

ADAPTIVE USER INTERFACES

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HCI

- part of art & part of science
- successful software =
 - good internal architecture
 - good user interface
 - ?
- mental model

MOTIVATION

1
OFFICIAL BALLOT, GENERAL ELECTION
PALM BEACH COUNTY, FLORIDA
NOVEMBER 7, 2000

OFFICIAL BALLOT, GENERAL ELECTION
PALM BEACH COUNTY, FLORIDA
NOVEMBER 7, 2000

A

**ELECTORS
FOR PRESIDENT
AND
VICE PRESIDENT**

(A vote for the candidates will
actually be a vote for their electors.)

(Vote for Group)

(REPUBLICAN)
GEORGE W. BUSH - PRESIDENT 3 →
DICK CHENEY - VICE PRESIDENT

(DEMOCRATIC)
AL GORE - PRESIDENT 5 →
JOE LIEBERMAN - VICE PRESIDENT

(LIBERTARIAN)
HARRY BROWNE - PRESIDENT 7 →
ART OLIVIER - VICE PRESIDENT

(GREEN)
RALPH NADER - PRESIDENT 9 →
WINONA LaDUKE - VICE PRESIDENT

(SOCIALIST WORKERS)
JAMES HARRIS - PRESIDENT 11 →
MARGARET TROWE - VICE PRESIDENT

(NATURAL LAW)
JOHN HAGELIN - PRESIDENT 13 →
NAT GOLDHABER - VICE PRESIDENT

(REFORM)
← 4
PAT BUCHANAN - PRESIDENT
EZOLA FOSTER - VICE PRESIDENT

(SOCIALIST)
← 6
DAVID McREYNOLDS - PRESIDENT
MARY CAL HOLLIS - VICE PRESIDENT

(CONSTITUTION)
← 8
HOWARD PHILLIPS - PRESIDENT
J. CURTIS FRAZIER - VICE PRESIDENT

(WORKERS WORLD)
← 10
MONICA MOOREHEAD - PRESIDENT
GLORIA La RIVA - VICE PRESIDENT

WRITE-IN CANDIDATE
To vote for a write-in candidate, follow the
directions on the long stub of your ballot card.



01-41-0086
حاجی خان وزیر



20-34-0086
ذوالفقار خان شینواری



06-22-0075
وکیل عبدالرحمن



10-62-0032
حاجی شہزادہ



19-08-0022
سید محمد حریق



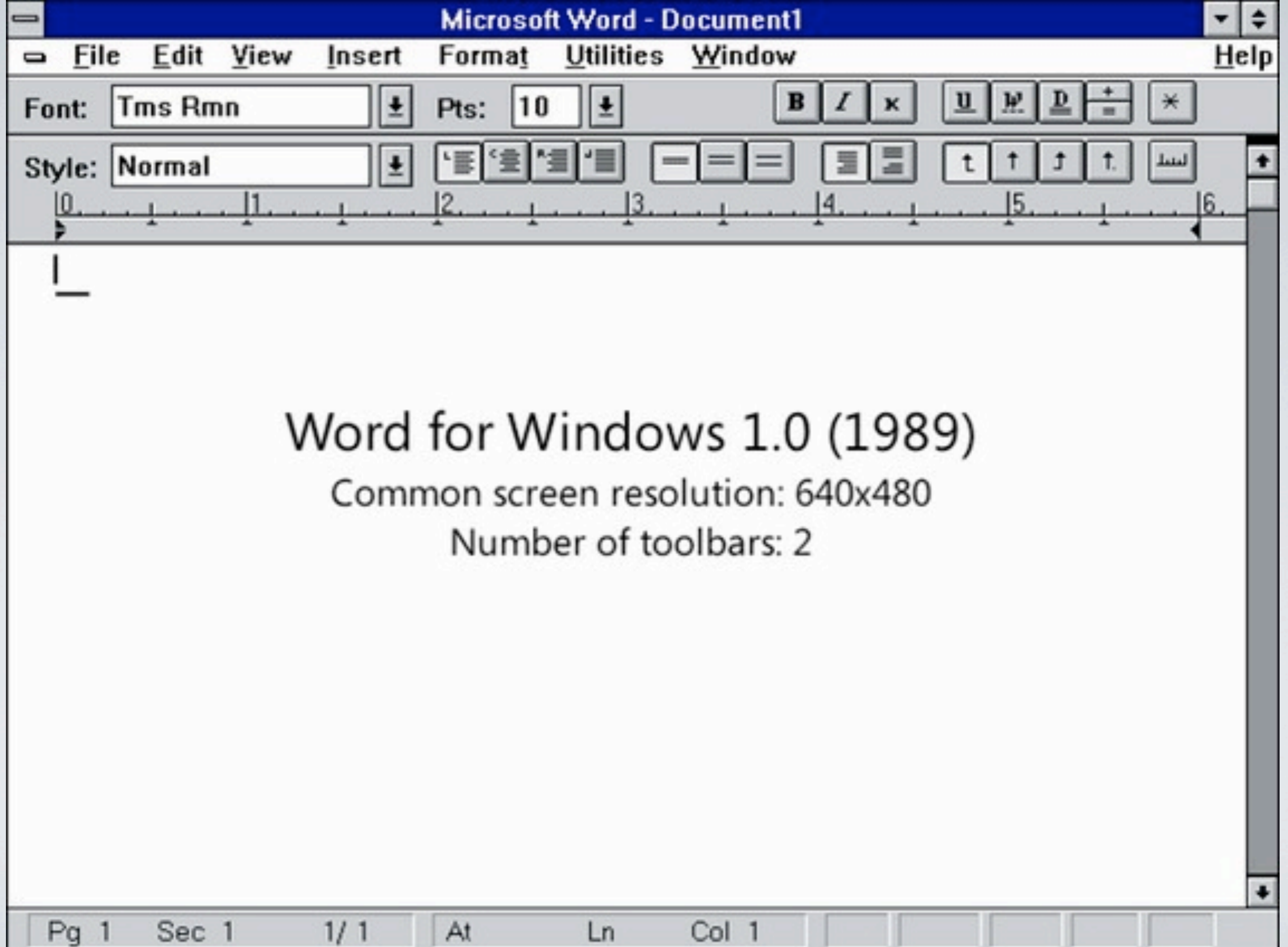
03-78-0113
صوفی عبدالستار هوتک

CURRENT STATUS

- WIMP paradigm
- “One size fits all”

WORD PROCESSORS

- XEROX STAR workstation (1981)
 - WIMP (Windows, Icons, Menus, Pointing device)
- Microsoft Word 1.0 (1989)



source: brazandre.com

Toto už je mod

Microsoft Office Online

- [Connect to Microsoft Office Online](#)
- [Get the latest news about using Word](#)
- [Automatically update this list from the web](#)

