

**USER INTERFACE DESIGN  
SOLUTION MANUAL**

1	Define Menus. Explain the structure of Menus with a small diagrammatic representation in detail.	[10]	CO3	L2
2	List the components of windows and explain its importance	[10]	CO3	L2
3 (a)	Differentiate between overlapping windows and tiled windows presentation styles with examples	[05]	CO2	L2
(b)	Write a note on Pop-Up Menus	[05]	CO3	L2
4	Briefly explain the general guidelines followed in designing of windows operations.	[10]	CO4	L2
5(a)	Explain Multiple Documents interface Scheme for Window Management	[2]	CO2	L2
(b)	Explain any two graphical menus in detail (Except popup menu)	[8]	CO3	L2
6	Demonstrate the selection of proper device based controls based on their characteristics and factors	[10]	CO4	L3

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1. Define Menus. Explain the structure of Menus with a small diagrammatic representation in detail.

Menus vary in form from very simple to very complex. They may range from small dialog boxes requesting the user to choose between one of two alternatives, to hierarchical tree schemes with many branches and level of depth. A menu's structure defines the amount of control given to the user in performing a task. The most common structures are the following.

1. Single Menus
2. Sequential Linear Menus
3. Simultaneous Menus
4. Hierarchical Menus
5. Connected Menus
6. Event-Trapping Menus

Single Menus

In this simplest form of menu, a single screen or window is presented to seek the user's input or request an action to be performed. A single menu may be iterative if it requires data to be entered into it and this data input is subject to a validity check that fails.

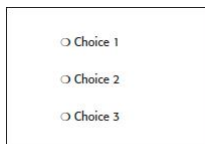


Figure 4.1 Single menu.

Sequential Linear Menus

Sequential linear menus are presented on a series of screens possessing only one path.

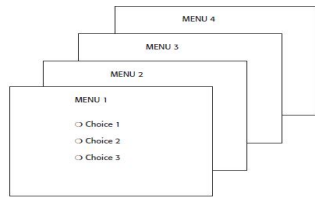


Figure 4.2 Sequential linear menus.

### Simultaneous Menu

Instead of being presented on separate screens, all menu options are available simultaneously, as illustrated in Figure 4.3.

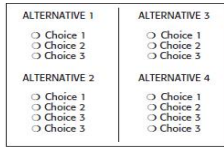
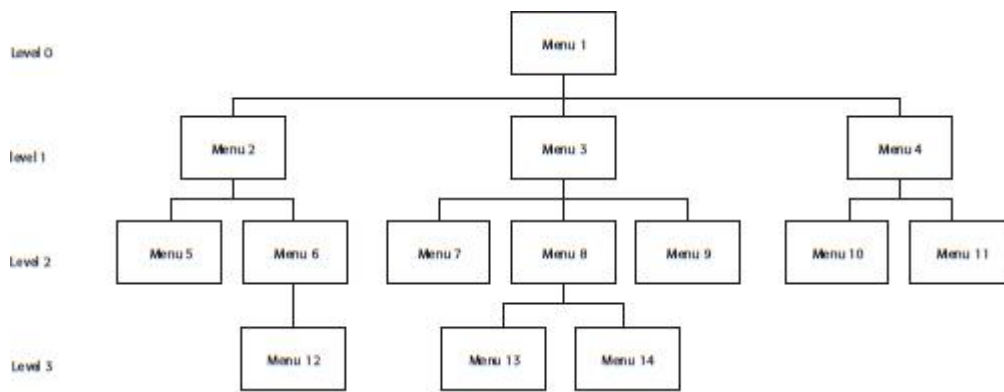


Figure 4.3 Simultaneous menus.

### Hierarchical Menu

A hierarchical structure results in an increasing refinement of choice as menus are stepped through, for example, from options, to suboptions, from categories to subcategories, from pages to sections to subsections, and so on. A



### Connected Menus

Connected menus are networks of menus all interconnected in some manner. Movement through a structure of menus is not restricted to a hierarchical tree, but is permitted between most or all menus in the network. From the user's perspective there is no top-down traversal of the menu system but an almost unhindered wandering between any two menus of interest. A connected menu system may be cyclical, with movement permitted in either direction between menus, or acyclical, with movement permitted in only one direction.

The biggest advantage of a connected menu network is that it gives the user full control over the navigation flow. Its disadvantage is its complexity, and its navigation may be daunting for an inexperienced user. An example connected menu structure is represented in Figure 4.5.

