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* HCI : Class Assignment - 3 *

Que.1] Explain Goal and Task Hierarchy model with example.

⇒ Ans :

i) The Goal and Task Hierarchy model is a framework used in Human-computer Interaction, and cognitive Psychology to understand how users achieve complex goals by breaking them down into the smaller, more mentally organized tasks to accomplish the specific goal.

ii) Components :-

a] Goal : The main objective the users want to achieve.

b] Sub-goals : The intermediate objectives that help achieve the main goal.

c] Tasks : specific actions or operations required to accomplish a sub-goal.

d] Sub-tasks : Further breakdown of tasks into smaller, executable steps.

iii) Example :-

Consider the goal of booking a flight ticket online.

Here,

a] Goal : Booking a flight ticket.

b] Subgoal 1 : search for available flights.

- Task 1.1 : open a flight booking website.
- Task 1.2 : Enter departure & destination.
- Task 1.3 : select departure & destination.

Subgoal 2 : Choose the Best Flight.

- Task 2.1 : compare flight prices & duration.
- Task 2.2 : check baggage policies & additional fees.
- Task 2.3 : Select a flight that meets travel.

Subgoal 3 : Complete the booking process.

- Task 3.1 : Navigate the airline's website of booking.

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- Task 3.2 : Enter the passenger details.
- Task 3.3 : Choose seating options.
- Task 3.4 : Enter payment info. & confirm the booking.

Subgoal 4 : Receive and organize Travel Info.
- Task 4.1 : save the confirmation mail.
- Task 4.2 : set reminders for check in & other preparations.

iv) Benefits of this structure :-

a] clarity

Each step of booking process is clearly defined.

b] Efficiency

Breaking down tasks allows for a smoother booking experience for user.

c] Flows

Helps user stay organized & reminds of imp. tasks.

Que.2] Hierarchical Task Analysis (HTA) is used to describe interactions between user & software system. Draw and explain HTA for an online movie booking system.

⇒ Ans :

i) HTA is a structured method for breaking down tasks into subtasks & actions, providing a clear representation of user interactions with software system.

ii) It is a technique used to analyze and breakdown complex tasks into subtasks & operations.

iii) In case of online movie booking system, HTA can describe various tasks a user goes thr to book a movie ticket.

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1. Goal : Book a movie ticket

1.1] Access the online movie booking platform.
- 1.1.1) open the website or app.
- 1.1.2) Log in or register if needed.

1.2] Browse or search for a movie.
- 1.2.1) view available movies.
- 1.2.2) Filter by genre, time or location.
- 1.2.3) Select desired movie.

1.3] Select movie showtime & theater
- 1.3.1) choose a date
- 1.3.2) choose a theatre & showtime.

1.4] Select no.of tickets & seat preferences
- 1.4.1) Select number of tickets.
- 1.4.2) Choose seat(s) from available options.

1.5] Make payment
- 1.5.1) Review booking summary.
- 1.5.2) Select payment method.
- 1.5.3) Enter payment details.
- 1.5.4) confirm payment.

1.6] Receive booking confirmation.
- 1.6.1) Get confirmation on screen.
- 1.6.2) Receive confirmation email/sms.

1.7] Exit or perform another task.
- 1.7.1) Logout or continue browsing.

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Que.3] How does Diagrammatic dialog design notations help designers to design better Interfaces? Justify with example.

⇒ Ans :

i) Diagrammatic dialog design notations are visual tools that helps designers create & communicate user interface design more effectively.

ii) These notations, such as flowcharts, state diagrams or task models, simply complex interaction paths & make it easier to identify usability issues, streamline processes and improve user experiences.

iii) Key Benefits :-

a] Clarity and Structure :

Diagrams make it easier to understand how users will interact with system. Designers can see the flow of tasks, identify bottlenecks & understand how users will navigate through interface.

b] User centered design :

By mapping out interactions, designers can think from the user's perspective. It becomes clearer where users might encounter difficulties, allowing the interface to be tailored to user needs & expectations.

c] Communication :

Visual notations help teams (designers, developers and stakeholders) communicate more effectively. They can all refer to the same diagram to understand the system's logic & behaviour, avoiding misinterpretation.

d] Problem Identification :

Potential issues like redundant steps, unclear workflows, inefficient paths can be identified early through the diagrammatic design. This reduces risk of confusion or error for users once the interface is deployed.

e] Improved Usability :

By visualizing interaction steps, designers can ensure the system is intuitive, eliminating unnecessary steps & ensuring smooth transitions between different tasks.

iv) Example : Online Banking Interface Design.

