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Internal Assessment Test 4 – February 2022

Sub:	Principles of User Interface Design							Code:	18MCA552
Date:	03-02-22	Duration:	90 mins	Max Marks:	50	Sem:	V	Branch:	MCA

Note: Answer 5 questions. . Total Marks: 50

	Marks	OBE	
		CO	RBT
Group 1 – Answer any 2			
1. a Discuss four pillars of design with a neat diagram.	**10**	CO2	L2
2 a What are the eight golden rules of interface Design? Explain with example	**10**	CO2	L1
3. a Explain the stages of user interface design methodology in details with suitable example.	**10**	CO2	L1
Group 2			
4. a Discuss command Language strategies and structure **(OR)**	**10**	CO1	L2

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5.	a.	Explain the basis for preparing error messages	**10**	CO2	L1
		Group 3 – Answer any 2	**10**	CO1	L1
6.	a.	Discuss the various models of response time impacts. Explain user productivity .			
7.	a.	Explain types of Graphical Menus in detail with example and Explain the guideline for form fill in	**10**	CO5	L2
8.	a.	Define Interaction Style. List various types of interaction styles in graphical system. And Explain each style with appropriate advantages and disadvantages	**10**	CO3	L3

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2. Discuss four pillar of design with a neat diagram.

User Interface Requirements

– Soliciting and clearly specifying user requirements is a major key to success in any development activity

– Laying out the user-interface requirements is part of the overall requirements development and management process

– User interface requirements describe system behavior

• Ethnographic Observation

– Identifying and observing the user community in action

– Discussed later

Guidelines documents and processes

Each project has different needs, but guidelines should be considered for:

• Words, icons, and graphics

– Terminology (objects and actions), abbreviations, and capitalization

– Character set, fonts, font sizes, and styles (bold, italic, underline)

– Icons, graphics, line thickness, and

– Use of color, backgrounds, highlighting, and blinking

• Screen-layout issues

– Menu selection, form fill-in, and dialog-box formats

– Wording of prompts, feedback, and error messages

– Justification, white space, and margins

– Data entry and display formats for items and lists

– Use and contents of headers and footers

• Input and output devices

– Keyboard, display, cursor control, and pointing devices

– Audible sounds, voice feedback, touch input, and other special devices

– Response time for a variety of tasks

• Action sequences

– Direct-manipulation clicking, dragging, dropping, and gestures

– Command syntax, semantics, and sequences

– Programmed function keys

– Error handling and recovery procedures

• Training

– Online help and tutorials

– Training and reference materials

– Command syntax, semantics, and sequences

User Interface Software Tools

A p l i c a t i o n

Higher-level Tools

Toolkit
Windowing System
Operating System

Expert Review and Usability testing

Interactive-System designers are now recognizing that they must carry out many *small* and some *large pilot tests* of system components before release to customers

What are the eight golden rules of interface Design? Explain with example

The following rules are mentioned to be the golden rules for GUI design

1. Strive for consistency - Consistent sequences of actions should be required in similar situations. Identical terminology should be used in prompts, menus, and help screens. Consistent commands should be employed throughout.
2. Enable frequent users to use short-cuts - The user's desire to reduce the number of interactions increases with the frequency of use. Abbreviations, function keys, hidden commands, and macro facilities are very helpful to an expert user.
3. Offer informative feedback - For every operator action, there should be some system feedback. For frequent and minor actions, the response must be modest, while for infrequent and major actions, the response must be more substantial.
4. Design dialog to yield closure - Sequences of actions should be organized into groups with a beginning, middle, and end. The informative feedback at the completion of a group of actions gives the operators the satisfaction of accomplishment, a sense of relief, the signal to drop contingency plans and options from their minds, and this indicates that the way ahead is clear to prepare for the next group of actions.
5. Offer simple error handling - As much as possible, design the system so the user will not make a serious error. If an error is made, the system should be able to detect it and offer simple, comprehensible mechanisms for handling the error.
6. Permit easy reversal of actions - This feature relieves anxiety, since the user knows That errors can be undone. Easy reversal of actions encourages exploration of unfamiliar options. The units of reversibility may be a single action, a data entry, or a complete group of actions.

