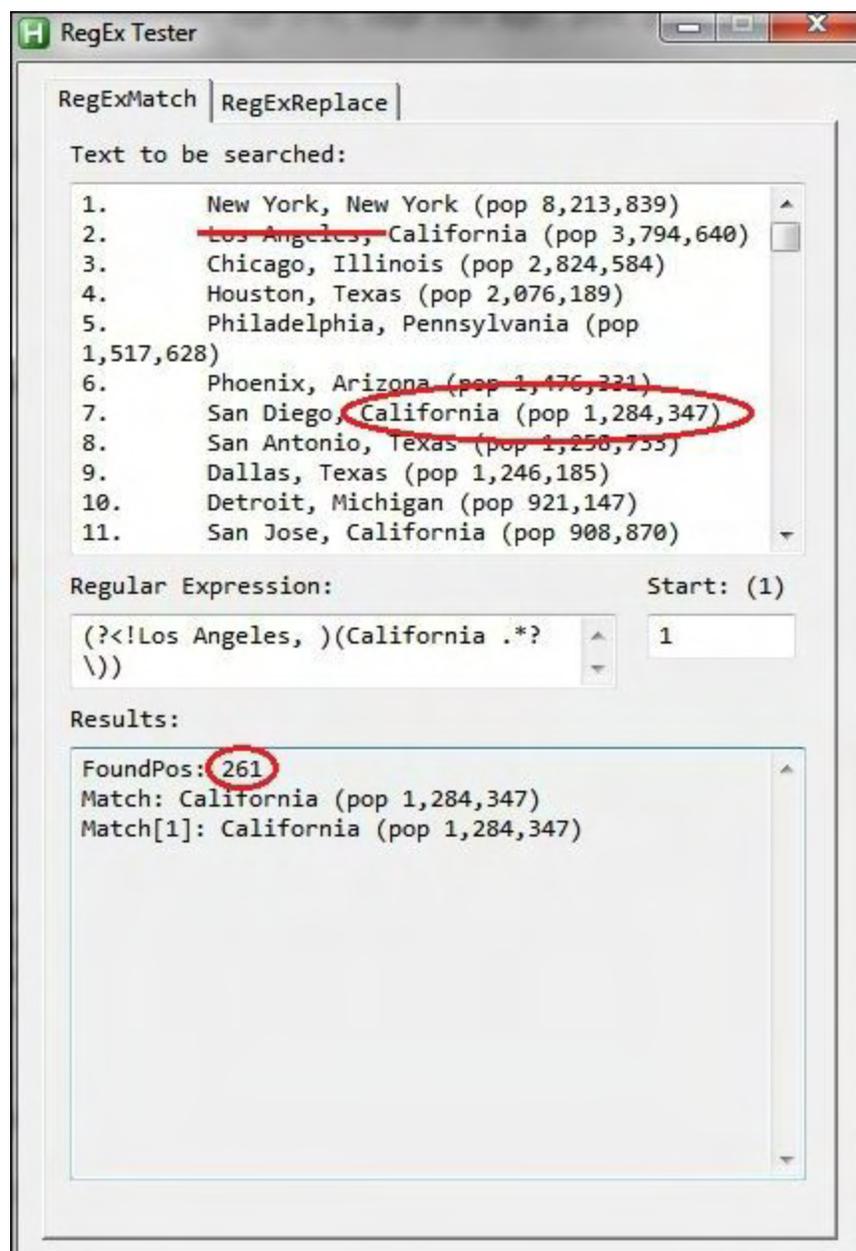
Figure 7. This look-behind assertion finds the first California city and population which is not Los Angeles.

In the example the RegEx:

```
(?<!Los Angeles, )(California .*?\))
```

is looking for the first California city which is *not* Los Angeles *(?<!Los Angeles,)*. When California is followed by the first closing parentheses *\)* (the "*)*" must be escaped with a backslash *\)*), the RegEx looks back for the words *Los Angeles*. If found, the match is ruled invalid and RegEx continues to the next match—in this case the San Diego listing

Look-ahead and look-behind assertions can be confusing, but they are important tools for your AutoHotkey RegEx toolbox. The time might come when you need to include (or exclude) specific patterns from matches without making the evaluation part of the match. That's when these techniques will make easy work of it.

