

Interaction Styles

Outline

- Interaction styles
 - Menus
 - Fill-in form
 - Direct manipulation
 - Command language
 - Function keys
 - Question and answer
 - Natural language
- Comparison of interaction styles

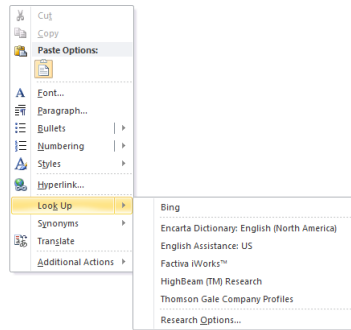
Dialog types

- Dialog type = interaction style
- Menu selection
 - Discriminator of options, recognition over recall
- Form Fill-in
 - Integrator of data values, higher skill, more flexible
- Question & Answer
 - Series of values, easy for untrained
- Function Keys
 - Hardware, software or labels
- Command Language
 - Naming and syntax issues

Dialog types (cont'd)

- Query Language
 - Specialized command language
- Natural Language
 - Most general purpose for untrained users
- Direct Manipulation
 - Physical properties reflected in objects
- Virtual Reality, Multimedia & Animation
 - Complete, realistic, interactive spaces
- Combinations of the above

Menu



Advantages of menu

- Self-explanatory
 - Reduces need for manuals
 - Requires little or no training
 - Makes both semantics and syntax explicit
- Requires little memory
 - Recognition vs. recall
- Few keystrokes
 - Less opportunity for user input error
- Easy error handling
 - Only limited valid inputs at any point
- Enhancements are visible



Disadvantages of menu

- Inefficient for experts and high frequency users
- Inflexible
 - System controlled
 - Forced choice
- Take up screen 'real estate'
 - Only limited valid inputs at any point
- Real estate = pixels on screen



When to use menu?

- Menu is most appropriate for
 - Knowledge and experience
 - Low typing skill
 - Little system experience
 - Low task experience
 - Low application experience
 - Frequent use of other systems
 - Low computer literacy
 - Job and task characteristics
 - Low frequency of use
 - Little or no training
 - Discretionary use
 - High turnover rate
 - Low task importance, but high task structure



Menu design guidelines: structure

- Create logical, distinctive categories with clear meanings

Which is better?

CHOOSE ONE:

- __ General Information
- __ Set Selection Criteria
- __ Refine Selection List
- __ Course Descriptions
- __ Scheduling
- __ Special Functions

CHOOSE ONE:

- __ View Requirements
- __ View Status
- __ Search Course Offerings
- __ Plan a Schedule



Menu design guidelines: structure

- Menu items should be brief, consistent in grammatical style and placement, and matched with corresponding menu titles

Student Registration

- __ List all requirements and student transcript
- __ Courses by term offered
- __ Suggested schedule to complete requirement
- __ Help

Term Selection

- __ Help
- __ Spring
- __ Fall
- __ Winter
- __ Summer

Which is better?



Student Registration

- __ View requirements
- __ Search courses offerings
- __ Build schedule
- __ HELP

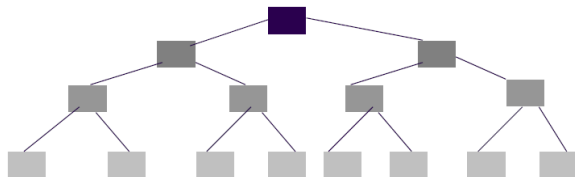
Search Course Offerings

- __ Spring
- __ Fall
- __ Winter
- __ Summer
- __ HELP



Menu design guidelines: structure

- Minimize menu hierarchy depth at the expense of breadth
- If going deep → slow response time



Menu design guidelines: ordering

- Order menu items according to functional groups, frequency of use, order of use and/or alphabetical order

E-Mail (grouped functionally)

__ Send	__ Save
__ Forward	__ Copy
__ Distribute	__ Move
__ Print	
__ Read	

E-Mail (grouped in order of use)

__ Read	__ Send
__ Forward	__ Distribute
__ Print	__ Copy
__ Save	__ Move

E-Mail (grouped by frequency of use)

__ Read	__ Save
__ Forward	__ Print
__ Send	__ Distribute
__ Copy	

E-Mail (grouped alphabetically)


__ Copy	__ Print
__ Distribute	__ Read
__ Forward	__ Save
__ Move	__ Send



Menu design guidelines: navigation

- Establish conventions for menu design and apply them consistently on all menu screens

Which is better



Between the menu on the left and right

Student Registration

- View requirements
- Search courses offerings
- Build schedule
- HELP

Term Selection:

Enter Item #:___

Press RETURN to accept

1. HELP
2. SPRING
3. FALL
4. WINTER
5. SUMMER

Student Registration

- View requirements
- Search courses offerings
- Build schedule
- HELP

Search course offerings

- Spring
- Fall
- Winter
- Summer
- HELP

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Menu design guidelines

- Prefer broad and shallow menus to narrow and deep ones
- Use items as titles for sub trees
- Group items meaningfully
- Use brief items, begin with the keyword
- Use consistent grammar, layout, terminology

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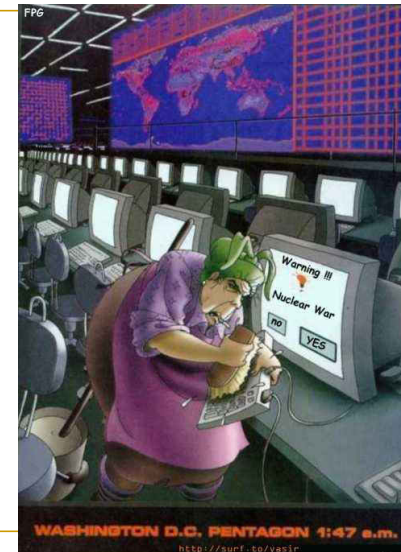
Menu design guidelines

- Allow type ahead, jump ahead, or other short cuts
- Consider
 - online help
 - optimal response time, display rate
 - screen size

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Outline

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Fill-in forms

Yahoo 2012-13

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Yahoo 2014



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Advantages of fill-in forms

- Self-explanatory
 - reduces need for manuals
 - requires little or no training
 - makes both semantics and syntax explicit
- Requires little memory
 - recognition vs. recall
- Efficient use of screen “real-estate”
- Accommodates parameters with many possible values
- Provide context

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Disadvantages of fill-in forms

- Assumes knowledge of valid inputs
- Assumes typing skills and knowledge of special keys (e.g. TAB, RETURN, BACKSPACE)
- Creates opportunities for user error

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When to use fill-in forms?

- Fill-in form is most appropriate for
 - Knowledge and experience
 - moderate to high typing skill
 - little to moderate system experience
 - moderate to high task experience
 - low to moderate application experience
 - moderate to frequent use of other systems
 - moderate to high computer literacy



Guidelines for fill-in forms

- Meaningful title
- Comprehensible instructions
- Logical grouping and sequencing of fields
- Familiar field labels
- Consistent terminology and abbreviations



Guidelines for fill-in forms

- Visible space and boundaries for data-entry fields
- Convenient cursor movement
- Error correction for individual characters and entire fields
- Error prevention where possible
- Error messages for unacceptable values
- Marking of optional fields
- Explanatory messages for fields



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Direct manipulation

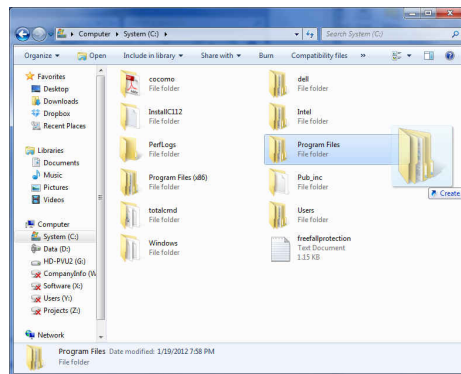
- Visual representation of the “world of actions”.
 - Objects and actions are shown.
 - Taps analogical reasoning.
- Rapid, incremental, and reversible actions.
- Replace typing with pointing/selecting.
- Immediate visibility of results of actions.

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Direct manipulation - Example



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Other examples

- Flight simulator
- Display-based text editor
- Personnel system
- Database query-by-example
- Video games
- CAD
- Programming of industrial robots
- Office automation systems
- Windowing systems
- Visual programming
- Touch-screen kiosk
- Touch-screen phones

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Advantages of direct manipulation

- Easy to learn and remember
- Direct, intuitive, WYSIWYG
- Flexible, easily reversible actions
- Provides context and instant visual feedback
- Exploits human use of visual and spatial cues
- Low typing requirements and visual feedback
- Less opportunity for user error



Disadvantages of direct manipulation

- Inefficient for high frequency expert users
- May be difficult to design recognizable icons for many objects and actions
- Icons take may more screen real estate than words



When to use direct manipulation?

