





# Topics

- What do I mean by “keyholes?”
- Why are they worth caring about?
- How can we eliminate or avoid them?
  - ▢ In some cases, elimination (from current software) isn’t worth it, but avoidance (for future software) is.
  - ▢ Due to time restrictions, I’ll treat this aspect superficially.

# **Visible Keyholes**

## **(GUI Components)**

The Vertical Listbox/Combobox keyhole.

The Horizontal Listbox/Combobox keyhole.

The Fixed Size Window keyhole.

The Maximum Size Window keyhole.

The Fixed Size Dialog keyhole.

The Limited Tree Expansion keyhole.

The Fixed Width Edit Control keyhole.

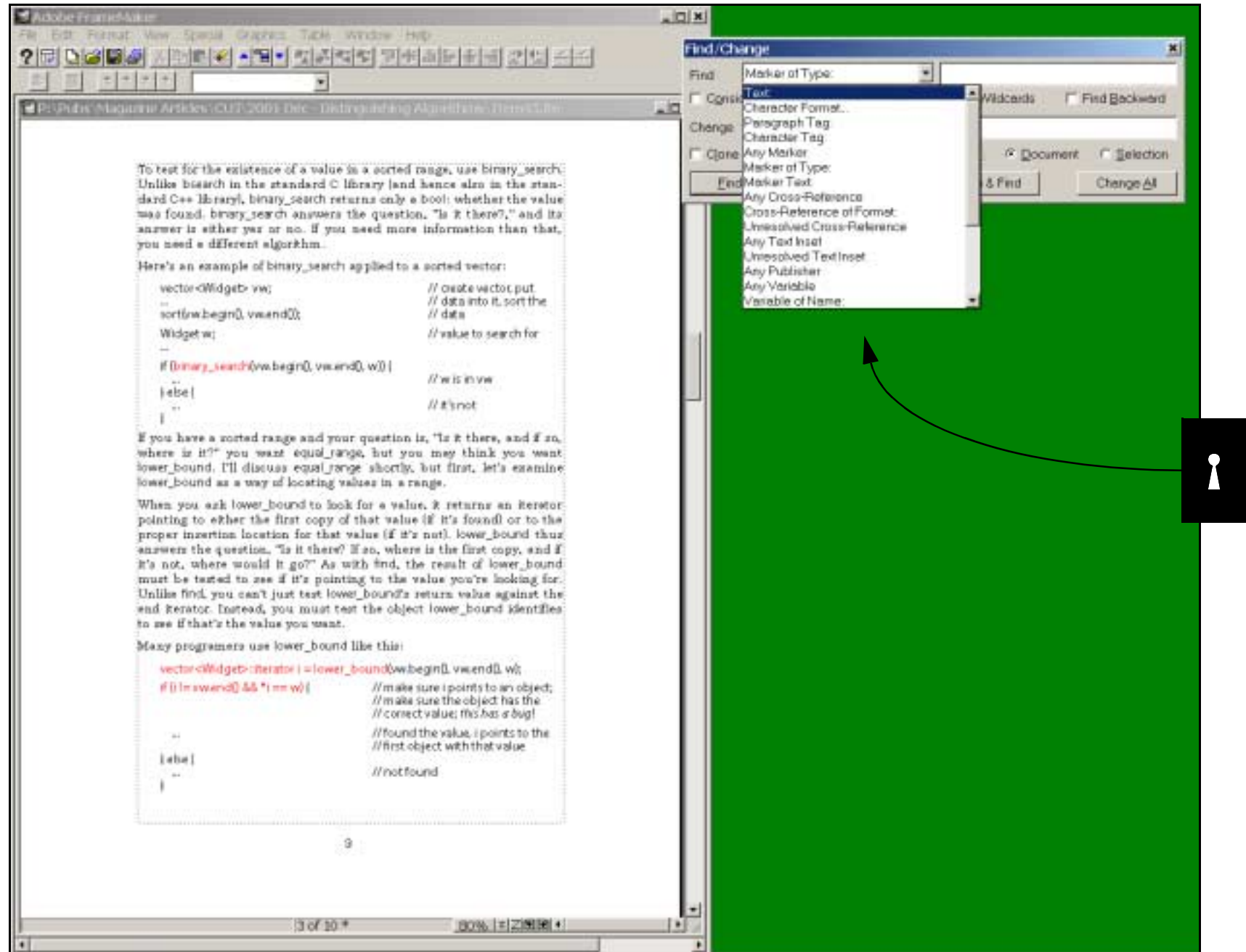
The Lying Fixed Width Edit Control keyhole.

The Limited-Width Web Page keyhole.



# The Vertical ListBox/ComboBox Keyhole

From Adobe's FrameMaker 6:



# The Vertical ListBox/ComboBox Keyhole

From **BooksAMillion**'s web site:

Nickname For This Address:

Name:

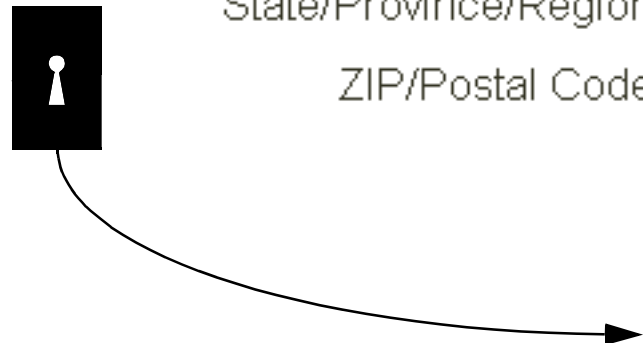
Address Line 1:

Address Line 2 (Optional):

City:

State/Province/Region: **Click To Select**

ZIP/Postal Code: **Click To Select**

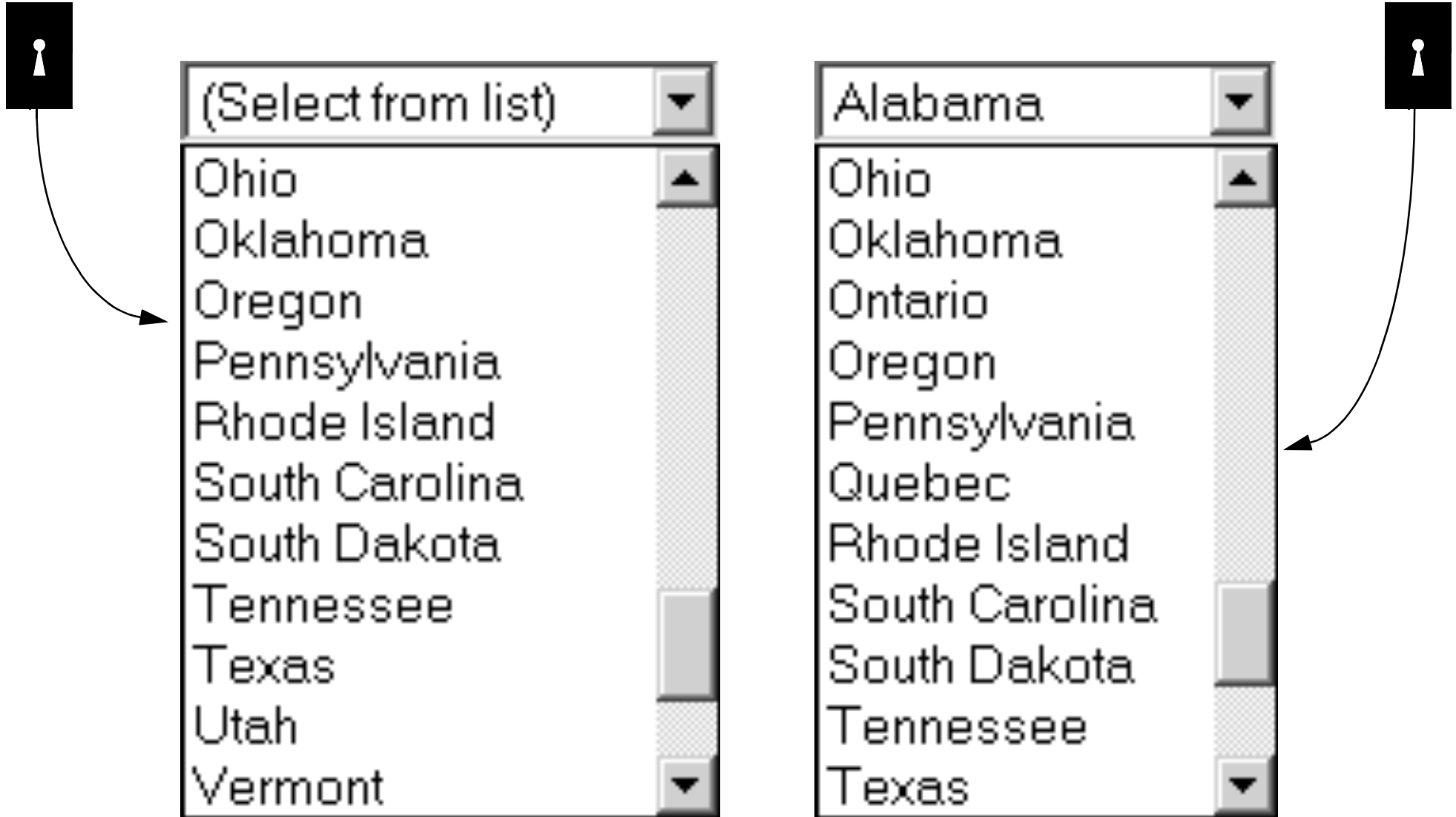


The diagram shows a black square with a white keyhole icon. A curved arrow points from this icon to the 'Click To Select' text in the State/Province/Region dropdown menu.

- Alabama
- Alaska
- America Samoa
- Arizona
- Arkansas
- Armed Forces Europe
- Armed Forces Pacific
- Armed Forces the Americas
- California
- Colorado

# The Vertical ListBox/ComboBox Keyhole

From **Dell**'s and **Channel Master**'s web sites. What is the correct keyboard shortcut?





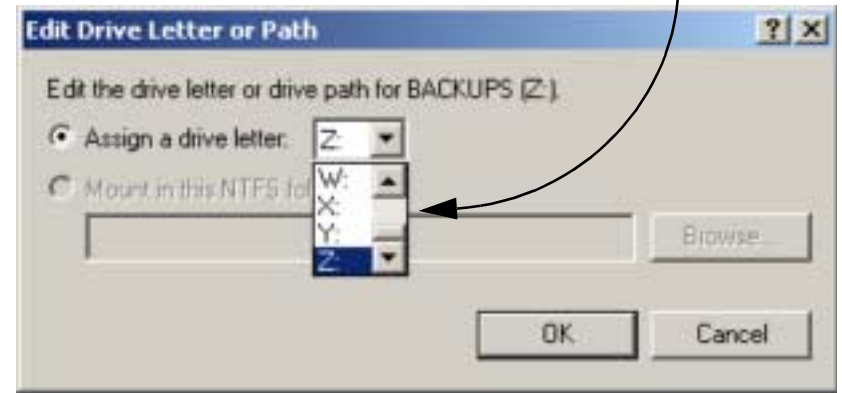
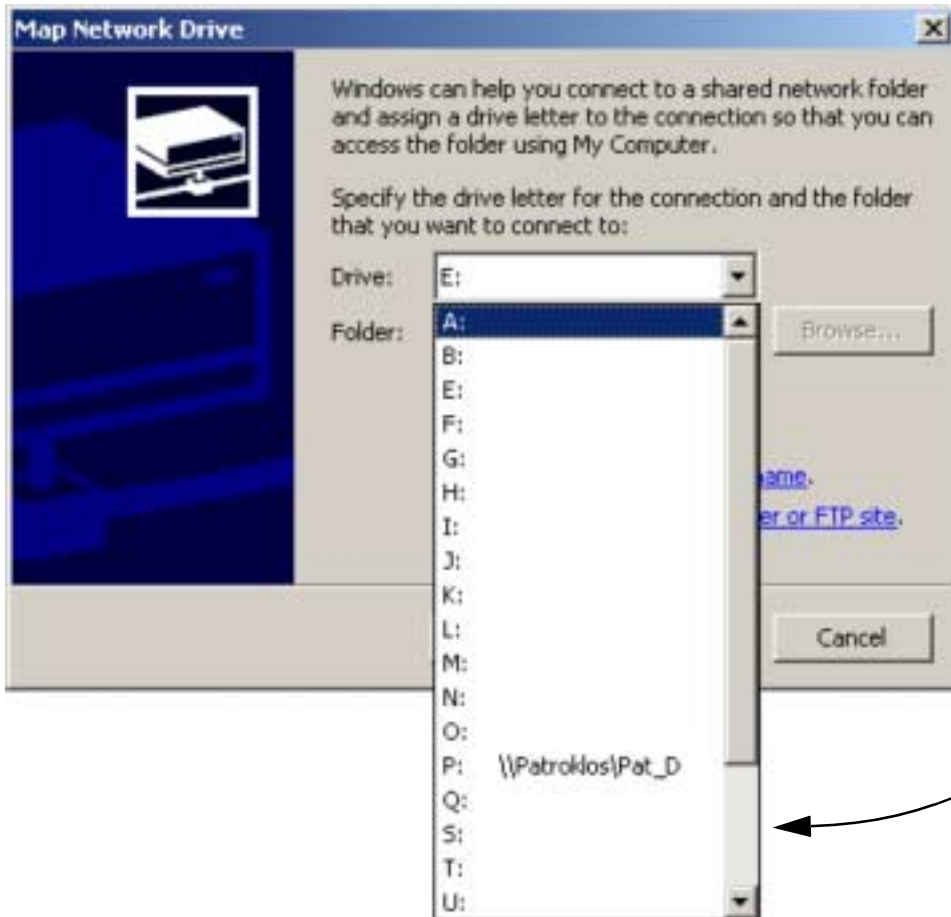
# The Vertical ListBox/ComboBox Keyhole

From Microsoft's Excel. Are only dollars supported?



