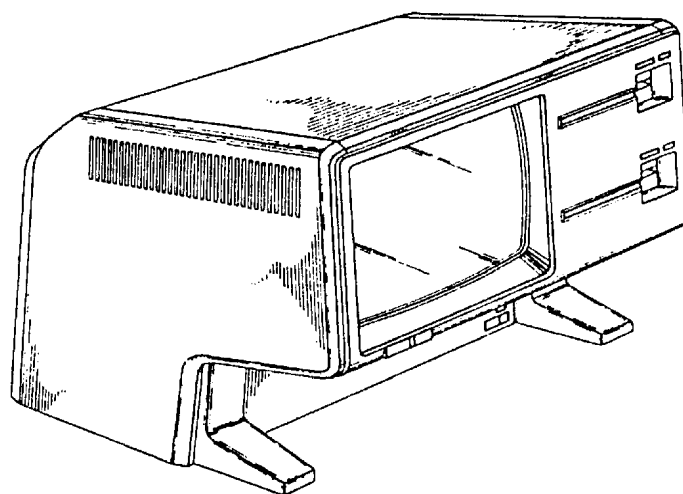


Apple Lisa Computer David Craig's GUI College Paper



This is a Texas A&M college paper that I wrote in 1987 for a technical writing class as part of my B.S. degree in Computing Science.

Scanned by David T. Craig and converted to a PDF document in September 1998.

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Apple Lisa Graphical Object-Oriented User Interface

*title should be
more precise*

Prepared for
Computing Science 481

By David T. Craig

Abstract

This report describes the user interface of Apple Computer's Lisa microcomputer system. By following a set of user interface design principles the Lisa system is easy to learn and remember because the basic operations are natural and intuitive.

October 1, 1987

*content
title
spelling/syntax*

INTRODUCTION

A computer user interface is defined as a "way for humans to interact with a computer" (Williams 1983, 36). A graphical object-oriented user interface is an interface that uses graphical images to represent computer concepts. Many people in the computer industry credit graphical user interfaces with "improving operator capabilities" (Krigman 1985, 56).

LISA SYSTEM DESCRIPTION

The Lisa is a single user, multitasking, desktop, microcomputer system manufactured by Apple Computer, Inc. that contains a screen, internal floppy disk drives, a detachable keyboard, and a screen pointing device called the "mouse" (Apple, Lisa 2 1983, E6). The mouse plays a central role in the Lisa user interface. This role will be discussed in detail in a later section. Figure 1 below shows a typical Lisa system. The small box-shaped object connected to the computer by a cable is the mouse.

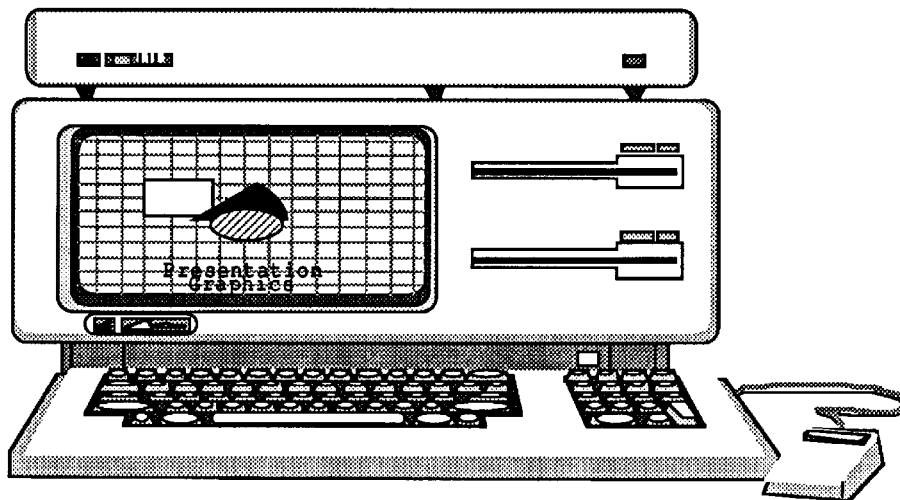


Figure 1 - The Lisa with her "mouse"

USER INTERFACE DESIGN PRINCIPLES

Several principles govern graphical object-oriented user interfaces for computer systems (Smith 1982, 250):

- Familiar user's conceptual model
- Seeing and pointing versus remembering and typing
- What you see is what you get
- Universal and consistent commands
- Simplicity
- Modeless interaction

The Lisa user interface follows these principles closely (Daniels 1984, 336).

