

Graphical interaction (part 2)

Michel Beaudouin-Lafon
Université Paris-Saclay
mbl@lisn.fr
<http://ex-situ.lri.fr>

3 levels of graphical interaction

Basic actions

“alphabet” of graphical interaction



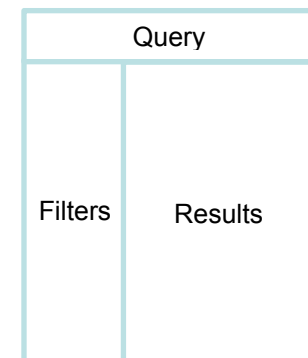
Basic interaction tasks

“vocabulary” of graphical interaction



Interaction patterns

“syntax” of graphical interaction



Interaction patterns

Combinations of basic interaction tasks

Complex data input

Selection

Dialog box

Inspector

Tool palette

Complex data input

Text with format

Phone number

+33 1 69 15 69 10 | accept spurious characters

Credit card number

1234 567 |

Date

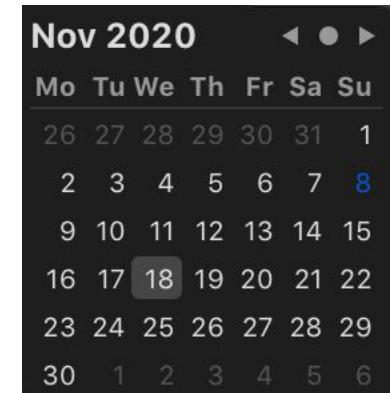
18 ▼ November ▼ 2020 ▼

Form

A screenshot of a contact form interface. At the top, there's a profile section with a circular avatar placeholder labeled 'edit', and fields for 'First' and 'Last' names, and a 'Company' field. Below this are two tabs: 'Info' (selected) and 'Picture'. The 'Info' tab contains several input fields with labels and dropdown arrows: 'mobile' (Phone), 'home' (Email), 'ringtone' (Opening), 'text tone' (Note), 'home page' (URL), 'birthday' (day/month/year), 'home' (User Name AIM), and 'home' (Street, Postal Code City, Country or Region). At the bottom, there's a 'note' field.

Rich text

A screenshot of a rich text editor. The top toolbar includes buttons for Bold (B), Italic (I), Underline (U), Link/Unlink (<>), Bulleted List (≡), Numbered List (1/2/3 ≡), Quote (”), and another Link/Unlink (<>). The editor content shows: 'Official website: [draftjs.org](#)', 'You can create ordered list:', an ordered list with '1. Item 1' and '2. Item 2', and 'Unordered list'.



Syntax of graphical interaction

A command requires :

one (or more) object(s) of interest [the subject]
an action [the verb]
parameters (sometimes)

2 possibilities :

Specify first the object(s) of interest *then* the action

Subject-verb syntax

Better when applying several actions to the same objet

Specify first the action *then* the object(s) of interest

Verb-subject syntax

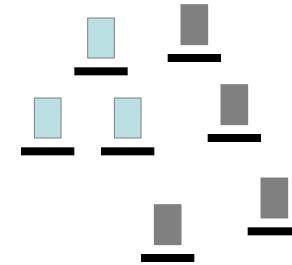
Better when applying the same action to several objets

Subject-verb syntax: the selection

The selection is the object (or set of objects) that the command will be applied to

It is specified by direct designation of the objects, which are highlighted

The selection is specified by direct designation



The action is specified with menus, buttons, drag-and-drop
Invalid actions should be deactivated (greyed-out)

Subject-verb syntax: the selection

Command parameters

The selection is specified
by direct designation

selection

Size ...

action



modal dialog box

Problems :

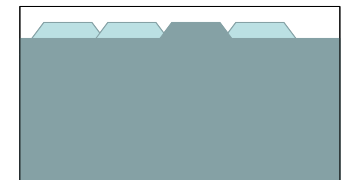
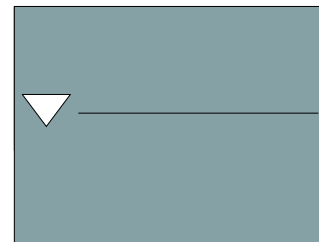
Requires to close the dialog box before seeing the effect

=> “Apply” button

Large number of parameters

=> optional part

=> tabs

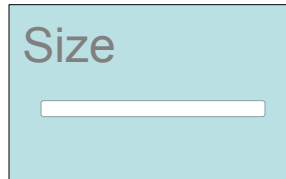


Subject-verb syntax: inspector

Inspector

Always visible

Hello

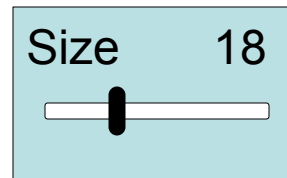


Size

A horizontal slider bar with a white track and a black handle, currently positioned at the left end.