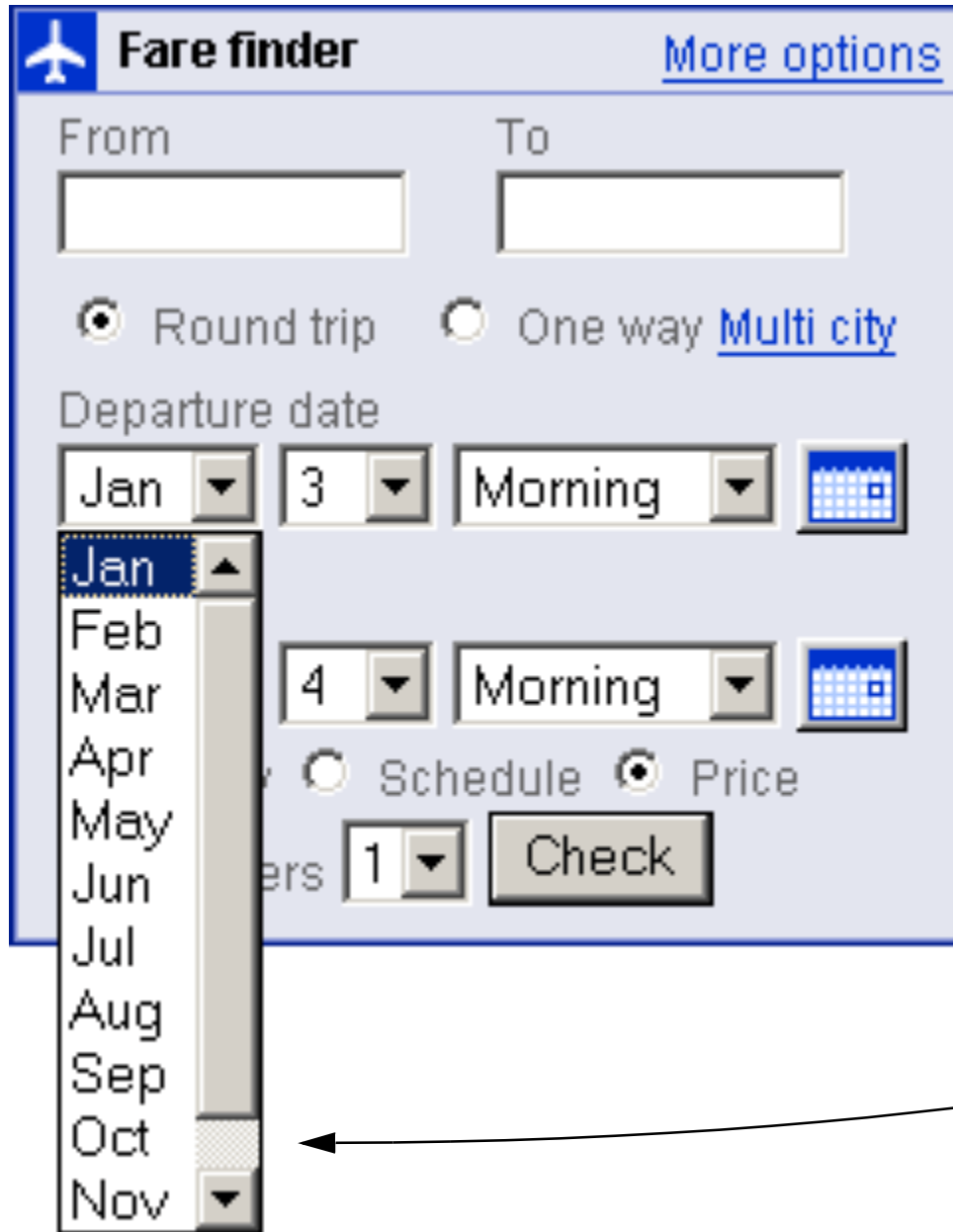
# The Vertical ListBox/ComboBox Keyhole

From Microsoft's Windows 2000:



# The Off-By-One ListBox/ComboBox Keyhole

From **United Airlines**' and **Microsoft**'s web sites:




**Fare finder** [More options](#)

From  To

☒ Round trip ☐ One way [Multi city](#)

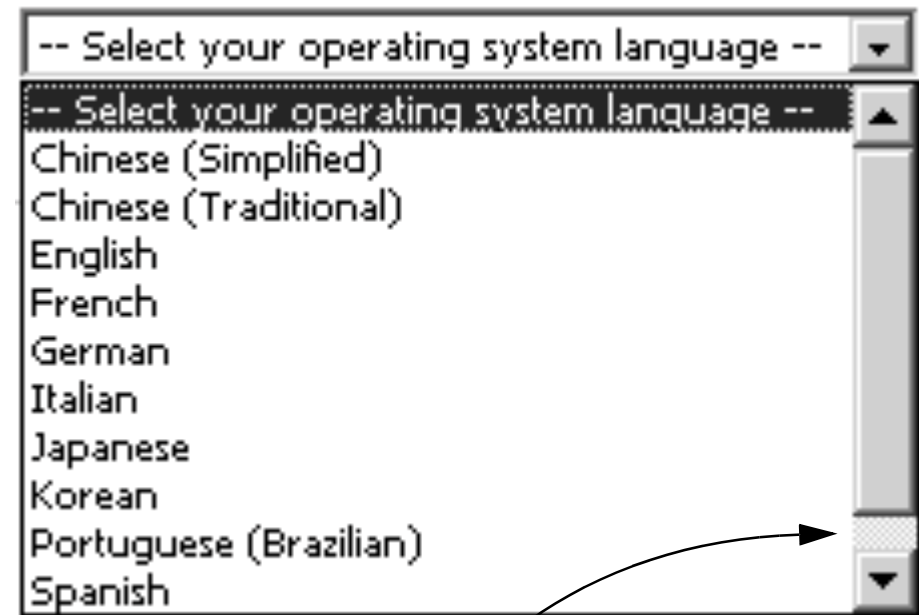
Departure date

Jan 3 Morning 

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov

☐ Schedule ☒ Price

1



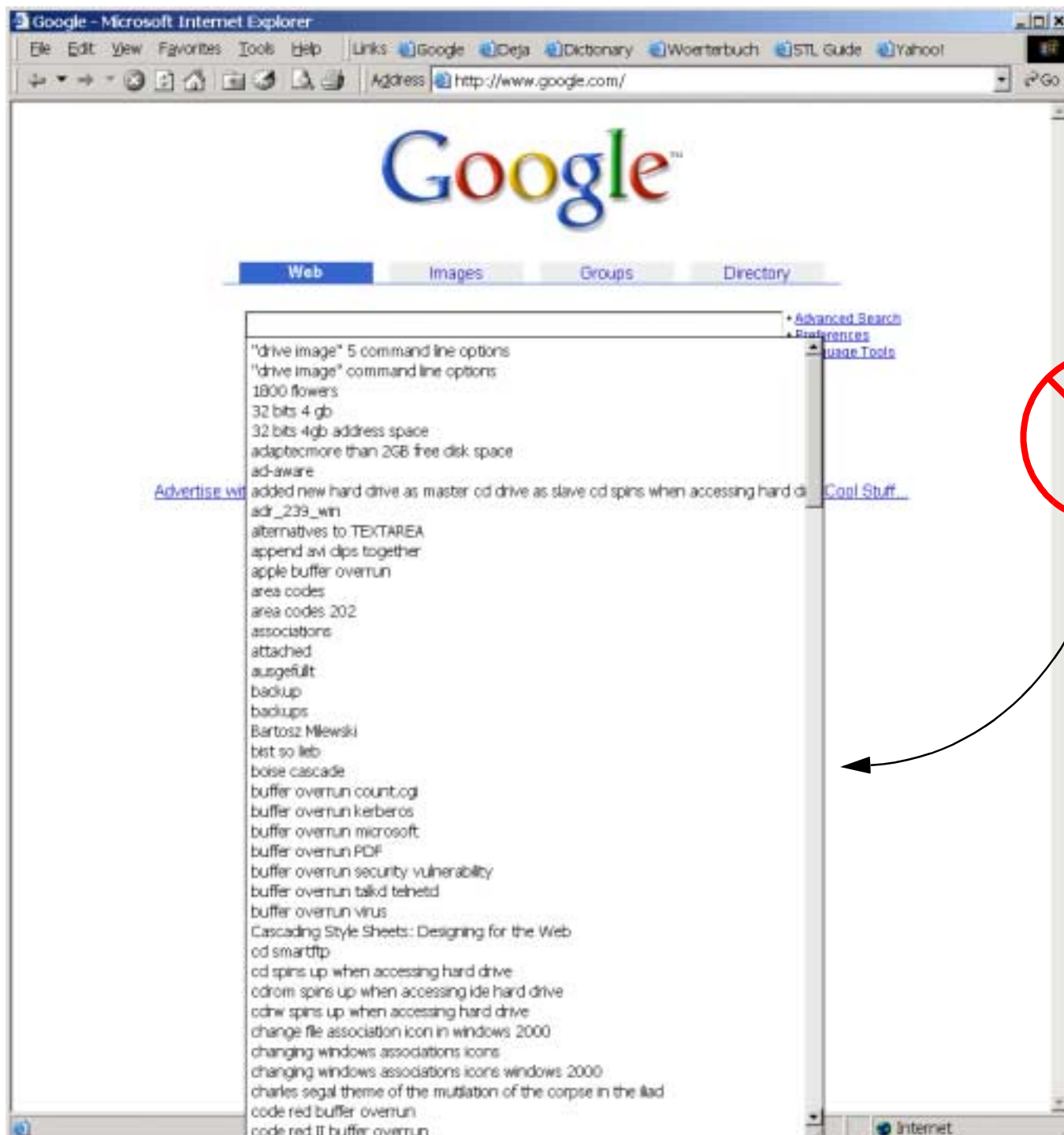
-- Select your operating system language --

-- Select your operating system language --

Chinese (Simplified)  
Chinese (Traditional)  
English  
French  
German  
Italian  
Japanese  
Korean  
Portuguese (Brazilian)  
Spanish



# It Doesn't Have to be This Way



# The Horizontal ListBox/ComboBox Keyhole

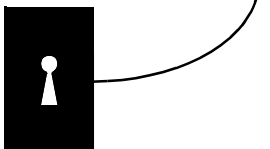
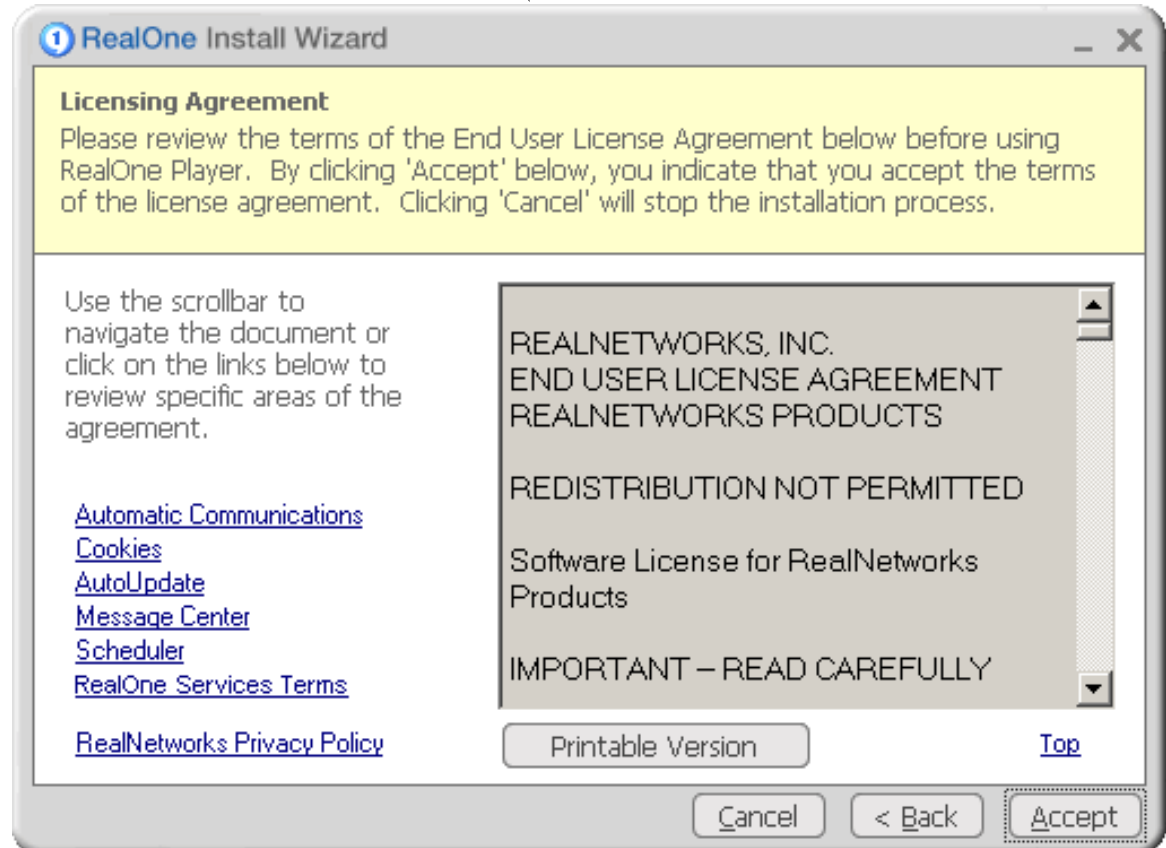
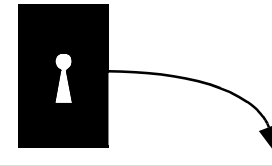
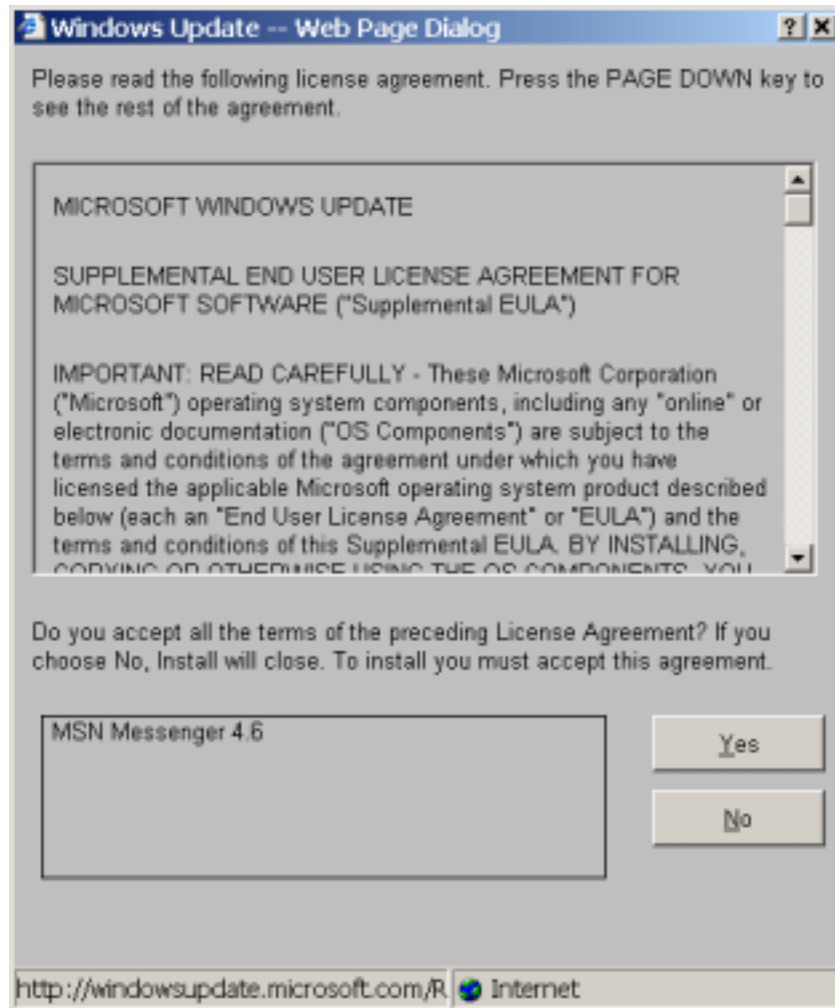
From Microsoft's web site for Windows Media Player:



To maximize usability, this is also a vertical Listbox keyhole.