Principle 1: FAMILIAR USER'S CONCEPTUAL MODEL

The user's conceptual model of a computer system is the set of ideas which enable the user to understand the system. To be useful this model should be familiar to the user. Apple Computer developed the Desktop Metaphor for their Lisa computer (Apple, Lisa User 1983, § 1-2). This metaphor relates physical objects to graphical objects on an electronic desktop (Apple, Lisa 2 1983, B7). For example, computer programs, documents, and physical hardware are represented by small images, called "icons", on the computer's display screen. Figure 2 below shows several icons representing various hardware components. The icon titled "Widget" represents a hard disk and the icon titled "JUNK" a floppy disk. The "Wastebasket" icon serves as a depository for deleted documents.



Figure 2 - Icons representing physical hardware components

Application programs are also represented by icons. Several appear in figure 3 below. These icons resemble the type of applications they perform. For example, the icon for LisaGraph, a data graphing program, contains an image resembling a

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line graph. LisaTerminal's icon contains two connected telephone poles which represent LisaTerminal's use of the telephone to transfer information from one computer to another.

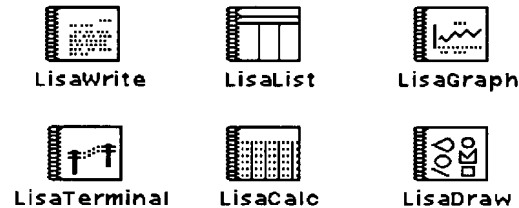


Figure 3 - Icons representing Lisa application programs

Lisa documents are displayed within rectangular regions called "windows". Figure 4 below shows a window for a document from LisaCalc, a spreadsheet program. Windows represent sheets of paper with textual or graphical data displayed within their interior. Since in most cases the images in a window are larger than the window's size a scrolling mechanism, utilizing the mouse, is built into each window. For the below window the regions on the right and bottom contain the scroll mechanism. ?

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LisaCalc Paper 09/29		
G Cells: A B		Value:
M Formula:		
	A	B
1	MONTH	Revenues
2	=====	=====
3	January	67
4	February	60
5	March	45
6	April	51
7	May	56
8	June	42
9	July	47
10	August	32
11	September	36
12	October	38
13	November	57
14	December	73

Figure 4 - Lisa window for a LisaCalc document

Principle 2: SEEING & POINTING VERSUS REMEMBERING AND TYPING

Documents, or in general any visual display objects including icons, are selected by pointing at them with a display pointer controlled by the mouse. A mouse is a small box about the size of a pack of cigarettes with a button on the top which a person's hand moves on a flat surface (Williams 1983, 36). Figure 5 below shows both a diagram of a mouse and a person's hand manipulating a mouse. Mouse movements move an arrow-shaped image, called the "pointer", on the screen. The button on the top is used to signal the computer to perform a command.

*why spend so much time
describing a mouse?
This paper should be directed
to knowledgeable computer-science
people.*

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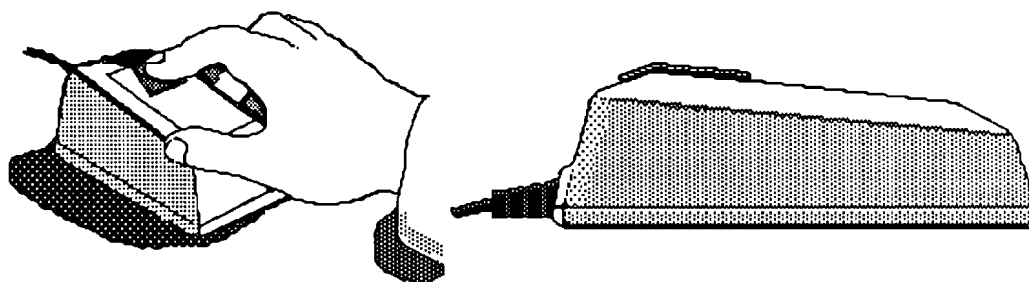


Figure 5 - Lisa mouse showing movement by a human hand and a mouse side view

The mouse eliminates the need to memorize complex computer commands. Instead the mouse pointer points to lists of commands in visual regions called "menus". Menus are the principle way the user tells an application program what to do (Apple, Lisa User 1983, § 3-1). Figure 6 below shows a LisaWrite menu, titled "Spelling", with the menu command 'Suggest Corrections' selected by the mouse arrow pointer.

