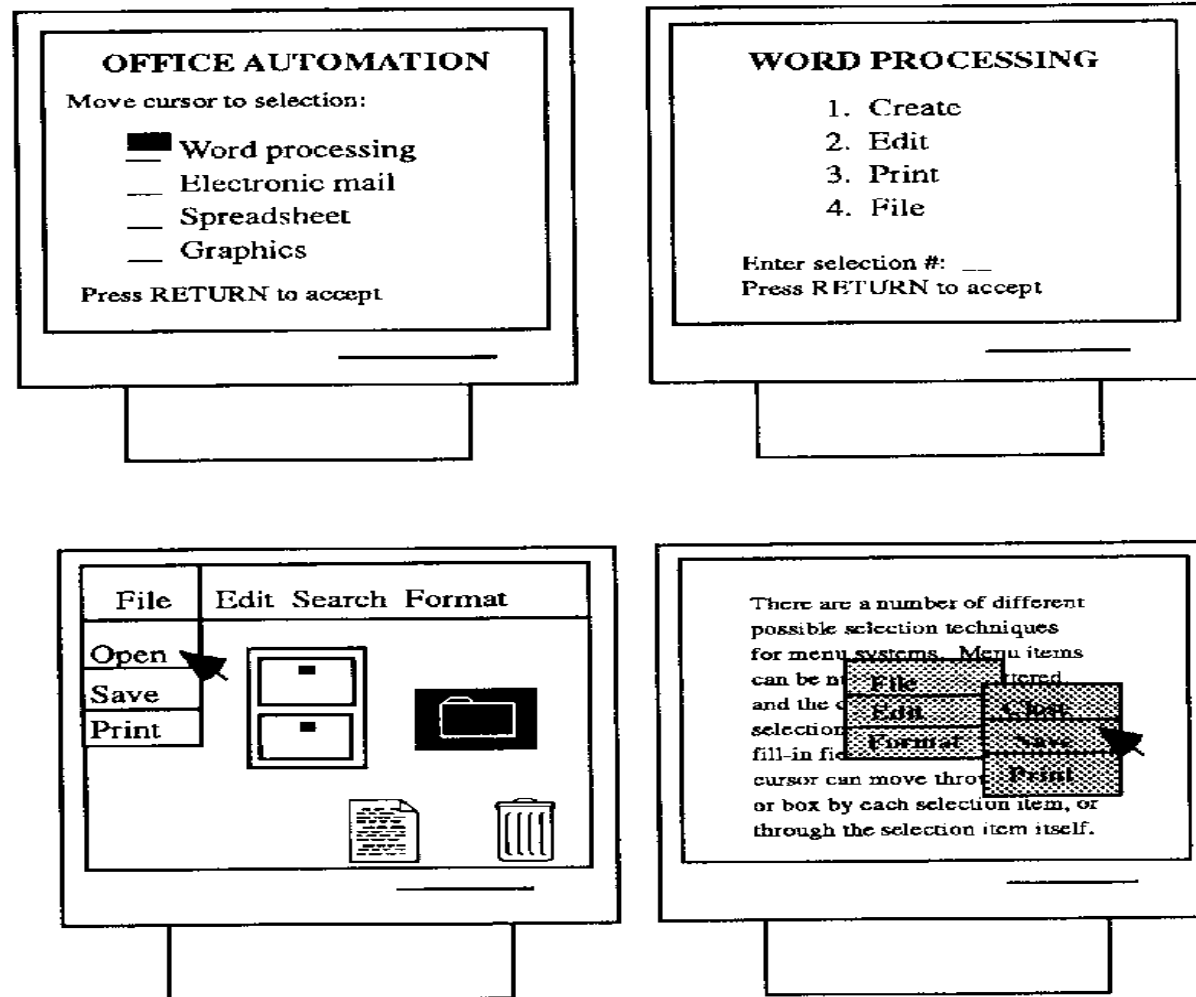


Interaction Style and Screen Design

- Interaction Style Design
 - Menu
 - Fill-in Form
 - Natural Language
 - Command Language
 - Window & Icon
- Screen Design

Menu

List of **options** from which user **selects** the desired choice



Menu

- Advantages:
 - **Self-explanatory**: Easy to learn - make both the semantics (what can be done) and the syntax (how to do it) explicit
 - **Require little human memory**: Users need not to remember command names as the interface always presents all valid options; Menus rely on **recognition** rather than **recall** memory
 - **Few keystrokes**: Typing effort is minimal \Rightarrow less user error
 - **Easy error handling**: Limited set of valid inputs at any one time
 - **Enhancements are visible**: If we add new functions into the system, they will appear on the menu screen

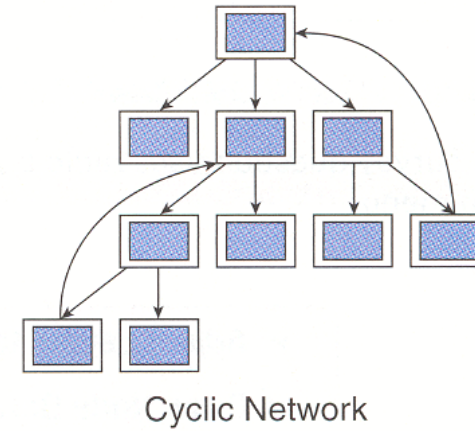
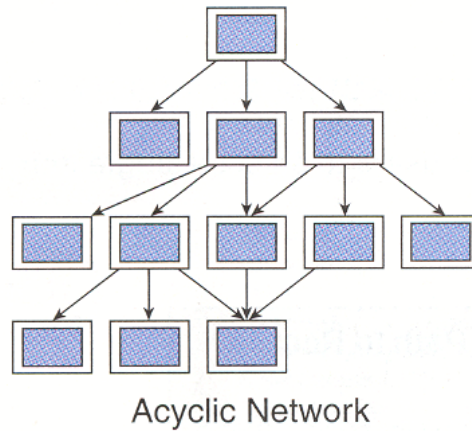
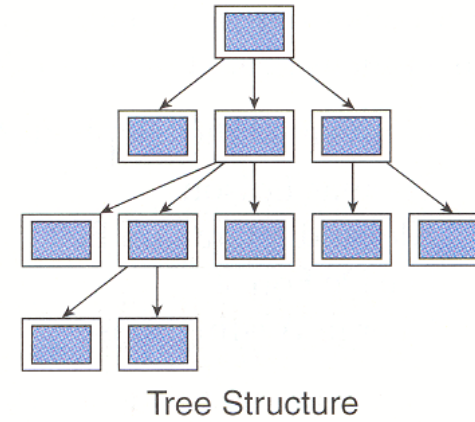
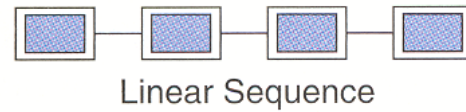
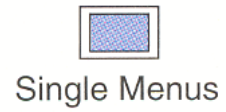
Menu

- Disadvantages:
 - **Inefficient**: In a complex menu system with many choices on each screen and many levels in the hierarchy \Rightarrow Difficult to find the desired function
 - **Inflexible**: Menus also force a user through set sequences of steps; The dialog is system rather than user controlled to a greater extent
 - **Impractical for numerous choices**: If there are too many options at any one time, this may make a menu dialog style to become too complex \Rightarrow Difficult to read & respond
 - **Take up screen space**: It will compete with other aspects of a display

Can we overcome the disadvantages of menu?

Menu

Menu Types:



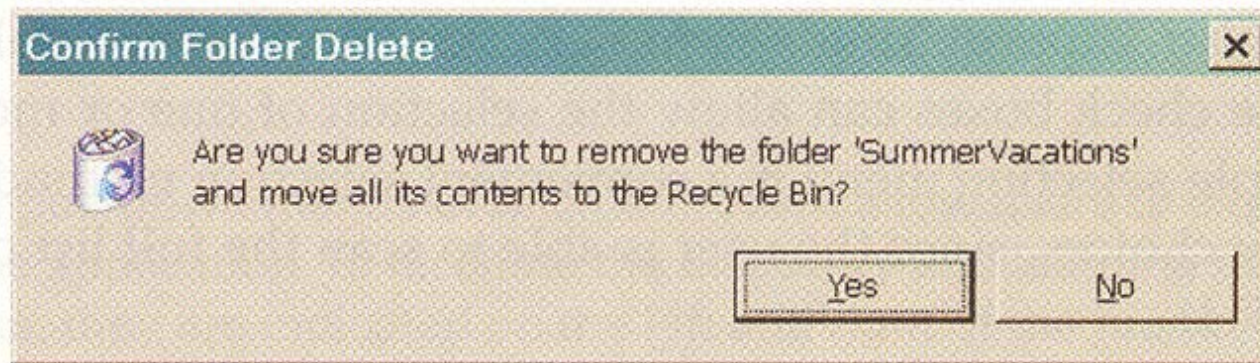
Menu

- **Single menu**

- Allow users to choose between 2 or more items, or multiple selections
- Remain permanent or in a pop up mode

1. **Binary** menu: allow users to choose between 2 options

- E.g., choice of “Yes” or “No”



- Radio button
- Button choice

Menu

2. **Multiple** item menu: allow users to choose between >2 options
 - E.g., choice of marital status

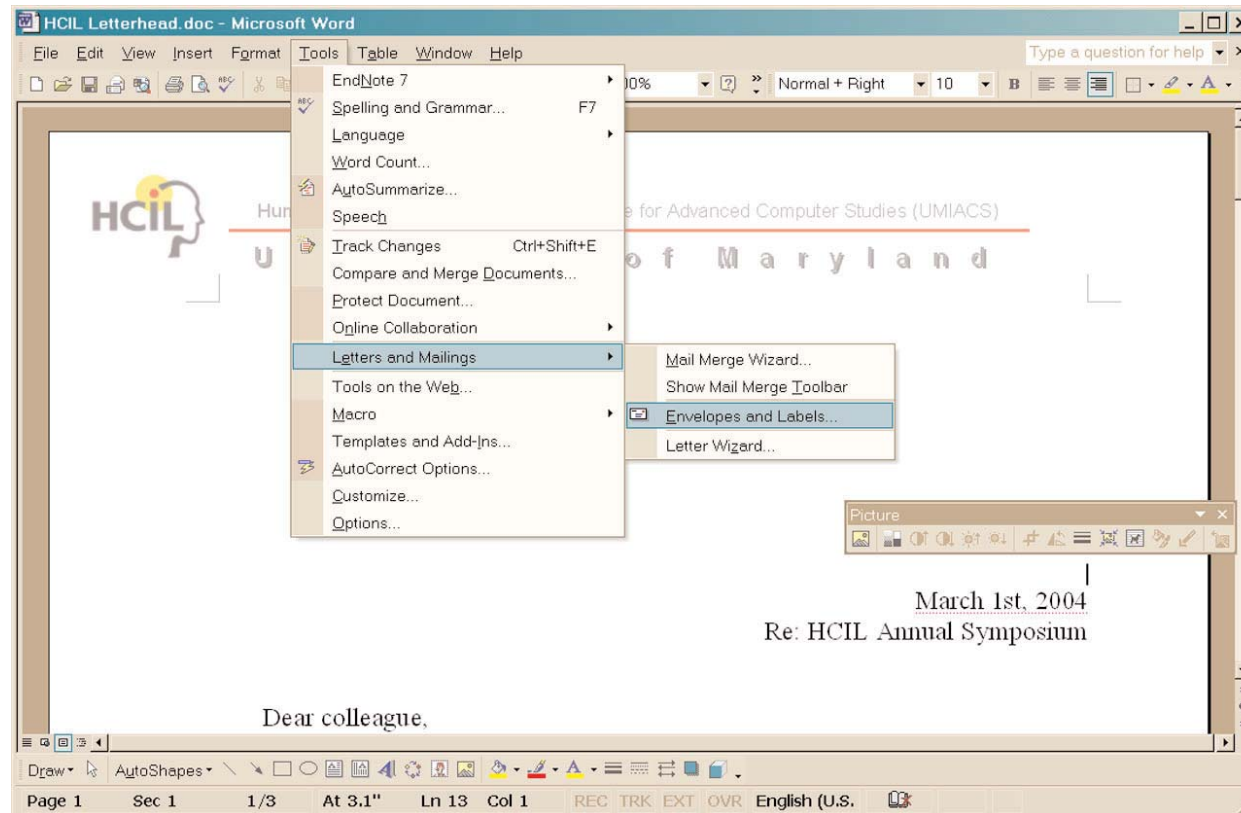
3. What is your marital status?
☐ Single ☐ Married ☐ Widowed/divorced/separated

3. **Multiple** selection menu: allow selection of one or more items
 - Convenient for handling multiple choices since user is able to scan the full list of items while deciding

<input type="checkbox"/> Plain	<input checked="" type="checkbox"/> <u>Underline</u>
<input checked="" type="checkbox"/> Bold	<input type="checkbox"/> <u>Wd. Underline</u>
<input type="checkbox"/> <i>Italic</i>	<input type="checkbox"/> <u>Dbl. Underline</u>
<input type="checkbox"/> Strike-Thru	<input type="checkbox"/> Superscript
<input type="checkbox"/> Outline	<input type="checkbox"/> UPPERCASE
<input type="checkbox"/> Shadow	

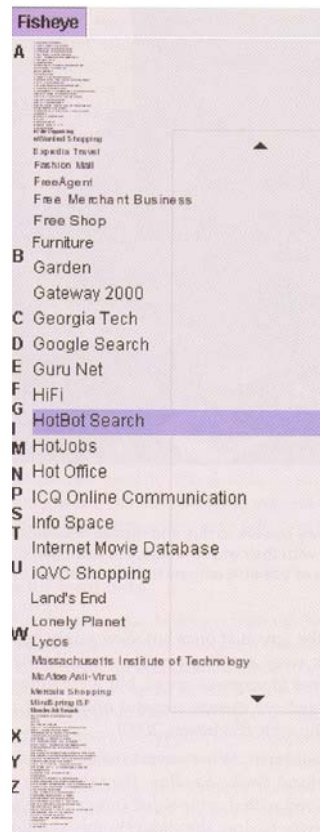
Menu

4. **Pull-down** menu: always available to the user by making selections on a top menu bar
 - Allow keyboard shortcuts, e.g., expert can use “Ctrl C” for copying



Menu

5. **Pop-up** menu: appear on a display in response to a click with a pointing device
6. Fisheye menu: allow rapid selection in a very large menu



Menu

7. **Two-dimensional** menu: a multiple column menu which allows rapid selection among numerous items



Menu

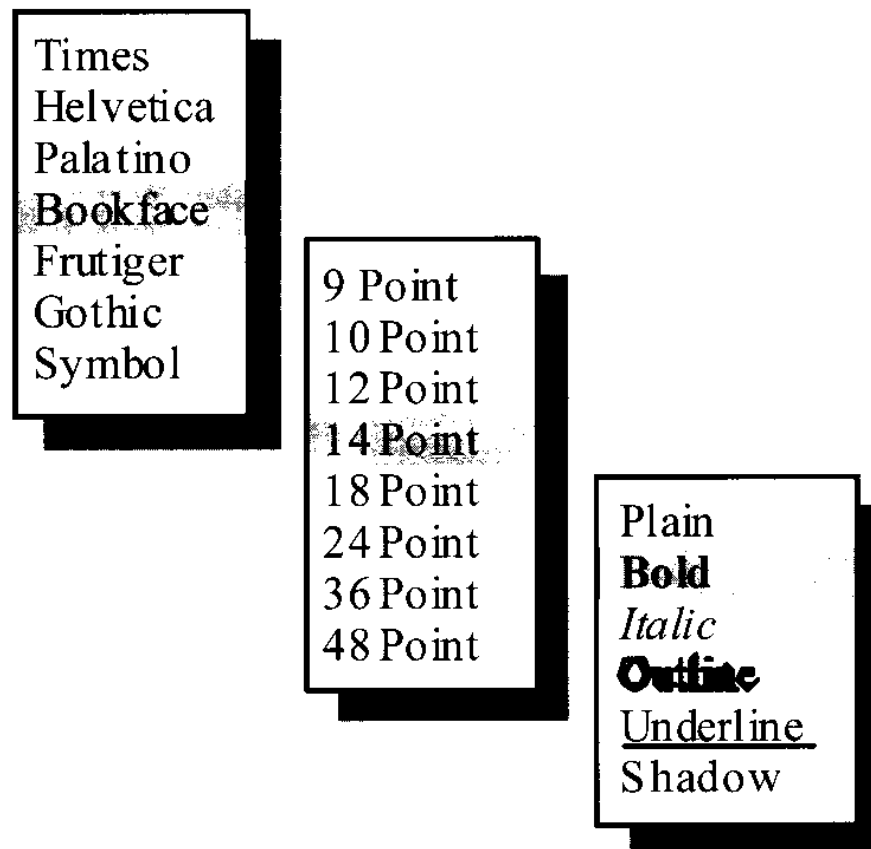
8. **Embedded** menu: items are embedded in text or graphics
- Permit items to be viewed in context & eliminate the need for a distracting & screen-wasting enumeration of items
 - Keep users focused on their tasks & on objects of interest