<div align="center">*   *   *</div>

[AutoHotkey Tricks You Ought To Do With Windows](#)! This e-book includes both those tips and the reference material (Table of Contents and indexes) from the other three AutoHotkey books. Pick up a copy free and share it with your friends.

Jack is the publisher of ComputorEdge Magazine. He's been with the magazine since first issue on May 16, 1983. Back then, it was called The Byte Buyer. His Web site is www.computoredge.com. He can be reached at ceeditor@computoredge.com. Jack is now in the process of updating and compiling his hundreds of articles and columns into e-books. Currently available:

Recently released is Jack's FREE AutoHotkey book, [AutoHotkey Tricks You Ought to Do with Window](#), available exclusively at ComputorEdge E-Books in the EPUB for e-readers and tablets, MOBI for Kindle, and PDF for printing formats.

ComputorEdge E-books is offering his [AutoHotkey Applications](#), an idea-generating intermediate level e-book about using the AutoHotkey Graphical User Interface (GUI) command to write practical pop-up apps for your Windows computer. (It's not as hard as it sounds.)

[Hidden Windows Tools for Protecting, Problem Solving and Troubleshooting Windows 8, Windows 7, Windows Vista, and Windows XP Computers](#).

Jack's *[A Beginner's Guide to AutoHotkey, Absolutely the Best Free Windows Utility Software Ever!: Create Power Tools for Windows XP, Windows Vista, Windows 7 and Windows 8](#)* and *[Digging Deeper Into AutoHotkey](#).*

Our second compilation of stupid *ComputorEdge* cartoons from 2011 and 2012 is now

available at Amazon! *[That Does Not Compute, Too! ComputorEdge Cartoons, Volume II: "Do You Like Windows 8 or Would You Prefer an Apple?"](#)*

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[Misunderstanding Windows 8: An Introduction, Orientation, and How-to for Windows 8 (Seventh Edition)](#)!

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[Sticking with Windows XP—or Not? Why You Should or Why You Should Not Upgrade to Windows 7](#),
and *[That Does Not Compute!](#)*, brilliantly drawn cartoons by Jim Whiting for really stupid gags by Jack about computers and the people who use them.

Wally Wang's Apple Farm

"The Danger of a Monoculture" by Wally Wang

The Danger of a Monoculture; Creating iOS Apps Easily; Paralyzed by What Doesn't Work; Making Games Easily; 3D Printers in Space; Demonstrating Creativity; Default Printer.

Hackers, most likely from North Korea, broke into Sony's computer networks and stole sensitive files. What's not surprising is that hackers can break into any computer network, but what is surprising is how easily hackers can break into most corporations.

The biggest problem comes from standardization. From an IT point of view, standardizing on a single computer and operating system makes sense because it makes it easy to manage. What always seems to get forgotten in the debate is whether a standard PC is good for all of the workers.

In the recent Sony hack, an anonymous Sony employee admitted that the company was getting by with alternate solutions that made the office feel like they were back in 1992. "We're mostly a fully-functioning office. We're going about our daily business. We just got our voicemail back. Everyone is a little calmer now after the initial shock. A couple of people had their computers removed but people using Macs were fine."

If Sony was like most companies, they probably relied on Windows PCs, but the problem isn't just standardizing on Windows, but standardizing on anything. The moment you rely on a single computer operating system solely for the convenience of the IT department (and often to the detriment of everyone else), you risk creating a monoculture computer network that makes it easy to hack. Hack one computer and you can easily hack all the rest of the computers in that same network because the computers are nearly identical.

Thanks to the laziness of the typical IT department, workers don't get to choose the optimum tool for their needs and hackers can easily take over an entire network after infiltrating a single computer on that network.

The real solution is to let workers use the best tools for the job whether that involves Linux, Windows, or OS X. By allowing multiple operating systems on a network, the IT department

will have to actually learn skills to handle multiple operating systems. Yet by making the IT department work for their money instead of being lazy, companies can give workers the best tools for their particular job while making their entire network much harder to hack.

Few hackers are equally skilled cracking multiple operating systems. Even fewer hacker tools work on more than one operating system. By confronting hackers with computers running Linux, Windows, and OS X, the mix of different operating systems makes it harder for hackers to compromise every computer on a network.