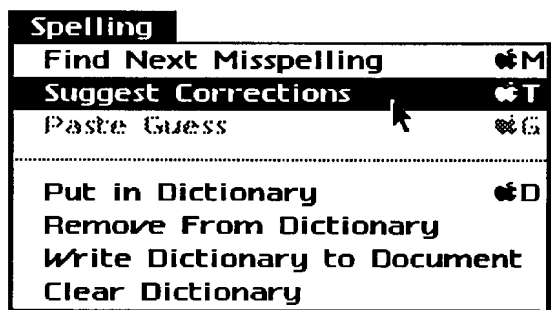


Figure 6 - Typical Apple Lisa menu

Menu titles occupy a region at the top of the screen called the "menu bar" and change when different applications are active. Moving the mouse pointer over a menu title and pressing the mouse button causes the menu commands to drop downward. Continued pressing of the mouse button and movement of the pointer over the dropped menu commands selects the command under the pointer. Releasing the mouse button activates the currently selected command.

The mouse eliminates much of the user's interaction with the keyboard. This results in simpler user operation since "most keyboards are confusing because they have too many buttons and inadequate feedback." (Krigman 1985, 58)

Principle 3: WHAT YOU SEE IS WHAT YOU GET

One of the most important principles of the Lisa user interface is the principle of "What you see is what you get" (Daniels 1984, 339). This means all information on the screen is seen exactly as viewed on a printed page. For example, in a word processing document, text consisting of different fonts and character sizes is displayed with those differences. The user can modify a document on the screen until it looks just right before printing it. Figure 7 below shows a pie chart that LisaGraph tool can display. When printed this pie chart will appear almost exactly on the paper as it is seen on the screen (note that differences in screen and printer resolutions can cause slight printing differences).

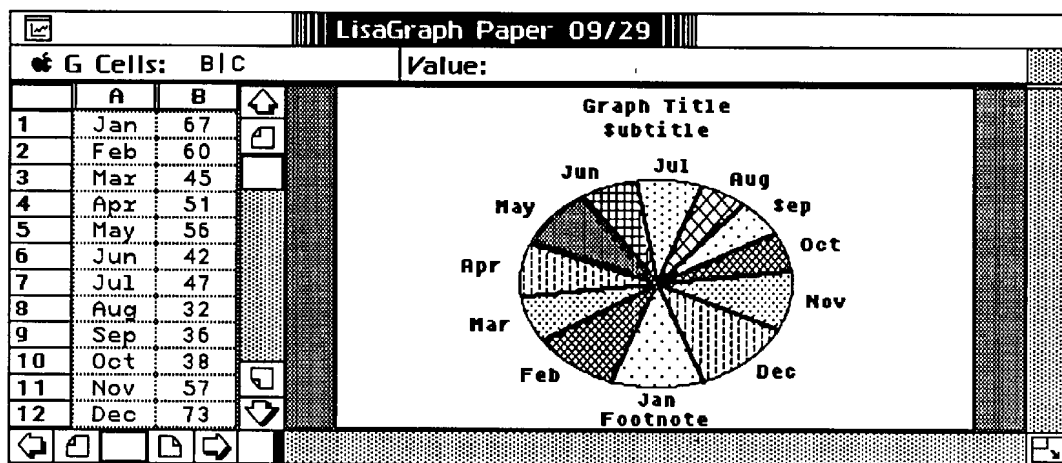


Figure 7 - LisaGraph window containing a pie chart

Principle 4: UNIVERSAL AND CONSISTENT COMMANDS

The principle of Universal and Consistent Commands says all computer commands act exactly the same way no matter where in the system the user issues them. With the Lisa, the user can at any time save to a disk or print the document she is working on because the "File/Print" menu is always present. Figure 8 below shows this menu.

