Total No. of Questions : 8]

SEAT No. :

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[Total No. of Pages : 2

[6181] - 401

B.E. (Electronics and Computer Engineering)

HUMAN COMPUTER INTERFACE

(2019 Pattern) (Semester - VII) (410345 B) (Elective - IV)

Time : 2 ½ Hours]

[Max. Marks : 70

Instructions to the candidates:

1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q8.*
2) *Neat diagrams must be drawn whenever necessary.*
3) *Figures to the right side indicate full marks.*
4) *Assume suitable data if necessary.*

Q1) a) Explain following WIMP interface elements with respect to any text editor. **[6]**

- Icons
- Menus
- Toolbars
- Dialog boxes

b) What is Ergonomics? List and explain different disciplines of Ergonomics. **[6]**

c) Describe different interaction styles used to accommodate dialog between user and computer. **[6]**

OR

Q2) a) Explain theory of User experience by Honeycomb Model. **[6]**

b) Explain paradigms of Interaction design. **[6]**

c) Explain the context of interaction with an example? **[6]**

Q3) a) What is a prototype? Explain different types of prototyping techniques in detail. **[9]**

b) List out five main design frameworks in HCI. Explain Wire framing and MVC framework in detail. **[8]**

OR

P.T.O.

Q4) a) Explain UI layer and its execution framework. **[9]**

b) What are different types of scenarios? Write scenarios for purchasing an airline ticket. **[8]**

Q5) a) Discuss Shneiderman's 8 golden rules of interface design with an example. **[9]**

b) What are the goals of evaluation? Explain Evaluation through Expert Analysis. **[8]**

OR

Q6) a) What is Usability? Explain the principles that support Usability. **[9]**

b) Explain Nielsen's ten heuristics. **[8]**

Q7) a) Explain Keystroke-Level-Model (KLM). **[9]**

b) Discuss applications meant for computer-mediated communication. **[9]**

OR

Q8) a) A Hierarchical Task Analysis (HTA) provides an understanding of the tasks users need to perform to achieve a certain goal. Perform HTA of the task to cook food(rice). Illustrate using diagram. **[9]**

b) List out different Diagrammatic Dialog Design notations. Explain State Charts with an example. **[9]**

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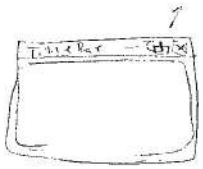
Unit 3-Understanding the interaction



→Describe WIMP Interface in detail.

i)WIMP stands for Windows, Icons, Menus, and Pointers.

ii)It refers to a style of graphical user interface (GUI) that became popular in the 1980s and is still widely used today.

iii)The WIMP interface is characterized by its use of visual elements and interactive components to facilitate user interaction with a computer system.

iv)The WIMP interface has become a standard in modern computing due to its intuitive and user-friendly design.

v)Here's a detailed breakdown of each component:

vi)Windows:Windows are graphical containers that represent open applications or documents on the computer screen. Each window typically has a title bar, borders, and can be resized, minimized, or maximized.Multiple windows can be open simultaneously, allowing users to work with different applications or documents concurrently.

vii)Icons:Icons are small, graphical representations of files, folders, applications, or actions. They are often used to visually represent objects or actions that users can perform.Users can interact with icons by clicking, dragging, or double-clicking on them to initiate specific actions, such as opening a file or launching an application.

viii)Menus:Menus are lists of commands or options that are presented to the user. They are typically accessed through a menu bar at the top of the screen or by right-clicking on an object.Menus provide a hierarchical structure of options, allowing users to navigate through different levels to find the command they want. Common menu types include file menus, edit menus, and view menus.

ix)Pointers:The pointer is a graphical element, often in the form of an arrow, that is controlled by a mouse or other pointing device. It is used to interact with objects on the screen, such as clicking on icons, buttons, or menu items.The pointer can change its appearance based on the context, indicating different actions that can be performed, such as clicking, dragging, or resizing.

→Explain WIMP interface elements. State advantages and disadvantages of WIMP interface.

A] Advantages of WIMP interface:-

i)User-Friendly Interaction: WIMP interfaces are designed for intuitive and user-friendly interactions, enhancing accessibility for a broad audience.

ii)Visual Representation: The use of icons provides a visual and easily recognizable way to organize and access information, improving user understanding.
iii)Multitasking: WIMP interfaces support multitasking, allowing users to run multiple applications simultaneously in separate windows.
iv)Consistency: WIMP interfaces enforce a consistent look and feel across applications, reducing the learning curve when transitioning between software programs.
v)Point-and-Click Interaction: The use of pointers and click-based interactions simplifies user actions, making computing more accessible.
B] Disadvantages of WIMP interface:-
i)Learning Curve: Despite user-friendliness, there can be a learning curve, especially for new users unfamiliar with graphical interfaces.
ii)Dependency on Hardware: WIMP interfaces rely on specific hardware components like mice, potentially limiting accessibility on devices lacking these input methods.
iii)Limited Efficiency for Expert Users: Experienced users may find WIMP less efficient than keyboard-based interfaces, slowing down tasks.
iv)Screen size: Managing numerous open windows on small screens can lead to clutter and hinder productivity.
v)Resource Intensive: Graphical interfaces, including WIMP, can be resource-intensive, impacting performance on older or less powerful hardware.

→Explain the following WIMP interface elements with respect to any text editor.
a. Icon b.Menus c. Toolbars d. Dialog boxes
A]Icon:-
i)Icons are small graphical representations that symbolize a specific function or feature in a software application.
ii)In a text editor, icons might represent common actions like save, open, cut, copy, paste, etc.
iii)For example, a floppy disk icon could represent the save function, and a pair of scissors could represent the cut function.
B]Menus:-
i)Menus are lists of commands or options that are typically organized hierarchically.
ii)Users can select an option from the menu to perform a specific action.

iii)Text editors have menus with options like File (for operations like opening, saving, and printing), Edit (for actions like cut, copy, paste), View (for changing how the text is displayed), and more.

C]Toolbars:-

i)Toolbars are rows or columns of icons or buttons that provide quick access to commonly used functions or features. They often sit just below the menu bar.

ii)In a text editor, toolbars may include icons for actions like save, open, cut, copy, paste, and others.

iii)Users can click these icons to perform tasks without going through the menus, providing a more efficient way to access frequently used functions.

D]Dialog boxes:-

i)Dialog boxes are pop-up windows that prompt the user for input or to make choices among various options.

ii)Dialog boxes in a text editor might appear when, for example, the user wants to save a file and needs to specify the file name and location.

iii)They can also appear for actions like opening a file or searching for text within the document.

→Explain different Interaction styles. Specify Advantages and disadvantages of each interaction style.

Interaction styles refer to the ways in which users interact with computer systems or software applications. Different interaction styles are designed to cater to various user needs and preferences.Here are several common interaction styles-

A]Command Line Interface (CLI):

i)Advantages:Efficiency: Experienced users often find CLI to be faster for certain tasks, as they can type commands directly.Resource Efficiency: CLI tends to be less resource-intensive compared to graphical interfaces.

ii)Disadvantages:Learning Curve: For new users, CLI can be intimidating and has a steeper learning curve.Limited Discoverability: Commands and their options may not be immediately familiar to users, requiring memorization or reference to documentation. Reduced Accessibility: Users with limited command-recall abilities may find CLI challenging.