If the IT department just worked for the benefit of the employees and didn't force everyone to use the same type of operating system, companies could make their computer networks far less likely to get completely hacked. Will IT departments in other companies realize the vulnerability of their monoculture computer networks? Or will they still insist on clinging to the only operating system they want to learn and force every worker in the company to use a standard computer whether it's the best tool for them or not?

Given the choice between employee productivity or IT department laziness, you can already guess what most IT departments will choose, and then wonder why they keep getting hacked so easily.

Creating iOS Apps Easily

If you want to sell iOS apps, you'll need to pay a $99 annual fee to Apple. In return for this fee, you'll get beta versions of future programming tools such as Xcode 6.2 that includes the WatchKit API (Application Programming Interface) that lets you create apps for the forthcoming apple Watch. Even if you don't want beta versions of future Xcode versions, you'll still need to pay $99 a year just for the right to distribute apps in the App Store.

Before you pay this $99 fee, use Xcode for free to create your iOS app. Only when you're ready to sell it should you spend the $99 to put your app on the App Store.

Although creating iOS apps in Xcode is much easier with the introduction of the Swift programming language, you might prefer simpler solutions. If you're a former Visual Basic 6 programmer, you might find [Xojo](#) interesting. Xojo is essentially a Visual Basic 6 clone that lets you create programs for Linux, Windows and OS X. For an additional $299 fee, you can also create iOS apps using Xojo as well.

In the old days, programming meant writing code to create your program and create your user interface. The genius behind Visual Basic was to provide standard user interface controls like buttons and text fields, and let you visually drag and drop them on the screen to create a user interface. Then you just added BASIC code to make that user interface actually work.

Visual Basic made Windows programming amazingly simple and spawned a huge following. Then Microsoft decided to kill Visual Basic 6 and create Visual Basic.NET, which is more

complicated and harder to learn. Visual Basic.NET is nearly as difficult to learn and use as C#, but not as powerful. As a result, many Visual Basic programmers simply switched to C#.

For those programmers who still wanted an easy to learn programming language, they stuck with Visual Basic 6 despite the lack of updates. Unfortunately, Visual Basic 6 can't create 64-bit programs for today's 64-bit versions of Windows. Since Microsoft will no longer update Visual Basic 6, many Visual Basic programmers have migrated to the more flexible Xojo instead.

Xojo maintains Visual Basic 6's ease and speed of development. Like Visual Basic 6, Xojo lets you visually design your iOS user interface and then write BASIC code to make it work. Right now, Xojo only supports a limited number of iOS features which means you cannot access the camera or common user interface items like date pickers.

Xojo will slowly address these limitations in future releases, but if you need access to every possible iOS feature, you'll still need to stick with Xcode and Swift or Objective-C. To see what you can create with Xojo, visit Xojo's Hour of Code page that gives you source code to a simple drawing app and game. By studying this free source code, you can use this as a starting point for creating your own iOS apps using Xojo.

Figure 1. The latest version of Xojo now lets you create iOS apps for the iPhone and iPad.

Xojo obviously targeted the iOS market because demand for creating iOS apps remains strong among the programming community. Programmers know that the growth in the mobile market depends on the iPhone, iPad, and possibly even the Apple Watch. If you're willing to live with the limitations of Xojo, you may find developing iOS apps can be much faster and easier than ever before.

Paralyzed by What Doesn't Work

One common reason why many people don't want to use Apple Pay or Google Wallet is because they believe it will just give hackers another way to get their credit card numbers. So to avoid the risk of losing their credit card numbers through unfamiliar technology, many people prefer to stick with known and proven insecure conventional credit cards that hackers routinely steal through break-ins at Staples, Target, Home Depot, and K-Mart.

In other words, given a choice between using a more secure form of payment or sticking with a completely insecure form of payment, most people prefer sticking with the completely insecure form of payment for safety reasons.

The biggest obstacle to progress is people's reluctance to let go of the familiar. Rather than change, most people prefer to do nothing, because doing nothing is easier even if it will result in greater pain and agony. The human mind isn't wired to accept change so much as it's programmed to avoid anything new that forces the mind to think.

One reason why so many prisoners go back to prison is because they can't accept the freedom and responsibility of taking care of themselves. Instead of taking control of their life, they prefer the safety and predictability of prison where someone else will give them food and tell them what time they can eat, sleep, and play. The safety of a prison is far more comforting than the uncertainty of making their own choices.

