Visible Keyholes
(GUI Components)

The Fixed-Width Web Page keyhole
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 Fixed-Width Web Page Keyhole

Dice’s web site is typical:

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 **Vertical ListBox/ComboBox Keyhole**

From BooksAMillion’s web site:

From Adobe’s FrameMaker 6:
The Vertical ListBox/ComboBox Keyhole

From Microsoft’s Visual Studio .NET:

```csharp
public DataCollector(string URIorURIFileName) {
    ArrayList URIs = getURIs(URIorURIFileName);
    if (URIs == 0) {
        Console.WriteLine("URI File is empty.");
        return;
    }
    int probes = new TimeSpan(TimeSpan.TicksPerHour); // Time probe for each URI
    for (int i = 0; i < URIs.Count; i++) {
        if (URIs[i] == null) {
            Console.WriteLine("Unable to access ", URIorURIFileName, i);
            continue;
        }
        try {
            WebRequest request = WebRequest.Create(URIorURIFileName);
            WebResponse response = request.GetResponse();
            items.Add(new ItemInfo(response.GetResponseStream(), DateTime.Now));
        }
        catch (Exception ex) {
            Console.WriteLine("Unable to access ", URIorURIFileName, i);
        }
    }
    finally {
        if (response != null) response.Close();
    }
}
```

It Doesn’t Have to be This Way

![Google Image Search](http://www.google.com)

```python
# A more readable version
for URI in URIs:
    if URI is None:
        continue
    try:
        response = WebRequest.Create(URI).GetResponse()
        items.add(ItemInfo(response.GetResponseStream(), DateTime.Now))
    except Exception as ex:
        print(f"Unable to access {URI}")
```
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:

![Image of Apple’s QuickTime 5 installer]

The Fixed Size Window Keyhole

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

![Image of WinZip Computing’s WinZip 8 help window]
The Fixed Size Window Keyhole

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

![Ameritrade's web site](image1)

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

![Photo Imaging News web site](image2)
The Fixed Size Window Keyhole

An unusual specimen from McCarthy Technologies’ web site:

![Image of a fixed size window keyhole from McCarthy Technologies' 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.

![Image of a maximum size window keyhole from Adobe Acrobat 4 documentation]
The **Fixed Size Dialog Keyhole**

From **Sonicbox's iM Tuner**:

![Screenshot of Sonicbox's iM Tuner](image1)

The **Fixed Size Dialog Keyhole**

From **Microsoft's Visual Studio 6**:

![Screenshot of Microsoft's Visual Studio 6 Options settings](image2)
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’s web site (account setup):

From OneSuite.com’s web site (account maintenance):

The Lying Fixed Width Edit Control Keyhole

From Marriott’s web site:
The Lying Fixed Width Edit Control Keyhole

From Symantec’s Winfax Pro 10:

Invisible Keyholes

The Too Few Bits keyhole.
The Unnecessarily Signed Int keyhole.
The Restricted Field Size keyhole.
The Restricted Domain keyhole.

Important: Invisible ≠ 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
```

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:

[Image of a dialog box showing an error message: "Password must not contain spaces."]

The Restricted Domain Keyhole

From 1800flowers.com’s web site:

[Image of a card with options to enter a card message, select a greeting, type a message, and a signature.]
Keyholes by Induction

If 1 is good, n must be better.

Keyholes Everywhere

Here’s my environment (PATH is highlighted):
Keyholes Everywhere

Here is Microsoft’s Windows 2000’s interface for editing it:

From Crucial Technology’s web site:
Keyholes Everywhere

From HP’s web site:

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

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
What You Can Do

Get a Feel for the Ubiquity of the Problem:

- 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.

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.
- When counting things, use unsigned integers.

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:

- **Typically 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 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?”

Thanks for the Gratuitous Frustration to

About 2/3rds of the World’s Web Sites

Microsoft
Adobe
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:

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