Menu

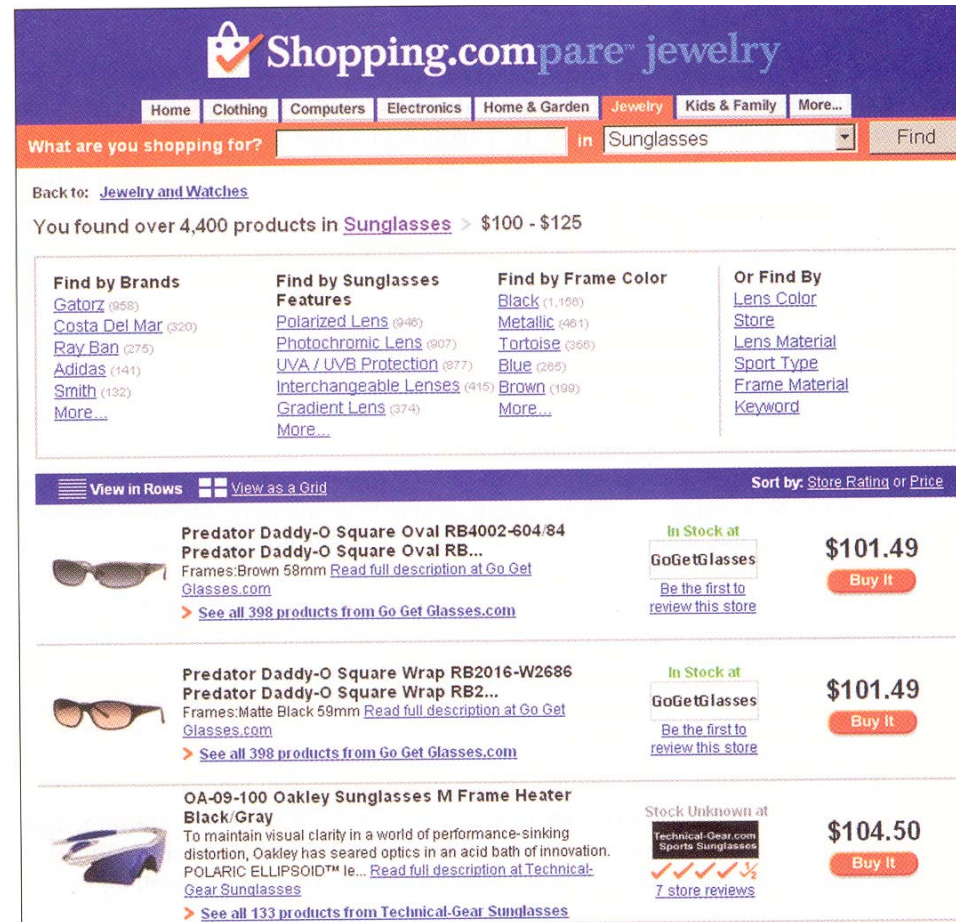
- Combinations of multiple menus

1. **Linear** menu sequence: guide users through a series of choices in which they see a sequence of menus:



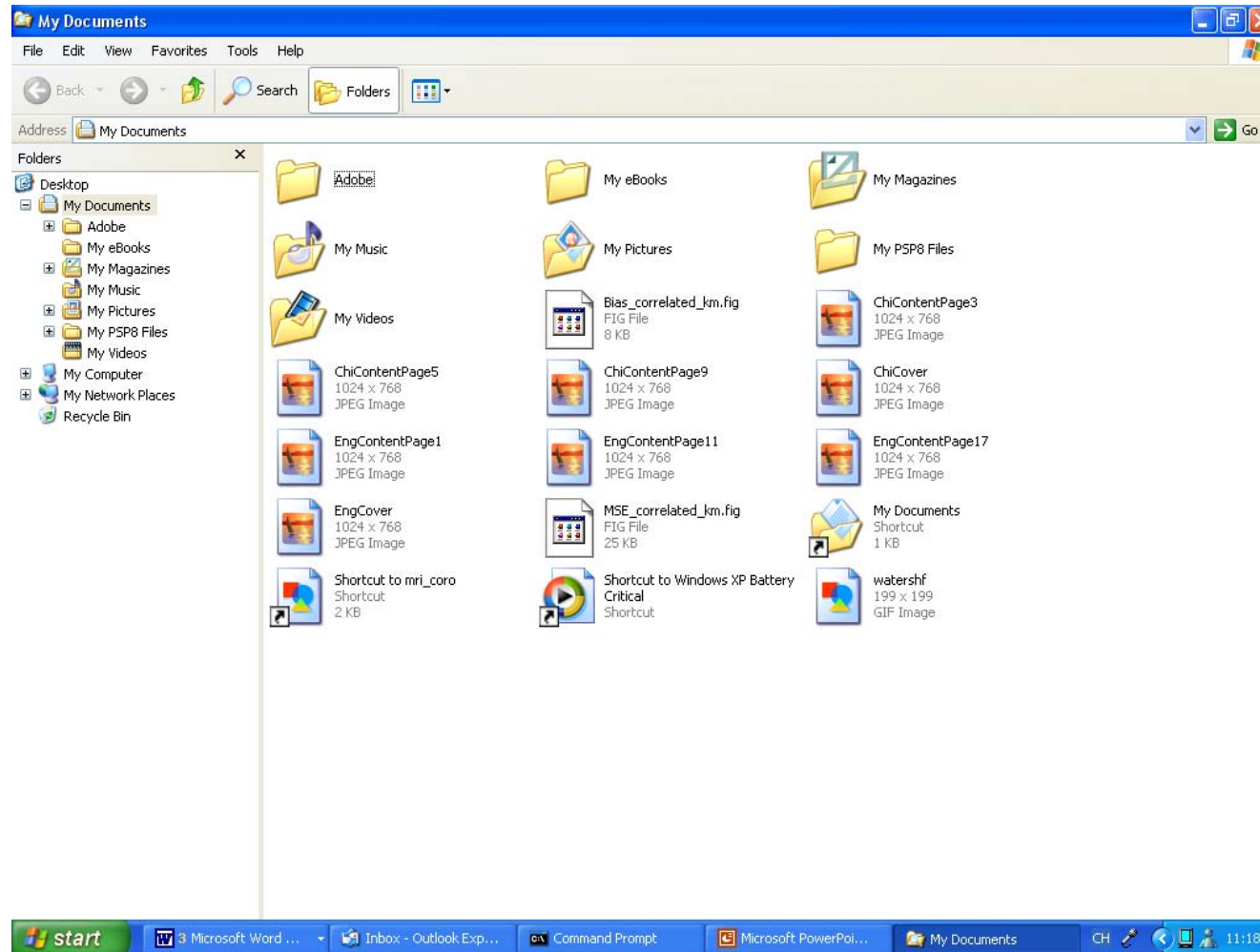
Menu

2. **Simultaneous** menus: present multiple active menus at the same time and allow users to enter choices in any order



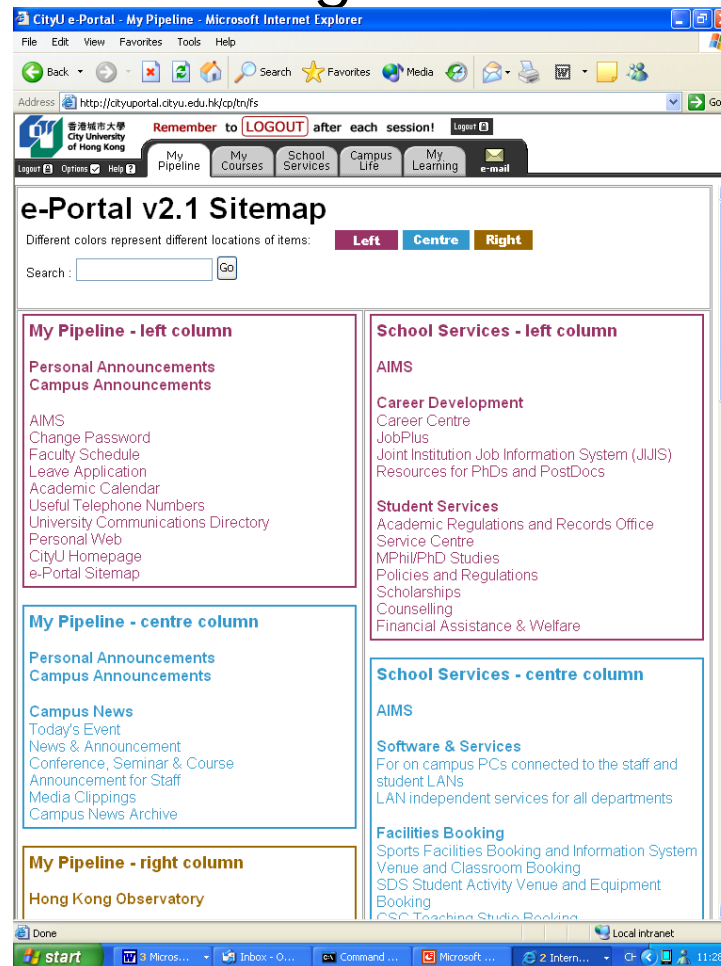
Menu

3. Tree-structured menu: form categories of similar items to create a tree structure



Menu

4. **Menu map** menu: avoid “getting lost” particularly in a menu tree with a large number of levels or **depth**

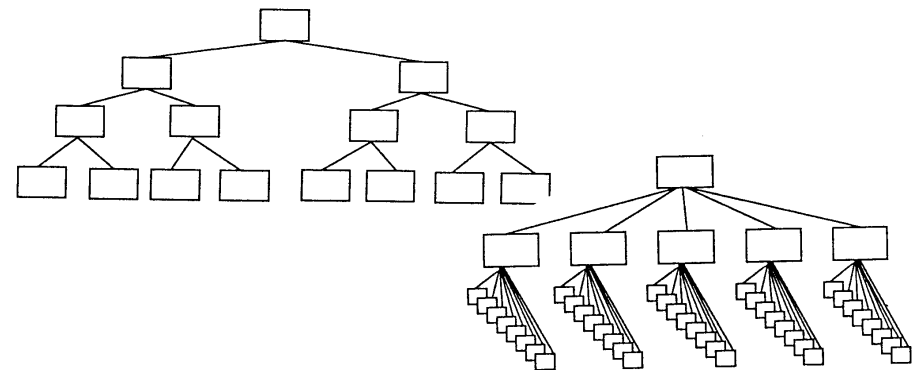


Menu

Design guidelines:

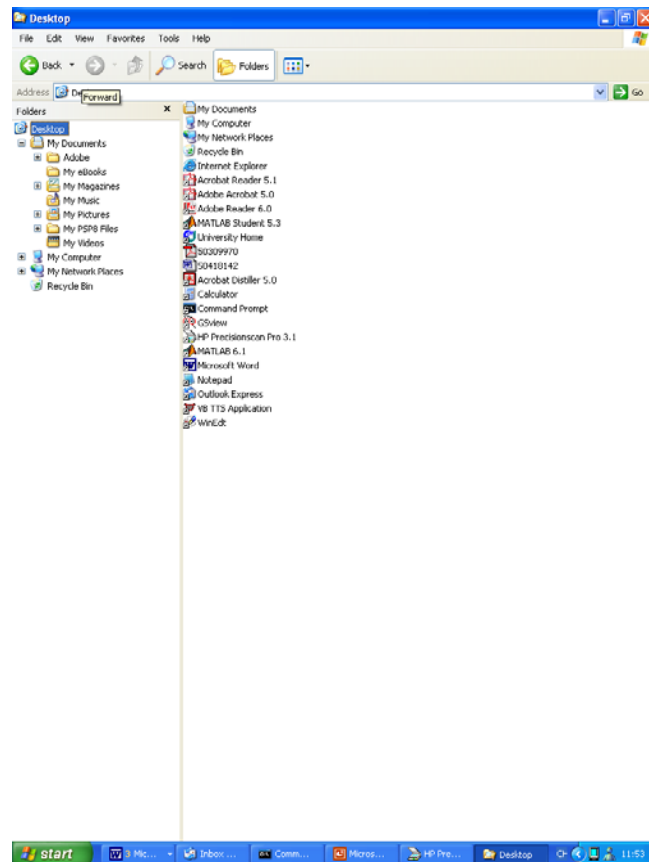
- **Structure**

1. Provide easy way to **tailor** menu to task structure
e.g., report of a science student will involve many equations, he can edit the report using WORD more efficiently by putting the equation editor on menu bar
2. **Depth-breadth** (number of items per level) trade-off:

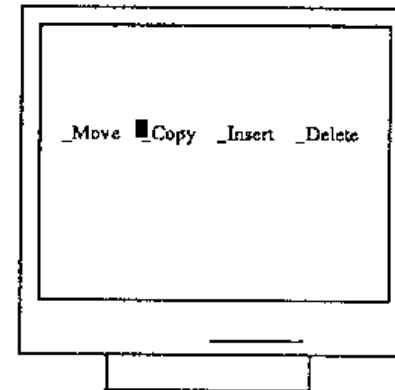


Menu

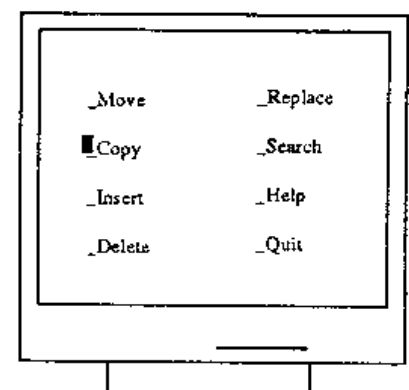
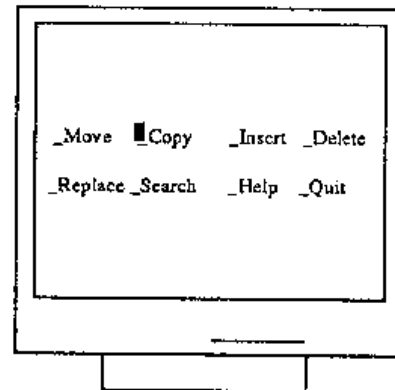
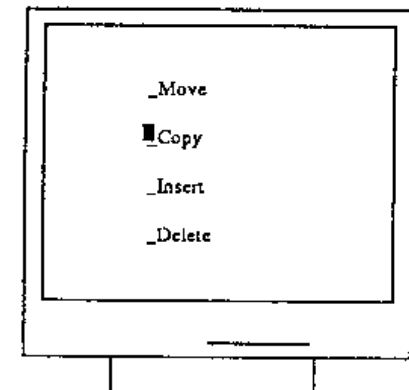
3. For full-screen text menu, present menu choice lists **vertically**



Poor:



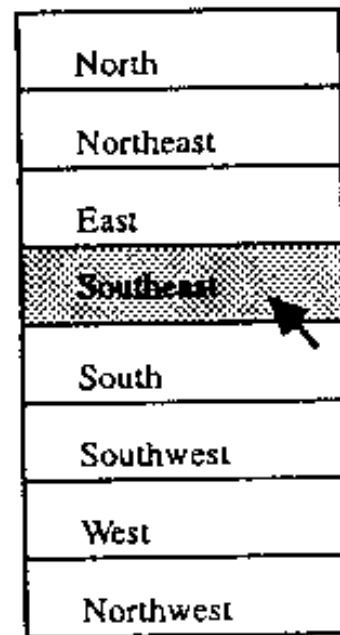
Improved:



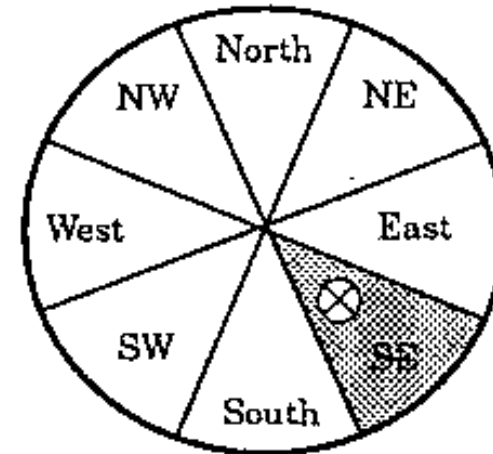
Menu

4. Consider pie-menu for one- or two-level mouse-driven menu hierarchies

Acceptable:



Improved:

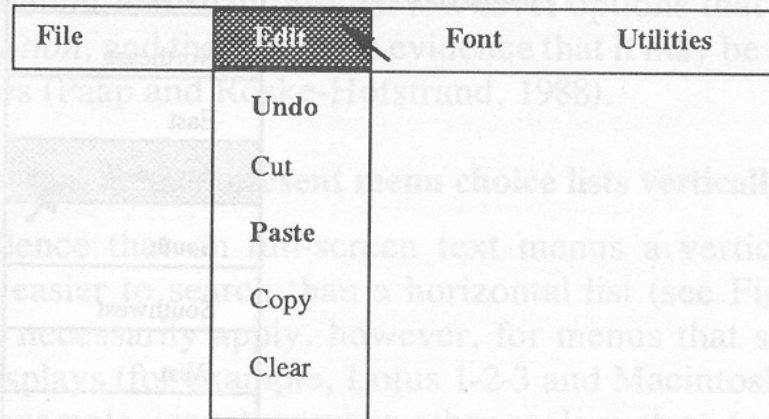


Why the pie-menu is better in this scenario?

