CMR INSTITUTE OF TECHNOLOGY

USN | | | | | | | | | | |

Internal Assesment Test –II, August 2023

Sub:	**User Interface Design**							**Code:**	**22MCA254**
Date:	**29/08/2023**	**Duration:**	90 mins	**Max Marks:**	50	**Sem:**	II	**Branch:**	MCA

	Answer Any 5 **QUESTIONS**	Marks	OBE	
			CO	RBT
	PART-I			
1)	Explain the variety of expert reviews methods with suitable example	10	CO1	L1
	OR			
2)	What is the need of usability test? Explain the process involved in developing and conducting a test	10	CO1	L1
	PART-II			
3)	Explain the various characteristics of Direct Manipulation	10	CO1	L2
	OR			
4)	Explain the methods used in the evaluation during active use.	10	CO2	L3
	PART-III			
5)	Explain with a neat diagram use of the Object Action Interaction (OAI) model to design manuals	10	CO4	L2
	OR			
6)	Write notes on: a. i)Slider ii) Treeview iii) Tabs (iv) Scroll bars	10	CO3	L2
	PART-IV			
7)	Explain in detail, functions of Menus with example	10	CO1	L3
	OR			
8)	Explain the guidelines for form fill in with example	10	CO2	L2
	PART-V			
9)	Describe how to use 3D Technology for user interface design ,Usability goals, Online tutorials, Legal issues of user interface.	10	CO2	L2
	OR			
10)	Demonstrate how Virtual Reality(VR) and Augmented Reality (AR) is supportive for GUI Design	10	CO4	L4

1. Explain the variety of expert reviews methods with suitable example

- There are a variety of expert review methods to chose from:
  - *Heuristic evaluation*
    The expert reviewers critique an interface to determine conformance with a short list of design heuristics, such as *the eight golden rules*
  - *Guidelines review*
    The interface is checked for conformance with the organizational or other guidelines document.
  - *Consistency inspection*
    Consistency inspection. The experts verify consistency across a family of inter faces, checking for consistency of terminology, fonts, color schemes, layout, input and output formats
  - *Cognitive walkthrough*
    Extensions to cover web-site navigation incorporate richer descriptions of users and their goals plus linguistic analysis programs to estimate the similarity of link labels and destinations
  - *Formal usability inspection*
    The experts hold a courtroom-style meeting, with a moderator or judge, to present the interface and to discuss its merits and Weaknesses.

- ❑ While *informal demos* to colleagues or *customers can provide some useful feedback,* more formal expert reviews have proven to be effective.

- ❑ Expert reviews entail one-half day to one week effort, although a lengthy training period may sometimes be required to explain the task domain or operational procedures.

- ❑ Expert reviews can be ***scheduled*** at several points in the development process when experts are available and when the design team is ready for feedback.

- ❑ Different experts tend to find different problems in an interface, so ***3-5 expert reviewers*** can be highly productive, as can complementary usability testing.

- ❑ The dangers with expert reviews are that the experts ***may not have an adequate understanding*** *o*f the task domain or user communities.

