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## **7.5 Declaration in Apple vs. Microsoft/Hewlett-Packard**

**Ben Shneiderman**

I, Ben Shneiderman, declare as follows:

1. I am a Professor in the Department of Computer Science and Head of the Human-Computer Interaction Laboratory at the University of Maryland at College Park. My background and qualifications are detailed in my declaration of March 30, 1990 that previously was filed in this action.

2. I am making this supplemental declaration to provide further examples of design alternatives referred to in my prior declarations and to further identify the arrangement that is unique to Apple and that makes the overall appearance of the Lisa/Macintosh interface widely recognizable.

3. *The Macintosh "Look and Feel."* To understand the distinctive appearance of the Macintosh interface, known as the Macintosh "look and feel" or "the Macintosh look", one needs to consider not only the individual elements that make up the appearance of the interface but also the way those elements are arranged and interact with one another to create the consistent and distinctive Macintosh inter-

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*United States District Court, Northern District of Calif., Jack E. Brown, Lois W. Abraham, Chris R. Ottenweller, Martin L. Lagod, Brown & Bain; Bernard Petrie, Attorneys for Plaintiff, Apple Computer, Inc.; APPLE COMPUTER, INC., Plaintiff, vs. MICROSOFT CORP. & HEWLETT-PACKARD CO., Defendants, April 1992.*

face. One way to describe that look and feel is by reference to the following main features of the Macintosh interface. The alphanumeric designations appearing in brackets correspond to items from Apple's list of similarities.

3a. *The "desktop."* The desktop in Macintosh provides a home base from which users can enter, exit, and manage their computer environment [Supplemental List, A.1.a, A.1.b, items in square brackets refer to the list of user interface elements in the case.] Each time a user enters the Macintosh environment he or she is immediately presented with a muted grey desktop and a collection of icons lying on that desktop (these icons may represent applications, folder directories, or documents and are identified by titles centered beneath each icon) (G1, G5, G6). To interact with the Macintosh a user opens one or more of these icons into its corresponding window. The resulting screen appearance (a representative screen is shown in Figure 1) contains many displays that are characteristic of the Macintosh:

3a(1) Unlike any earlier system, the Macintosh uses and displays icons in such a way that the typical user will not only see icons lying on the desktop [G5] but will also see icons inside of open windows [I4], and can open those icons into new windows [A1, A.1.a]. Macintosh and Lisa were the first user interfaces to

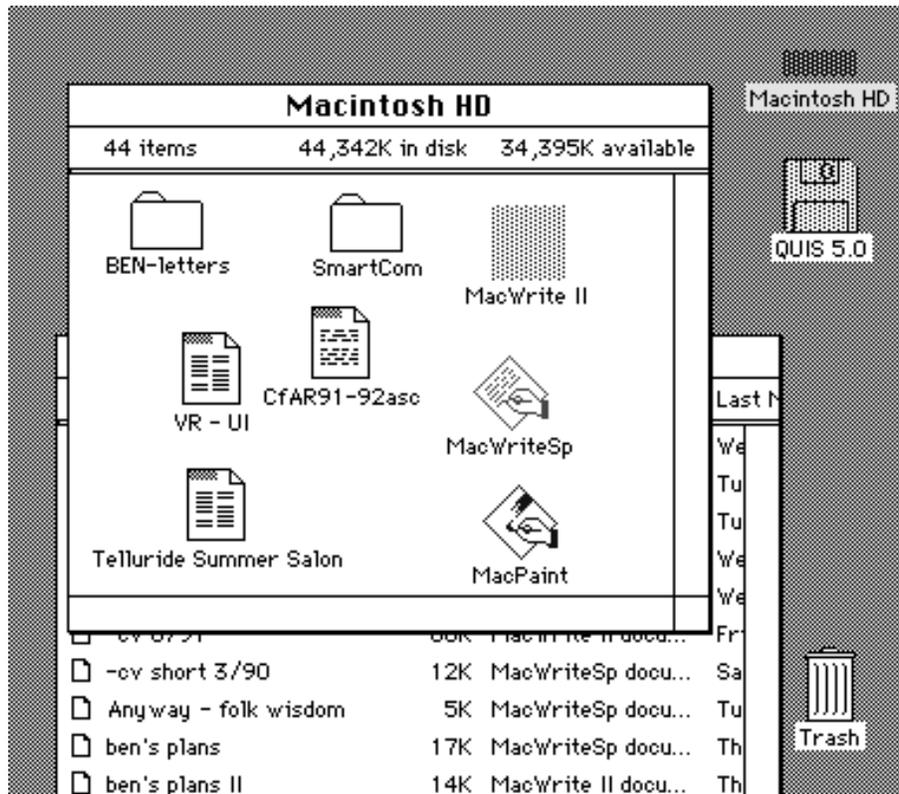


Figure 1.

combine the appearance of overlapping windows with the appearance of graphical icons lying on a desktop. The sequence of displays (opening an icon into a window that contains more icons, and then opening one or more of those icons into windows that overlap on the screen) and the resulting appearance shown in Figure 1 was not possible on any other interface that existed at the time the Lisa and Macintosh were introduced.