7 Support internal locus of control - Experienced operators strongly desire the sense that they are in charge of the system and that the system responds to their actions. Design the system to make users the initiators of actions rather than the responders.

8 Reduce short-term memory load - The limitation of human information processing in short-term memory requires the displays to be kept simple, multiple page displays be consolidated, window-motion frequency be reduced, and sufficient training time be allotted for codes, mnemonics, and sequences of actions.

Explain the stages of user interface design methodology in details with suitable example.

Stage 1: Develop Product Concept

- Create a high concepts
- Establish Business objectives
- Set usability design team
- Identify user population
- Identify technical and environment issues
- Produce staffing plan , schedule and budget

Stage 2: Research and Needs Analysis

- Break job activities into task unit
- Partition user population into homogeneous segments
- Identify major objects and structures which will be used in the software interface

Stage 3: Design Concepts and Key Screen Prototype

- Identify set of key screen, logion, home, major process.
- Conduct Initial review and usability test
- Initiate guidelines and style guide

Stage 4: Iterative Design and Refinement

- Conduct heuristic and expert reviews
- Conduct full-scale usability tests.
- Deliver prototype and specifications

Stage 5: Implement Software

- Develop standard practices
- Manage late stage change
- Develop online help, documentation and tutorials

Stage 6: Provide Roll-Out Support

- Provide training and assistance
- Perform logging, evaluation, and maintenance

Discuss command Language strategies and structure

Ans. Strategies

- Several strategies for command organization have emerged. A unifying interface concept or metaphor aids learning, problem solving, and retention.

- Electronic-mail enthusiasts conduct lively discussions about the metaphoric merits of such task-related objects as file drawers, folders, documents, memos, notes, letters, or messages.
- The appropriate interface actions (CREATE, EDIT, COPY, MOVE, DELETE) and the choice of action pairs such as LOAD/SAVE (too much in the computer domain), READ/WRITE (acceptable for letters, but awkward for file drawers), or OPEN/CLOSE (acceptable for folders, but awkward for notes).

- Designers often err by choosing a metaphor closer to machine domain than to the user's task domain.
    - **Simple command set**
        - Each command is chosen to carry out a single task. The number of commands match the number of tasks.
        - For small number of tasks, this can produce a system easy to learn and use.
        - E.g. the vi editor of Unix.
    - **Command plus arguments/options**
        - Follow each command by one or more arguments that indicate objects to be manipulated, e.g.
            - COPY FILEA, FILEB
            - DELETE FILEA
            - PRINT FILEA, FILEB, FILEC
        - Keyword labels for arguments are helpful for some users, e.g. COPY FROM=FILEA TO=FILEB.
        - Commands may also have options to indicate special cases, e.g.:
            - PRINT/3,HQ FILEA
            - PRINT (3, HQ) FILEA
            - PRINT FILEA -3, HQ

            to produce 3 copies of FILEA on the printer in the headquarters building.
        - Error rates and the need for extensive training increase with the number of possible options.
    - **Hierarchical command structure**
        - In the third option, the set of commands is organized into a tree structure, like a menu tree. The first level might be the command action, the second might be an object argument, and the third might be a destination argument:

Action	Object	Destination
CREATE	File	File
DISPLAY	Process	Local printer
REMOVE	Directory	Screen
COPY		Remote printer
MOVE		

Structure

- Human learning, problem solving, and memory are greatly facilitated by meaningful structure.
- Meaningful structure is beneficial for *task concepts*, and *syntactic* details of command languages.
- **Consistent argument ordering**: Several studies have shown that there are benefits associated with using a ***consistent*** order for arguments. For example, when presented

with commands with ***inconsistent*** and consistent argument ordering, users performed significantly faster with the consistent argument ordering.

