

ABOUT FACE

THE ESSENTIALS OF
USER INTERFACE DESIGN



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"Father of Visual Basic"
Microsoft Windows Pioneer Award Honoree

Foreword by Andrew Singer

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About

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cursor makes as it merely passes over something on the screen **free cursor hinting**. Once the captive phase has begun, I call changes to the cursor **captive cursor hinting**.

Microsoft Word uses the clever free cursor hint of reversing the angle of the arrow when the cursor is to the left of text to indicate that selection will be line-by-line or paragraph-by-paragraph instead of character-by-character as it normally is within the text itself. Many other programs use a hand-shaped cursor to indicate that the document itself, rather than the information in it, is draggable.

Microsoft is using captive cursor hinting more and more as they discover its usefulness. Dragging-and-dropping text in Word or cells in Excel are accompanied by cursor changes indicating precisely what the action is and whether the objects are being moved or copied. In Windows 95, when you drag a file in the Explorer, you actually drag the text of the name of the file from one place to another.

When something is dragged, the cursor must drag either the thing or some simulacrum of that thing. In a drawing program, for example, when you drag a complex visual element from one position to another, it may be too difficult for the program to actually drag the image (due to the computer's performance limitations), so it often just drags an outline of the object. If you are holding down the CTRL key during the drag to drag away a copy of the object instead of the object itself, the cursor may change from an arrow to an arrow with a little plus sign over it to indicate that the operation is a copy rather than a move. This is a clear example of captive cursor hinting.

Drag-and-Drop

Of all the direct-manipulation idioms of the GUI, nothing defines it more than the operation, clicking and holding the button on some object across the screen. Surprisingly, it isn't used as widely as we imagine, and it could have lived up to its full potential.

Whither drag-and-drop?

Any mouse action is very efficient because it has a command component in a single user action: a location and a specific function. Drag-and-drop is efficient because, in a single, smooth action, it specifies a geographical location. Although drag-and-drop is immediately as a cornerstone of the modern GUI, it is remarkable that drag-and-drop is found so rarely in programs that specialize in drawing and editing. Thankfully, this seems to be changing, as more programs embrace this idiom.

There are several variations of drag-and-drop, and they are only a subset of the many forms of direct manipulation. The characteristics of drag-and-drop are fuzzy and difficult to define exactly. We might define it as “clicking on some object and moving it elsewhere,” although that is a pretty good description of repositioning, too. A more accurate description of drag-and-drop is “clicking on some object and moving it to imply a transformation.”

The Macintosh was the first successful system to offer drag-and-drop. A lot of expectations were raised with the Mac’s drag-and-drop that were never truly realized for two simple reasons:

1. Drag-and-drop wasn’t a system-wide facility, but rather an artifact of the Finder, a single program.
2. As a single-tasking computer, the concept of drag-and-drop between applications didn’t surface as an issue for many years.

To Apple’s credit, they described drag-and-drop in their first user interface standards guide. On the other side of the fence, Microsoft not only didn’t put drag-and-drop aids in their system, but it wasn’t described in their programmer documentation. Nor was it implemented in their Finder equivalent, the notoriously brain-dead MSDOS.EXE, the first Windows shell. The only drag-and-drop anywhere in Windows was in the simple paint utility distributed with the system. Yet again, Microsoft shipped an operating system—a standard-defining tool—but abdicated their responsibility for adequately defining collateral standards. I’m not ungrateful, as Windows was still by far the best thing around on the PC platform. Still, had Microsoft defined even some rudimentary standards, the drag-and-drop world would have evolved stronger and more rapidly.

It wasn’t until Windows 3.0 that any drag-and-drop outside of MSPAINT.EXE appeared. The new File Manager and Program Manager programs supported a rudimentary form of drag-and-drop. You could drag icons around in the Program Manager and files and directories around in the File Manager. Wonder of wonders, you could also drag an EXE file* from the File Manager into the Program Manager and create an icon, although few users knew this. This disappointing lack of design leadership has resulted in an industry-wide sluggishness to embrace drag-and-drop, much to our software’s detriment.

After ten years, though, Windows is finally getting a drag-and-drop standard. It is not strictly a part of Windows, but rather a part of the OLE 2.0

specification. To get a community of third-party technology, there is something even better than having a solid set of library routines that enable them to build applications without having to invent the tedious libraries have ever been made available in the Windows world. It is so large and frustratingly complex that there is no drag-and-drop standard will become either lost or based on a few implementations. This unfortunate bind will only be resolved if a vendor encapsulates the functionality of drag-and-drop into an easy-to-program package, then makes it available to developers.

