Universiti Malaysia PAHANG
Engineering • Technology • Creativity

Graphical User Interface

Chapter Three- Part 2
Phases of Interface Design

Editor
Dr Taha Hussein Rassem
Faculty of Computer Systems and Software Engineering
tahahussein@ump.edu.my

Chapter Description

- Aims
  - To Understand the user interface design process.
  - To identify the components of GUI.
  - To identify the roles of use GUI components to build a good GUI.

- Expected Outcomes
  - Understand the user interface design process.
  - Able to design a good GUI.

- References

The Essential Guide to User Interface Design, Third Edition, Wilbert O. Galitz, Wiley Publishing Inc.

The User Interface Design Process
Step 1: Know your user

- The user needs a system that is built to serve.
- Understanding people and what they do is a difficult and often undervalued process but very critical because of the gap in knowledge, skills, and attitudes existing between system users and developers that build the systems.

The User Interface Design Process

What you should know

- Understand how people interact with computers.
- Understand the human characteristics important in design.
- Identify the user's level of knowledge and experience.
- Identify the characteristics of the user's needs, tasks, and jobs.
- Identify the user's psychological characteristics.
- Identify the user's physical characteristics.

User's Psychological characteristics

- Attitude and Motivation

Is the user's attitude toward the system positive, neutral, or negative? Is motivation high, moderate, or low?

- Patience

Low, moderate, or high due to interest or fear.

- Expectations

What are user's expectations about the system or Web site?

- Cognitive style

People differ in how they think about and solve problems..
Verbal or spatial, analytic or intuitive, concrete or abstract

User's physical characteristics

- Age

(1)Age classifications

Yong: 18-39

Middle-aged:40-59

older: 60-74

oldest: 75 and older

(2) Vision

(3)Hearing

User's physical characteristics

(4)Cognitive processing

Brain processing also appears to slow with age. Working memory, attention capacity, and visual search appear to be degraded

(5)Older people and Internet use

Age 45-55:86%; Age 56-65: 75%; Age 66+: 41%

- Gender ????
- Handedness (R 87%, L 13%) - In china, Japan?
- Disabilities : People with special needs must be considered in design

The Experience Bell Curve

- Different Needs for different groups

(1) Beginners

1)What does this product do?

2)where do I begin?

3)What do I need to do to complete the tasks?

The Experience Bell Curve

(2) Intermediates

1)Can you remind me how to perform this task?

2)How do I find this function?

3)What new features are in this upgrade?

The Experience Bell Curve

(3) Advanced users

1)Are there shortcuts for completing this task?

2)Can I automate this task?

3)How can I customize the interface for my needs?

Step 2: Understand the Business Function

- Perform a business definition and requirements analysis.
- Determine basic business functions.
- Describe current activities through task analysis.
- Develop a conceptual model of the system.
- Establish design standards or style guides.
- Establish system usability design goals.
- Define training and documentation needs.

Business definition and requirements analysis

- Information collection techniques

(1) Individual face-to-face interview

(2) Telephone interview or survey

(3) Traditional focus group

(4) Observational field study

(5) Requirements prototyping

(6) User-interface prototyping

Business definition and requirements analysis

(7) Paper survey or questionnaire

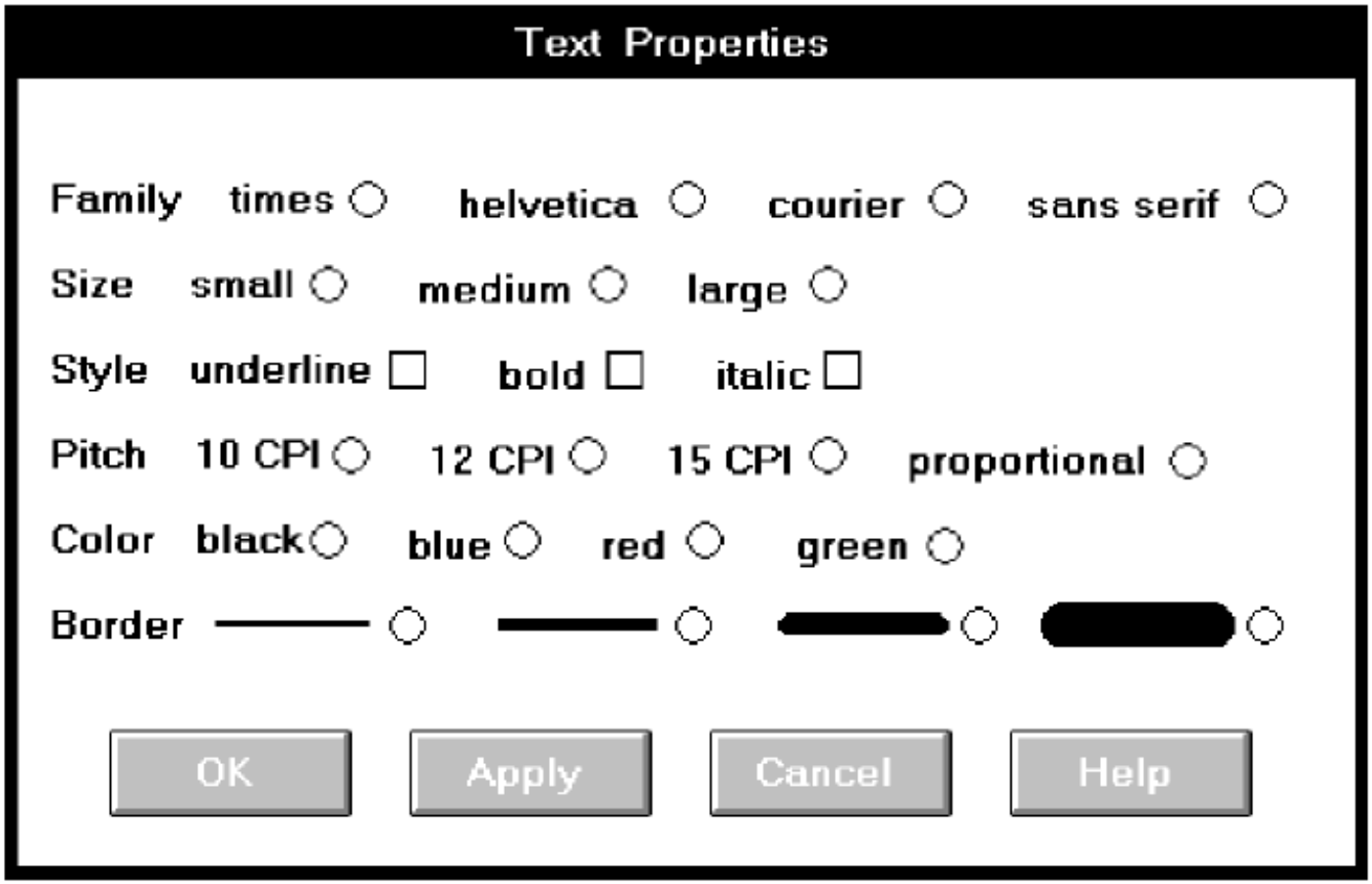
(8) Electronic survey or questionnaire

(9) Electronic Focus Group

Step 3: Understand the Principles of Good Interface and Screen Design

Why we need a well design

- Reflects the capabilities, needs, and tasks of its users
- Achieves the business objectives of the system for which it is designed