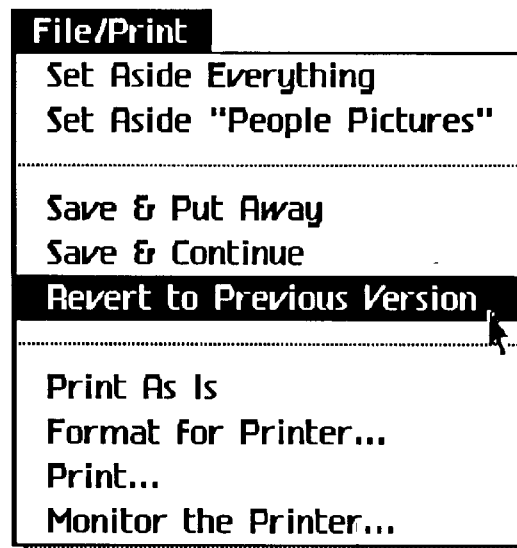


Figure 8 - Lisa "File/Print" menu

Principle 5: SIMPLICITY

The principle of Simplicity states that redundant methods should not exist. Having multiple ways to achieve one result increases the complexity of a system. When the Lisa requires an answer to a question she displays a dialog box containing the question and several buttons containing the possible answers (Apple, Lisa User 1983, § 7-1). Figure 9 below shows a sample dialog. To answer the question the user only has to point the mouse arrow at the appropriate dialog answer box, in this case

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either 'Cancel' or 'Erase', and press the mouse button. All questions are handled this way, so once the user understands how to use one dialog all future dialogs will be similar.

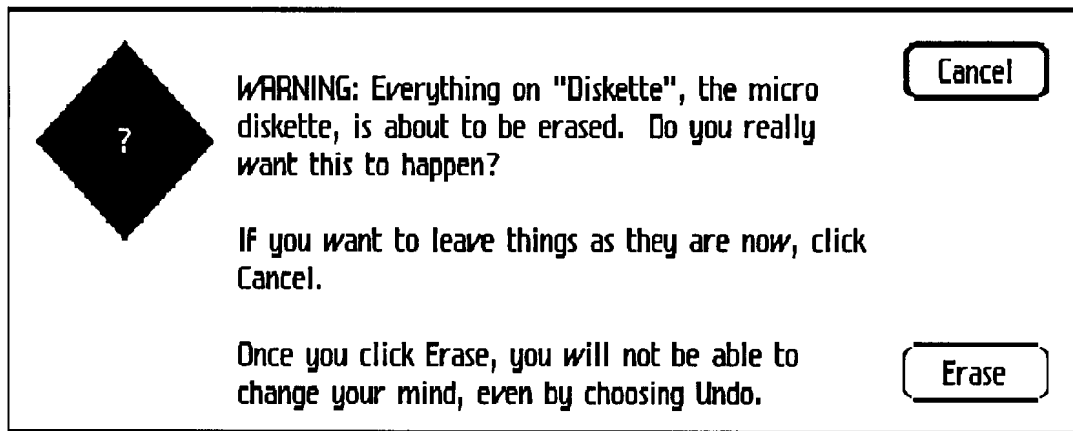


Figure 9 Lisa dialog example

Principle 6: MODELESS INTERACTION

The Modeless Interaction principle states that modes should not exist in the system.

A mode is defined as follows (Smith 1982, 276):

A mode of an interactive computer system is a state of the user interface that lasts for a period of time, is not associated with any particular object, and has no role other than to place an interpretation on the operator input.

The existence of modes isolates capabilities of the system from the user. For example, in most computer systems if the user types a report with a word processing program and wishes to delete a file, the user must quit the word processor and execute a program which allows file deletions. Without modes the user could delete a file without quitting the word processor. The Lisa, a modeless computer, allows the user to execute several programs simultaneously on the screen. To switch from one program to another involves pointing the mouse pointer in the desired program's window and pressing the mouse button. Figure 10 below shows a typical Apple Lisa

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screen containing two word processor documents, an illustrative graphics document, two disk file catalogs, the mouse arrow pointer accessing the command 'Suggest Corrections' in a menu titled 'Spelling', and a window titled 'Clock' showing the current date and time.