Content changes according to the selection

■ Hello ■

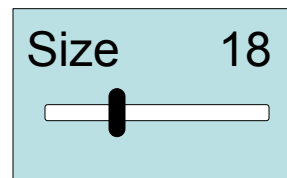


Size 18

A horizontal slider bar with a white track and a black handle, currently positioned at the 18 mark.

Effects of changes or immediately visible

■ Hello ■



Size 18

A horizontal slider bar with a white track and a black handle, currently positioned at the 18 mark.

Subject-verb syntax: inspector

Inspector

Always visible

Hello

Size



Content changes according to the selection

■ Hello ■

Size 18



Effects of changes or immediately visible

■ Hello ■

Size 24



Subject-verb syntax: inspector

Work area
Selection of the objects of interest

Property
inspector of
selected
objects

Subject-verb syntax: inspector

Subject-verb syntax: the selection

The selection is the object (or set of objects) that the command will be applied to

It is specified by direct designation of the objects, which are highlighted

The selection is specified by direct designation



The action is specified with menus, buttons, drag-and-drop

Invalid actions should be deactivated (greyed-out)

6

Style
Text
Arrange

Body*

Update

Style
Layout

Font

Arial

Regular 24 pt

B / I / U / S

Character Styles None

Text Color

B
I
U
S

T
*
↓

▼ Spacing

Lines 1

Before Paragraph 25 pt

After Paragraph 0 pt

▼ Bullets & Lists None*

No Bullets

Indent: 0 cm 0 cm

Bullet Text

Subject-verb syntax: inspector

Subject-verb syntax: the selection

The selection is the object (or set of objects) that the command will be applied to

It is specified by direct designation of the objects, which are highlighted

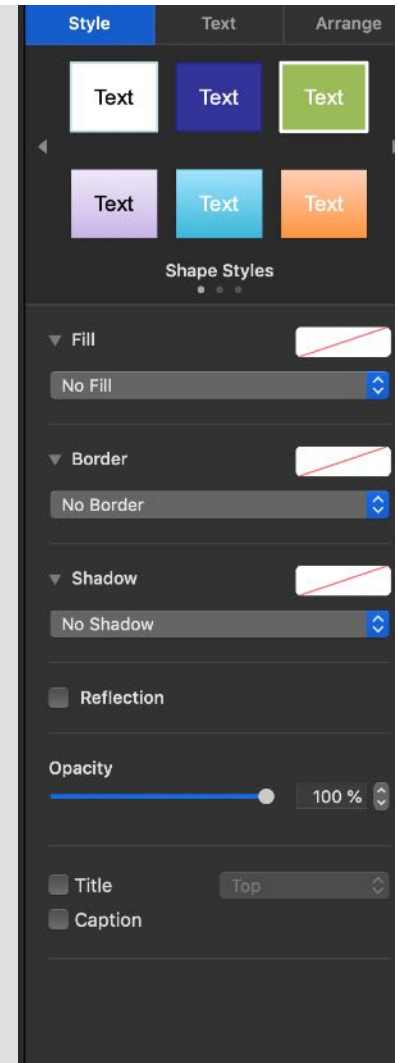
The selection is specified by direct designation