Inconsistent	**order of argument**	**Consistent order of arguments**	
SEARCH	file no, message id	SEARCH	message id, file no
TRIM	message id, segment size	TRIM	message id, segment size
REPLACE	message id, code no	REPLACE	message id, code no
INVERT	group size, message id	INVERT	message id, group size

- **Symbol versus keywords:** Command structure affects performance

Symbol editor	Keyword editor
FIND: /TOOTH/: -1	BACKWARD TO "TOOTH"
LIST: 10	LIST 10 LINES
RS: / KO / , / OK/:*	CHANGE ALL "KO" TO "OK"

Explain the basis for preparing error messages

Error Messages

- Error messages are key part of an overall interface design strategy of guidance for the user. The strategy should ensure integrated, coordinated error messages that are consistent across one or multiple applications.
- Avoid
  - imperious tone that condemns user
  - messages that are too generic (e.g. WHAT? or SYNTAX ERROR)
  - messages that are too obscure (e.g. FAC RJCT 004004400400)

.1 Specificity

- Messages that are too general make it difficult for the novice to know what has gone wrong. Simple and condemning messages are frustrating because they provide neither enough information about what has gone wrong nor the knowledge to set things right. The right amount of specificity therefore is important.

User-centered phrasing

Suggests user controls the interface, initializing more than responding

User should have control over amount of information system provides e.g. screen tips; a help button for context-sensitive help or an extensive online user manual

Telephone company, "We're sorry, but we are unable to complete your call as dialed. Please hang up, check your number, or consult the operator for assistance", versus "Illegal telephone number. Call aborted. Error number 583-2R6.9. Consult your user manual for further information.'

Appropriate physical format

use uppercase-only messages for brief, serious warnings

avoid code numbers; if required, include at end of message

debate over best location of messages. E.g. Could be:

- near where problem arose
- placed in consistent position on bottom of screen
- near to, but not obscuring relevant information

Poor	Better
SYNTAX ERROR	Unmatched left parenthesis
ILLEGAL ENTRY	Type first letter: **S**end, **R**ead, or **D**rop
INVALID DATA	Days range from 1 to 31
BAD FILE NAME	File names must begin with a letter

11.2.2 Constructive guidance and positive tone

- Messages should, where possible, indicate what users should do to correct the problem.
- Unnecessarily hostile messages using violent terminology can disturb non-technical users:
  - FATAL ERROR, RUN ABORTED
  - CATASTROPHIC ERROR: LOGGED WITH OPERATOR
  - Negative terms such as ILLEGAL, ERROR, INVALID, BAD should be eliminated or used infrequently

- audio signals useful, but can be embarrassing - place under user control

- Development of effective messages
  - Messages should be evaluated by several people and tested with suitable participants
  - Messages should appear in user manuals and be given high visibility
  - Users may remember the one time when they had difficulties with a computer system rather than the 20 times when everything went well
- Recommendations
    - Increase attention to message design
    - Establish quality control
    - Develop guidelines
      - Have a positive tone
      - Be specific and address the problem in the user's terms
      - Place the users in control of the situation
      - Have a neat, consistent, and comprehensible format
    - Carry out usability test
    - Collect user performance data

10.Discuss the various models of response time impacts. Explain user productivity

For users, the main experience of Quality of Service is the computer's response time

Response time is the number of seconds it takes from the time a user initiates an action until the computer presents the results.

User think time The number of seconds the user thinks before entering the next action.
Simple Stages of Action Model

1. initiation of an action
2. Wait for computer's response
3. Observe while results appear
4. Think about results

This simple model is not very realistic because users plan while they are initiating an action (typing/clicking), waiting for results to appear, and interpreting results. Because users are able to use this time to plan, it is very difficult to obtain precise measurements of user think time.

- Response Time is usually easier to estimate
    - Many times pop-up messages are displayed immediately after the initiation of an action so the response time doesn't seem as long.
    - Delays greater than 160 milliseconds are noticed and become annoying. However, users have come to accept delays from networked devices.