Text Properties
Family
times
helvetica
courier
sans serif
Size
small
medium
large
Style
underline
bold
italic
Pitch
10 CPI
12 CPI
15 CPI
proportional
Color
black
blue
red
green
Border
OK
Apply
Cancel
Help

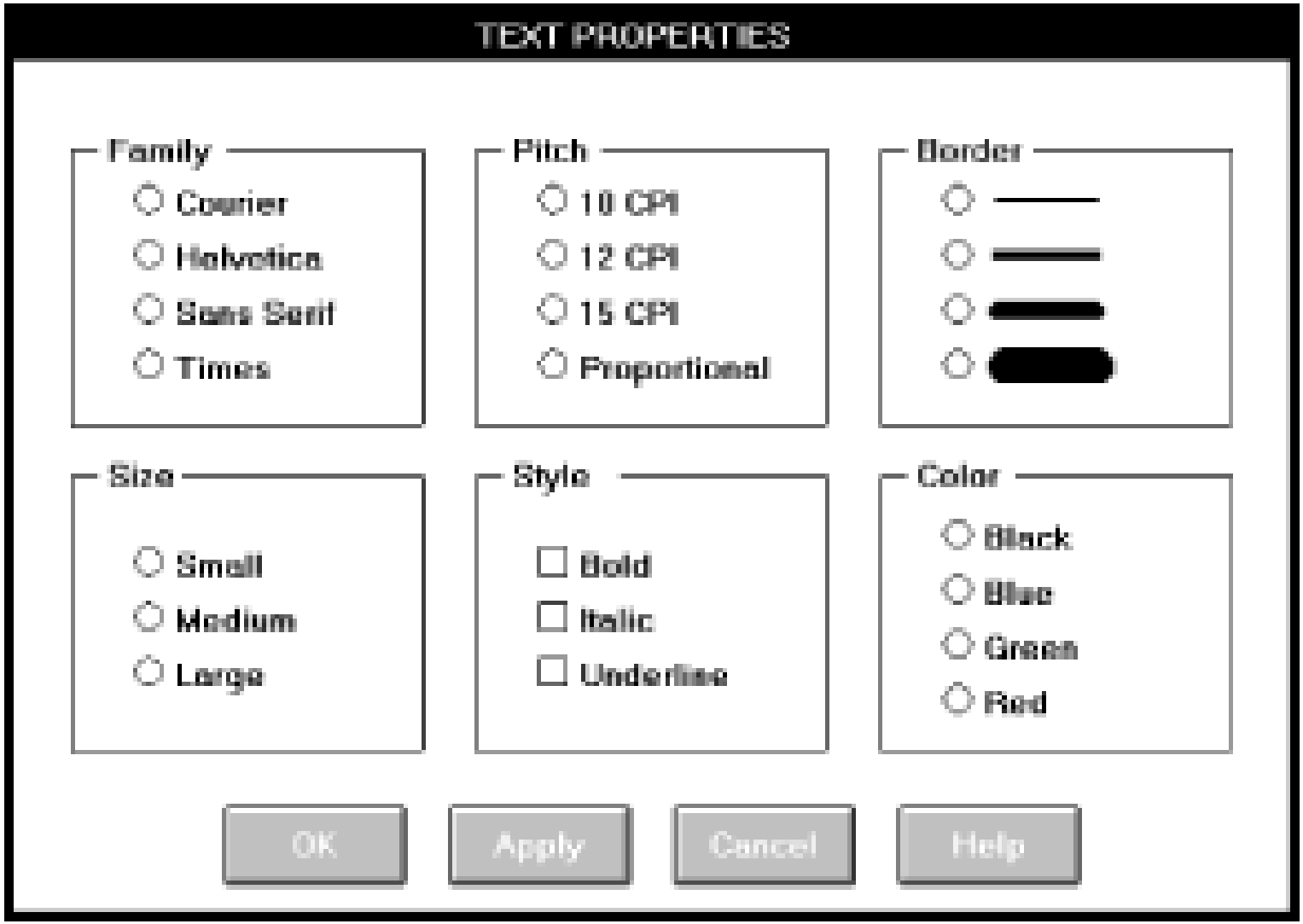
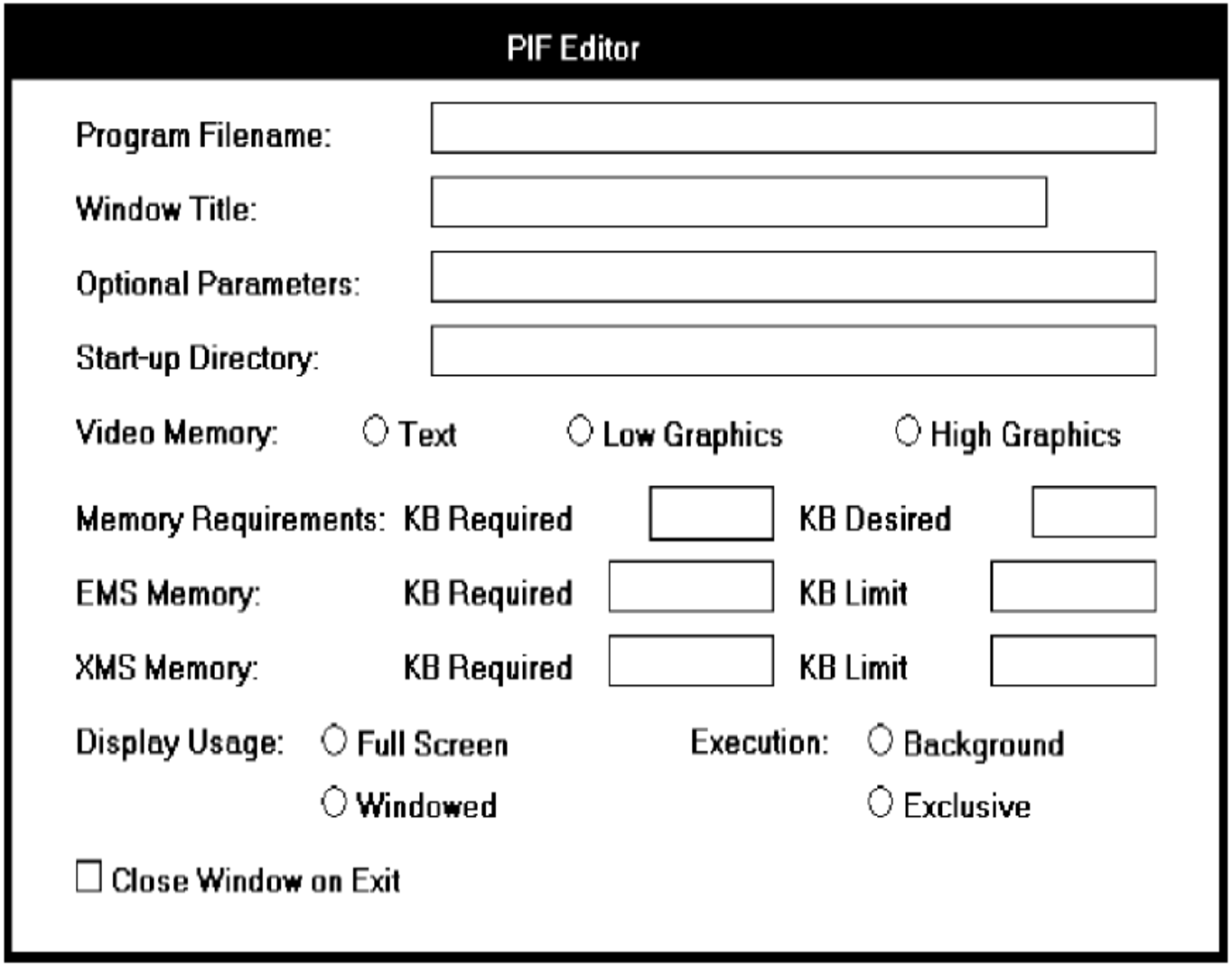