Likewise, so many people fanatically and emotionally cling to the familiar in technology despite alternatives that may actually be superior. Ask these people why they cling to inferior solutions and they'll likely get angry because their only real reason for not changing is to avoid thinking and learning something new.

The idea that humans progress steadily and slowly towards improvement is a myth. The reality is that humans actively fight to avoid thinking. After all, why think when you can stay within the confines of familiar habits? Why deal with the uncertainties of life when you can accept the certainty of prison?

People who love prisons for themselves are likely the first ones to advocate imprisoning others both mentally and physically. If people still can't choose between secure (and unfamiliar) forms of payment in favor of staying with insecure (but familiar) forms of payment, there's little hope that people will magically change overnight and look for ways to make their own life better. Just visit any Third World country where people dump raw sewage in their drinking water and then wonder why they get sick. Ask these people to change their habits to protect their drinking water and they'll likely look at you as insane for suggesting they do something different for their own benefit.

When you realize that far too many people actively seek limitations for themselves and others, you'll realize that progress can only occur slowly. In the world of non-cash transactions, you

can expect momentum to build as more people realize the security of digital payment systems like Apple Pay and Google Wallet. Then the people who actively resisted switching from insecure payment systems to secure ones will gradually make the transition and conveniently forget that they ever passionately resisted doing something different for their own benefit.

Making Games Easily

Almost no one creates a game from scratch. Instead, they rely on game engines that take care of the technical details of moving objects on a screen. Then they just have to add the creative part of unique images and goals. In case you want to make a game, download a free copy of Cocos2D - SpriteBuilder, which lets you create games in Xcode using Objective-C or Swift.
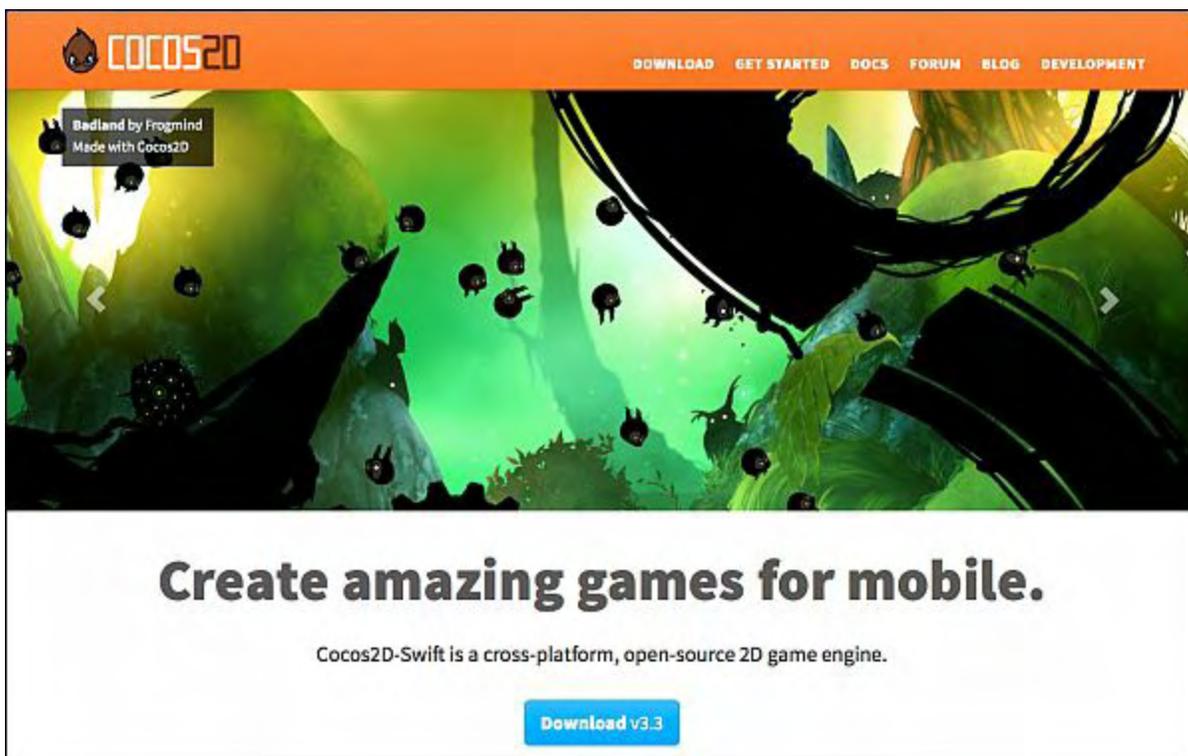
Figure 2. Cocos2d - SpriteBuilder has been used to create many popular games.