Designers and network managers who seek to provide high QoS have to consider several factors including: technical feasibility, costs, tasks complexity, user expectations, speed of task performance, error rates, and error-handling procedures.

- Most users prefer rapid interactions
  - Response times that are longer than 15 seconds can be detrimental to productivity, can increase error rates and decrease satisfaction.
  - Rapid interactions, faster than 1 second, can increase productivity, but may also increase error rates for complex tasks.

Web-site display performance was studied by evaluating delay, familiarity, and breadth to examine interaction effects on user performance, attitudes, stress, and behavioral intentions. Lab-tests were conducted to determine "acceptable" delays in two cultures, U.S. and Mexico. Although not all results have been published, conclusions show that user impatience is high, especially in the U.S. as compared to Mexico.

- **Refresh Rates** - can lead to user frustration if too slow and can be very pleasing when operating speedily
  - In web applications screen refresh rate may be limited by network transmission or server performance. Images may appear in fragments over several seconds.

- **Network Connection Speeds**
  - There are several network options for consumers to purchase from 56-Kbps dial-up to 50-Mbps Fiber Optic Service (FiOS) that will affect the quality of service that the user receives.
  - Internet service providers (ISP) have typically offered plans with a much greater download speed than upload speed because most users download more content than they upload. However, with the current "user-generated" content era, it is increasingly important for upload speeds to keep up with download speeds.
  - There are tools available that allow users the check their connection speeds and have a better idea of the quality of service they are receiving from their current ISP. However, they need to understand that network traffic and server loads can also have an effect on their connection speeds, especially during peak usage times.

- Reading textual information from a screen is often a challenging cognitive and perceptual task
  - Users tend to relax, pace themselves, and work productively when the screen fills with text instantly
  - Users often scan the documents to find the information they are looking for
  - Because of these facts, it is useful to display text first and leave space for graphics that are slower to load
  - As display quality improves, as more people are going 'green', and as online books and newspapers become increasing available, there is an increasing demand for rapid display of textual and graphical data.

- **Limitations of short-term and working memory**
  - Magic number seven - plus or minus two
    - The average person can rapidly recognize seven 'chunks' of information at any given time
      - They can hold this information for 15 to 30 seconds in short-term memory
      - The size of the chunks of information depends on the person's knowledge and experience about the material
    - Performing a distracting task during this time, erases the chunks
    - If a person focuses on retaining the information it can be transferred to long-term memory

- Short-term memory and working memory are used together to process information and solve problems
  - Short-term memory processes perceptual input
  - Working memory generates and implements solutions
- People tend to combine several lower-level concepts into a single higher-level chunk to help them remember complex problems
- Short term and working memory are both highly volatile
  - Disruptions can cause loss of memory
  - Delays may require that the memory be refreshed

- What causes **errors**?
  - After a user is able to construct a solution to a problem, he/she must then record or implement the solution.
    - The potential for errors increases and the pace of work slows when the solutions have to be recorded
  - When using an interactive computer system, users formulate plans and then have to wait while each step of the plans are executed. If the execution takes too long or if an unexpected result is obtained, the users may forget a portion of the plan and therefore be forced to continually review the plan. This can cause slowed productivity and more errors.
  - Longer response times cause users to become anxious because the penalty for an error increases
    - When users are anxious, their performance slows and errors increase.
  - Response times that are too short could cause the user to skip or fail to understand important materials or even obtain incorrect results

- Paced vs. Un-paced tasks

- Car driving analogy
  - Higher speeds increase the potential for accidents, so speed limits are provided to lower the risk of the dreadful consequences. "When incorrect use of computer systems can lead to damage to life, property, or data, should not speed limits be provided?"
  - Talking on a cell phone while driving has shown to increase accident rates. Computer users who tend to multitask make more mistakes. GPS systems are available to aid drivers in getting to their destination. Agents and wizards guide novice users to successful conclusions, but will this grow in the near future?