Figure P.2 A redesigned screen.


PIF Editor
Program Filename:
Window Title:
Optional Parameters:
Start-up Directory:
Video Memory:
Text
Low Graphics
High Graphics
Memory Requirements:
KB Required
KB Desired
EMS Memory:
KB Required
KB Limit
XMS Memory:
KB Required
KB Limit
Display Usage:
Full Screen
Windowed
Execution:
Background
Exclusive
Close Window on Exit

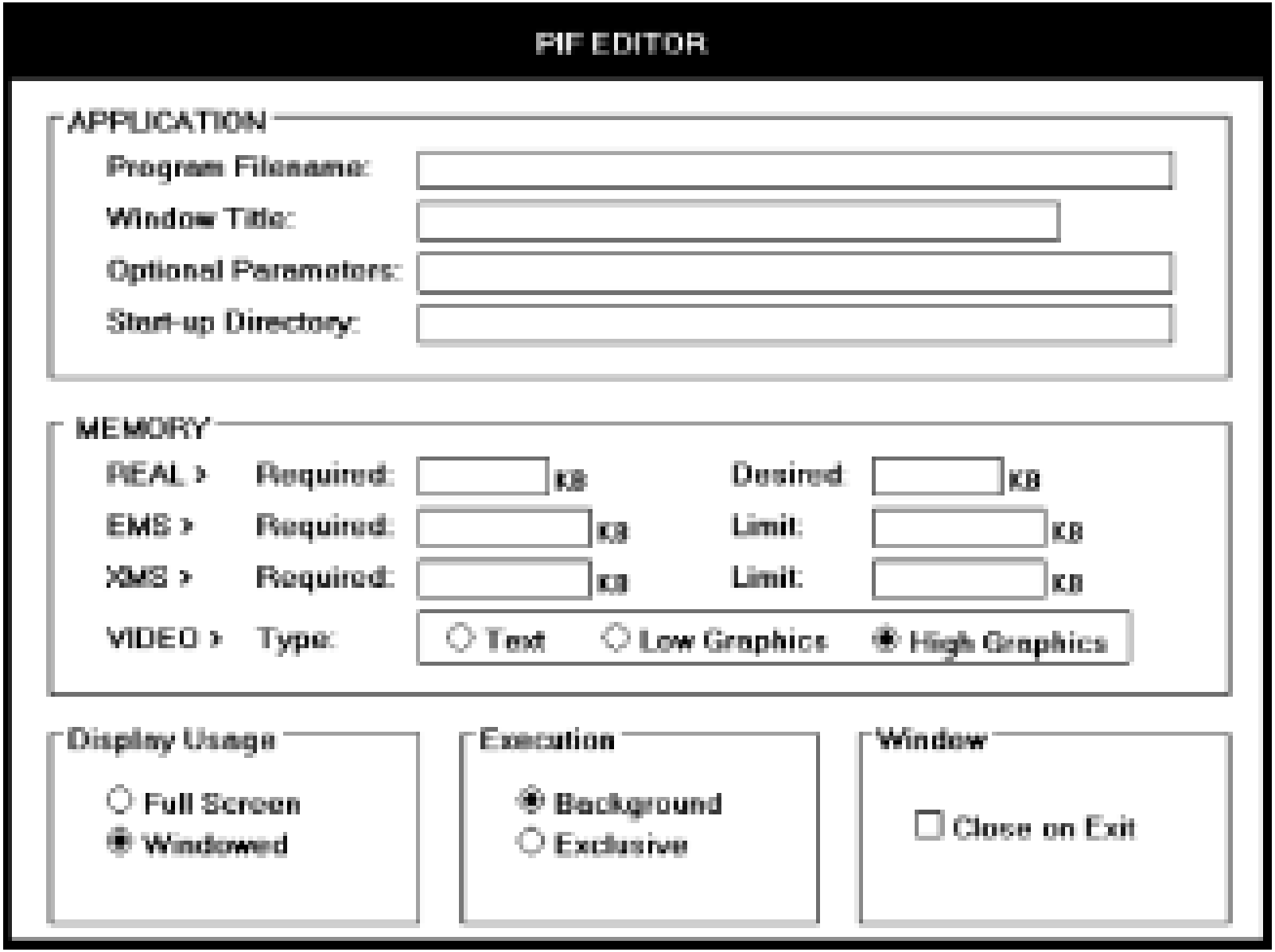


Figure P.4 A redesigned screen.

Starting point

- Provide an obvious starting point in the screen's upper-left corner.
- Focus user attention on the most important parts of a screen or page.
- Textual displays : Eyeball fixation studies

(upper-left center of the display, and then quickly move through the display in a clockwise direction)

- Graphical and web displays (example)

(1) people tend to look at text first, not image

(2) larger type dominates over smaller type.

(3) changing information is looked at before non-changing information.