Consider an online banking interface where user wants to transfer money. A flowchart or state diagram can represent steps a user takes, such as :

1] Login to account.
2] Navigate to Transfer section.
3] Enter recipient details.
4] Input Transfer amount.
5] Review and confirm the transaction.
6] Receive confirmation.

Diagrammatic notations help the designer :
- Visualize optional branches, such as additional verification steps for high-value transfer.
- Identify redundant steps that may frustate the users. (e.g. Asking for same info twice).
- Streamline the process, ensuring that no of interactions is minimal but secure. (e.g. If diagram shows that after 'Input transfer amount', users are prompted to confirm their password twice (once for login & once for transfer), designers can reduce this to a single step, improving efficiency without compromising security).

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Que.4] Explain following golden rules with example.
i) Strive for consistency.
ii) Enable frequent users to use shortcuts.
iii) offer informative feedback.

⇒ Ans :

The golden rules for user interface design, outlined by the Ben Shneidermann, aim to create intuitive, efficient & enjoyable user experiences.

① Strive for consistency :

- consistency in design means ensuring that similar tasks are performed in similar ways across the interface, leading to a more intuitive & predictable user experience.
- This includes visual consistency (e.g. color schemes, fonts, button styles), functional consistency (e.g. same interactions for similar actions) & internal/external consistency (e.g. - maintaining similar design patterns to other popular applications).
- e.g. In the 'Word' Application, if the 'save' button is represented by floppy disk icon in one part of the interface, it should remain same throughout app (menu, toolbar & pop-up dialogs). Similarly, if user clicks 'Ctrl + s' to save a document in one screen, they should expect same shortcut to work consistently across different screens or tasks.

② Enable frequent users to use shortcuts :

- Frequent users often become power users & prefer faster, more efficient ways to complete tasks.
- By offering shortcuts, such as keyboard commands, command-line options, or gesture based interactions, designers cater to advanced users who want to bypass the repetitive navigation.

- e.g. In photo editing software like Adobe Photoshop, experienced users can press 'Ctrl+Z' to undo an action, rather than navigating through 'Edit' menu and selecting 'Undo'.
- Shortcuts increase productivity for frequent users, leading to more efficient & satisfying experience for advanced users.

(iii) Offer informative feedback :

- Users should receive clear, timely feedback from the system to understand what actions they have taken and what their outcomes are.
- Feedback could be visual (e.g. change in button color), auditory (e.g. a sound confirming an action), or textual (e.g. error msg.).
- The feedback should be appropriate for the action's significance: minor tasks may require subtle feedback, while major tasks should provide more explicit responses.
- e.g. In an online shopping platform, after users click 'Place Order', they should see a confirmation msg like 'Thank you for your order' along with an order no. & estimated delivery date.

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✳ HCI : Class Assignment - 4 ✳

Que.1] What are the goals of evaluation ? Explain cognitive walkthrough and heuristics evaluation technique in detail.

⟹ Ans :

i) Goals of Evaluation :

- The primary goal of evaluation in HCI is to ensure that a system or interface meets user needs and expectations.
- Evaluation helps to assess the usability, efficiency & effectiveness of interface, identify usability issues & guide design improvements.
- Some specific goals are :-
  1] Usability Assessment : Checking if the system is easy to use, learn and remember.
  2] Identifying Usability Issues : Detecting potential problems users might face while interacting with system.
  3] Improving design : Using feedbacks from evaluation to improve interface for better user experience (UX).
  4] Validating Requirements : Ensuring the system meets both functional & non-functional user requirements.
  5] User Satisfaction : Checking whether users find the system satisfying & enjoyable to use.

ii) Cognitive Walkthrough :

- It is an expert based usability evaluation technique that focuses on understanding how new users interact with the system while performing specific tasks.
- It is mainly concerned with how easy it is for a user to learn & use the system.
- Steps in cognitive walkthrough :-
  1] Define the tasks.
  2] Identify the users.
  3] Walk through the task.
  4] Answer 'key' questions.

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For each task step, evaluators ask four main questions.

- Will the user know what to do next?
- Will the user notice that correct action is available?
- Will the user associate correct action with intended outcome?
- If correct option is performed, will the user see that progress is being made?

5] Identify Problems.

