HCI Detailed Design

Interface selection and consolidation

- For each subtasks and scenes in the storyboard, particular software interface components (e.g. widgets), interaction technique (e.g. voice recognition), hardware (sensors, actuators, buttons, display, etc.) will be chosen.

- Consider response time

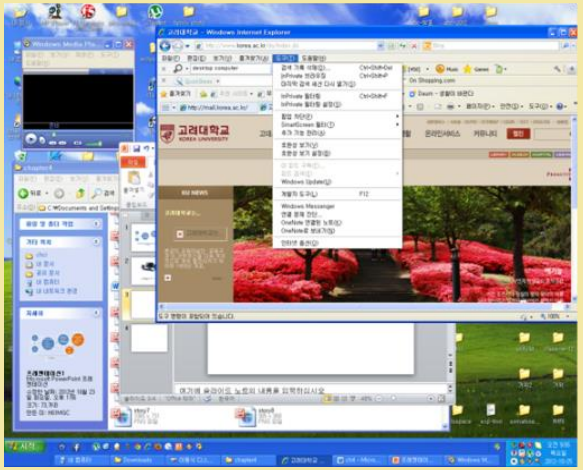
- The chosen individual interface components need to be consolidated into a practical package, because not all of these interface components may be available on a working platform (e.g. Android based smart phone, desktop PC, mp3 player). Certain choices will have to be retracted in the interest of employing a particular interaction platform.

Interface choices: Hardware/Platform

- Desktop
- Mobile
- Pad
- Kiosk
- Embedded
- TV / Console
- VR / AR
- Free form

Interface choices: Software components

- Command line
- WIMP/2D
  - Windows/Layers
  - Icons
  - Menu
  - GUI
  - Direct interaction
- Non-Wimp
  - 3D, Gesture, Voice, Multimodal, …



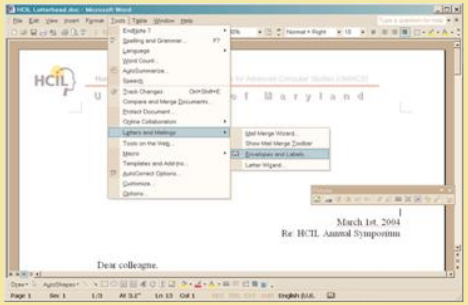
Interface choices: Types of menus

메뉴 형태	사용처
풀다운	최상위㈜ 범주 메뉴
팝업	객체 별 메뉴, 상황 별 메뉴
도구 모음	기능 / 운영 작업
탭	서류철 메타포 (범주 메뉴)
스크롤 메뉴	긴 메뉴 (많은 메뉴 항목)
2 차 원 배 열 / 이미지 맵	아이콘 (긴 이름 대신) 또는 그림으로 항목을 나타냄
버튼/ 하이퍼링크	짧은 메뉴 (적은 선택)
체 크 상 자 / 선 택 버 튼 (Radio buttons)	다중 선택 / 배타적인 선택
단축키	전문가용
청각 메뉴	텔레마케팅, 장애인용

[Table 4.1] Where to use different menu styles for.

Menu type	Usage
Pull down	Top level (main) categorical menu
Pop up	Object specific, context specific
Tool bar	Functional / operational tasks
Tabs	File folder metaphor (categorical menu)
Scroll menu	Long menu (many menu items)
2D array / Image maps	Identification of items by icons (vs. by long names) or pictures
Buttons / Hyperlinks	Short menu (few choices)
Check boxes / Radio buttons	Multiple choice / Exclusive choice
Hot Keys	For expert users
Aural menu	Telemarketing, For the disabled

Interface choices: Types of menus



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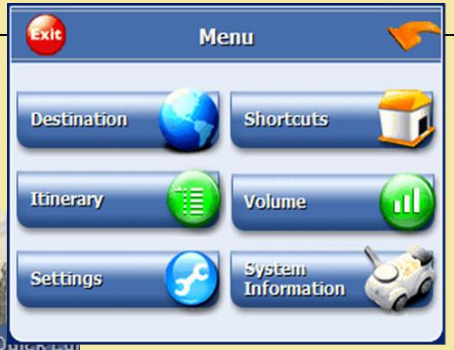
(b)



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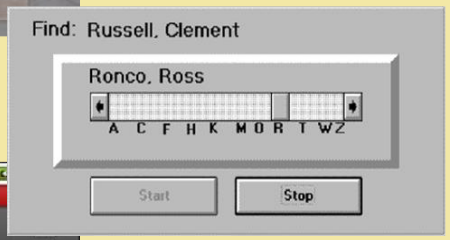
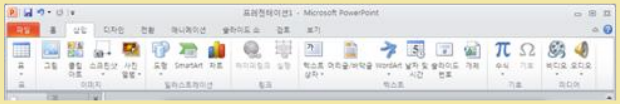


(c)

(d)

(c)



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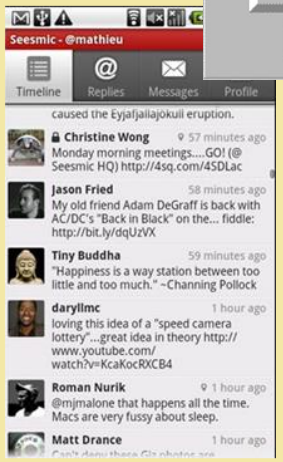
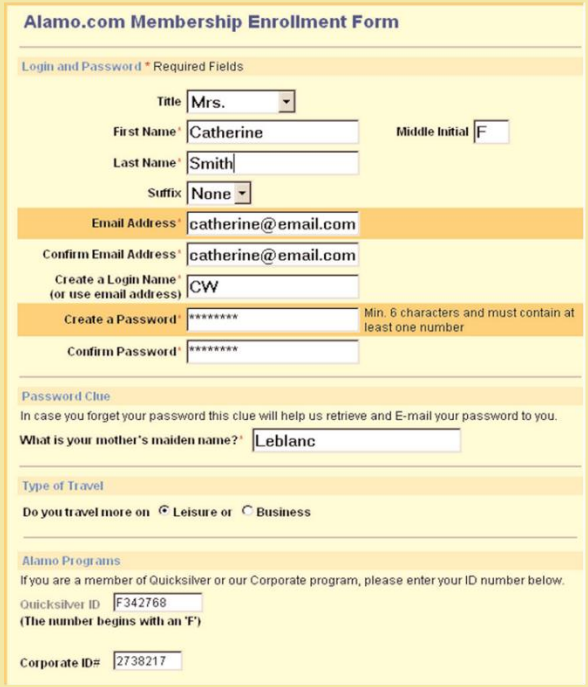


(e)

Interface choices: GUIs

- Text box – for making short/medium alphanumeric input
- Forms – Mixture of menus, buttons and text boxes for long thematic input
- Dialog/Combo boxes - Mixture of menus, buttons and text boxes for short mixed mode input



(a)

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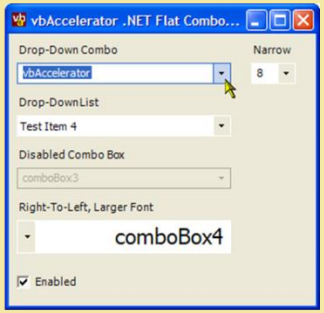

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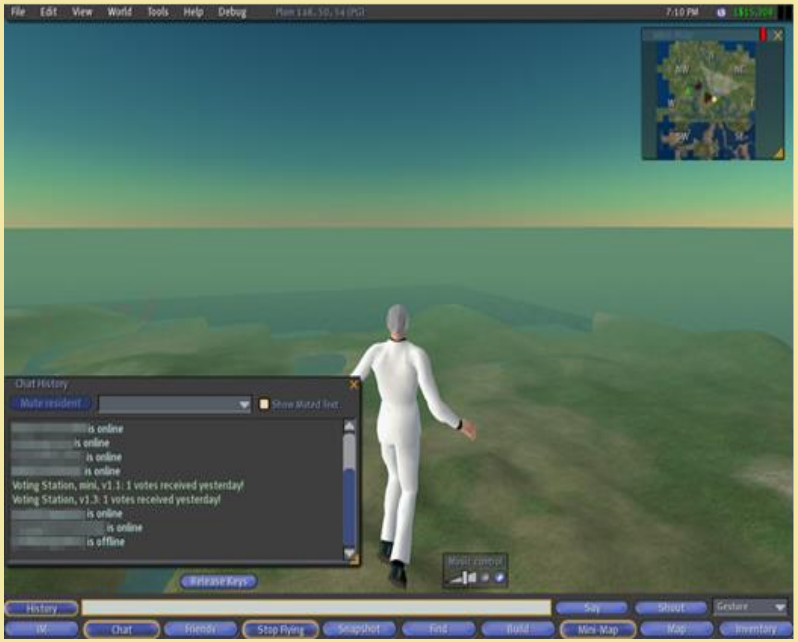
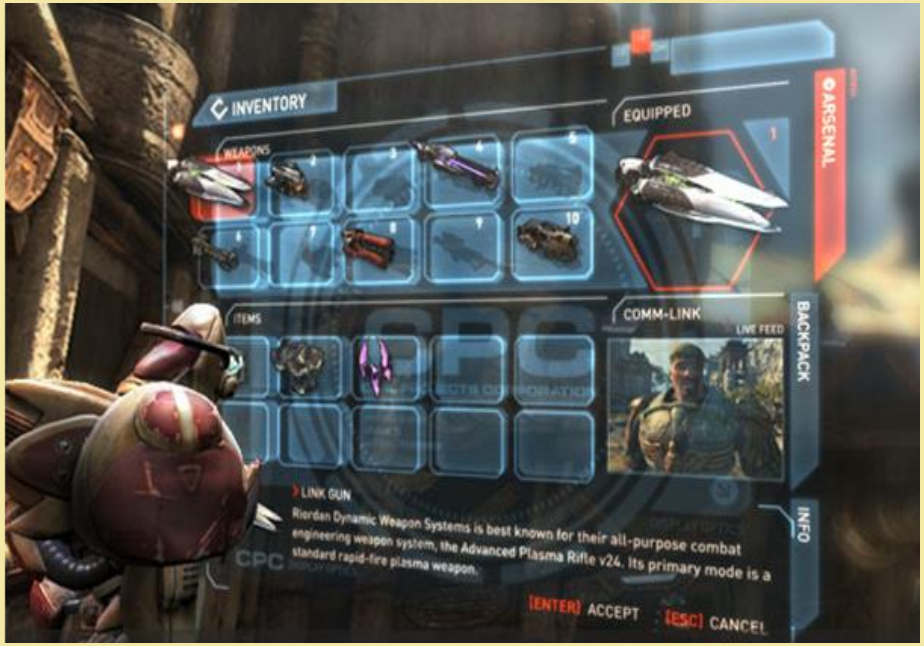
Interface choices: 3D in 2D