Of course, don't think downloading SpriteBuilder will automatically make game creation simple without taking time to go through the tutorials and experiment with the program. SpriteBuilder can shave off the time needed to create a game, but you'll still need to put in plenty of work to design a video game of your own. For help in using SpriteBuilder, read *Learn SpriteBuilder for iOS Game Development*.
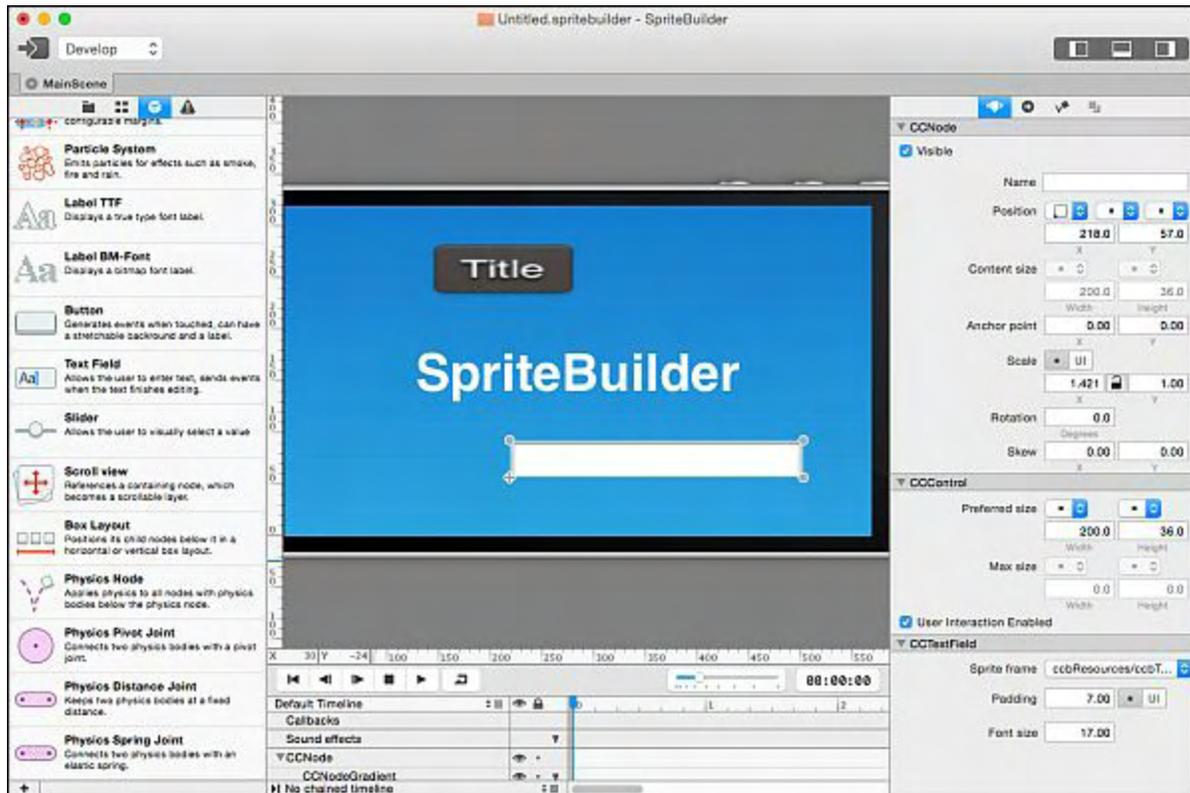
Figure 3. SpriteBuilder simplifies the task of building a video game.

SpriteBuilder is open source and free, so instead of spending time playing video games, try making them. You might find making your own games can be far more intellectually rewarding. If you create a particularly appealing game, you could wind up selling thousands of copies to happy customers all over the world.

3D Printers in Space

Resupplying the International Space Station isn't easy because with there's only a limited amount of items rockets can send to the space station. That's why NASA sent a 3D printer to the space station. The idea is that the 3D printer can make parts and tools that the astronauts might need.