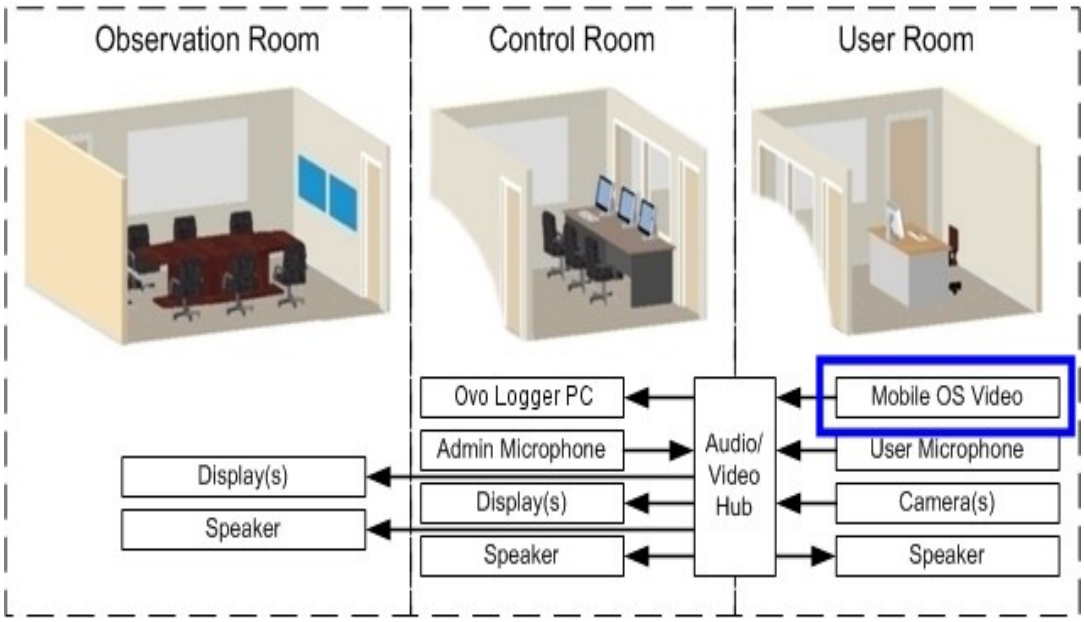
- ❑ To strengthen the possibility of successful expert reviews it helps to chose ***knowledgeable experts*** who are familiar with the project situation and who have a longer term relationship with the organization.

- ❑ Moreover, even experienced expert reviewers have great difficulty knowing ***how typical users***, especially first-time users will really behave.

2. What is the need of usability test? Explain the process involved in developing and conducting a test

- The remarkable surprise was that usability testing not only speed up many projects but that it produced dramatic cost savings.
- Participants should be chosen to represent the intended user communities, with attention to background in *computing, experience* with the task, *motivation, education*, and *ability with the natural language used in the interface.*
- Participation should always be voluntary, and informed consent should be obtained.
- **Videotaping** participants performing tasks is often valuable for later review and for showing designers or managers the problems that users encounter.
- **Field tests attempt** to put new interfaces to work in realistic environments for a fixed trial period. Field tests can be made more fruitful if logging software is used to capture error, command, and help frequencies plus productivity measures.
- **Game designers** pioneered the can-you-break-this approach to usability testing by providing energetic teenagers with the challenge of trying to beat new games.
- **Destructive testing** approach, in which the users try to find fatal(critical) flaws in the system, or otherwise to destroy it, has been used in other projects and should be considered seriously.
- For all its success, usability testing does have at least two serious **limitations:**
- It emphasizes first-time usage and has limited coverage of the interface features.
- These and other concerns have led design teams to supplement usability testing with the varied forms of expert reviews.

Process



3. Explain the various characteristics of Direct Manipulation

Direct manipulation is a human–computer interaction style which involves continuous representation of objects of interest and rapid, reversible, and incremental actions and feedback.

- The advances of WYSIWYG (What You See Is What You Get)word processors:
  - Display a full page of text
  - Display of the document in the form that it will appear when the final printing is done
  - Show cursor action
  - Control cursor motion through physically obvious and intuitively natural means
  - Use of labeled icon for actions
  - Display of the results of an action immediately
  - Provide rapid response and display
  - Offer easily reversible actions

Technologies that derive from the word processor:

- Integration
- Desktop publication software
- Slide-presentation software
- Hypermedia environments
- Improved macro facilities
- Spell checker and thesaurus

Grammar checkers

The VisiCalc spreadsheet and its descendants

- VisiCalc users delighted in watching the program propagate changes across the screen.
- In some cases, spatial representations provide a better model of reality
- Successful spatial data-management systems depend on choosing appropriate:
  - Icons
  - Graphical representations
  - Natural and comprehensible data layouts

- **Video games**
- From PONG to Nintendo GameCube, Sony PlayStation 2, and Microsoft Xbox
- Field of action is visual and compelling
- Commands are physical actions whose results are immediately shown on the screen
- No syntax to remember
- Most games continuously display a score
- DOOM and Quake controversial