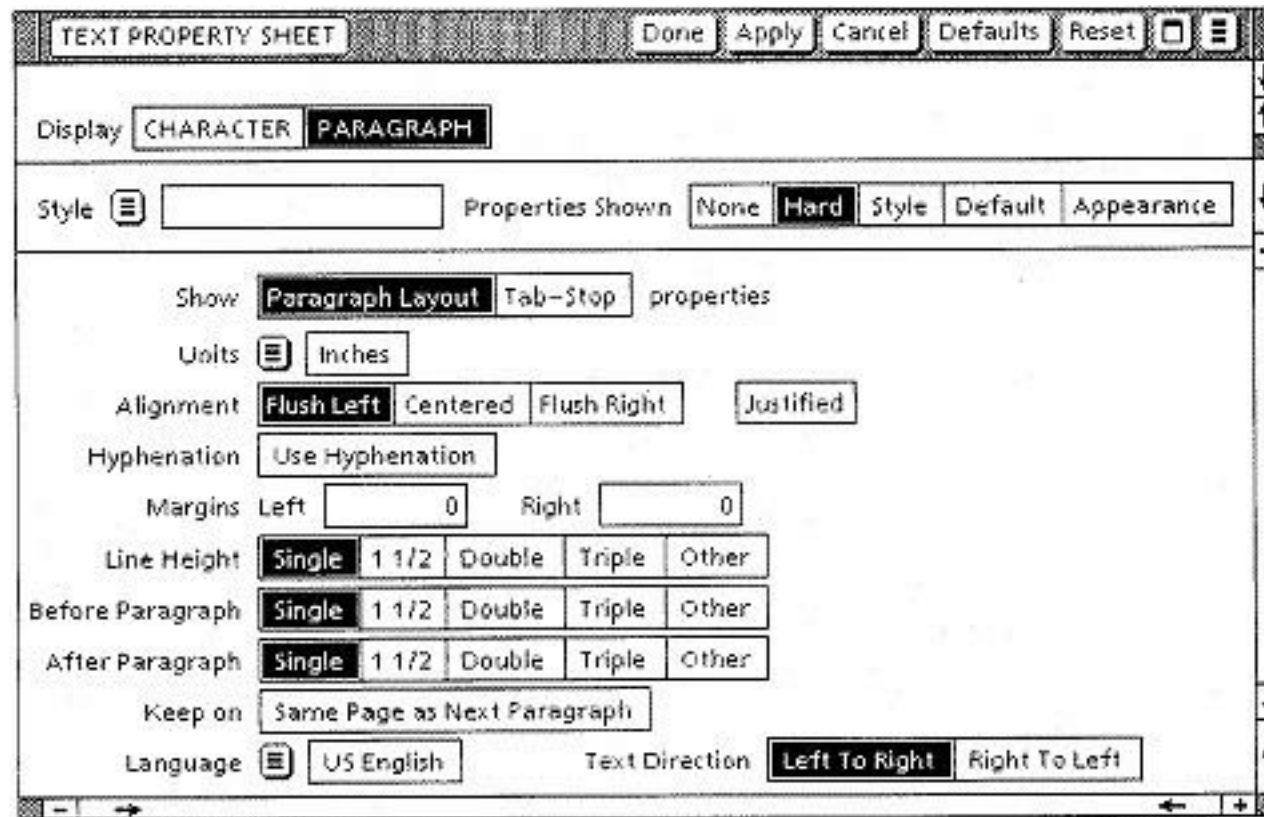
The action is specified with menus, buttons, drag-and-drop

Invalid actions should be deactivated (greyed-out)

6

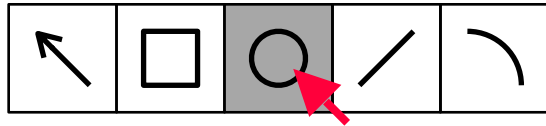


Property boxes – the Xerox Star (1981)