# The Fixed Size Window Keyhole

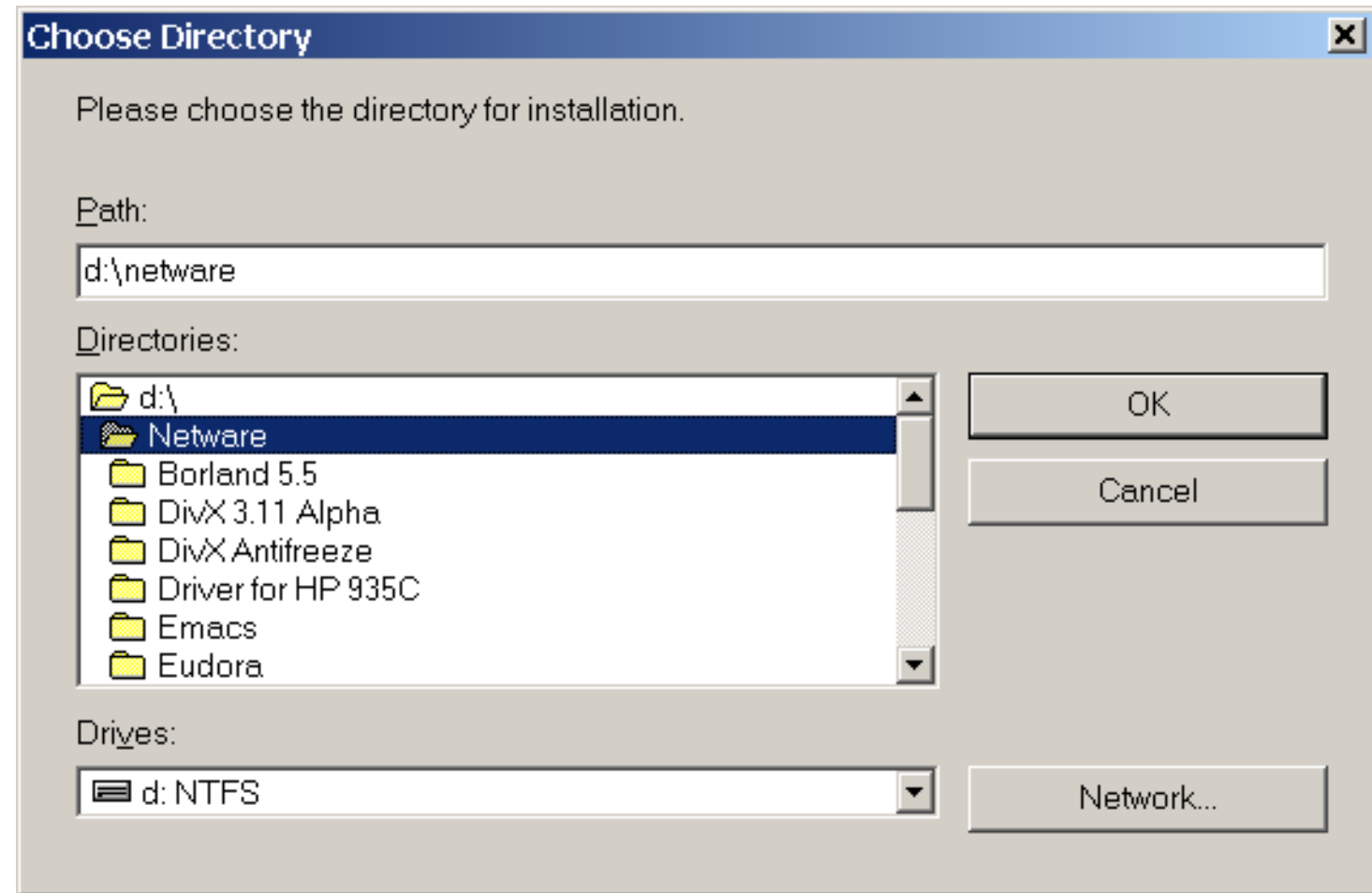
Very popular for licensing agreements. From **Microsoft** and **Real Networks**:





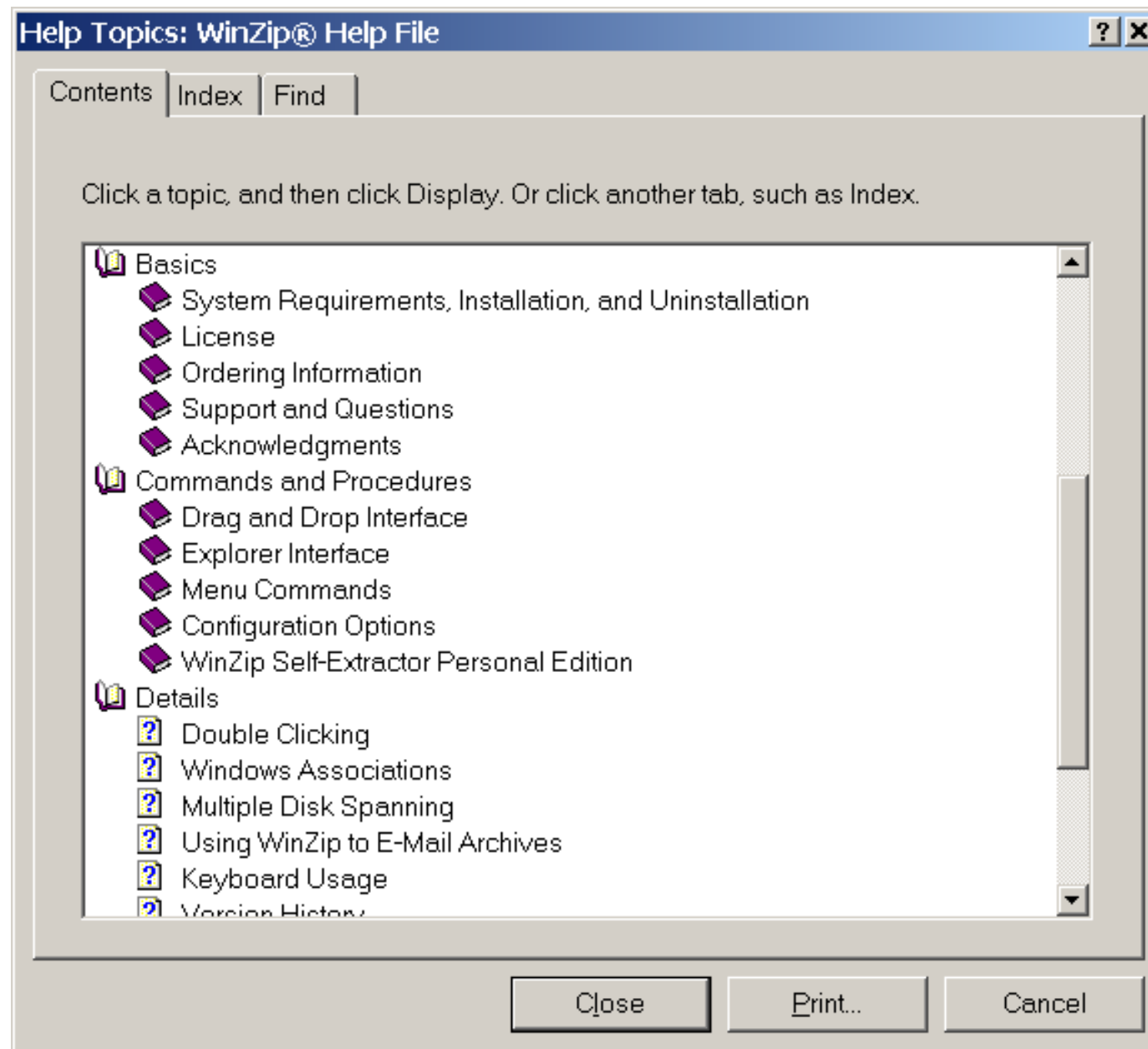
# The Fixed Size Window Keyhole

Also common for installation directory dialogs. From Apple's QuickTime 5 installer:



# The Fixed Size Window Keyhole

Common for help, as well. From **WinZip Computing**'s WinZip 8:



# The Fixed Size Window Keyhole

Web sites like them, too. From Ameritrade's web site:

The image shows a screenshot of the Ameritrade website's 'Joint Account Application' form. The browser window is titled 'https://www.ameritrade.com/cgi-bin/apps/JointApServlet?segment=ameritrade - Microsoft Internet Explorer'. The form is titled 'Step 1 of 4' and 'Ameritrade Joint Account Application'. It includes sections for 'Sign up for your new account bonus!', 'Account Funding', 'Account Type', 'Account Selection', and 'Shareholder Information'. A black square with a white keyhole icon is overlaid on the left side of the form, with a curved arrow pointing to the 'Account Type' section. The 'Account Type' section is titled 'Account Type' and has a 'Close' button. It contains text explaining that the type of account depends on the user's situation and can have legal and tax consequences. It also lists 'Joint Tenants With Rights Of Survivorship (JTWROS)' as an option, stating that each tenant owns an undivided interest in the account.

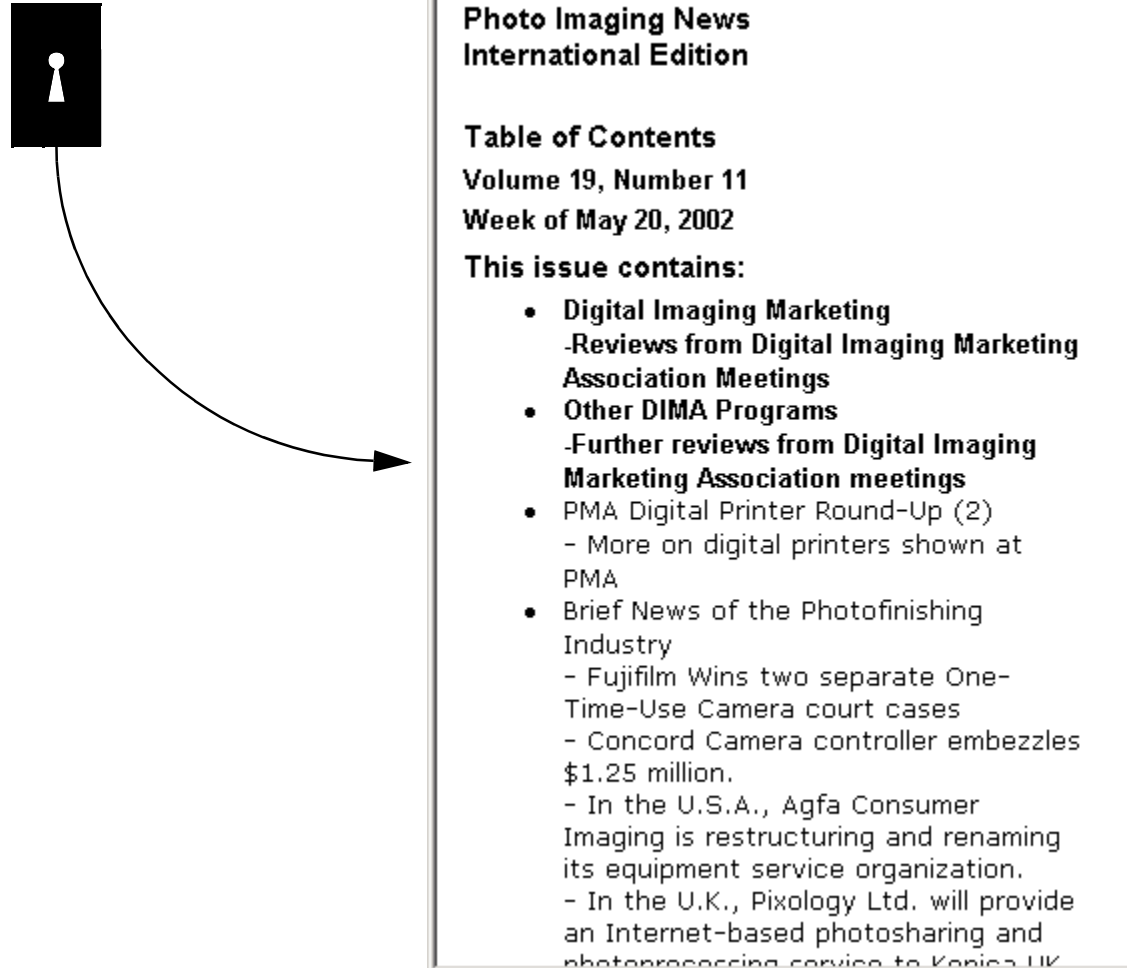
Account Type

The type of account you choose depends on your particular situation, and can have legal and tax consequences. You may want to consult a legal or tax professional to help you decide what would be best for you.

Joint Tenants With Rights Of Survivorship (JTWROS)  
Each tenant owns an undivided interest in the account.

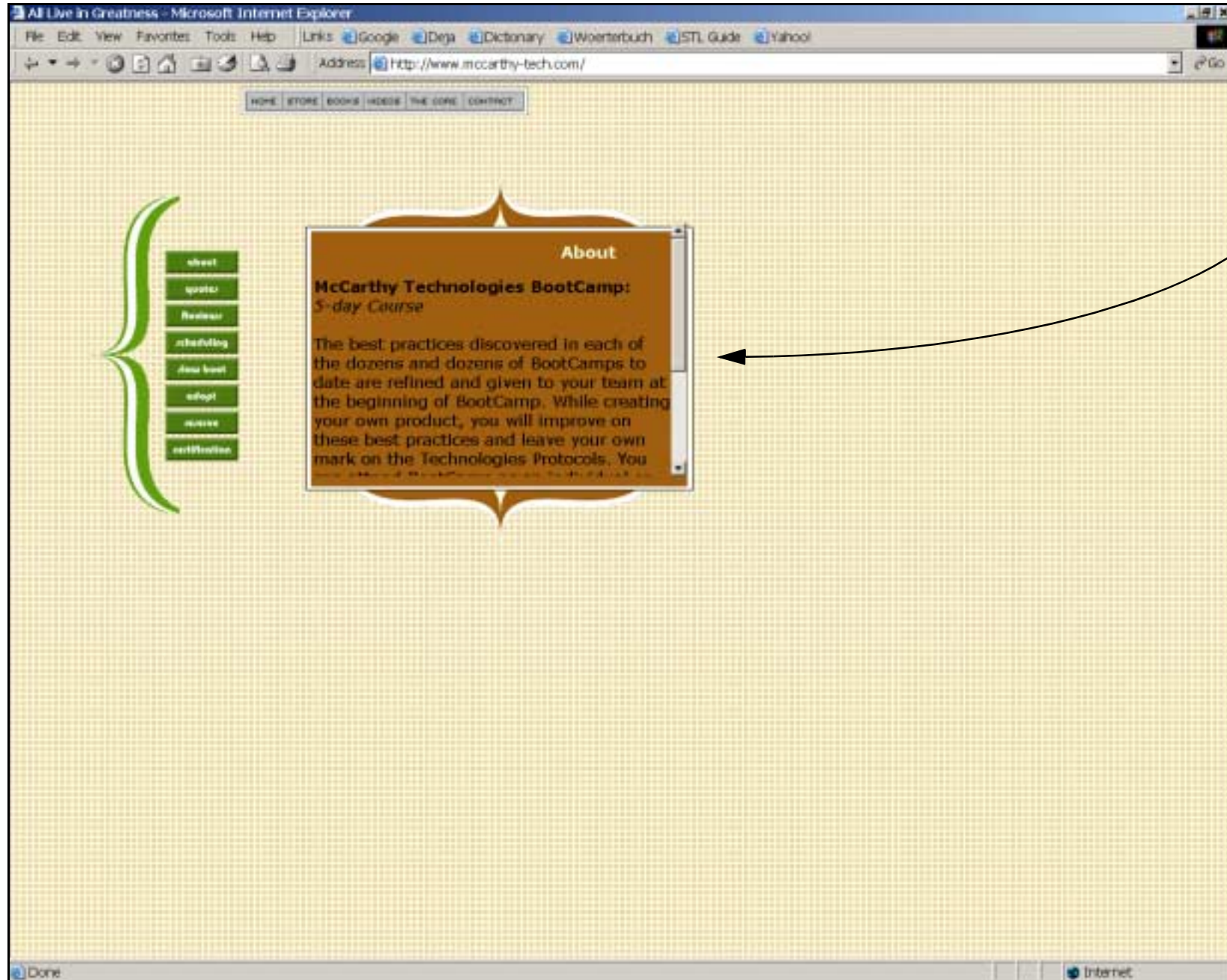
# The Fixed Size Window Keyhole

An interesting twist: an unscrollable window from **Photo Imaging News**' web site:



# The Fixed Size Window Keyhole

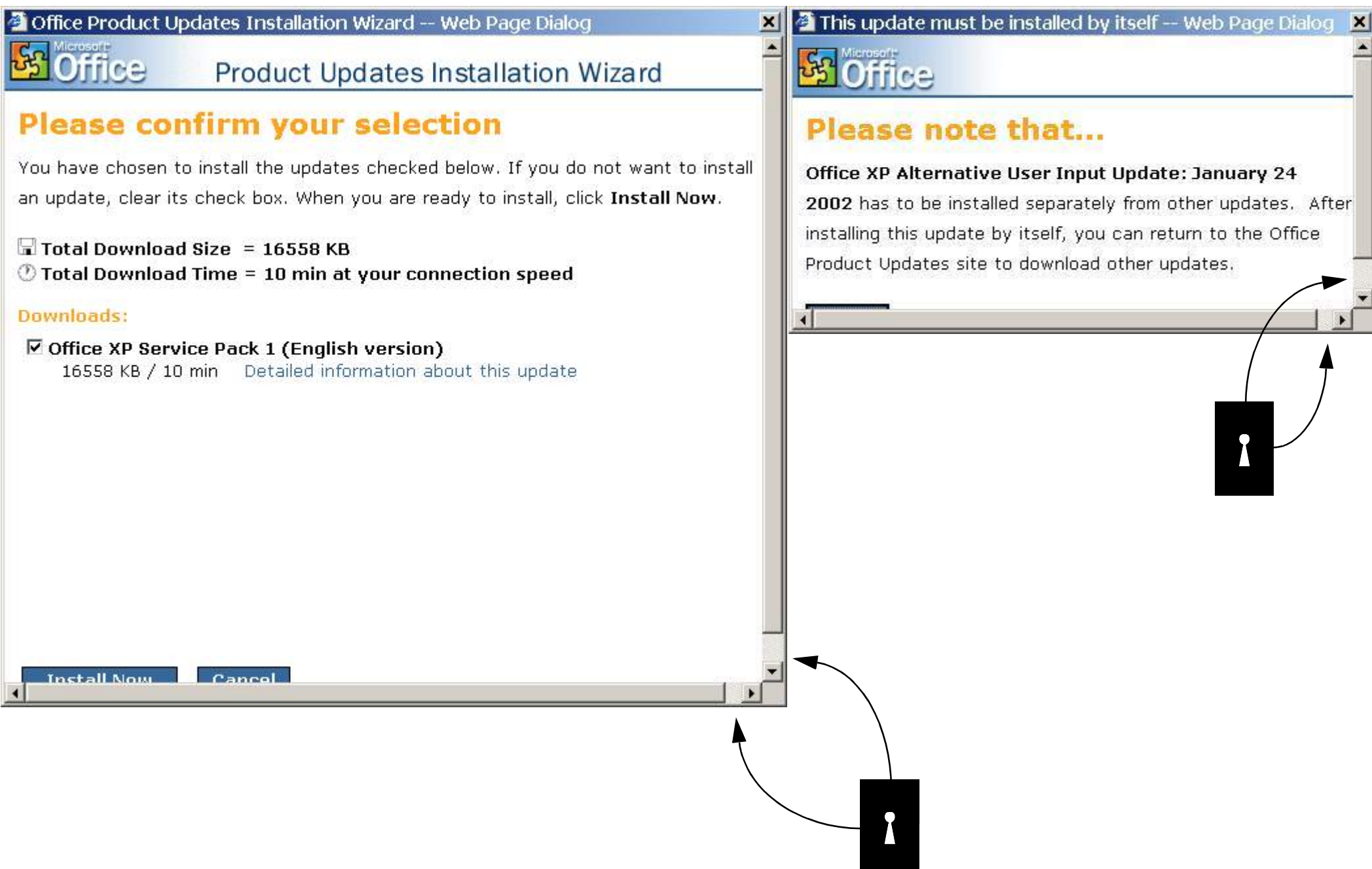
An unusual specimen from **McCarthy Technologies**' web site:





# The Fixed Size Window Keyhole

From **Microsoft**'s Office Update web site:

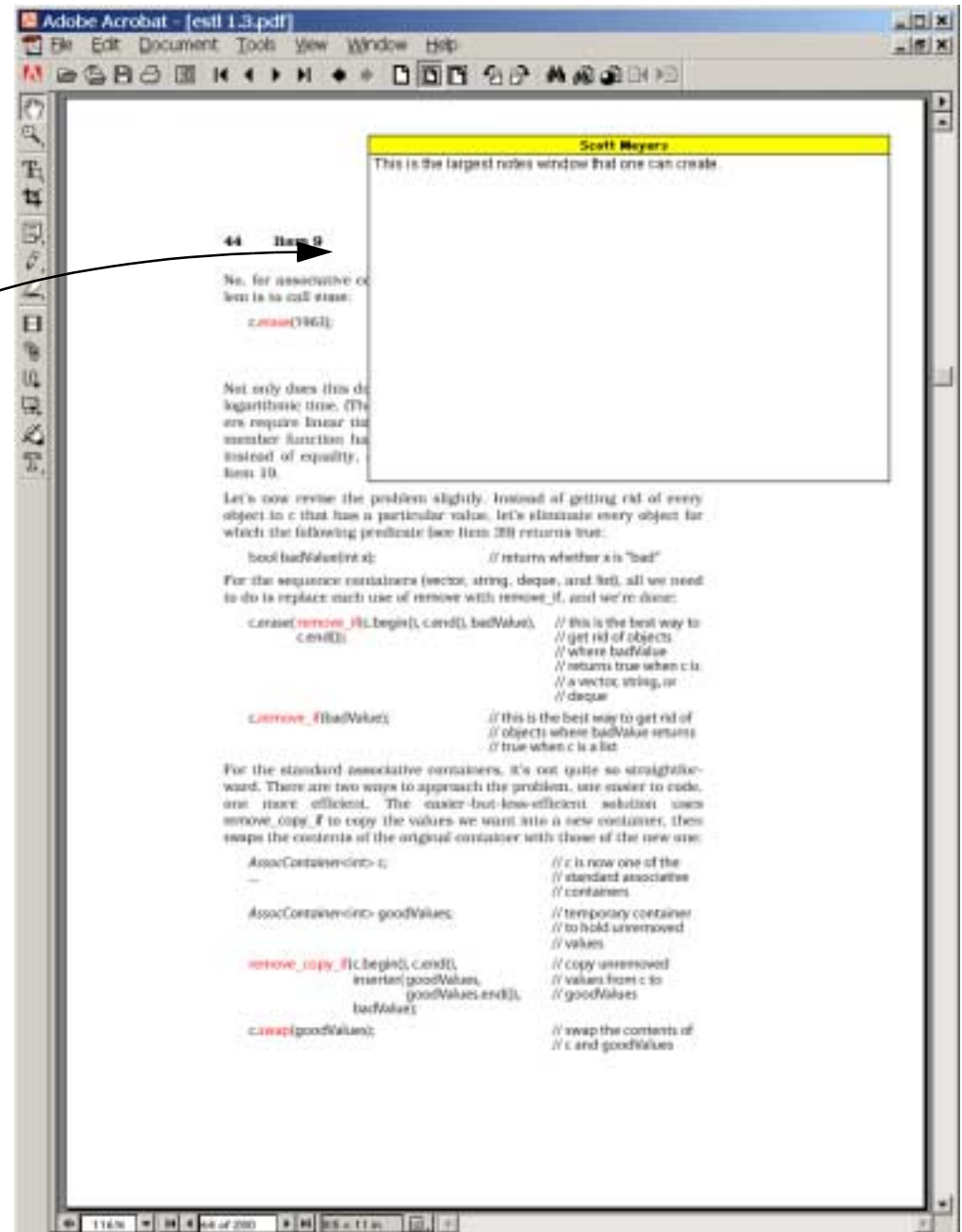
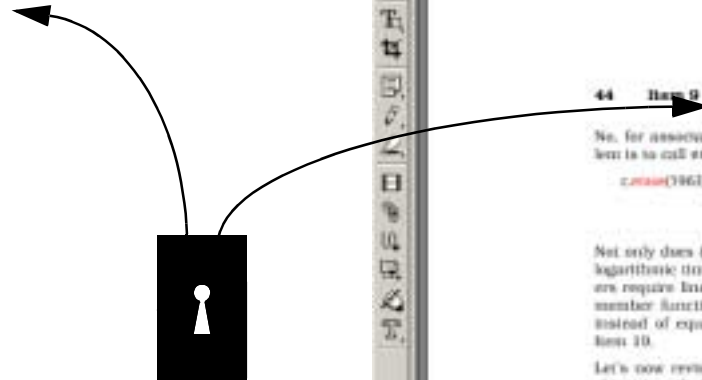




# The Maximum Size Window Keyhole

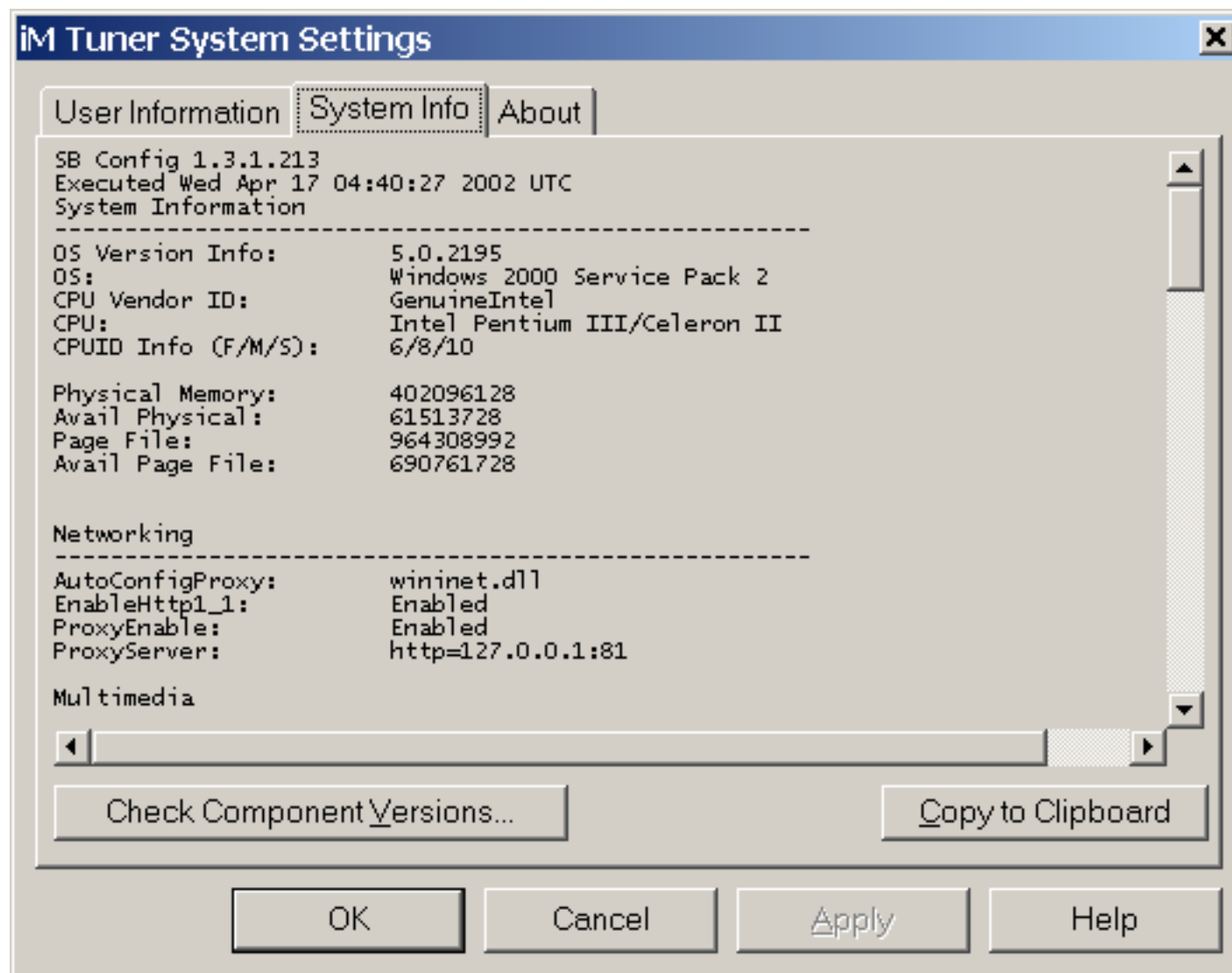
From Adobe's Acrobat 4 documentation:

The maximum size for the note window is 288 pixels high and 432 pixels wide.



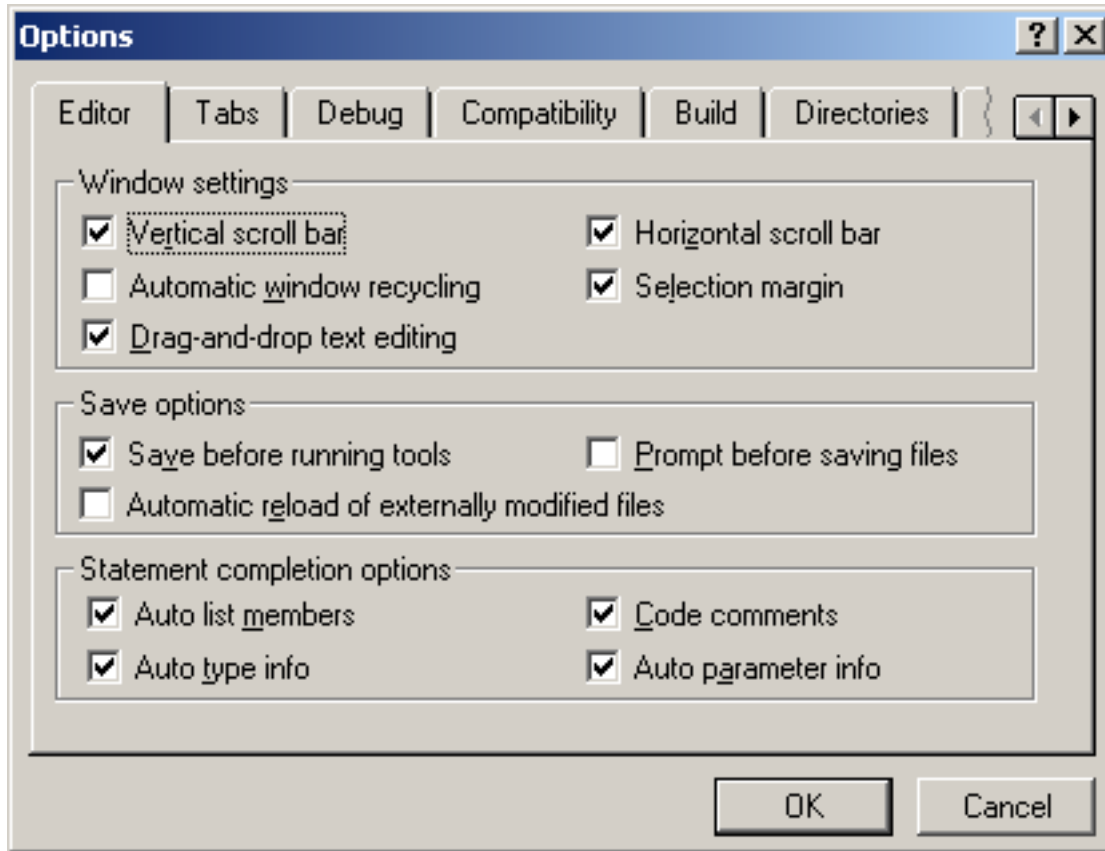
# The Fixed Size Dialog Keyhole

From Sonicbox's iM Tuner:



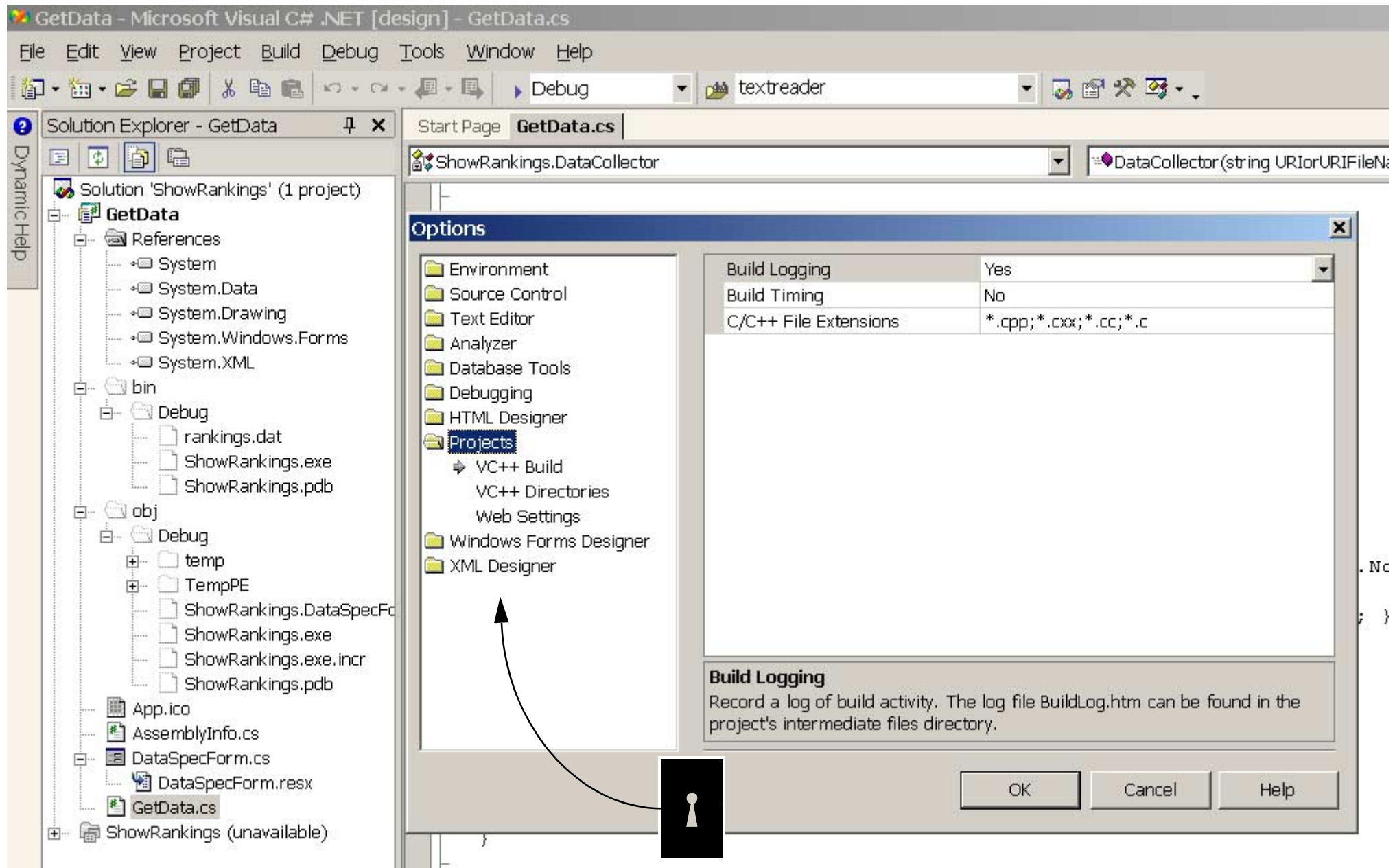
# The Fixed Size Dialog Keyhole

From Microsoft's Visual Studio 6:



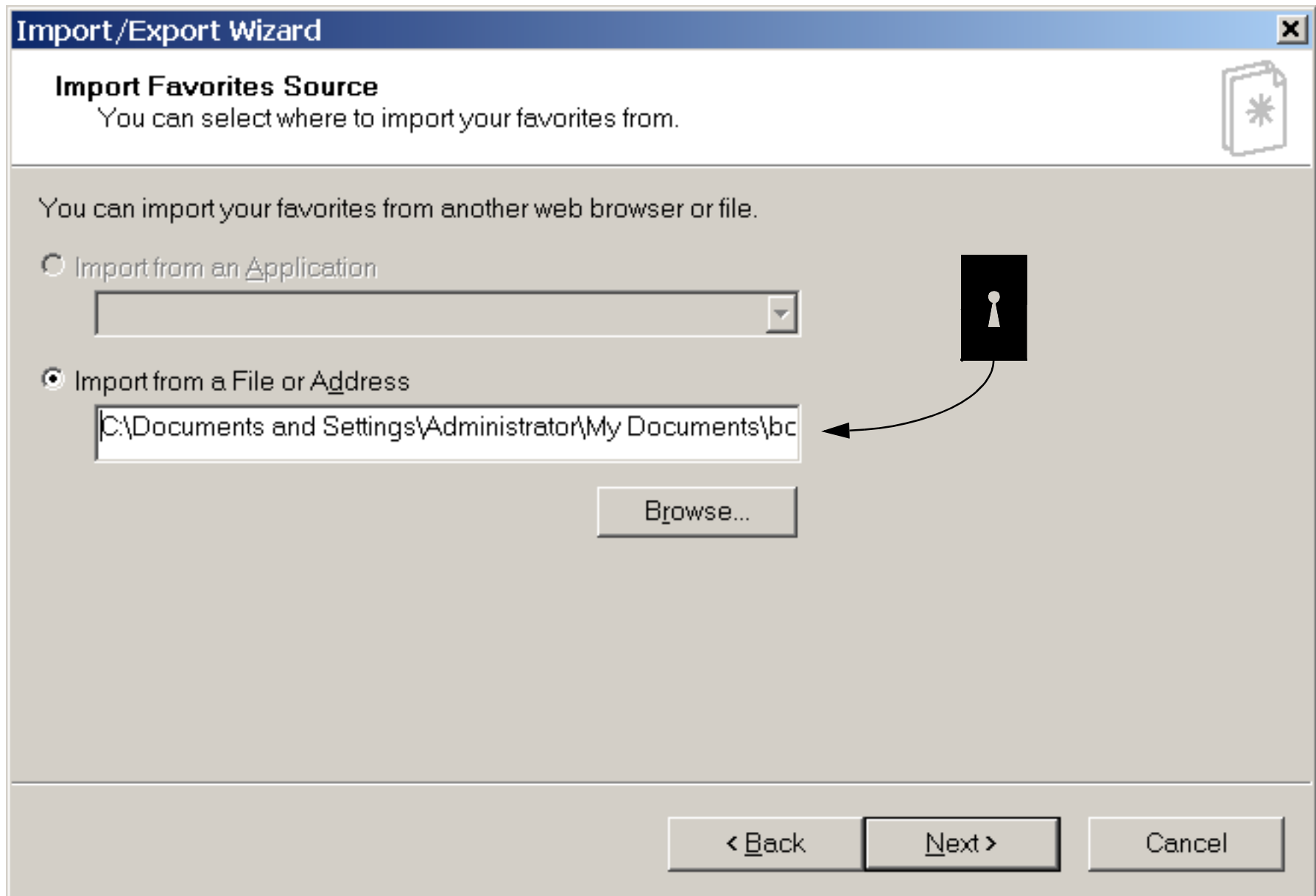
# The Limited Tree Expansion Keyhole

From Microsoft's Visual Studio .NET:




# The Fixed Width Edit Control Keyhole

From Microsoft's Internet Explorer 6:



# The Fixed Width Edit Control Keyhole

From [OneSuite.com](http://OneSuite.com)'s web site (account setup):



**STEP 2: Account Information**

User Name	<input type="text"/>	3 to 16 chars. Last character must be numeric.
Password	<input type="password"/>	
Re-Enter Password	<input type="password"/>	
Secret Question	<input type="text" value="What is your favori"/>	This question and answer are used if you lose your password.
Secret Answer	<input type="text"/>	The answer to your secret question.
E-Mail Address	<input type="text"/>	Account information is sent to this e-mail address.

From [OneSuite.com](http://OneSuite.com)'s web site (account maintenance):

Secret Question:

Answer:



# The Lying Fixed Width Edit Control Keyhole

From Marriott's web site:

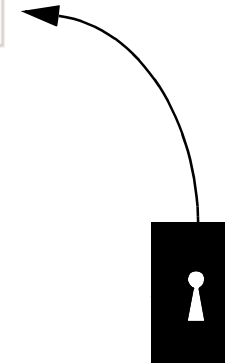
Check-in Date: April, 2002 17 

Check-out Date: April, 2002 18 

Number of Guests: 1 

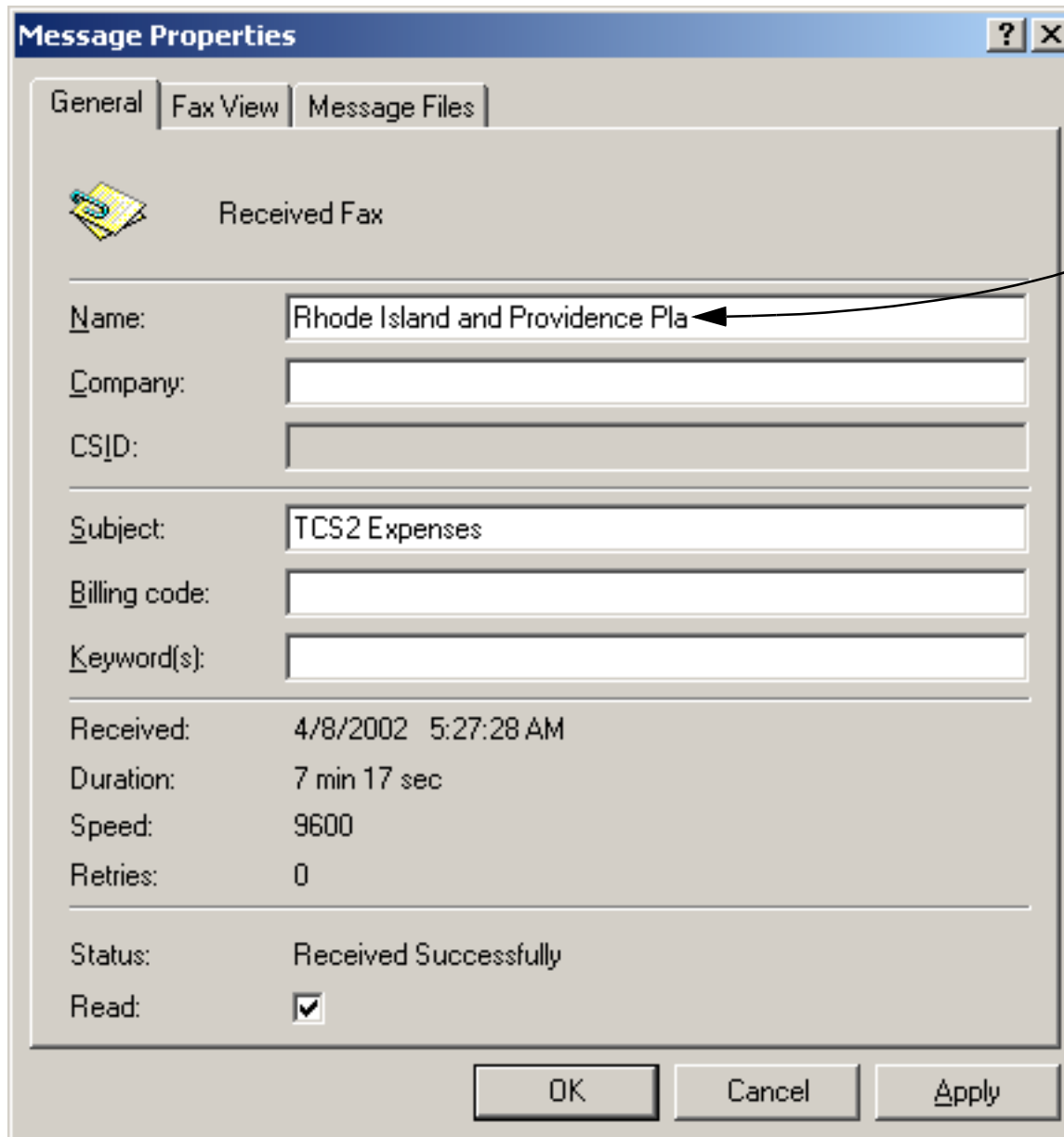
Enter your Marriott Rewards number to earn points or miles at participating Marriott Rewards hotels.

Marriott Rewards Number: 777 555 4




# The Lying Fixed Width Edit Control Keyhole

From **Symantec**'s Winfax Pro 10:



**Message Properties** [?] [X]

General | Fax View | Message Files

 Received Fax

Name: Rhode Island and Providence Pla

Company:

CSID:

Subject: TCS2 Expenses

Billing code:

Keyword(s):

Received: 4/8/2002 5:27:28 AM

Duration: 7 min 17 sec

Speed: 9600

Retries: 0

Status: Received Successfully

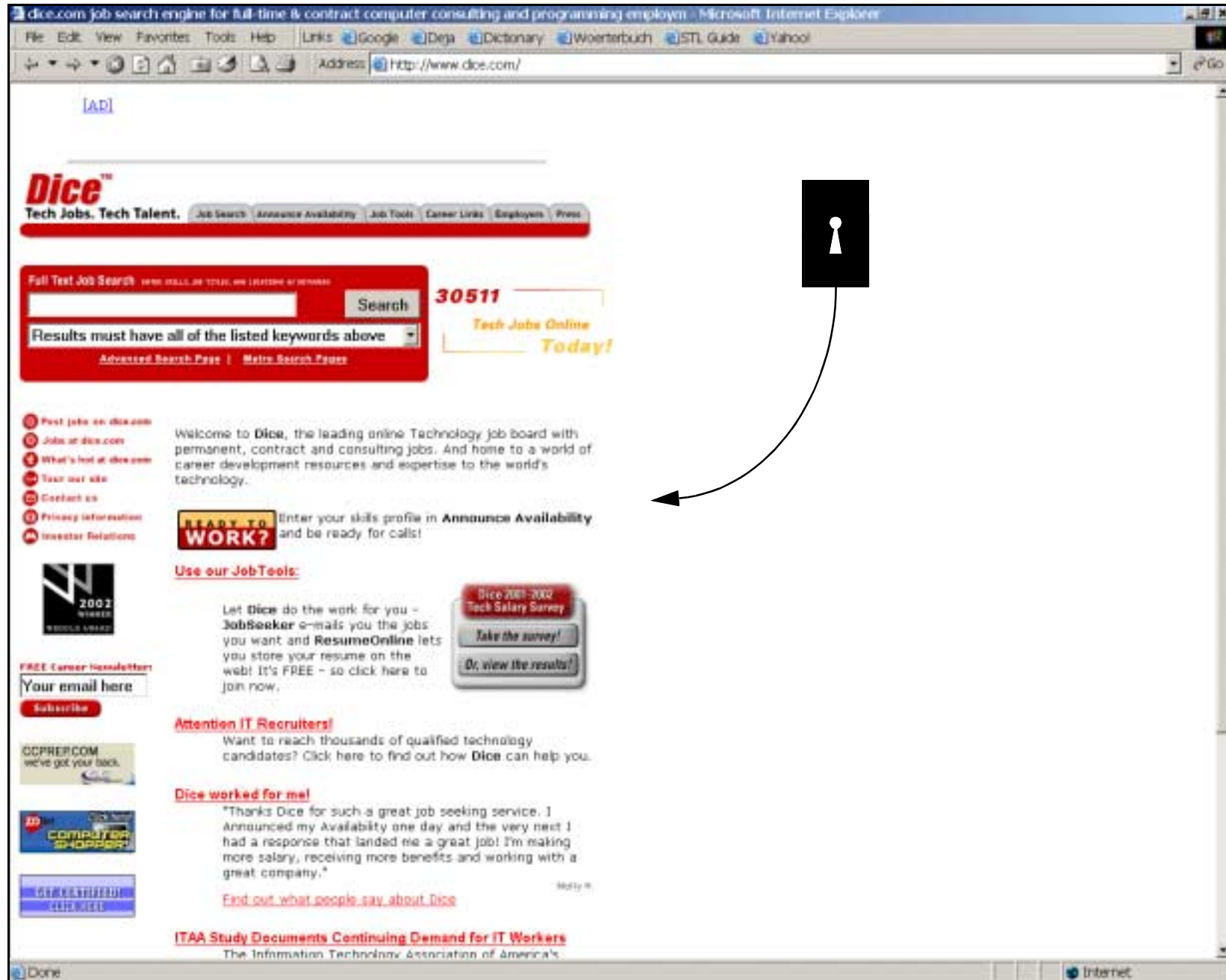
Read: ☒

OK Cancel Apply



# The Fixed-Width Web Page Keyhole

Dice's web site is typical:



# The Fixed-Width Web Page Keyhole

Like **MSN**, some 2/3rds of *PC Magazine's* Top 100 Classic Web Sites use fixed-width pages.