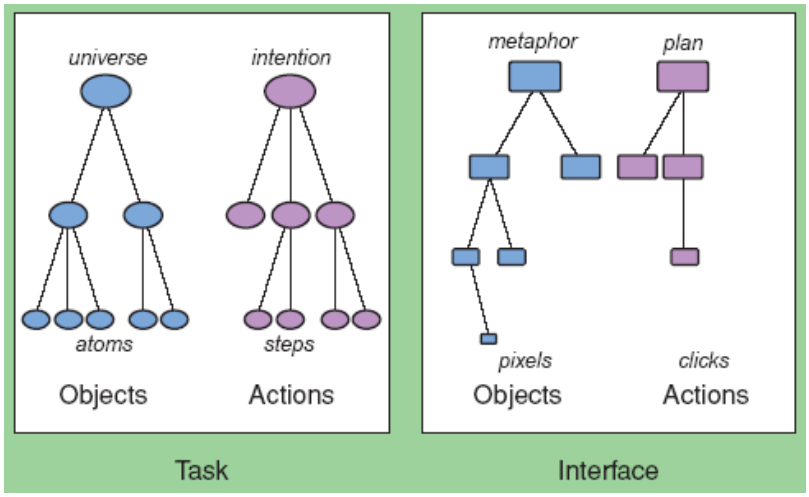
4. Explain the methods used in the evaluation during active use.

- A carefully designed and thoroughly tested system is a wonderful asset, but successful active use requires constant attention from .
    - dedicated managers,
    - user-services personnel,
    - and maintenance staff.
    - Perfection is not attainable, but percentage improvements are possible and are worth pursuing.
- **Interviews and focus group discussions**
    - *Interviews with individual* users can be productive because the interviewer can pursue specific issues of concern.
    - After a series of individual discussions, *group discussions* are valuable to ascertain the universality of comments.
- **Continuous user-performance data logging**
    - The software architecture should make it easy for system managers to collect data about the patterns of system usage, speed of user performance, rate of errors, or frequency of request for online assistance.
    - A major benefit of usage-frequency data is the guidance they provide to system maintainers in optimizing performance and reducing costs for all participants.
- **Online or telephone consultants**
    - Online or telephone consultants are an extremely effective and personal way to provide assistance to users who are experiencing difficulties.
    - Many users feel reassured if they know there is a human being to whom they can turn when problems arise.
    - On some network systems, the consultants can monitor the user's computer and see the same displays that the user sees while maintaining telephone voice contact.
    - This service can be extremely reassuring; the users know that someone can walk them through the correct sequence of screens to complete their tasks.
- **Online suggestion box or trouble reporting**
    - *Electronic mail* can be employed to allow users to send messages to the maintainers or designers.
    - Such an online suggestion box encourages some users to make productive comments, since writing a letter may be seen as requiring too much effort.
- **User newsletters and conferences**
    - Newsletters that provide information about *novel interface facilities*, *suggestions* for improved productivity, requests for assistance, *case studies* of successful applications, or stories about individual users can promote user satisfaction and greater knowledge.
    - *Printed newsletters* are more traditional and have the advantage that they can be carried away from the workstation.
    - *Online newsletters* are less expensive and more rapidly disseminated
    - *Conferences* allow workers to exchange experiences with colleagues, promote novel approaches, stimulate greater dedication, encourage higher productivity, and develop a deeper relationship of trust.
- **Online bulletin board or newsgroup**
    - Many interface designers offer users an electronic bulletin board or newsgroups to permit posting of open messages and questions.
    - Bulletin-board software systems usually offer a list of item headlines, allowing users the opportunity to select items for display.
    - New items can be added by anyone, but usually someone monitors the bulletin board to ensure that offensive, useless, or repetitious items are removed.