기준	주요 범주	예시
사용자 유형	나이/세대/성별 장애/접근성[W3C] 소비자 집단 직업 문화/국적[ref]	아이 [ref], 노인 [ref], 시각 장애인 [ref], 베이비 붐 세대, 학생, 부모, 동양인, 운동 선수
플랫폼/시스템 구성	이동형/휴대형기기/데스크탑 대형 화면/임베디드 가상현실 공용 장치 운영체제/네트워크	스마트폰 [ref], 스마트패드 장치, 데스크탑 [ref], 키오스크, 임베디드 운영체제, 클라우드 기반 [ref], 네비게이션 시스템, 게임 장치, MP3 플레이어, 전자 책
서비스 제공자 / 기관	개인 공공 설계 형식 / 정체성	NASA [ref], 고려대학교 [ref], 안드로이드 [ref], iOS [ref], 윈도우즈 XP [ref]
인터페이스 형식/ 양식 / 기술	WIMP / 비 WIMP 3D 다중 양식	목소리/청각 [ref][std], 제스쳐 [ref], 싱글/멀티터치 [ref], 택타일/햅틱, 다중 양식 [ref][std], 메뉴 기반 [ref], GUI/위젯 [ref], 시각적 인식 [ref][std]
작업/조작 맥락	위치/장소/시간 [std] 소음/조명 몸 제약 [tsd]	사무실, 실외, 도로/거리, 집, 자동차, 지하철, 강의실, 아이즈프리(Eyes free), 핸즈프리, 잘 쓰는 손(handedness)
응용 프로그램	게임 / 미디어/정보 / 전자 상업 / 설계/편집 / 소셜 네트워크 서비스	
HCI 하위 구분 (일반)	화면 배치 [ref] / 정보 구조/네비게이션 [ref] / 입력 방법 [ref] / 정보/결과 가시화 [ref] / 설계 절차와 실행 [ref] / 사용자 경험 [ref] / 일반적인 미학	

More detailed design

- Content organization
  - Task/Information structure
  - Navigation

- Display and Lay-out
  - Menu selection, form fill-in, and dialog-box formats
  - Wording of prompts, feedback, and error messages
  - Justification, white space, and margins
  - Data entry and display formats for items and lists
  - Use and contents of headers and footers

More detailed design

- Action sequences (micro level interaction methods)
  - Direct-manipulation clicking, dragging, dropping, and gestures
  - Command syntax, semantics, and sequences
  - Programmed function keys
  - Error handling and recovery procedures

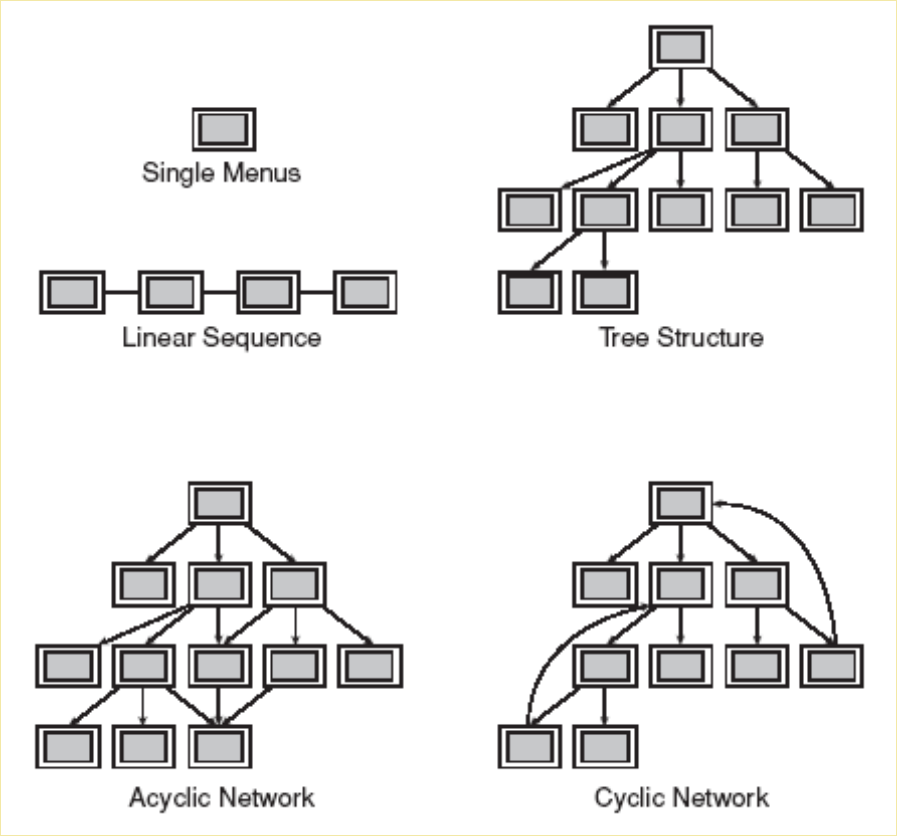
- Words / Icons / Labels / Color
  - Terminology (objects and actions), abbreviations, and capitalization
  - Character set, fonts, font sizes, and styles (bold, italic, underline)
  - Icons, graphics, line thickness, and
  - Use of color, backgrounds, highlighting, and blinking

Content Organization

- **Task-related grouping in tree organization**
  - Create groups of logically similar items
  - Form groups that cover all possibilities
  - Make sure that items are non-overlapping
  - Use familiar terminology, but ensure that items are distinct from one another

Task Model → Task-Related Organization → **Menu**

- The primary goal: create a sensible, comprehensible, memorable, and convenient organization relevant to the user task

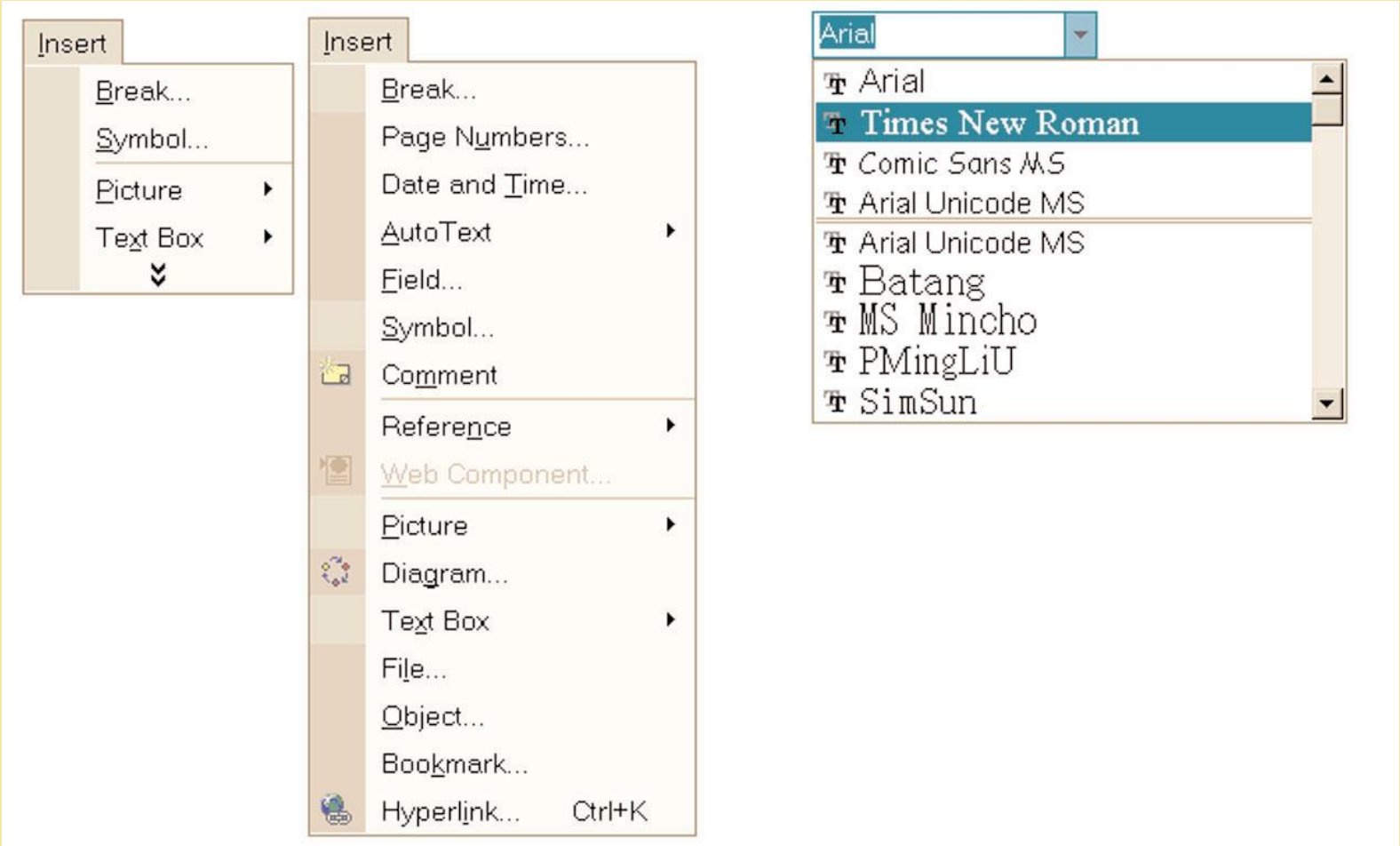


- Categorical (Semantic) vs. Naïve
  - OAI
- Network vs. Hierarchy
- Frequency based (hand-held/mobile)