- So basically it focuses on how new users approach the system, making it useful for improving learnability.

iii) Heuristic Evaluation:

- It is another expert-based usability evaluation technique, where a small group of evaluators examines the interface & compares it against established Heuristics (rules of thumb).
- Nielsen's 10 Usability Heuristics :-

1] Visibility of System status:

The system should always keep users informed about what is happening.

2] Match between system & real world:

The system should speak the user's language and follow real world conventions.

3] User control and freedom:

Users should have ability to undo & redo actions easily.

4] consistency and standards:

The interface should follow platform conventions to ensure consistency.

5] Error prevention:

The system should prevent errors before they occur.

6] Recognition rather than recall:

Minimize the user's memory load by making objects, actions & options visible.

7] Flexibility and efficiency of use :
Interface should cater to both novice & experienced users, providing shortcuts for power users.

8] Aesthetic and minimalist design :
The design should not contain irrelevant info.

9] Help users recognize, diagnose & recover from errors :
Error msgs should be helpful & guide user in solving the issue.

10] Help and documentation :
Even though it's better if system can be used without help, documentation should be available

- Steps in Heuristic Evaluation :-
  i) Select Evaluators.
  ii) Conduct Independent Evaluations.
  iii) Aggregate Results.
  iv) Rate severity.
  v) Provide Recommendations.

Que-2] What is Usability Testing ? How will you perform usability Testing on an interactive interface ?

⇒ Ans :

i) Usability Testing is a method used in HCI to evaluate how easy and user-friendly a system or interface is for real users. It involves observing users as they interact with interface to complete specific tasks. The goal is to identify usability issues, measure performance, and gather feedback to improve overall User experience (UX).

ii) Key objectives of Usability Testing :-
  1] Effictiveness : can users complete tasks accurately & successfully ?
  2] Efficiency : How quickly can users complete tasks ?
  3] Satisfaction : How satisfied are users with their experience ?

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4] Error Rate : How often do users make mistakes & how easily can they recover from them?

5] Learnability : How easy it is for new users to learn how to use the system.

iii) Steps to Perform Usability Testing on an Interactive Interface :

1] Define goals & objectives :-

- clearly define purpose of usability test.
- Determine which aspects of interface you want to evaluate. (e.g. system navigation, easy access, bottlenecks in task completion)
- e.g. If testing an e-learning platform, objective might be to evaluate how quickly users can access course materials, view results, etc.

2] Identify and Recruit Test Users :-

- Recruit participants who represent target audience for the interface.
- It's imp. to have a mix of users with different levels of expertise (novice, intermediate, expert).

3] Prepare Test Scenarios & Tasks :-

- create realistic tasks that participants will perform during test.
- These tasks should align with system's primary functions & user goals.

4] Choose a Testing Methodology :-

- In person Testing, Remote Testing, Moderated Testing, Unmoderated Testing.

5] Conduct the Test :-

6] Collect Data and Analyze Results :-

- Gather qualitative & quantitative data.

7] Provide Recommendations :-

- Based on analysis, provide recommendations to address usability issues.

8] Implement changes & Re-Test.

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Que.3] Explain User Interface Management System (UIMS) in detail along with its architecture.

⇒ Ans :

i) A UIMS is a software framework that seperates the user interface from the core application logic of a system.

ii) It provides a way to design, implement & manage the interaction between users & system by providing tools & techniques for creating, controlling & maintaining user interfaces.