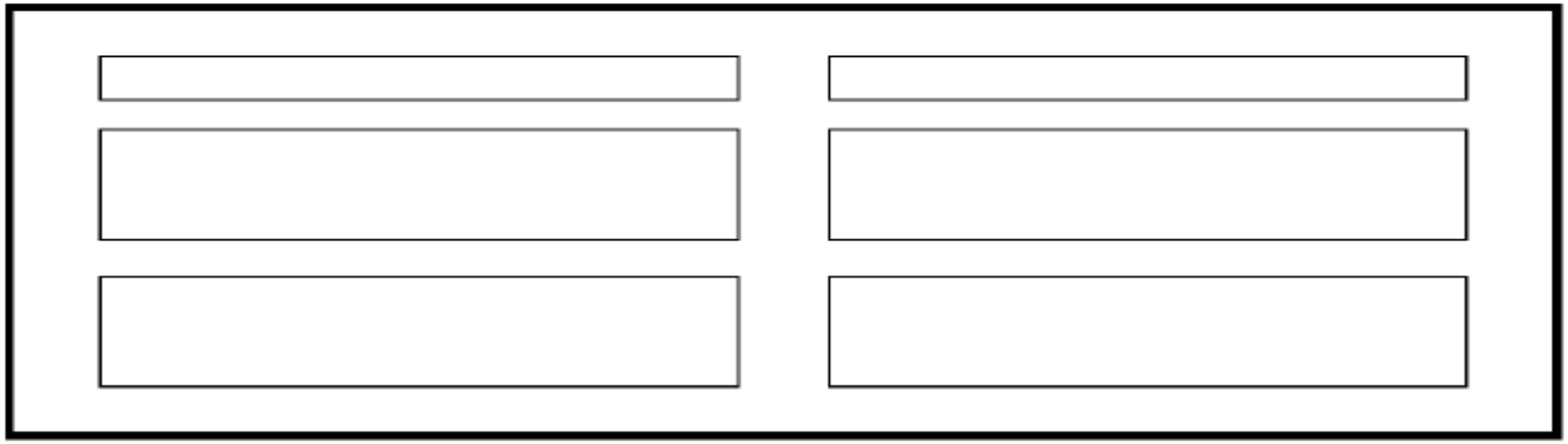
Ordering web pages

- Establish levels of importance. (example: airasia)
- Place critical information near the top of the web site.
- Organize information clearly.
- Place important items consistently.
- Place important items at the top of a page.
- Structure for easy comparison

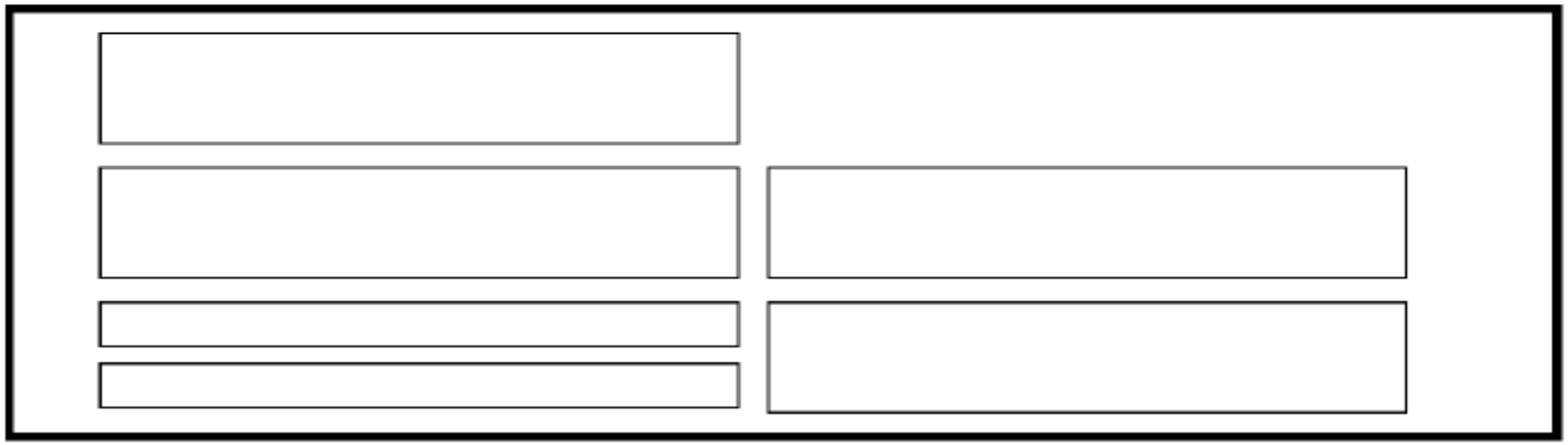
Visually Pleasing Composition

- Balance: providing an equal weight of screen element, left and right, top and bottom.
- Symmetry: replicating elements left and right of the screen centerline.
- Regularity: use similar element sizes, shapes, colors and spacing.
- Predictability
- Unity
- Simplicity
- Proportion : In screen design, aesthetically pleasing proportions should be considered for major
- components of the screen, including window sizes, Web page sizes, graphics, and
- groupings of data or text.

