USER INTERFACE DESIGN [17CS832]

1.b.

a.) Explain importance & benefits of User Interface Design

We produce systems and inefficient & confusing or at worst, just plain unusable? It is because "we still don't know what really makes good design" We don't have time to find out what makes a good design.

So, A well-designed interface & screen is very important to users. It is their window to view the capabilities of the system. To many, it is a system, being one of the view visible components of product and developers create. It is also the vechile through which many critical tasks are presented.

A screen's layout & appearance affect a person in a variety of ways. If they are confusing & inefficient, people will have greater difficulty in doing their jobs & will make more mistakes.

Poor design may even chase some people from a system permanently. It can also lead to aggravation, frustration, & increased stress.

The Benefits of Good Design:-

→ The benefits of a well-designed screen have also been under experimental scrutiny for many years. One researcher, for ex. attempted to improve screen clarity & readability by making screens less crowded. The results: Some users of the modified screens completed transaction in 25% less time & with 25% fewer errors than those who used the orginal screen.

- Another researcher has reported that reformatting inquiry screens following good design principles reduced decision-making time by about 40%, resulting a saving 41 person yrs. in the affected systems
- Other benefits also accrue from good design. Training costs are lowered because training time is reduced, support hns costs are lowered because fewer assist calls are necessary, & employee satisfaction is increased because aggravation & frustration are reduced
- Another benefit is, ultimately, that an organization's customers benefit because of the improved service they receive.
- Identifying & resolving problems during the design & development process also has significant economic benefits

10/6

b.b Write any four differences between GUI & Webpage Design.

Devices

GUI

- User hardware variations limited
- Use hardware characteristics well-defined.
- Screens appear exactly as specified.

WEB

- User h/w variations enormous.
- Screen appearance influenced by h/w being used

User Focus:

GUI

- Data & Application

WEB

Information & Navigation.

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User Tasks

GUI	WEB
• Install, configure, Personalize, start, use & upgrade pgms.	• Link to a site, browse / read pages, fill out forms, register for services, participate in transactions, download & save things
• Open, use, & close data files.	• Movement between pages & sites very rapidly
• Fairly long time spent within an appln.	• Familiarity with many sites not established
• Familiarity with appln often achieved.	

User's Conceptual Space

GUI	
• Controlling & constrained by program	• Infinite & generally unorganised.

10b Explain in Detail, the characteristics of
Co> GUI

① Sophisticated Visual Presentation

→ Visual presentation is visual aspect of the interface. It is what people see on the screen. The sophistication of graphical s/m permits displaying lines, including drawings & icons. It also permits the displaying of a variety of character fonts, including different size & styles.

→ The meaningful interface elements visually presented to the user in a graphical s/m include windows, menus, icons to represent objects. The objective is to reflect visually on the screen the real world of the user as realistically, meaningfully, simply &

clearly as possible.

(2) Pick- and- Click Interaction
→ To identify a proposed action is commonly referred to as 'pick', the signal to perform an action is as 'click'.
→ The primary mechanism for performing this is most often the mouse & its buttons & the secondary mechanism for performing these selection actions is the keyboard.

(3) Restricted Set of Interface Options
→ The array of alternatives available to the user is what is presented on the screen or what may be inferred from what is presented on the screen, nothing less, & nothing more. This concept fostered the acronym .WYSIWYG

(4) Visualization
→ It is a cognitive process that allows people to understand info that is difficult to perceive, because it is either too voluminous or too abstract
→ The goal is not necessarily to reproduce a realistic graphical image, but to produce one that conveys the most relevant information.

(5) Object Orientation
→ A graphical scene consists of objects & act°. Objects are what people see on screen as a single unit.
→ Objects can be composed of sub objects.
→ They are divided into 3 meaningful classes as Data Objs which present info, container objects to hold other objects & Device Objects represent physical objects in real world.

→ Objects can exist within the context of other objects, & one object may affect the way another object appears or behaves. These relationships are called constraints, composites & containers

→ Properties / Attributes of objects: Properties are unique characteristics of an object. Properties help to describe an object & can be changed by users.

→ Actions: People take actions on objects. They manipulate objects in a specific ways/ modify the properties of objects.

→ Appⁿ versus object or Data Orientation: An appⁿ oriented approach takes an actⁿ. Object approach like this.

Actⁿ > 1. An appⁿ is opened.
Act: Object > 2 → A file or other object selected

An object-oriented object: actⁿ approach does:

Object > 1 → A object is chosen
Action > 2 → A appⁿ is selected.

→ Views: They are ways of looking at an object's info. IBMs GAD can describes 4 kinds of views: composed, contents, settings & Help.

(6) Use of Recognition Memory.

→ Continuous visibility of objects & actions encourages to eliminate "out of sight, out of mind" problem.

(7) Concurrent Performance of Functions

→ Graphic UIMs may do two or more things at one time. Multiple programs may run simultaneously.

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→ It may process background tasks or preemptive multitasking

Q2)

a) Explain the concept of Direct Manipulation for Graphical Systems.

The term is used to describe this style of interact for graphical sys. was first used by Shneiderman. He called them "Direct Manipulat" sys, suggesting that they possess the following characteristics

→ The system is portrayed as an extension of real world: A person is allowed to work in a familiar environment & in a familiar way, focusing on the data not the appl & tools. The physical organisat of the sys which most often is unfamiliar, is hidden from view & is not a distract.

→ Continuous visibility of objects & actions: Objects are continuously visible. Reminders of actions to be performed are also obvious. Nelson described this concept as "virtual reality" a represental of reality that can be manipulated.

→ Actions are rapid & incremental with visible display of results: The results of actions are immediately displayed visually on the screen in their new & current form. Auditory feedback may also be provided.

→ Incremental actions are easily reversible: Finally, actions, if discovered to be incorrect or not desired, can be easily undone.

Q2)

b) Discuss characteristics of Intranet & Internet & bring out the differences between them.