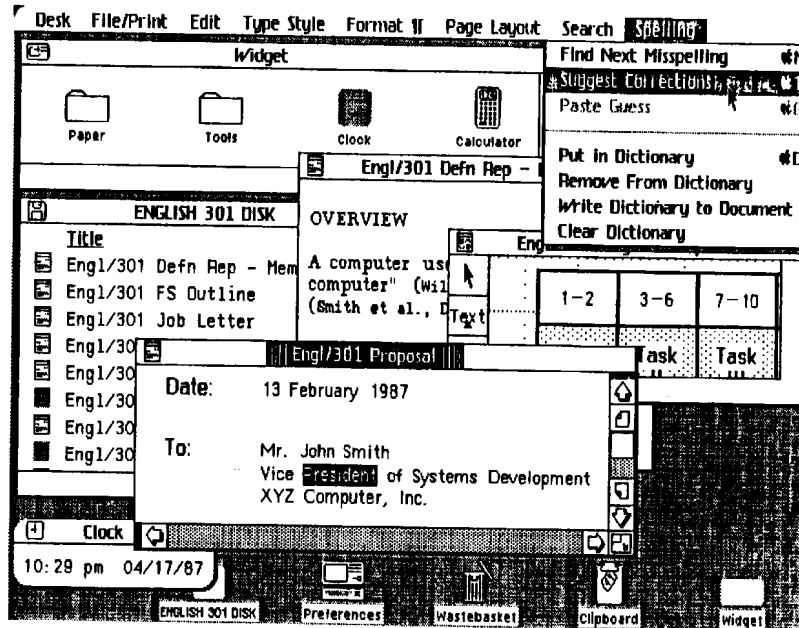


Figure 10 - Lisa screen showing modeless application interaction

CONCLUSION

The graphical object-oriented user interface of the Lisa computer results in a simple but powerful method for people to communicate with a computer. A combination of several design principles achieve this result:

- Familiar user's conceptual model
- Seeing and pointing versus remembering and typing
- What you see is what you get
- Universal and consistent commands
- Simplicity
- Modeless interaction

*paper is too short
(8-10 pages double-spaced excluding figures)
-5
content is not very technical*

REFERENCES

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- Apple Computer, Inc. 1983. Lisa 2 Owner's Guide. Apple Technical Documentation.
- Daniels, B. 1984. The Architecture of the Lisa Personal Computer. Proceedings of the IEEE, Vol. 72, No. 3, March 331-341.
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- Smith, D. et al. 1982. Designing the Star User Interface. Byte April 242-45.
- Williams, G. 1983. The Lisa Computer System. Byte February 33-50.