3a(2) Opening a window on the Macintosh results in “zooming rectangles,” an effect conceived by Larry Tesler for the Lisa that was unique to Apple and produces a distinctive and identifiable Apple look [G28, G29].

3a(3) The top-most window on the desktop is designated as the active window and displays a filled in title bar and scroll bars [B1]. Macintosh users quickly learn that filling-in or decorating a feature is associated with changing that item from inactive to active. The Macintosh reinforces this impression by displaying an inactive window with the details of its title bar and scroll bars “whited out.”

3a(4) Apple’s designers chose to always place the active window on top of all other open windows before the user can interact with that window [B2]. Although in some respects this Macintosh design diverges from a desktop metaphor, Windows 2.03 and 3.0 mimic the top-most active style of the Macintosh.

3b. *Display of borders.* The Macintosh design displays the controls needed to manage overlapping windows in each window’s border. Users can move, scroll, size and close a window by a combination of clicking or clicking and dragging in designated parts of each window’s frame. For example, windows are moved using the title bar located at the top of each window [D1], windows are closed with a close box that is always found in the upper left corner [A5], windows are sized by dragging from the grow box located in the lower right corner [C1], and windows are scrolled using either one of the scroll bars positioned on the right and bottom of each window [E2 - E5].

3c. *Moving animation.* The Macintosh provides a consistent and recognizable set of visual displays associated with moving any object in the environment. To show movement, Macintosh uses an outline of the object and the appearance of that outline being dragged by the mouse cursor. This series of images is applied to all moving actions in the Macintosh and is reinforced every time a user moves a window [D1], moves an icon [G4, G20, G21], moves the elevator box located in each scroll bar [E8], or moves the edge of a window to resize it [C1]. Repeated and consistent use of these displays contributes to the cohesive look and feel of the Macintosh user interface.

3c(1) In the appearance of window moving, Macintosh again displays some arbitrary design choices. First, to move a window the mouse cursor must be positioned in the window’s title bar [D1]. Several alternatives could have been implemented including a move button located on the window or, as in any other system, allowing the user to click and drag anywhere in the window. Second, windows in the Macintosh may be moved anywhere on the desktop and even partially off of the desktop [A8]. The ability to move windows partly off screen

was not part of Smalltalk-76, the Xerox Star or Windows 1.0. Some systems permit windows to be moved partially off screen in all directions. Some systems permit windows to be moved completely off screen (Star, SunView, Interslip D, Viewpoint, Metaphor). However, Macintosh Windows may not be moved off the top of the screen. There is no reason why Apple's designers could not have provided such a facility, but they did not. (With respect to both of these aspects of window moving, Windows 2.03 was designed with the same capabilities and limitations as the Macintosh).

3d. *The menu bar.* Macintosh presents menu choices in a dedicated horizontal band above the desktop [F1]. The arrangement of menu choices always begins with the system menu followed by File and Edit. The first letter of each word is capitalized. Macintosh users quickly become familiar and comfortable with this display and arrangement of menu items.

3e. *Text.* Macintosh uses a proportionally spaced font for all text that appears in the environment [A.l.d]. The use of proportionally-spaced text in all menu items, title bars, icon names and text directories gives the Macintosh a consistent and distinctive appearance.

Of the numerous aspects of the appearance of the Macintosh described above, no single one fully defines the look and feel of the Macintosh. However, each represents an attribute of the Macintosh environment that Apple's designers portrayed in an imaginative and distinctive fashion. Through exposure to the particular displays selected for the Macintosh, users develop expectations about how the interface should look and act under different circumstances. Those expectations come to characterize the look and feel of the Macintosh to its users.

4. Some of the many alternatives that Microsoft and Hewlett-Packard might have chosen in refining Windows 1.0 to generate Windows 2.03, Windows 3.0, and NewWave.