They differ however in some important characteristics

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- Users: The users of Intranets, being organisation employees, know a lot about the organisation its structure, its products, its jargon, & its culture. Co. Customers use internet sites & others who know much less about the organisation & often care less about it.
- Tasks: An Intranet is used for organisation's everyday activities, including computer transactions, queries & comm. The Internet is mainly used to find information with a supplementary use being simple transactions
- Type of Information: An Intranet will contain detailed info. needed for organisational functioning. Info will often be added or modified. The Intranet will usually present more stable info: marketing & customer or client info, reports & so forth.
- Amount of Information: Typically, an Intranet site will be much larger than ab organisations Internet site. It has been estimated that an intranet site can be 10 to 100 times larger than its corresponding public site.
- Hardware & Software: Since Intranet exists in a controlled environment, the kinds of computers, monitor, browsers & other s/w can be rationalized or standardised. The need for cross-platform compatibility is minimized or eliminated; upgraded comm also permit Intranets to run from 100 to 1000 times faster than typical Internet access can. This allows the use of rich graphics & multimedia, screen elements that contribute to very slow download times for most Internet users.
- Design philosophy: Implementation on the Intranet of current text-based & GUI appl will present a user model similar to those that have existed in other domains. This will cause a swing back to more traditional GUI designs.

The resulting GUI hybrids will be quicker & much more effective.

Q9)

Co2 Discuss the general principles of UID (any 8)

The general principles are

(1) Aesthetically Pleasing
(2) Clarity
(3) Compatibility
(4) Comprehensibility
(5) Configurability
(6) Consistency
(7) Control
(8) Directness
(9) Efficiency
(10) Familiarity
(11) Flexibility
(12) Forgiveness
(13) Predictability
(14) Recovery
(15) Responsiveness
(16) Simplicity
(17) Transparency
(18) Trade-Off

(1) Aesthetically Pleasing:-

- Provide visual appeal by following these presentation & graphical design principles.
  - Provide meaningful contrast between screen elements
  - Create groupings.
  - Align screen elements & groups.
  - Provide 3D representation
  - Use color & graphics effectively & simply.

(2) Clarity

- The interface should be visually, conceptually & linguistically clear, including:
  - Visual elements
  - Icons,
  - Metaphors
  - Words & Text

(3) Compatibility
- Provide compatibility with the following:
  - The user
  - The task of job
  - The product
- Adopt the user's perspective

(4) Configurability
- Permit easy personalizat°, configuration & reconfiguration of settings.
  - Enhances a sense of control
  - Encourages an active role in understanding

(5) Directness
- Provide direct ways to accomplish task
  - Available alternatives should be visible.
  - The effect of actions on objects should be visible.

(6) Familiarity
- Employ familiar concepts & use of a language that is familiar to the users
- Keep the interface natural, mimicking the user's behaviour patterns
- Use real-world metaphors

(7) Forgiveness.
- Tolerate & forgive common & unavoidable human errors.
- Prevent errors from occurring whenever possible.
- Protect against possible catastrophic errors.

(8) Trade-offs
- Final design will be based on series of trade-offs balancing often-conflicting design principles.

- People's requirements always take precedence over technical requirements.

3% 9% List & explain the 5 commandments in designing for people.

The complexity of a graphical or web interface will always magnify any problems that do occur. Pitfalls can be eliminated if the following design commandments remain foremost in the designer's mind.

- Gain a complete understanding of users & their tasks:
  The users are the customers. Today, people expect a level of design sophistication from all interfaces, including Websites.
- Solicit early & ongoing user involvement:
  Involving the user in design from the beginning provides a direct conduit to the knowledge they possess about jobs, tasks & needs. Involvement also allows the developer to confront a person's resistance to change, a common human trait.
- Perform rapid prototyping & testing: Prototyping & testing the product will quickly identify problems & allow you to develop solns. It must continually performed during all stages of development to uncover all potential defects. If thorough testing is not performed before product release, the testing will occur in user's office.
- Modify & iterate the design as much as necessary: While design will proceed through a series of stages, problems detected in one stage may force the developer to revisit a previous stage.
- Integrate the design of all s/w components: The s/w, the documentation, the help & training needs are all important elements

of a graphical s/m. / website & all should be developed concurrently.

3) b) Describe in detail the human characteristics in the user Interface Design (Any 5)

(1) Perception (2) Memory
(3) Sensory Storage (4) Visual Acuity
(5) Foveal & peripheral vision (6) Info. Processing
(7) Mental Model (8) Movement Control
(9) Learning (10) Skill
(11) Individual Differences

Sensory Storage:
→ It is the buffer where the automatic processing of info collected from our senses take place. It is an unconscious process, large, attentive to the environment, quick to detect changes, & constantly being replaced by newly gathered stimuli.
→ Repeated & excessive stimulation can fatigue the sensory storage mechanism, making it less attentive & unable to distinguish what is important
→ Design the interface so that all aspects & elements serve a definite purpose.

Visual Acuity:
→ The capacity of the eye to resolve details is called visual acuity. It is the phenomenon that results in an object becoming more distinct as we turn our eyes towards it & rapidly losing distinctness as we turn our eyes away.
→ It has been shown that retative visual acuity is approx' halved at a distance of 2.5° from the point of eye fixation
→ The eye's sensitivity increases for those characters closest to the fixation point ("0")

and decreases for those characters at the extreme edges of the circle. This may be presumed to be a visual "chunk" of a screen

Movement Control

- Particularly important in screen design is Fitt's Law (1954). This law states that:
  - → The time to acquire a target is a f° of the distance to & size of the target.
  - → This simply means that the bigger the target is, or the closer the target is, the faster it will be reached. The implication in screen design are:
    - Provide large objects for imp. f°.
    - Take adv. of the "pinning" actions of the sides, top bottom & corners of the screen

Skill

- The goal of human performance is to perform skillfully. To do so requires linking p/p & responses into a sequence of action. The essence of skill is performance of actions or movements in the correct time sequence with adequate precision.
- Skill are hierarchical in nature, & many basic skills may be integrated to form increasingly complex ones.