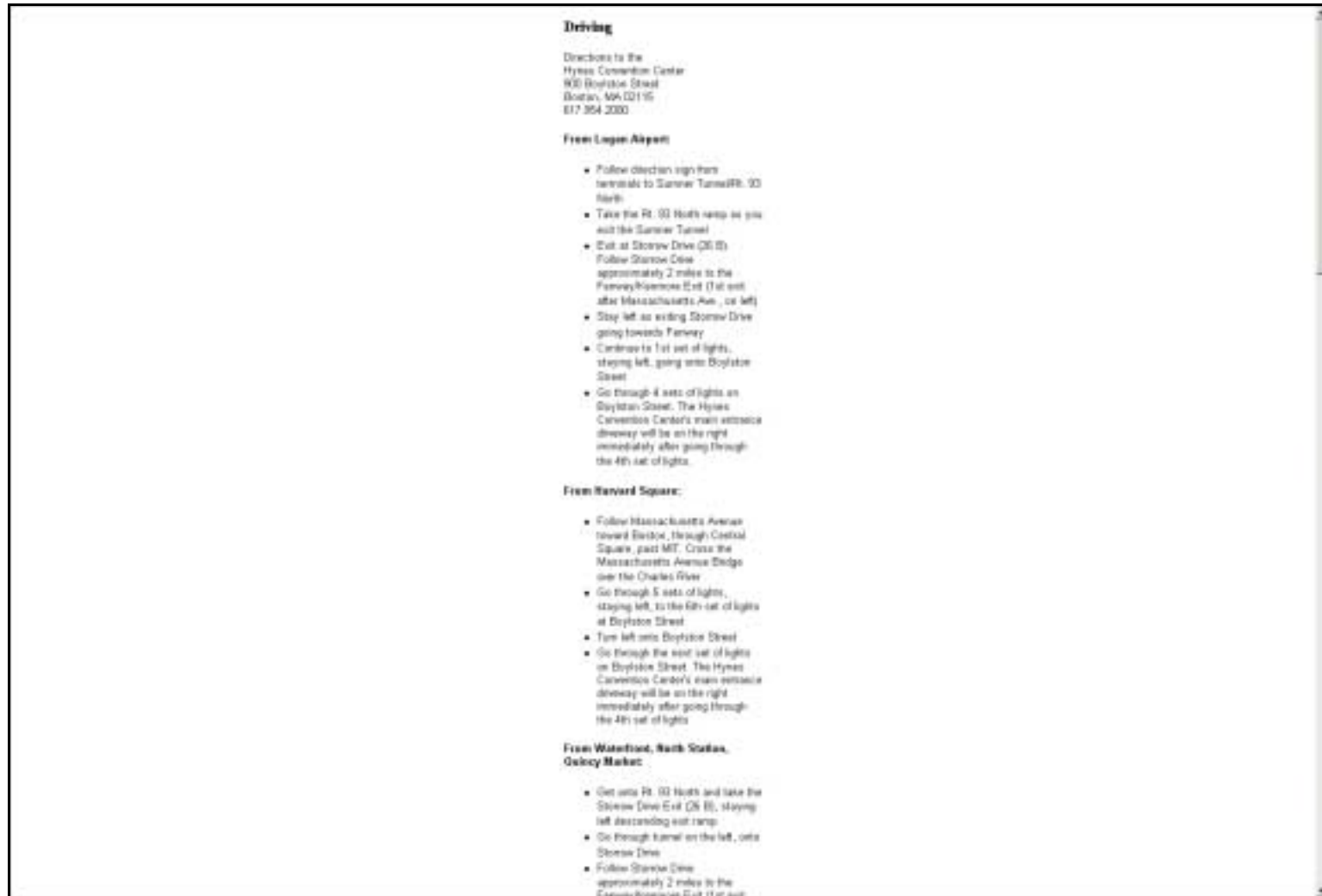


**AOL** is representative of those that center their fixed-width pages. Ooooh!



# The Fixed-Width Web Page Keyhole

From the **Massachusetts Convention Center Authority**'s web site:





# The Fixed-Width Web Page Keyhole

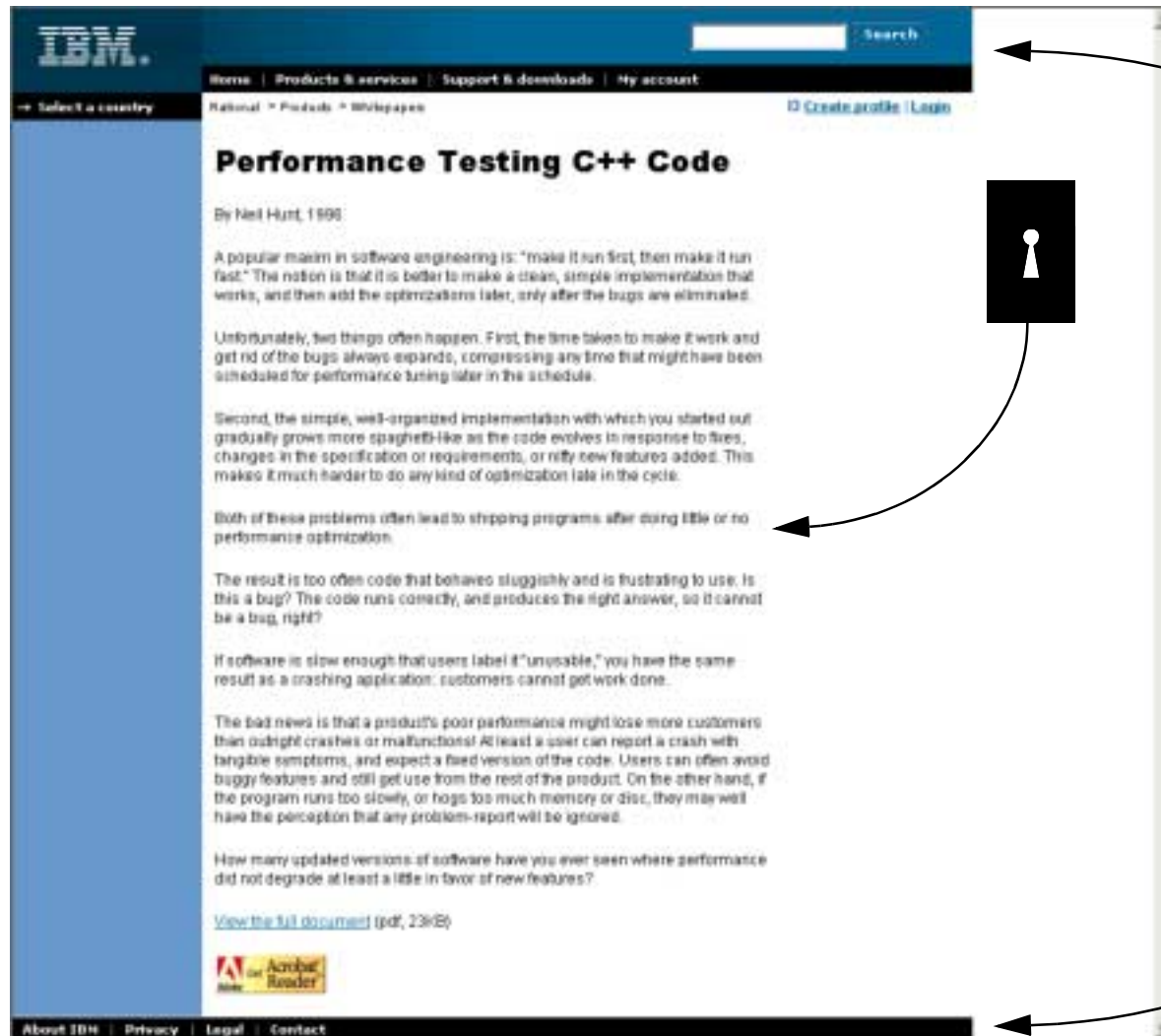
From **Ebay**'s web site:





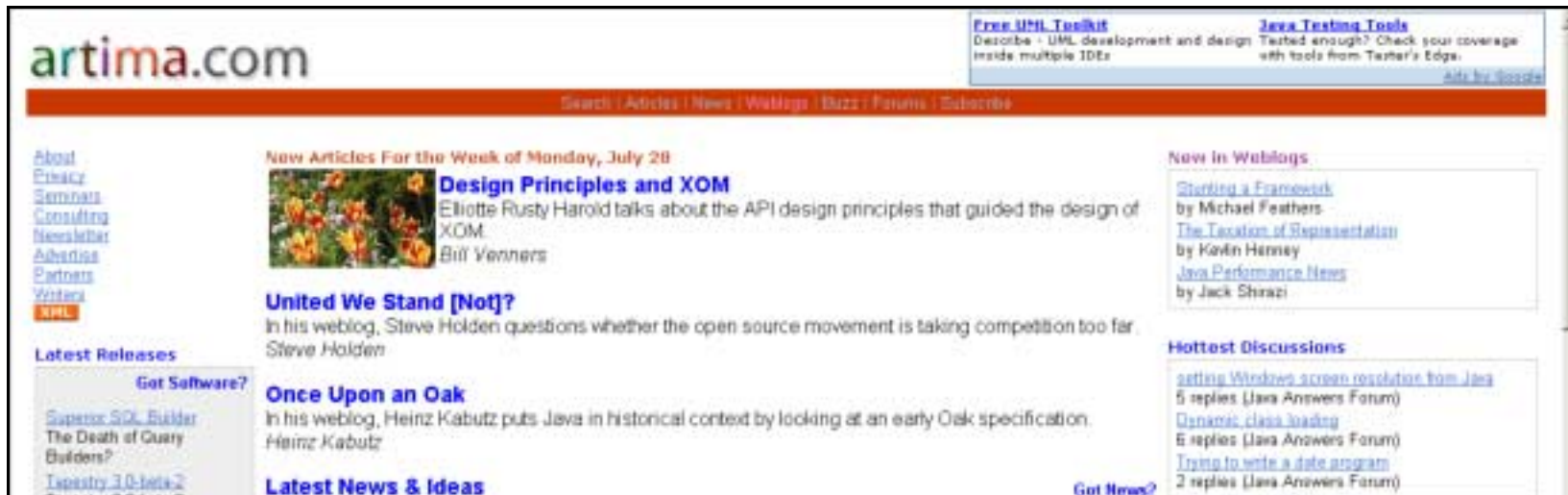
# The Fixed-Width Web Page Keyhole

From IBM's web site:



# The Fixed-Width Web Page Keyhole

From Artima's web site:



# Invisible Keyholes

The Too Few Bits keyhole.

The Unnecessarily Signed Int keyhole.

The Restricted Field Size keyhole.

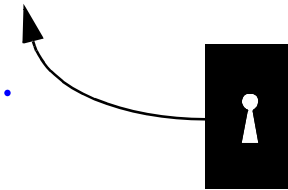
The Restricted Domain keyhole.

Important: **Invisible**  $\neq$  **Undetectable**!

# The Too Few Bits Keyhole

From Roxio's web site (but the software is due to Adaptec):

If you have Easy CD Creator 4.00 and have more than 8Gb of free space, please create TEMP directories and fill up space in these until less than 8Gb of free space remains.

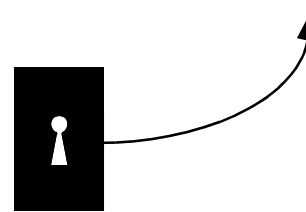


8GB is 33 bits...

# The **Unnecessarily Signed Int** Keyhole

Naviscope's Naviscope status report:

Naviscope: Active, 10 Prefetched, -4116 Ads Blocked



# The **Restricted Field Size** Keyhole

A phrase to index using Adobe's FrameMaker 6:

Prefer iterator to const\_iterator, reverse\_iterator, and const\_reverse\_iterator.