Content Organization: Item Presentation Sequence

- The order of items in the menu is important, and should take natural sequence into account when possible:
  - Time
  - Numeric ordering
  - Physical properties
- When cases have no task-related orderings, the designer must choose from such possibilities as:
  - Alphabetic sequence of terms
  - Grouping of related items
  - Most frequently used items first
  - Most important items first

Content Organization



Content Organization: Menu Layout Rules

- Use task semantics to organize menus (single, linear sequence, tree structure, acyclic and cyclic networks)
- Prefer broad–shallow to narrow–deep
- Show position by graphics, numbers, or titles
- Use items as titles for subtrees
- Group items meaningfully
- Sequence items meaningfully
- Use brief items, begin with the keyword
- Use consistent grammar, layout, terminology
- Allow type ahead, jump ahead, or other shortcuts
- Enable jumps to previous and main menu
- Consider online help; novel selection mechanisms; and optimal response time, display rate, screen size

Content Organization: Titles

- For single menus, use a simple descriptive title
- For tree-structured menus, use the exact same words in the higher-level menu items as in the titles for the next lower-level menu.
  - E.g. if a menu item is called Business and Financial Services, the next screen should have that phrase as its title
- Phrasing of menu items
  - Use familiar and consistent terminology
  - Ensure that items are distinct from one another
  - Use consistent and concise phrasing
  - Bring the keyword to the left

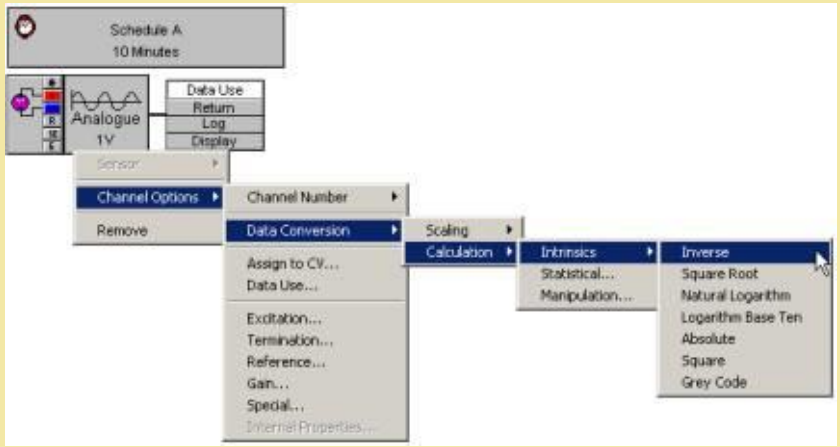
Content Organization: Others

- **Graphic layout and design (Consider constraints by)**
  - Screen width and length
  - Character set
  - Highlighting techniques

- **Establish guidelines for consistency of at least these menu components:**
  - Titles and Item placement
  - Instructions
  - Error messages/ Status reports

Content Organization: Others

- **Standard Techniques**
  - Indentation and Upper/lower case characters
  - Symbols such as * or - to create separators or outlines
  - Position markers
  - Cascading or walking menus



- **Keyboard shortcuts**
  - Fast navigation
  - Supports expert use
  - Bookmarks in browsers
  - User configured toolbars

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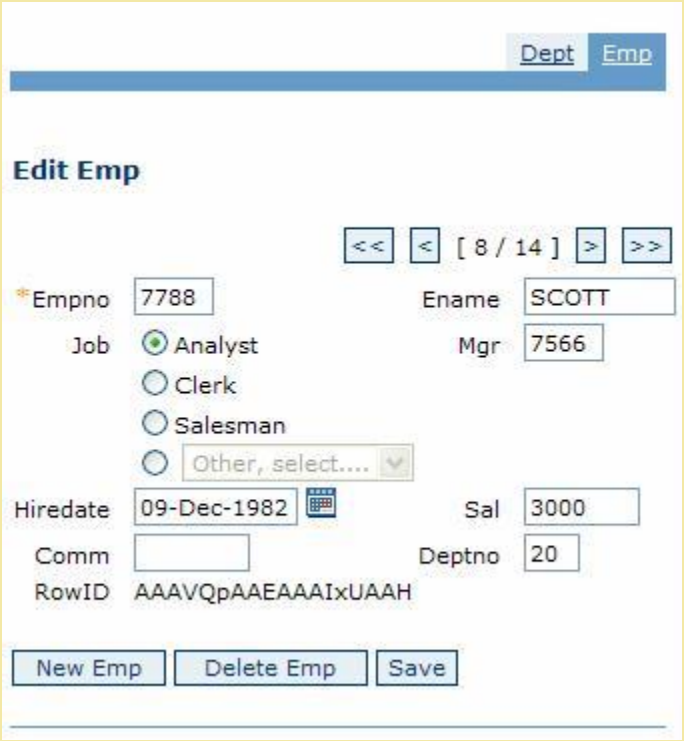
Single Menus

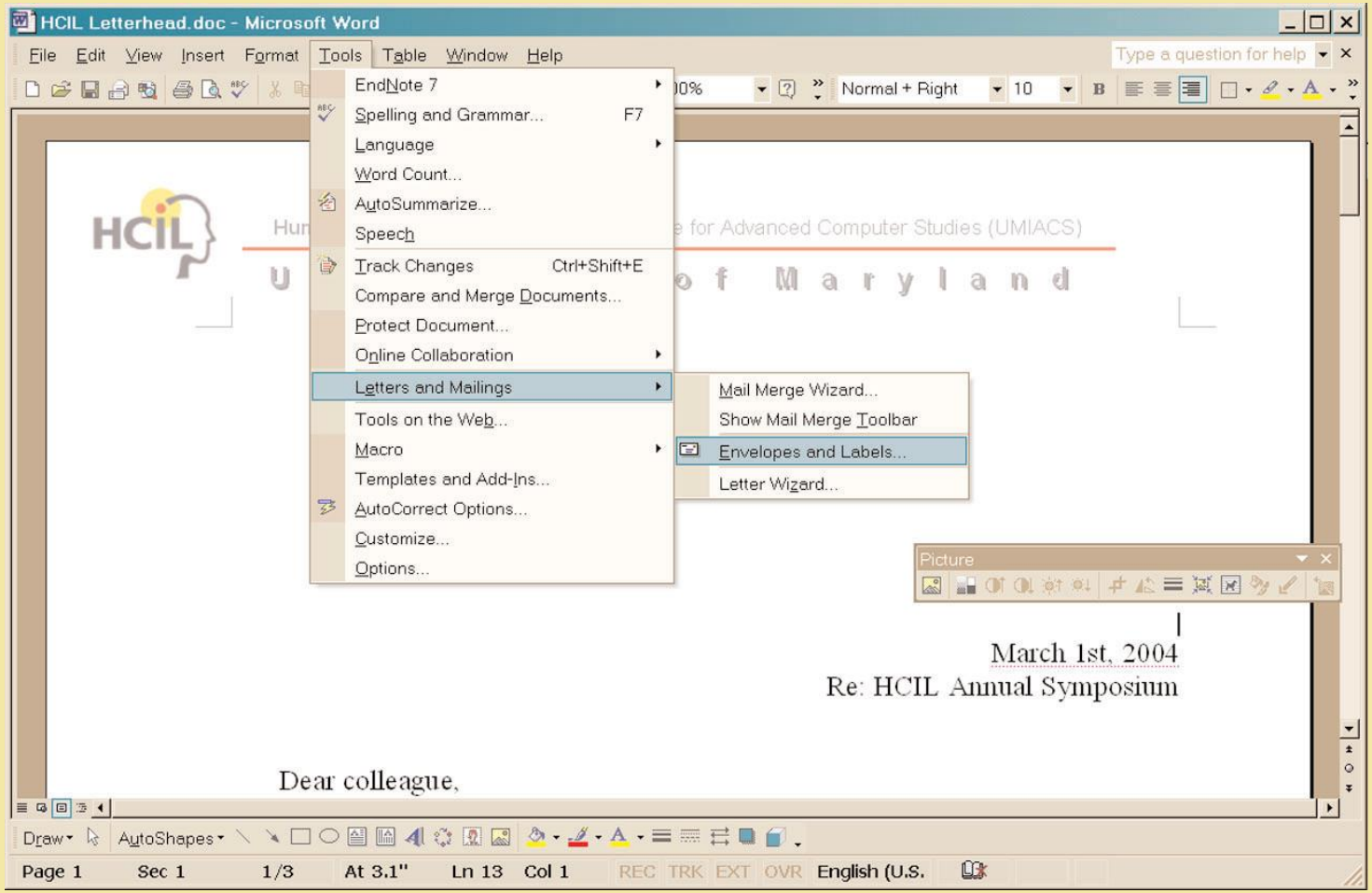
- **Binary Menus**
  - Mnemonic letters
  - Radio Buttons
  - Button Choice
- **Multiple-item Menus**
- **Multiple-selection menus or check boxes**



Single Menus: Pull-down, Pop-up and Toolbar

- Pull-down menus
  - Always available to the user by making selections on a top menu bar
  - Key board shortcuts
    - E.g., Ctrl-C important to support expert user efficiency
- Toolbars, iconic menus, and palletes
    - Offers actions on a displayed object
- Pop-up menus
    - Appear on a display in response to a check or tap with a pointing device