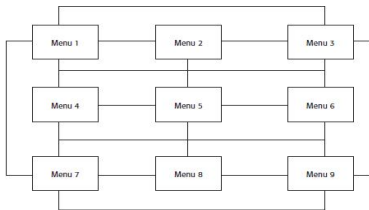


Figure 4.5 Connected menus.

### Event-Trapping Menus

Event Trapping menus provide an ever-present background of control over the system's state and parameters while the user is working on a foreground task. They are, in essence, a set of simultaneous menus imposed on hierarchical menus. In a graphical system, for example, existing together are a simultaneous menu, the menu bar, and a hierarchy—the menu bar and its pull-downs.

2 List the components of windows and explain its importance.

1. Frame
2. Title Bar
3. Title Bar Icon
4. Window Sizing Buttons
5. What's This? Button
6. Menu Bar
7. Status Bar

8. Scroll Bars

9. Split Box

10. Toolbar

11. Command Area

### 1. Frame

A window will have a frame or border, usually rectangular in shape, to define its boundaries and distinguish it from other windows. While a border need not be rectangular, this shape is a preferred shape for most people. Also, textual materials, which are usually read from left to right fit most efficiently within this structure. The border comprises a line of variable thickness and color.

### 2. Title Bar

The title bar is the top edge of the window, inside its border and extending its entire width. This title bar is also referred to by some platforms as the *caption*, *caption bar*, or *title area*.

The title bar contains a descriptive title identifying the purpose or content of the window.

### 3. Title Bar Icon

Located at the left corner of the title bar in a primary window, this button is used in Windows to retrieve a pull-down menu of commands that apply to the object in the window. It is a  $16 \times 16$  version of the icon of the object being viewed. When clicked with the secondary mouse button, the commands applying to the object are presented. Microsoft suggests that:

### 4. Window Sizing Buttons

Window's title bar must have equivalent commands on the pop-up or shortcut menu for that window. When these buttons are displayed, use the following guidelines:

When a window does not support a command, do not display its command button.

The *Close* button always appears as the rightmost button. Leave a gap between it and any other buttons. The *Minimize* button always precedes the *Maximize* button. The *Restore*

button always replaces the *Maximize* button or the *Minimize* button when that command is carried out.

#### 5. *What's This? Button*

The *What's This?* Button, which appears on secondary windows and dialog boxes, is used to invoke the *What's This? Windows* command to provide contextual Help about objects displayed within a secondary window.



Figure 5.2 *What's This?* button.

#### 6. *Menu Bar*

A menu bar is used to organize and provide access to actions. It is located horizontally at the top of the window, just below the title bar. A menu bar contains a list of topics or items that, when selected, are displayed on a pull-down menu beneath the choice. A system will typically provide a default set of menu actions that can be augmented by an application. In the past, some platforms have called the menu bar an *action bar*.

#### 7. *Status Bar*

Information of use to the user can be displayed in a designated screen area or areas. They may be located at the top of the screen in some platforms and called a *status area*, or at the screen's bottom. Microsoft recommends the bottom location and refers to this area as the *status bar*. It is also referred to by other platforms as a *message area* or *message bar*.

#### 8. *Scroll Bars*

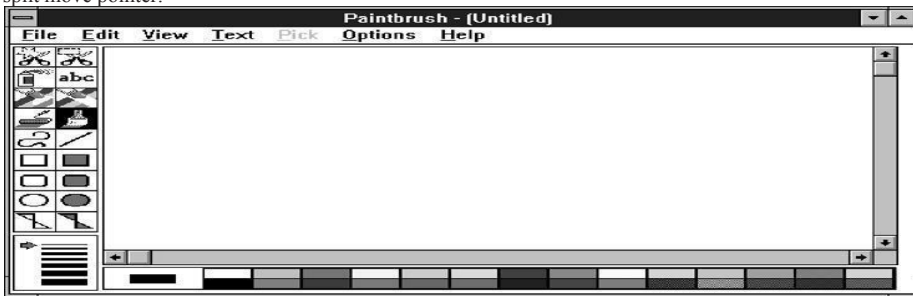
When all display information cannot be presented in a window, the additional information must be found and made visible. This is accomplished by scrolling the display's contents through use of a scroll bar. A scroll bar is an elongated rectangular container consisting of a scroll area or shaft, a slider box or elevator, and arrows or anchors at each end. For vertical scrolling, the scroll bar is positioned at the far right side of the work area, extending its entire length. Horizontal scrolling is accomplished through a scroll bar located at the bottom of the work area.