Balance

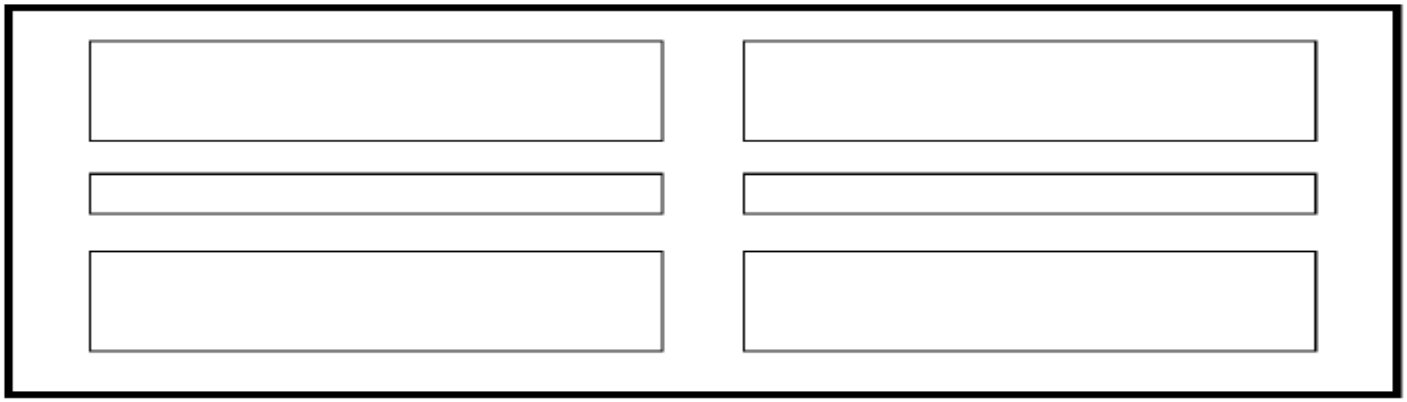


Balance

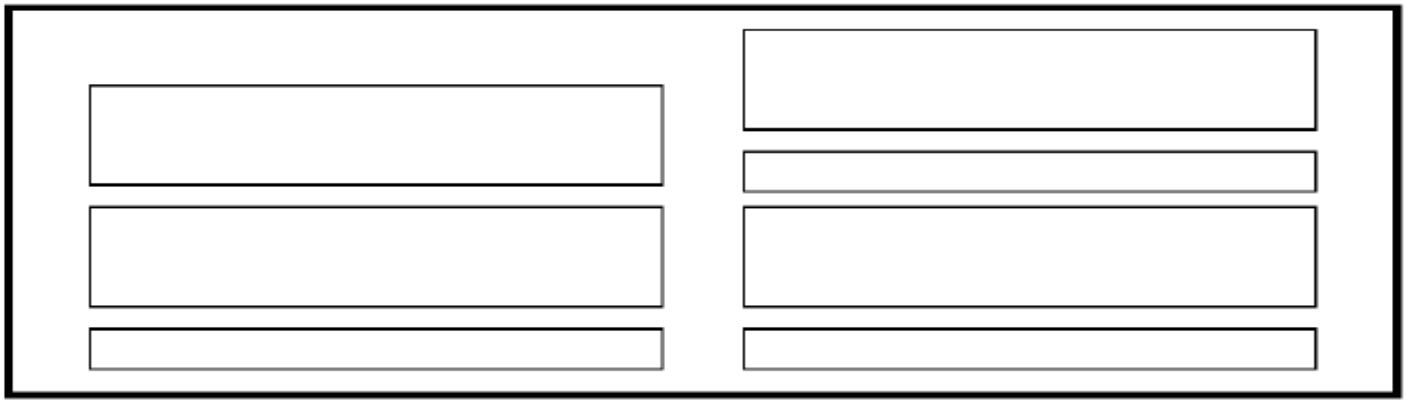


Instability

Symmetry



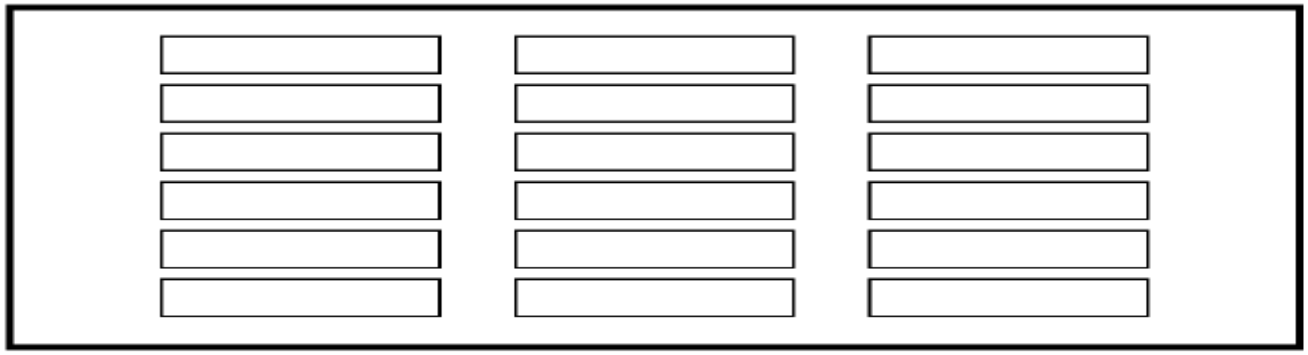
Symmetry



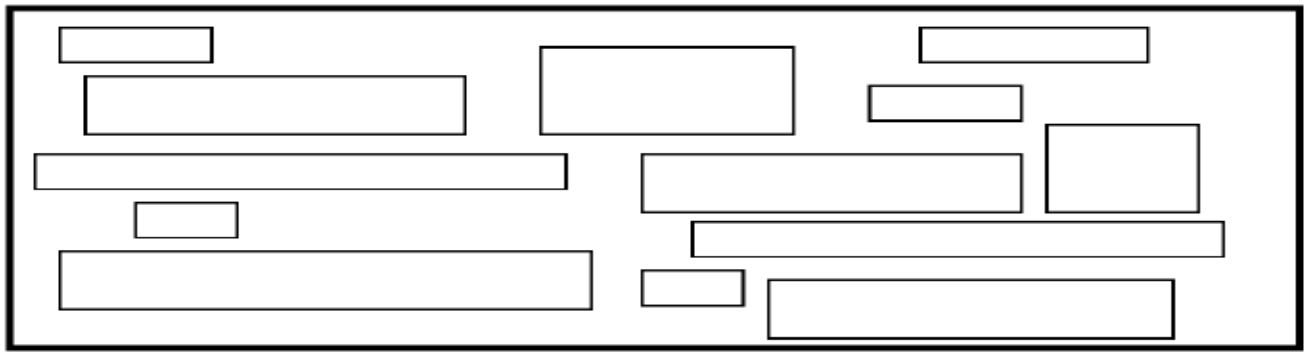
Asymmetry

Regularity

- Create regularity by establishing standard and consistently spaced horizontal and vertical alignment points.
- use similar element sizes, shapes, colors, and spacing.



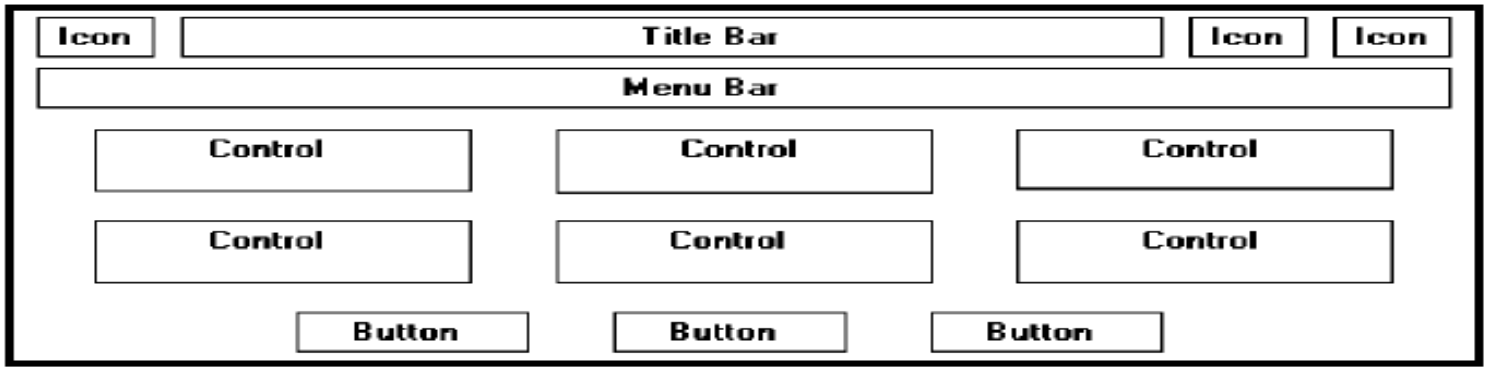
Regularity



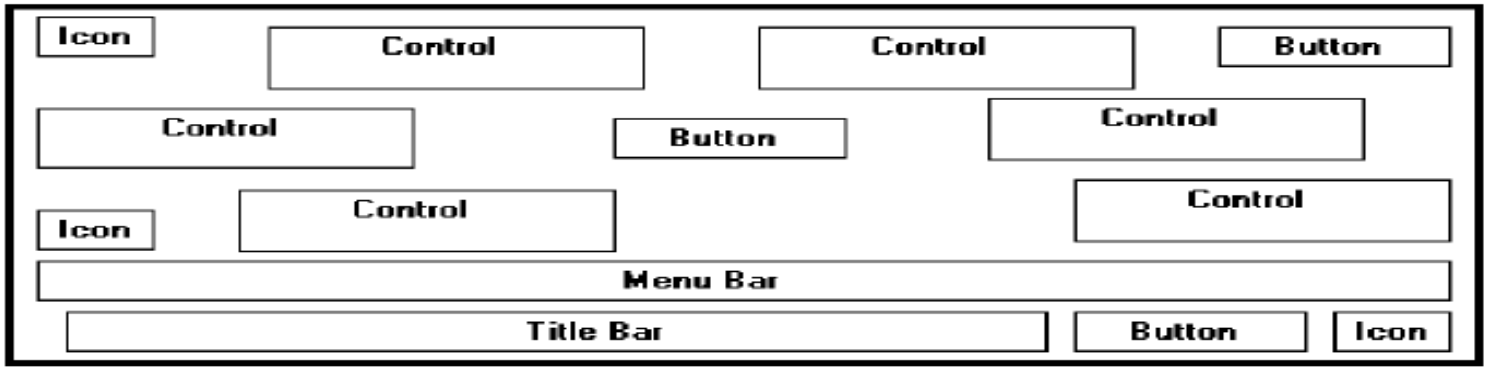
Irregularity

predictability

Create predictability by being consistent and following conventional orders or arrangements.