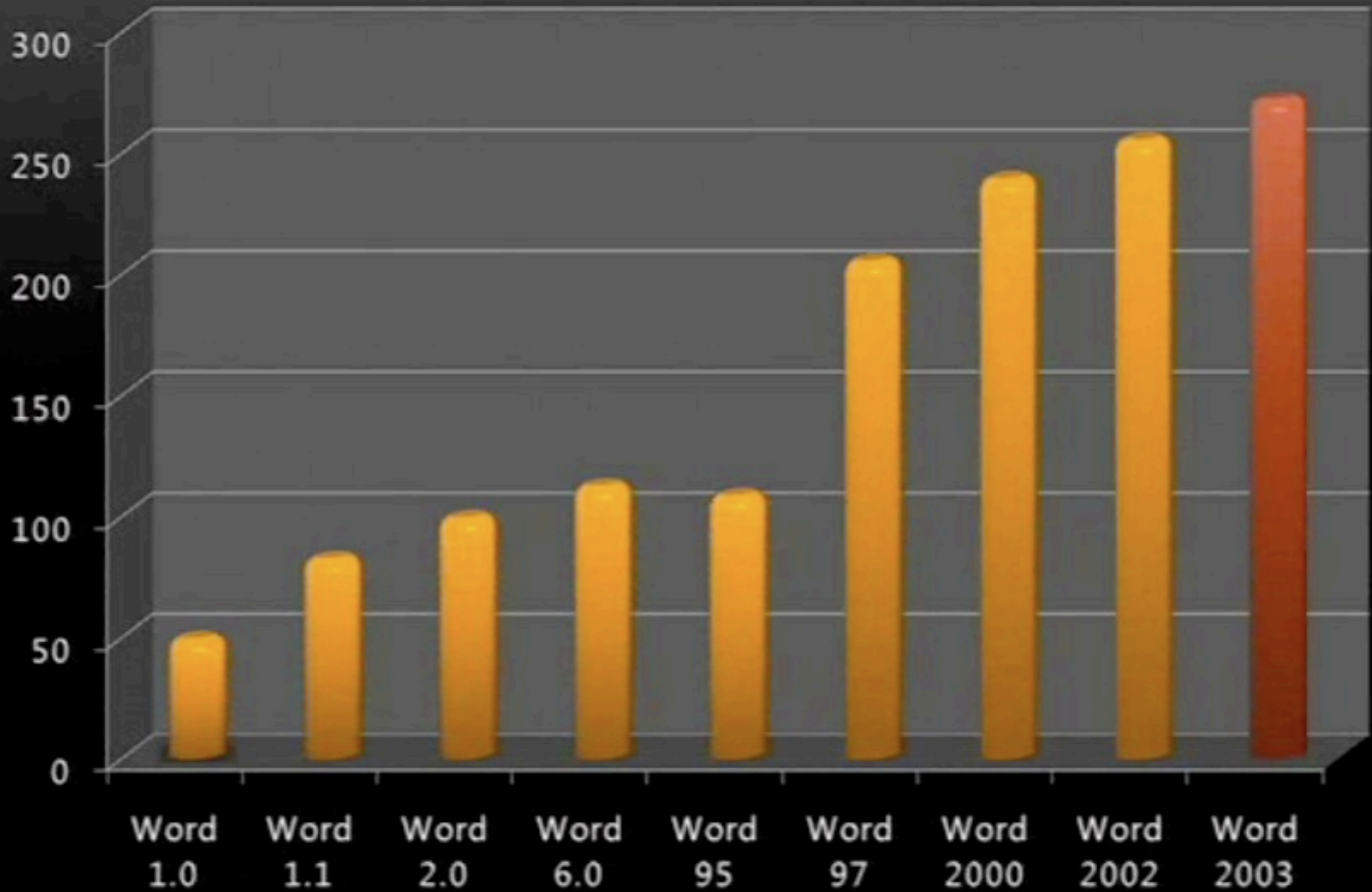
More...

Search for:

Example: "Print more than one copy"

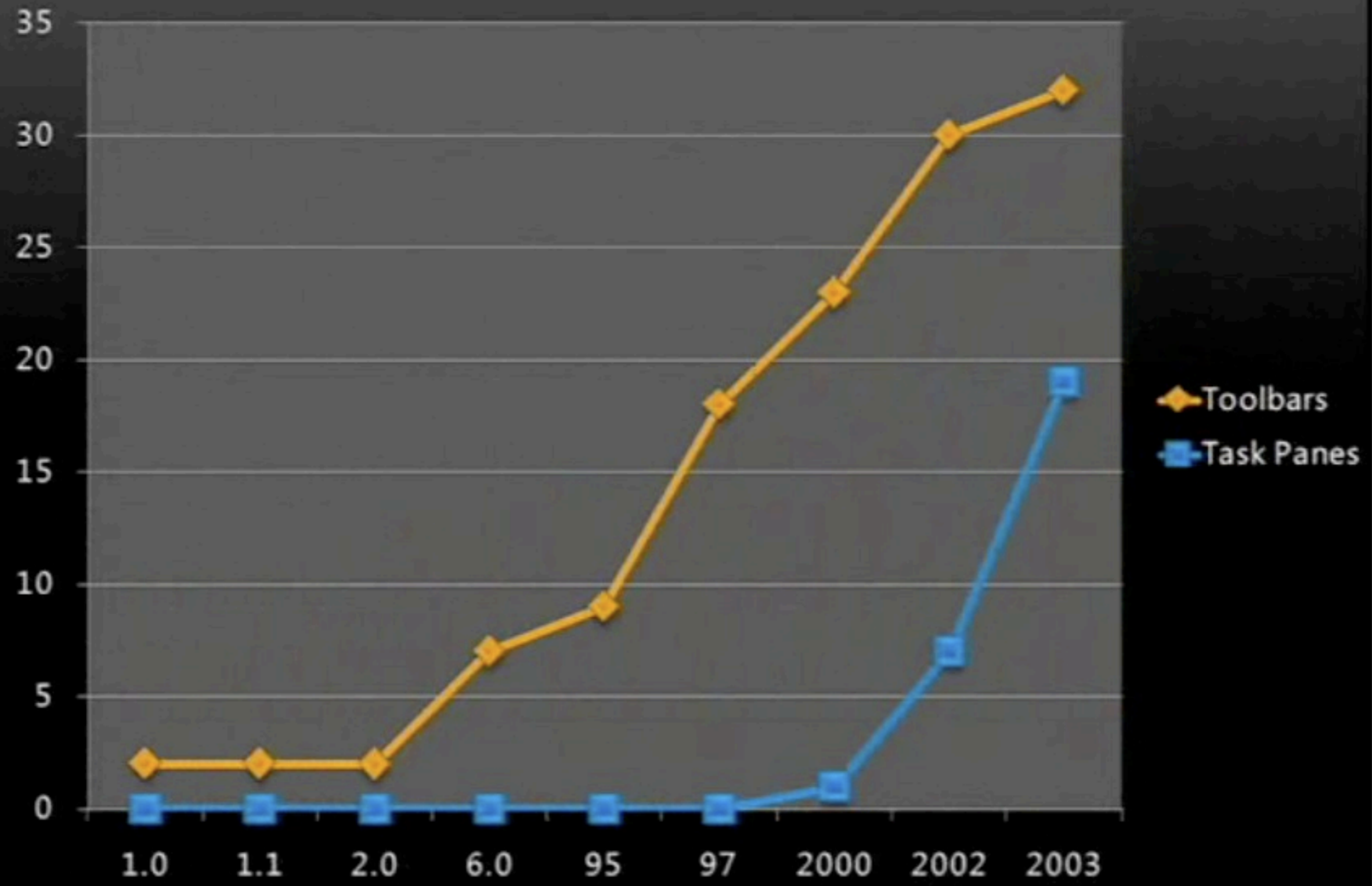
Open

Menu Items in Microsoft Word



source: cybernetnews.com

Toolbars and Task Panes in Microsoft Word



source: cybernetnews.com

SOFTWARE BLOAT

(CREEPING FEATURISM, FEATURE WAR)