5. Explain with a neat diagram use of the Object Action Interaction (OAI) model to design manuals

The OAI Model explanation of direct manipulation

- Portrait of direct manipulation:
  - Continuous representation of the objects and actions of interest
  - Physical actions or presses of labeled buttons instead of complex syntax
  - Rapid incremental reversible operations whose effect on the object of interest is immediately visible
- Beneficial attributes:
  - Novices learn quickly
  - Experts work rapidly
  - Intermittent users can retain concepts
  - Error messages are rarely needed
  - Users see if their actions are furthering their goals
  - Users experience less anxiety
  - Users gain confidence and mastery



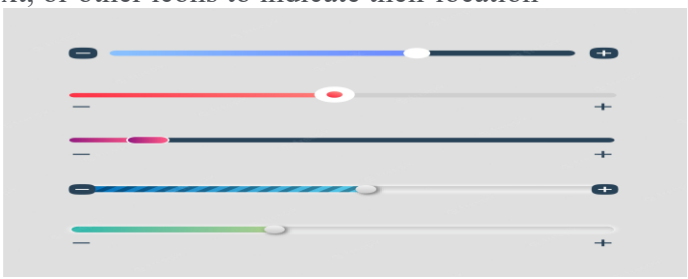
Visual Thinking and Icons

- The visual nature of computers can challenge the first generation of hackers
- An icon is an image, picture, or symbol representing a concept
- Icon-specific guidelines
  - Represent the object or action in a familiar manner
  - Limit the number of different icons
  - Make icons stand out from the background
  - Consider three-dimensional icons
  - Ensure a selected icon is visible from unselected icons
  - Design the movement animation
  - Add detailed information
  - Explore combinations of icons to create new objects or actions

6. Write notes on:

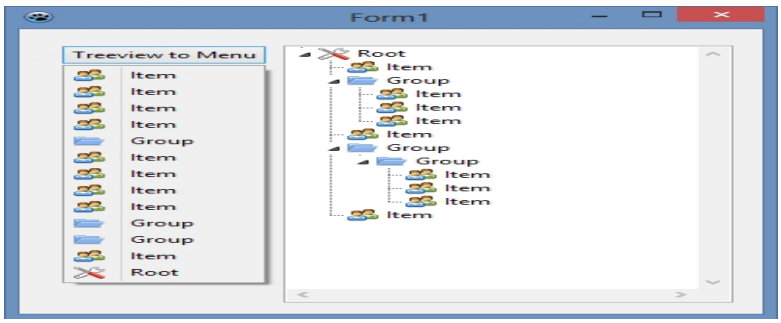
i) Slider

A wonderful website design element is a sliding menu. A slide menu is an off-screen element that slides in and out of view when users want it. In general, slide menus use hamburger icons, arrows, text, or other icons to indicate their location



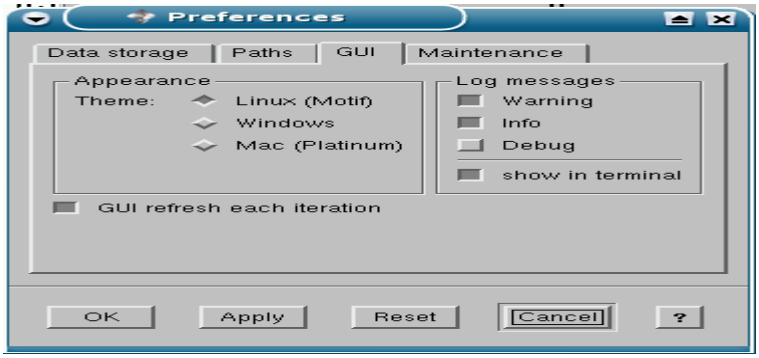
ii) Treeview

A tree view represents a hierarchical view of information, where each item can have a number of subitems.