Individual Differences

- In reality, there is no average user. A complicating but very advantages human characteristics is that we all differ in looks, etc
- Individual differences complicate design because the design must permit people with widely ranging char' to satisfactorily & comfortably learn the task / job, or use the website.

Ans

Explain the common usability problems in web based systems

Common Usability problems in web based system are:

(1) Visual Clutter: A lack of "white space" meaningless graphics, & unnecessary & wasteful decorate lead to visual clutter.

(2) Impaired Information & readability: It is diminished by poor developer choices in typefaces, colors, & graphics.

(3) Incomprehensible Components: Some design elements give the user no clue as to their fn, leaving their purpose not at all obvious. Language is also often confusing, with the developer's terminology being used, not that of user.

(4) Annoying distractions: Elements constantly in motion, scrolling marquees or text, blinking text, or looping continually running animation complete with meaningful content for user's eye & attention & destroy a page's readability

(5) Confusing Navigation: A site structure often resembles a maze of twisting pages into which the user wanders & is quite soon lost. Poor, little, or no organisation among pages leads to this

(6) Inefficient Navigation: A person must transverse content-free pages to find what is meaningful. One whole screen is used to point to another. Large graphic waste screen space & add to the page count

(7) Inefficient Operations: Time is wasted doing many things. Page download time can be excessive.

(8) Excessive or Inefficient Page Scrolling: Long pages requiring scrolling frequently lead to the user's losing context as related info's spatial proximity increases & some info entirely

disappears from view ie, from memory.

(9) Information Overloaded: Poorly organized & large amounts of information taxes one's memory & can be overwhelming.

(10) Design Inconsistency: It is magnified here. The business user may visit a handful of sites in one day, the web user may visit dozens. All are different from each other & no user can remember design for operations

(11) Outdated Information: One important value of a web site is its "currentness". Outdated info destroys a site's credibility in minds of many users, & therefore its usefulness.

(12) Stale design caused by emulation of printed documents of past systems.

4)

b) Explain the techniques for determining the users requirements using Indirect Methods.

Indirect Methods are:

MIS Intermediary

→ A company representative defines the user's goals & needs to designers & developers.

→ This representative may come from the Info Service dept.

Paper Survey or Questionaire

A survey of questionaire is administered to sample of users using traditional mail methods to obtain their needs.

Electronic Survey / Questionaire

A survey / questionnaire to a sample of users using email / the web to obtain their needs

In creating it:

1. Determine the survey objects.
2. Determine where will you find the people to complete the survey.

3. Create a mix of multiple choice & open-ended questions requiring short answers.
4. Keep it short.
5. Keep it simple, requiring no more than 5-10 mins to complete

Electronic Focus Group
A small grp of users & a moderator discuss the requirements online using workstations.

Marketing & Sales
Company representatives who regularly meet customers obtain suggestions / needs, current & potential

Support Line
Information collected by the unit that helps customers with day-to-day problems is analysed.

Email / Bulletin Board
Problems, questions & suggestions from users posted to a bulletin board or through email are analysed.

User Group
Improvements are suggested by customer groups who convene periodically to discuss SW usage. They require careful planning

Competitor Analysis
A review of competitor's product / website is used to gather ideas, uncover design requirements and identify tasks

Trade Show
Customers at a trade show are presented a mock-up or prototype & asked for comments.

Other Media Analysis
An analysis of how other media, print or broadcast, presents the process, info or subject matter of interest

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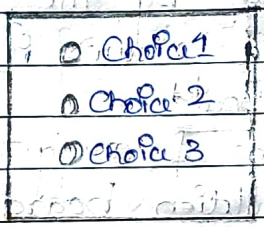
5.) Explain the structure of menu with
ans) illustrations.

Structure of Menus:-

(1) Single Menus.

→ In this simplest form of menus, a single screen or a 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. If this data input is subject to a validity check that fails. The menu will then be represented to the user, with a message requesting reentry of valid data.

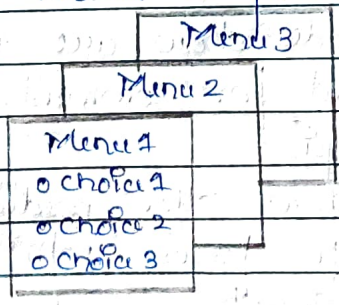


(2) Sequential Linear Menus.

→ They are presented on a series of screens possessing only one path.

→ The menu screens are presented in a preset order, and, generally their objective is for specifying parameters or for entering data.

→ Sequential path menus have several short comings. A long sequence may become tedious as menu after menu is presented.



(3) Simultaneous Menus:-

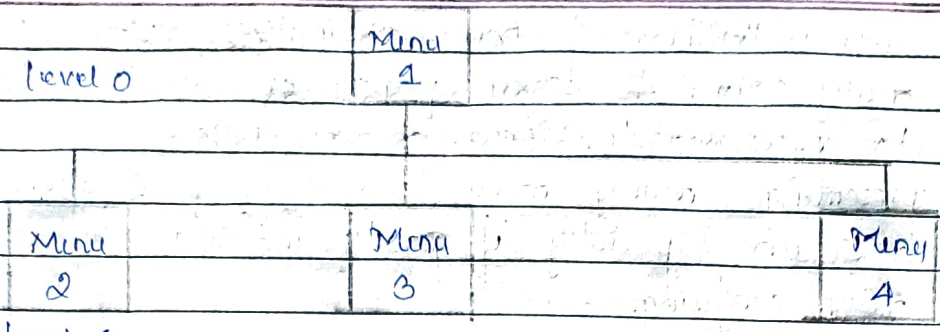
→ Instead of being presented on separate screens, all menu options are available simultaneously

→ Problems with simultaneous menus are that for

large collections of menu alternatives screen clutter can easily occur, & screen paging or scrolling may still be necessary to view all the choices.
- Presenting many menu dependencies & relationships on a screen, especially if poorly indicated, can also be very confusing.