Verb-subject syntax : tool palette

Select tool in palette



Set tool parameters

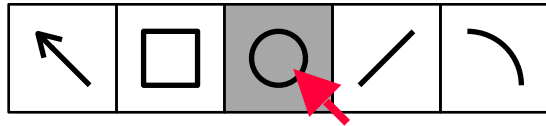


Apply tool to object of interest



Verb-subject syntax : tool palette

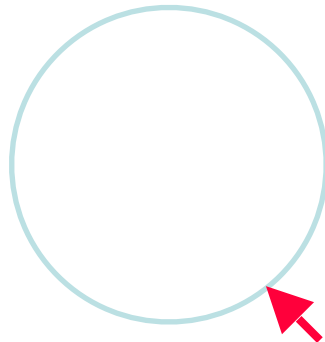
Select tool in palette



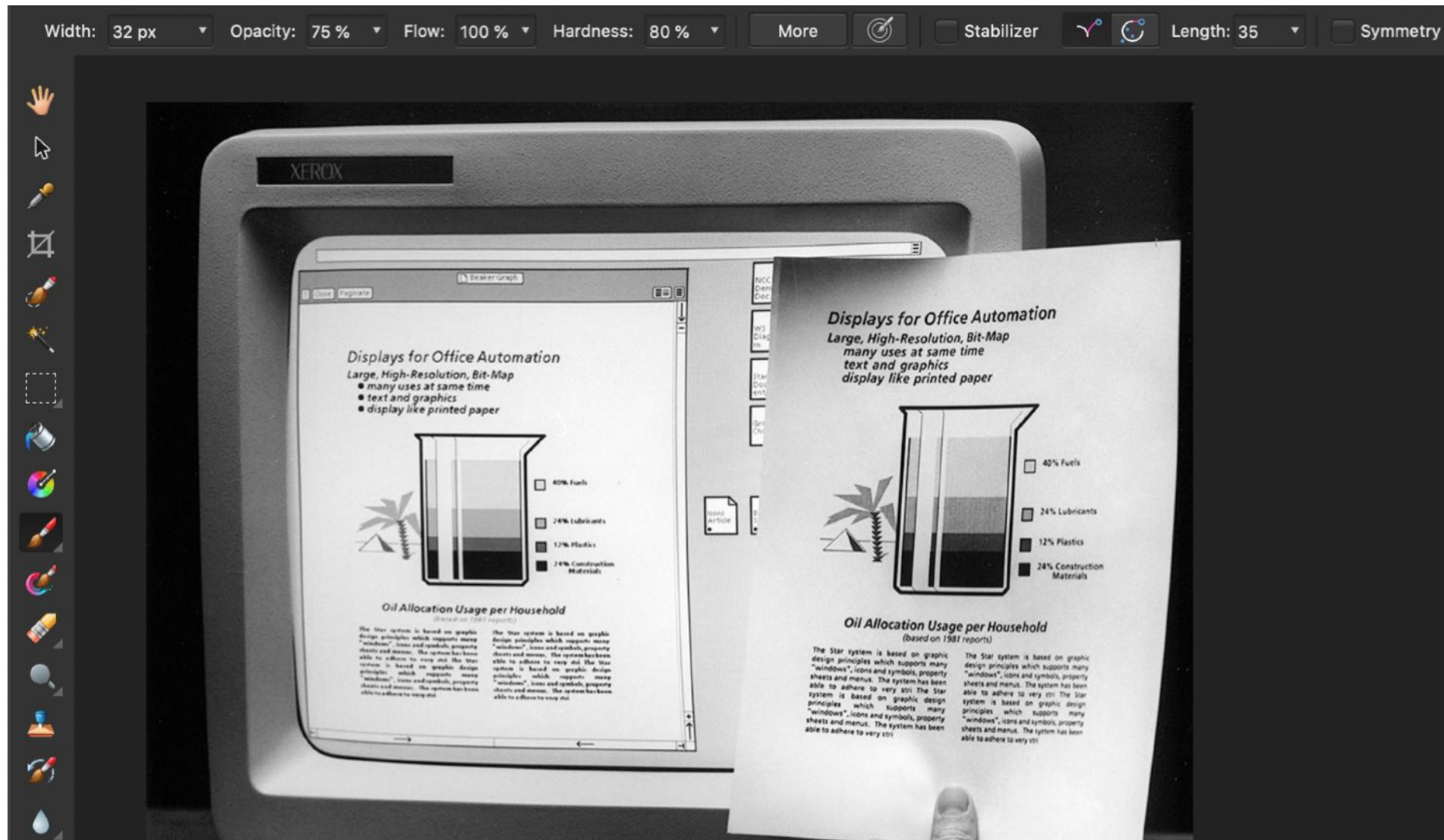
Set tool parameters



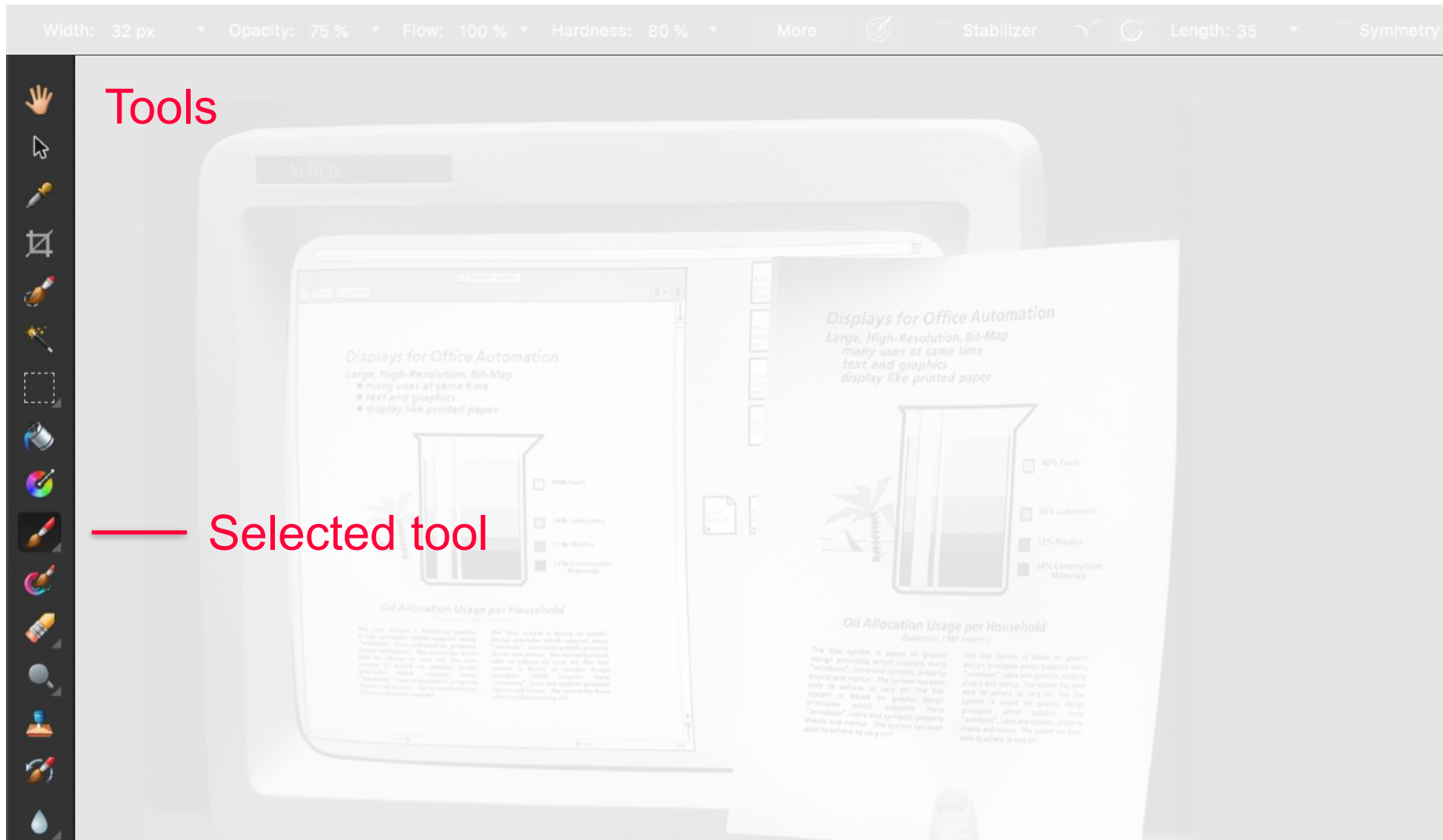
Apply tool to object of interest



Verb-subject syntax : tool palette

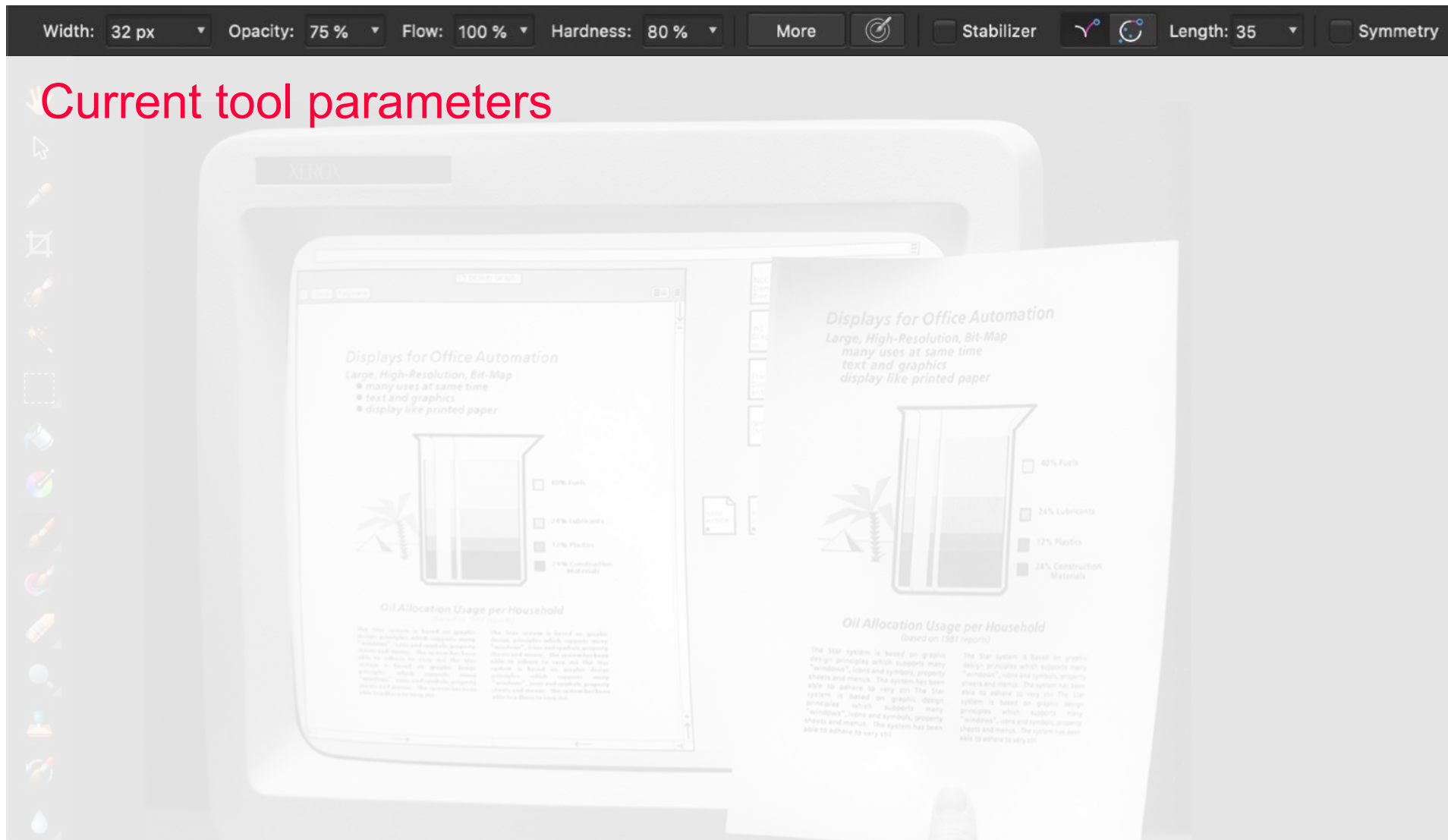


Verb-subject syntax : tool palette