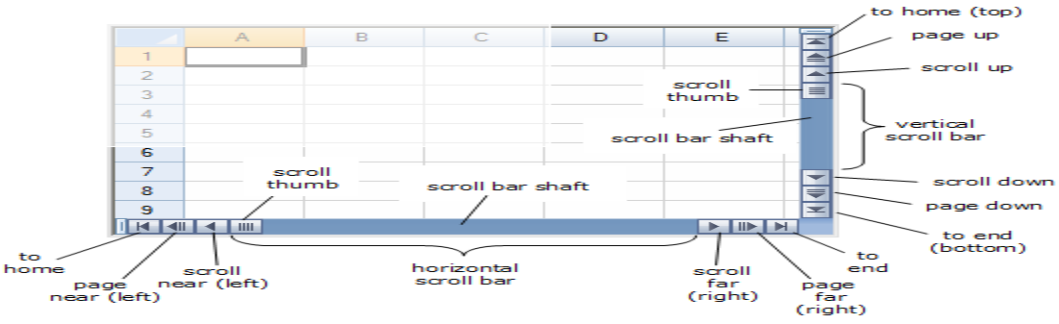
iii) Tabs

Tab Menu is a minimalist tab manager for Chrome. It enables you to search, switch, rearrange, and close tabs from the toolbar menu



(iv) Scroll bars

A scrollbar is an interaction technique or widget in which continuous text, pictures, or any other content can be scrolled in a predetermined direction (up, down, left, or right) on a computer display, window, or viewport so that all of the content can be viewed, even if only a fraction of the content can be seen on a device's screen at one time.

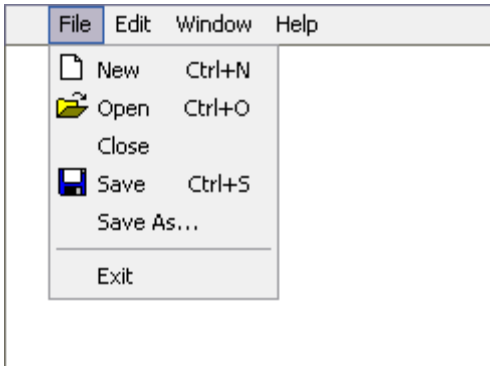


7. Explain in detail, functions of Menus with example

A menu's structure defines the amount of control given to the user in performing a task. The most common structures are the following. Single menus conceptually require choices from this single menu only, and no other menus will follow necessitating additional user choices.

"The primary goal for menu, form-fillin, and dialog-box designers is to create a sensible, comprehensible, memorable, and convenient organization relevant to the user's task."

- It helps customer to know range and list of food and beverage available in service outlet.
- It also helps service staff to know the type of dish outlet will be serving.
- Guest can know details of dish like accompaniment served , garnish , ingredients used.
- Customer can order according to their budget.
    - Pull-down menus
        - Always available to the user by making selections on a top menu bar
    - Pull-down menus (cont.)
        - Key board shortcuts
            - E.g., Ctrl-C important to support expert user efficiency
        - Toolbars, iconic menus, and palletes
            - Offers actions on a displayed object
        - Pop-up menus
            - Appear on a display in response to a check or tap with a pointing device.



- Menus for long lists
    - Scrolling menus, combo boxes, and fisheye menus
        - Scrolling menus display the first portion of the menu and an additional menu item, typically an arrow that leads to the next set of items in the menu sequence.
        - Combo boxes combine a scrolling menu with a text-entry filed.

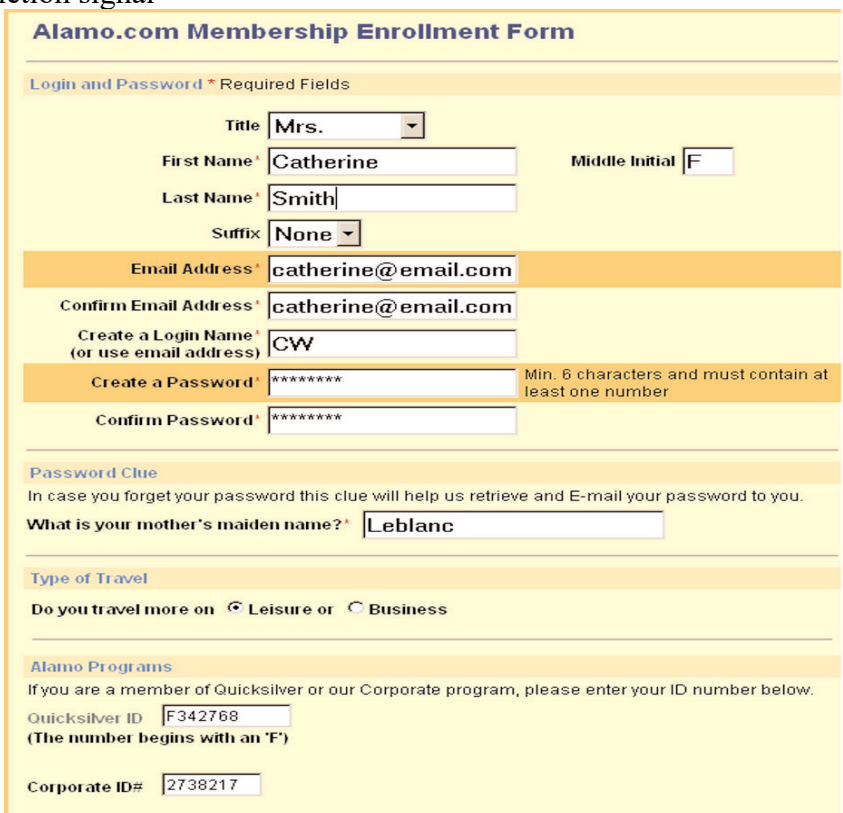
Fisheye menus display all of the menu items on the screen at once, but show only items near the cursor at full size