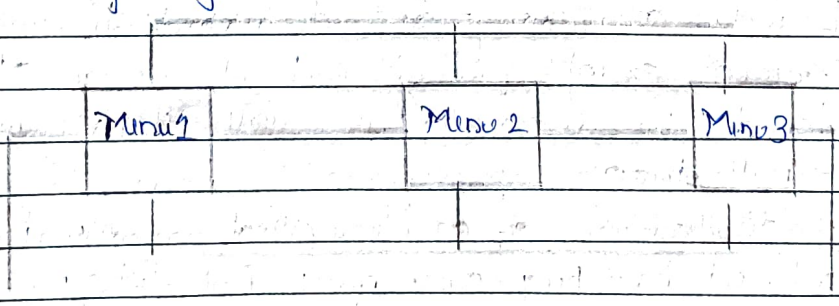
Alternative 1	Alternative 3
o Choice 1	o Choice 1
o Choice 2	o Choice 2
o Choice 3	o Choice 3
Alternative 2	**Alternative 4**
o Choice 1	o Choice 1
o Choice 2	o Choice 2
o Choice 3	o Choice 3

Hierarchical Menus:-
- A hierarchical structure results in an increasing refinement of choice as menus are stepped through, for ex. from options to suboptions, from categories to subcategories, from pages to sections to subsection & so on.
- A hierarchical structure can best be represented as an inverse tree, leading to more & more branches as one moves downward through it.
- Common example of hierarchical design today are found in menu bars with their associated pull-down.
- A disadvantage of a hierarchical scheme is that the defined branching order may not fit the user's concepts of the task flow.
- If users are not familiar with the hierarchical menu or are unable to predict what suboptions lie below.
- A particular choice, they may go down wrong paths & find it necessary to go back up the tree to change a choice, or perhaps even return to the top-level menu.



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 trees, but is permitted between most or all menus in the network.
- Connected menu system may be cyclical, with movement permitted in either direction between menus, or acyclical, with movement permitted in only one direction. These menus also vary in connectivity, the extent to which menus are linked by multiple paths.
- The biggest advantage of a connected menu is that it gives the user full control over the navigation flow. Its disadvantage is its complexity.



Event Trapping Menus:

- Event Trapping Menus provide an ever-present background of control over the F.

5.)

b.) Describe the components of a Web Navigation Systems with Illustration.

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To move between website information fragments necessitates the creation of navigation links. They are contained within a framework of tools or controls, including the browser's command buttons, textual phrases, website navigation bars & website command buttons.

Utilization of hypertext on web allowed links to be created using images as well as text, so the term hypermedia was coined to reflect this expanded nature.

Several General link Guidelines are:

* All navigation controls must:
  - Make sense in the absence of site context
  - Be continually available
  - Be obvious & distinctive.
  - Be consistent in appearance, & ordering
  - Possess a textual label or description
  - Offer multiple navigation paths

Browser Command Buttons

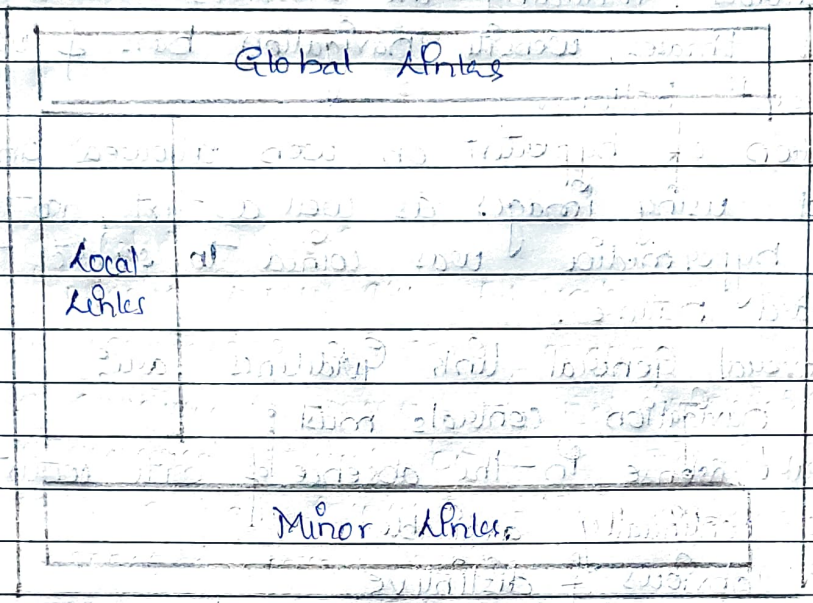
- Hide the split between the browser & the website appln by including navigational control within the appln

Website Navigation Bars.

- Provide a global navigational bar at the top of each page.
- Provide a local category or topical links navigation bar on the left side of a page.
- Place minor illustrative, parenthetical or footnote links at the end of the page.
- For long pages, provide a navigation bar repeating important global or local links at the page bottom.

A website navigation bar is a menu, an array of textual phrases, graphical images or icons, or command buttons, as shown in fig.

- Refer fig 4.13, 4.14 & 4.15 from text book.
- A website contains atleast 3 levels of navigation links, global, or site-wide, local & minor.



Locating the global links at the top of page make sense if one considers the logical flow of info through a screen. The left-justified category navigation area would, however, have been better positioned on the right.

Textual Phrases:
→ Provide a mix of textual phrase links:
- In explicit menus.
- Embedded within page text

Graphical Images or Icons.
- It may appear in an array in the form of a navigation bar, or be individually located at relevant points in a page.

Command Buttons
It may appear in an array in the form of a navigation bar, or be individually located at relevant points in a page.

Other Website Navigation Elements

They are overviews, including executive summaries, site map, indexes & table of contents. Other elements are historical trails & search engine.

Overviews

Provide:

- An executive summary that provides a preview of the site & contains links to all major concepts.
- A site map illustrating the site's hierarchical structure & the relationships of components.
- Both global & local maps.
- An alphabetized site index
- A table of contents

Allow accessibility from any point in the website.