Overhead Projections for the Oral Presentation

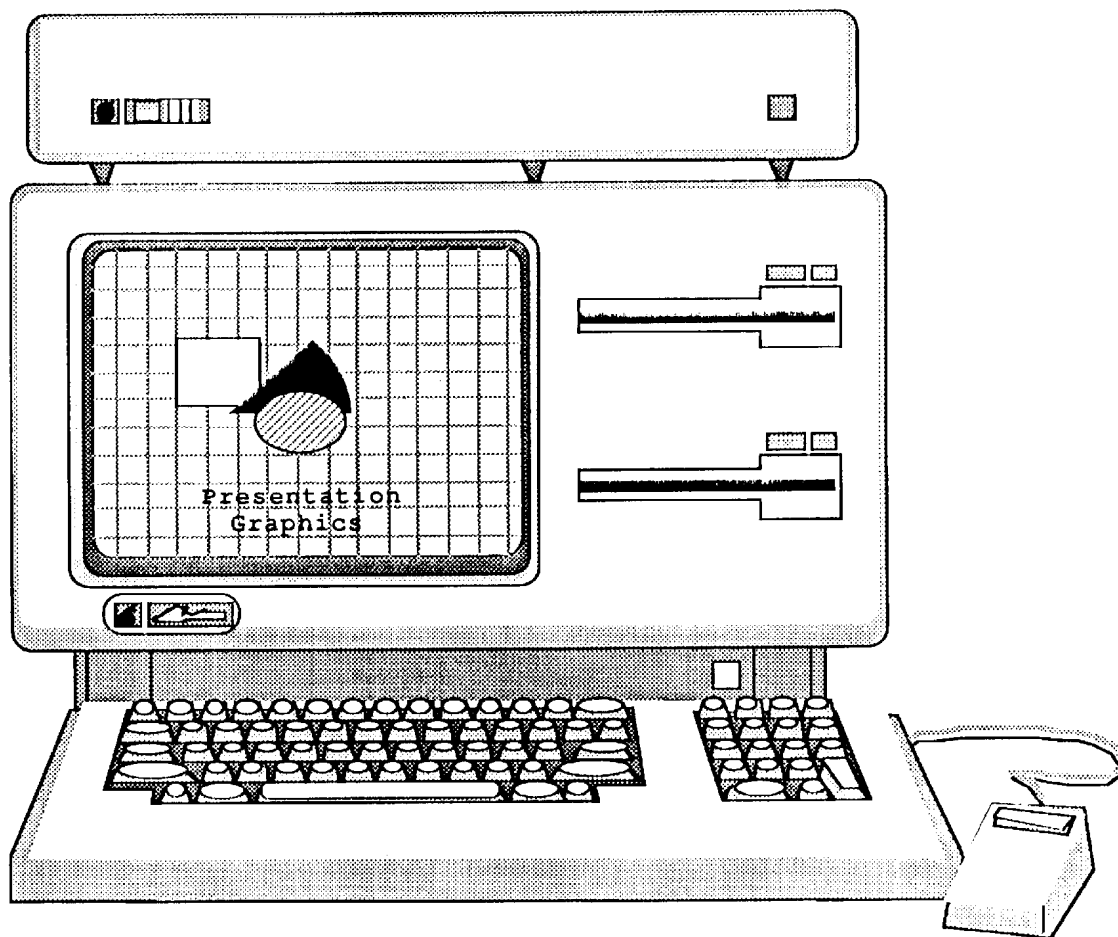
GRAPHICAL OBJECT-ORIENTED USER INTERFACES

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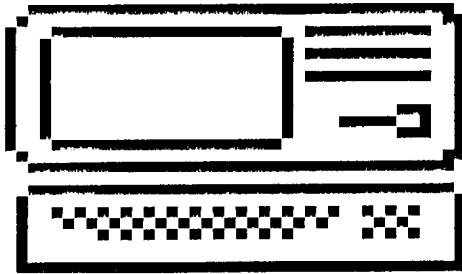
SEEING & POINTING
VS.
REMEMBERING
AND TYPING

WHAT YOU SEE IS WHAT YOU GET

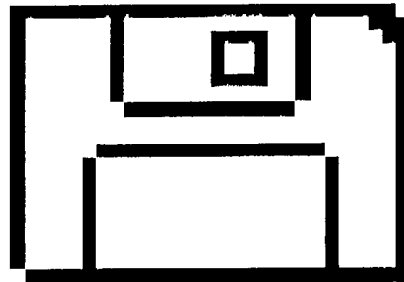
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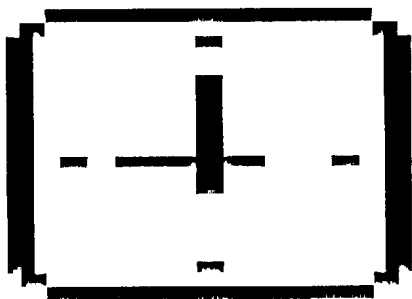
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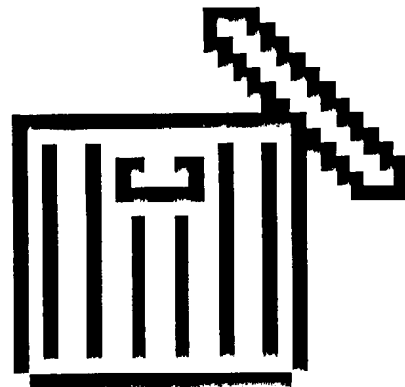
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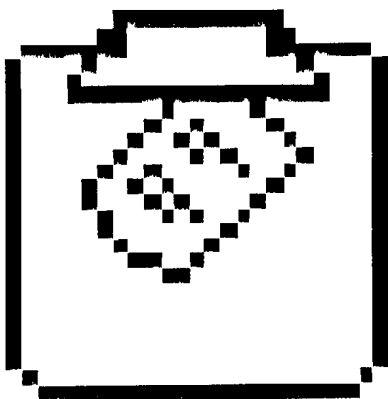
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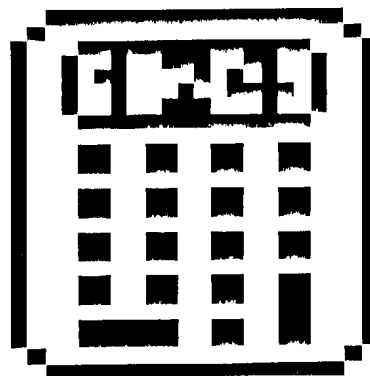
CLOCK