- **Progress indicators** tend to shorten perceived elapsed time and heighten satisfaction by reassuring the user that the process is underway:
  - Graphical indicators (usually better than static, blinking, or numeric)
  - Blinking messages
  - Numeric seconds left for completion

- **Conditions for Optimum Problem Solving**
  - Users can achieve rapid task performance, low error rates, and high satisfaction if all the following criteria are met:
    - Users must have sufficient knowledge of the objects and actions necessary to complete the task
    - The solution plan can be carried out without delays
    - Distractions are eliminated
    - User anxiety is low
    - Feedback is given about progress toward solution
    - Errors can be avoided or easily handled
  - Other conjectures that play a role in choosing the optimum interaction speed
    - Novices prefer to work at slower speeds so they normally exhibit better performance with slower response times
    - When there is little penalty for an error, users prefer to work faster

        - When the task is familiar and easily comprehended, users prefer more rapid action
        - If users have experienced rapid performance previously, they will expect and demand it in future situations

In order to better evaluate user productivity, researchers have extended models to include tempting distractions and unavoidable interruptions, such as arriving e-mail, instant messages, phone calls, and other requests.

Expectations and Attitudes

- **Response Times**
    - What are acceptable response times?
    - The 2 second limit is appropriate for many circumstances, but sometimes a tenth of second is necessary.
        - Ex. 2s -v- .1s response times of dial tones and key presses

- **Factors that influence acceptable response times**
    - Expectations
    - User tolerance for delays
    - Task complexity

- **Expectations**
    - Once you go broadband, you never go back.
    - If tasks are completed quicker than expected, people will be pleased, and vice versa. (traffic lights)
    - One way to reduce network complaints is by using a response-time choke.
        - When the load is light the system can perform slower to give uniform speed to all users.
        - Disruptions frustrate users who develop a working style based on a certain level of responsiveness.
        - Some users refuse to work when response times are slow.
    - Users expect a rapid startup for laptops/cameras, and are annoyed with waiting times.

- **User tolerance for delays**
    - Novices have more patience.
    - Variations in acceptable waiting times.
        - Personality (Laid back/Demanding)
        - Cost (Twitter/Air traffic control)
        - Age (Young/Old)
        - Mood (Carefree/Upset)
        - Cultural context (Mexico/US)
        - Time if delay (1:00pm/4:30pm)
        - Noise (Quiet/Loud)
        - Perceived pressure to complete a task (No pressure/Deadlines)

- **Task complexity**
    - Repetiitive tasks demand faster response times.
    - Complex tasks with longer response times allow for users to plan ahead.
    - With complex tasks, users will adapt their working sytle to multitask duing delays.
    - Even so, excessively long delay will cause user dissatisfaction.

- **Tasks that demand rapid system performance:**

1. Video games
2. Flight simulators

3. Graphic design
4. Dynamic queries
5. VoIP
6. Streaming multimedia

These tasks require no perceived delay (<100 milliseconds)

Long response times in the WWW lead users to view the company negatively and find the content less interesting. Use of Ajax and other dynamic techniques increase responsiveness and user expectations.

User controlled pace settings can benefit expert users as well as those who are older or disabled. It also allows companies to charge a premium for faster internet service.

User Productivity

Productivity can in many ways be related to the amount of work accomplished in a given period of time. Therefore, in order to improve user productivity, the efficient use of response times is vital.

Shorter response times can lead to increased productivity. However, long response times may give users opportunities to work on concurrent processes, reducing the effort and/or time required to finish a task. The opposite of this may also occur. Working too quickly because of fast response times, can result in errors, reducing productivity.

Because of these two extremes designers must carefully assess each situation to determine appropriate response times for optimal levels of user productivity. For occasional tasks the importance of this is less critical. But for tasks that occur frequently, determining proper response times should be given greater priority in order to prevent loss of productivity.

An alternative to forcing users to sit through longer response times is to hide the delay. Designers can display important or critical information while other information or processes are still loading. This technique is very useful for websites in order to keep users engaged while they wait for the rest of the content to be loaded in the browser.