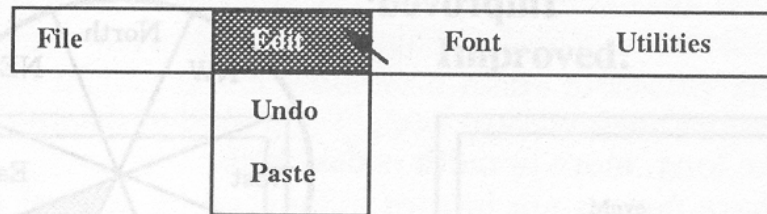
Menu

5. Consider **graying out** or **deletion** of inactive menu items (depend on user experience)

Grayed out:



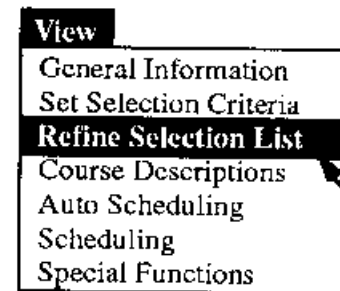
Deleted:



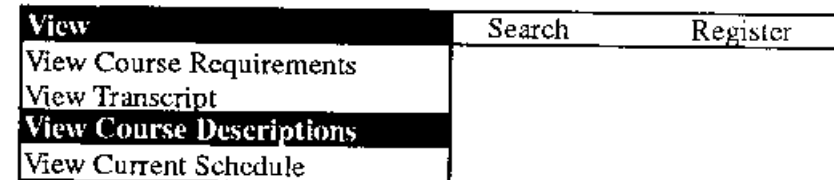
Menu

6. Use **familiar** terminology, but ensure that items are **distinct** from one another

Poor:



Improved:



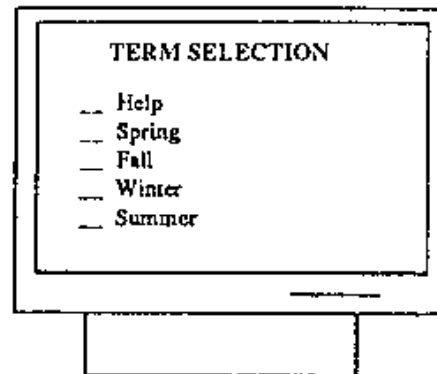
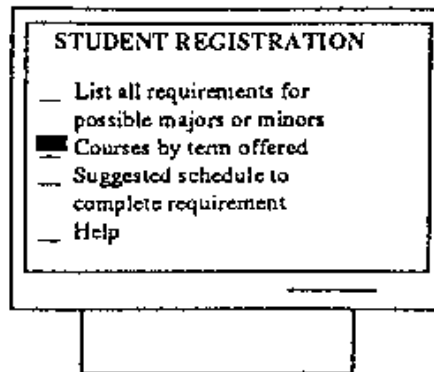
午夜後到天亮前這段時間 = 凌晨? or 清晨?

<http://www.takungpao.com/news/08/09/02/GW-955291.htm>

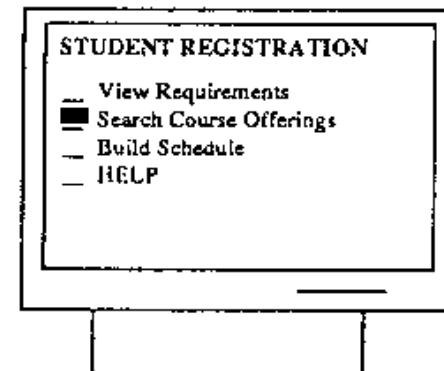
Menu

7. Labels should be **brief**, **consistent** in grammatical style & placement, & matched with corresponding menu titles

Poor:



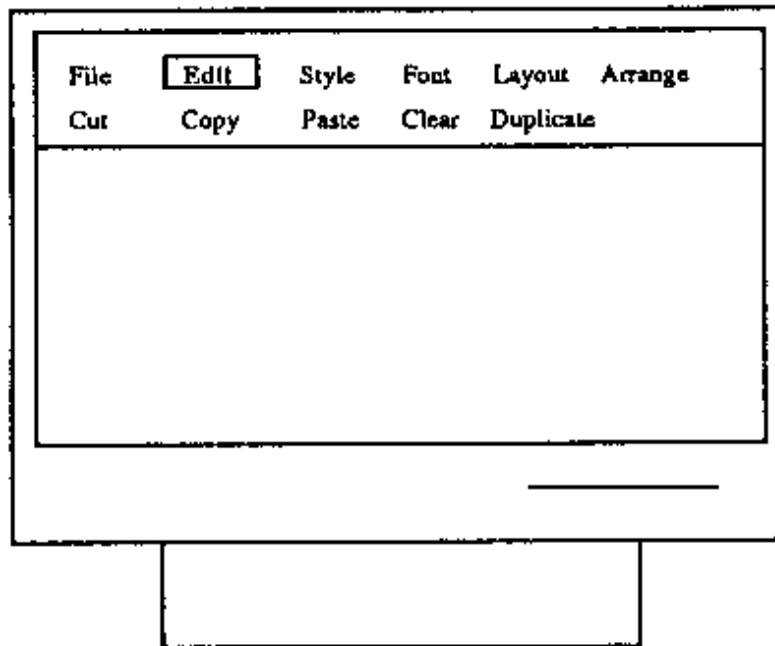
Improved:



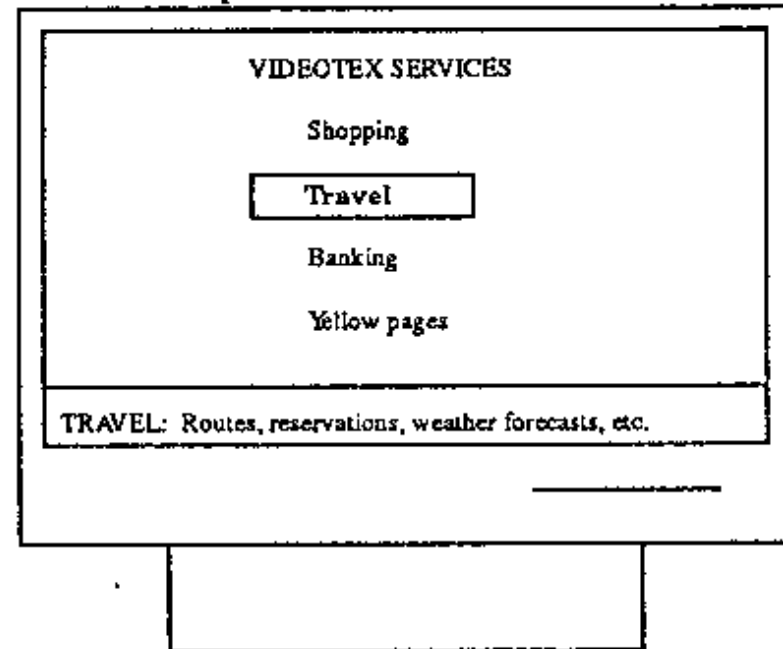
Menu

8. Consider **menu choice descriptors**, e.g., look-ahead & microhelp (increase satisfaction & decrease error)

Look-ahead:



Microhelp:



Menu

- **Choice ordering**
 - **Convention**: months of the year, days of the week, numbers, sizes
 - **Frequency of use**: choices are listed in order of expected frequency of use, e.g., Help users are expected to most often consult the general Help index
 - **Order of use**: choices are listed in the order users are expected to use them in a sequence
 - **Categorical**: choices are grouped according to semantic property
 - **Alphabetic**: choices are simply listed in alphabetic order

Menu

Conventional:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Frequency of use:

Help
Index
Keyboard
Commands
Procedures
Tools
Using Help
About Paintbrush

Order of use:

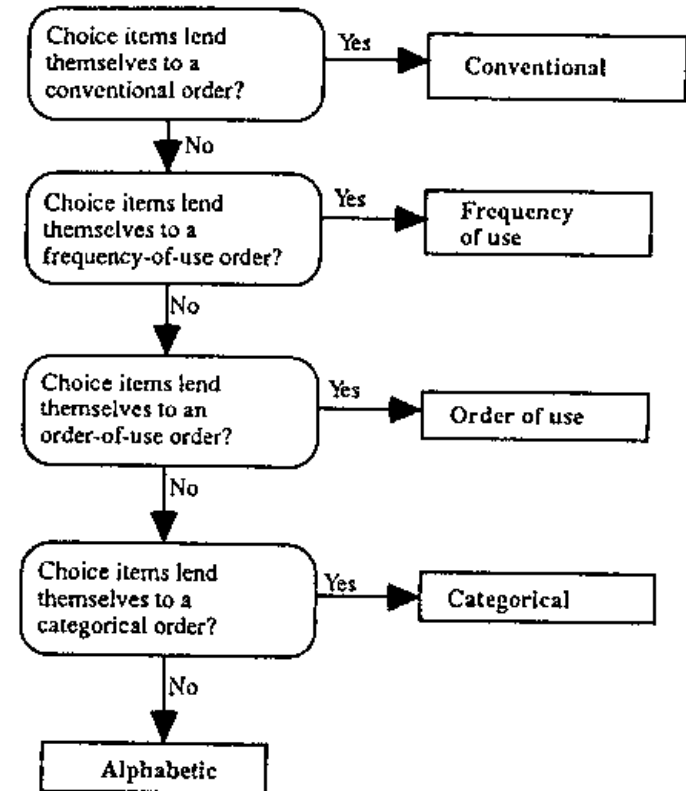
Email
Read
Forward
Print
Save
Send
Distribute
Copy
Move

Categorical:

File
New
Open
Save
Save As
Page Setup
Print
Print Setup
Exit

Alphabetic:

Font
Athens
Basel
Cairo
Geneva
Helvetica
New York
Times



Menu

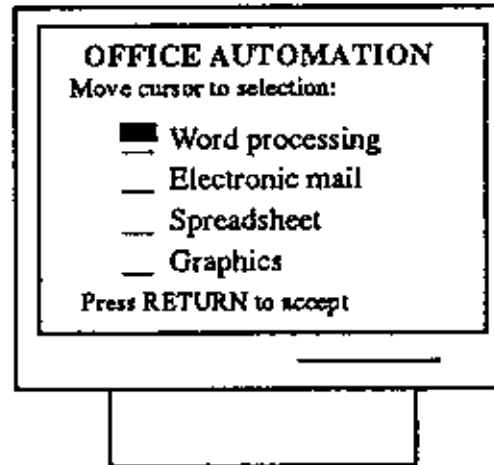
- Choice selection

1. For keyboard-driven menu:

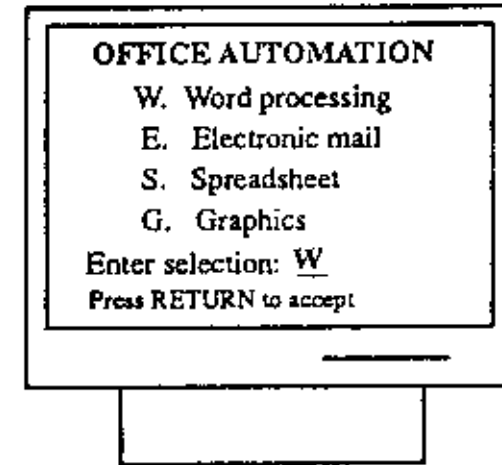
- **Cursor**: advantage- ease of learning & comfort, disadvantage- slow for many items
- **Mnemonic** letters: advantages - fast, no change when adding new items (e.g., "e" for "edit")
- **Numbers**: fast, need change if adding new items
- **Non-mnemonic** letters: fast, need change if adding new items

Menu

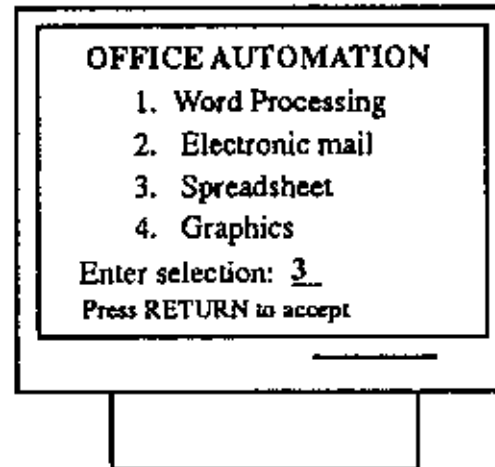
Cursor:



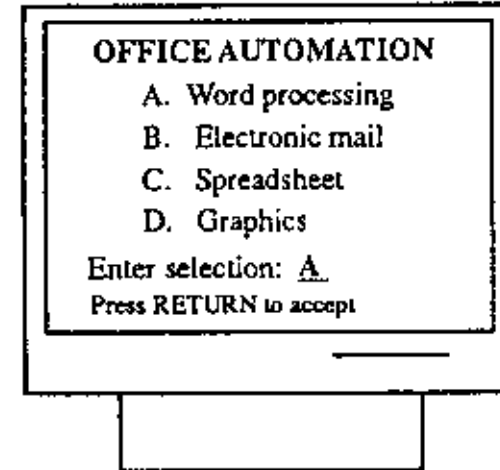
Mnemonic letters:



Numbers:



Nonmnemonic letters:



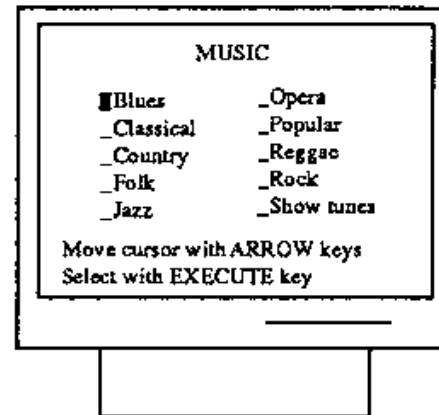
Menu

- Never start with zero
- Left justification
- Well labelled selection field appear below the choices
- Best: combine cursor movement with mnemonic letter codes
- Provide menu select defaults when possible

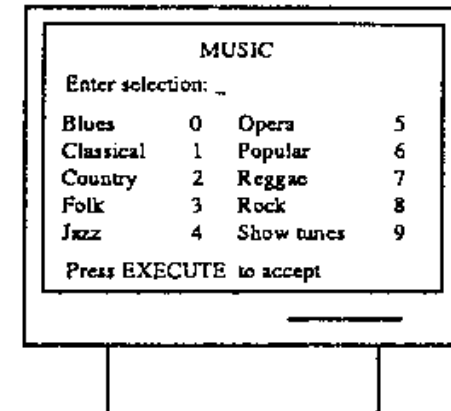
Menu

■ Examples:

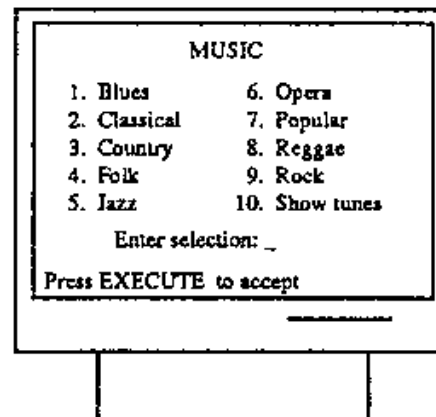
Poor:



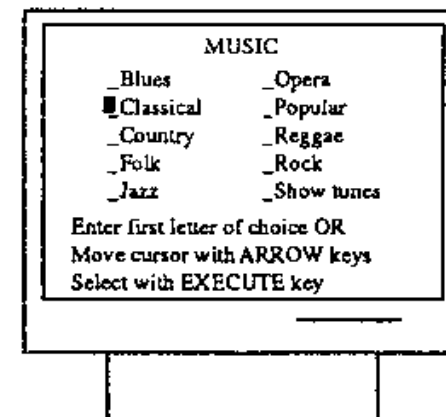
Still poor:



Better:



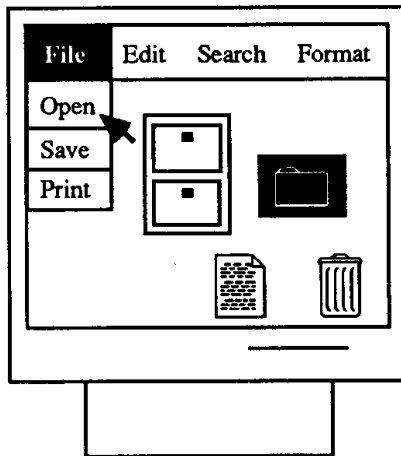
Best:



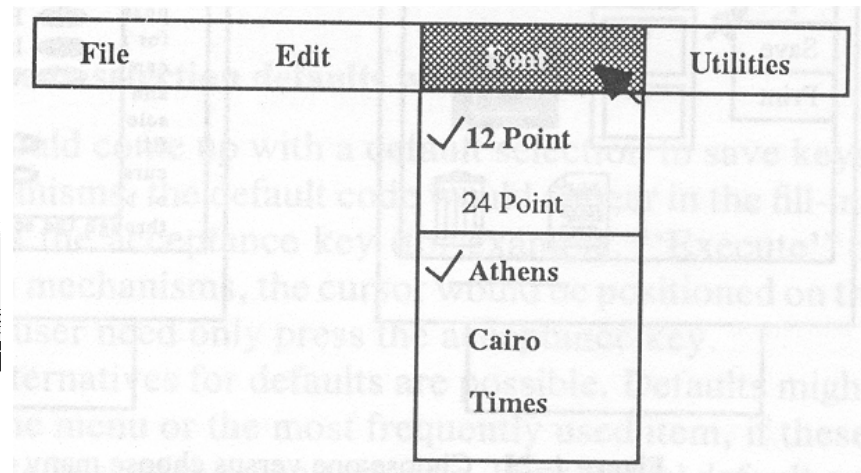
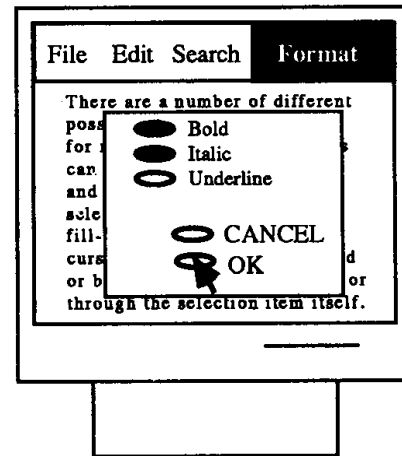
Menu

2. Distinguish between “choose one” and “choose many” menus (allow users to choose the choices in one pass).

Choose one:



Choose many:



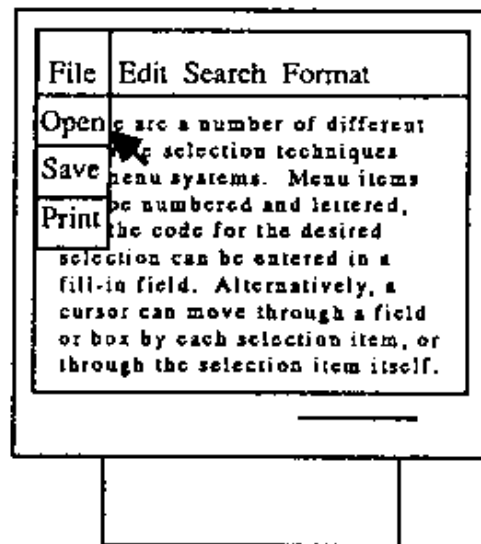
3. Provide menu selection feedback

Menu

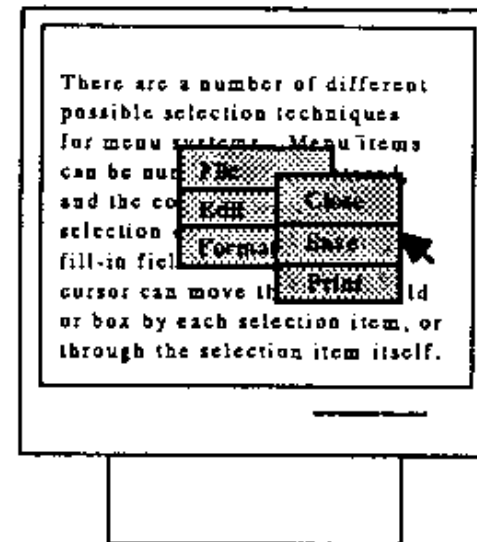
■ Invocation

1. **Permanent** menus are more preferred
2. Pop-up or **user invoked** menus for expert users & situation where screen space is small

Permanent:



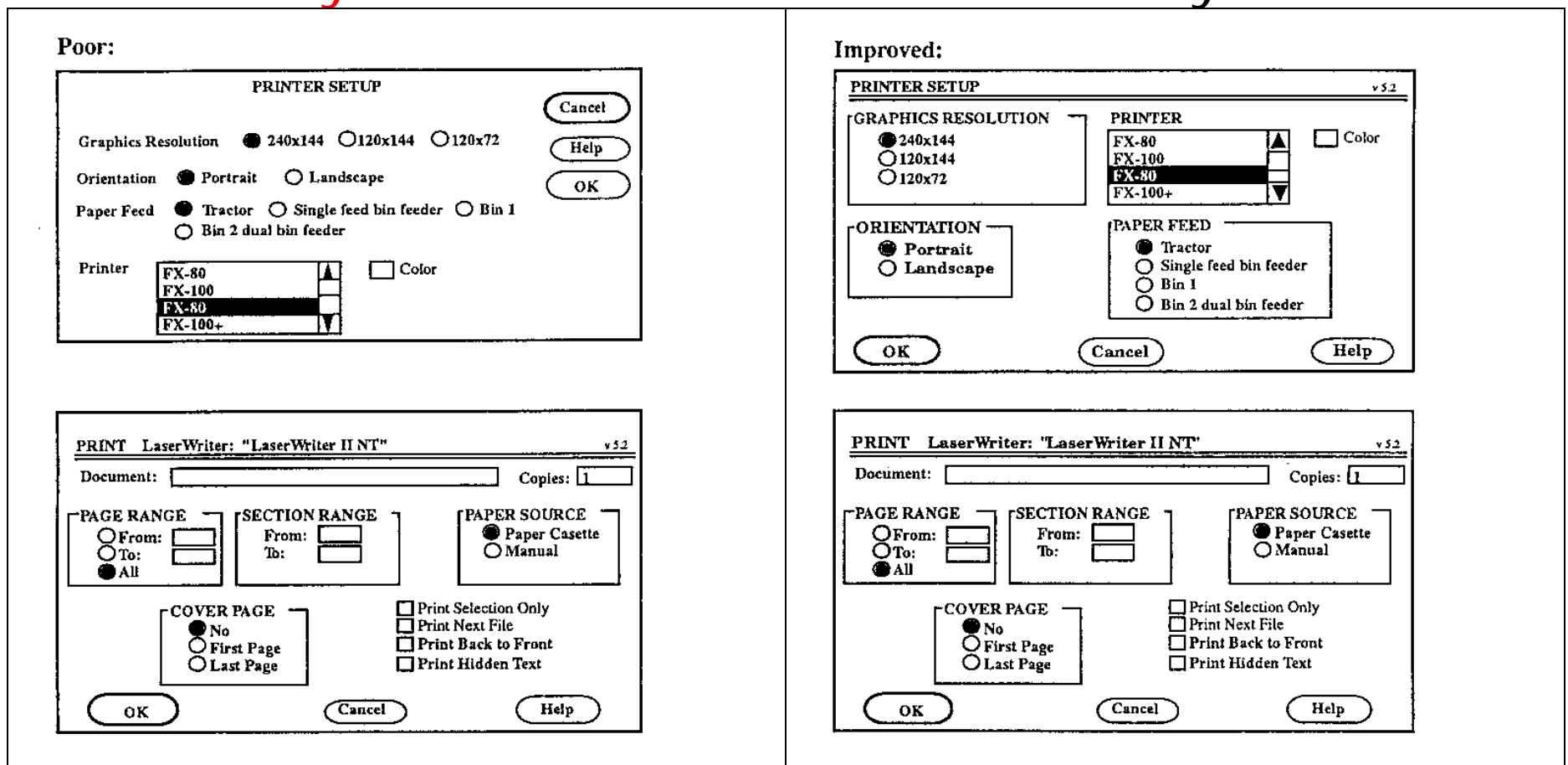
User invoked:



Menu

■ Navigation

1. Establish **conventions** for menu design & apply them **consistently** on all menu screens within a system

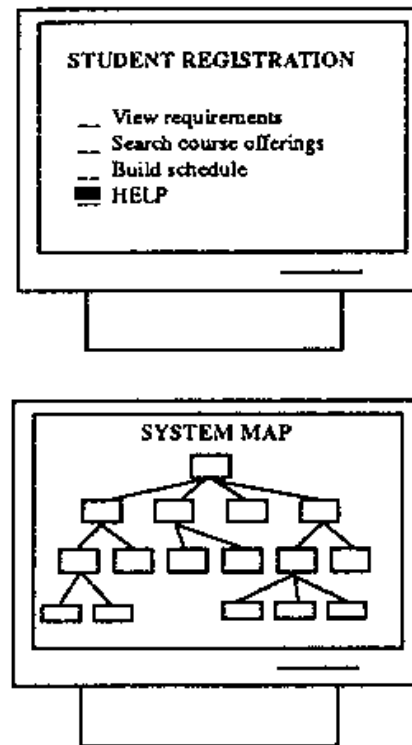


Menu

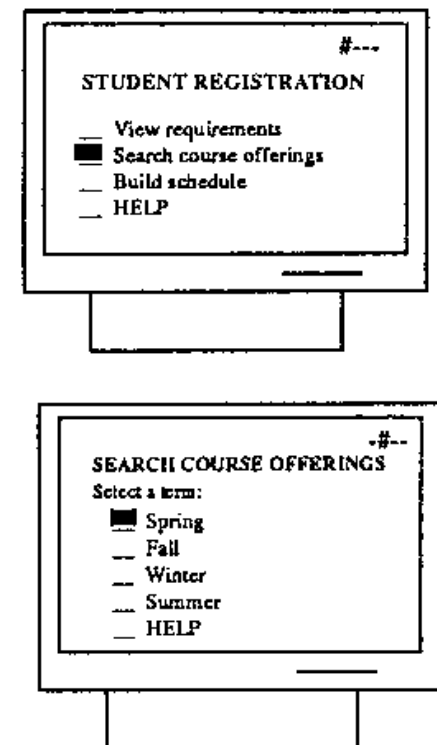
Use menu maps, or place markers as navigation aids in complex menu systems

- **Menu map** is the overview of menu hierarchy
- **Place marker** is a symbol to signify the position

Menu maps:



Place markers:



Menu

3. Facilitate **backward** navigation or allow jumps to previous and main menu

- **Layout**

1. Menu designers should establish guidelines for **consistency** of at least these menu components:

- **Title** - centered or left justification is acceptable
- **Item** - item is left justified with item number or letter preceding the item description; blank lines (& other methods, such as box or border) should be used to separate meaningful groups of items
- **Instructions / error messages** - should be identical in each menu, & should be placed in same position

Fill-in Form

Similar to paper fill-in form

Field for typing in data

Caption for each field to indicate data type

Possible data types: user-typed strings, user choices from a list, default values, required and optional values, & dependent values

A screenshot of a dialog box titled "International - Currency Format". It contains four input fields with labels: "Symbol Placement:" with a dropdown menu showing "\$1", "Negative:" with a dropdown menu showing "(\$123.22)", "Symbol:" with a text box containing "\$", and "Decimal Digits:" with a text box containing "2". To the right of the fields are two buttons: "OK" and "Cancel".

A screenshot of a dialog box titled "LOAN APPLICATION". It contains several input fields with labels: "Name:" with a text box containing "Dr. Deborah J. Mayhew", "Address:" with a text box containing "Box 248, W. Tisbury, MA 02575", "Date:" with a text box containing "4/8/91", "Amount:" with an empty text box, "Rate:" with an empty text box, and "# Months:" with an empty text box. To the right of the first two fields are "OK" and "Cancel" buttons. At the bottom of the dialog box is a "HINT:" label followed by the text "Date: mm/dd/yy format - no leading zeroes".

Fill-in Form

- Advantages:
 - Self-explanatory
 - Require little memory
 - Efficient use of screen real estate: traditional menu system asks only one question per screen; with fill-in form, multi-questions can be asked on one screen
 - Accommodate parameters with many possible input values
 - Provide context: because there are usually several or many fill-in fields on a single screen, users can get a board context information
 - Enhancements are visible

Fill-in Form

- Disadvantages:
 - **Assume knowledge of valid input**
e.g., "Married: __" (Y/N)? or (S/M)?.
e.g., "Size" UK or US standards?
 - **Assume typing skill** \Rightarrow more user error
 - **Assume knowledge of special keys**: in keyboard driven case, users need to use "Tab", "Cursor key", "Return", "Backspace"
 - **Inflexible**: most fill-in forms make it difficult to fill in fields in any order other than the **order** in which the fields appear

Can we overcome the disadvantages of fill-in form?

Fill-in Form

Design guidelines:

- Organization & layout

2. Organize the form to support task

e.g., if the fill-in form is an online version of the paper form \Rightarrow both layouts should be similar, such as credit card application form

e.g., search engine \Rightarrow allow user to input information in a flexible order, such as “human computer interaction” = “computer human interaction”

Fill-in Form

3. Organize groups of items by:

- **Categorical** grouping
- **Sequence** of uses: order of the fields according to the familiar order
- **Frequency** of uses: most frequently filled-in fields located at the top of groups, e.g., document name
- Relative **importance**: most important fields located at the top of groups; optional fields should appear at the bottom

First: _____ M.: _____ Last: _____
Street: _____
City: _____ State: _____ Zip: _____

Avoid presenting name and address fields in an unfamiliar order, such as

Last Name: _____
Zip: _____
State: _____
City: _____
First name: _____
Middle name: _____
Street: _____

Fill-in Form

3. Use **white** space to create balance and symmetry
4. **Separate** logical groups by spaces, lines, color or other visual cues

Print request

Document name: -----

Pitch: - (1=pica, 2=elite)

Print notes: - (y or n)

Number of copies: --- (000-999)

Paper size: - (1=letter, 2=legal)

Print summary: - (y or n)

Font: - (press ?)