I find it amusing that the Microsoft style guide describes drag-and-drop. It makes it sound like a simple and commonly known task. It describes how to put on your shoes in the most straightforward and easy way.

Dragging where?

Fundamentally, you can drag-and-drop something inside your program, or you can drag-and-drop something from your program into some other program. I call these **interior drag-and-drop** and **exterior drag-and-drop**, respectively.

Interior drag-and-drop can be made pretty simple from a coding point of view. Exterior drag-and-drop requires more sophisticated support because both programs are involved, and they must be implemented in concert. We’ll discuss the exterior variant after we get a look at the interior variant.

I classified repositioning as a direct-manipulation operation in the last chapter. Now we will discuss the remaining types of drag-and-drop. Primarily, there are two: master-and-target and target-and-target.

Master-and-target

When the user clicks on a discrete object and drags it to another object in order to perform a function, I call it **master-and-target**.

The object within which the dragging originates is the master object, which will be a window. If the target is a window, the master object is a window icon in a window.

is the window. When the user ultimately releases the mouse button, whatever was dragged is dropped on some **target object**.

The main purpose of the term “master-and-target” is to differentiate this operation from the kind of drag-and-drop operations we find in drawing and painting programs, where tools and graphical objects are dragged around on an open canvas. Master-and-target is a more function-oriented idiom, where manipulating logical objects represents some behind-the-scenes processes. The most familiar form of master-and-target drag-and-drop is rearranging icons in the Program Manager or in the Macintosh Finder.

Dragging data to functions

Instead of dragging a file or folder to another folder, you can drag it to a gizmo that represents a function. This idiom is arguably the most famous expression of direct manipulation because of the Macintosh’s familiar trashcan. Windows 95 copies this familiar idiom with its “recycle bin.” Someday, as we build software with better object-orientation, we’ll be able to drag-and-drop objects onto gizmos representing functions other than just delete. Imagine targets representing a cloner, an archiver, a file compressor, a faxer or a contents-indexer.

Notice that all of the idioms in the above paragraph involve exterior drag-and-drop, because the target objects are separate programs. Within a single program, the code knows what objects are draggable—usually one type—and any function gizmo that it gets dropped on will easily handle it. In an exterior drop, the master object can come from any program, and the target gizmo may well not have any direct knowledge of the originating program or the dropped object. The target must be able to handle the unknown object in some reasonable way without necessarily understanding what it is or what is in it. The Program Manager, for example, can do this because it knows that it will only be handed files. What would it do if it were handed a paragraph of dragged text from a word processor, for example? If it can’t handle the text, it isn’t truly exterior capable. To Microsoft’s credit, the Recycle Bin in Windows 95 can actually accept paragraphs of text dragged from Word or cells dragged from Excel. I have not yet been able to determine whether these are generic operations or just code specific to Microsoft applications.

To be truly exterior capable, an object must be able to accept a drop of anything from any other object, regardless of the originating program. At first, this

to be. Mostly, it’s a matter of defining interface. If a target object has to “drop” to the master object. The two objects then because it is unreasonable to expect every object program’s proprietary formats. If the master object offer the data in its internal format. Another Micro to decipher this format, but a Brand X product m get object politely demurs—not to the drop, but contents. Excel, the master, must then re-offer t generic formats: SYLK, CSV, ASCII. The target o SYLK or CSV, but by convention, it must accept mon denominator format on all platforms. Every minimally accept ASCII, simple bitmaps, pointe functions. Objects that hope to become success accept many more formats than that, but these t with everything. Even an audio file, for example, simple pointer to a disk file. I call exterior drag-a port this type of haggling over formats **negotiated**.

I call protocols like those in the Windows 3.x Manager, which don’t negotiate formats, **known**.

Dragging functions to data

Proper, negotiated, exterior drag-and-drop capabilities dropping functions onto data as well as dragging-ar tions. Defining the scope of such actions can be pr concrete data, but it can still be generally quite could click on the italic button on the toolbar and a spreadsheet. Clearly, the user’s intent in this acti that cell to italic. Part of the format negotiation in nize a function as a valid drop value. Conceptual between the function “delete” and the function “ita gram deletes its internal copy of the data and han other, the target program hands a copy of the data converts the text to italic and hands it back. Thi Excel’s window can be dragged onto text in Word know what to do with it. Or, more meaningfully, dragged onto the text in Microsoft Word. Once the

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