In my judgment the substantial similarity of Windows 2.03 and Windows 3.0 to the Macintosh is a result of the designer's choices and not because of necessity. Many design alternatives exist that would provide equivalent function. Also there are many ways to have improved on the function of the Macintosh and to have created a visually distinct appearance. Illustratively:

4a. *Window movement.* Movement can be displayed in a wide variety of ways. Where it is possible to move the entire window (Apollo Domain, DesqView, NeXT) this seems preferable, but when not possible a grid (X-Windows), a window corner (Smalltalk), or an XOR'd gray shadow (Tektronix Smalltalk) are just a few of the possibilities open to developers. Movement by dragging on the title bar is also a distinctive feature of the Macintosh that was copied by designers of later systems.

4b. *Opening/closing animation.* There are many ways to show the animation of opening and closing an icon besides the zooming rectangles of the Macintosh, including shooting lines, zooming grids, and an expanding gray or black shadow.

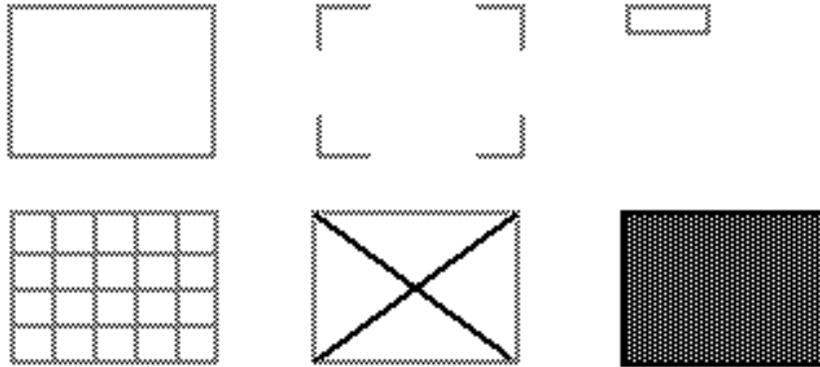


Figure 2.

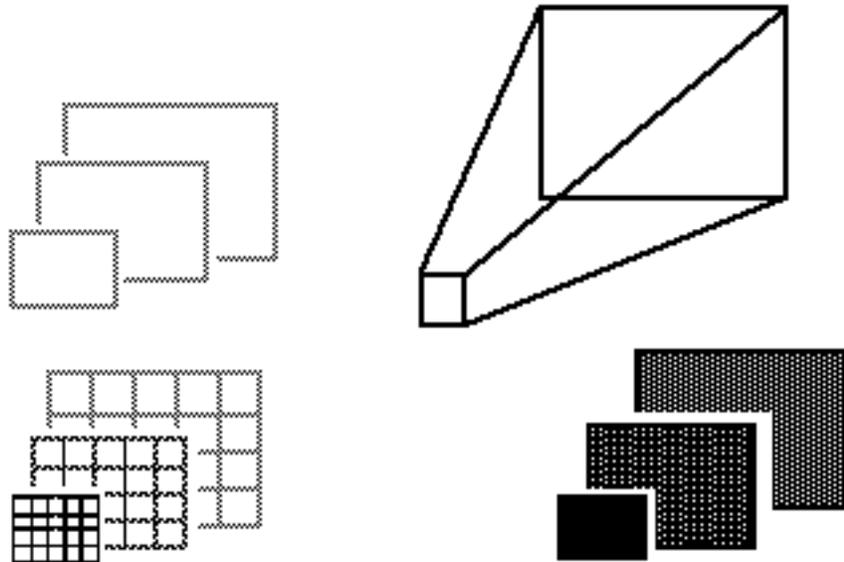


Figure 3.

Figure 3 shows variations on the theme originated by Apple. Beyond this theme there is a vast number of possible ways to portray the relationship between an icon and its window. The icon could dissolve in place and the window appear in the new location; the icon could dissolve into small dots with the window emerging up from the dots; or the window could be a larger representation of the icon itself (for example, the icon of a binder or folder becomes larger and flips open).

4c. *Icon title placement and labelling* [G6]. Icon titles can be placed in a variety of places, and labelling done in a variety of ways other than the way chosen by Apple as part of the primary Macintosh style (title centered under the icon).

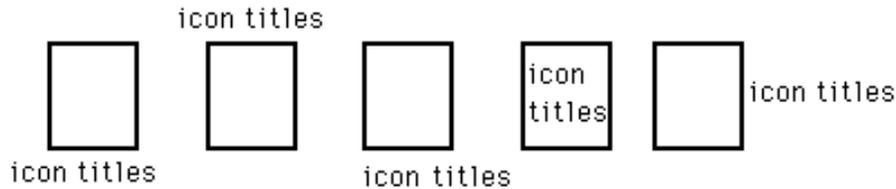


Figure 4.