Historical Trails

Provide:

- Breadcrumb Trails.
  - Locate at the top the page below the link
  - A breadcrumb trail in a hierarchical website structure is a sequential textual listing of pages traversed from the parent page to the page currently being displayed.
  - A trail illustrated in fig 4.18, is also a series of links that permit the user to go back to any page in the sequence with one click. Symbols used are an arrow (→), a colon (:), (>) greater than sign, a slash (/).
- A history list is a sequential textual listing of sites or pages visited over specific time period, a session, a day, or some other time period.
- A history tree is an overview map of a site's structure with pages already visited marked by an indicator such as a plus sign, check mark or asterisk.

- The marking serve as footprints, guiding the user back to pages of interest, and/or signaling which have already been seen & may no longer be of interest.
- A bookmarks is similar to a history list except that it is designated by the user to mark locations of continuing interest.

Search facility
- Provide a search facility.

(Q6)

a) Describe the functions of Menus:

A menu can be used to perform several functions, to navigate to a new menu, to execute an actions or procedure, to display information or to input data or parameter.

Navigation to a new Menu:
- Each user selection causes another menu in a hierarchical menu tree to be displayed.
- The purpose of each selection is to steer the user toward an objective or goal.
- Selection errors may lead the user down wrong paths, & cost time & perhaps aggravation but these errors are nondestructive & usually undone.

Execute an Action / Procedure:
- A user selection cause the computer to implement an action or perform a procedure.
- The action may be something like opening / closing a file, copying text or sending a message.
- Accidental selection of critical irreversible actions must be prevented in interface design.

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Displaying Information
- The main purpose of selecting a menu choice may simply be to display information.
- The user may be searching for specific information in a database or browsing the web.
- The user's focus is primarily on the info. desired & less on the selection function.
- Wrong turns in the process will again cost time & perhaps aggravation, but these errors are nondestructive & usually undoable.

Data or Parameter Input:
Each selection specifies a piece of input data for the o/m or provides a parameter value. Data or values may be input on a single menu or spread over a hierarchy of menus.

6.) List all kinds of Graphical Menus &
b) Explain any one in detail.

Kinds of Graphical Menus are:
1. Menu Bar
2. Pull-Down Menu.
3. Cascading Menu
4. Pop-up Menus.
5. Tear-off Menus
6. Iconic Menus.
7. Pie Menus.
8. Default Menu Items

Menu Bar:
- Proper Usage:
→ To identify & provide access to common & frequently used appl. actions that takes place in a wide variety of different windows.
→ A menu bar choice by itself should not initiate an action.

Advantages:
→ Are always visible, reminding the user of their existence
→ Are easy to browse through
→ Are easy to locate consistently on screen

→ Usually do not obscure the working area
→ Usually are not obscured by windows & dialog boxes
→ Allow for use keyboard equivalents.

Disadvantage
→ They consume a full row of screen space.
→ They require looking away from the main working area to find.
→ They require moving pointer from the main working area to select.
→ The menu options are smaller than full-size buttons, slowing selection time.
→ Their horizontal orientation is less efficient for scanning.
→ Their horizontal orientation limits no of choices that can be displayed.

Displays:
→ All primary window must have a menu bar
→ All menu bars must have an associated pull-down menu containing at least two choices
→ Do not allow the user to turn off the display of the menu bar.
→ If all the items in its associated pull-down menu are disabled, then disable the menu bar item.
  • Display the disabled item in a visually subdued manner.

Location:
→ Position choices horizontally over the window entire row at the top of the screen, just below the screen title.
→ A large no of choices may necessitate display over two ways.

Title:
→ The window title will be the menu bar title

Item Description
→ The menu item description must clearly reflect the kinds of choices available in the associated pull down menus.
→ Menu item descriptions will be the "titles" for pull-down menus associated with them
→ Use mixed-case letters to describe choices.
→ Use single-word choices whenever possible
→ Do not display choices that are never available to the users.

Organization
→ Follow standard platform ordering schemes where they exist
  • Place application-specific choices where they fit best.
→ Order choices left-to-right with
  • Most frequent choices to the left
  • Related info grouped together
→ Choices found on more than one menu bar should be consistently positioned.
→ Left-justify choices with the line.
→ When choice can be logically grouped, provide visual logical groupings, if possible.
→ Help, when included, should be located at the right side of the bar.

File	Edit	Options	Windows	Help

Layout
→ Indent the first choices one space from the left margin.
→ Leave at least 3 spaces between each of the succeeding choices.
→ Leave one space between the final choice & right margin.

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Separation
- Separate the bar from the remainder of the screen by:
  - A different background or
  - Solid lines above & below.

Other Components
→ Keyboard equivalent mnemonics should be included on menu bars.
→ Keyboard accelerators to a window indicators, & cascade indicators need not be included.

Selection Indication
→ Keyboard cursor:
- Use a reverse video, or reverse color, selection cursor to surround the choice.
- Cover the entire choice including one blank space before & after the choice word.

window.

→ Pointer
- Use reverse video, or reverse color, to highlight the selected choice.

Q.6
a.) Explain the components of a window with example.
Components of window are.
① Frame
→ A window will have a frame or a border, usually rectangular in shape to define its boundaries & distinguish it from other windows.
→ While a border need not be rectangular, this shape is a preferred shape for most people.

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Title Bar

→ The title bar is the top edge of the window inside its border extending its entire width
→ Title bar is also referred as caption, caption bar or title area.
→ It contains descriptive title identifying the purpose / content of the window.

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 cmds that apply to the object in window.
→ It is 16 × 16 version of icon.

Window Sizing Buttons

→ Located at the right corner of the title bar, these buttons are used to manipulate the size of a window
→ The Maximize button, the minimize button - Inscribed with a short horizontal line toward the bottom of the button - is used to reduced a window to its minimum size, usually an icon.
→ The maximize button - Typically Inscribed with a large box - enlarge a window to its max size, usually the entire screen.
→ When these buttons are displayed, use the following guidelines:
- When a window does not support a cmd, do not display its cmd button.
- The close button always appears as the rightmost button. Leave a gap between it & any other btns
- The Minimize button always precedes the max button
- The Restore button always replaces the Maximize button or Minimize button when that cmd is carried out.