- Menus for long lists (cont.)
    - Sliders and alphasliders
        - When items consist of ranges or numerical values, a slider is a natual choice to allow the selection of a value.
        - The alphaslider uses multiple levels of granularity in moving the slider thumb and therefore can support tens or hundreds of thousand of items.

- Linear menu sequences and simultaneous menus
    - Linear
        - Guide the user through complex decision-making process.
            - E.g. cue cards or "Wizards"
        - Effective for novice users performing simple tasks
    - Simultaneous
        - Present multiple active menus at the same time and allows users to enter choices in any order

8. Explain the guidelines for form fill in with example

- **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

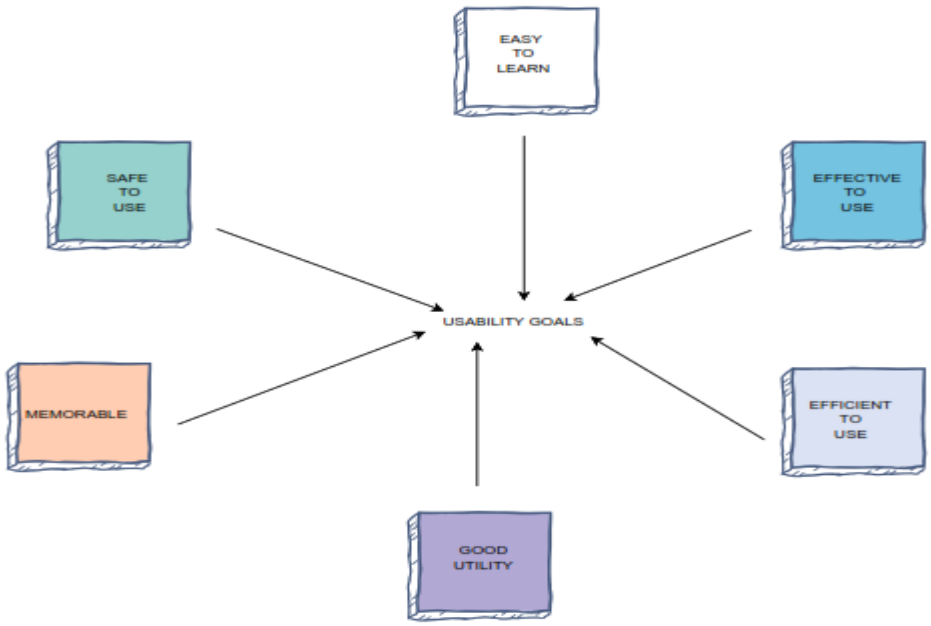


- **Format-specific field**
  - **Coded fields**
    - Telephone numbers
    - Social-security numbers
    - Times
    - Dates
    - Dollar amounts (or other currency)
  - External Relationship
    - Smooth appearance and disappearance
    - Distinguishable but small boundary
    - Size small enough to reduce overlap problems
    - Display close to appropriate items
    - No overlap of required items
    - Easy to make disappear
    - Clear how to complete/cancel
- **Novel design combining menus and direct manipulation**
  - Pie menus
  - Control menus
  - Marking menus
  - Flow menus
  - Toolglass

9. Describe how to use 3D Technology for user interface design ,Usability goals, Online tutorials, Legal issues of user interface.