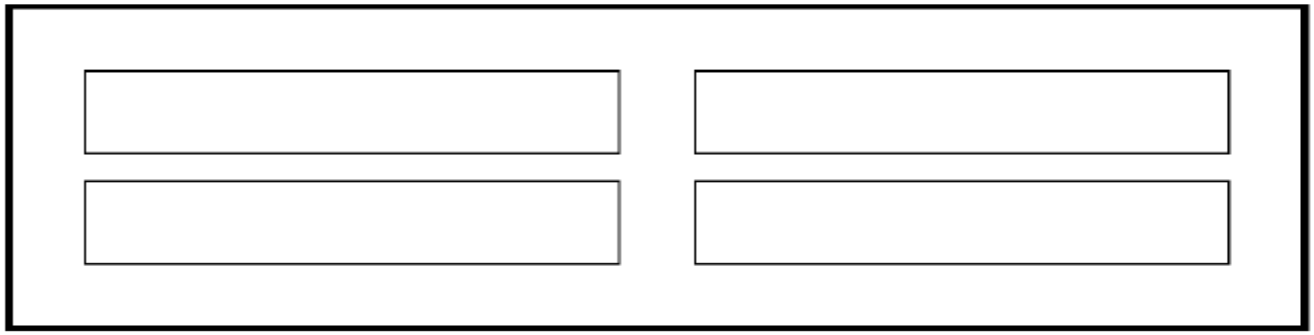
Predictability



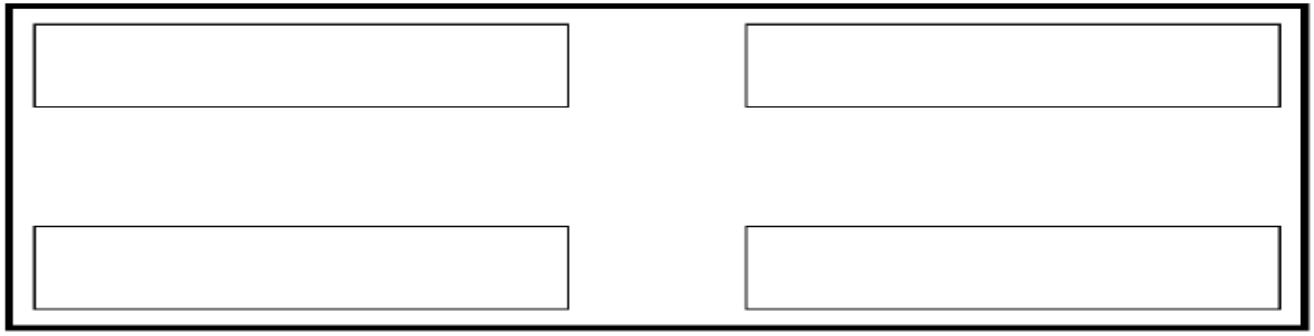
Spontaneity

Unity

Create unity by
— Using similar sizes, shapes, or colors for related information.
— Leaving less space between elements of a screen than the space left at the margins



Unity

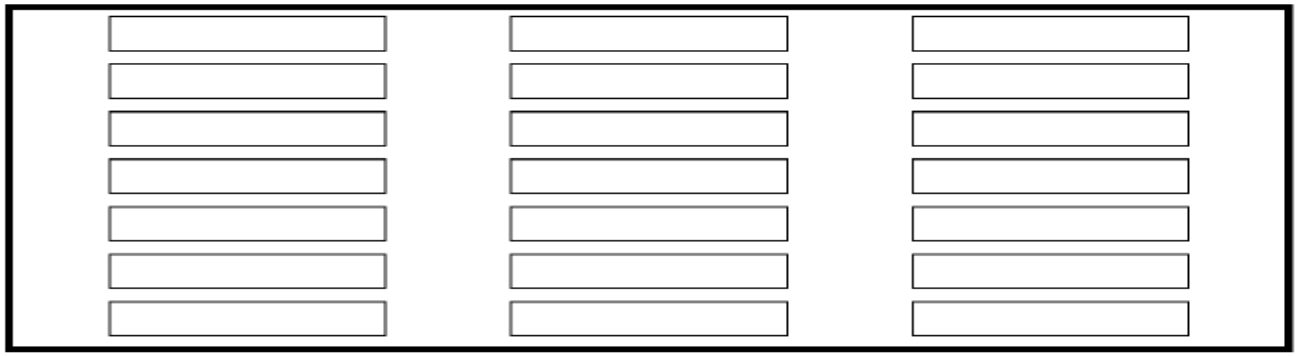


Fragmentation

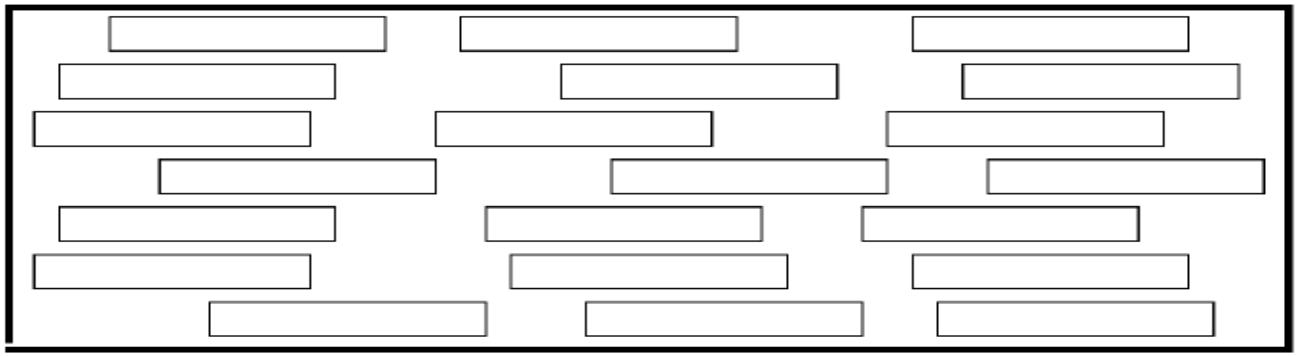
Simplicity (Complexity)

- Optimize the number of elements on a screen, within limits of clarity.
- Minimize the alignment points, especially horizontal or columnar.