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What's this ? Button

→ The What's ? Button, which appears on secondary windows of dialog boxes, is used to invoke the What's This?

→ Windows cmd to provide contextual Help about objects displayed within a secondary window.

Menu Bar

→ It is used to organize & 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/items that, when selected, are displayed on a pull-down menu beneath the choice.

Status Bar

→ Info² 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 & called a status area, or at the screen's bottom.

Scroll Bar

→ When all display info cannot be presented in a window, the additional info must be found & made visible.

→ This is accomplished by scrolling the display's contents thro' use of a scroll bar.

→ Scroll bar is an elongated rectangular container consisting of a scroll area or shaft, a slider box / elevator, & arrows or anchors at each end.

Split Box

→ A window can be split into 2 or more pieces or panes by manipulating a split box located above a vertical scroll bar / to the left of a horizontal scroll bar.

→ The 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.

Toolbar

Toolbars are permanently displayed panels / arrays of choices / cmds that must be accessed quickly. They are sometimes called cmd bars.
→ Toolbars are designed to provide quick access to specific cmds or options. Specialized others are sometimes referred to as ribbons, toolboxes, rulers or palette

Command Area

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

Size Grip

→ Size Grip is a Microsoft windows special handle included in a window to permit it to be resized

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 borders containing relevant peripheral screen components such as the menu bar, scroll bars, or message bars.
→ The work area may also be referred to as the client area.

7b)

b) Discuss briefly about the types of windows with examples (any four)

Types of Windows

1) Primary windows.
2) Secondary windows.
3) Dialog Boxes
4) Property Sheets & Property Inspectors
5) Palette windows
6) Pop-up windows
7) Message Boxes.

(1) Primary Window:-

Proper Usage:

→ Should represent an independent fn / appl^n
→ Use to present constantly used window components & controls
  • Menu bar items that are:
    - Used frequently.
    - Used by most, or all, primary or secondary windows.
  • Controls used by dependent windows
→ Use for presenting info^n that is continually updated. Ex: Date & time
→ Use for providing context for dependent window to be created
→ Do not:
  • Divide an independent fn into two or more primary windows.
  • Present unrelated fn in one primary window

Refer fig 5.7

(2) Dialog Box:-

→ Use for presenting brief messages.
→ Use for requesting specific, transient actions
→ Use for performing actions that:

- Take a short time to compute
- Are not frequently changed.

→ Command buttons to include:
- OK
- Cancel
- Others as necessary.

Refer fig 5.16

③ Message Boxes:-
→ Use for displaying a message about a particular situation or condition
→ Cmd buttons include:
- Ok
- Cancel
- Help
- Yes / No
- Stop
- Buttons to correct the action that caused the message box to be displayed.

→ Enable the title bar close box only if the msg includes a cancel button.
→ Designate the most frequent or least destructive option as the default cmd button.

Refer fig 5.17
Microsoft suggest providing the following:
→ If a msg requires no choices to be made, but only acks, include an OK & optional Help button
→ If a msg requires the user to make a choice, include a cmd button for each opt.
→ Include an & Cancel buttons only when the user has the opt. of continuing/stopping the action
→ Use Yes & No buttons when the user must decide how to continue
→ If these choices are too ambiguous, label the command buttons with the names of specific actions, for ex. Save & Delete

④ Palette windows
→ Use to present a set of controls
→ Design as resizable.
- Alternately, design them as fixed in size

Refer fig 5.18

⑤ Pop-Up windows

→ Use pop-up windows to display:
- Additional info when an abbreviated form of the info is the main presentation.
- Textual labels for graphical controls
- Context-sensitive Help info

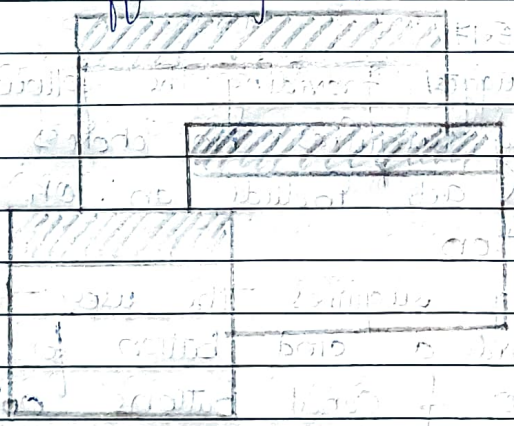
Refer 5.19

Q. Describe overlapping windows, tiled window presentation styles with example.

Overlapping windows:-

→ Overlapping windows may be placed on top of one another like papers on a desk.

→ They possess a 3D quality, appearing to lie on different planes



Advantages:-
- Usually, their look is 3D, resembling the desktop that is familiar to the user
- Greater control allows the user to organize the windows to meet his/her needs.
- Windows can maintain larger size, consistent size, consistent positions.
- Screen space conservation is not a problem, because windows can be placed on top of one another

- There is less pressure to close or delete windows no longer needed.
- They yield better user performance for tasks where the data acquired must be manipulated to complete the task.

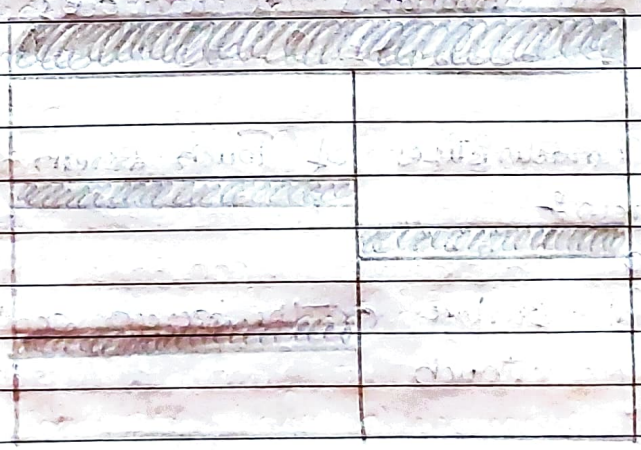
Disadvantages

- They are operationally much more complex than tiled windows.
- Info in windows can be obscured behind other windows.
- Windows themselves can be lost behind other windows & be presumed not to exist.
- That overlapping windows represent a 3D space is not always realized by the user.