Single Menus



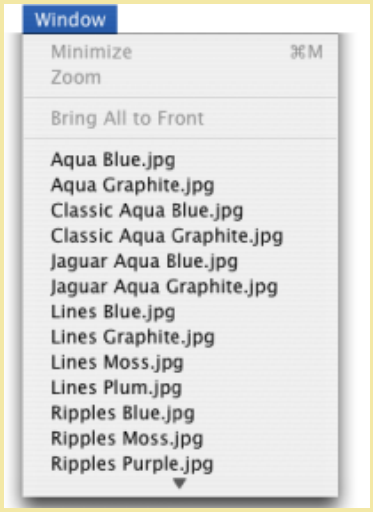
Single Menus (Pop-up/Embedded)

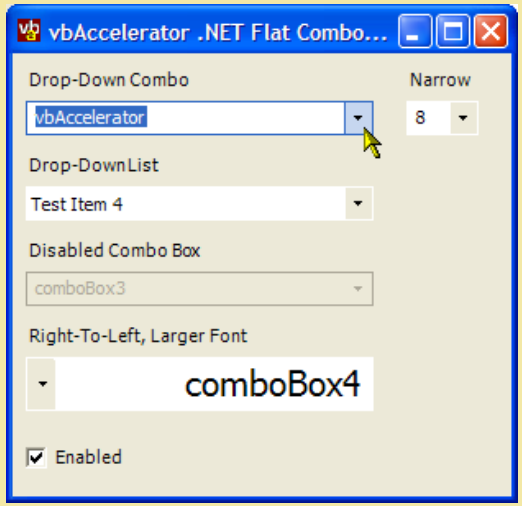
Single Menus for Long List:
Scrolling, Combo and Fisheye

- Scrolling menus display the first portion of the menu and an additional menu item, typically an arrow that leads to the next set of items in the menu sequence

- Combo boxes combine a scrolling menu with a text-entry filed

- Fisheye menus display all of the menu items on the screen at once, but show only items near the cursor at full size





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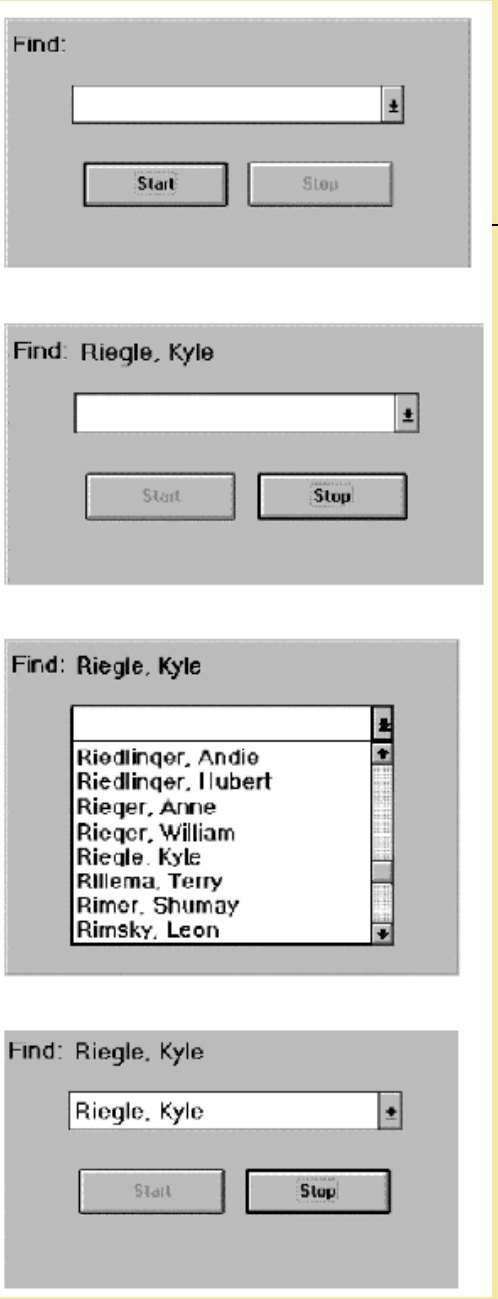
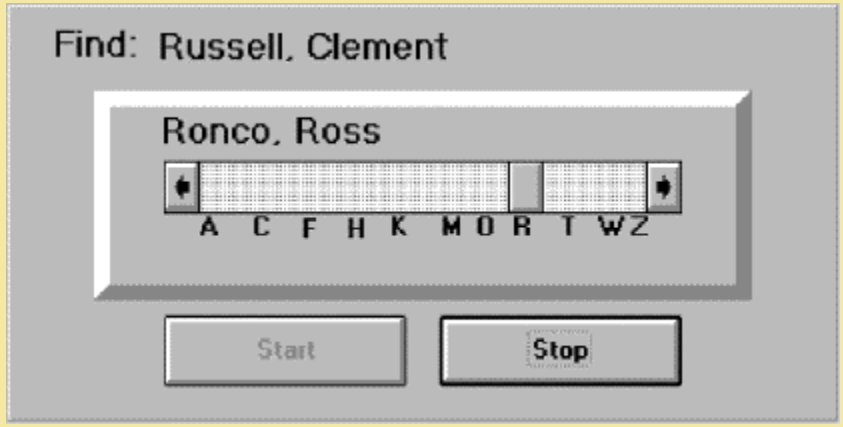


Single Menus: Alphasliders

- When items consist of ranges or numerical values, a slider is a natural choice to allow the selection of a value
- The alphaslider uses multiple levels of granularity in moving the slider thumb and therefore can support tens or hundreds of thousand of items



Single Menus: 2D

- "Fast and vast" two-dimensional menus give users a good overview of the choices, reduce the number of required actions, and allow rapid selection

Single Menus: Embedded and Hot Links

- Embedded menus are an alternative to explicit menus

- It is natural to allow users reading about people, events, and places to retrieve detailed information by selecting menus in context

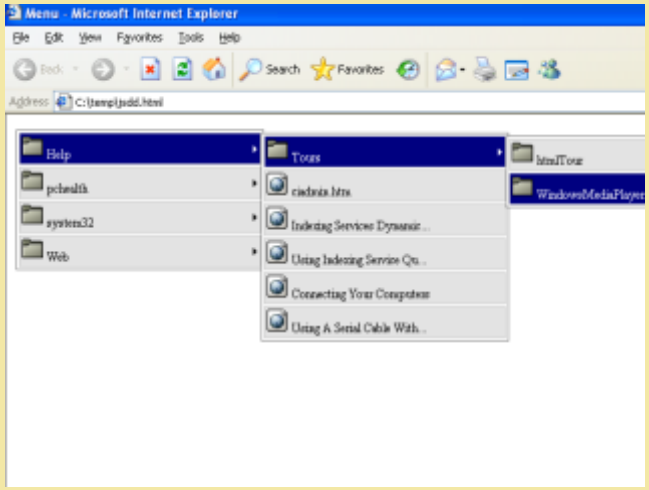
Combination of multiple menus

- **Linear menu sequences and simultaneous menus**
  - Linear
    - Guide the user through complex decision-making process
      - E.g. Cue cards or "Wizards"
    - Effective for novice users performing simple tasks
  - Simultaneous
    - Present multiple active menus at the same time and allows users to enter choices in any order

Combination of multiple menus

- Tree-structured menus
  - Designers can form categories of similar items to create a tree structure
    - E.g., fonts, size style, spacing
  - Fast retrieved if natural and comprehensive
  - Use terminology from the task domain
  - Expanding menus maintain the full context of each choice
    - Continue to allow access to most things

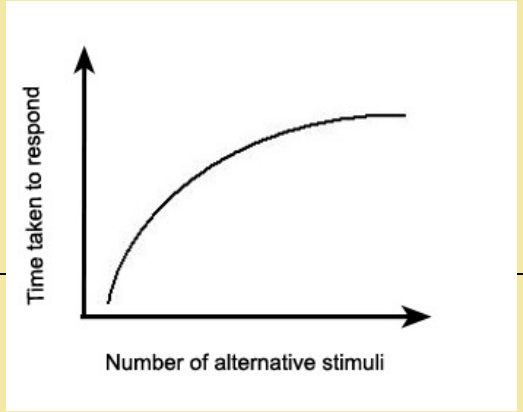
Combination of multiple menus: Navigation



- Depth vs. Breadth
  - Depth > 4 → Disorientation, Slow

    T = k + c log b, where D = $\log_b N$ (c, k are constants) → Hick Hyman Law
    - T: Time, b: branching factor (e.g. 16),
    - D: depth (e.g. 3)
    - N: total # of items (4096)
    - Total time = D * (k + c log b) → e.g. 3 * (k + c log 16)
  - Too much breadth → against working memory (magic number!)
  - Good Choice?: 3 level Max. 16 options