Print from page: --- (000-999)

Print to page: --- (000-999)

PRINT REQUEST

Document Name: -----

Print from page: ---	Paper size: --
Print to page: ---	Font: -- (press ?)
Number of copies: ---	Pitch: -- (1=pica, 2=elite)

Print notes: - (y or n)

Print summary: - (y or n)

Fill-in Form

■ Caption & field design

1. For single fields, place the caption to left; for listed fields place the caption above, left justified above alpha lists, right justified above numeric lists
2. Provide distinctive field group & section **headings** in complex form

Name:	<input type="text"/>	Major:	<input type="text"/>	Year:	<input type="text"/>	Status:	<input type="text"/>
ID:	<input type="text"/>	Co-op Track:	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Number	Title	Section	Sequence				
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>				
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>				
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>				
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>				
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>				
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>				
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>				

Improved:

STUDENT REGISTRATION					
STUDENT					
Name:	<input type="text"/>	*Major:	<input type="text"/>	Year:	<input type="text"/>
ID:	<input type="text"/>	Track:	<input type="text"/>	Status:	<input type="text"/>
COURSES					
Number	*Title	Section	Sequence		
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	

Fill-in Form

3. **Distinguish** captions from fields

4. **Brief, familiar & descriptive** captions

e.g., Telephone Number or Phone ?

e.g., First line of street address or Address Line 1 ?

5. Indicate when fields are **optional**

LOAN APPLICATION

Name: Mayhew, Deborah J. (Last, First M.)
Address: Box 1, Anytown, ST 01010 (Street, City, ST Zip)

Date: 1/1/90 (mm/dd/yy) Amount: 5000.00 (xxxx.xx)
Rate: 10.25 (xx.xx) # Months: 36 (xxx)

To move cursor, Press ARROWS
To accept input, Press ENTER

LOAN APPLICATION

Name: Mayhew, Deborah J. (Last, First M.)
Address: Box 1, Anytown, ST 01010 (Street, City, ST Zip)

Date: 1/1/90 (mm/dd/yy) Amount: 5000.00 (xxxx.xx)
Rate: 10.25 (xx.xx) # Months: 36 (xxx)

To move cursor, Press ARROWS
To accept input, Press ENTER

Fill-in Form

Alamo.com Membership Enrollment Form

Login and Password * Required Fields

TitleMrs.

First Name *Catherine

Middle InitialF

Last Name *Smith

SuffixNone

Email Address *catherine@email.com

Confirm Email Address *catherine@email.com

Create a Login Name *
(or use email address)CW

Create a Password *
*****Min. 6 characters and must contain at least one number

Confirm Password *

Password Clue

In case you forget your password this clue will help us retrieve and E-mail your password to you.

What is your mother's maiden name? *Leblanc

Type of Travel

Do you travel more on ☒ Leisure or ☐ Business

Alamo Programs

If you are a member of Quicksilver or our Corporate program, please enter your ID number below.

Quicksilver ID F342768
(The number begins with an 'F')

Corporate ID# 2738217

Fill-in Form

- Input format

1. Provide system **completion** of unambiguous partial input

e.g., "Ja" or "1" \Rightarrow January

e.g., "Jun" \Rightarrow June

2. When user moves the cursor to the next field, the **completed** information in the previous field should be displayed
3. Provide **default** whenever possible
4. Should be **case blind**

Fill-in Form

5. Avoid complex rules for entering data in various fields of a form

e.g., provide relevant fields which depend on users

Poor:

Name: John Doe
Age: 23

Senior citizen discount: ■ _%

Better:

Name: John Doe
Age: 23

(Fill-in only if age \geq 65)
Senior citizen discount: ■ _%

Best:

Name: John Doe
Age: 23■

Senior citizen discount: ■ _%

Name: John Doe
Age: 66

Senior citizen discount: ■ _%

Fill-in Form

6. Meaningful groupings to break up long input formats
e.g., Break the input into groups of three to four
characters separate by space, dashes, etc.,
e.g., "EMP-SAL-235" is better than "EMPSAL235"

Poor	Improved
DATE: _____ (e.g. 1/12/90) DATE: _____ (e.g. 011290)	DATE: __/__/__ (e.g. 011290)
TIME: _____ (e.g. 8:15AM) TIME: _____ (e.g. 0815am)	DATE: __: __pm (e.g. 0815am)
CARD #: _____ (1234567891234567) CARD #: _____ (1234-5678-9123-4567)	CARD #: _____-_____-_____-_____ (1234567891234567)

Fill-in Form

7. For **display of fields**:

- Alphabetic fields are customarily left justified on entry & on display
- Numeric fields may be left justified on entry but then become right justified on display
- Avoid entry & display of leftmost zeros in numeric fields
- Numeric fields with decimal points should line up on the decimal points
- Special attention on

Phone number: (_ _ _) _ _ _ _ _ _ _ _

ID: (_) _ _ _ _ _ (_)

Time: _ _ : _ _ : _ _

Date: _ _ / _ _ / _ _ _ _

Fill-in Form

- Prompt & instruction

1. Prompt should be **brief** & **unambiguous**
2. Place prompts to right of fields or in Microhelp line at the bottom of the screen
3. Use **consistent** terminology & consistent grammatical form & style instructions

Fill-in Form

Poor:

LOAN APPLICATION

NAME: _____
(Put last name first, then first, then middle)

ADDRESS: _____
(First enter street, then city, state and zip)

DATE: (MM/DD/YY) _____ AMOUNT: (XXXX.XX) _____
RATE: (XX.XX) --- # MONTHS: (XXX) ---

TO MOVE CURSOR PRESS ARROWS
HIT ENTER TO ACCEPT INPUT

Acceptable:

LOAN APPLICATION

NAME: ■ _____ (Last, First Middle)
ADDRESS: _____ (Street, City, State Zip)

DATE: --/--/-- (MM/DD/YY) AMOUNT: ----- (XXXX.XX)
RATE: --- (XX.XX) # MONTHS: --- (XXX)

To move cursor, Press ARROWS
To accept input, Press ENTER

Improved:

LOAN APPLICATION

NAME: ■ _____ (Last, First Middle)
ADDRESS: _____ (Street, City, State Zip)

DATE: --/--/-- (MM/DD/YY) AMOUNT: ----- (XXXX.XX)
RATE: --- (XX.XX) # MONTHS: --- (XXX)

To move cursor, Press ARROWS
To accept input, Press ENTER

MicroHelp: ex.: Mayhew, Deborah J.

Improved:

LOAN APPLICATION

NAME: ■ _____
ADDRESS: _____

DATE: --/--/-- AMOUNT: -----
RATE: --- # MONTHS: ---

To move cursor, Press ARROWS
To accept input, Press ENTER

MICROHELP: NAME: Enter Last, First Middle

Fill-in Form

■ Navigation

1. When a form is first entered, position the cursor in **default** position
2. **Vertical** groups are preferable than horizontal
3. Allow forward & backward **movement**
4. Provide **titles** & **page number** or place maker

POLICY APPLICATION

APPLICANT	VEHICLE
NAME: █	YEAR: ____
POLICY #: ____	MAKE: ____
	NEW/USED: .
DRIVER	LIENHOLDER
NAME: ____	VEHICLE #: ____
BIRTHDATE: ____	NAME: ____
MARITAL STATUS: .	ADDRESS: ____
GENDER: .	

Press TAB to move cursor forward by field

POLICY APPLICATION ** Page 1 of 4 **

APPLICANT	VEHICLE
NAME: ____	YEAR: ____
POLICY #: ____	MAKE: ____
	TYPE: <input type="radio"/> NEW <input checked="" type="radio"/> USED
DRIVER	LIENHOLDER
NAME: ____	VEHICLE #: ____
BIRTHDATE: ____	NAME: ____
MARITAL ST.: <input type="radio"/> M <input type="radio"/> F	ADDRESS: ____
GENDER: <input type="radio"/> M <input type="radio"/> F	

Press TAB to move cursor forward by field
Press HELP for additional navigation commands

Fill-in Form

■ Error Handling

1. Allow user to edit individual character in fields
2. Error messages for unacceptable values
3. Place cursor in error field
4. Provide semantic & syntactic information in errors messages, e.g.
 - Illegal date (poor)
 - Characters not accepted in date field (syntactic)
 - February dates range from 1 to 29 (semantic)

LOAN APPLICATION

NAME: Mayhew, Deborah J. _____ (Last, First Middle)
ADDRESS: 1 C St., Town, MA, 00000 _____ (Street, City, State Zip)

DATE: 2/1/87 (MM/DD/YY) AMOUNT: 3500.00 (XXXX.XX)
RATE: 11.5 - (XX.XX) # MONTHS: 36 - (XXX)

Press ARROWS to move cursor
Press ENTER to accept input

Illegal date

LOAN APPLICATION

NAME: Mayhew, Deborah J. _____ (Last, First Middle)
ADDRESS: 1 C St., Town, MA, 00000 _____ (Street, City, State Zip)

DATE: 2/1/87 (MM/DD/YY) AMOUNT: 3500.00 (XXXX.XX)
RATE: 11.5 - (XX.XX) # MONTHS: 36 - (XXX)

To move cursor, Press ARROWS
To accept input, Press ENTER

****ERROR**** Alph characters not accepted in DATE field

Natural Language

Allows user to express requests to a software applications in their **native language**

A **keyboard** as an input device & a **screen** as an output device are assumed, although voice input & output are possible

ACCOUNTS MANAGER

i want to find certain accounts. invoices were sent to them in jan. 1989.

THIS IS WHAT ACCOUNTS MANAGER UNDERSTANDS YOUR QUERY TO BE:
PRINT THE NAME OF EVERY ACCOUNT TO WHICH AN INVOICE WAS SENT DURING JANUARY 1989.

IS ACCOUNT MANAGER'S UNDERSTANDING

- 1 CORRECT AND COMPLETE
- 2 CORRECT BUT INCOMPLETE
- 3 INCORRECT

SELECT ONE CHOICE BY NUMBER

1

THE ANSWER TO YOUR QUERY IS:

ACCOUNT NAME

XYZ MANUFACTURING
ABC MEDICAL PRODUCTS
AAA INSTRUMENTS, INC.

DO YOU HAVE ANY FURTHER QUESTIONS ON THESE ACCOUNTS?
IF NOT, JUST HIT THE "ESC" KEY.

Natural Language

- Advantages:
 - **Powerful, fast & efficient**: a simple command can set many functions
 - **Flexible & user controlled**
 - Use **small screen space**
 - Easy to **learn & remember**

Natural Language

- Disadvantages:
 - Assume **typing skill** \Rightarrow more user error
 - Enhancements are **invisible**
 - **Vagueness** & **ambiguity**: makes it very difficult for a machine to understand \Rightarrow may need to lengthy confirmation & clarification dialogs (In real word, much of our half of the conversation involves repeating & clarifying with our conversation parties)
 - **Expensive** to implement

Natural Language

Design guidelines:

1. Use **consistent** familiar terminology & **simple** brief grammatical form
e.g., “This is what I...” & “Your request...”)
2. Provide **cooperative responses**
e.g., handling simple errors: july or june for “jule”
3. Provide an optional **clarification** dialog
4. **Distinguish** between user input & system output with white space & visual cues
5. Provide a way to view **dialog history**
6. Provide instruction for **navigation**

Natural Language

■ Example:

show all projects begun in jule
I can't parse your request as it is.
Perhaps you have made a typing error
somewhere. Please try again.
show all projects begun in july.
This is what I understand your
query to be: List projects with
start date in July:
Is this correct? Y or N.
Y
Project Start Date
Mars July 2
Jupiter July 20
Pluto July 29
Who is the project leader of
Jupiter?
Your request is interpreted as
follows: List the project leader of
Project Jupiter: Is this correct?
Y or N.
Y
Project Project Leader
Jupiter Vader, Darth
-

Poor

>show all projects begun in
jule
Can't recognize "jule". Choose one:
1 July
2 June
3 Enter word
4 Cancel query
> 1
REQUEST: List projects with
start date = July:
PROJECT START DATE
Mars July 2
Jupiter July 20
Pluto July 29
> Who is the project leader of
Jupiter?
REQUEST: List project leader for
project = Jupiter:
PROJECT PROJECT LEADER
Jupiter Vader, Darth
>
For instructions, Press HELP
To submit request, Press RETURN
To scroll, Press ARROWS
To cancel and quit, Press ESC
To save and quit, Press EXECUTE

Improved

Command Language

Original, traditional style of human-computer interface

User types in requests through an **artificial language** with its own unique semantics, vocabulary & syntax, e.g., "ping", "rm", "ls"

- Advantages:
 - Powerful, fast & efficient: a few keystrokes can express complex command
 - Flexible & user controlled
 - Use minimal screen space
- Disadvantages:
 - Difficult to learn & remember
 - Assume typing skill
 - Enhancements are invisible

Command Language

Design guidelines:

1. Provide consistency in syntax
e.g., VolB!FileA! & FileA!VolB!
2. Use **action-object** syntax, e.g., "del file.doc"
3. Avoid arbitrary of punctuation
4. Allow **defaulting** of optional parameters
5. Command name abbreviation: **simple & consistent**

Poor:

VolB!FileA!D\$\$

FileA!VolB!ER\$L!KO:!*\$\$

Improved:

search (for) filea (in) volb.

open filea (in) volb. list all
lines with "KO".

OR

s filea volb.

o filea volb. lal "KO".

Command Language

Name	Abbreviations	
	Poor:	Improved:
Move forward	MovF	MovF
Move backward	Mvb	MovB
Insert	I	Ins
Delete	DI	Del
Replace	Repl	Rep
Search	Srch	Sea
Delete	X	Del
Send	Sn	Sen
Print	Prt	Pri
Search	Srch	Sea
Send	Sn	Sen
Find	Fi	Fin
Choose	Ch	Cho

Windows & Icons

- Advantages:
 - Easy to learn & remember
 - Flexible, easily reversible actions
 - Provide context, instant, visual feedback
 - Less error prone
- Disadvantages:
 - Can be inefficient
 - e.g., file copying in a directory with many files
 - May be difficult to design recognizable icons:
e.g., How to design the icons, especially for actions,
such as, "save", "quit", "change" or "undo"

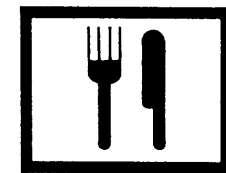
Windows & Icons

Types of icons

- **Resemblance**: depict the underlying concept through an analogous image
- **Exemplar**: represents a typical example of a class of objects
- **Symbolic**: used to convey an underlying referent that is at a higher level of abstraction than the image
- **Arbitrary**: an arbitrary image \Rightarrow must be learned



(a)



(b)



(c)



(d)

Windows & Icons

Design guidelines:

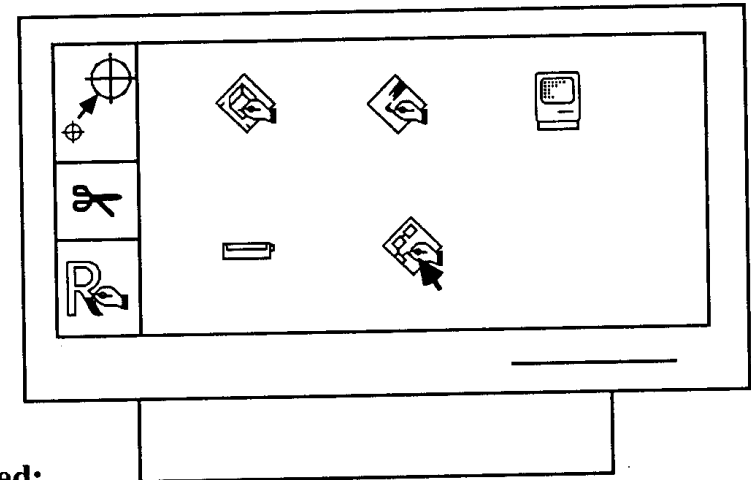
1. Choose a **consistent** icon design scheme

e.g., In "Poor", "magnify" is designed by depicting a *before & after*

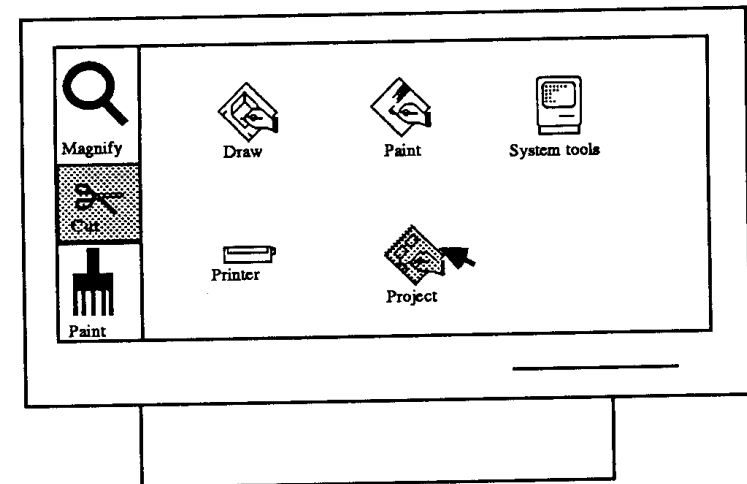
representation; "cut" is designed by depicting *tool* that is used to accomplish operation; "paint" is designed by depicting *action*