Tiled Windows:-

→ Tiled windows derive their name from common floor/wall tile. Tiled windows appears in one plane on the screen & expand/contract to fill up the display surface, as needed.

→ Most OS/ms provide 2D tiled windows, adjustable in both height & width.



Advantages

- The OS/m usually allocates & positions windows for the user, eliminating the necessity to make positioning decisions.

- Open windows are always visible, eliminating the possibility of them being lost & forgotten
- Every window is always completely visible, eliminating the possibility of info being hidden.
- They are perceived as fewer complexes than overlapping windows possibly because there are fewer management operations or they seem less "magical"

Disadvantages:
- Only a limited no can be displayed in the screen area available.
- As windows are opened / closed, existing windows change in size, it can be annoying.
- As windows change in size / position, the movement can be disconcerting.
- As the no of displaying windows increases, each window can get very tiny.
- The changes in sizes & locations made by the S/m are difficult to predict.
- The configuration of windows provided by the S/m may not meet the users needs.
- They permit less user control because the S/m actively manages the windows.

Q6
b) Explain Characteristics of Touch Screen & Keyboard

Touch Screen:
→ Description
- A special surface on the screen sensitive to finger or stylus touch

→ Advantages
- Direct relationship b/w hand & pointer located in terms of direction, distance & speed.
- Movement is direct, in the same plane as screen.
- Requires no additional desk space

- stands up well in high-use environments

→ Disadvantages

- Fingers may obscure small screen
- Stylus may be too large for small objects
- Requires moving the hand away from keyboard
- Very fatiguing to use for extended period of time
- May scratch or damage the screen

Design Guidelines:

- Screen objects should be atleast 3/4" x 3/4" in size
- Object separation should be at least 1/8"
- Provide visual feedback in response to activation. Auditory feedback may also be appropriate.
- When the consequences are destructive, require confirmation after selection to eliminate inadvertent selection
- Provide an instructional invitation to begin using

Keyboard :-

Description

- Standard typewriter keyboard & cursor movement keys

Advantages

- Familiar
- Accurate
- Does not take up additional desk space.
- Very useful for:
  - Entering text & alphanumeric data
  - Inserting in text & alphanumeric data
  - Key shortcuts - accelerators
  - Keyboard mnemonics - equivalents.
- Advantageous for:
  - Performing actions when less than 3 mouse buttons exist.

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Use: with very large screens
- Touch typists.

• Disadvantages
- slow for non-touch typists
- slower than other devices for pointing
- Requires discrete actions to operate
- No direct relationship between finger/hand movement on the keys and cursor movement on screen in terms of speed & distance

Keyboard Usage Guidelines
• Provide keyboard Accelerators
- Assign single keys for frequently performed, small scale tasks
- Use std platform accelerations
- Assign shift+key combinations for actions that extend or are complementary to the actions of key or key combinations used without the shift key.
- Assign Ctrl key combinat° for.
  • Infrequent actions
  • Tasks that represent larger-scale versions of the task assigned to the unmodified key.

• Provide keyboard Equivalents
- use std platform equivalents
- Use first letter of the item descript°
- If first letter conflicts exist, use:
  • Another distinctive consonant in the item description
  • A vowel in the item description

• Provide window navigation through use of keyboard keys.

Q: Explain Radio Buttons and List Boxes selection controls.

A:

Radio Buttons :-

→ Description

- A 2-part control consisting of the following:
  - Small circles, diamonds or rectangles
  - Choice Description
- When a choice is selected:
  - The option is highlighted
  - Any existing choice is automatically unhighlighted if deselected

→ Purpose

- To set one item from a small set of mutually exclusive opt^{n} (2 - 8)

→ Proper Usages

- For setting attributes, properties or values.
- For mutually exclusive choices
- When adequate screen space is available.
- Do not use:
  - for commands
  - Singly to indicate the presence or absence of a state

Refer fig 7.24 & 7.25 from text book

→ Choice descript^{n}

- Provide meaningful, fully spelled out choice descript^{n} clearly describing the values/effects of the choice
- Display in single line of text
- Display using mixed case letters
- Position it the right of the button. Separate them by at least one space.
- When a choice is conditionally unavailable for select^{n}, display it grayed out or dimmed
- Include "None" if required.

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Size
Show a minimum of two choices, a maximum of eight

Default
→ when the control possesses a state or affect that has been predetermined to have a higher probability of select^n than the others, designate it as the default & display its button filled in.
→ when the control includes choices whose states cannot be predetermined, display all the buttons without setting a dot, or in the indeterminate state
→ when a multiple select^n includes choices whose states vary.

Structure
- A common orientation is the preferred manner of presentation
- Left-align the buttons & choice descriptions
Refer fig 7.26
→ If vertical space on the screen limited, oriented the buttons horizontally.
→ Provides adequate separat^n bet^{w} choices
fig 7.27
→ Enclose the buttons in a border to visually strengthen the relationship they posses.
Refer fig 7.28

Organizat^n
→ Arrange select^n in expected order or follow other patterns such as frequency of occurrence sequence of use or importance
→ If under certain conditions, a choice is not available, display it subdued or less brightly than the available choice

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Related Control
→ Position any control related to a radio button immediately to the right of the choice description.
→ If the radio button choices description also act as the label for the control that follows it, end the label with an arrow (→)

Fig - 7.30

Captions, Keyboard Equivalents & Select Method Indication may be included for one whole 8 marks.

List Boxes:-
→ Description
- A permanently displayed box-shaped control containing a list of alternatives.
- A choice may be text, pictorial representations
- Selections are made by using a mouse to point & click.
- Capable of being scrolled to view large lists of choices.
- No text entry field exists in which to type text.

→ Purpose
- To display a collection of items containing
  - Mutually exclusive options.
  - Non-mutually exclusive options.

Refer 7.60

Select Description
Clearly & meaningfully describe the choice available, spell them out as fully as possible.
- Graphical representation must clearly represent the options.