The nature of a task strongly influences decisions about adjusting response time. Faster response times can allow users to work more quickly, but decisions may be less than optimal. However, this faster pace might also allow a user to quickly reverse actions and try new ones, reducing the penalty for errors. Users may also learn how to use a system faster since shorter response times would allow for easy exploration of alternatives.

Users adopt various strategies for data entry depending on the response time of a system.

Response Time	**User Strategies**	**Result**
Less Than 1 Second	Work without checking to see if the system is ready for input.	Increased Errors

Between 1 and 2 Seconds	Work is paced. Wait until system is ready for input.	Appropriate time is given for the system to accept inputs
Greater Than 2 Seconds	Increased monitoring of system	Users make sure system is ready for input

For complicated problem-solving, users adapt their work style to the response time. Changes in response time between 0.1 and 5 seconds do not impact productivity because of this. Simple and habitual tasks receive the greatest benefits in productivity due to faster response times.

In the case of complex tasks, shorter response times result in hurried decisions and increased errors. Longer response times increase the frustration a user may already be experiencing while trying to solve a problem, placing a burden on short-term memory.

9. Define Interaction Style. List various types of interaction styles in graphical system. Ans Explain each style with appropriate advantages and disadvantages.

Define Interaction Style

Interaction styles are the "bread and butter" of the interface. The concept of Interaction Styles refers to all the ways the user can communicate or otherwise interact with the computer system.

The types of interaction styles mentioned are usually

COMMAND LANGUAGE

Command language is the earliest form of interaction style and is still being used, though mainly on Linux/Unix operating systems. These "Command prompts" are used by (usually) expert users who type in commands and possibly some parameters that will affect the way the command is executed. The following screen dump shows a command prompt - in this case, the user has logged on to a (mail) server and can use the server's functions by typing in commands.

Advantages

- Flexible.
- Appeals to expert users.
- Supports creation of user-defined "scripts" or macros.
- Is suitable for interacting with networked computers even with low bandwidth.

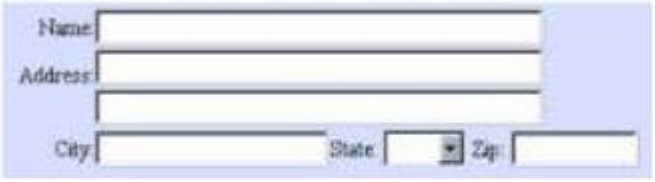
Disadvantages

- Retention of commands is generally very poor.
- Learnability of commands is very poor.
- Error rates are high.
- Error messages and assistance are hard to provide because of the diversity of possibilities plus the complexity of mapping from tasks to interface concepts and syntax.
- Not suitable for non-expert users.

FORM FILLIN

The form fillin interaction style (also called "fill in the blanks") was aimed at a different set of users than command language, namely non-experts users. When form fillin interfaces first appeared, the whole interface was form-based, unlike much of today's software that mix forms

with other interaction styles. Back then, the screen was designed as a form in which data could be entered in the pre-defined form fields. The TAB-key was (and still is) used to switch between the fields and ENTER to submit the form. Thus, there was originally no need for a pointing device such as a mouse and the separation of data in fields allowed for validation of the input. Form fillin interfaces were (and still is) especially useful for routine, clerical work or for tasks that require a great deal of data entry.



Advantages

- Simplifies data entry.
- Shortens learning in that the fields are predefined and need only be 'recognised'.
- *Guides* the user via the predefined rules.

Disadvantages

- Consumes screen space.
- Usually sets the scene for rigid formalisation of the business processes.

MENU SELECTION

A menu is a set of options displayed on the screen where the selection and execution of one (or more) of the options results in a state change of the interface (Paap and Roske-Hofstrand, 1989, as cited in Preece et al. 1994). Using a system based on menu-selection, the user selects a command from a predefined selection of commands arranged in menus and observes the effect. If the labels on the menus/commands are understandable (and grouped well) users can accomplish their tasks with negligible learning or memorisation as finding a command/menu item is a recognition as opposed to recall memory task (see recall versus recognition). To save screen space menu items are often clustered in pull-down or pop-up menus. Some examples of menu selection is shown below.