- hardware vs human abilities
- J. McGrenere and G. Moore: Are we all in the same “bloat”?
 - “Software is “bloated” when a significant proportion of the functions available are not used by the majority of users”
- L. Kaufman and B. Weed: Too much of a good thing?: identifying and resolving bloat in the user interface

HOW PEOPLE USE WORD PROCESSORS?

- McGrenere and Moore: Of the 265 first-level functions, 15.8% (42) were not used at all and only 21.5% (57) were used by more than half of the participants. There were only 3.3% (12) functions that were used regularly by more than three quarters of the participants.
 - users usually use only 5%.
- Dostál: there are no significant groups of users
- Spolsky: 80% of the people use 20% of the features, Unfortunately, it's never the same 20%.

SOLUTIONS

- decrease provided functionality
- personalization:
 - adaptable approach
 - adaptive approach
- versioning
- plug-in

USER INTERFACE FACADES



WELL KNOWN ADAPTIVE USER INTERFACES

(EVERYBODY HATES A MAGICIAN)

- Microsoft Office Assistant - "Clippy"
- Microsoft Smart Menu

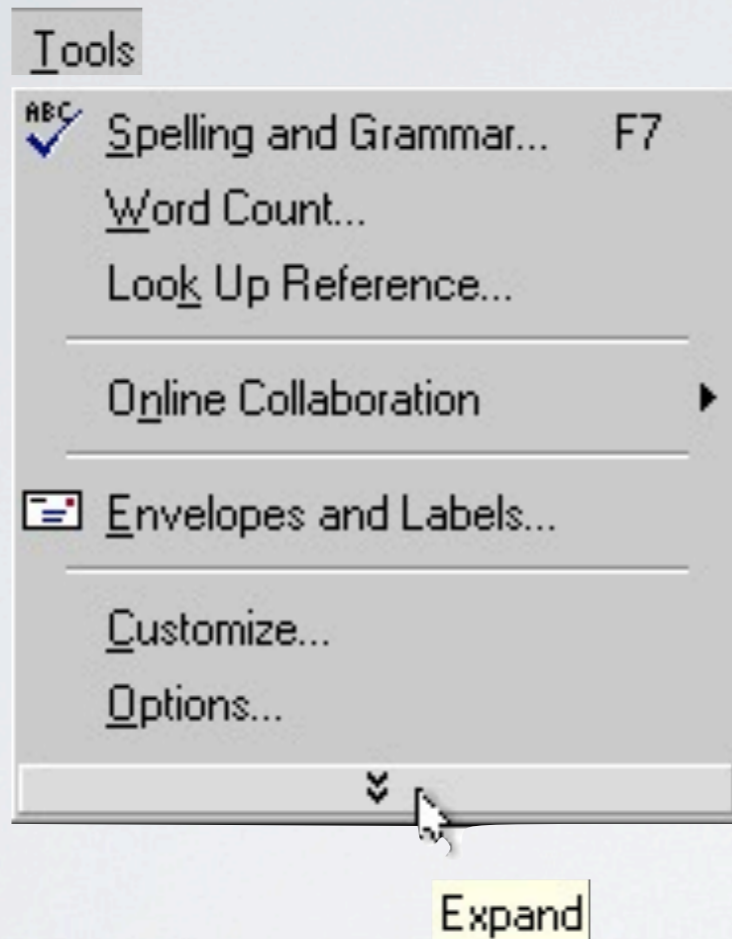
It looks like you're writing a letter.

Would you like help?

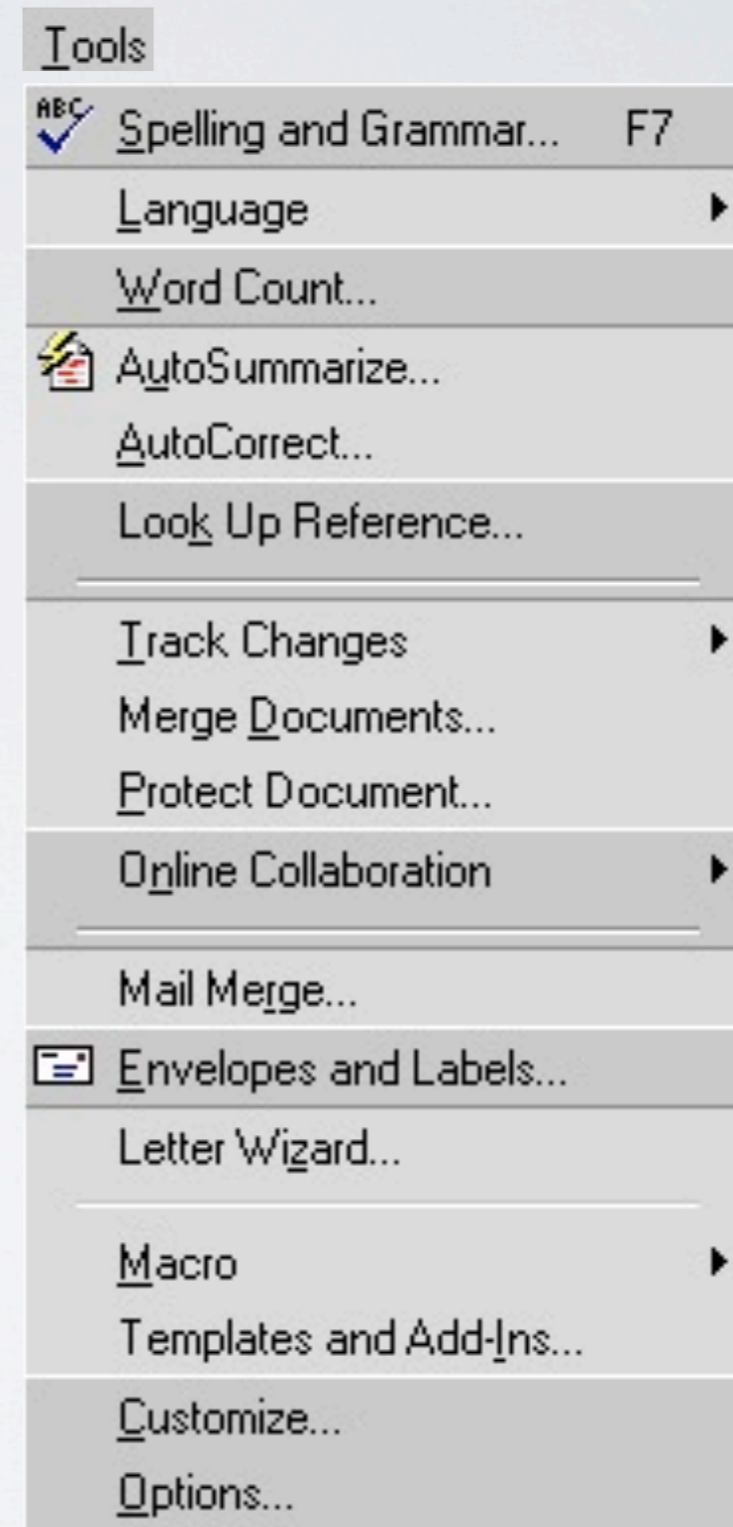
- Get help with writing the letter
- Just type the letter without help
- Don't show me this tip again