B]Graphical User Interface (GUI):

i)Advantages:Simplicity: GUIs are generally more easy and user-friendly, making them accessible to a broader audience, including non-technical users.Visual Representation: Information is presented visually, making it easier to understand complex data.

ii)Disadvantages:Resource Intensive: GUIs can be more resource-intensive compared to CLI, consuming more memory and processing power.Customization Limitations: GUIs may limit customization options compared to CLI, which can be a drawback for power users.

C]Natural Language Interface:

i)Advantages:User-Friendly: Allows users to interact with the system using natural language, making it accessible to a broad audience.Reduced Learning Curve: Users don't need to learn specific commands; they can communicate in a more familiar manner.

ii)Disadvantages:Ambiguity: Natural language can be ambiguous, leading to misunderstandings or misinterpretations by the system.Development Complexity: Building a robust natural language interface can be challenging and may require sophisticated natural language processing capabilities.

D]Menu-Based Interface:

i)Advantages:Structured Interaction: Menus provide a structured way for users to navigate and select options.Discoverability: Users can easily discover available options without memorizing commands.Reduced Error Rates: Since users choose from predefined options, the likelihood of errors is reduced.

ii)Disadvantages:Limited Flexibility: Menus may not cover all possible actions or configurations, limiting flexibility for advanced users.Space Consumption: In complex applications, extensive menus can consume a significant amount of screen space.

→Explain Models of interaction.

Models of interaction are conceptual frameworks that describe how users interact with computer systems or software applications.

A]Command-Line Interaction Model:

i)In this model, users interact with the system by typing textual commands into a command-line interface (CLI).

ii)Users enter specific commands to perform actions.

B]Menu-Based Interaction Model:

i)Users interact with the system by choosing options from predefined menus.

ii)Provides a structured set of choices.

C]Natural Language Interaction Model:

i)Users interact with the system using natural language, similar to how they would communicate with another person.

ii)Requires sophisticated natural language processing (NLP) capabilities.

D]GOMS (Goals, Operators, Methods, and Selection Rules) Model:

i)GOMS is a cognitive model that analyzes human-computer interaction in terms of goals, operators, methods, and selection rules.

ii)Focuses on predicting the time required for users to perform specific tasks.

E]Form-Fill Interaction Model:

i)Users interact with the system by completing forms, entering data into fields, and submitting information.

ii)Often used for tasks involving data collection or submission.

F]Direct Manipulation Interaction Model:

i)Users interact with the system by directly manipulating on-screen objects or elements.

ii)Users perform actions through direct gestures (e.g., dragging, clicking, resizing).

→Explain the execution and evaluation cycle.

i)The execution and evaluation cycle is a fundamental process in the development and improvement of computer systems, software applications, or any interactive systems.

ii)This cycle involves the execution of the system or application, followed by an evaluation of its performance, usability, and other relevant factors.

iii)This is a repetitive process that helps identify areas for improvement and refinement.

iv)This cycle is often referred to as an iterative or cyclic process, emphasizing the continuous nature of system development and improvement.

v)It ensures that systems evolve to meet user expectations, technological advancements, and changing business needs.

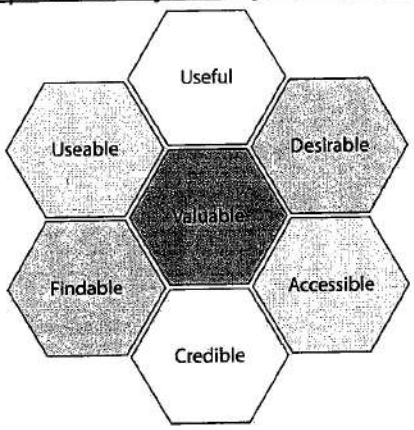
vi)The execution and evaluation cycle is integral to achieving a user-friendly, reliable, and efficient system.

vii)It begins with planning, where goals are set. Design and implementation follow, with testing ensuring functionality.

viii)Deployment introduces the system to users, and ongoing monitoring and maintenance address issues

ix)Iterative improvements are made based on feedback, creating a cycle of continuous refinement and enhancement.

→Explain theory of User experience by Honeycomb Model.



i)Useful:The system or product should offer value and serve a purpose, addressing the users' needs. A useful website provides relevant and accurate information that fulfills the user's objectives.
ii)Usable:The design must be easy to use and navigate, minimizing the effort required to accomplish tasks. An easy-to-navigate interface with clear labels and intuitive interactions enhances usability.
iii)Findable:Users should be able to locate information or elements within the system quickly and easily.Clear navigation, effective search functionality, and well-organized content enhance findability.
iv)Credible:Users should trust the information and feel confident in the reliability of the system.Displaying author credentials, citing sources, and maintaining a professional design contribute to credibility.
v)Accessible:The system should be accessible to users of all abilities, ensuring inclusivity.Providing alternative text for images, using accessible color contrasts, and accommodating keyboard navigation contribute to accessibility.
vi)Desirable:The design should create a pleasant experience for users.Visual aesthetics, branding, and engaging content contribute to a desirable user experience.
vii)Valuable:The user experience should bring value to both the user and the business or organization.Offering features or services that meet user needs while aligning with the business goals adds value to the overall experience.

→What is the Context of interaction? Explain with example.
i)The context of interaction in the field of human-computer interaction (HCI) refers to the circumstances, environment, and conditions in which users interact with a system or application.

ii)It involves understanding the specific context or setting in which the user and the technology come together.
iii)This context plays a crucial role in influencing the user experience and the effectiveness of the interaction.
iv)Example: Mobile Weather Application:- Consider a mobile weather application that provides real-time weather information to users. The context of interaction includes various factors:
v)Location: The user's geographical location is a critical factor. The weather information presented should be relevant to the user's current location to meet their immediate needs.
vi)Time of Interaction: The time of day or night influences the type of information the user may be interested in. For example, they might want to know the forecast in the morning to plan their day or check the evening temperature before going out at night.
vii)Weather Conditions: The current weather conditions, such as sunny, rainy, or snowy weather, impact the user's requirements. For instance, users might be interested in rain forecasts if it's cloudy.
viii)Device Used: Whether the user is accessing the application on a smartphone, tablet, or smartwatch can affect the interface design. Screen size may affect.
ix)User's Activity: If the user is outdoors, the app might need to prioritize simple and easily readable information. If the user is at home planning the week, more detailed forecasts and additional features might be valuable.

→Describe Paradigms of Interactions.
i)Interactions between users and computer systems have evolved over time, and different paradigms of interaction have emerged.
ii)Each paradigm represents a distinct approach to how users engage with technology.
iii)Command-Line Interface (CLI) Paradigm
iv)Graphical User Interface (GUI) Paradigm
v)Natural Language Interface Paradigm
vi)Touchscreen Paradigm:Users interact with the system through touch-sensitive displays, commonly found in smartphones and tablets.
vii)Gesture-Based Paradigm:Users interact with the system using hand or body movements detected by sensors. Eg Gaming consoles
viii)Augmented Reality (AR) Paradigm:Users experience a blend of the physical and virtual worlds, with digital information overlaid on the real environment.

ix)Virtual Reality (VR) Paradigm:Users interact with a computer-generated environment using VR devices.