Recently, astronauts used their 3D printer to create a ratcheting socket wrench. The process took less than a week, but now the astronauts have the tool they need without waiting for the next supply rocket to arrive.

Although 3D printers still remain more of a curiosity than a necessity, their use will only continue to grow. Hewlett-Packard claims to be readying a 3D printer that's ten times faster than current models. With 3D printers, shipping specialized tools and objects over the Internet can be just as fast as streaming a full-length movie. When 3D printers can make objects out of multiple materials, you can expect artists to sell their designs over the Internet. Now the cost of

shipping will require nothing more than high-speed Internet access.

If NASA sends people to Mars, they'll need 3D printers to make tools and supplies they can't get from Earth. When manufacturing can be done on an individual basis, the cost-savings of mass production will disappear.

Although 3D printers sound like science fiction today, they'll be commonplace tomorrow. As the capability goes up and the cost goes down, 3D printers represent the future. If you want a secure job, learn how to use, design, and fix 3D printers. Who knows? With knowledge of 3D printers, you could become part of the next adventure in space.

Demonstrating Creativity

Not everyone needs an iPad, but there's a huge difference between not needing one and claiming that no one in the whole world needs one. If you want to see what musician Steve-san Onotera can do with an iPad, watch his YouTube video where he plays all the instruments on an iPad to play Blue Oyster Cult's song "(Don't Fear) The Reaper."

The iPad simply gives people a variety of choices to use it. Some people write on the iPad, others sketch and doodle, some just browse the Internet, many play games, and people like Steve-san Onotera play music on an iPad.

Even if you don't plan on playing music on an iPad, you can at least appreciate the versatility of the iPad that lets someone play virtual instruments on a flat, glass surface. Back in 2010, the North Point Community Church used iPhones and iPads to play a concert of various songs including Felix Navidad.

Seeing how other people have used an iPad in creative ways should inspire your own creativity. If you can't appreciate what other people can do with their imagination, then you might feel more comfortable watching *How the Grinch Stole Christmas* and weeping when the Grinch fails to destroy the happiness of everyone around him.

*   *   *

With so many people relying on e-mail attachments, fewer people bother printing anything any more. If you still rely on printing once in a while, you might want to choose a default printer if you have two or more printers hooked up to your Macintosh.

Click the Apple menu and choose System Preferences to open the System Preferences window. Now click the Printer & Scanners icon and click on the Default printer pop up menu. You can specify a particular printer or just have your Macintosh use the last printer you used.
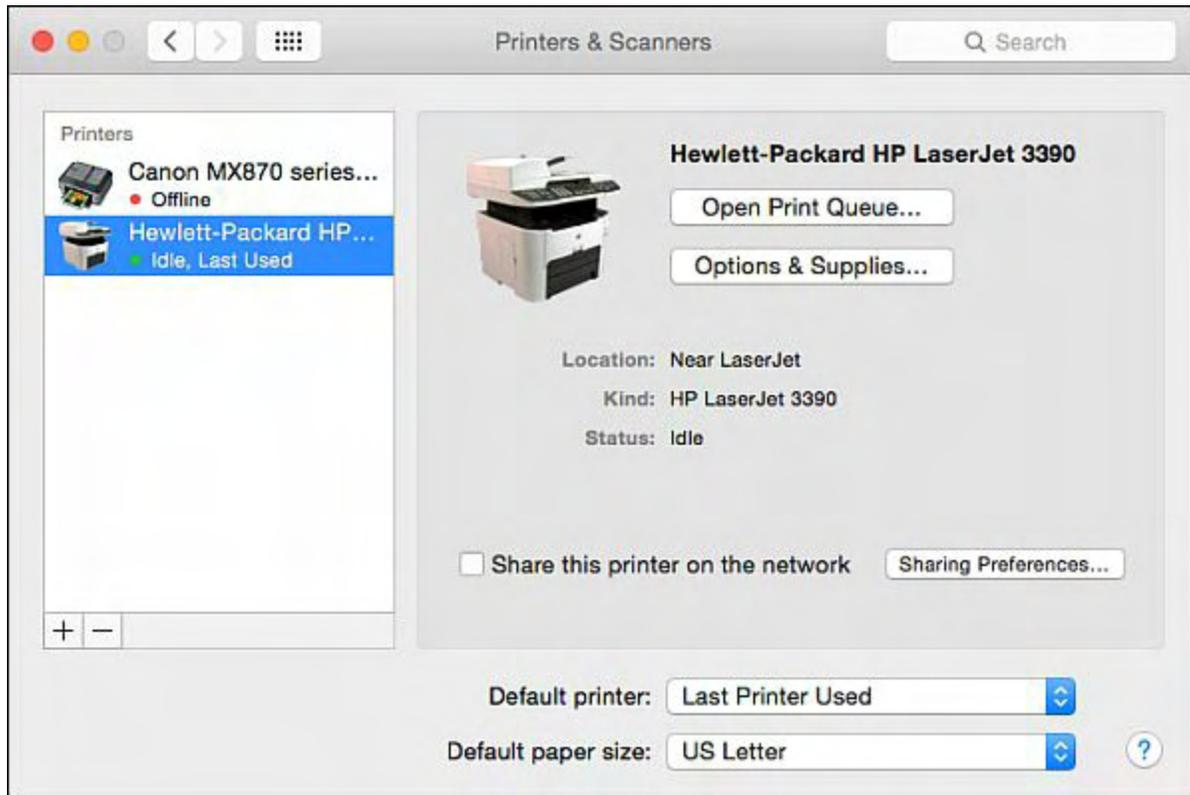
Figure 4. Defining a default printer in OS X.