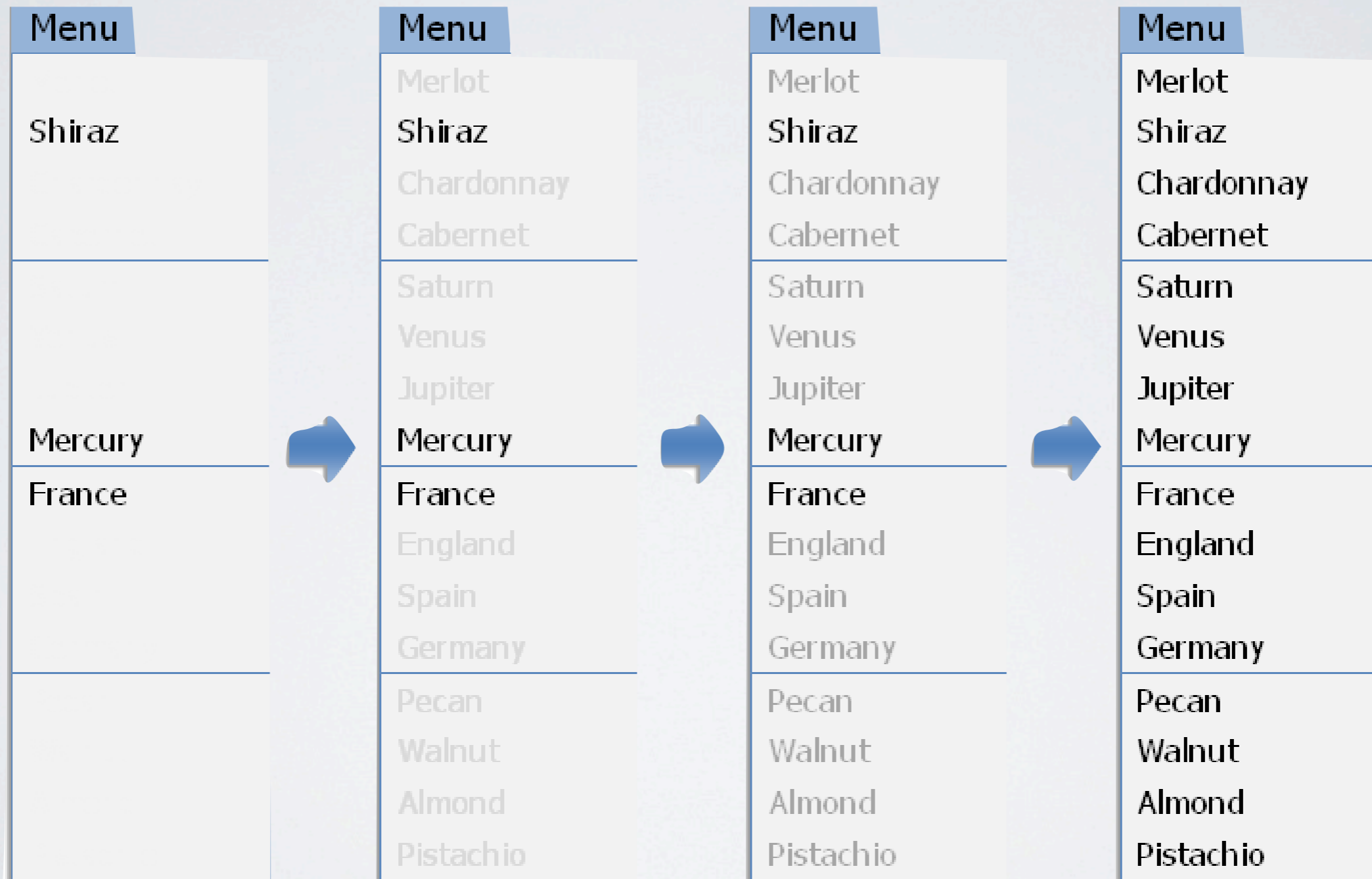
SMART MENU



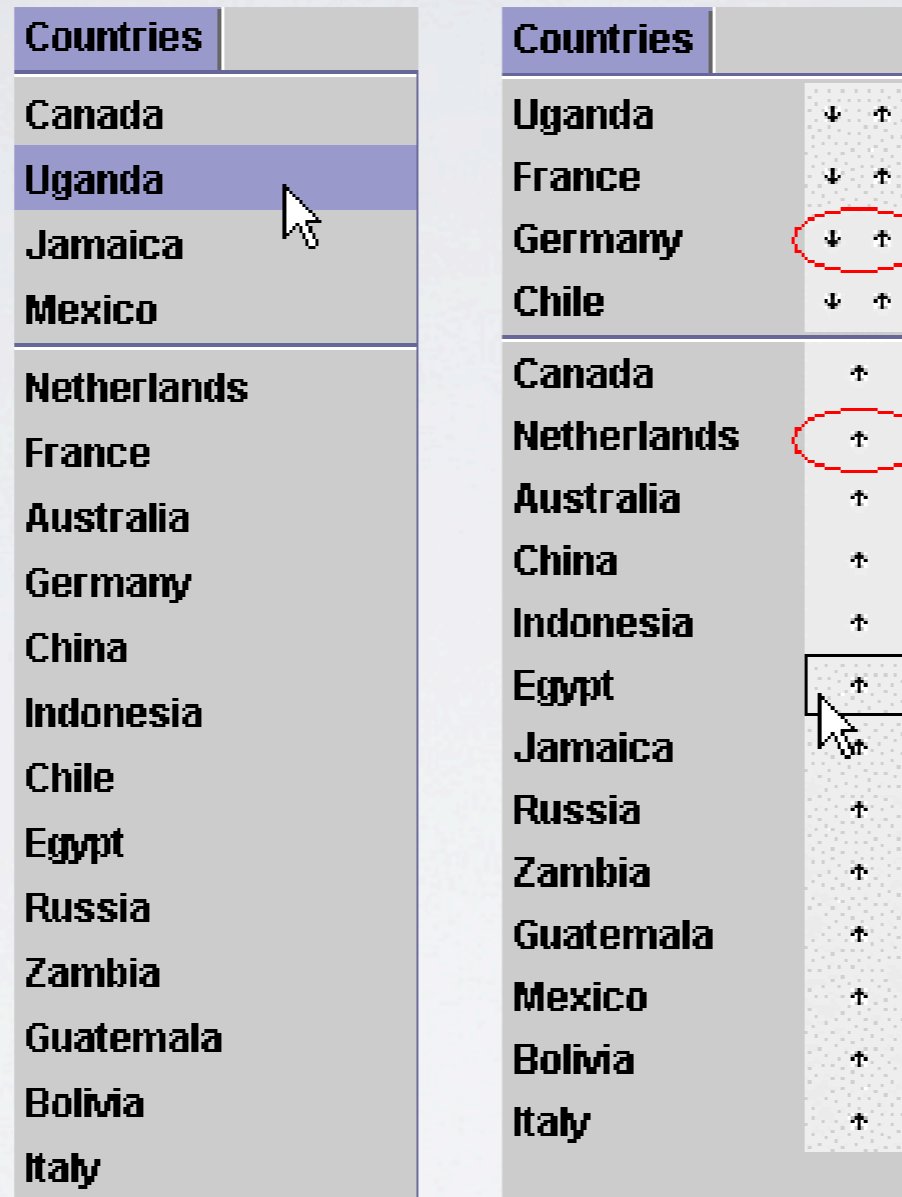
"Short" Menu



EPHEMERAL MENU



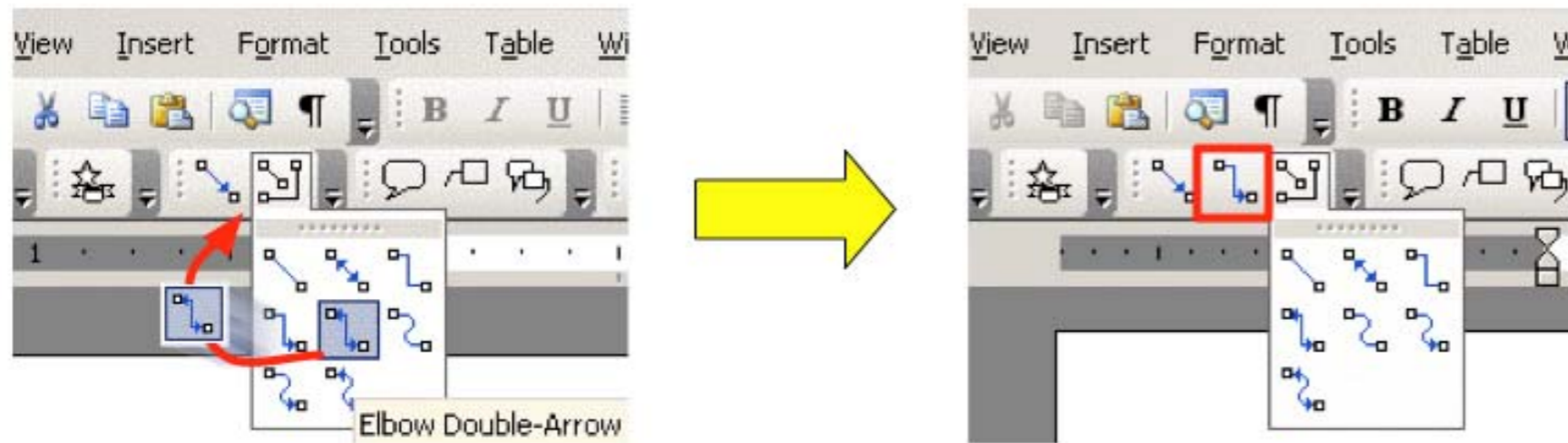
SPLIT MENU