→What is Ergonomics? List and explain the various disciplines of Ergonomics?
i)Ergonomics, also known as human factors engineering, is the scientific discipline that focuses on designing systems, products, and environments to optimize the interaction between humans and their work.
ii)It aims to enhance performance, comfort, and well-being while minimizing the risk of injuries or errors.
iii)Ergonomics considers factors such as physical, cognitive, and organizational aspects of human activity. Here are some key disciplines of ergonomics:
iv)Physical Ergonomics:Deals with the human body's physical aspects, such as posture, movement, and muscle activity.
v)Cognitive Ergonomics:Examines mental processes like perception, memory, decision-making, and problem-solving in relation to human-computer interaction.Design of user interfaces, software, and information displays to enhance cognitive performance and reduce mental workload.
vi)Organizational Ergonomics:Examines organizational structures, policies, and culture to optimize efficiency, communication, and employee well-being. Design of work processes, team structures, and organizational policies to improve overall system performance.
vii)Environmental Ergonomics:Considers the impact of environmental factors, such as temperature, lighting, and noise, on human performance.Design of workspaces and environments to optimize comfort, safety, and productivity.
viii)Safety Ergonomics:Addresses the prevention of accidents, injuries, and hazards in the workplace.Design of safety protocols, equipment, and procedures to reduce the risk of accidents and injuries.
ix)Healthcare Ergonomics:Addresses ergonomic issues in healthcare settings, considering the well-being of both healthcare professionals and patients.Design of medical equipment, hospital layouts, and work processes to enhance efficiency and reduce the risk of injuries.

→Elaborate Ergonomics in understanding the interaction
i)Ergonomics, in the context of understanding human-computer interaction and the broader interaction between humans and their environments, is crucial for creating designs and systems that optimize user experience, performance, and well-being.

ii)Ergonomics emphasizes a user-centered design approach, focusing on the needs, capabilities, and preferences of the end-users.
iii)It considers the physical aspects of human interaction, including posture, movement, and muscle activity.
iv)Investigates mental processes such as perception, memory, decision-making, and problem-solving in relation to interaction with technology.
v)By applying ergonomic principles, designers can create interactions that are efficient, effective, and align with the natural capabilities and preferences of the users.

→How does making a call differ when using i. cell phone ii. Smart phone? Consider the kinds of user, type of activity, and context of use.

Cell Phone	Smartphone
User:-Often users that prioritize simple communication.	User:-Attracts users seeking advanced features.
Type of activity:- Voice calls and basic texting.	Type of activity:- Calls, Messaging, Internet browsing, apps, multimedia.
Context of Use:-Typically used for communication on the move.	Context of Use:-Used in diverse contexts reflecting its multifunctional nature.
User Preferences:-Appeals to users prioritizing simplicity.	User Preferences:-Attracts users seeking a comprehensive, all-in-one device.
Features and Capabilities:-Limited to basic communication features.	Features and Capabilities:- Encompasses advanced features, apps, and internet connectivity.

Unit 4-HCI design process

→What is a prototype? Explain different types of prototyping techniques in detail.

i)A prototype is a preliminary version of a product or system that is used for testing, evaluation, and feedback before the final version is developed.

ii)Prototypes can be physical models or digital representations, and they help stakeholders visualize, interact with, and understand the proposed design.

iii)There are various prototyping techniques, each serving different purposes and stages in the design and development process. Here are some common types :-

iv)Paper Prototyping:Hand-drawn sketches or printouts are used to represent interface elements and interactions. Facilitates early-stage feedback on overall design concepts. Quick and cost-effective.

v)Wireframe Prototyping:Basic, static representations of the user interface, often created using software tools. Allows for quick visualization of content placement. Focuses on layout and structure.

vi)Interactive Prototyping:Digital prototypes with interactive elements that simulate user interactions and navigation. Provides a more realistic representation of the final product. Enables user testing and feedback on navigation and functionality.

vii)Functional Prototyping: A prototype that includes functional components, offering a closer representation of the final product. Suitable for assessing technical feasibility. Allows for testing of specific functionalities.

viii)Evolutionary Prototyping: A prototype that evolves over time, with continuous refinement based on user feedback. More suitable for long-term projects. Allows for ongoing improvements.

ix)Virtual Reality (VR) Prototyping: Prototypes created in a virtual environment, allowing users to experience and interact with the design in 3D. Enables realistic testing in a simulated environment. Requires specialized equipment.

→List out five main design frameworks in HCI.Explain Wire framing and MVC framework in detail.

A]Five main design frameworks in HCI:-

i)User-Centered Design (UCD): Focuses on involving end-users throughout the design process to ensure products meet their needs and expectations. Iterative design, user feedback, usability testing.

ii)Activity-Centered Design (ACD): Centers design around the activities or tasks users perform, emphasizing workflow and efficiency. Task analysis, workflow optimization, user engagement.
iii)Experience-Centered Design (ECD): Prioritizes creating positive and memorable user experiences. Emotion, aesthetics, user satisfaction.
iv)Interaction Design (IxD): Focuses on designing interactive systems, emphasizing the interface and user interactions. Usability, user interface design, interaction patterns.
v)Participatory Design (PD): Involves users and stakeholders as active participants in the design process. Collaboration, co-creation, shared decision-making.
B]Wireframing:-
i)Wireframing is a visual representation of the skeletal structure of a website or application.
ii)It outlines the basic layout, structure, and elements on a page without including design details like colors and graphics.
iii)It serves as a blueprint for the final design, helping designers and stakeholders visualize the overall structure and user interface.
iv)Quick and cost-effective way to communicate design ideas.
v)Represents the basic layout of pages, including headers, footers, and content areas.
C]MVC Framework:-
i)MVC is a software design pattern that separates an application into three interconnected components: Model, View, and Controller.
ii)It is widely used in web and application development to enhance maintainability, scalability, and reusability of code.
iii)Model:Represents the application's data and business logic. Manages data storage, retrieval, and processing.
iv)View:Represents the user interface and presentation layer. Displays information to users and captures user input.
v)Controller:Acts as an intermediary between the Model and View.Handles user input, updates the Model, and manipulates the View accordingly.

→Explain UI layer and its execution framework.
A] UI Layer:-

i)The UI (User Interface) layer, also known as the presentation layer, is a crucial component in software architecture that deals with the visual representation of the application and the interaction with users.
ii)It encompasses everything users see and interact with on the screen, including buttons, forms, menus, and other graphical elements.
iii)The UI layer aims to provide a user-friendly and aesthetically pleasing experience.
iv)Defines the arrangement and appearance of UI components, ensuring a cohesive and visually appealing design.
v)Manages how users interact with the application, handling input events like clicks, taps, and keyboard input.
B] Execution framework:-
i)Its execution framework manages the flow of the user interface and handles user inputs.
ii)The framework facilitates communication between the UI and other layers of the application.
iii)Common UI execution frameworks include Angular, React, and Vue.js for web applications.
iv)These frameworks enable the creation of responsive and dynamic user interfaces. It plays a crucial role in providing a seamless and intuitive user experience.
v)In summary, the UI layer and its execution framework are essential for building user-friendly and visually appealing software interfaces.