Hick-Hyman Law

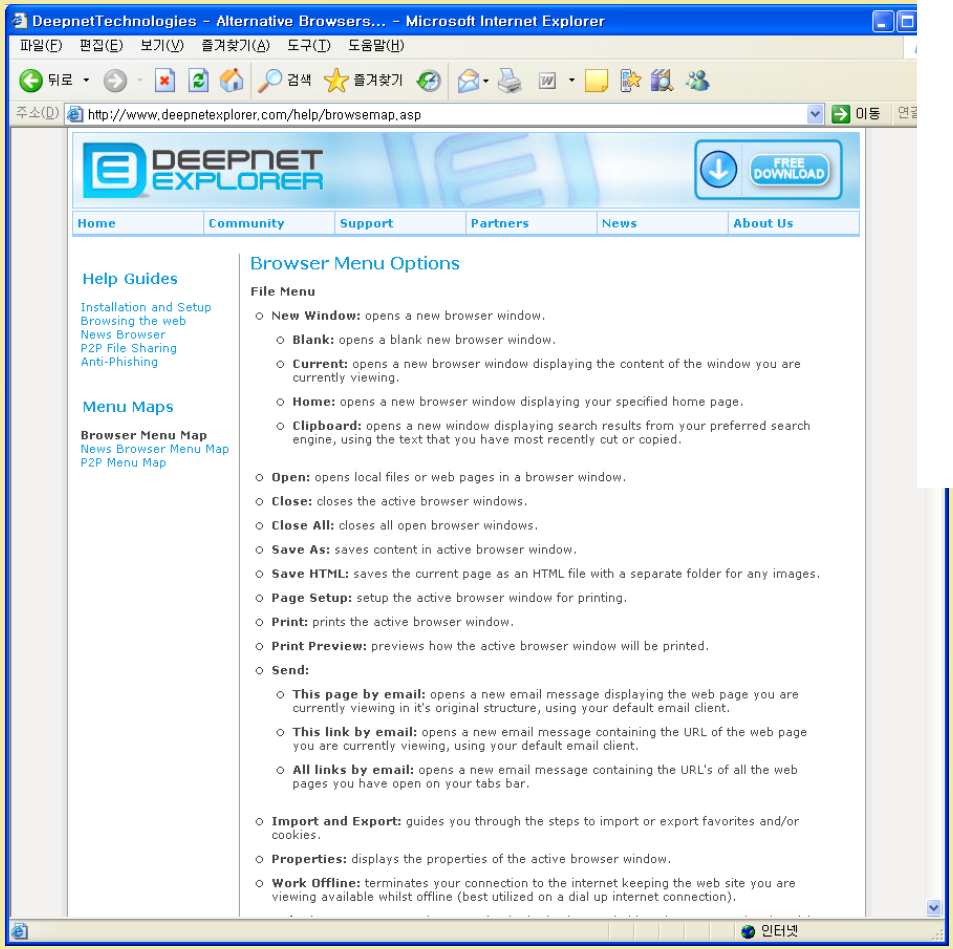


- describes the time it takes for a person to make a decision as a result of the possible choices: increasing the number of choices will increase the decision time logarithmically.
- Hick's law is sometimes cited to justify menu design decisions. For example, to find a given word (e.g. the name of a command) in a randomly ordered word list (e.g. a menu), scanning of each word in the list is required, consuming linear time, so Hick's law does not apply. However, if the list is alphabetical and the user knows the name of the command, he or she may be able to use a subdividing strategy that works in logarithmic time.

Combination of multiple menus

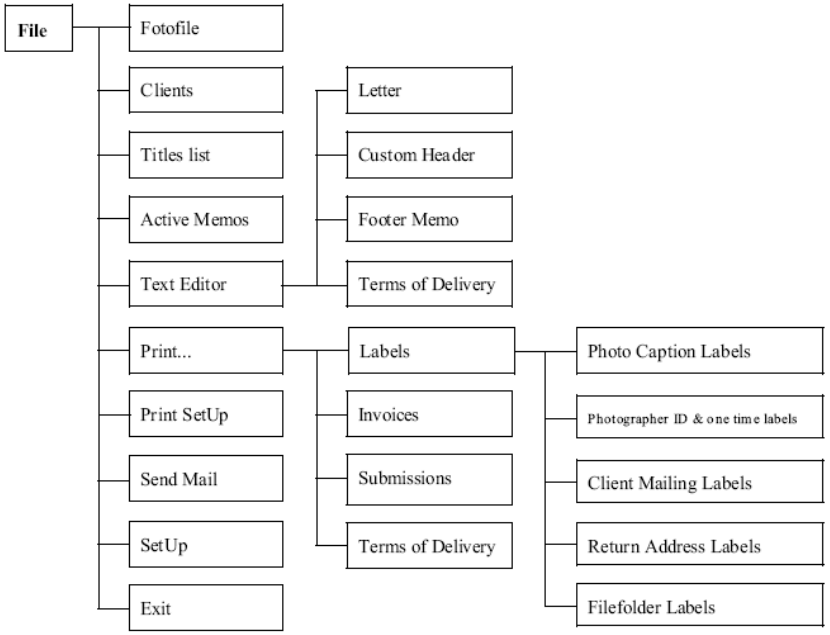
- **Menu Maps**
  - Menu maps can help users stay oriented in a large menu tree
  - Effective for providing overviews to minimize user disorientation

- **Acyclic and Cyclic Networks**
  - Useful for
  - social relationships
  - transportation routing
  - scientific-journal citations
  - Can cause confusion and disorientation



Menu Maps

The following charts show the relationships between the various main menu items and their pull-down submenus.



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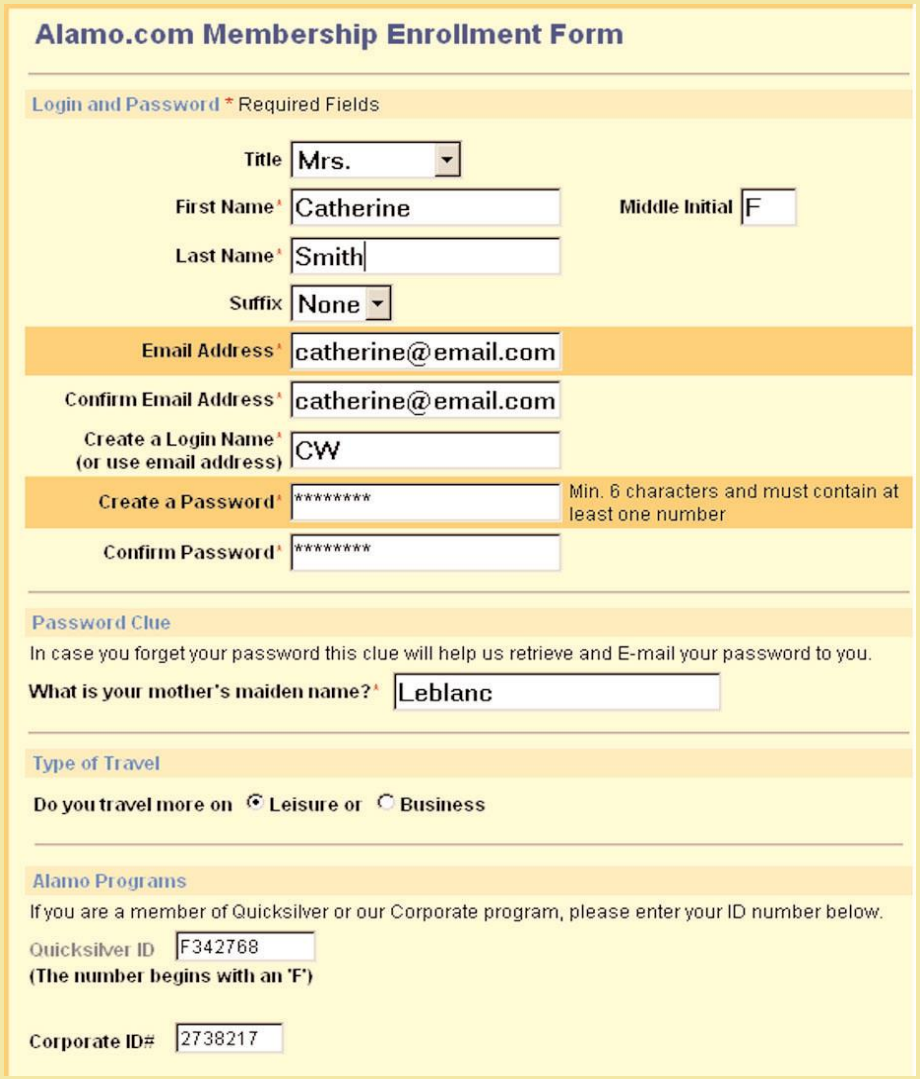
Data Entry with Menus:
Form Fill-in, Dialog Boxes, and Alternatives

- **Form Fillin**
  - Appropriate when many fields of data must be entered:
    - Full complement of information is visible to user.
    - Display resembles familiar paper forms.
    - Few instructions are required for many types of entries.
  - Users must be familiar with:
    - Keyboards
    - Use of TAB key or mouse to move the cursor
    - Error correction methods
    - Field-label meanings
    - Permissible field contents
    - Use of the ENTER and/or RETURN key.

Form Fill-in Rules

- Meaningful title
- Comprehensible instructions
- Logical grouping and sequencing of fields
- Visually appealing layout of the form
- Familiar field labels
- Consistent terminology and abbreviations
- Visible space and boundaries for data-entry fields
- Convenient cursor movement
- Error correction for individual characters and entire fields
- Error prevention
- Error messages for unacceptable values
- Optional fields clearly marked
- Explanatory messages for fields
- Completion signal

Forms Fill-in: Coded Fields



- Telephone numbers
- Social-security numbers
- Times
- Dates
- Dollar amounts
  (or other currency)

Dialog Boxes

- Combination of menu and form-fillin techniques
- Internal layout guidelines:
  - Meaningful title, consistent style
  - Top-left to bottom-right sequencing
  - Clustering and emphasis
  - Consistent layouts (margins, grid, white space, lines, boxes)
  - Consistent terminology, fonts, capitalization, justification
  - Standard buttons (OK, Cancel)
  - Error prevention by direct manipulation