Advantages

- Ideal for novice or intermittent users.
- Can appeal to expert users if display and selection mechanisms are rapid and if appropriate "shortcuts" are implemented.
- Affords exploration (users can "look around" in the menus for the appropriate command, unlike having to remember the name of a command *and* its spelling when using command language.)
- Structures decision making.
- Allows easy support of error handling as the user's input does not have to be parsed (as with command language).

Disadvantages

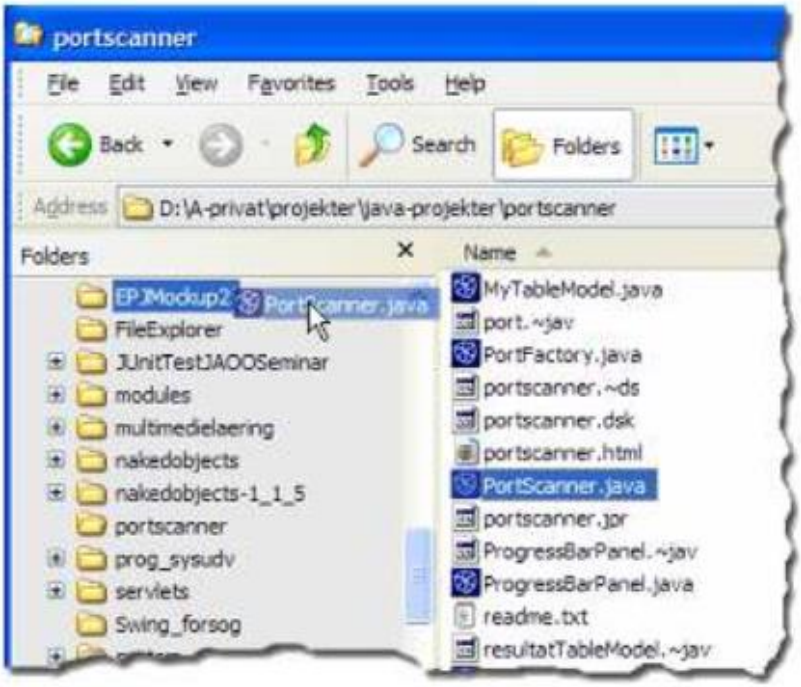
- Too many menus may lead to information overload or complexity of discouraging proportions.
- May be slow for frequent users.
- May not be suited for small graphic displays.

DIRECT MANIPULATION.

Direct manipulation captures the idea of "direct manipulation of the object of interest" which means that objects of interest are represented as distinguishable objects in the UI and are manipulated in a direct fashion.

Direct manipulation systems have the following characteristics:

- Visibility of the object of interest.
- Rapid, reversible, incremental actions.
- Replacement of complex command language syntax by direct manipulation of the object of interest.



Advantages

- Visually presents task concepts.
- Easy to learn.
- Errors can be avoided more easily.
- Encourages exploration.
- High subjective satisfaction.
- Recognition memory (as opposed to cued or free recall memory)

Disadvantages

- May be more difficult to programme.
- Not suitable for small graphic displays.
- Spatial and visual representation is not always preferable.
- Metaphors can be misleading since the "the essence of metaphor is understanding and experiencing one kind of thing in terms of another" (Lakoff and Johnson 1983: p. 5), which, by definition, makes a metaphor different from what it represents or points to.
- Compact notations may better suit expert users.

10.Explain types of Graphical Menus in detail with example and Explain the guideline for form fill in.