iii) Goals of UIMS :-

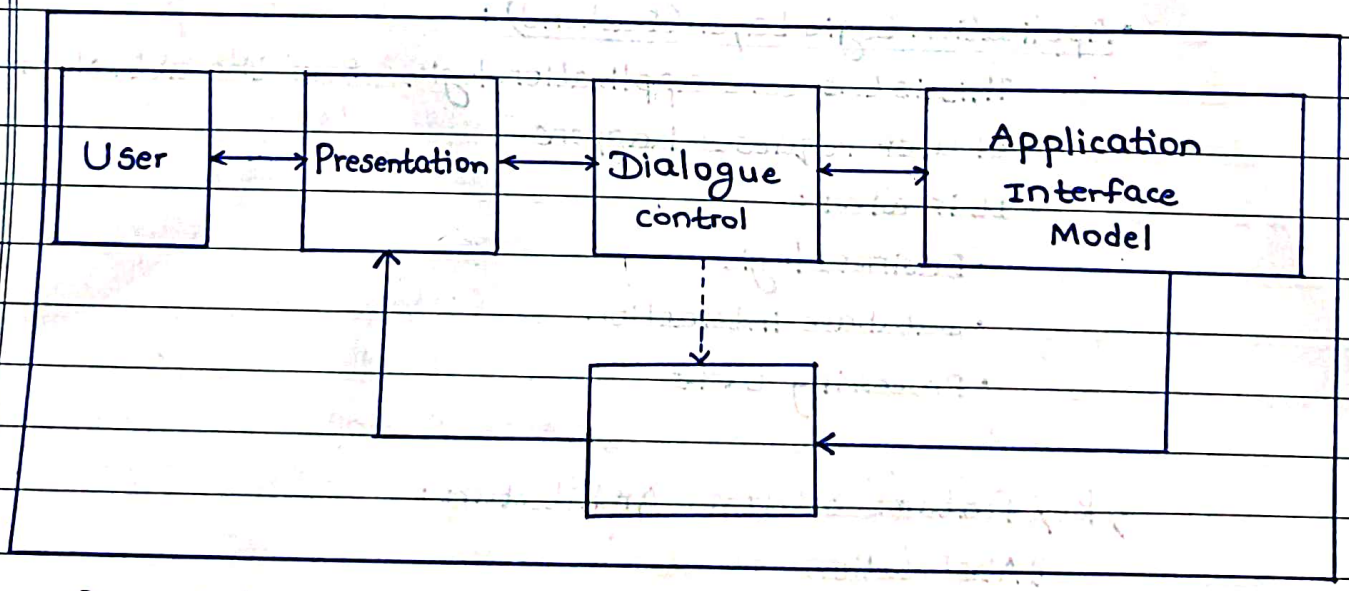
1] Seperation of concerns : seperating UI from business logic, making both easier to manage & update independently.

2] Reusability : Interface components developed using UIMS can be reused across different applications.

3] Consistency : Interfaces across different parts of application follow a consistent design.

4] Modifiability. 5] Device Independence.

iv) Architecture of UIMS :-



- Presentation Layer (UI Layer) :-

-This layer handles all aspects related to visual appearance of system including layout design, widgets (e.g. buttons, menus, I/P fields, etc.), Text & graphics rendering.

~~train, test = train_test_split(data, test_size=0.25, random_state=1)~~

- It manages user interface elements & is responsible for displaying data to users & capturing user inputs.

- **Dialog control Layer :-**
  - It manages flow of interaction bet^n user & system.
  - It acts as a controller, coordinating user I/P with appropriate response from application.
  - Main functions : User I/P processing, managing interaction flow, dialog sequencing.

- **Application Interface Layer :-**
  - It connects dialog control layer to application logic.
  - It acts as a bridge, ensuring communication between the interface & applications backend logic.

- **Application Logic Layer (Backend) :-**
  - This is the core application logic, where the actual processing of user requests happens.
  - It involves :
    - Business logic
    - Database interaction
    - Processing tasks

v) key features of UIMS Architecture :