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In the early days, before Wally became an Internationally renowned comedian, computer book writer, and generally cool guy, Wally Wang used to hang around The Byte Buyer dangling participles with Jack Dunning and go to the gym to pump iron with Dan Gookin.

Wally is responsible for the following books:

Microsoft Office 2013 For Dummies

Beginning Programming for Dummies

Beginning Programming All-in-One Reference for Dummies

Breaking Into Acting for Dummies with Larry Garrison

Strategic Entrepreneurism with Jon and Gerald Fisher

How to Live with a Cat (When You Really Don't Want To)

The Secrets of the Wall Street Stock Traders

Mac Programming For Absolute Beginners

[Republican Fairy Tales (Children's Stories the 1% Tell About the Rest of Us)](#)

[The Zen of Effortless Selling with Moe Abdou](#)

[The 15-Minute Movie Method](#)

[Math for the Zombie Apocalypse](#)

[How to Write a Great Script with Final Draft 9](#)

[Making a Scene: The Science of Scene Structure](#)

In his spare time, Wally likes blogging about movies and writing screenplays at his site "[The 15 Minute Movie Method](#)," finding interesting news stories about cats at his site "[Cat Daily News](#)," giving advice to authors who want to self-publish e-books at his site "[The Electronic Author](#)," and providing the type of advice he wishes someone would have told him when he was much younger at his [personal Web site](#). Wally can be reached at [wally@computoredge.com](#) or you can follow him on Twitter @wallacewang_com.

Editor's Letters: Tips and Thoughts from Readers

"Computer and Internet tips, plus comments on the articles and columns." by ComputorEdge Staff

"1/4 Moore's Law," "Uninstalling Programs," "Windows Live Mail—UGH," "SoftEther VPN Software Setup"

1/4 Moore's Law

[Regarding Jack Dunning's December 12 article, "Tablet Sadness":]

Moore's law from 1965 about doubling of transistors in a dense integrated circuit every two years needs to be updated! New models of smartphones are occurring six months, we need a term for 1/4 Moore's law.

-Richard Brown, Bonita, CA

Uninstalling Programs

[Regarding the November 7 Digital Dave column:]

While Win does provide an uninstall feature in the Control Panel using it leaves Registry garbage. A free program that does it all is Revo Uninstaller. I've been using it for years; does a very good job of getting rid of all aspects of a program.

-Ron, San Diego, CA

Windows Live Mail—UGH

[Regarding the December 12 Digital Dave column:]

I read John Campbell's letter a bit differently, apparently he's having a problem with Windows Live Mail (WLM) remembering addresses.

While he didn't ask, my recommendation would be to dump WLM, as even MS has little to no support for it any more as the move to the Cloud. I have an aunt who uses it and has nothing

but problems with it and as a knowledgeable computer person, my Googling for answers to some of the problems has come up with more complaints about the program, usually without solution from anyone, including Microsoft.