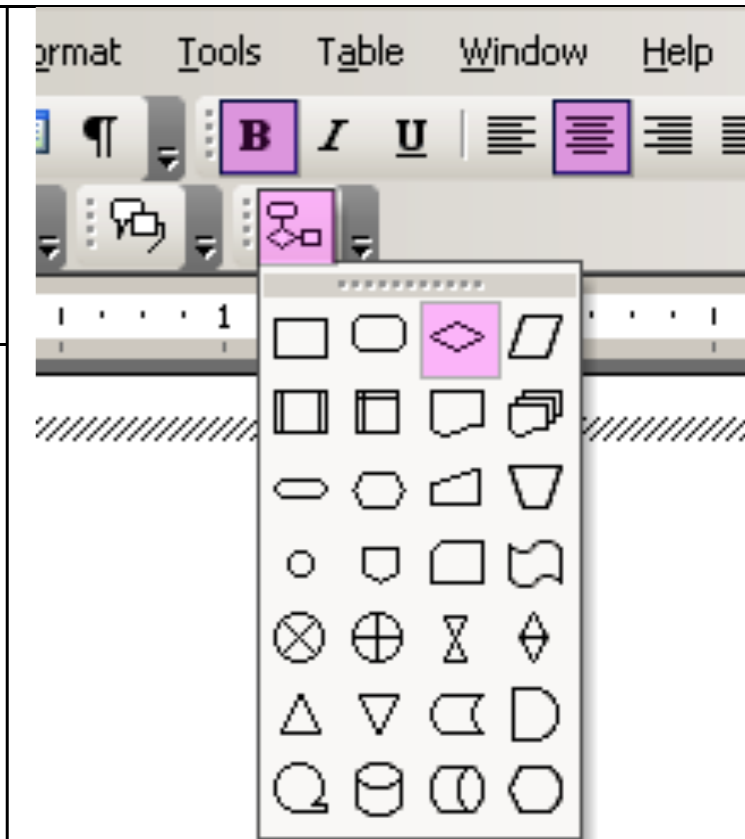
ADAPTIVE TOOLBAR



(a)



(b)



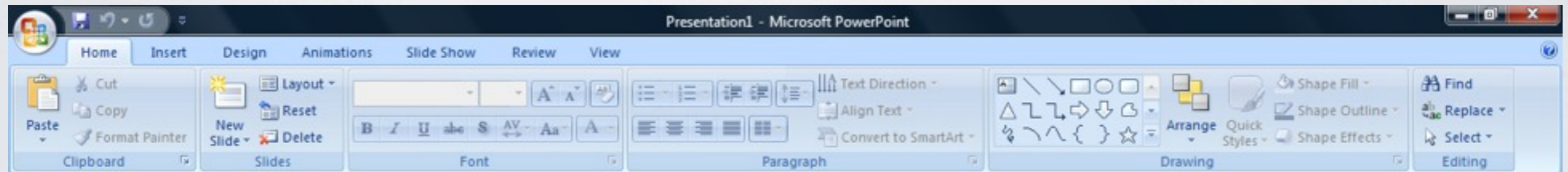
(c)

Figure 1. (a) The Split Interface; (b) The Moving Interface; (c) The Visual Popout Interface