1] Abstraction

2] Modularity

3] Flexibility

4] Portability

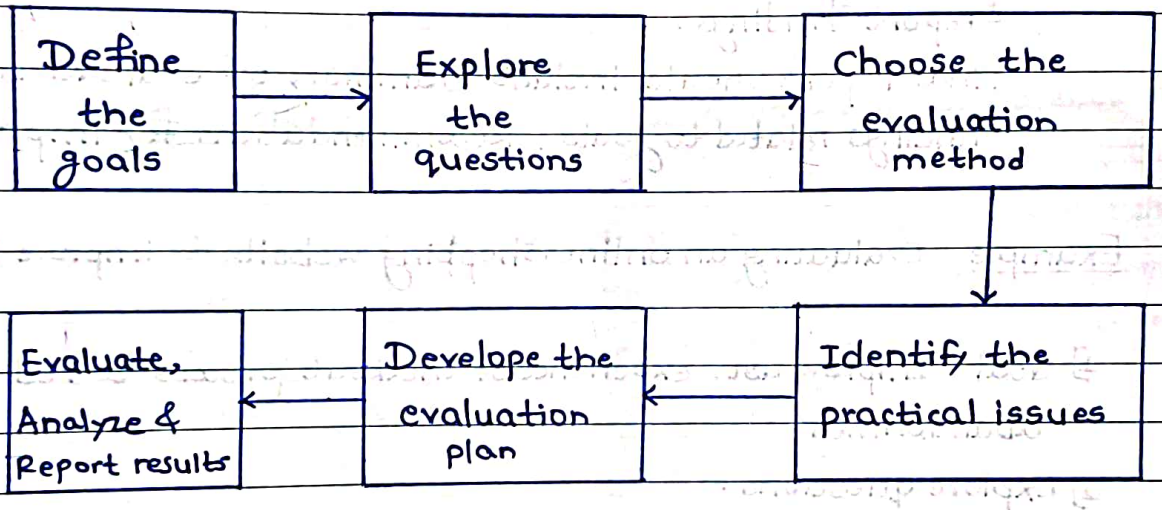
5] consistency

Que.4] Explain DECIDE framework with necessary diagram and example of the same.

⇒ Ans :

i) The DECIDE framework is a structured approach used in HCI and usability evaluation to guide evaluation process of interactive systems. It was developed by Diana S.W.H. Neilsen to help evaluators ensure a comprehensive & systemtic assessment of UI.

ii) DECIDE framework :-



iii) Define the Goals :-

- Establish the objectives of evaluation. what do you want to learn from evaluation.
- Identify specific usability goals (e.g. improve task completion times, reduce error rates).

iv) Explore the Questions :-

- Formulate specific questions related to evaluation goals.
- This questions will guide the evaluation process.
- e.g. What are common errors users encounter?

v) Choose the Evaluation method :-

- Select appropriate evaluation methods to answer the questions.
- common methods include Usability Testing, Heuristic evaluation, cognitive walkthrough, Surveys & questionnaires.

vi) Identify the Practical Issues :-
- Resources available (time, budget)
- Participant recruitment & availability.
- Testing environment & equipment.

vii) Develope the evaluation plan :-
- create a detailed plan outlining evaluation process.

viii) Evaluate, Analyze & Report the Results :-
- conduct the evaluation, gather data, analyze the results, & report findings.
- Final report should include summary of evaluation process, findings related to goals, Recommendations for improvements.

Example : Evaluating an online shopping website to improve its usability.

1] Goal : Improve user experience of checkout process to reduce cart abandonment.

2] Explore questions :
- What are main obstacles users face during checkout?
- How long does it take for users to complete purchase?

3] Choose evaluation method :
- Usability Testing : observing users as they go thr checkout process.
- Surveys : collecting user feedback on their experiences & satisfaction.

4] Identify Practical Issues :
- Time frame : 4 weeks for planning & testing.
- Budget : Limited funds for participant incentives.

5] Develope Evaluation Plan :
- Tasks : "Add items to cart", "Proceed to checkout", "complete payment".
- Schedule : Usability testing sessions over two weeks.
- Data collection : screen recordings, task completion times, surveys.
- Team roles : one facilitator, one observer & one note-taker.

6] Evaluate, Analyze & Report the Results :

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Que.5] Explain i) Augmented Reality, ii) Virtual Reality with real life examples.

⇒ Ans :

(i) Augmented Reality (AR) :-

- AR overlays digital information onto the real world, enhancing user perception thr devices like smartphones or AR glasses.
- It combines real & virtual elements, allowing for real-time interaction.
- Examples :
  1] IKEA Place : An app that lets users visualize furniture in their homes by placing 3D model using their phones.
  2] Google Lens : An application that identifies objects in real world, providing instant info.
  3] L'oreal Makeup Genius : This app allows users to virtually try on different makeup products using smartphone camera. Users can see how different shades & products will look on their faces before making a purchase.

(ii) Virtual Reality (VR) :-

- VR creates an immersive, simulated environment that users can interact with thr specialized headsets.
- It fully engages users by making them feel present in the virtual world.
- Examples :
  1] Google Earth VR : Allows users to explore globe in 3D.
  2] VR Training simulators : Used in healthcare and aviation for realistic training, allowing users to practice procedures without real-world risks.
  3] Medical Realities : A VR platform that provides surgical training simultations for medical professionals. It allows trainees to practice surgeries in safe, controlled VR before performing on real patients.

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HCI : Class Assignment - 5

Que.1] Draw and explain Design thinking in detail for any suitable application

⇒ Ans:

i) Design thinking is a user-centered approach to innovation that integrates the needs of people, the possibilities of technology, and the requirements for business success.

ii) It involves several stages that focus on empathizing with users, defining the problem, ideating solutions, prototyping & testing.

iii) For a suitable application like developing a food delivery app, the design thinking can be illustrated as follows:

1] Empathize:

- Understand the user's needs and painpoints.
- Conduct interviews with users, such as people who frequently order food online & delivery personnel.
- Gather insights like delivery time, food freshness, ease of navigation, etc.