In "Improved", all are designed by depicting *the tool that is used to accomplish the operation*

Poor:







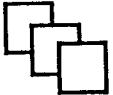



Improved:





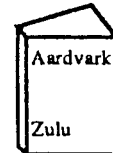

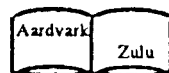



Windows & Icons

2. Design icons to be concrete & familiar

	Concrete/Familiar	Abstract/Unfamiliar
Folder		
Telephone Book		
Clock		
Database		

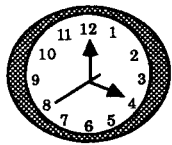
3. Design icons in a set to be visually & conceptually distinct

	Dictionary	Phonebook
Conceptual similarity		
Conceptual distinctiveness		
Visual similarity		
Visual distinctiveness		

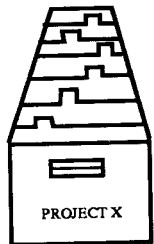
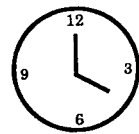
Windows & Icons

4. Avoid excessive detail in icon design

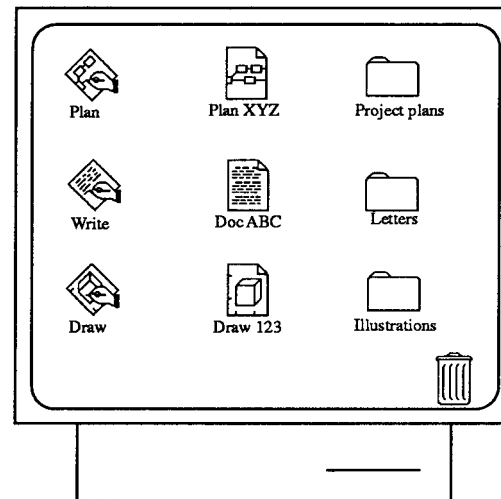
Poor:



Improved:



5. Design Icons to communicate object relations & attributes whenever possible



Poor:

STATUS:

Planned



Job #1 Install Pole

In progress



Job #1 Install Pole

Complete



Job #1 Install Pole

Improved:



Job #1 Install Pole



Job #1 Install Pole



Job #1 Install Pole

6. Accompany icons with names

Screen Design

Layout design guidelines:

1. Include ONLY/ALL **information essential** to decision making
2. Start in the **upper-left corner** (eye-tracking studies show that the eye tends to go to the upper-left corner of a display)
3. **Consistent** format
4. **Group items logically** (user can easily locate the items or fields)

The diagram illustrates a screen layout within a rounded rectangle. At the top left is the date field 'mm/dd/yy' and at the top right is the time field 'hh:mm:ss'. Centered below these is the 'MENU TITLE'. A black horizontal bar, labeled 'Menu Selection Number One' in white text, is positioned below the title. Below this bar are the menu items: 'Menu Selection Number Two', 'Menu Selection Number Three', three vertical dots indicating more items, and 'Menu Selection Number Seven'. At the bottom of the screen, there are two lines of instructions: 'Press ARROWS to move selection bar' and 'Press RETURN to select' on the first line, and 'Press CANCEL to return to previous menu' on the second line. The very bottom of the screen is labeled 'Status and Error Message Line'.

Screen Design

5. Provide symmetry & balance through the use of white space
6. Avoid heavy use of all **uppercase** letters
7. Distinguish captions & fields

COURSE OFFERINGS

QUARTER COLLEGE
SPRING 86 ALL

SEQUENCE 02 PROFESSOR ALL

COURSE NUMBER	COURSE NAME	NUMBER CREDITS	PROFESSOR
COM1200	DATASTRUC	04	SMITH
PSY0001	INTRODUCT	04	JONES
BIO0032	GENETICS	04	RUBIN
COM0987	FORTTRANLA	01	MICHEALS

COURSE OFFERINGS

QUARTER: Spring COLLEGE: All
SEQUENCE: 2 PROFESSOR: All

NUMBER	NAME	CREDITS	PROFESSOR
--------	------	---------	-----------

COM 987	Forttranla	1	Michaels
COM 1200	Datastruc	4	Smith
BIO 32	Genetics	4	Rubin
PSY 1	Introduct	1	Jones

Press **ARROW KEYS** to scroll

Press < **RETURN** > to go back

Screen Design

- **Text** design guidelines:

1. **Message**

- Should be **brief** & **concise** (1)
- Design the level of detail according to users' knowledge & experience (2)
- Express message in the **affirmative** (3)
- Should be **constructive**, not critical (4)
- Should be **specific** & comprehensible (5)
- Should imply that user is in **control** (6)
- When message implies a necessary action, use words in message consistent with that action
e.g., There is no entry on the field?
The field is empty?
Please fill in the field?

Screen Design

	Poor:	Improved:
(1)	The processing of the text editor yielded 23 pages of output	Output 23 pages
(2)	Error in DRESS SIZE field	Error: DRESS SIZE range is 4 to 16
(3)	Cannot exit before saving file	Save file before exiting
(4)	Bad/illegal/invalid file name	Maximum file name length is 8 characters
(5)	Syntax error 1542	Unmatched left parenthesis in line 210
(6)	Enter command	Ready for command

Screen Design

2. Instructional prompts

- Place prompts when & where needed (1)
- Design the level of detail according to the users' knowledge & experience (2)
- Use active voice (3)
- Avoid negatives (4)
- Order prompts **chronologically** (5)
- Format prompts using white space or other visual cues (6)
- Apply **consistency** (7)

(1)	Position cursor and press return	Position cursor Press return to accept
(2)	SIZE: ____	SIZE: ____ (4 to 16)
(3)	The message is sent by pressing TRANSMIT	To send message, Press TRANSMIT
(4)	Do not return to menu before completing entry	Complete entry before returning to menu
(5)	Page forward after entering address	Enter address, then page forward
(6)	Press backtab to go up, tab to go down	To go <i>up</i> , Press BACKTAB To go <i>down</i> , Press TAB
(7)	Press U for up Hit D for down	For up, Press U For down, Press D

Screen Design

3. Instructions

- Make text simple & clear
- Use short sentences & simple & familiar words
- Keep paragraphs & separate them by at least one blank line
- Avoid hyphenation
- Avoid right justifying with unequal spacing

Scrolling. There are a number of different ways you can peruse through text that is not currently visible on the screen, otherwise known as scrolling. First, the arrow keys are available for moving the cursor, and when the cursor reaches a border or edge of the screen, then the text will scroll in the appropriate direction, such as left from the right border, up from the bottom border etc. Alternatively, one can choose to scroll by pagefuls, and the next and previous keys are available for this purpose. Next takes you to the next pageful, and Prev

SCROLLING

There are three ways to scroll.

FIRST, move the cursor using the ARROW keys. When you reach any edge of the screen, the text will scroll.

If you reach the right edge, the text will scroll to the left. If you reach the bottom edge, text will scroll up, etc.

SECOND, the NEXT and PREV keys scroll by page.

Screen Design

4. Screen number

- Right justify integers
- Decimal-align real numbers
- Avoid leading zero when unnecessary & non-standard
- Break up long numbers into groups of 3 to 4 digits
- Use standard separators when they apply; otherwise use spaces

Poor:	Improved:
10 100 1,000 10,00	10 100 1,000 10,000
100.00 25.2563 5,432.48 1.45491	5,432.48 1.45491 100.00 25.2563
10:1 p.m 02/07/87 002 100 013	10:01 p.m. 2/7/87 2 100 13
6173954686 028405554 1234567890 135792468	617-395-4686 028-40-5554 1,234,567,890 135 792 468

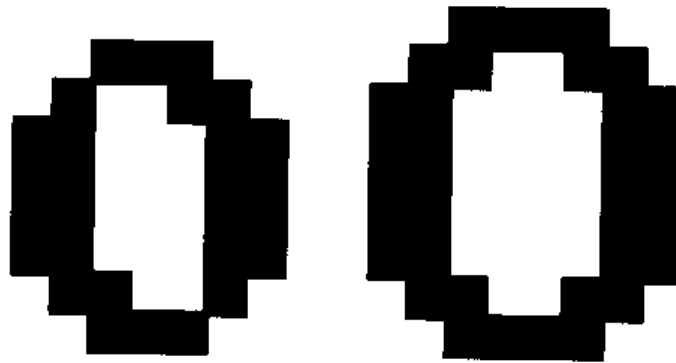
Screen Design

5. Font

- Use **Georgia** or **Verdana** (Georgia and Verdana are the screen display versions of Times New Roman and Arial, respectively; Note the difference between printing on a paper, >600dpi and displaying on a screen 72-120 pixels per inch)
- Use 10 point to 12 point type
- Avoid bold or italic in body type, except for a few words for emphasis
- Use upper case only for the first word of sentences, proper names, etc.
- Use left alignment
- Use **dark** text on a light background

Screen Design

Illustration: a 12-point letter “o” is displayed in Times New Roman and Georgia. If we enlarge them:



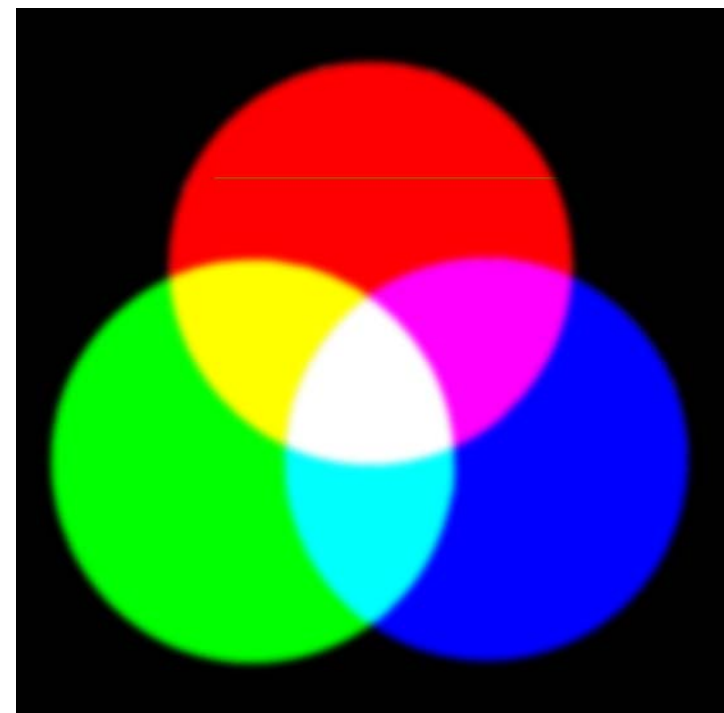
- In Times New Roman, there are two places where pixels touch only at their corners while Georgia has a smoother appearance
 - Size of Georgia is a bit larger
- ⇒ Georgia is a screen friendly font especially for small font sizes

Screen Design

6. Color

- Color adds an extra dimension to an interface & can help the user understand complex information structures
- No consumption on the dimension of screen
- Can be used to highlight exceptional events

RGB color model:



Screen Design

Design guidelines:

- Aware **concept** of color in different cultures:

Concept	Chinese		American	
	Color	%	Color	%
Safe	Green	62.2	Green	61.4
Cold	White	71.5	Blue	96.1
Caution	Yellow	44.8	Yellow	81.1
Go	Green	44.7	Green	99.2
On	Green	22.3	Red	50.4
Hot	Red	31.1	Red	94.5
Danger	Red	64.7	Red	89.8
Off	Black	53.5	Blue	31.5
Stop	Red	48.5	Red	100.0

Screen Design

- Make sure there is sufficient **contrast** between text and background colors
e.g., avoid text and background colors that differ only in **blue** because human is less sensitive to this color

Offer expires 07/31/03. Offer available to new High Speed Internet subscribers only. May not be used in conjunction with any other offer. Service is not available in all areas.

	Color	R	G	B	
Text	Yellow	255	255	0	
Background	White	255	255	255	
Difference		No	No	Yes	Not a good combination
Text	Brown	64	64	0	
Background	White	255	255	255	
		Yes	Yes	Yes	Good combination

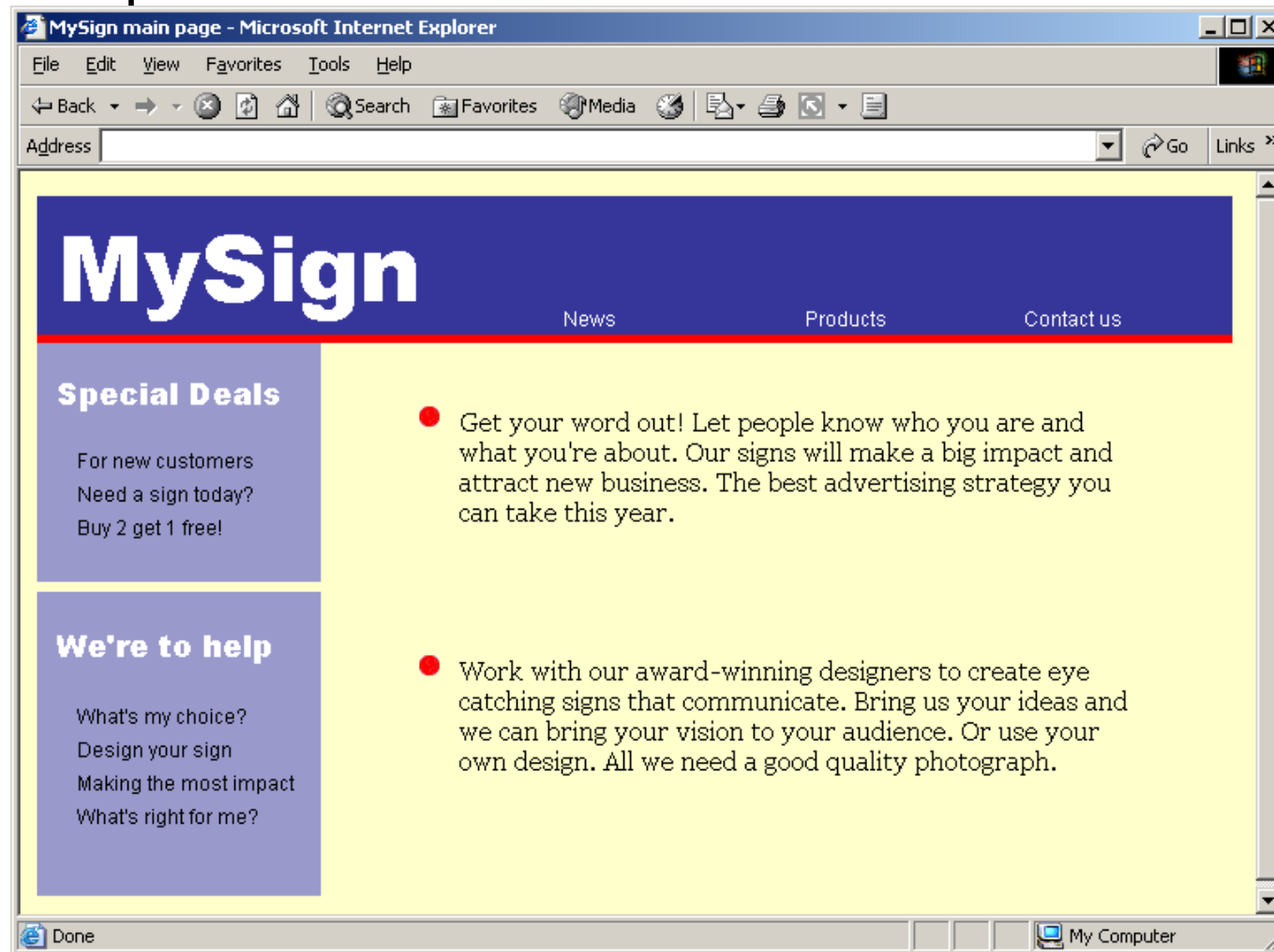
Screen Design

Offer expires 07/31/03. Offer available to new High Speed Internet subscribers only. May not be used in conjunction with any other offer. Service is not available in all areas.