Alternatives include centered above (as it sometimes appears in Windows 1.0), left justified under (as in NewWave 3.0), inside the icon (as in Star), and to the right (as in many systems, especially when smaller icons are used). The defendants also could have included other information in the title or in a pull down menu from the icon such as last date of modification, application used and date. Figure 4 shows these five basic variations on the position for an icons title. These are not the only possibilities but are nonetheless quite distinctive as alternatives.

Many graphical user interfaces restrict the placement of ions to certain grid locations on the screen (Star, Viewpoint, Windows 1.0, Atari GEM), to certain regions of the screen (GeoWorks, Windows 1.0, Cedar), or even to certain windows on the screen (DECWindows, PERQ).

4d. *Window border.* Window titles also can appear in many different places as shown below in Figure 5. Each alternative in figure 5 is taken from an existing system.

4e. *Window resizing.* Window sizing animation can be shown by directly shrinking the window, by showing an outline, by showing a gray or black area, by showing a grid (animations for resizing are similar to animations for window movement, as shown below in figure 2). Windows 2.03 and 3.0 use animation similar to the Macintosh, but the designers did add sizing controls all around the window. This change does not significantly alter the appearance of the window but it is one of the few places where an innovative addition was made.

4f. *Windows partially off screen.* Attractive options here include allowing windows to be fully off screen and enlarging the desktop to be very large so that only part of the desktop is visible at any one time. Rooms (Xerox PARC), Workspaces 9H-P VUE), and Oaks Desktop (SUN) implement this notion effectively, allowing users to move among collections of open windows. Layers of windows as in Piles-of-Tiles (GO PenPoint) also allow greater flexibility in managing multiple windows, or windows could automatically resize to a smaller window when they hit the side of the screen. Finally, defendants did not need to have windows that could appear partially off the screen at all (Star, SunView, Interslip D, Metaphor, Viewpoint, Smalltalk-76).

4g. *Top window active.* There are a variety of ways to show a window being made active, such as selecting from a menu or clicking on a control point on the window border. Some systems allow a non-top window to be active (SunView, OpenLook). Some systems allow every window to be active with keyboard input

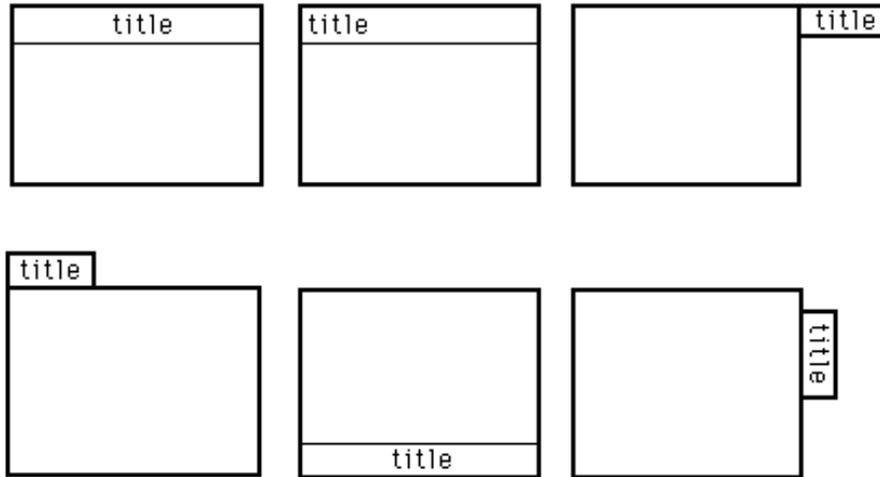


Figure 5.

being sent to the window which contains the mouse cursor. Some systems activate windows by selecting a command such as TOP or FRONT from a pop-up menu.

5. *Refinements of the "Macintosh Look and Feel"*. There are many other refinements that Microsoft and Hewlett-Packard could have made to the Macintosh look and feel that would have represented distinctive innovations and mitigated the mimicking of the Macintosh. For example, synchronized scrolling in which the scroll bar of one window might be linked to another scroll bar so that movement of one scroll bar would cause the other window to also scroll its contents as well. Another option for window closing would be the ability to close all the dependent windows at once. This could be applied to closing dialog, message, and help windows with a single action. Lines, shading, or decoration on the border might indicate families of windows with special marks for parents and children. Other possibilities are shown my recently published *Designing the User Interface: Strategies for Effective Human-Computer Interaction*, Second Edition (Addison-Wesley, 1992).

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