#### 9. *Split Box*

A window can be split into two or more pieces or panes by manipulating a *split box* located above a vertical scroll bar or to the left of a horizontal scroll bar. A split box is sometimes referred to as a *split bar*. A window can be split into two or more separate viewing areas that are called *panes*. Splitting a window permits multiple views of an object. A split window allows the user to: Examine two parts of a document at the same time. Display different, yet simultaneous, views of the same information.

## 10. Toolbar

They are sometimes called *command bars*. Toolbars are designed to provide quick access to specific commands or options. Specialized toolbars are sometimes referred to as *ribbons*, *toolboxes*, *rulers*, or *palettes*. Each toolbar band includes a single-grip handle to enable the user to resize or rearrange the toolbars. When the user moves the pointer over the grip, it changes to a two-headed arrow. When the user drags the grip, the pointer changes to a split move pointer.



## 11. Command Area

In situations where it is useful for a command to be typed into a screen, a command area can be provided. The desired location of the command area is at the bottom of the window.

If a horizontal scroll bar is included in the window, position the command area just below it. If a message area is included on the screen, locate the command area just above it.

## 12. Size Grip

A size grip is a Microsoft Windows special handle included in a window to permit it to be resized. When the grip is dragged the window resizes, following the same conventions as the sizing border. Three angled parallel lines in the lower-right corner of a window designate the size grip. If the window possesses a status bar, the grip is positioned

at the bar's right end. Otherwise, it is located at the bottom of a vertical scroll bar, the right side of a horizontal scroll bar, or the junction point of the two bars.

## 13. Work Area

The work area is the portion of the screen where the user performs tasks. It is the open area inside the window's border and contains relevant peripheral screen components such as the menu bar, scroll bars, or message bars.

### 3 a Differentiate between overlapping windows and tiled windows presentation styles with examples

#### 1. Tiled Windows



Figure 5.4 Tiled windows.

Tiled windows, the first and oldest kind of window, are felt to have these advantages:

- The system usually allocates and positions windows for the user, eliminating the necessity to make positioning decisions.
- Open windows are always visible, eliminating the possibility of them being lost and forgotten.

Disadvantages include the following:

- Only a limited number can be displayed in the screen area available.
- As windows are opened or closed, existing windows change in size. This can be annoying.
- As windows change in size or position, the movement can be disconcerting.

#### Overlapping Windows

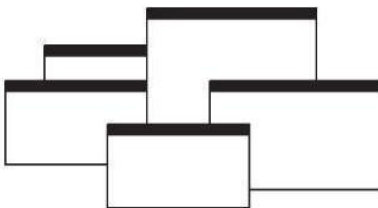


Figure 5.5 Overlapping windows.

Overlapping windows, illustrated in Figure 5.5, may be placed on top of one another like papers on a desk. They possess a three-dimensional quality, appearing to lie on different planes. They have the following advantages:

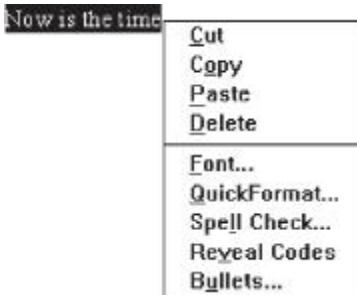
- Visually, their look is three-dimensional, resembling the desktop that is familiar to the user.
- Greater control allows the user to organize the windows to meet his or her needs.
- Windows can maintain larger sizes.

Disadvantages include the following:

- They are operationally much more complex than tiled windows. More control functions require greater user attention and manipulation.
- Information in windows can be obscured behind other windows.

### 3 b) Write a note on Pop-Up Menus

- Use to present alternatives or choices within the context of the task.



The *advantages* of pop-up menus are:

- They appear in the working area.
- They do not use window space when not displayed.
- No pointer movement is needed if selected by button.
- Their vertical orientation is most efficient scanning.
- Their vertical orientation most efficient for grouping.

### 4. Briefly explain the general guidelines followed in designing of windows operations.

#### Active Window

- A window should be made active with as few steps as possible.
- Visually differentiate the active window from other windows.
- Performance was slower with multiple open windows

#### General Guidelines

- Easy to use
- Minimize number
- Easy navigation
- Setting up-opening, resizing, moving,
- User-tailorable configuration-created, named, and recalled

#### Opening a Window

Provide an iconic representation or textual list of available windows. If opening with an expansion of an icon, animate the icon expansion.

#### Sizing Windows

Provide large-enough windows to: Larger windows seem to have these advantages:

- They permit displaying of more information.
- They facilitate learning: Data relationships and groupings are more obvious.
- Less window manipulation requirements exist.
- Breadth is preferred to depth (based on menu research).
- More efficient data validation and data correction can be performed.