There are many different kinds of graphical menus available. The various kinds of graphical menus are

1.Menu Bar
2.Pull-Down Menus
3.Cascading Menus
4.PopUp Menus
5.Tear Off Menus
6.Iconic Menus
7.Pie Menus

1.Menu Bar:

The highest level graphical system menu is commonly called the menu bar.The Menu bar consists of a series of textual words or buttons.These are used to represent the application alternatives or choices to the user.All primary window must have a menu bar.All menu bars must have an associated pull down menu which containing atleast 2 choices.It does not allows the user to turn off the display of the menu bar.The window title will be the menu bar title.It do not display choices that are never available to the user.It separate the bar from the remainder of the screen by a different background.They require the moving pointer from the main working area to select the choices.It consumes a full row of screen space.It usually do not hidden the screen working area.This is called Menu Bar.

2.Pull-Down Menus:

These are the first level menus which is used to provide access to the common and most frequently used application actions that take place on a wide variety of different windows.These are a smaller number of items.No window space is consumed when they are not used.These menus are easy to browse.The items are smaller than full sized buttons.It displays all possible alternatives.Each consists of atleast 2 choices.Title is not necessary for a pull down menu.If a pull down choice leads to another pull down,then it provide a cascade indicator to denote it.This is called Pull-Down Menus.

3.Cascading Menus:

A cascading menu is a sub menu which is derived from a higher level menu,most typically a pull down menu.It don not exceed 3 menu levels that is 2 cascades.This is called Cascading menus.

4.Popup Menus:

The choices may be presented to the user on the screen through popup menus.These menus appear in the working area.They do not use window space when not displayed.No pointer movement is needed if selected by button.They require a special action to see the menu.Their display location may not be consistent.This is called Popup Menus.

5.Tear Off Menus:

A tear off menu is a pull down menu that can be positioned any where on the screen.It possess all the characteristics of a pull down.It require extra steps to retrieve.It hides the screen working area.This is called Tear off menus.

6.Iconic Menus:

It is the picture of menu items or objects in a graphic form.The purpose of an iconic menu is to remind users of the functions,commands,attributes or application choices available.Icons must be meaningful and clear.This is called Iconic Menus.

7.Pie Menus:

A pie menu is a circular representation of menu items.It can be used as a alternative for pull down menu or popup menus.This is called pie menus.

This article is very useful for computer science engineering students.

Form Fillin

- Appropriate when many fields of data must be entered:
  - Full complement of information is visible to user.
  - Display resembles familiar paper forms.
  - Few instructions are required for many types of entries.
- Users must be familiar with:
  - Keyboards
  - Use of TAB key or mouse to move the cursor
  - Error correction methods
  - Field-label meanings
  - Permissible field contents
  - Use of the ENTER and/or RETURN key.

- **Form-Fillin Design Guidelines**
  - Meaningful title
  - Comprehensible instructions
  - Logical grouping and sequencing of fields
  - Visually appealing layout of the form
  - Familiar field labels
  - Consistent terminology and abbreviations
  - Visible space and boundaries for data-entry fields
  - Convenient cursor movement
  - Error correction for individual characters and entire fields
  - Error prevention
  - Error messages for unacceptable values
  - Optional fields clearly marked
  - Explanatory messages for fields
  - Completion signal
  - Order the Form Logically and Only Ask What's Required
  - Present Fields in a Single Column Layout
  - Minimize the Number of Input Fields and User Typing Effort

- Match Fields to the Size of the Input
- Place Labels Above the Corresponding Input Felds
- Use Forgiving Formatting
- Don't Use Placeholder Text as Input Field Label
- Distinguish Optional And Required Fields
- Avoid 'Reset' Button
- Provide Highly Visible and Specific Error Messages

- **Format-specific field**
  - **Coded fields**
    - Telephone numbers
    - Social-security numbers
    - Times
    - Dates
    - Dollar amounts (or other currency)
- **Dialog Boxes**
  - Combination of menu and form-fillin techniques.
  - Internal layout guidelines:
    - Meaningful title, consistent style
    - Top-left to bottom-right sequencing
    - Clustering and emphasis
    - Consistent layouts (margins, grid, white space, lines, boxes)
    - Consistent terminology, fonts, capitalization, justification
    - Standard buttons (OK, Cancel)
    - Error prevention by direct manipulation