- Use color **sparingly**; design first in monochrome & optimize other aspects of screen layout & design, then add color only where it adds value
- Be **consistent** with color association in a system
- Use color to **draw attention**
- Use color to indicate **status**

Use of Color

- Use color to communicate organization and establish relationship



Screen Design

Lorem ipsum

Lorem ipsum

Lorem ipsum

Lorem ipsum

Lorem ipsum

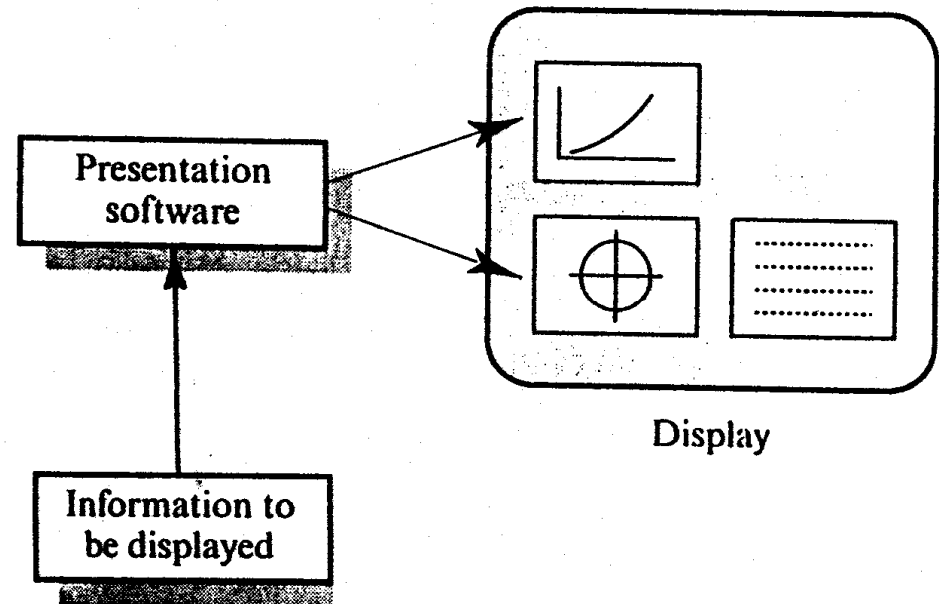
Lorem ipsum

Do they look good? Why?

Screen Design

7. Information presentation

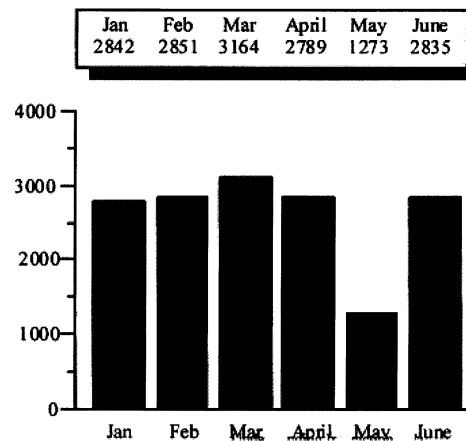
- **Static** information
 - Initialized at the beginning of a session; it does not change during the session
 - May be either numeric or textual, e.g., power indicator



- **Dynamic** information
 - Change during a session & the changes must be communicated to the system user
 - May be either numeric or textual, e.g., clock

Screen Design

- Analogue & digital presentation
 - **Digital** presentation
 - Can be compact: take up little screen space
 - Precise values can be communicated
 - **Analogue** presentation
 - Easier to get an “at a glance” impression of a value
 - Possible to show relative values
 - Easier to see exceptional/extreme data values



Screen Design

8. Visual organization

Four Design principles:

- Proximity

- Group related content items close together
- Separate unrelated items

- Alignment

- Place related items along an imaginary line
- Align items of equal importance and indent subordinate items

- Consistency

- Make related items look the same
- Maintain high degree of uniformity in layout with a page and uniformity in layout across pages

- Contrast

- Make different items look different

Screen Design

Any improvement?

Dan's Clothing Store

*Checkout
close out on pink socks
Email us
July specials
Kid's clothes
Men's clothes
Open an account
Sale on rain wear
Special sizes
Store locations
Your account status
Women's clothes*

Screen Design

Dan's Clothing Store

*Women's clothes
Men's clothes
Kid's clothes
Special Sizes*

*July Specials
Sale on Rainwear
Closeout on pink socks*

*Store locations
Store hours*

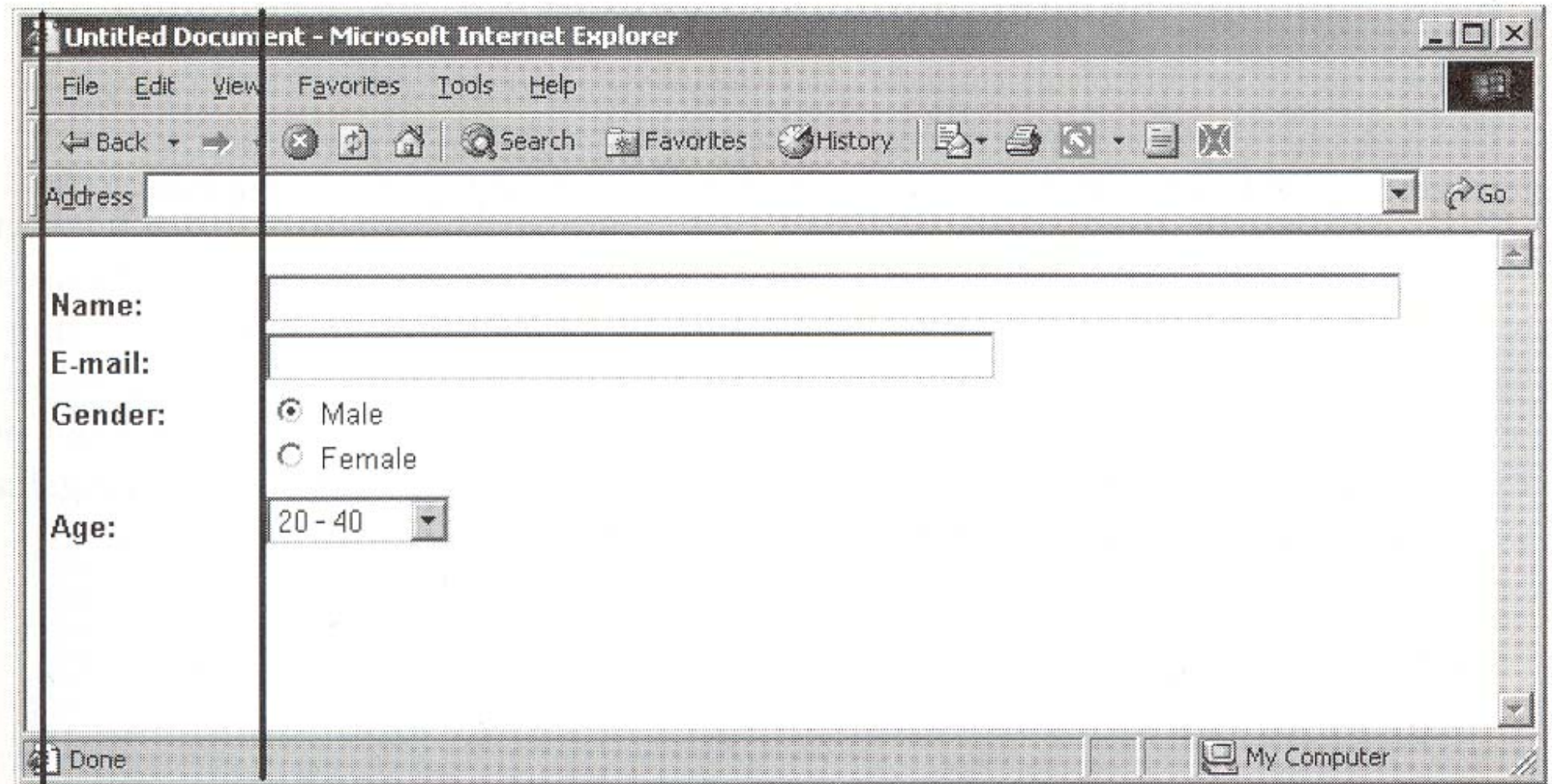
*Open an account
Your account status*

Checkout

Email us

Better? Which principle is used?

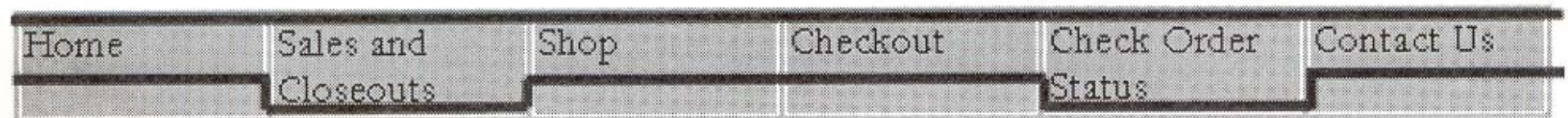
Screen Design



Which principle is used?

Screen Design


Good alignment maximizes the number of unbroken virtual lines



Which one is better?

Screen Design

Avoid centered alignment for lines that are of nearly equal length



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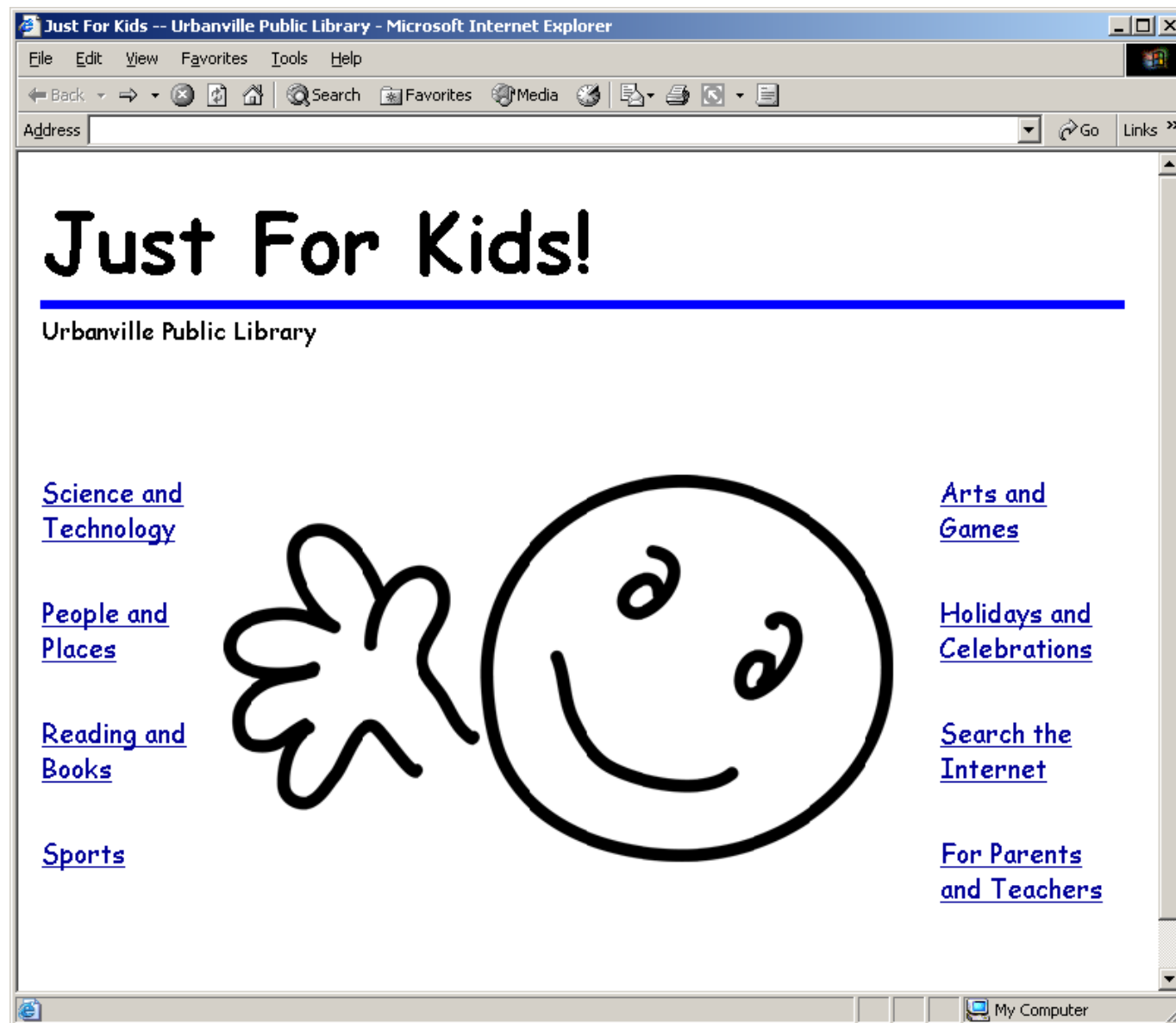
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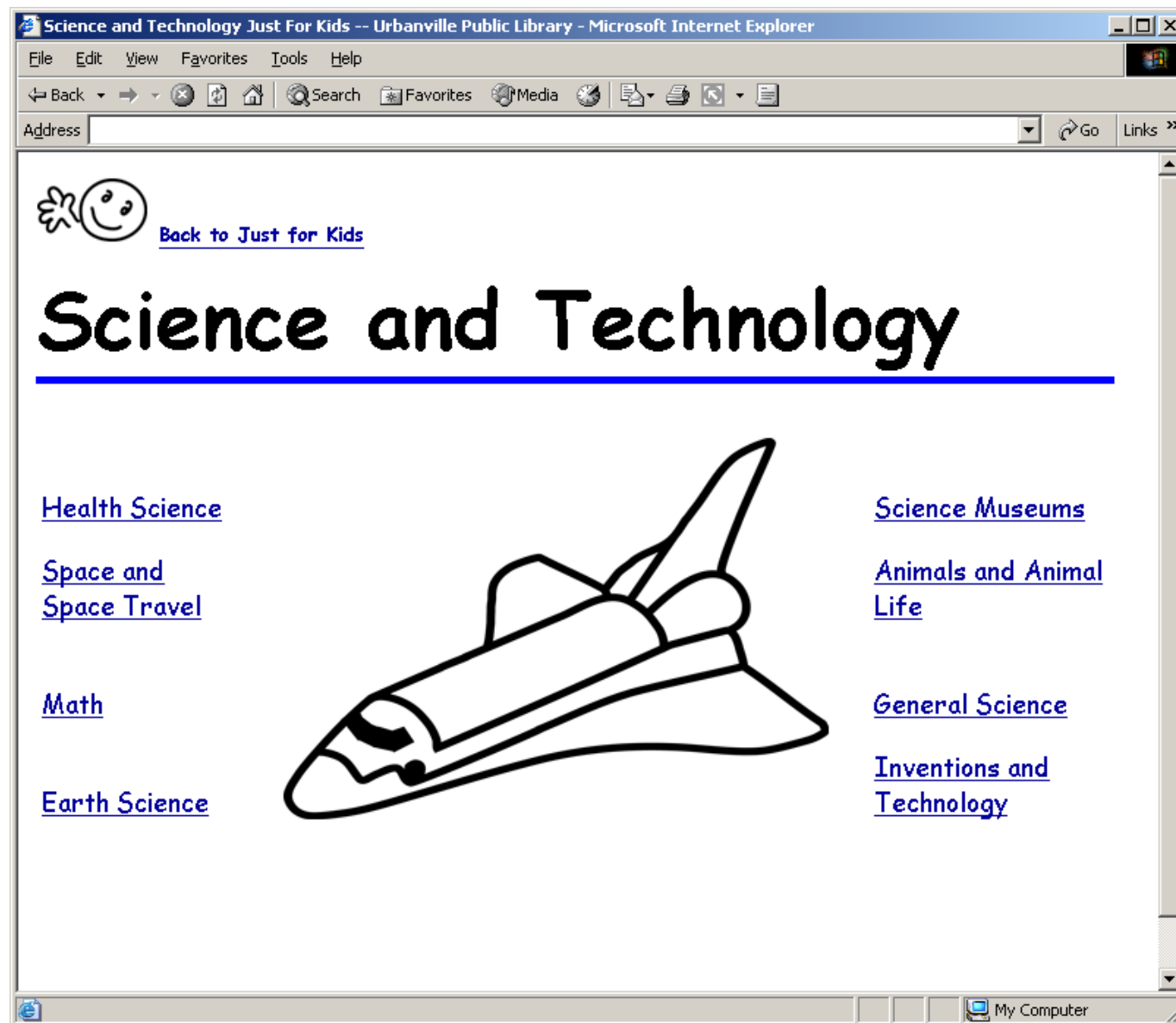
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Which one is better?