— Provide standard grids of horizontal and vertical lines to position elements



Simplicity



Complexity

Groupings

- Grouping using white space
- Grouping using borders: leave sufficient padding space between the information and the surrounding borders; be cautious in using horizontal lines as separators between page sections.
- Grouping using backgrounds: contrasting background for related information.
- Distinctiveness: screen, buttons should not touch a window border; not touch each other.

Focus and emphasis

- To provide emphasis use techniques such as

  (1) higher brightness
  (2) distinctive typeface: bold; italics; underlining.
  (3) color.
  (4) larger size.
  (5) animation.
  (6) positioning.

- In web page design

  (1) call attention to new or changed content.

Font types and families

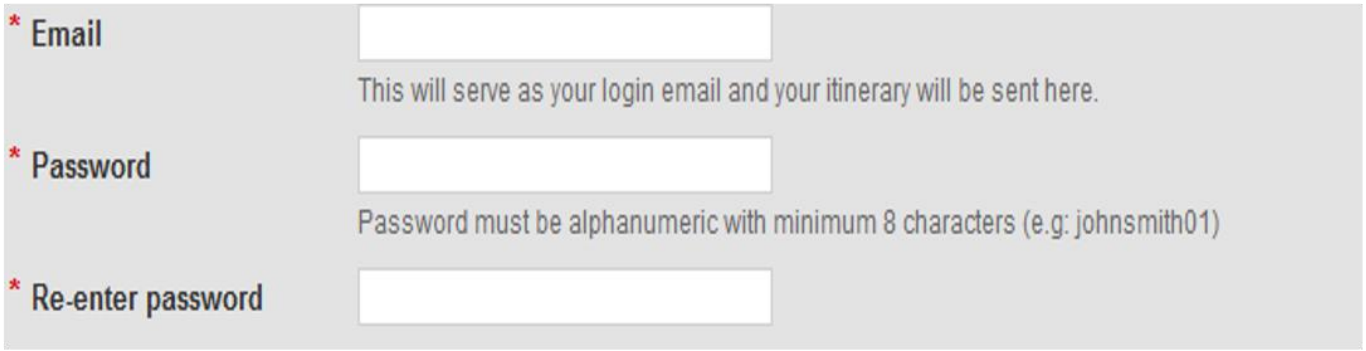
- Use simple, common, and familiar fonts to achieve the best reading speed
  - (1) arial or verdana sans serif
  - (2) times new roman or georgia serif.
- Use no more than two families.
  - (1) assign a separate purpose to each family
  - (2) allow one family to dominate.

Control caption-data field justification

- 1. first approach

  (1) left-justify both captions and data fields

  (2) leave one space between the longest caption and the data field column.

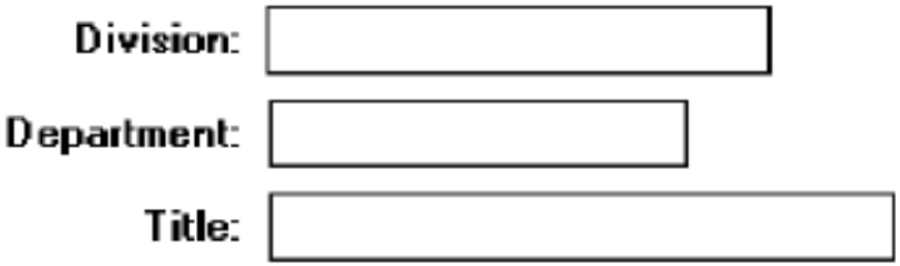


Control caption-data field justification

2. second approach

(1) left-justify data fields and right-justify captions to data fields

(2) leave one space between each.



Homepage

- Homepage purpose
- To tell the viewer what the site does and where they are. (first impressions can create a positive or negative feeling)
- Size: limit to one screen (one screen whenever possible) - view without scrolling
- Elements to include.

  (1) name or logo of web site owner.

  (2) web site name.

  (3) brief description of web site.

Homepage

(4) Summary of the key informational content.

(5) Navigation links to most of the site or major sections (if not all).

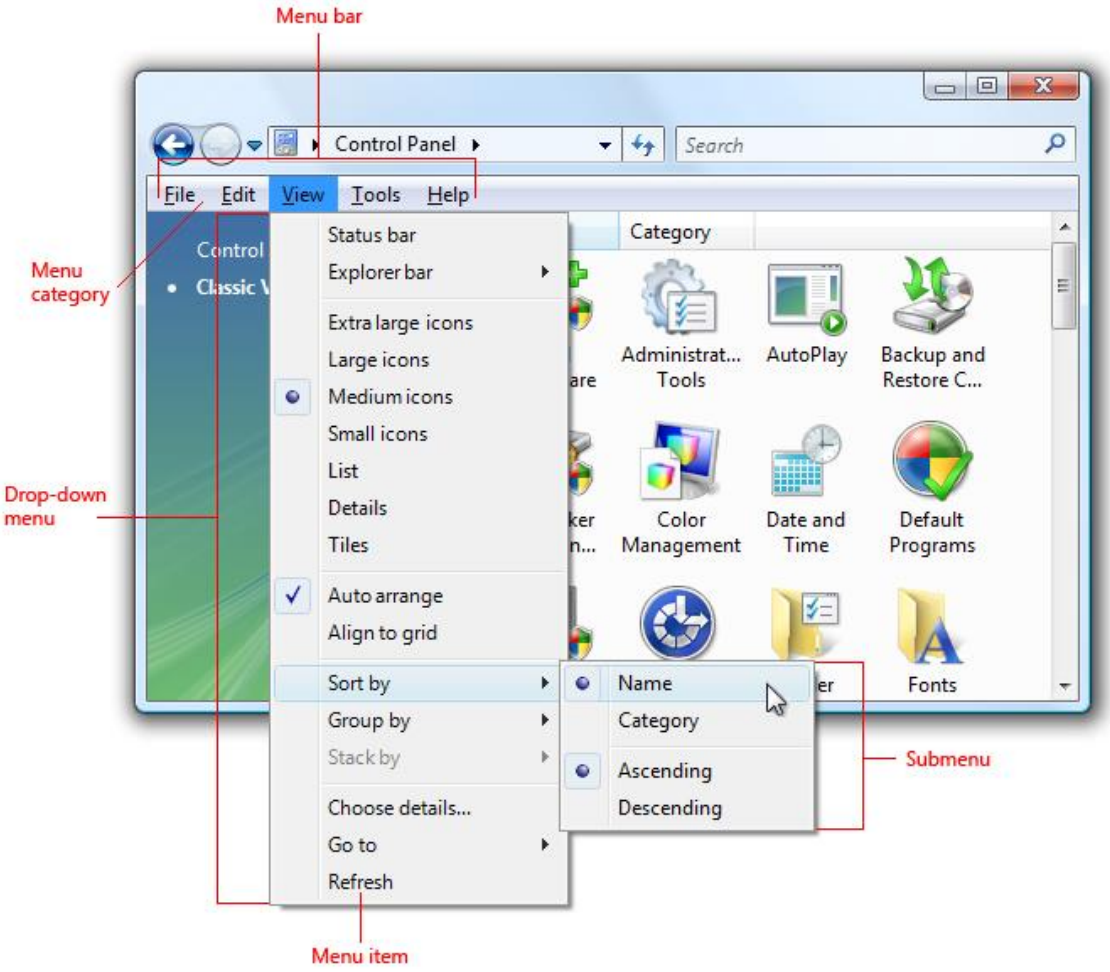
(6) Summary of the latest news or promotions.