EARLY ADAPTIVE USER INTERFACES

- AIDA
- FLEXCEL

RIBBON USER INTERFACE



ADAPTIVE APPROACH

- not well accepted by users
- predictability and accuracy
- hard to implement to real application: mock-ups or very simple
- adaptation of menu or toolbar - destructive

LOGGERS

- User Interface Events-Based
 - MStTracker
 - AppMonitor
 - RUI
- User Command-Based
 - OWL

INTERCEPTOR

- OpenOffice.org logger
- Interceptor + OpenOffice.org = research framework
- API
- hybrid approach logging:
 - user interface events
 - underlying function calls (macro recorder)

BOULEVARD

“Today’s cities are vast and complex, just like today’s applications. Boulevard is a metaphor of a main street (boulevard), where the users can find everything they need.” - Dostál



BOULEVARD

- adaptive container of user commands
- non-destructive principle
- adapts:
 - user commands
 - interaction style
 - parameters and values

ARRANGEMENT IN BOULEVARD

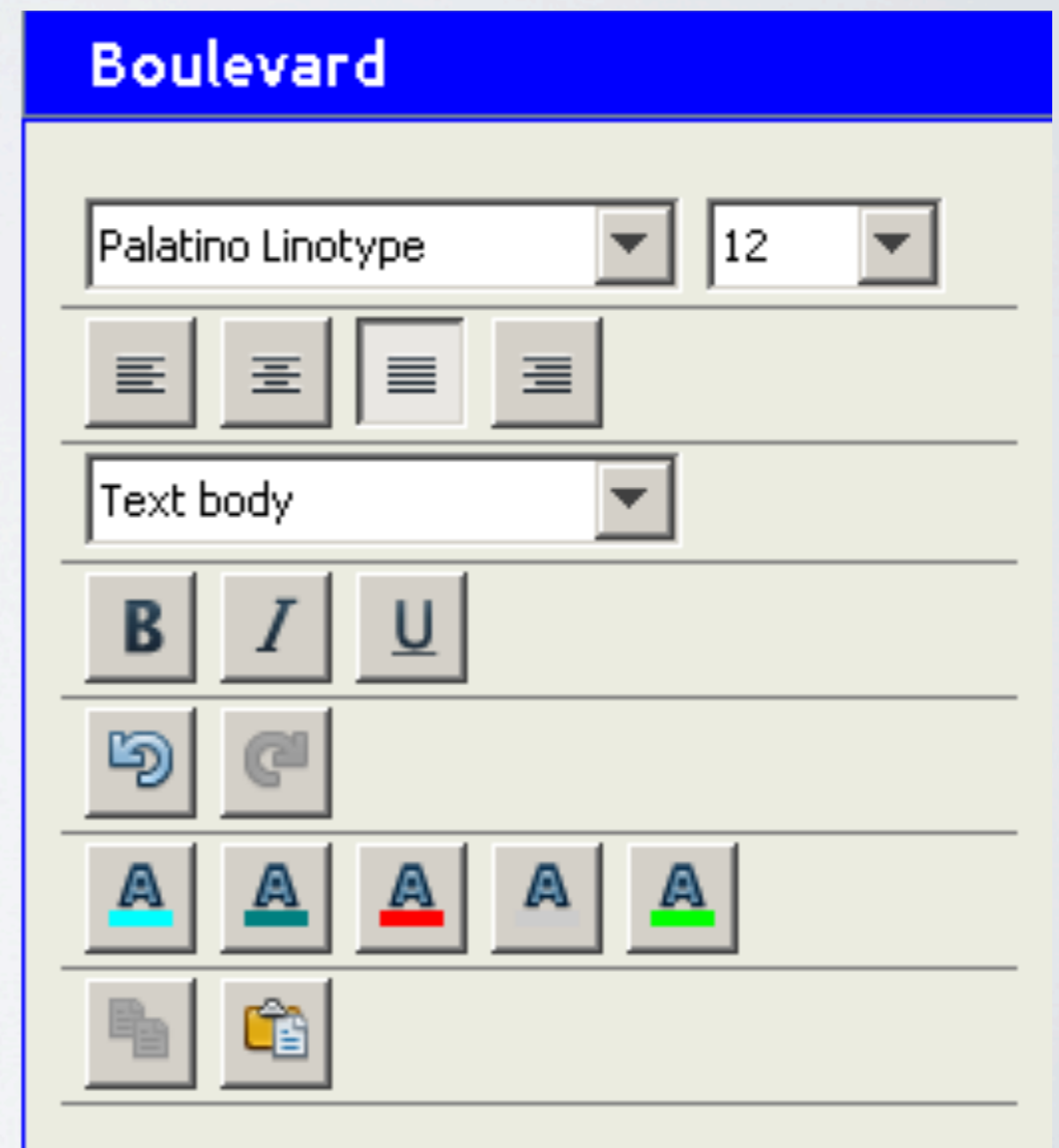
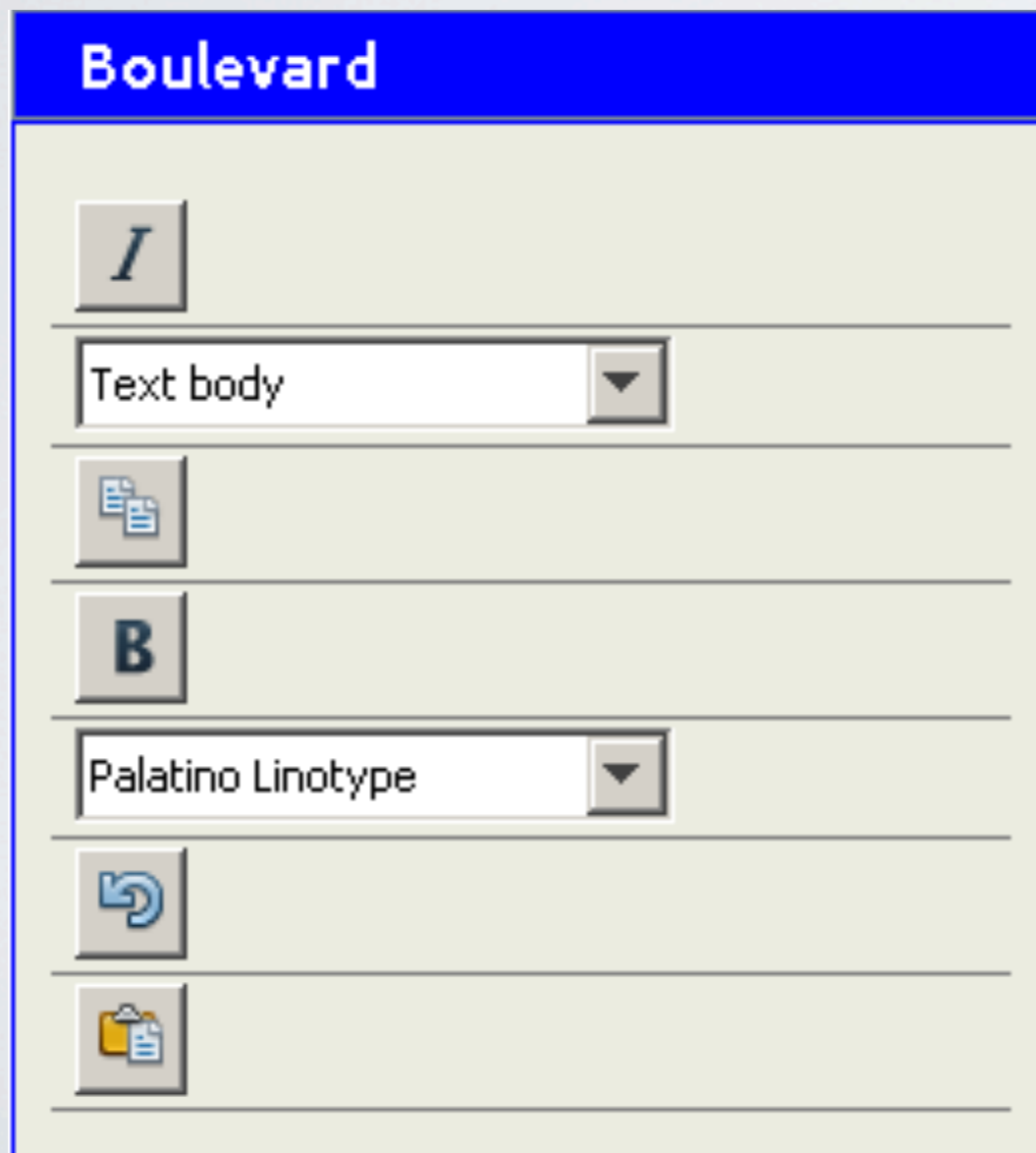
- vertical or horizontal layout
- user command prominence:
 - frequency
 - recency