- Most appropriate for:
 - Knowledge and experience
 - Low typing skill
 - Low system experience
 - Low task experience
 - High frequency of use of other systems
 - Low computer literacy
 - Job and task characteristics
 - Low frequency of use
 - Little or no training
 - Discretionary use
 - High turnover rate
 - Low task importance
 - Low task structure



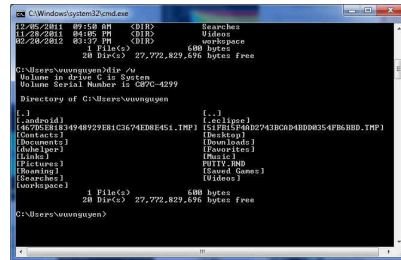
DM design guidelines

- Provide alternative interface for high frequency and expert users
- Choose a consistent icon design scheme
 - Depict “before and after”
 - Depict tool
 - Depict action
- Accompany icons with names
- Provide visual feedback for position selection and movement, and physical feedback for modes



Command language

- Interact with computer using text or voice commands
- Rely on naming and syntax
- Examples
 - Commands on DOS
 - Commands on UNIX



Advantages and disadvantages

- **Advantages**
 - Flexibility
 - Supports user initiative
 - Appeals to “power users”
 - Potentially rapid for complex tasks
 - Supports macro capability
- **Disadvantages**
 - Requires training and memorization
 - Difficult to retain
 - Poor error handling

key-press	Linux and Unix
attach	chroot
backup	tar
dir	ls
cls	clear
copy	cp
del	rm
delete	rm -R
edit	vi
exit	exit
format	format, mount, and umount
move and rename	mv
line	less <file>
ls	ls
sd	sudo
more < file	more file
net	nsd
yes	startx

Command language guidelines

- Choose meaningful, specific, distinctive names
- Support consistent abbreviation rules
 - prefer truncation to one letter
- Offer frequent users the capability to create macros
- Limit number of commands and ways of accomplishing a task
- Consider command menus on high-speed displays

Function keys

- **Dedicated function keys**
 - F1, Esc, Window key, etc.
- **Soft function keys (labels on screen)**
 - Self-explanatory
 - Easy to use
 - Flexible
 - Requires little human memory
 - Little or no onscreen real estate needed
 - Limited typing requirement

Function keys (cont'd)

- Concerns
 - Limited number of function keys exist
 - Application-specific
 - Inconsistence among applications
 - Ctrl + F on Office and Outlook
- Guidelines
 - Gray-out non-applicable functions
 - Combination of keys
 - E.g., Ctrl + Alt + Del, Ctrl + C
 - Keys should be easy to reach
 - Consistent grammar
 - E.g., Ctrl for special, Alt for alternative pointing methods

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Question and answer style

- Combines some features of menus and fill-in forms
- User is posed with a single question, e.g.,
 - Wizard dialog
 - Prompt for missing parameters
- Appropriate for lowly-motivated, less-experienced users
- Requires little training

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Q&A style example

This is Artificial Intelligence **Corporation's Intellect Query System**. I'm ready to answer questions about the employee file

Please enter your first request:

=> **What's in the database?**

Fields in the file of Employees:

Name	Job	Salary	Sex
Age	Family	City	State

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Q&A style example (cont'd)

Next request:

=> **Who works in New York City?**

Print the job and name of all employees with City = New York.

Occupation	Name
Machinist	Angelin
Physician	Angus

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Natural language interaction style

- Interact with computer using natural spoken or written language
- Examples
 - Voice command for GPS to find gas stations, food, directions, etc.
 - Google search voice command box
 - Chatbot
 - Amazon's Alexa
 - Google's Home



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When to use NLI?

- NLI may work best for
 - Users who are knowledgeable about the task domain
 - Users with moderate computer skills
 - Limited access to other interaction styles
 - E.g., Voice used while driving
 - Disabled people, e.g., those cannot type

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Exercise

- Form groups of 5 students each
- Update the design of the registration page for Batdongsan.com.vn (in the next slide)
- Time
 - 15 minutes for design
 - 10 minutes for 2 groups to present

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- Batdongsan.com.vn

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Interaction style summary

User Profile		Dialog Style		
User Psychology	Menu	Fill-in Forms	Question & Answer	Command Language
Attitude	Negative	Negative Neutral	Negative	Positive
Motivation	Low	Low Moderate	Low	High



Interaction style summary (cont'd)

Knowledge & Experience	Menu	Fill-in Forms	Question & Answer	Command Language
Typing Skill	Low	Moderate High	Moderate High	Moderate High
System Experience	Low	Low Moderate	Low Moderate	High
Task Experience	Low	Moderate High	Low	High
Application Experience	Low	Low Moderate	Moderate	High
Use of Other Systems	Frequent	Moderate Frequent	Moderate Frequent	Infrequent
Computer Literacy	Low	Moderate High	Low	High



Interaction style summary (cont'd)

User Profile		Dialog Style	
User Psychology	Function Keys	Direct Manipulation	Natural Language
Attitude	Negative	Negative	Negative
Motivation	Low	Low	Low



Interaction style summary (cont'd)