MS has essentially stopped any support for it, my personal recommendation would be to take this time to move to one of the online/Web based e-mail programs so no need for backups, as well as transportability (any computer with Internet access (even if your computer dies) has all your e-mails, and contacts) as well as many other reasons to utilize one of the free ones. I like integration of my calendar with my Web e-mail as well.

What people often don't realize is you can use a Web based e-mail program and keep *using your old e-mail just as you had in the past, no need to notify anyone of a change in address, etc. The only learning curve is how to do the same things you did in WLM in the new program. Of the many folks my encouragement to move to Web based e-mail, I've never had a one that was sorry afterwards.*

However, there are other old type standalone e-mail programs that are well supported. Mozilla's Thunderbird (same folks who make the browser, Firefox) is an excellent one, and there are others. I'd move to one of those if my ranting above doesn't have him at least try an online/Webmail setup.

-Rich Ernst, San Diego, CA

SoftEther VPN Software Setup

[Regarding the December 5 [Editors Letters: Tips and Thoughts from Readers column](#):]

I'm checking out the softether.org VPN solution and not sure what instructions I need/want to utilize. I'd like access to home LAN/network devices (computer, printers), but also want to browse the Internet securely from elsewhere, so tunnel from public Wi-Fi location to home, and then out to Internet. What/which solution am I'm looking to document, the "Remote Access" or "Comfortable network anywhere"?

Thanks,

-Rich Ernst, San Diego, CA

Hi Rich,

It looks like you want "[Comfortable network anywhere](#)" as your setup. This should turn one of your home computers into a VPN server ([per this week's discussion](#)) which would then give you a secure connection between any Wi-Fi spot and that home computer. Then, it would be like you're actually browsing and working from home and have the same protections. No local Wi-Fi peeking in on you.
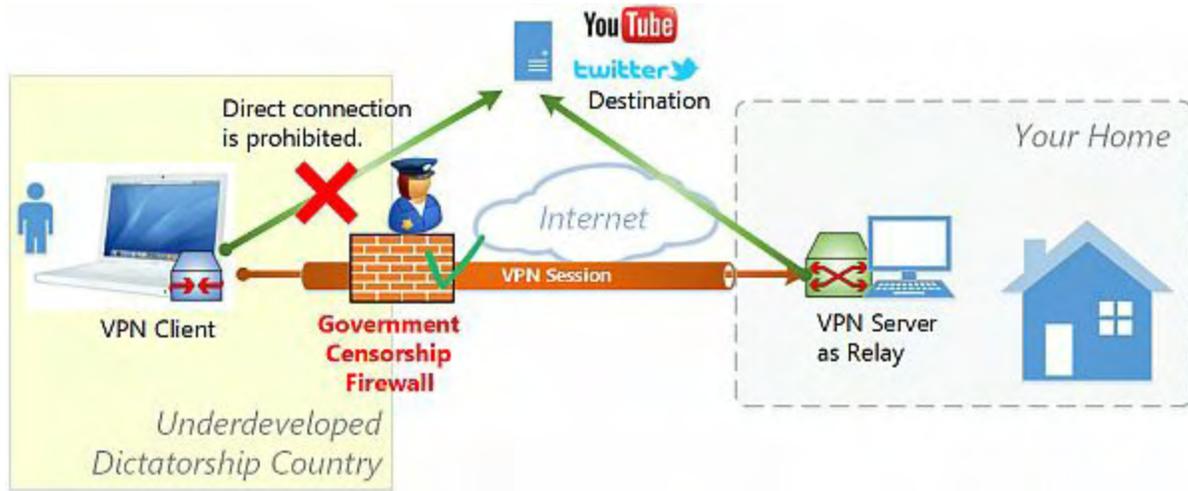
The primary downside I see is you need a computer at home to make the VPN server.

-Digital Dave *, ComputorEdge*

ComputorEdge always wants to hear from you, our readers. If you have specific comments about one of our articles, please click the "Tell us what you think about this article!" link at the top or bottom of the specific article/column at ComputorEdge.com*. Your comments will be attached to the column and may appear at a later time in the "Editor's Letters" section.If you want to submit a short "ComputorQuick Review", or yell at us, please e-mail us at* ceeditor@computoredge.com*. If you would like to review our recent e-books, please visit* ComputorEdge E-Books*.*

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SoftEther VPN Software Setup

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