A. Usability goals are concerned with how useful and easy it is to use a product or system. When we design a product, we consider usability goals in order to ensure that the product delivers the expected solution to the identified problem.

There are 6 main usability goals that establish the standard:



The 6 usability goals

1. Easy to learn: This goal refers to how easy a system is to learn. When a product is designed, it must be evaluated to see if anyone can easily learn how to use the new product.

2. Safe to use: Digital products must be designed to ensure user safety and security. No harm should come to the user from using the product.

3. Effective to use: The effectiveness goal refers to how good a system is at doing what it is supposed to do. This particular goal evaluates the solution that a product provides, as compared to the identified problem. The effectiveness goal ensures that the product solves the problem for which it was designed.

4. Efficient to use: The efficiency goal refers to the way a system supports users in carrying out tasks. This goal helps to ensure the product performs the task in a way that minimizes time and other essential resources that may be required.

5. Good utility: This goal refers to the extent to which the system provides the correct functionality so that users can do what they need or want to do.

6. Memorable: How easy a system is to remember to use is a key goal in usability. This goal ensures a system can be used over and over again with ease once a user has learned to use it, and does not require the user to relearn how to use the product each time.

B. An online tutorial is a self-study activity designed to teach a specific learning outcome. They are usually delivered via Blackboard but can also be made available via the Internet or on a DVD.

Recorded tutorials are video or screencast recordings, typically of a subject expert presenting information and ideas or giving a demonstration. *Interactive tutorials* are a structured collection of navigable web pages. Individual pages can contain any combination of text, images, audio, video, self-test questions and other interactive activities.

C. Legal issues of user interface : It is well recognised fact that GUI has become an emerging area for countries to contribute to the economy by investing in the technology driven smart devices and its protection as an intellectual property. In the recent years, there can be seen an incredible growth in the use of GUI incorporated devices and so in the legal battles.

GUI can be protected under *Copyright, Trade Dress, Patents and Design Rights under different jurisdiction.* Overlapping of protection is not the issue as each IP is independent in its nature and has different eligibility criteria.

India being a developing nation is still reluctant to protect GUI under India Designs Act, 2000 because the nature of GUI does not establish the eligibility criteria required for acquiring design rights.

The legal situation is unsettling and creating lacunas in the area of protection of interfaces that is promoting the economical and technological texture of every nations of the world.

10. Demonstrate how Virtual Reality(VR) and Augmented Reality (AR) is supportive for GUI Design.

This allows designers to create experiences not limited by the physical constraints of the natural world, such as a virtual museum tour or a 360-degree view of a product. Both AR and VR have the potential to enhance the user experience significantly and can be powerful tools in the hands of skilled designers.

The term ‘augmented’ denotes an increase in quantity, value, or size of something. Augmented reality (AR) refers to an enhanced version of the physical world, achieved through the use of digital visual elements, sound, or other sensory stimuli delivered via technology.

n computing, the term ‘virtual’ refers to a digitally replicated version of something that exists in the real world. Virtual Reality (VR) is a computer-generated environment that features realistic scenes and objects, immersing the user in a simulated world. This environment is experienced through a device called a Virtual Reality headset or helmet.

AR is a technology that overlaps digital information onto the physical world, while VR creates a simulated digital environment.

Both AR and VR have the potential to enhance the user experience significantly and can be powerful tools in the hands of skilled designers.

Applications: AR is often used in areas such as advertising, marketing, and education, where users can interact with real-world objects in new ways. VR is commonly used in gaming, training simulations, and virtual tours where users can explore new environments and experiences.

Design: AR and VR require specialized design skills to create engaging and immersive user experiences. UI/UX designers must consider various factors such as user interaction, 3D modeling, and animation to create compelling AR/VR experiences.