TRASH CAN

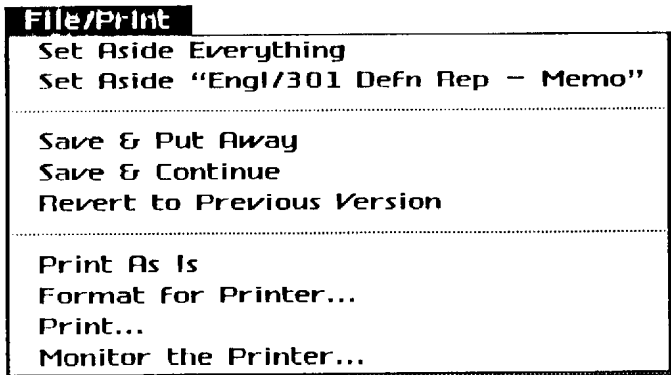


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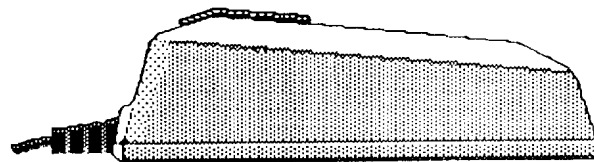
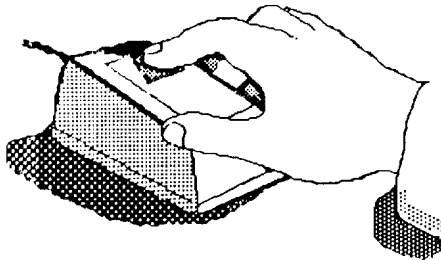
CALCULATOR