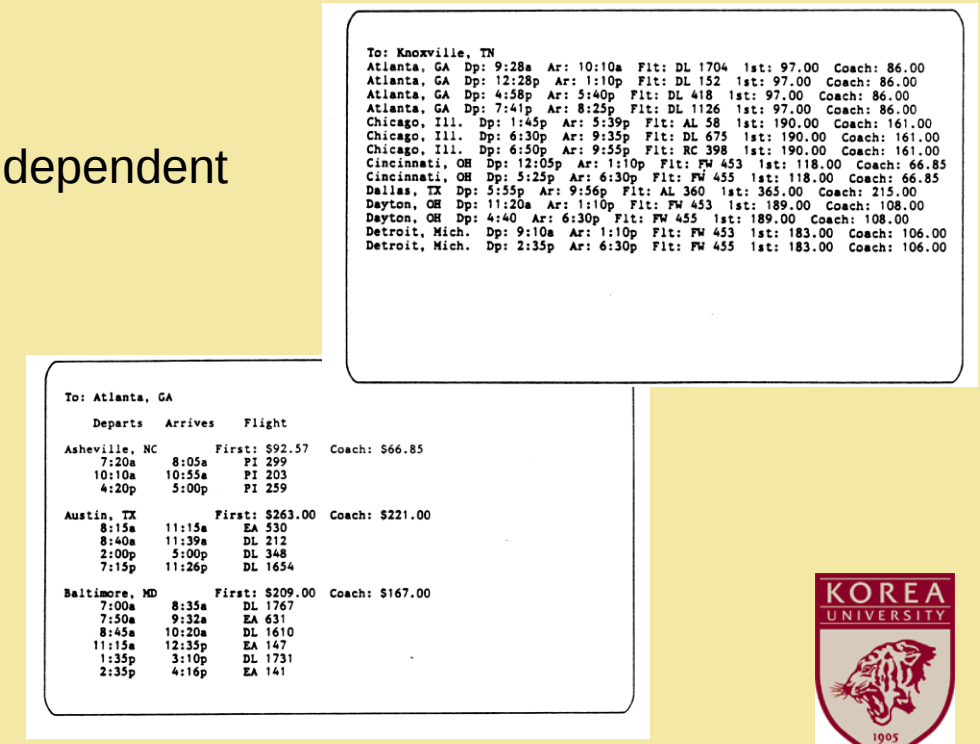
Dialog Boxes

- External Relationship (with parent window)
  - Smooth appearance and disappearance
  - Distinguishable but small boundary
  - Size small enough to reduce overlap problems
  - Display close to appropriate items
  - No overlap of required items
  - Easy to make disappear
  - Clear how to complete/cancel

Display design

- Display-complexity metrics
  - Although knowledge of the users' tasks and abilities is key to designing effective screen displays, objective and automatable metrics of screen complexity are attractive aids

- Tullis (1997) developed four task-independent metrics for alphanumeric displays:
  - Overall Density
  - Local Density
  - Grouping
  - Layout Complexity



To: Knoxville, TN

Atlanta, GA	Dp: 9:28a	Ar: 10:10a	Flt: DL 1704	1st: 97.00	Coach: 86.00
Atlanta, GA	Dp: 12:28p	Ar: 1:10p	Flt: DL 152	1st: 97.00	Coach: 86.00
Atlanta, GA	Dp: 4:58p	Ar: 5:40p	Flt: DL 418	1st: 97.00	Coach: 86.00
Atlanta, GA	Dp: 7:41p	Ar: 8:25p	Flt: DL 1126	1st: 97.00	Coach: 86.00
Chicago, Ill.	Dp: 1:45p	Ar: 5:39p	Flt: AL 58	1st: 190.00	Coach: 161.00
Chicago, Ill.	Dp: 6:30p	Ar: 9:35p	Flt: DL 675	1st: 190.00	Coach: 161.00
Chicago, Ill.	Dp: 6:50p	Ar: 9:55p	Flt: RC 398	1st: 190.00	Coach: 161.00
Cincinnati, OH	Dp: 12:05p	Ar: 1:10p	Flt: FW 453	1st: 118.00	Coach: 66.85
Cincinnati, OH	Dp: 5:25p	Ar: 6:30p	Flt: FW 455	1st: 118.00	Coach: 66.85
Dallas, TX	Dp: 5:55p	Ar: 9:56p	Flt: AL 360	1st: 365.00	Coach: 215.00
Dayton, OH	Dp: 11:20a	Ar: 1:10p	Flt: FW 453	1st: 189.00	Coach: 108.00
Dayton, OH	Dp: 4:40	Ar: 6:30p	Flt: FW 455	1st: 189.00	Coach: 108.00
Detroit, Mich.	Dp: 9:10a	Ar: 1:10p	Flt: FW 453	1st: 183.00	Coach: 106.00
Detroit, Mich.	Dp: 2:35p	Ar: 6:30p	Flt: FW 455	1st: 183.00	Coach: 106.00

To: Atlanta, GA

Departs	Arrives	Flight		
Asheville, NC		First: $92.57	Coach: $66.85	
7:20a	8:05a	PI 299		
10:10a	10:55a	PI 203		
4:20p	5:00p	PI 259		
Austin, TX		First: $263.00	Coach: $221.00	
8:15a	11:15a	EA 530		
8:40a	11:39a	DL 212		
2:00p	5:00p	DL 348		
7:15p	11:26p	DL 1654		
Baltimore, MD		First: $209.00	Coach: $167.00	
7:00a	8:35a	DL 1767		
7:50a	9:32a	EA 631		
8:45a	10:20a	DL 1610		
11:15a	12:35p	EA 147		
1:35p	3:10p	DL 1731		
2:35p	4:16p	EA 141		

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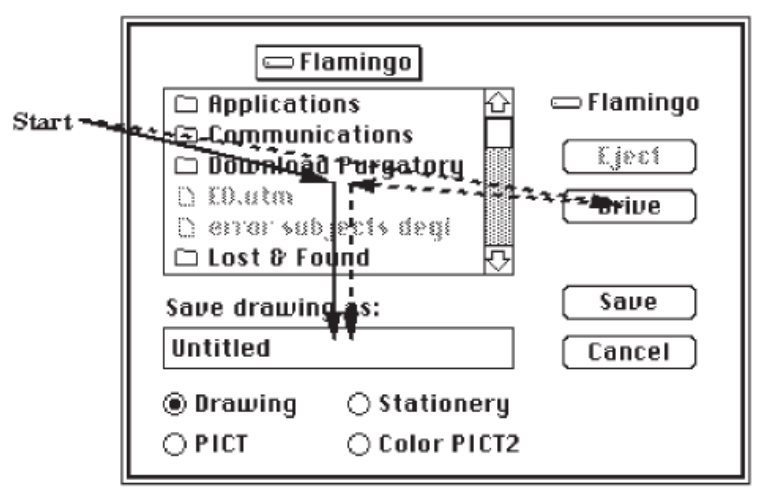
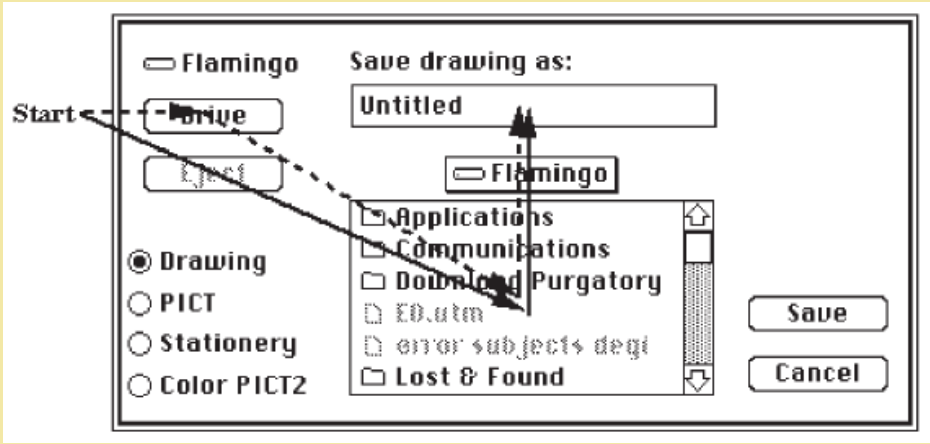
Display design

- Sears (1993) developed a task-dependent metric called *layout appropriateness* to assess whether the spatial layout is in harmony with the users' tasks





Display design

- **Field layout**
  - Blank spaces and separate lines can distinguish fields.
  - Names in chronological order, alignment of dates, familiar date separators.
  - Labels are helpful for all but frequent users.
  - Distinguish labels from data with case, boldfacing, etc.
  - If boxes are available they can be used to make a more appealing display, but they consume screen space.
  - Specify the date format for international audiences
  - Other coding categories – background shading, color, and graphic icons

- Ensure that any data that a user needs, at any step in a transaction sequence, are available for display.
- Display data to users in directly usable forms; do not require that users convert displayed data.
- Maintain a consistent format, for any particular type of data display, from one display to another.
- Use short, simple sentences.
- Use affirmative statements, rather than negative statements.
- Adopt a logical principle by which to order lists; where no other principle applies, order lists alphabetically.
- Ensure that labels are sufficiently close to their data fields to indicate association, yet are separated from their data fields by at least one space.
- Left-justify columns of alphabetic data to permit rapid scanning.
- Label each page in multipaged displays to show its relation to the others.
- Begin every display with a title or header, describing briefly the contents or purpose of the display; leave at least one blank line between the title and the body of the display.
- For size coding, make larger symbols be at least 1.5 times the height of the next-smaller symbol.
- Consider color coding for applications in which users must distinguish rapidly among several categories of data, particularly when the data items are dispersed on the display.
- When you use blink coding, make the blink rate 2 to 5 Hz, with a minimum duty cycle (ON interval) of 50%.
- For a large table that exceeds the capacity of one display frame, ensure that users can see column headings and row labels in all displayed sections of the table.
- Provide a means for users (or a system administrator) to make necessary changes to display functions, if data-display requirements may change (as is often the case).