#### Window Placement

##### General:

- Position the window so it is entirely visible.
- If the window is being restored, place the window where it last appeared.
- If the window is new, and a location has not yet been established, place it:

##### Window Separation

##### Moving a Window

- Permit the user to change the position of all windows.
- Change the pointer shape to indicate that the move selection is successful.
- Move the entire window as the pointer moves.

- Their vertical orientation allows more choices to be displayed

5. a) Explain Multiple Documents interface Scheme for Window Management

It is a technique for managing a set of windows where documents are opened into windows. It contains a single primary window, called the parent. A set of related document or child windows, each also essentially a primary window. The purpose of this scheme of windows is to provide multiple views of the same object, to permit comparisons among related objects, and to present multiple parts of an application

b) Explain any two graphical menus in detail (Except popup menu)

**1. Menu Bar**

■ Proper usage:

- To identify and provide access to common and frequently used application actions that take place in a wide variety of different windows.
- A menu bar choice by itself should not initiate an action.



**Figure 4.19** Menu bar composed of text.



**Figure 4.20** Menu bar composed of buttons.

The *advantages* of menu bars are that they:

- Are always visible, reminding the user of their existence.
- Are easy to browse through.

The *disadvantages* of menu bars are that:

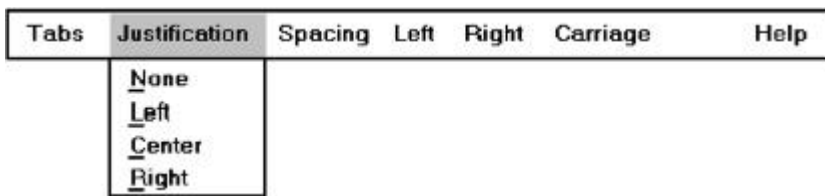
- They consume a full row of screen space.
- They require looking away from the main working area to find.

**2. Pull-Down Menu**

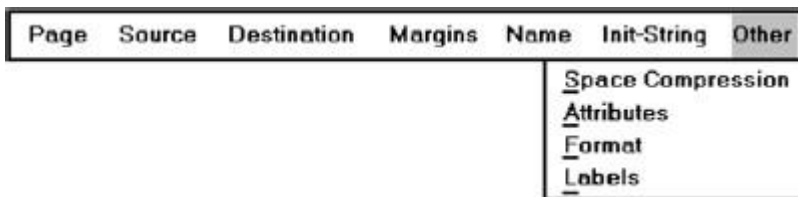
■ Proper usage:

- To initiate frequently used application actions that take place on a wide variety of different windows.
- A small number of items.
- Items best represented textually.
- Items whose content rarely changes. The *advantages* of pull-down menus are:

- The menu bar cues a reminder of their existence.
- They may be located relatively consistently on the screen.
- No window space is consumed when they are not used.



— Pull-downs for choices on the far right side of the menu bar, or long pull-down descriptions, may require alignment to the left of their menu bar choice to maintain visibility and clarity.



**Groupings**

■ Provide groupings of related pull-down choices:

- Incorporate a solid line between major groupings.
- Incorporate a dotted or dashed line between subgroups.
- Left-justify the lines under the first letter of the columnized choice descriptions.
- Right-justify the lines under the last character of the longest choice description.



## 6. Demonstrate the selection of proper device based controls based on their characteristics and factors

### Characteristics of Device-Based Controls

Several specific tasks are performed using graphical systems.

- To point at an object on the screen.
- To select the object or identify it as the focus of attention.
- To drag an object across the screen.
- To draw something free form on the screen.
- To track or follow a moving object.
- To orient or position an object.
- To enter or manipulate data or information.

#### 1. Mechanism direct or indirect pointing device

*Direct* devices are operated on the screen itself. Examples include the light pen, the finger, and voice. *Indirect* devices are operated in a location other than the screen, most often on the desktop. Examples include the mouse, trackball, and keyboard.

#### 2. In terms of *direction*, *distance*, and *speed*

The mouse achieves a coupled relationship in all three aspects of direction, distance, and speed: The pointer on the screen moves in the direction the mouse is pushed, at the speed the mouse is pushed, and the distance the mouse is pushed (there may be some ratios applied). A trackball does not achieve this relationship in all three aspects. The pointer moves the direction the trackball is turned and the speed the ball is turned, but not the distance the ball is moved because the ball does not move forward or backwards; its socket is stationary.