$$\mathit{rank}(x) = w \frac{|x|}{|T|} + (1 - w) \frac{\sum_{p_i \in P_x} (q - p_i + 1)}{\sum_{i=1}^q i}$$

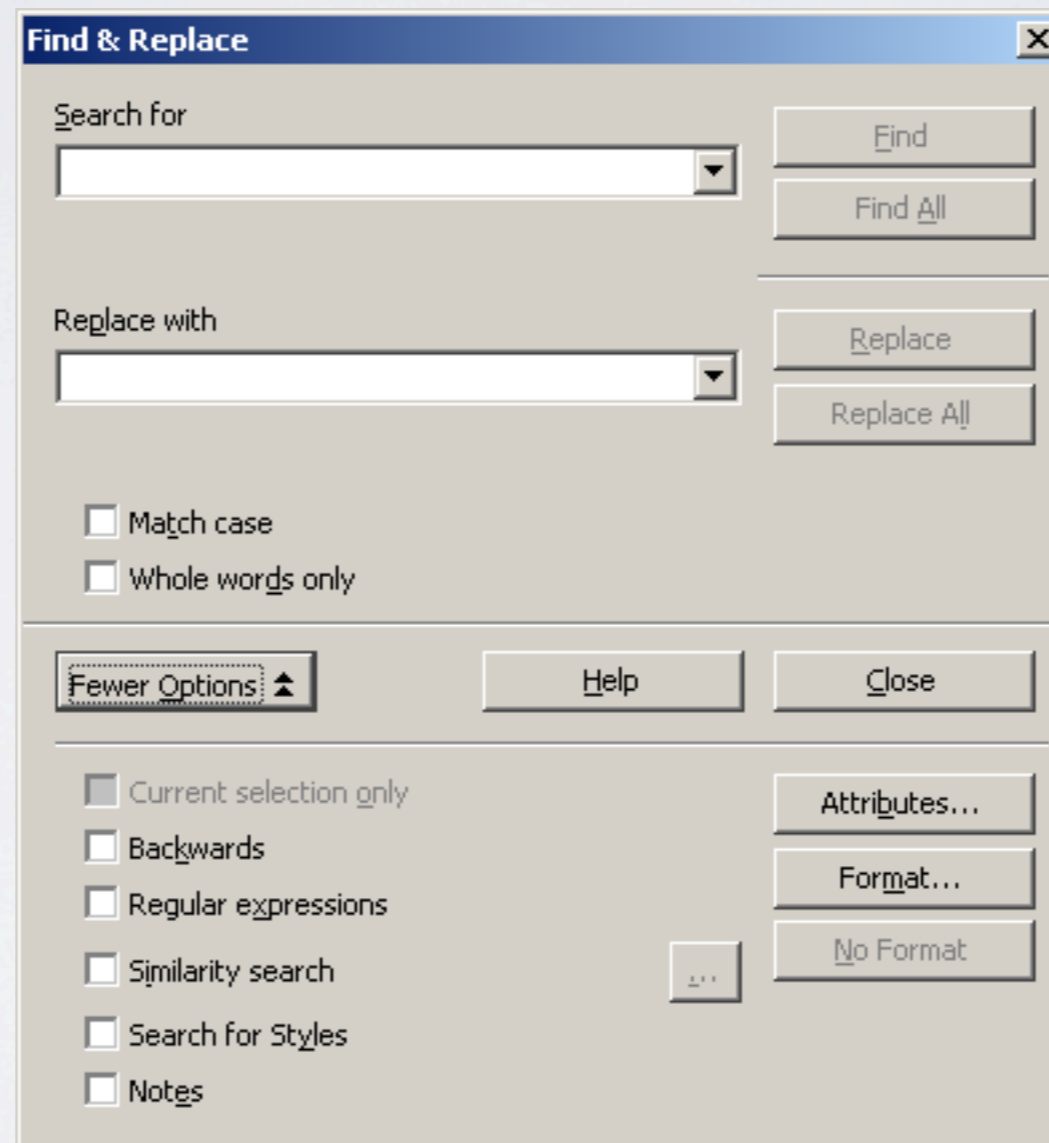
VISUAL REPRESENTATION

- adaptive representation:
 - interaction style
 - parameters and values
- animations

SWEEPING BACK



FIND COMMAND EXAMPLE



FIND COMMAND EXAMPLE

Boulevard

Search for:

Find

Text body

Palatino Linotype 12

I **B** U

Zoom

Boulevard

Search for:

aaa

Find

Find All

Replace with:

aaa

Replace

Replace All

Text body

Palatino Linotype 12

I **B** U

Boulevard

Search for:

aaa

Find

Find All

Replace with:

aaa

Replace

Replace All

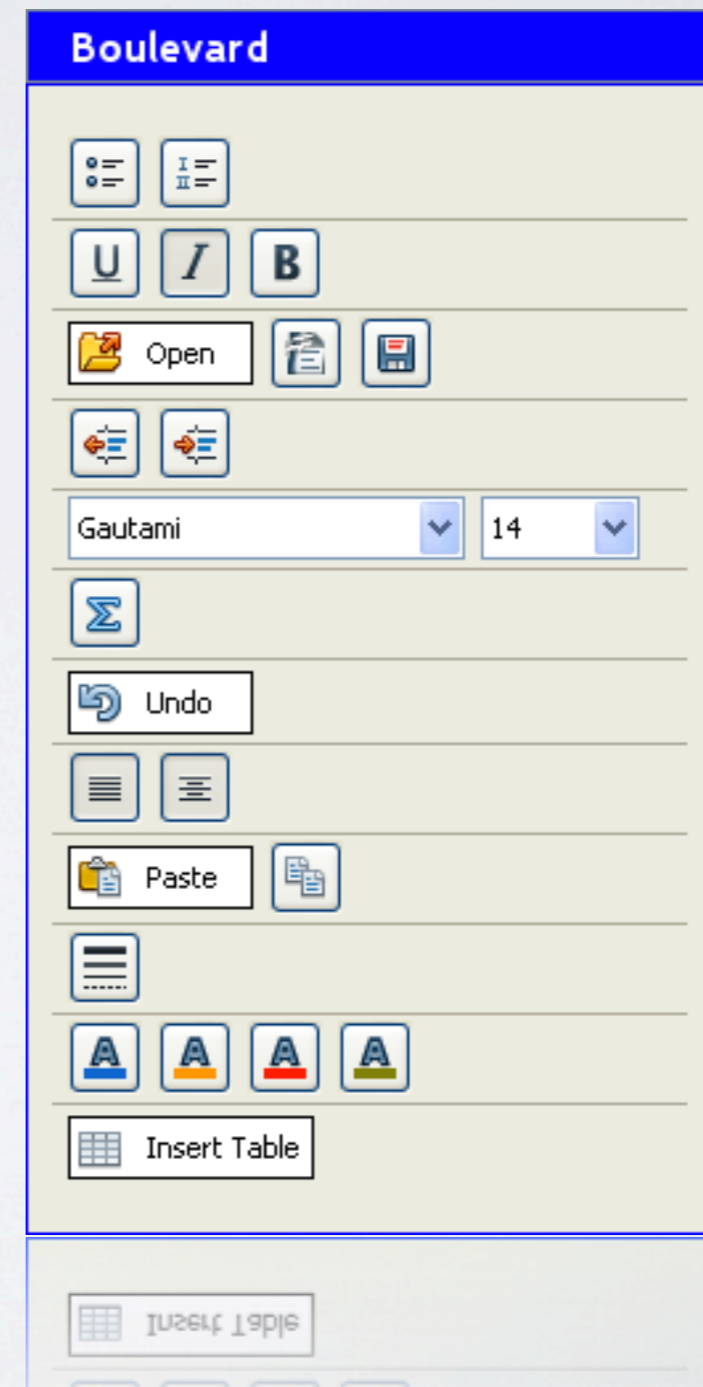
Match case Regular expression

Backwards Whole words only

Text body

IMPLEMENTATION

- OpenOffice.org
- OpenOffice.org Interceptor
- Expert System (Clips)
- Java, Swing



DEMO

Boulevard

✂ ✕

☰

I **B**

📄

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Mauris ullamcorper massa sem, vel imperdiet orci. Curabitur commodo scelerisque libero. Duis bibendum hendrerit erat. Sed id sapien at nisi vulputate tempor eu non felis. Nulla facilisi. Nam tempus venenatis lectus quis malesuada. Aliquam eget eros ipsum, ac faucibus neque. Nullam lacinia venenatis mauris eget commodo. Nunc conwallis condimentum elit a facilisis. Aenean condimentum portitor purus, at ultricies purus accumsan id. Nulla malesuada metus eget tortor sodales eget eleifend nisi rutrum. Pellentesque sem ante, rhoncus sed egestas et, gravida a neque. Ut semper pretium quam, sed blandit quam posuere eu. Mauris nec risus lorem. Curabitur nec imperdiet mi. Pellentesque sed nunc accumsan justo dapibus mollis. Integer laoreet nulla eget erat sagittis sit amet consequat tortor vehicula. Nullam imperdiet. ¶

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FUTURE WORK

- Boulevard as adaptive user interface for people with disabilities
- workflow analysis and its adaptation
- revise current Boulevard
- deploy Boulevard to end-users and long-term study
- visualization of adaptivity

USABILITY TEST

- comparison of toolbar vs Boulevard vs menu
- measuring task completion time and error rates
 - no statistically significant difference was found between toolbar and Boulevard
- questionnaires
 - Boulevard rated as a better interaction style than toolbar

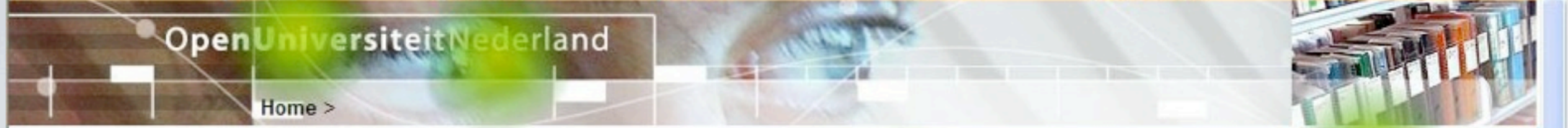


Source: SolidWorks

TESTING USABILITY

USABILITY TESTING

- mock-ups vs real software
- quantitative approach
 - exact
 - time, error rates, distance, ...
 - loggers
- qualitative approach
 - subjective
 - behavior, feelings, beauty, ...
 - questionnaires



- ▶ Home
- ▶ Studeren
- ▶ **Over de OU**
- ▶ Actueel
- ▶ Onderzoek
- ▶ OU zakelijk
- ▶ Handig
- Introduction
- Study with us
- Innovation
- Internationalisation
- R&D
- Partnerships
- Departments and Schools
- Studyprogrammes
- Organisation
- Addresses

Introduction to Open Universiteit Nederland



Open Universiteit Nederland, which welcomed its first students in September 1984, is an independent government-funded institute for distance learning at university level. The Dutch government's purpose in founding Open Universiteit Nederland was to make higher education accessible to anyone with the necessary aptitudes and interests, regardless of formal qualifications.

A profile of Open Universiteit Nederland in 2006, tells you more about our organisation and mission, the facts and figures, study methods, objectives, et cetera over the year 2006. See 'Organisation' for recent facts and figures (as per 31-12-2006).

PDF Growing through lifelong learning.

Open Universiteit Nederland identifies four further aims:

- to create a cost-effective form of higher education,
- to encourage innovation in Dutch higher education, in terms of both curriculum and teaching methods,
- to reduce the teacher shortage in Dutch primary and secondary schools, and
- to be a recognized player in (commercial) distance and e-learning training programmes and consultancy.

Lifelong learning

In addition, our organisation aims to play a key role, both for the Netherlands and internationally, as

Lees voor

Dies natalis
28 september 2007
Workshops met o.a. **Stienne Wenger**

- Courses in English**
- Projectmanagement
 - Introduction to International Economics
 - Geo Information Systems
 - Remote Sensing
 - Neurobehavioural Toxicology and Addiction
 - Environmental Policy in an International Context