I want several different index entries:

iterator: vs. other iterator types

const\_iterator: vs. other iterator types

reverse\_iterator: vs. other iterator types

const\_reverse\_iterator: vs. other iterator types

iterators: choosing among types

containers: choosing among iterator types

With markup, here's the index entry I want to make:

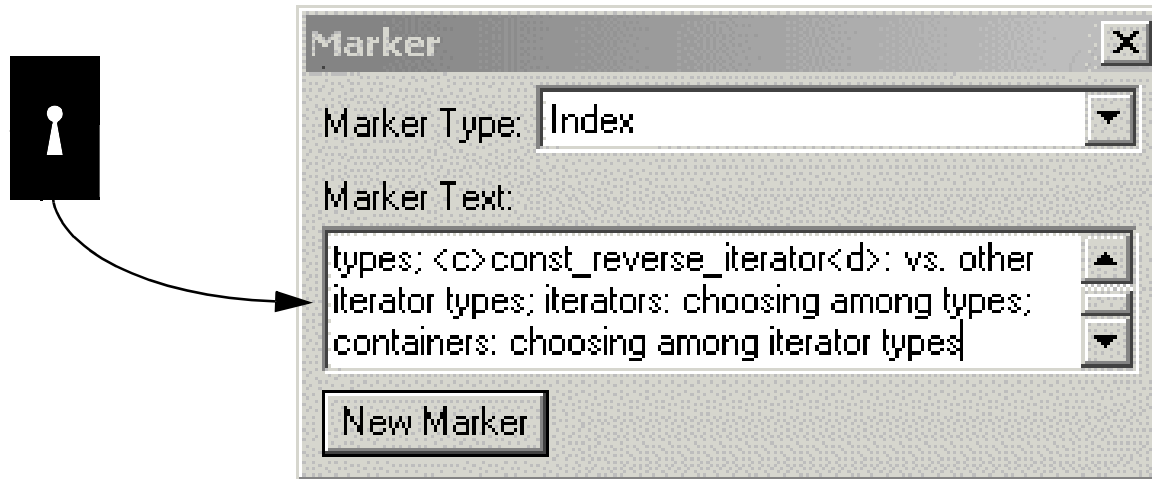
<\$startrange><c>iterator<d>: vs. other iterator types;

<c>const\_iterator<d>: vs. other iterator types; <c>reverse\_iterator<d>: vs. other iterator types; <c>const\_reverse\_iterator<d>: vs. other iterator types; iterators: choosing among types; containers: choosing among iterator types

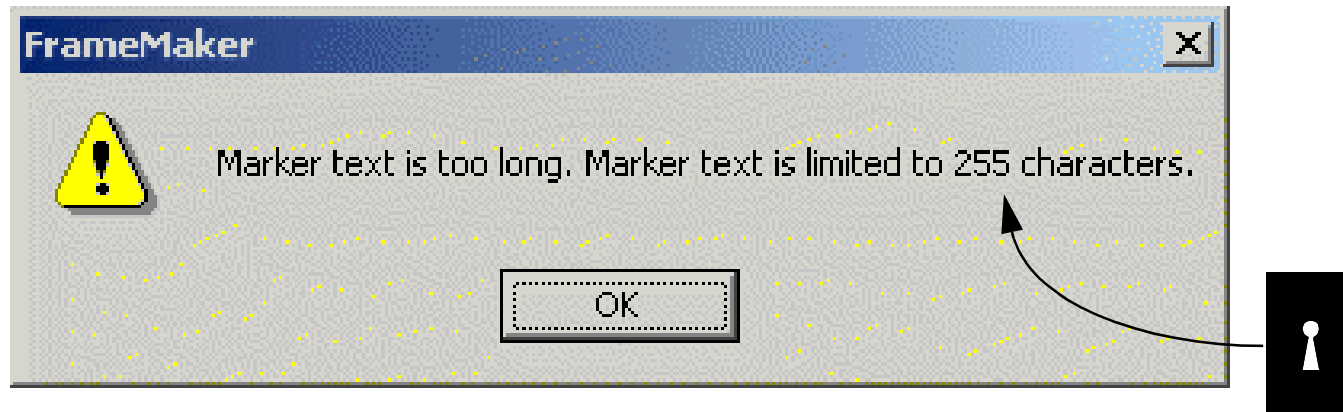


# The Restricted Field Size Keyhole

FrameMaker lets me type it into this lovely keyhole,



but when I click “New Marker”...



# The Restricted Field Size Keyhole

From **Microsoft**'s Visual C++ 6:

## Compiler Warning C4786

The debugger cannot debug code with symbols longer than 255 characters.

From **Microsoft**'s Visual Studio .NET Readme:

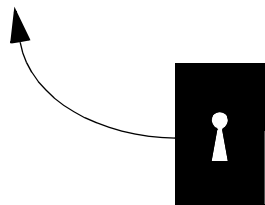
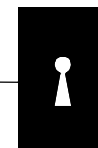
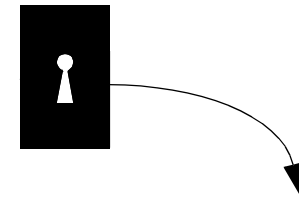
Setup fails if any path and file name combination exceeds 260 characters.  
The maximum length of a path in Visual Studio is 221 characters;  
accordingly, you should copy files to a path with less than 70 characters.

If you create a network share for a network image, the UNC path  
to the root install location should contain fewer than 39 characters.

Annotations in **Adobe** Acrobat 4 appear to be limited to 5000 characters.

Nostalgia:

- Local phone numbers will never have more than 7 digits.
- Two digits will always suffice to identify the year.



# The **Restricted Domain** Keyhole

Unbelievably common for user IDs and passwords, often in conjunction with field size keyholes:

The University  
of Arkansas

## CICS Passwords

- Must be between 3 and 8 characters.
- Can have alpha and numeric characters. No special characters (dollar sign. percent signs..)

Hotmail

Must be **at least six (6) characters long**, may contain numbers (0-9) and upper and lowercase letters (A-Z, a-z), but **no spaces**.

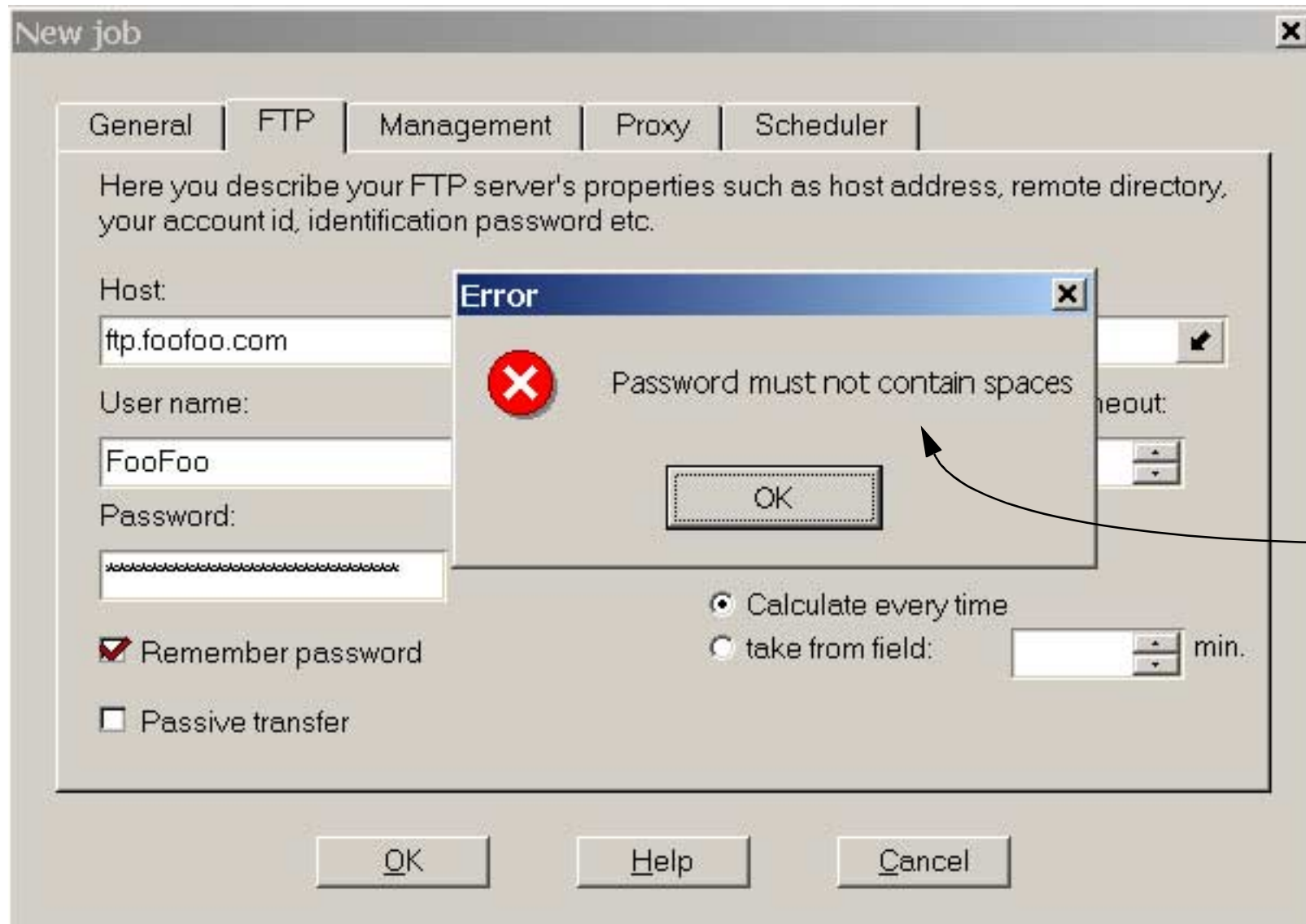
Ameritrade

Your PIN...

1. Must be a 4-digit number
2. Cannot begin with a zero
3. Cannot include letters or symbols

# The Restricted Domain Keyhole

From Rifco's DC SmartFTP:



# The Restricted Domain Keyhole

From [1800flowers.com](http://1800flowers.com)'s web site:

The image shows a web form titled "Enter a Card Message" on a yellow background. The form includes a greeting type dropdown menu, a greeting text box, a message text area with a 150 character limit, and a signature text box. Four black keyhole icons with arrows point to specific parts of the form: the title, the greeting type dropdown, the greeting text box, and the signature text box. A text box on the left provides a 150 character limit warning and a note about special symbols. A link at the bottom left offers help for users at a loss for words.

**Enter a Card Message**

There is a 150 character limit for your message due to the size of the card. **Note:** please do not use any special symbols like "&".

At a loss for words? We can help you express your sentiments. [Click here to view](#)

greeting type:

greeting:

message: 150 character maximum

signature:

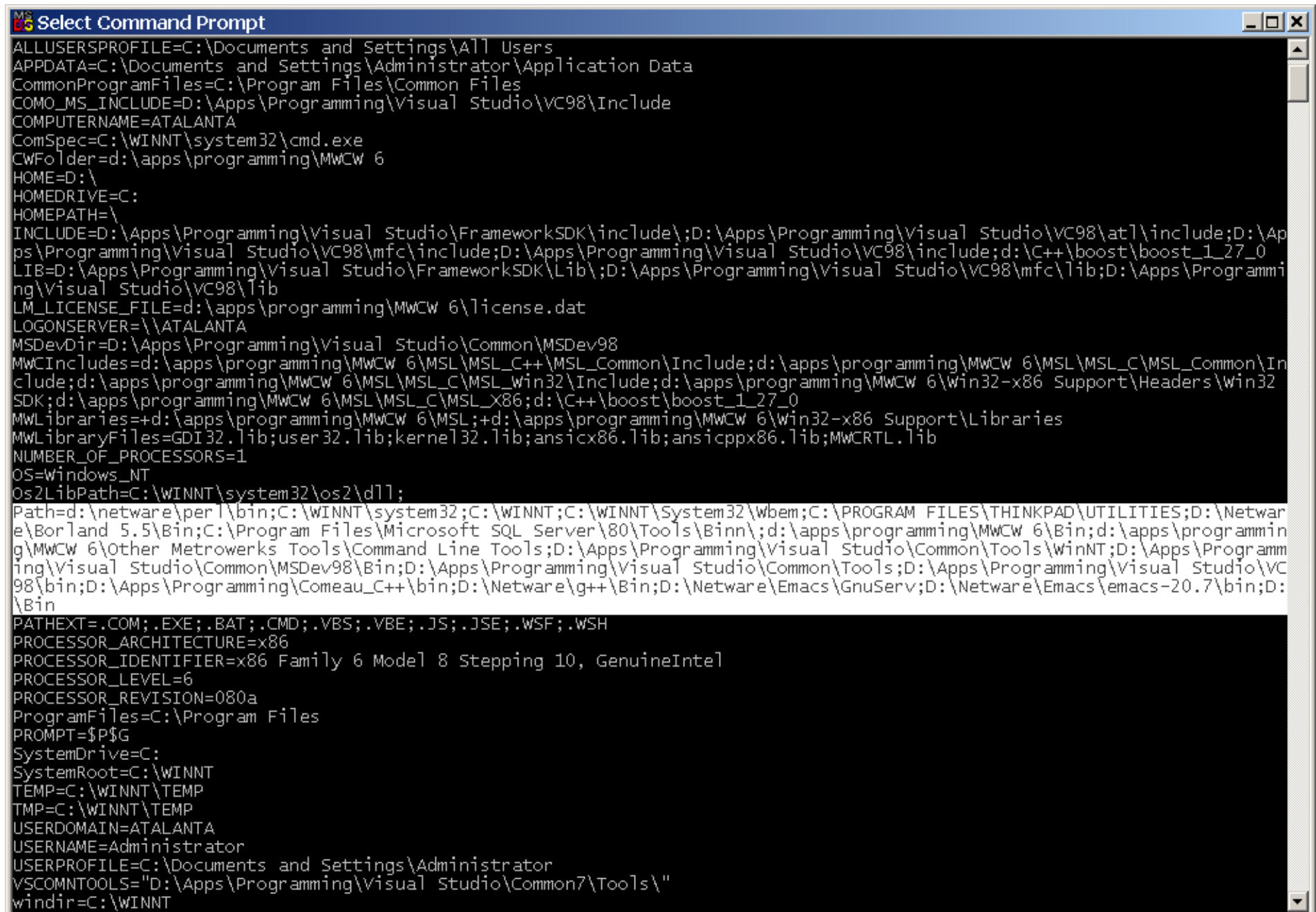
# Keyholes by Induction

If 1 is good, n must be better.