(7) Search facility.

(8) Access : enable access to the homepage from any other page.

(9) Announcements of changes to Web site.

Step 4: Develop System Menus and Navigation Schemes



Menus

- Why sometime we need menus ?
- Structures of menus

Menus vary in form from very simple to very complex

1. Single menus: single screen or window is presented to seek the user's input or request an action to be performed
2. Hierarchical menus: depth and breadth

Formatting of Menus

- **Consistency :** Menu formatting, phrasing, choice selection, and navigation must be consistent throughout a graphical system or Web site.

- **Presentation :** A menu and its choices should be immediately recognizable by the user.

- **Organization :** the goal is to simply and effectively reveal its structure, while also reducing the number of actions needed to locate the target item.

- **Ordering**

❑ For lists associated with numbers, use numeric order.

❑ For textual lists with a small number of options (seven or less), order by

- Sequence of occurrence.
- Frequency of occurrence.
- Importance.
- Semantic similarity.

❑ Use alphabetic order for

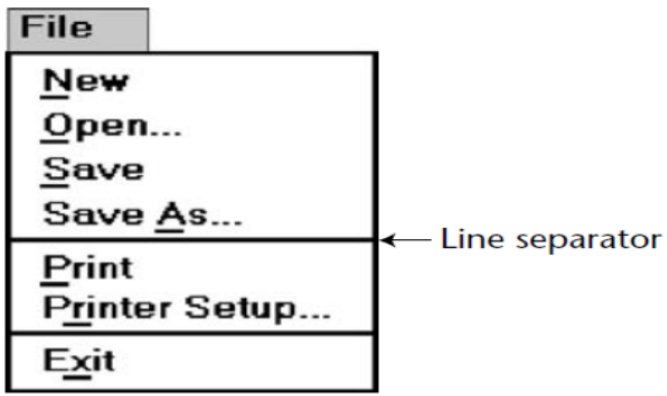
- Long lists (eight or more options).
- Short lists with no obvious pattern or frequency.

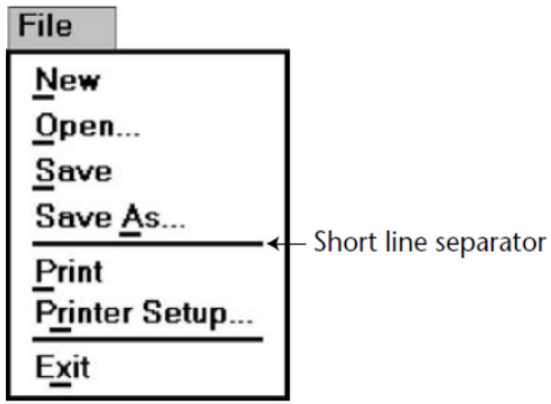
- **Groupings**

Items displayed on menus should be logically grouped

Line Separators

Separate vertically arrayed groupings





Selection support menus

- Traditional menu: if there is no small, discrete set of items that is used 30 percent of the time or more.

MENU

RELISHES

Ripe Olives Celery
Green Onions Radishes

SOUP

Oyster Soup

ENTREES

Spiced Sugar Cured Ham

ROASTS

Roast Young Tom Turkeys
Cranberry Sauce Giblet Gravy
Chestnut Dressing

VEGETABLES

Candied Sweet Potatoes Potato Croquettes

SALAD

Fruit Salad

DESERT

Fruit Cake Hard Sauce
Lemon Meringue Pie
Assorted Candies Assorted Nuts
Cluster Raisins Ice Cream
Candy Canes
Cigars Cigarettes
Coffee

GEORGE H. UPTON,
CHIEF COMMISSARY STEWARD UNITED STATES NAVY

Selection support menus

- Split menu: when a small set of items is selected between 31 percent and 89 percent of the time and the other items are selected with lower frequencies

Selection support menus

- Folded menu: when a small, discrete set of functions is accessed 90 percent or more of time.

Standard keyboard accelerators

accelerator	action
Ctrl+C	copy
Ctrl+N	new
Ctrl+O	open
Ctrl+P	print
Ctrl+S	save
Ctrl+V	paste
Ctrl+X	cut
Ctrl+Z	undo
F1	Display contextual help window.
Esc	Cancel
Shift+F10	Display pop-up menu

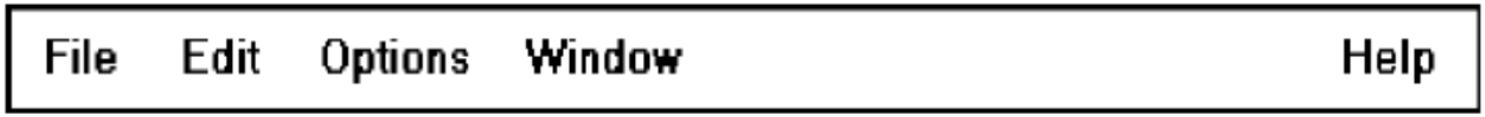
Kinds of graphical menus

The best kind of menu to use in each situation depends on several factors. The following must be considered:

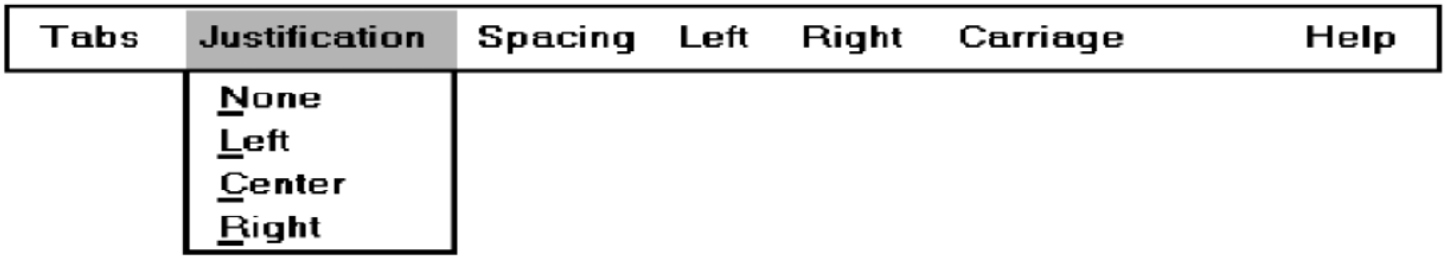
1. The number of items to be presented in the menu.
2. How often the menu is used.
3. How often the menu contents may change.

Kinds of graphical menus

- Menu bar



- Pull-down menu.



- Cascading menus: reduce menu breadth;
  do not exceed three menu levels.
- Pop-up menus: use to present alternatives or choices within the context of the task.
- Pie menus

Good vs. bad