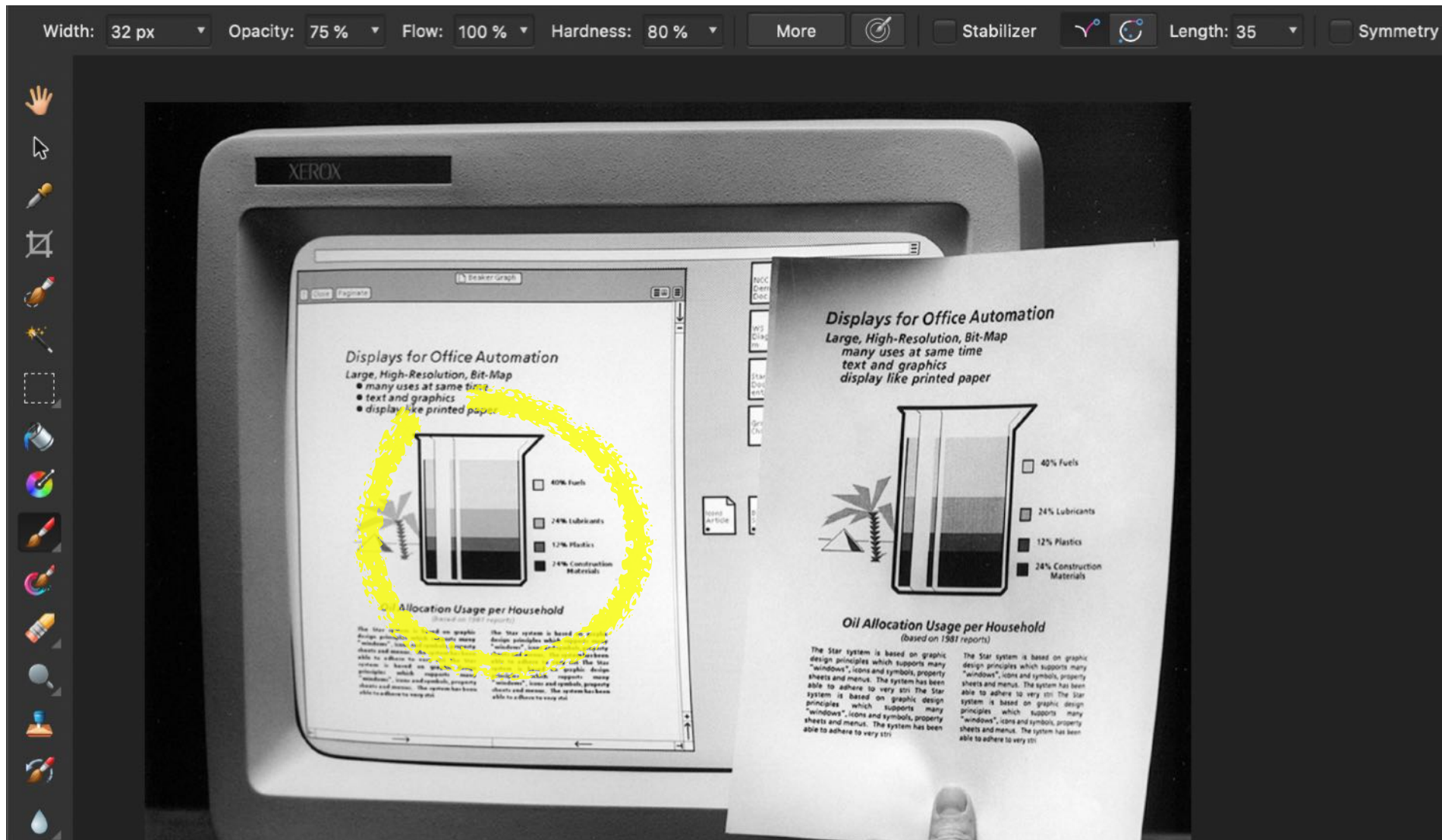


Verb-subject syntax : tool palette

Current tool parameters



Verb-subject syntax : tool palette



Modes

Mode = state of the interface where user actions are interpreted consistently, and differently than in other modes

Problems: Mode visibility, mode change

Examples

“vi” text editor:

Type “Esc” to switch between input/command modes

“emacs” text editor:

Control and Meta modifiers to enter commands

Tool palettes:

Select a tool to activate it



Modes

Temporal modes

The same user action performed at different times
has different effects

Problem : Initiative of the mode change

Spatial modes

The same user action performed at different locations
has different effects

Quasi-modes

Temporal modes activated as long as a physical action is sustained

An interface is a collection of modes

Conclusion

3 levels of analysis of graphical interaction

Basic actions:

Pointing, Activation, Dragging

Basic interaction tasks:

Input, Selection, Trigger, Navigation,
Property/parameter specification, Transformation

Interaction patterns:

Complex data entry, Subject-Verb vs Verb-Subject,
Selection, Dialog boxes, Inspector, Tool palette

Conclusion

Direct manipulation + Indirect manipulation
Menus & Forms

Modes organize/structure the interface
Spatial vs. temporal

Analyzing interfaces in terms of basic interaction tasks
Input (new information) vs select (among existing info.)
Generic methods vs. specific ones

Exercise: analyze (multi-)touch interfaces