→What are different types of scenarios? Write scenarios for purchasing an airline ticket.
i)Normal Scenario:User selects the desired destination and travel dates.The system displays available flights with corresponding prices. User chooses a specific flight and provides passenger details. The system confirms the booking and issues the ticket.
ii)Error Scenario:User enters invalid date or destination. The system prompts an error message and guides the user to correct the input. User attempts to book a flight that is already full. The system notifies the user of unavailability and suggests alternative flights.
iii)Cancellation Scenario:User decides to cancel a booked ticket. The system verifies cancellation eligibility and processes the refund if applicable. Confirmation message is displayed, and the ticket status is updated.

iv)Payment Failure Scenario:User enters payment details, but the transaction fails. The system provides an error message and suggests alternative payment methods. User successfully completes the payment process. The system confirms the booking and issues the ticket.
v)Seat Selection Scenario:User chooses to select specific seats during the booking process. The system displays a seat map and allows the user to pick preferred seats. Confirmation of seat selection is integrated into the final booking.
vi)Last-Minute Booking Scenario:User searches for available flights on short notice. The system displays last-minute options with associated prices. User quickly selects a suitable flight and completes the booking process.
vii)Multi-City Travel Scenario:User plans a trip with multiple destinations. The system accommodates the multi-city itinerary and provides appropriate flight options. User confirms the selections for each leg of the journey.
viii)Mobile Booking Scenario:User accesses the airline's mobile app to book a ticket. The mobile interface facilitates a seamless booking experience. Confirmation details are sent to the user's mobile device.
ix)Check-in Scenario:After booking, the system prompts the user to check in. User provides necessary details for check-in. The system generates a boarding pass, completing the pre-flight process.

→Explain the constraints of the software design process framework in HCI.
i)Time Constraints:Designers may face deadlines that limit the time available for comprehensive user research and iterative design, impacting the depth of the design process.
ii)Budget Constraints:Financial limitations may restrict the resources allocated to user testing, prototyping, or the implementation of advanced features, influencing the overall design quality.
iii)Technological Constraints:The available technology may impose limitations on the design, affecting factors such as responsiveness, compatibility, and overall user experience.
iv)Platform Constraints:Designers must consider the platform on which the software will run (e.g., mobile devices, web browsers), adapting the design to fit the platform's capabilities and constraints.
v)Accessibility Constraints:Designers need to adhere to accessibility standards to ensure that the software is usable by individuals with disabilities, introducing additional design considerations and constraints.

vi)Cultural and Ethical Constraints:Cultural differences and ethical considerations may limit certain design choices to ensure that the software is culturally sensitive and ethically responsible.
vii)Compliance Constraints:Designers must adhere to legal and industry regulations, which may impose constraints on data handling, security measures, and other design aspects.
viii)Device Limitations:Designers need to account for variations in devices and screen sizes, ensuring a consistent and effective user experience across different devices.
ix)Security Constraints:Security requirements may limit certain design choices to prevent vulnerabilities and safeguard user data, introducing constraints related to authentication, authorization, and data protection.

→Explain hill climbing approach with prototyping.
i)Hill climbing is an optimization algorithm used in the software design process.
ii)It involves making incremental improvements to a solution, continually moving towards the most optimal state.
iii)In the hill climbing approach with prototyping, each prototype represents a "hill" or a potential solution in the design space.
iv)The prototype is evaluated through user testing and feedback, identifying strengths and weaknesses. Incremental changes are made to the prototype, climbing the metaphorical "hill" towards a more optimal design.
v)Feedback from users is collected after each prototype iteration, guiding the direction of subsequent adjustments.
vi)The design undergoes continuous refinement based on user feedback and evaluation results.
vii)The optimization targets in hill climbing with prototyping could include usability, user satisfaction, efficiency, or any other relevant design objectives.
viii)The hill climbing approach may converge towards an optimal design if successive iterations consistently improve the solution.
ix)Hill climbing with prototyping promotes continuous improvement, allowing designers to navigate the design space and lead towards an increasingly refined and optimal solution.

→What are different types of scenarios? Write scenario for music player design.

i)Normal Scenario:User opens the music player. The system displays the user's music library. User selects a song, and the music begins playing with controls available.

ii)Error Scenario:User attempts to play a corrupted or unsupported file. The system prompts an error message and skips to the next playable track.

iii)Playlist Creation Scenario:User creates a new playlist. The system allows the user to add and remove songs from the playlist. The user saves the playlist for future playback.

iv)Shuffle Mode Scenario:User activates shuffle mode for a playlist or the entire library. The system randomizes the playback order for a dynamic listening experience.

v)Search and Play Scenario:User searches for a specific artist or song. The system displays search results, and the user plays the desired selection.

vi)Offline Mode Scenario:User switches to offline mode to play downloaded music. The system provides seamless playback without an internet connection.

vii)Equalizer Adjustment Scenario:User accesses the equalizer settings. The system allows the user to customize audio settings for a personalized listening experience.

viii)Lyrics Display Scenario:User selects a song, and the system displays synchronized lyrics. The lyrics scroll in real-time with the playback for sing-along.

ix)Multi-Device Sync Scenario:User switches playback from one device to another. The music player syncs the playback position and settings across devices seamlessly.

→What is interaction design? Explain screen design process.

A] Interaction Design:-

i)Interaction design is the process of creating meaningful and efficient interactions between users and digital products or systems.

ii)It involves designing the user interface, considering how users will interact with the system and ensuring a positive and intuitive user experience.

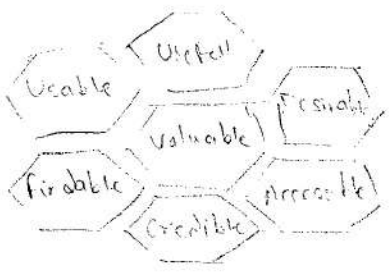
iii)Interaction designers focus on aspects such as usability, accessibility, and overall user satisfaction.

B] Screen Design Process:-

i)The screen design process involves creating the visual layout and appearance of a user interface. Here's a brief overview:

ii)Research and Analysis:Understand the target audience, user needs, and the context of use. Analyze competitors and existing design trends.
iii)Define User Flow: Outline the user's journey through the interface, determining key tasks and interactions. Define the information architecture and navigation structure.
iv)Sketching and Wireframing: Create rough sketches or wireframes to visualize the basic layout and structure of the screen.
v)Prototyping:Develop interactive prototypes to simulate the user experience.
vi)Visual Design:Apply the brand's visual identity, including color schemes, typography, and imagery. Ensure visual consistency across all screens for a cohesive look.
vii)Responsive Design: Optimize the layout for different screen sizes and devices. Test and adjust the design to ensure responsiveness and adaptability.
viii)User Testing: Conduct usability testing with real users to identify any issues in the design. Gather feedback on the visual appeal, usability, and overall user satisfaction.
ix)Iterative Refinement: Based on user feedback and testing results, refine the screen design.