# Keyholes Everywhere

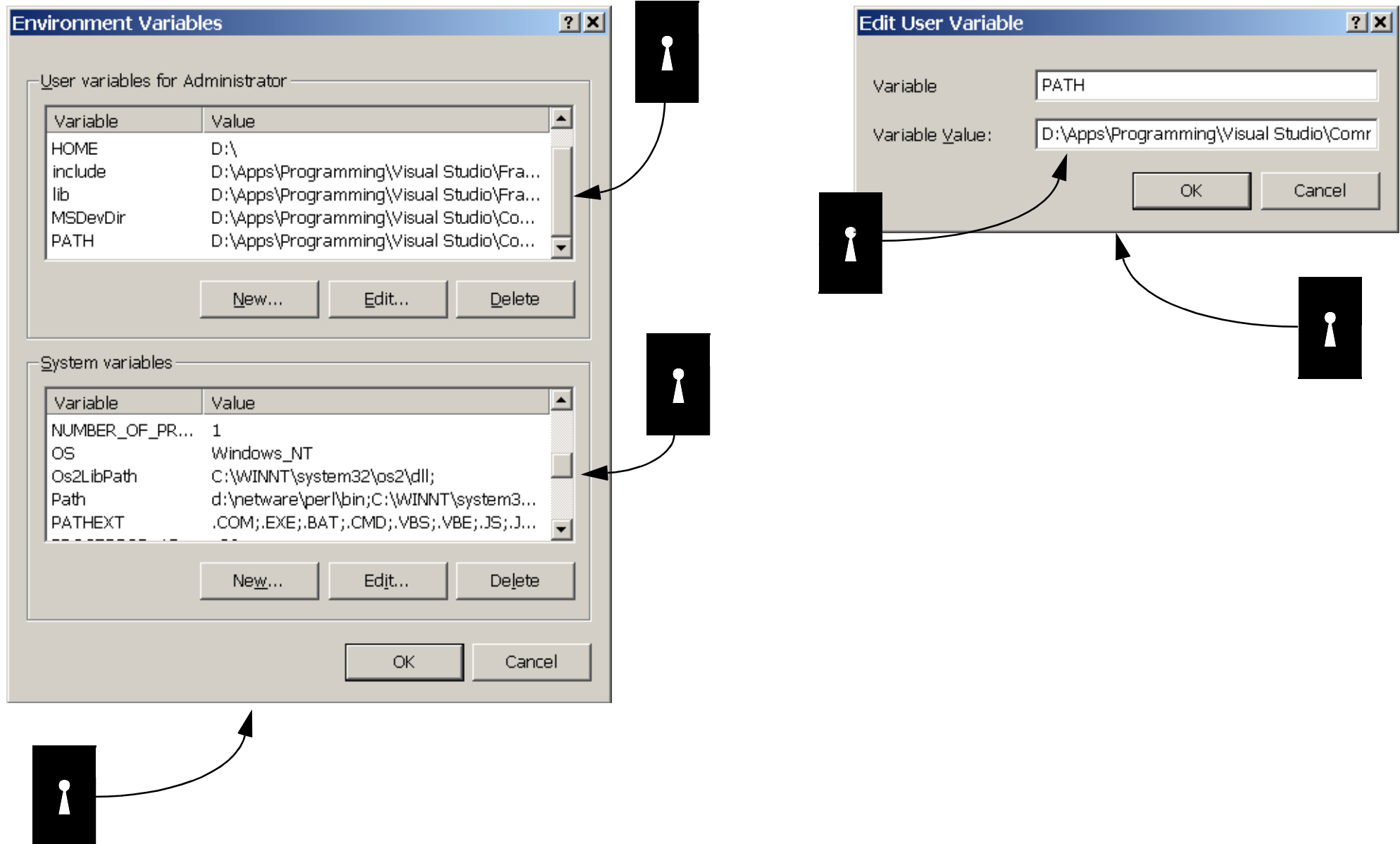
Here's my environment (PATH is highlighted):



```
ALLUSERSPROFILE=C:\Documents and Settings\All Users
APPDATA=C:\Documents and Settings\Administrator\Application Data
CommonProgramFiles=C:\Program Files\Common Files
COMO_MS_INCLUDE=D:\Apps\Programming\Visual Studio\VC98\Include
COMPUTERNAME=ATALANTA
ComSpec=C:\WINNT\system32\cmd.exe
CWFolder=d:\apps\programming\MwCW 6
HOME=D:\
HOMEDRIVE=C:
HOMEPATH=\
INCLUDE=D:\Apps\Programming\Visual Studio\FrameworkSDK\include\;D:\Apps\Programming\Visual Studio\VC98\atl\include;D:\Apps\Programming\Visual Studio\VC98\mfc\include;D:\Apps\Programming\Visual Studio\VC98\include;d:\C++\boost\boost_1_27_0
LIB=D:\Apps\Programming\Visual Studio\FrameworkSDK\Lib\;D:\Apps\Programming\Visual Studio\VC98\mfc\lib;D:\Apps\Programming\Visual Studio\VC98\lib
LM_LICENSE_FILE=d:\apps\programming\MwCW 6\license.dat
LOGONSERVER=\\ATALANTA
MSDevDir=D:\Apps\Programming\Visual Studio\Common\MSDev98
MwCIncludes=d:\apps\programming\MwCW 6\MSL\MSL_C++\MSL_Common\Include;d:\apps\programming\MwCW 6\MSL\MSL_C\MSL_Common\Include;d:\apps\programming\MwCW 6\MSL\MSL_C\MSL_win32\Include;d:\apps\programming\MwCW 6\win32-x86 Support\Headers\win32 SDK;d:\apps\programming\MwCW 6\MSL\MSL_C\MSL_X86;d:\C++\boost\boost_1_27_0
MwLibraries=+d:\apps\programming\MwCW 6\MSL;+d:\apps\programming\MwCW 6\win32-x86 Support\Libraries
MwLibraryFiles=GDI32.lib;user32.lib;kernel32.lib;ansicx86.lib;ansicppx86.lib;MwCRTL.lib
NUMBER_OF_PROCESSORS=1
OS=Windows_NT
os2LibPath=C:\WINNT\system32\os2\dll;
Path=d:\netware\perl\bin;C:\WINNT\system32;C:\WINNT;C:\WINNT\System32\wbem;C:\PROGRAM FILES\THINKPAD\UTILITIES;D:\Netware\Borland 5.5\Bin;C:\Program Files\Microsoft SQL Server\80\Tools\Binn\;d:\apps\programming\MwCW 6\Bin;d:\apps\programming\MwCW 6\Other Metrowerks Tools\Command Line Tools;D:\Apps\Programming\Visual Studio\Common\Tools\WinNT;D:\Apps\Programming\Visual Studio\Common\MSDev98\Bin;D:\Apps\Programming\Visual Studio\Common\Tools;D:\Apps\Programming\Visual Studio\VC98\bin;D:\Apps\Programming\Comeau_C++\bin;D:\Netware\g++\Bin;D:\Netware\Emacs\GnuServ;D:\Netware\Emacs\emacs-20.7\bin;D:\Bin
PATHEXT=.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH
PROCESSOR_ARCHITECTURE=x86
PROCESSOR_IDENTIFIER=x86 Family 6 Model 8 Stepping 10, GenuineIntel
PROCESSOR_LEVEL=6
PROCESSOR_REVISION=080a
ProgramFiles=C:\Program Files
PROMPT=$P$G
SystemDrive=C:
SystemRoot=C:\WINNT
TEMP=C:\WINNT\TEMP
TMP=C:\WINNT\TEMP
USERDOMAIN=ATALANTA
USERNAME=Administrator
USERPROFILE=C:\Documents and Settings\Administrator
VSCOMNTTOOLS="D:\Apps\Programming\Visual Studio\Common7\Tools\"
windir=C:\WINNT
```

# Keyholes Everywhere

Here is **Microsoft**'s Windows 2000's interface for editing it:



# Keyholes Everywhere

From **Crucial Technology**'s web site:

**Expert Online - Microsoft Internet Explorer**

**Expert Online**

Type your question below:

I could add a 512MB module to a system currently holding two 128MB modules. Is that a correct assumption?

**Submit** **Exit**

**Silvia**>Yes or PC133, either would work in the system or mixed speeds together in the system.  
**Scott**>This is PC-100 memory, right?  
**Silvia**>There is the page that you would want to order from.  
**Silvia**>http://www.crucial.com/store/listparts.asp?Mfr%2BProductline=%2BSupermicro&model=UPER+P6SBA&x=9&y=14  
**Scott**>I need to confirm the type of memory I need for my system. It was built locally. The motherboard is a Supermicro P6SBA.  
**Silvia**>Hello Scott. How can I help you?

**Memory upgrades from Crucial.com - Attributes for the SUPER P6SBA Motherboard - Microsoft Internet Explorer**

File Edit View Favorites Tools Help

Links Google Deja Dictionary German Dictionary STL G Yahoo!

Address http://www.crucial.com/store/listparts.asp?model=UPER+P6SBA&DetailMB=Y

**crucial TECHNOLOGY** A Division of Micron

**The Memory Experts™**

store/home company library help log in

International Customers | Order Status | FAQ | Shopping Cart | Contacts | Site Map

**Motherboard Specifications:**  
**SUPER P6SBA**

- Chipset: Intel 440BX
- Accepts PC133 SDRAM: Y
- Accepts SDRAM 100MHZ: Y
- Accepts SDRAM 66MHZ: N.A
- Accepts Registered SDRAM: Y
- Accepts EDO: Y
- Accepts Fast Page Mode: N
- Max EDO/FPM: N.A
- Accepts DDR: N.A
- Accepts ECC: Y
- Accepts RDRAM (Rambus):
- Accepts Parity: N
- DIMM Socket Count: 3
- Sockets per DIMM Bank: 1
- 72-pin SIMM Socket Count: N.A
- Sockets per 72-pin SIMM Bank: N.A
- 30-pin SIMM Socket Count: N.A
- Sockets per 30-pin SIMM Bank: N.A
- Buffering: Unbuffered
- Max Unbuffered SDRAM: 384 MB

**Shipping Rates**

FedEx 2nd Day ..... **FREE**  
Overnight (arrives 4:30 pm) .... \$11.50  
All domestic rates ..... [click here](#)  
All international rates ..... [click here](#)

**Need Help?**  
[Currency Converter](#)  
[Explanation of Memory Terms](#)

**Microsoft Internet Explorer**

Question should not exceed 255 characters.

**168-pin DIMM (picture)**

Module Size	Price (ea.)	V	Buy	Part Details
256MB	\$62.99	\$56.69	<input type="checkbox"/> Buy	CT32M72S4R8E SDRAM, PC100 • CL=2 • Registered • ECC • 8ns • 3.3V • 32Meg x 72
128MB	\$25.99	\$23.39	<input type="checkbox"/> Buy	CT16M64S4D75 SDRAM, PC133 • CL=3 • Unbuffered • Non-parity • 7.5ns • 3.3V • 16Meg x 64
128MB	\$25.99	\$23.39	<input type="checkbox"/> Buy	CT16M64S4D8E SDRAM, PC100 • CL=2 • Unbuffered • Non-parity • 8ns • 3.3V • 16Meg x 64
128MB	\$29.99	\$26.99	<input type="checkbox"/> Buy	CT16M72S4D75 SDRAM, PC133 • CL=3 • Unbuffered • ECC • 7.5ns • 3.3V • 16Meg x 72
128MB	\$29.99	\$26.99	<input type="checkbox"/> Buy	CT16M72S4D8E SDRAM, PC100 • CL=2 • Unbuffered • ECC • 8ns • 3.3V • 16Meg x 72
128MB	\$30.99	\$27.89	<input type="checkbox"/> Buy	CT16M64S4D7E SDRAM, PC133 • CL=2 • Unbuffered • Non-

# Keyholes Everywhere

From HP's web site:

The image shows a screenshot of an HP e-mail support form in a Microsoft Internet Explorer browser window. The browser's address bar shows the URL: `http://sbwin334.external.hp.com/fd2/email_form.cfm?countrycode=US&langcode=en&sn=hpdeskjet919035`. The form is titled "e-mail form" and contains several fields and a large text area. Annotations with keyhole icons point to various parts of the form:

- A keyhole icon points to the top of the form, with a callout box containing the text: "please provide the exact problem description and any other information that can help hp assist you."
- A keyhole icon points to the "what operating system do you use?" dropdown menu.
- A keyhole icon points to the "if 'other' please specify" text input field.
- A keyhole icon points to the "how is the product connected to your computer?" dropdown menu.
- A keyhole icon points to the "if 'other' please specify" text input field.
- A keyhole icon points to the "if there is an error message please specify" text input field.
- A keyhole icon points to the large text area, with a callout box containing the text: "This is the total amount of text that can be typed into a window of this size. Do you think it is big enough?"
- A keyhole icon points to the "first name" text input field.
- A keyhole icon points to the "last name" text input field.
- A keyhole icon points to the "e-mail address" text input field.
- A keyhole icon points to the "phone number" text input field.
- A keyhole icon points to the "country/region" dropdown menu, with a callout box containing a list of countries: Saudi Arabia, Senegal, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, and South Georgia.

The form includes a "continue" button at the bottom.



# Beyond Inconvenience

What happens when the log exceeds 65.535" in width?



“It was a very serious bug. It really could have killed someone.”

# Beyond Inconvenience

Fixed-size buffers + programmer incompetence or oversight = Hackers' Delight.

- Code Red and Code Red II worms

A quick Google search yields reported buffer overrun vulnerabilities all over the place:

- **gzip** under **Linux**
- **xdat** under **AIX**
- **count.cgi** everywhere
- MIT's **Kerberos**
- SGI **df**, **pset**, and **eject** under **IRIX**
- HP's **Openview Network Node Manager Alarm Service**
- Microsoft **Clip Art Gallery**
- **Microsoft Index Server 2.0** under **Windows NT**.
- **rpc.espd** daemon under **IRIX**
- **xterm** under **OpenBSD**
- **statd** under **Unix**
- **talkd** under **HPUX**
- **NTP** under **NetBSD**
- **AOL Instant Messenger** under **Windows**
- Microsoft **Windows Media player**
- Microsoft **HyperTerminal**
- Microsoft **SQL Server**
- Microsoft **Internet Explorer** under **MacOS**
- Microsoft **IIS**
- TalentSoft's **Web+**
- CDE's **dtspcd** daemon under **Unix**
- **login** under **System-V-derived Unix**
- Microsoft's **C Runtime Library**
- Apple's **sudo** under **MacOS**



# Beyond Inconvenience

The stakes can be high...

- March 1979:  
TMI-2 comes  
within 30  
minutes of  
total  
meltdown
- Contributing  
factor:  
A steam  
temperature  
readout is  
programmed  
**never to  
display  
values over  
280° F**



# Topics Revisited

## What do I mean by “keyholes?”

- Primarily *gratuitous* restrictions on what a user can see or express.
  - ▢ Not all restrictions are gratuitous.
- Often:
  - ▢ Use of a constant where a variable would be better.
  - ▢ Imposition of a limit where none is warranted.
- Missing features are typically *not* due to keyholes:
  - ▢ Keyholes generally keep you from seeing everything at once.
  - ▢ Missing features are not visible at all.
- Not all usability problems are due to keyholes.
- Not all keyholes lead to what are usually considered “usability issues.”

# Topics Revisited

## Why are keyholes worth caring about?

- They typically degrade a system's usability.
  - ▢▢▢▢➔ Users can't see what they want to see.
  - ▢▢▢▢➔ Users can't express what they want to express.
  - ▢▢▢▢➔ The system offers inconsistent behavior.
- They often make systems brittle in the face of change:
  - ▢▢▢▢➔ Constants that are “obviously appropriate” become inappropriate (e.g., PDA meets SXGA)
  - ▢▢▢▢➔ Limits that are “obviously big enough” become too small (e.g., Warning C4786)
- They can lead to serious security and safety vulnerabilities.

# What You Can Do

## Remember:

- Even if you eat it yourself, dog food is still dog food.
  - Have you seen what dogs eat?



## Measure:

- For one full day, count the number of friction-inducing keyholes you encounter.
- Calculate how many times you are interrupted by the need to work around needless keyholes.

# What You Can Do

## Fundamental: Avoid imposing gratuitous restrictions.

- As much as possible, determine things dynamically instead of statically:
  - ▢ Window sizes
  - ▢ Layout of window content
  - ▢ Field and buffer sizes
  - ▢ Etc.

## General practices:

- Reject components (especially GUI components) that impose keyholes.
- Before putting something somewhere, make sure it will fit!
- Don't try to shave bits.

## Web site designers:

- Follow the advice above.
- When in doubt, copy Amazon.
- When not in doubt, check Amazon anyway.

# But, But...

But programming with keyholes is faster and easier than programming without them:

- **Often false for GUIs.** Standard components/techniques offer better behavior:
  - ➡ Fixed-width web pages are easily eliminated (cf. Amazon)
  - ➡ Ditto fixed-size windows (cf. most Windows apps)
  - ➡ Ditto windows with a maximum size.
  - ➡ Ditto fixed-width edit controls (cf. Windows search)
  - ➡ Ditto lying fixed-width edit controls.
- **Also often false for invisible keyholes:**
  - ➡ Use of unsigned or 64-bit ints typically trivial.
  - ➡ Use of variable-sized fields typically trivial.
  - ➡ Use of unrestricted value domains typically *easier* (when it makes sense).
- **Even when true, a lousy argument:**
  - ➡ Write non-keyhole components once, then use them all over.
  - ➡ You have to write some infrastructure anyway.

But everybody uses keyholes:

- **Listen to your mother:**
  - ➡ “If everybody jumped off a cliff, would you jump, too?”



# More on Keyholes

- *The Keyhole Problem* Web Site, <http://www.aristeia.com/TKP/>.
  - Draft chapters of the book I'm working on.
  - Information on a mailing list on keyholes.

# Thanks for the Gratuitous Frustration to

About 2/3rds of the World's Web Sites

Microsoft

Adobe

Dell

Real Networks

Apple

WinZip Computing

SonicBox

Symantec

Adaptec

Naviscope

Rifco

And all the other Keyhole-Happy Software Vendors

# Please Note

Scott Meyers offers consulting services in all aspects of the design and implementation of software systems. For details, visit his web site:

<http://www.aristeia.com/>

Scott also offers a mailing list to keep you up to date on his professional publications and activities. Read about the mailing list at:

<http://www.aristeia.com/MailingList/>