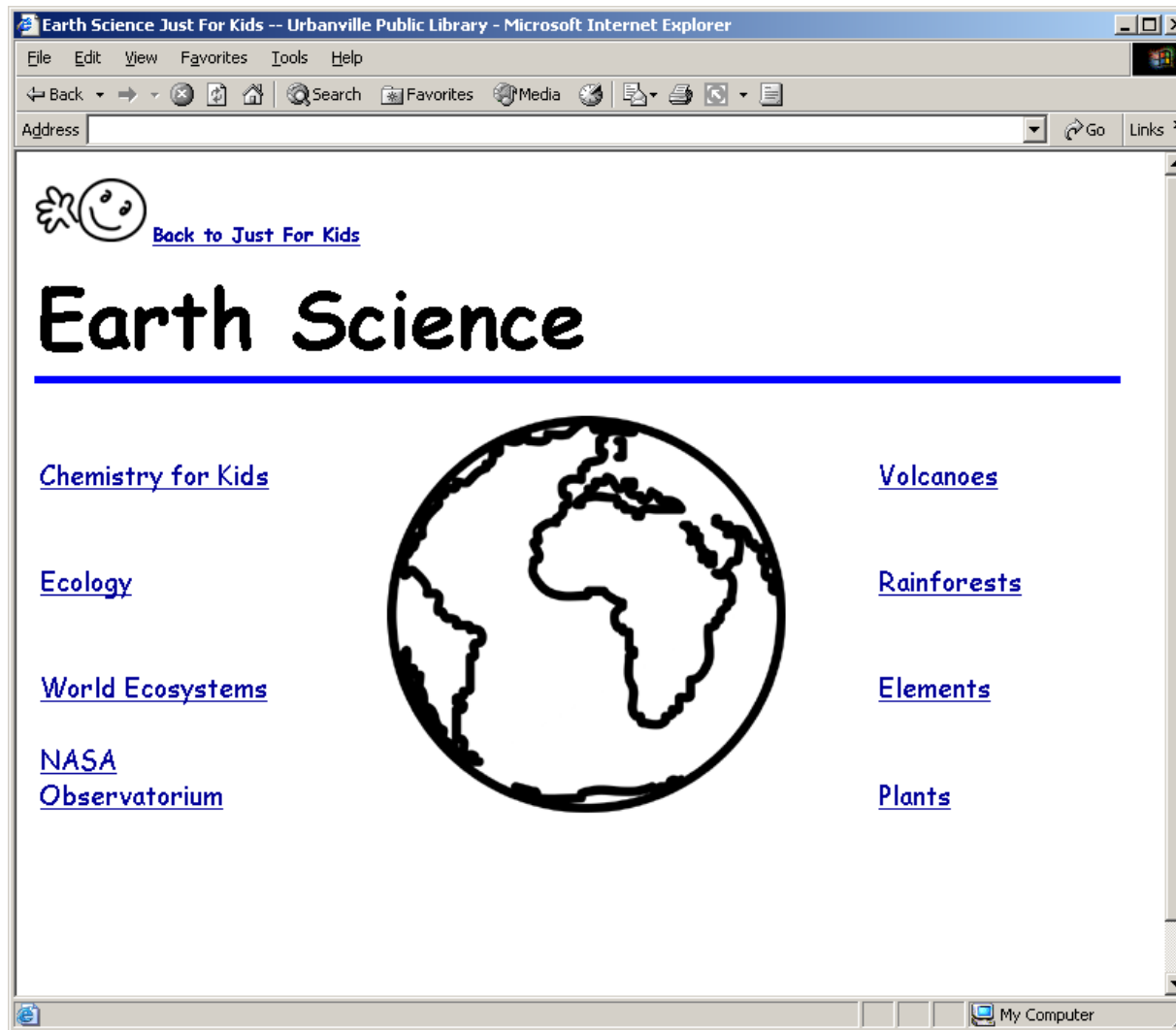
Screen Design



Screen Design

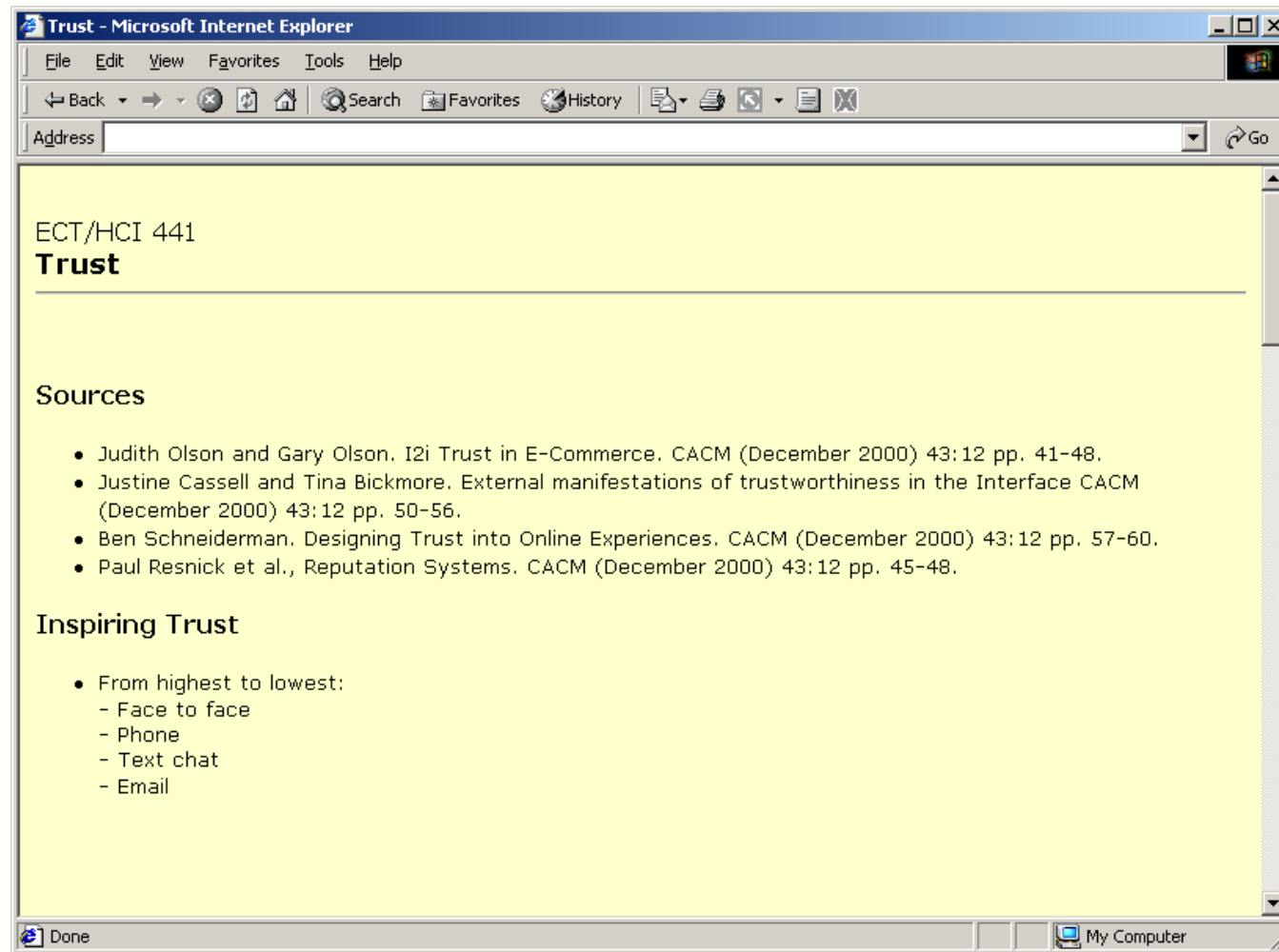


Screen Design



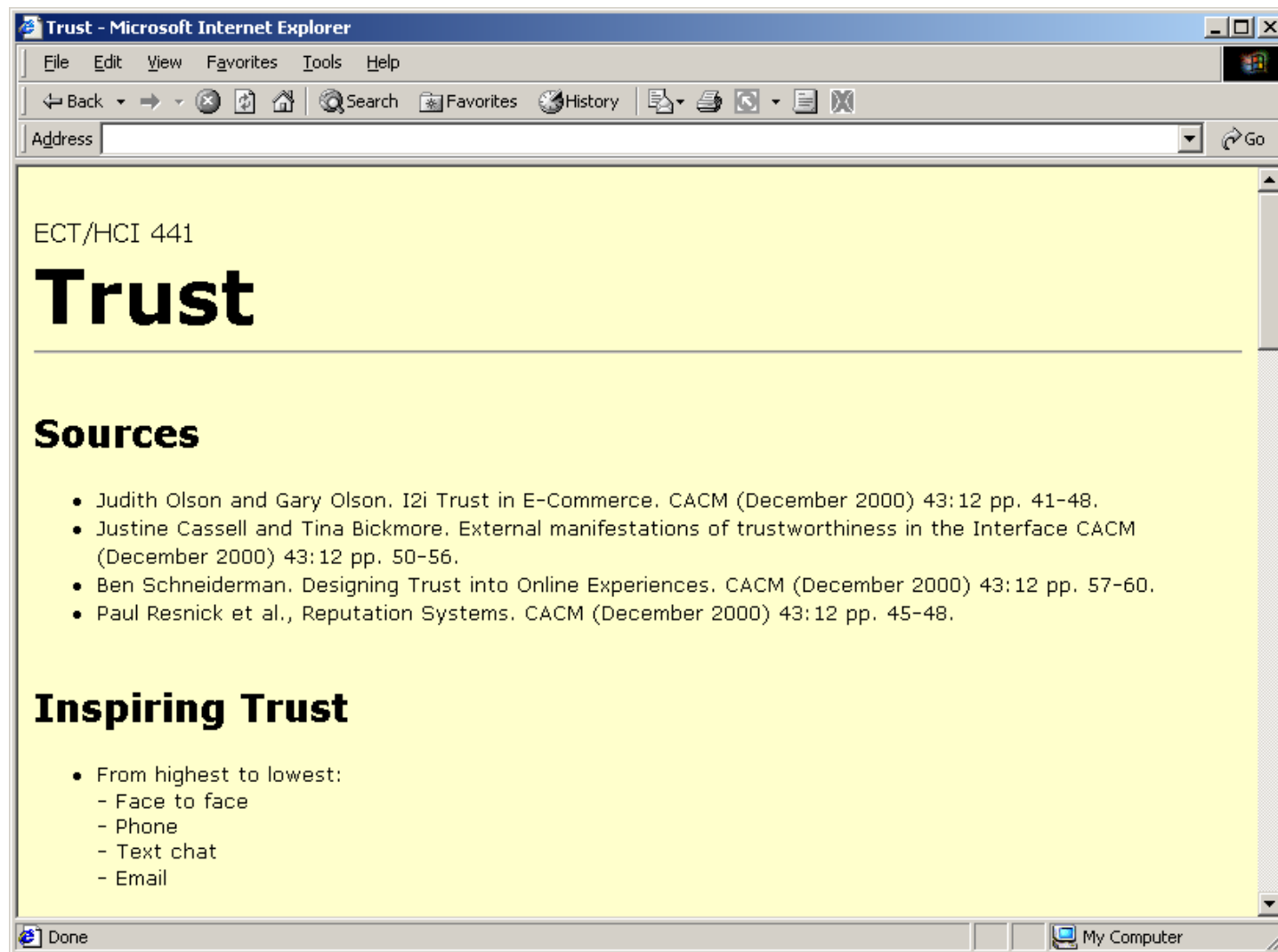
Which principle is used?

Screen Design



Sound interesting?

Screen Design



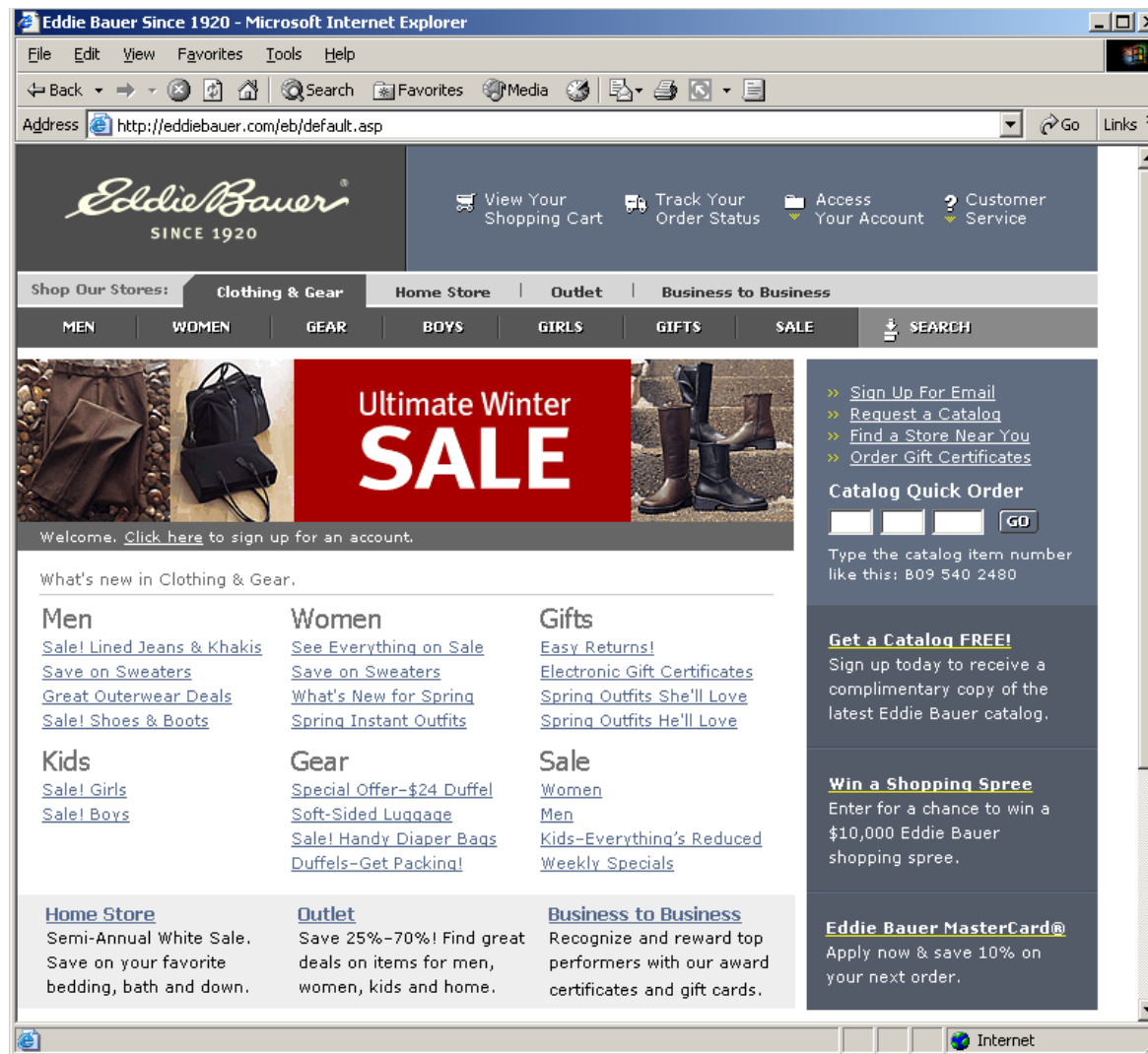
Better? Which principle is used?

Screen Design



Which principle(s) is/are used?

Screen Design



Which principle(s) is/are used?