→Elaborate Model-View-Controller(MVC) Framework.
i)Model:Represents the application's data and business logic. Manages the data, responds to requests for information, and updates the controller if the data changes.It is responsible for the data validation, business rules, and database interactions.
ii)View:Represents the user interface and presentation of the application. Displays information from the model to the user and sends user inputs to the controller.
iii)Controller:Acts as an intermediary between the model and the view. Receives user inputs from the view, processes them, and updates the model accordingly. Handles user interactions, business logic, and updates the view with changes in the model.
iv)Flow of Control: User interacts with the view by providing input. The view forwards the input to the controller. The controller processes the input, updates the model, and may choose a new view. The updated model is reflected in the view.
v)The modular structure of MVC promotes the reuse of code.



vi)MVC enforces a clear separation of concerns, ensuring that each component has a distinct role.
vii)The MVC pattern supports scalability as different components can be developed and scaled independently.
viii)MVC is widely used in web development frameworks (e.g., Ruby on Rails, Django, Spring MVC) to structure the code and enhance maintainability in large-scale applications.

→Describe Navigation Design
i)Navigation design involves planning and creating the structure, organization, and presentation of information within a system to facilitate user movement and interaction.
ii)Ensure intuitive and user-friendly navigation. Help users understand the system's structure and find information efficiently.
iii)Linear Navigation: Sequential movement through a series of steps, often used in wizards or guided processes.
iv)Hierarchical Navigation: Organized in a tree-like structure with parent and child pages.
v)Web-Like Navigation: Hyperlinked structure similar to web navigation, often seen in content-rich applications.
vi)It has elements such as Menu, Tabs, Icons and Breadcrumbs.
vii)Provide visual feedback to enhance user understanding of interactions.
viii)Include search and filtering options for quick content access.
ix)User testing and feedback are essential for iterative navigation design improvements.

→What is interaction design? Explain software design process.
A] Software Design Process:-
i)Identify and understand the needs and specifications of the software through discussions with stakeholders.
ii)Develop an architectural blueprint that defines the system's structure, components, and their relationships.
iii)Specify each component's functionalities, including algorithms, data structures, and interfaces.
iv)If applicable, design the database structure, defining tables, relationships, and data storage mechanisms.

v)Create the visual layout and interactions of the user interface based on user experience principles.
vi)Conduct various testing phases (unit testing, integration testing, system testing) to ensure the software meets requirements.
vii)Release the software to users, whether it's for internal use or public release.
viii)Monitor and maintain the software post-deployment, addressing bugs, adding new features, and making necessary updates.

→What is the need of MVC pattern? Draw figure and explain.
i)Separation:MVC pattern ensures a clear division of responsibilities among Model, View, and Controller components.
ii)Code Reusability:Components like Models and Controllers can be reused across different Views, promoting efficient development.
iii)Ease of Maintenance:The modular structure reduces the impact of changes on other components, making maintenance more straightforward.
iv)Scalability:Independent development of components supports scalability, allowing for the addition of new views or controllers without affecting the existing structure.
v)Parallel Development:Different teams or developers can work concurrently on separate components, accelerating overall project progress.
vi)Flexibility: Different technologies or frameworks can be employed for each component, providing flexibility in technology choices.
vii)Adaptability to Change:MVC accommodates changing requirements by allowing modifications to the user interface or the addition of new features without affecting the entire system.
viii)Testing and Debugging:Independent components simplify unit testing, making it easier to identify and resolve issues during debugging.

→Write a short note on 'Golden rule of Design
Also called Ben Shneiderman's Eight Golden Rules
i)Strive For Consistency: Consistency can be achieved through elements such as fonts, color, shape, and position being consistently the same in all menus & screens, across categories for a particular software.The sequence of actions that we perform must be in a similar situation.
ii) Seek Universal Usability:The needs of diverse users must be recognized for facilitating the transformation of content.While designing make sure you keep in

mind various audiences ranging from different expertise, ages, disabilities, and international variations.

iii)Offer Informative Feedback:Proper feedback should be provided for every user action. Interfaces not just being communicative but also need to help users in terms of learning and feedback which tells them that they are moving in the right direction.

iv)Design Dialogs To Yield Closure: The sequence of actions must be organized clearly into beginning, middle, and end phases.Providing feedback to the user after the completion of a group of actions gives the user satisfaction of accomplishment, and a sense of relief, and prepare for the next group of actions.If we consider an example of an e-commerce website that provides users with clear information from selecting a product to the checkout ending with clear information.

v)Prevent Errors:Make sure the user interface is as user-friendly as possible. such that the user doesn't make any serious errors.For example, if a user is filing a form and if he types an invalid captcha or pin code then he should be redirected to update only the specific mistake and all other details must be saved and need not be entered again.

vi)Permit Easy Reversal Of Actions: The interactions must be built such that retracing backward or reverse of actions can be performed which gives flexibility to users to explore new options.Make sure the actions are as much as reversible. such that the user doesn't feel anxiety, as the user knows that errors can be undone, and helps the user to explore unfamiliar options.

vii)Keep Users In Control: Allow users to always feel 'in control' of the system and of the situation. Make the user aware that he/she is in control.Users should believe that they are controlling the system and not the way around.

viii) Reduce Short-Term Memory Load:As Humans have a limited capacity for Information processing in short-term memory. The interface design must be in such a way that it should not force users to remember huge amounts of information

Unit 5-HCI design rules, guidelines and evaluation techniques

→Elaborate User interface management system (UIMS) in detail.

i)A User Interface Management System (UIMS) is a mechanism for cleanly separating process or business logic from Graphical user interface (GUI) code in a computer program.

ii)UIMS are designed to support N-tier architectures by strictly defining and enforcing the boundary between the business logic and the GUI.

iii)A UIMS may also have libraries and systems such as graphical tools for the creation of user interface resources or data stores.

iv)Generally, you cannot easily use multiple UIMS systems at the same time, so choosing the correct model for your UIMS is a critical design decision in any project.

v)The choice of system is dependent upon the system(s) you wish to create user interfaces for, and the general style of your application.

vi)For example, if you want to create a web based front end, or just a standalone application or both that would be an important factor in choosing.

vii) If you want to deploy on MacOS, Windows or Linux, that would further influence your choice of a UIMS system.

→Explain the design standards and design Guidelines in HCI.

A] Design Standards:-

i)Design standards are established conventions, rules, or specifications that provide a set of guidelines for creating consistent and high-quality user interfaces.

ii)Ensure uniformity and consistency in design across different interfaces or applications.

iii)Example:-ISO Standards: International Organization for Standardization provides standards for various aspects of design, including usability and accessibility.

iv)Users can easily switch between applications with similar design standards, as they share common conventions.

v)Developers can follow established standards, streamlining the design and development process.

B] Design Guidelines:-

i)Design guidelines are specific recommendations or suggestions that guide designers in making informed decisions during the design process.

ii)Provide detailed advice on implementing design principles in specific contexts.
iii)Addresses common challenges and issues faced by designers in particular domains or platforms.
iv)Example:-Design Guidelines: Offered by Google, these guidelines focus on the principles and components for creating consistent and intuitive interfaces.
v)Following guidelines increases the likelihood of creating interfaces that are user-friendly and easy to navigate.