Window design

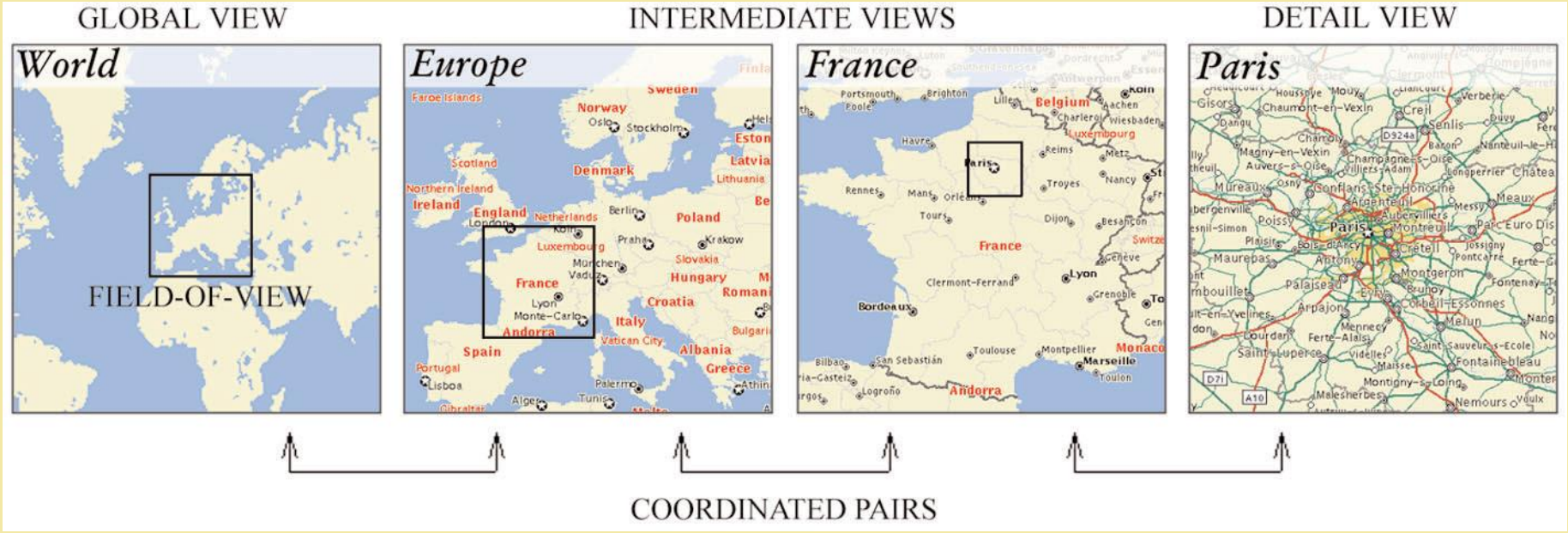
- Users need to consult multiple sources rapidly
- Must minimally disrupt user's task
- With large displays, eye-head movement and visibility are problems
- With small displays, windows too small to be effective
- Need to offer users sufficient information and flexibility to accomplish task, while reducing *window housekeeping* actions, distracting clutter, eye-head movement
  - opening, closing, moving, changing size
  - time spent manipulating windows instead of on task
- Can apply direct-manipulation strategy to windows
- Rooms - a form of window macro that enables users to specify actions on several windows at once

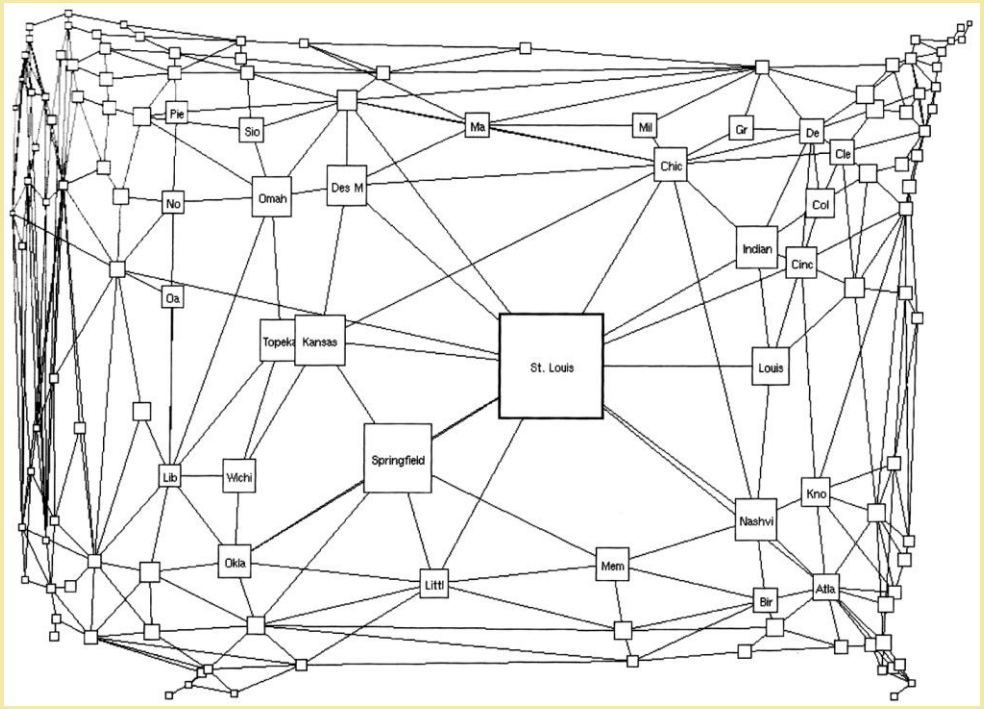
Window design

- **Coordinating multiple windows**
  - Designers may break through to the next generation of window managers by developing coordinate windows, in which windows appear, change contents, and close as a direct result of user actions in the task domain
  - Such sequences of actions can be established by designers, or by users with end-user programming tools
  - A careful study of user tasks can lead to task-specific coordinations based on sequences of actions
  - Important coordinations:
    - Synchronized scrolling
    - Hierarchical browsing
    - Opening/closing of dependent windows
    - Saving/opening of window state

Window design

- **Image browsing**
  - A two-dimensional cousin of hierarchical browsing
    - Work with large images
    - Overview in one window (context), detail in another (focus)
    - Field of view box in the overview
    - Panning in the detail view, changes the field of view box
    - Matched aspect ratios between field of view box and the detail view





Side by side placement, versus fisheye view

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Color

- Color can
  - Soothe or strike the eye
  - Add accents to an uninteresting display
  - Facilitate subtle discriminations in complex displays
  - Emphasize the logical organization of information
  - Draw attention to warnings
  - Evoke string emotional reactions of joy, excitement, fear, or anger

Color guidelines

- Use color conservatively
- Limit the number and amount of colors
- Recognize the power of color to speed or slow tasks
- Color coding should support the task
- Color coding should appear with minimal user effort
- Color coding should be under user control
- Design for monochrome first
- Consider the needs of color-deficient users
- Color can help in formatting
- Be consistent in color coding
- Be alert to common expectations about color codes
- Be alert to problems with color pairings
- Use color changes to indicate status changes
- Use color in graphic displays for greater information density

Non-anthropomorphic design

- Concerns
  - attributions of intelligence, autonomy, free will, etc can deceive, confuse, and mislead users
  - important to clarify differences between people and computers
  - although attractive to some people, an anthropomorphic interface can produce anxiety in others
    - computers can make people feel dumb
    - computers should be transparent and support concentrating on the task in hand
  - mature technology should avoid Mumford's obstacle of animism
  - anthropomorphic interfaces may distract users
    - Microsoft’s ill-fated Clippet character was intended to provide help suggestions
      - Amused some, but annoyed many
      - Disruptive interference
      - Lacked appropriate emotional expressions

Non-anthropomorphic design

- Advocates of anthropomorphic interfaces suggest that they may be most useful as teachers, salespeople, therapists, or entertainment figures

- An alternative design is to present a human author of a package through prerecorded audio or video

- Guidelines
  - Be cautious in presenting computers as people.
  - Design comprehensible, predictable, and controllable interfaces.
  - Use appropriate humans for introductions or guides.
  - Use cartoon characters in games or children’s software, but usually not elsewhere
  - Do not use 'I' pronouns when the computer responds to human actions.
  - Use "you" to guide users, or just state facts.

Error messages

- Phrasing of error messages or diagnostic warnings is critical, especially when dealing with novices

- Avoid
  - imperious tone that condemns user
  - messages that are too generic (e.g. WHAT? or SYNTAX ERROR)
  - messages that are too obscure (e.g. FAC RJCT 004004400400)

- Specificity

Poor	**Better**
SYNTAX ERROR	Unmatched left parenthesis
ILLEGAL ENTRY	Type first letter: **S**end, **R**ead, or **D**rop
INVALID DATA	Days range from 1 to 31
BAD FILE NAME	File names must begin with a letter

Error messages

- Constructive guidance and positive tone
  - Messages should, where possible, indicate what users should do to correct the problem
  - Unnecessarily hostile messages using violent terminology can disturb non-technical users:
    - FATAL ERROR, RUN ABORTED
    - CATASTROPHIC ERROR: LOGGED WITH OPERATOR
    - Negative terms such as ILLEGAL, ERROR, INVALID, BAD should be eliminated or used infrequently

Poor	**Better**
Run-Time error '-2147469 (800405): Method 'Private Profile String' of object 'System' failed.	Virtual memory space consumed. Close some programs and retry.
Resource Conflict Bus: 00 Device: 03 Function: 01	Remove your compact flash card and restart
Network connection refused.	Your password was not recognized. Please retype.
Bad date.	Drop-off date must come after pickup date.

Error messages

- **User-centered phrasing**
  - Suggests user controls the interface, initiating more than responding
  - User should have control over amount of information system provides e.g. screen tips; a help button for context-sensitive help or an extensive online user manual
  - Telephone company, “We’re sorry, but we are unable to complete your call as dialed. Please hang up, check your number, or consult the operator for assistance”, versus “Illegal telephone number. Call aborted. Error number 583-2R6.9. Consult your user manual for further information.’