List Size:-

- Not actual limit in code
- Present all available alternatives
- Require no more than two page-downs to search a list

Box Size
- Must be long enough to display 6 to 8 choices without scrolling
- Must be wide enough to display longest possible choice

fig 7.61

Organization:-
- Order in a logical & meaningful way to permit easy browsing
- If a particular choice is not available in the current context omit it from the list.

Layout & Separation
- Enclose the choices in a box with a solid border.
- Leave one blank character position b/w the choice descript^n & left border.
- Leave one blank char. position between the longest choice descript^n & right border.

Capt^n, Disabling & Select^n Method & Indication to be included for a menu.

Q6)

b) Explain any two types of testing prototypes used in UID.

Interactive Paper Prototypes

Description
- Interface components constructed of common paper technologies

- The components are mutually manipulated to reflect the dynamics of the sln.
- Re low-fidelity prototype

Advantages
- More illustrative of program dynamics than sketches.
- Can be used to demonstrate the interactn
- Otherwise, generally the same as for hand-written sketches & scenarios.

Disadvantages
- Only a rough approximatn
- A demonstratn not an exe.
- Driven by a facilitator, not the user.
- Limited usefulness for usability testing

Programmed facades

Description
- Examples of finished dialogs & screens for some aspects of the sln.
- Created by prototyping tools
- Medium fidility to high-fidility prototypes.

Advantages
- Provide a good detailed specification for writing code.
- A vehicle for data collectn

Disadvantages.
- May solidify the design too soon.
- May create the false expectatn that the "real thing" is only a short time away
- More expensive to develop.
- More time-consuming to create
- Not effective for requirements gathering
- Not practical for investigatn more than 2/3 approaches

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(Q5)

a) Explain Slider & Tree View operable controls

Slider:-

Description

- A scale exhibiting degrees of a quality on a continuum.
- Includes the following:
  - A shaft or bar.
  - A range of values with appropriate labels.
  - An arm indicating relative setting through its location on the shaft.
  - Optionally, a pair of buttons to permit incremental movement of the slider arm.
- May be oriented vertically or horizontally.
- Selected by using the mouse to:
  - Drag a slider across the scale until the desired value is reached.
  - Keying a value in the associated text box.

- Purpose:
  - To make a setting when a continuous qualitative adjustment is acceptable, it is useful to see the current value relative to the range of possible values.

Proper Usage:

- To set an attribute
- For mutually exclusive choices
- When an object has a limited range of possible settings
- When the range of values is continuous
- When gradations are relatively fine.
- When the choices can increase or decrease in some well-known, predictable & easily understood way.

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Fig 7.19

General guideline
- Use standard sliders whenever available.

Caption & Labels.
- Caption
  - Provide meaningful, clear & consistent captions
  - Display them using mixed-case letters.
  - Position the caption to the left of the box.
    - Alternately, it may be positioned left-justified above the slider.

- Labels
  - Provide meaningful & descriptive labels to aid in interpreting the scale.

Scale:-
- Show a complete range of choices.
- Mark the low, intermediate & high ends of the scale.
- Provide scale interval marking, where possible.
- Provide consistent increments
- Permit the user to change the units of measure.

Slider Arm
- If the user cannot change the value shown in a slider, do not display a slider arm

Slider Buttons
- Provide slider buttons to permit movement by the smallest increment
- If the user can't change the value shown is a slider, do not display slider buttons

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Detents
- Provide detents to set values that have special meaning
- Permits the user to change the detent value.

Proportions
- To indicate the proportion of a value being displayed, fill the slider shaft in some visually distinctive way.
  - Fill horizontal sliders from left to right
  - Fill vertical sliders from bottom to top.

Tree view
Description
- A special list box control that displays a set of objects as an indented outline, based on the objects logical hierarchical relationship.
- Includes, optionally, buttons that expand & collapse the outline.
  - A button inscribed with (+) ⇒ expands
  - A button inscribed with (-) ⇒ collapse
- Elements that can optionally be displayed are:
  - Icons.
  - Graphics, such as a check box.
  - Lines to illustrative hierarchical relations

Purpose & proper Usage.
- To display a set of objects as an indented outline to illustrate their logical hierarchical relationships.

Refer fig 7.82

(or) Explain Cognitive Walkthroughs, Think aloud Evaluations & Usability tests conducted in UD.

Cognitive Walkthrough

Description
- Reviews of interface in the context of tasks users platform.

Advantages
- Allow a clear evaluation of the task flow early in the design proc.
- Do not require a fully prototype.
- Low cost
- Can be used to evaluate alternate sol?
- Can be performed by developers.
- More structured than a heuristic evaluation

Disadvantages
- Tedious to perform
- May miss inconsistencies & general & recurring problems

Guidelines
- Needed to conduct the walkthrough are:
  - A general descript? of proposed sys users & what relevant knowledge they possess
  - A specific descript? of one or more core or representative tasks to be performed.
- Review
  - Several core or representative tasks across a range of functions
  - Proposed tasks of particular concern.
- Developers must be assigned roles of:
  - Scribe to record results of the action
  - Facilitator to keep the evaluation moving
- Start with simple tasks

- Don't get bogged down demanding solutions.

Think Aloud Evaluations

Descriptions:
- Users perform specific tasks while thinking out load.
- Comments are recorded & analyzed

Advantages
- Utilizes actual representative tasks
- Provides insights into the user's reasoning

Disadvantages
- May be difficult to get users to think out loud.

Guidelines:
- Develop
  - Several core or representative tasks
  - Tasks of particular concern.
- Limit session to 60 to 90 minutes

Usability Test

Description
- An interface evaluation under real-world or controlled conditions
- Measures of performance are derived for specific tasks
- Problems are identified.

Advantages
- Utilizes an actual work environment
- Identifies serious or recurring problems.

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Disadvantages
- High cost for establishing facility.
- Requires a test conductor with user interface expertise
- Emphasizes first-time GUI usage.
- Poorly suited for detecting inconsistency problems