→Explain evaluation through user participation.
i)Evaluation through user participation engages end-users in assessing system usability.
ii)Methods include usability testing, focus groups, surveys, and participatory design.
iii)Benefits encompass user-centric solutions, early issue identification, and improved satisfaction.
iv)Challenges include resource intensity and ensuring a representative user sample.
v)Continuous iteration and ethical considerations are integral to this approach.
vi)Usability labs and remote testing offer controlled and real-world evaluation environments.
vii)The process ensures the system aligns with user needs, preferences, and expectations.
viii)Early involvement of users facilitates timely corrections and enhances collaboration.
ix)User participation contributes to a sense of ownership and satisfaction with the final product.

→Explain evaluation through expert analysis.
i)Evaluation through expert analysis in HCI involves usability experts assessing system usability without direct user involvement.
ii)Methods include heuristic evaluation, cognitive walkthroughs, and expert reviews.
iii)Experts apply established heuristics to identify potential usability issues and provide valuable insights.
iv)This approach is efficient and resource-effective, especially in the early stages of design.

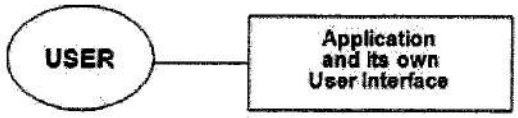
v)Heuristic evaluation involves experts systematically evaluating interfaces based on predefined usability principles.
vi)Cognitive walkthroughs simulate user tasks to assess how well the system supports users' thought processes.
vii)Expert reviews encompass a comprehensive analysis of design elements, interactions, and user interface components.
viii)Findings from expert analysis help uncover usability problems, guiding design improvements.

→Write a note on - Evaluation Criteria
i)Usability:Assessing the ease with which users can interact with the system, including factors like learnability, efficiency, and user satisfaction.
ii)Accessibility:Ensuring that the design accommodates users with diverse abilities and disabilities, providing a universally inclusive experience.
iii)Consistency:Evaluating the uniformity and consistency of design elements, interactions, and visual aesthetics throughout the system.
iv)Efficiency:Measuring the system's ability to perform tasks and deliver information promptly, minimizing user effort.
v)Learnability:Assessing how quickly users can understand and navigate the system, especially for first-time users.
vi)Engagement:Evaluating the ability of the design to captivate and maintain user interest, promoting prolonged interaction.
vii)Aesthetics:Assessing the visual appeal and design aesthetics, considering factors like color schemes, typography, and overall look and feel.
viii)Performance:Evaluating the speed, responsiveness, and efficiency of the system in delivering the desired outcomes.

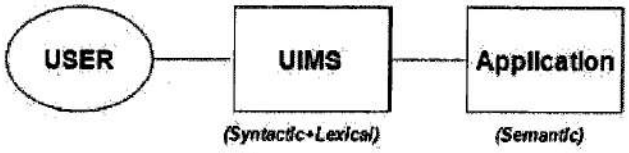
→What is Usability? Explain the principles that support usability.
i)Usability refers to the extent to which a product or system can be used by specified users to achieve specific goals with effectiveness, efficiency, and satisfaction in a specified context of use.
ii)It is a key aspect of user experience design, focusing on ensuring that users can interact with a product or system in an effective, efficient, and satisfying manner.
iii)Principles that Support Usability: Learnability, Efficiency, Satisfaction, Error Prevention, Consistency, Flexibility, Accessibility, Aesthetic Design

→Explain User Interface Management System(UIMS) conceptual architecture.

- **Before**



- **After**



→Explain Nielsen's ten heuristics.

i)Visibility of system status:-The first principle is about keeping users informed about their actions and what's happening at a given interaction.For example: when you finish watching an episode of a series on Netflix, the system provides a small screen telling you how long it will take to load the next episode.

ii)Match between system and the real world:-This principle claims that a system should always speak the user's language and follow real-world conventions.Use words, phrases, and concepts that are familiar to your target audience.

iii)User control and freedom:-A good UI design should never impose an action on the user or make decisions for them. Instead, the system should only suggest which paths the users can take.

iv)Consistency and standards:-This heuristic is about keeping the same language throughout the system to avoid confusing the user. So when users interact with a product, they should have no doubts about the meaning of words, icons, or symbols used.

v)Error prevention:-This Nielsen heuristic proposes that a good design should always prevent problems from occurring.Think of a delete files button, for example. We must assume that users might accidentally click this button or that they can imagine a different result from it.

vi)Recognition rather than recall:-As seen, Nielsen's heuristics aim to reduce users' cognitive load, and this also includes their memory capacity.So it's essential to think of ways to make options and actionable components visible; this is important because it's easier for us to recognize something rather than remember it.

vii)Flexibility and efficiency of use:-Your designs should benefit both inexperienced and experienced users.Notice that inexperienced users need more detailed information. But as they keep using a product, they become experienced users.
viii)Aesthetic and minimalist design:-As a designer, please don't consider aesthetics above functionalities.Therefore, create interactions that contain only essential information. Avoid unnecessary visual elements that can overwhelm and distract users.
ix)Help users recognize, diagnose, and recover from errors:-Your designs should help the user identify and find solutions to eventual problems and errors.
x)Help and documentation:-The last of Nielsen's heuristics concerns documentation that will help users understand how to perform their tasks.Although all the heuristics listed above are supposed to help users avoid errors and make it easy to navigate without assistance, it is still essential to provide further assistance at any given time.

→What is evaluation?
i)Evaluation, in the context of design and system development, refers to the systematic assessment and analysis of a product, interface, or system to determine its effectiveness, usability, and overall quality.
ii)It involves gathering data, insights, and feedback to understand how well a design meets its intended goals and aligns with user needs.
iii)Evaluation plays a crucial role in identifying areas for improvement and guiding the refinement of a product or system throughout its lifecycle.

→Explain cognitive walkthrough with an example.
i)A cognitive walkthrough is a usability evaluation method that involves step-by-step analysis of a user's thought processes while interacting with a system or product.
ii)The evaluator simulates the perspective of an end user, systematically assessing the system's design to identify potential usability issues.
iii)This method is particularly useful during the early stages of interface design.
iv)Example of a Cognitive Walkthrough: *Task: Add a Product to the Shopping Cart in an E-commerce App*
v)Step 1: Open the App: User Goal: Access the app easily.Thought Process: "I need to find the app on my phone. It should be visible and recognizable."Issue: If the app icon is not distinct or easily accessible, it may cause user frustration.

vi)Step 2: Navigate to Product Category:User Goal: Find the desired product category.Thought Process: "I want to browse phones, so I'll look for the 'Electronics' or 'Technology' section."Issue: If the category names are unclear or the navigation is complex, users may struggle to locate products.
vii)Step 3: Select a Product:User Goal: Choose a specific phone.Thought Process: "I like this model; I'll click to view details."Issue: If the product details are not easily accessible or if there's ambiguity, users may become frustrated.
viii)Step 4: Add to Cart:User Goal: Add the selected phone to the cart.Thought Process: "There should be a clear 'Add to Cart' button. I'll look for it after deciding."Issue: If the 'Add to Cart' button is hidden or unclear, users may struggle to complete the intended action.
ix)Step 5: View Cart and Checkout:User Goal: Review the cart and proceed to checkout.Thought Process: "I need to check the cart contents before purchasing."Issue: If accessing the cart or proceeding to checkout is not straightforward, users may abandon the process.