Knowledge & Experience	Function Keys	Direct Manipulation	Natural Language
Typing Skill	Low	Low	High
System Experience	Low	Low	Low
Task Experience	Moderate High	Low	High
Application Experience	Moderate	Low	Low
Use of Other Systems	Low	High	High
Computer Literacy	Moderate High	Low	Low



Interaction style summary (cont'd)

Task Characteristics	Menu	Fill-in Forms	Question & Answer	Command Language
Frequency of Use	Low	Moderate High	Low	High
Primary Training	Little or none	Little or None	Little or None	Formal
System Use	Discretionary	Discretionary	Discretionary	Mandatory
Turnover Rate	High	Low Moderate	High	Low
Other Systems		Paper forms		
Task Importance	Low	Moderate	Low	High
Task Structure	High	High	High	Low



Interaction style summary (cont'd)

Task Characteristics	Function Keys	Direct Manipulation	Natural Language
Frequency of Use	Low	Low	Low
Primary Training	Little or none	Little or none	Little or none
System Use	Discretionary	Discretionary	Discretionary
Turnover Rate	Moderate	High	High
Other Systems			
Task Importance	Moderate	Low	Low
Task Structure	Low Moderate	Low	Low



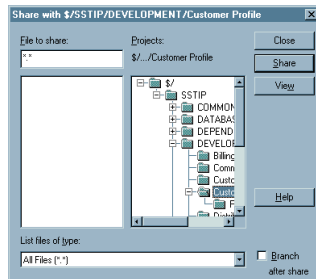
Summary

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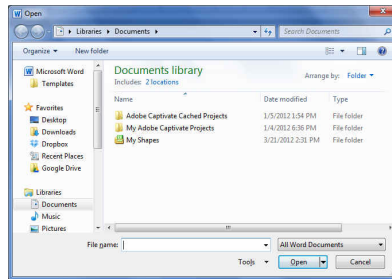
UI Hall of fame or shame

■ MS Visual SourceSafe 5.0



Source: Interface Hall of Shame

Open dialog of MS Word 2010



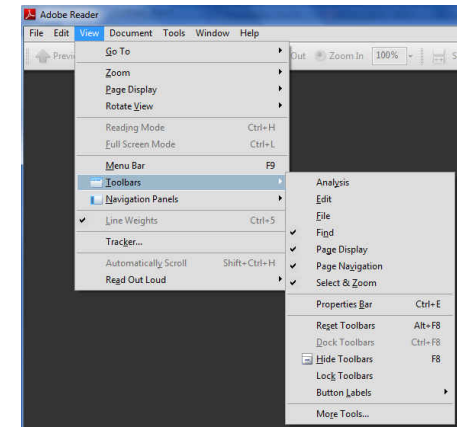
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UI Hall of fame or shame

■ Adobe reader

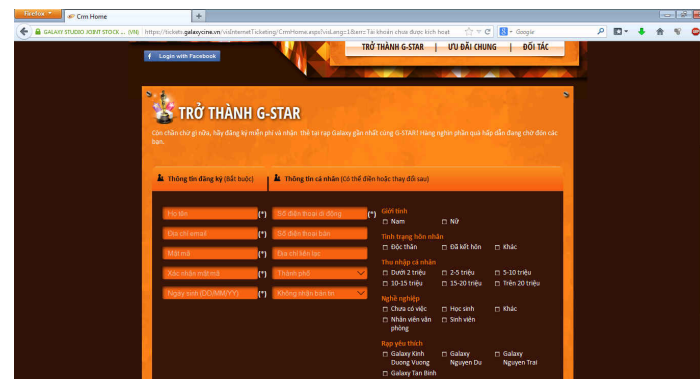


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Galaxy Cinema

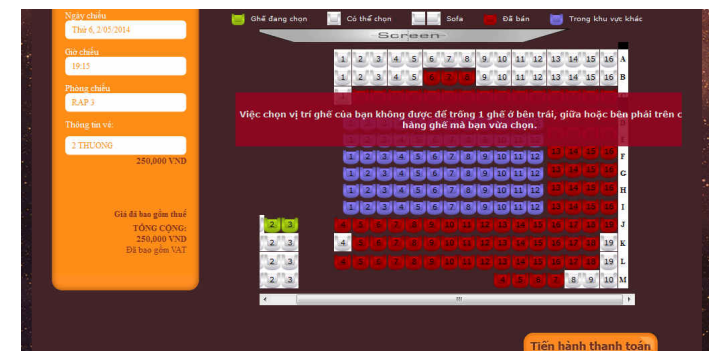


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Galaxy Cinema



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Video

- Augmented reality and magic

<http://www.youtube.com/watch?v=C4pHP-pgwll>