2] Define:

- Define the core problem based on empathy stage.
- e.g. "Users need a fast, reliable, and user-friendly way to order food without confusion or long waiting times".

3] Ideate:

- Brainstorm multiple potential solutions, like an intuitive app design, optimized menus, real time delivery tracking, etc.
- Focus on generating diverse ideas before filtering best ones.

4] Prototype:

- Create a low fidelity prototype or wireframes of food delivery app.
- Show the core features like restaurant search, order confirmation & delivery tracking.

5] Test :

- Test the prototype with real users to get feedback.
- Refine the app based on user feedback, improving design elements that don't meet user expectations.

Que. 2] In today's world finding things on web has become very easy. Discuss how the multimodal input has enriched the experience.

⇒ Ans :

i) Multimodal input refers to using multiple modes of interaction simultaneously or alternately, such as touch, voice, gestures & eye-tracking. It has significantly enhanced user experience on the web.

ii) In the context of web interaction, multimodal input has significantly enriched the userexperience by making information retrieval faster, more intuitive & accessible to a wide range of users.

iii) How multimodal Input has enriched the web experience :-

a] Voice Input : Hands-free and Natural Interaction.

- Voice search allows users to speak queries into devices, eliminating the need for typing.
- voice assistants like Siri, Alexa, Google Assistants have simplified how users interact with search engines or websites, allowing hands-free, natural lang. interactions.
- e.g. Users can ask "What's the weather today ?" and get immediate response without typing.

b] Touch & Gesture Input : Intuitive & Immediate Interaction.

- Gestures like swiping, pinching or facial recognition, provide intuitive interaction for tasks like scrolling or zooming in/out of web content, making navigation easier.

c] Text Input : classic but enhanced to auto complete & suggestion.
- while traditional text input has been enriched with the features like autocomplete, contextual suggestions and predictive text that speed up the process of finding information.

d] Visual Input : Eye tracking.
- visual search tools allows users to search the web using images, instead of text, providing a highly intuitive & context driven search experience.
- Tools like Google Lens enable users to identify objects, landmarks or plants by simply taking photos.
- Eye tracking can enhance user experience by predicting where users are looking & helping with accessibility.

e] Augmented Reality (AR) & Mixed Reality (MR) :
- AR & MR are increasingly being integrated into web experience, allowing users to interact with digital context in real world contexts.
- e.g. Users can use AR to visualize how furniture might look in their living room, before purchasing.

iv) Impact on Experience :-

1] Faster interaction :
Multimodal inputs allow more natural & faster communication, improving efficiency.

2] Personalization :
By combining voice & gestures, users can have tailored and adaptive experiences.

Que.3] A Hierarchical Task Analysis (HTA) provides an understanding of the tasks users need to perform to achieve certain goal. Perform HTA of the task – to cook food (rice).

⇒ Ans :

Goal

Cook rice using a stove or rice cooker.

HTA Breakdown

Main Task : Cook Rice

1] Prepare Ingredients

1.1) Measure rice

1.2) Rinse rice in water

1.3) Measure water for cooking

2] Cook the rice

2.1) Place rice & water in cooker.

2.2) Turn on the stove.

2.3) Set heat to medium high.

2.4) wait for water to boil.

2.5) Reduce heat to low, once boiling.

2.6) cover the pot with a lid.

3] Monitor cooking

3.1) wait for 15-20 minutes.

3.2) Check if water is fully absorbed.

3.3) If not done, allow more time.

4] Finish cooking

4.1) Turn off the heat

4.2) Let rice rest for few minutes & fluff it with fork then.

5] Serve rice.

5.1) Dish out rice onto plate.

Que.4] Goals are accomplished by methods consisting of operators which are identified by selection rules. Illustrate this for following goals.

i) To delete a sentence in graphical text editor.

⇒ Ans :

1] Method 1 :

- Select the sentence using mouse (operator : Drag to highlight).
- Press the 'Delete' key. (operator : Press Delete key).

2] Method 2 :

- Move the cursor to beginning of sentence. (operator : Mouse & Arrow click).
- Press & hold the 'backspace' key.