→Write classification of evaluation techniques.
Classification of Evaluation Techniques:
i)Quantitative vs. Qualitative: Quantitative: Numerical metrics (e.g., success rates).Qualitative: Subjective insights (e.g., user interviews).
ii)Remote vs. Local:Remote: Participants at a distance.Local: In-person evaluation.
iii)Inspection vs. User Testing:Inspection: Evaluator-focused.User Testing: User interaction-focused.
iv)Diagnostic vs. Comparative:Diagnostic: Identifies issues.Comparative: Compares designs or versions.

→Write use of a toolkit in design with an interface.
i)A toolkit in design refers to a set of resources, tools, and components that designers use to streamline the design process, maintain consistency, and enhance efficiency.
ii)Toolkit can have several valuable uses:Consistency Across Interfaces, Efficiency in design workflow, Brand Identity Maintenance, Usability, Accessibility, Iterative Design Improvement, Cross platform design.

Unit 6-HCI Models and theories

→Describe a linguistic model in detail.

i)A linguistic model is a computational framework for understanding and generating human language.

ii)It involves statistical and rule-based methods to analyze linguistic structures.

iii)It employs techniques such as natural language processing (NLP) and machine learning to comprehend syntax, semantics, and context. Linguistic models, like transformer-based architectures, capture intricate language patterns and relationships.

iv)These models utilize vast amounts of text data to learn linguistic nuances and context dependencies.

v)They power applications like chatbots, language translation, and sentiment analysis.

vi)Pre-trained linguistic models, such as BERT and GPT, have demonstrated state-of-the-art performance in various language-related tasks.

vii)Continuous training and fine-tuning optimize linguistic models for specific applications, making them versatile tools in the realm of natural language understanding.

→A Hierarchical Task Analysis (HTA) provides an understanding of the tasks users need to perform to achieve a certain goal. Perform HTA of the task to cook food(rice). Illustrate using a diagram.

Goal: Prepare Cooked Rice:-

i)Subtask 1: Measure Rice Subtask 1.1: Take measuring cup Subtask 1.2: Scoop desired amount of rice

ii)Subtask 2: Rinse Rice Subtask 2.1: Place rice in a sieve Subtask 2.2: Rinse rice under cold water

iii)Subtask 3: Add Water Subtask 3.1: Fill a pot with water Subtask 3.2: Pour water into the pot with rice

iv)Subtask 4: Set Up Cooking Subtask 4.1: Place pot on the stove Subtask 4.2: Turn on the stove

v)Subtask 5: Cook Rice Subtask 5.1: Bring water to a boil Subtask 5.2: Reduce heat and simmer

vi)Subtask 6: Monitor Cooking Subtask 6.1: Check rice occasionally Subtask 6.1: Check rice occasionally

vii)Subtask 7: Let It Rest Subtask 7.1: Turn off the stove Subtask 7.2: Allow rice to rest before serving
viii)Subtask 8: Serve Subtask 8.1: Fluff rice with a fork Subtask 8.2: Serve rice on a plate

→Explain Cognitive architectures
i)Cognitive architectures are theoretical frameworks or computational models that aim to simulate and understand the underlying structures and processes of human cognition.
ii)These architectures are designed to emulate the way the human mind processes information, learns, and makes decisions.
iii)Mimicking Human Cognition:Cognitive architectures seek to replicate aspects of human cognitive processes, including perception, memory, reasoning, and problem-solving.
iv)Information Processing:They involve computational models that represent how information is received, processed, and transformed within the system, drawing inspiration from psychological and neuroscientific principles.
v)Rule-Based and Learning Mechanisms: They incorporate rule-based systems and learning mechanisms to adapt to new information and experiences, allowing the system to improve its performance over time.
vi)Applications in AI:Cognitive architectures serve as a foundation for building intelligent systems and artificial agents capable of human-like cognitive abilities. They are used in areas such as robotics, natural language processing, and decision support systems.
vii)Cognitive architectures contribute to advancing our understanding of how the human mind works and play a crucial role in developing intelligent systems with more human-like capabilities.

→Explain three state model.
i)Input State:In the input state, the user provides input to the system. This can include actions such as clicking a button, typing on a keyboard, or interacting with any input device. The system receives and processes this input, preparing to transition to the next state.
ii)Processing State:During the processing state, the system processes the user input and performs the necessary computations or operations. This may involve executing commands, handling data, or carrying out any tasks based on the

user's input. The processing state is crucial for translating user actions into meaningful system responses.
iii)Output State:In the output state, the system presents feedback or output to the user based on the processed input. This output can take various forms, such as displaying information on the screen, providing auditory feedback, or triggering any other response that communicates the system's reaction to the user's input.
iv)The three-state model helps designers and developers conceptualize the interactive process between users and systems, providing a framework for understanding the flow of information and actions.
v)Effective user interfaces ensure smooth transitions between these states, offering responsive and intuitive interactions.

→Explain Keystroke-Level-Model(KLM).
i)The Keystroke-Level Model (KLM) is a predictive modeling technique used in human-computer interaction (HCI) to estimate the time it takes for a user to perform specific tasks based on the number of keystrokes or mouse clicks required.
ii)Developed by Stuart Card, Thomas Moran, and Allen Newell, KLM breaks down tasks into basic operations, each associated with a specific time value.
iii)KLM identifies fundamental actions, such as keystrokes or mouse clicks, as basic operations. Each operation is assigned a predetermined time value.
iv)The model uses standard time values for common operations. For example, pressing a key might take 0.2 seconds, while moving the mouse and clicking might take 1.1 seconds.
v)Tasks are decomposed into a sequence of basic operations.
vi)The total time for a task is calculated by summing the time values associated with each basic operation in the sequence. The formula is Time = Σ(Operation Time × Frequency).
vii)KLM allows designers to predict and evaluate the efficiency of different interface designs by estimating the time it takes to complete tasks.
viii)KLM is most suitable for predicting and comparing the performance of straightforward, repetitive tasks, such as those involving data entry or simple interaction sequences.

→Write a note on Ubiquitous Computing
i)Ubiquitous Computing visions a seamless integration of computing into everyday life.

ii)It focuses on making computing capabilities available, accessible anytime and anywhere.
iii)Devices and technologies become invisible, blending into the environment and minimizing user awareness.
iv)Relies on sensors, connectivity, and context-aware systems to enhance user experiences and automate tasks.
v)Envisions smart environments where computing seamlessly supports human activities without explicit user intervention.
vi)Challenges include privacy concerns, data security, and the need for efficient and reliable connectivity.
vii)Ubiquitous Computing aligns closely with the Internet of Things (IoT), fostering interconnected devices and intelligent ecosystems.
viii)Applied in smart homes, healthcare, transportation, and various industries, transforming how we interact with technology.