MOUSE & MENUS

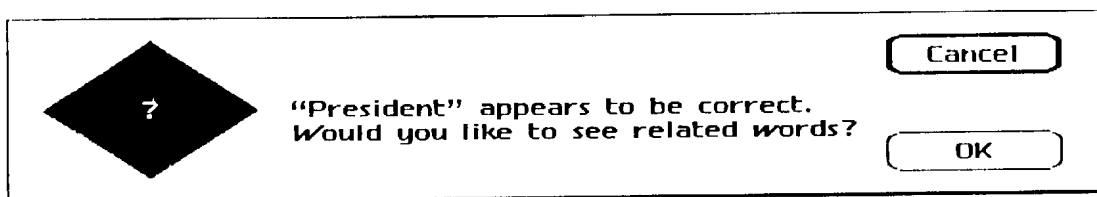


MOUSE ARROW

FILE/PRINT MENU

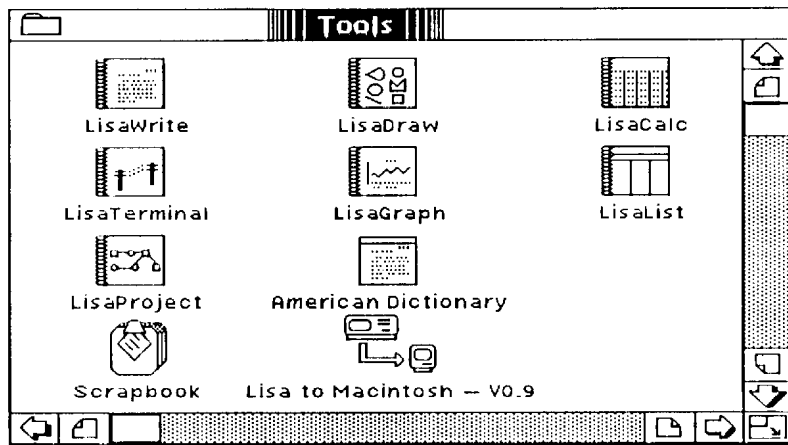


MOUSE

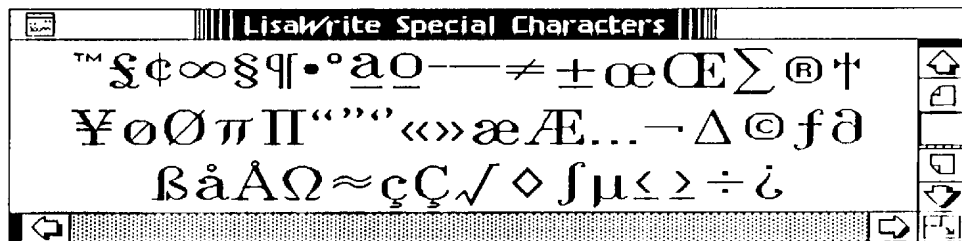


DIALOG

WINDOWS

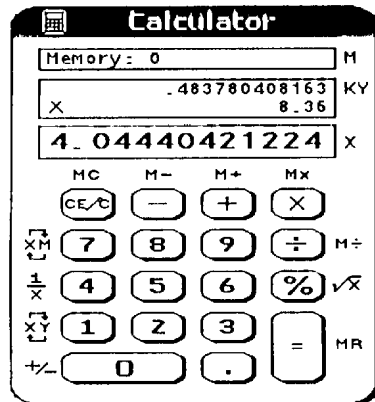


ICON WINDOW

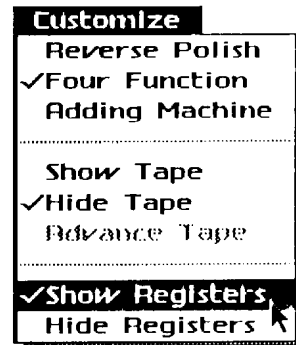


WORD PROCESSOR WINDOW

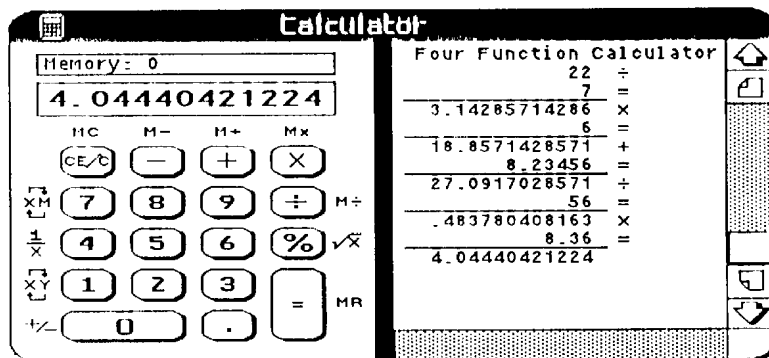
CALCULATOR & CLOCK



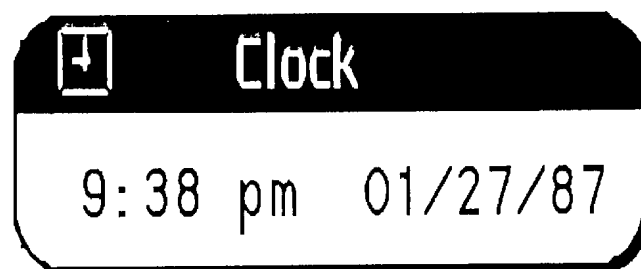
STANDARD CALCULATOR



CALCULATOR MENU



CALCULATOR
WITH
TAPE



CLOCK