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Display design

- Effective display designs must provide all the necessary data in the proper sequence to carry out the task

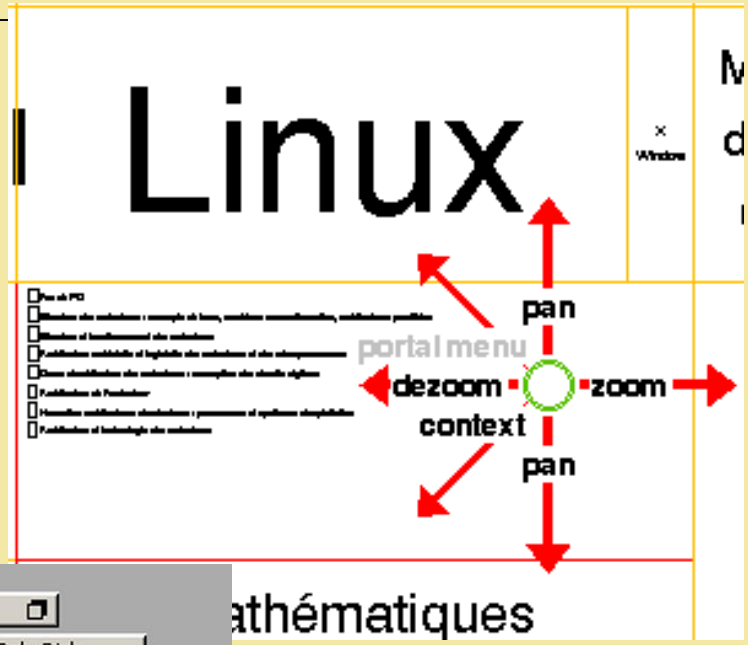
- Mullet and Sano's categories of design principles:
  - Elegance and Simplicity: unity, refinement and fitness
  - Scale, Contrast, and Proportion: clarity, harmony, activity, and restraint
  - Organization and Visual Structure: grouping, hierarchy, relationship, and balance
  - Module and Program: focus, flexibility, and consistent application
  - Image and Representation: immediacy, generality, cohesiveness, and characterization
  - Style: distinctiveness, integrity, comprehensiveness, and appropriateness

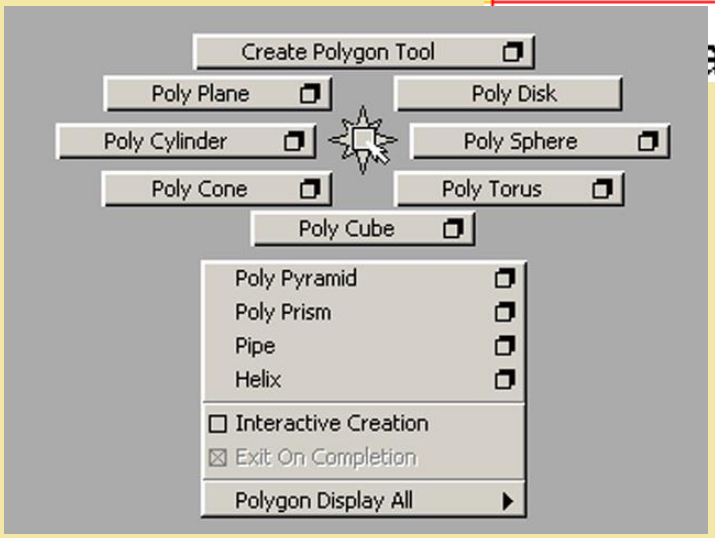
Display design

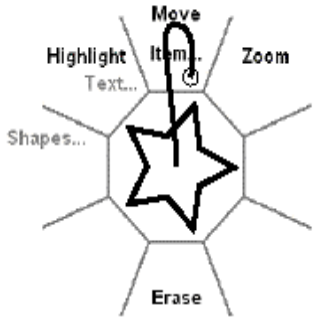
- **Empirical results**
  - structured form superior to narrative form
  - improving data labels, clustering related information, using appropriate indentation and underlining, aligning numeric values, and eliminating extraneous characters improves performance
  - performance times improve with fewer, denser displays for expert users
  - screen contents should contain only task-relevant information
  - consistent location, structure, and terminology across displays important
  - sequences of displays should be similar throughout the system for similar tasks

Alternatives: Menus and Direct Manipulation

- Pie menus
- Control menus
- Marking menus
- Flow menus
- Toolglass



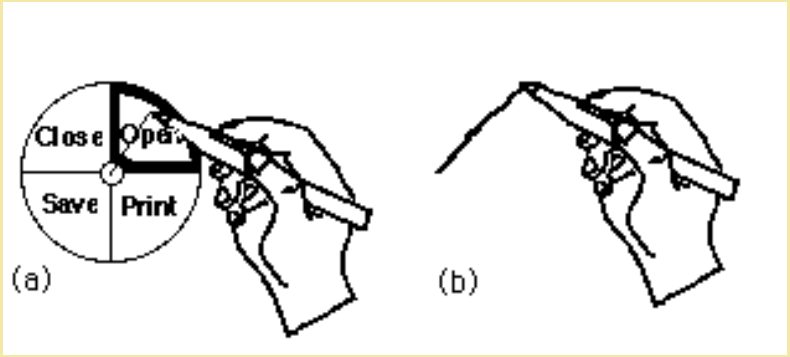


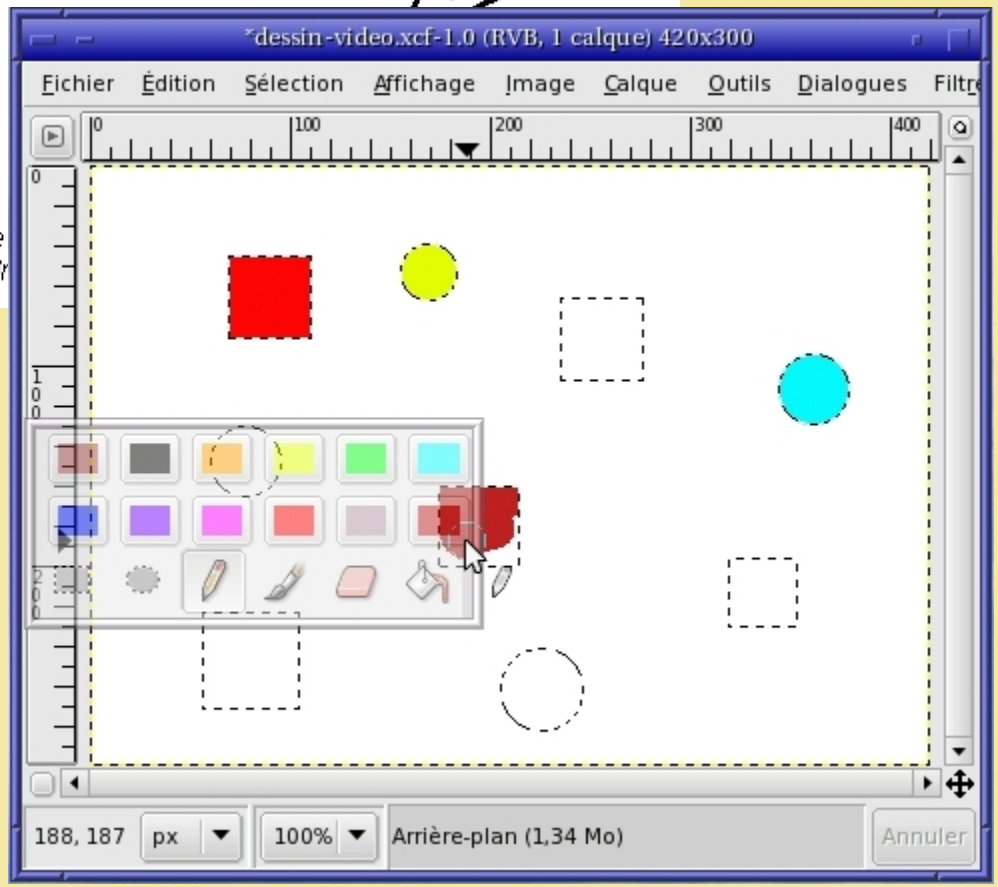


a

b

FlowMenu interaction integrates smoothly with direct manipulation. Here
user continues directly with the dr





Error messages

- **Appropriate physical format**
  - use uppercase-only messages for brief, serious warnings
  - avoid code numbers; if required, include at end of message
  - debate over best location of messages. E.g. Could be:
    - near where problem arose
    - placed in consistent position on bottom of screen
    - near to, but not obscuring relevant information
  - audio signals useful, but can be embarrassing - place under user control

Visual Guidelines

- Welcome
- What's New
- About the Design
- Fonts
- Colors
- Icons
- Controls
- Folders & Layouts
- FAQ

Welcome to the Windows XP Visual Guidelines

We are excited to share with you the new look and feel of Windows XP.

We changed the look of Windows to make your computer more exciting to use. Say goodbye to Windows grey and say hello to fresh colors, soft curves, rich gradients and friendly typography and imagery.

The Windows XP look is based on simplicity, color, freshness and excitement. We believe that visual design is integral to the user experience. We hope these guidelines help you generate excitement about Windows XP in your efforts.

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Audio Menus and Menus for Small Displays

Menu systems in small displays and situations where hands and eyes are busy are a challenge

- Audio menus
  - Verbal prompts and option descriptions
  - Input is normally verbal or keypad
  - Not persistent, like a visual display, so memorization is required
    - Confirmation is important
      - Highlighting on screen (if visual is possible)
      - Repeat after me …
  - Requesting users to immediately enter can avoid listening to options
  - “Repeat the menu” option needed
  - Biggest problem: Voice recog. just does not cut it yet

Audio Menus and Menus for Small Displays

- **Menu for small displays**
  - Two distinct application domains:
    - Entertainment and communication services
  - Learnability is a key issue for hand-held devices
  - Simplification/removal of functions
  - Use of hardware buttons
    - Navigation, select
  - Responsiveness and speed is a key
    - Sequencing by frequency
  - Context driven soft keys (touch / screen mapped button)
  - Tap to replace explicit dismissal of dialog boxes
  - Distractions and interruptions → automatic services (like save)