→How to find things on the web: Future of HCI?
The future of Human-Computer Interaction (HCI) in finding things on the web is shaped by ongoing advancements in technology and user interface design. Here are several trends and considerations:
i)Natural Language Processing (NLP):Improved NLP capabilities enable users to search using conversational language, making interactions with search engines more intuitive and human-like.
ii)Augmented Reality (AR) and Virtual Reality (VR):AR and VR technologies contribute to immersive search experiences, where users can visually explore and interact with information in virtual environments, enhancing spatial understanding.
iii)Personalized and Context-Aware Search:AI-driven systems provide more personalized search results by considering individual preferences, historical data, and contextual information, delivering tailored information based on user profiles and behaviors.
iv)Gesture-Based Interaction:Gesture recognition and touchless interfaces offer alternative ways to interact with search interfaces, allowing users to navigate and find information with physical movements.
v)Predictive Search and AI Assistants:AI-driven predictive search anticipates user needs and preferences, offering suggestions before users complete their queries. AI assistants become more proactive in delivering relevant information.

vi)Continuous Learning Interfaces:Interfaces that continuously learn from user behaviors and adapt over time enhance the efficiency and effectiveness of web search experiences.
vii)As HCI evolves, the future of finding things on the web aims to create more intelligent, personalized, and context-aware search experiences that seamlessly integrate with users' daily lives while prioritizing ethical considerations and user privacy.

→Elaborate Hierarchical task analysis (HTA).
i)Hierarchical Task Analysis (HTA) is a systematic method for decomposing complex tasks into a hierarchical structure, offering a detailed understanding of the steps involved in task completion.
ii)HTA breaks down tasks into hierarchical levels, ranging from high-level goals to detailed subtasks, creating a structured representation of the task's complexity.
iii)Tasks are decomposed into smaller, more manageable elements, facilitating the identification of dependencies, sequences, and relationships among different actions.
iv)Typically presented in a tree or diagram format, HTA visually illustrates the relationships between goals, tasks, and subtasks, aiding in communication and analysis.
v)HTA reveals decision points within a task, where users make choices or branch to different subtasks, offering insights into user decision-making processes.
vi)HTA helps assess the efficiency, effectiveness, and learnability of systems by analyzing task structures and potential improvements.
vii)Designers use HTA to optimize task workflows, ensuring that systems align with user expectations and minimizing cognitive load during task execution.
viii)HTA supports an iterative design process, allowing designers to refine task structures based on user feedback, ensuring that the final design aligns with user needs and goals.

→Discuss applications meant for computer-mediated communication.
i)Email Platforms:Facilitate asynchronous communication through electronic mail, allowing users to send and receive messages, documents, and multimedia content.
ii)Instant Messaging (IM) Apps:Enable real-time text, voice, and video communication, fostering quick and dynamic conversations among users across various devices.

iii)Video Conferencing Tools:Support virtual face-to-face meetings, enhancing remote collaboration, and enabling users to participate in discussions from different locations.
iv)Social Media Platforms:Offer diverse communication channels, including text, images, and videos, fostering social connections, information sharing, and community engagement.
v)Webinars and Webcasts:Facilitate online presentations and seminars, allowing presenters to interact with a remote audience through Q&A sessions and chat features.
vi)Podcasting Platforms:Support the creation and distribution of audio content, enabling individuals or groups to share information, stories, and discussions with a global audience.
vii)Virtual Reality (VR) Communication:Emerging applications leverage VR technology to create immersive communication experiences, allowing users to interact in virtual spaces and share experiences more intuitively.
viii)Blogs:Facilitate online presentations and seminars, allowing presenters to interact with a remote audience through Q&A sessions and chat features.

→Describe Physical and device models with examples
A] Physical Models:-
i)Physical models represent the tangible aspects of a system or object, providing a three-dimensional, often scaled, representation of its form and structure.
ii)Examples:Architecture: Scaled-down representations of buildings or structures, aiding architects and designers in visualizing and planning construction projects.
B]Device Models:-
i)Device models are abstractions or representations of electronic or mechanical devices, describing their functionalities, interactions, and components.
ii)Examples:Circuit Diagrams:Schematic representations of electronic circuits, illustrating the connections and components within electrical systems.

→Write a short note on – i. BNF(Backus-Naur-Form) ii. GOMS (GOAL,OPERATORS,METHODS AND SELECTION)
A]BNF(Backus-Naur-Form):-
i)Backus-Naur Form (BNF) is a metasyntax used to formally describe the syntax of programming languages and document the structure of context-free grammars.

ii)Introduced by John Backus and Peter Naur, BNF employs a set of production rules to define the valid combinations of symbols in a language.
iii)It consists of terminal and non-terminal symbols, where non-terminals represent syntactic categories, and terminals are the actual symbols used in the language
iv)BNF is widely used in compiler design, documentation, and the specification of programming languages.
B]GOMS (GOAL,OPERATORS,METHODS AND SELECTION):-
i)GOMS is a cognitive model used in Human-Computer Interaction (HCI) and psychology to analyze and predict user performance in interactive tasks.
ii)GOMS breaks down user tasks into four components:
iii)Goals: Describing the overall objectives users aim to achieve.
iv)Operators: Identifying the basic actions or interactions users perform to accomplish a goal.
v)Methods: Sequences of operators that users employ to achieve goals.
vi)Selection Rules: Governing the decision-making process users use to choose methods based on the task context.

→List out Diagrammatic Dialog Design notations. Explain any two with examples.
i)Flowcharts:Utilized to represent the flow of a dialog or process through various decision points and actions. Symbols like rectangles (for processes), diamonds (for decisions), and arrows (for flow) are commonly used. Useful for mapping out the sequential steps and decision points in a user's interaction, providing a clear visualization of the dialog flow.
ii)State Transition Diagrams:Depict the different states a system or dialog can be in and the transitions between these states. Circles represent states, and arrows indicate transitions. Describes the various states a system can be in and the transitions triggered by user actions, valuable for understanding the overall system behavior.
iii)Storyboarding:Visual storytelling using a sequence of images to represent the progression of a user's interaction with a system or application.
iv)Wireframes:Basic visual representation of the layout and structure of a user interface, focusing on the placement of elements without detailing visual design.
v)Entity-Relationship Diagrams (ERD):Illustrate the relationships between entities in a system, providing insights into the data structure and interactions.

→What is task action grammar?

i)Task Action Grammar (TAG) is a linguistic model applied in Human-Computer Interaction (HCI) to represent and analyze user interactions with computer systems.

ii)In essence, TAG combines linguistic structures with task analysis to understand and describe user actions in a formalized manner.

iii)TAG integrates linguistic elements, such as verbs and nouns, into a grammar framework to represent user actions.

iv)Utilizes formal grammar rules to describe the syntax and structure of user interactions, emphasizing clarity and precision.

v)Integrates task analysis methodologies to map linguistic constructs to specific actions within a given task.

vi)Often applied in the design of dialogue systems to facilitate natural and task-oriented interactions between users and machines.

vii)Aims for more intuitive and effective user experiences.

viii)Supports user-centered design by providing a structured framework for designing interfaces based on linguistic models of user behavior.