3] Selection rule :

- Use Method 1 if sentence needs to be deleted quickly & precisely.
- Use Method 2 if user prefers to remove characters manually.

ii) To close a window in graphical text editor.

⇒ Ans :

1] Method 1 :

- Click the 'X' button at top right corner of window.

2] Method 2 :

- Press 'Alt + F4' (keyboard shortcut).

3] Selection rule :

- Use Method 1 if user is navigating with mouse.
- Use Method 2 if user prefers keyboard shortcuts for faster actions.

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⁂ HCI : Class Assignment - 6 ⁂

Que.1] How does making a call differs when using:

i) cell phone

ii) smart phone

consider the kinds of user, type of activity & context of use.

⟹ Ans :

i) Kinds of Users :

- cell phone
  - Typically used by older adults or individuals who prefer simple, no-frills communication.
  - May also be used by users in region with low internet connection.

- smart phone
  - Used by a wide range of users, from tech-savvy individuals to professionals, and younger people who are comfortable with advanced technology.
  - More widely adopted in urban areas with reliable internet access.

ii) Type of Activity :

- cell phone
  - Primary activity is voice calling & text messaging (SMS).
  - Basic calling, limited or no internet access.
  - calling involves dialing the number manually or accessing stored contacts in simple interface.

- smart phone
  - In addition to traditional voice calling, users can make video calls, send text messages via internet based platforms & use voice assistants, to initiate calls.
  - Users can switch between different communication apps & even integrate calling into their work or social apps.

iii) Context of use:

- Cell phone
  - Mainly used in environments where the only need is to make calls & send texts.
  - Usable in low network areas.

- Smartphone
  - often used in multi-tasking scenarios.
  - contexts include high connectivity areas like cities, workplaces or homes where users can leverage internet & multitasking features.

Que.2] Negative affect can make it harder to do even easy tasks; positive affect can make it easier to do difficult tasks. What are the implications of this for interaction design?

⇒ Ans:

i) Negative affect (e.g. frustation, stress) makes it difficult for users to concentrate, often leading to errors & inefficiency; conversly, positive affect (e.g. satisfaction, happiness) can help users engage more smoothly, even with complex tasks.

ii) Implications for Interaction Design:-

1] Design for Minimal Frustation:

- Designers should minimize negative emotions by providing clear feedback, error prevention & easy navigation.
- e.g. Undo options in text editors reduce the anxiety of making irreversible mistakes.

2] Engagement through Positive Feedback:

- Positive affect can be encouraged thr playful elements, achievements & reward systems.

3] Emotional Impact of Aesthetic Design:

- Interfaces that are visually appealing & easy to use, lead to positive emotions, which can make users more inclined to engage with complex systems.
- e.g. The clean, minimalist interface of Apple devices envokes positive emotions, making users more willing to explore their capabilities.

4] Handling stress & errors gracefully:

- When users make errors, system should avoid penalizing them harshly. offering solutions, helpful messages & simple fixes can reduce frustation.
- e.g. Google docs autosave feature alleviates stress of losing work, maintaining positive user experience.

Que.3] Explain:
i) Augmented Reality
ii) Virtual Reality
along with real life examples of both.

⇒ Ans:

i) Augmented Reality:

- AR is a technology that overlays digital content onto the real-world environment in real-time, enhancing the user's perception of reality.
- AR uses cameras, sensors & sometimes locations data to understand environment around user.
- It then places digital elements over this environment, which the user can see through a device like smartphones, tablet or AR glasses.

- Real Life examples :

  - Pokemon Go : A popular mobile game where players use their smartphones to capture virtual creatures that appear as if they exist in real world.

  - IKEA Place App : Allows users to see how furniture will look & fit in their homes using AR thr their phone cameras.

ii) Virtual Reality :

- VR is a fully immersive technology that simulates a completely artificial environment, often using a headset, allowing users to interact within that environment.
- Real Life examples :
  - Oculus Quest 2 : A VR gaming device that immerses players in virtual worlds where they can interact using motion controllers & head tracking.
  - virtual tourism : Using VR headsets to 'visit' places like historical landmarks, etc.

Que.4] ⟹ Explain Future of HCI in detail.

Ans :

i) The future of HCI is shaped by emerging technologies, evolving user needs, and the increasing integration of computers into daily life. Below are some key trends & developments :

ii) Natural User Interfaces (NUI) :

- Interfaces that allow users to interact through natural behaviours like voice, gestures & eye movements, will become more refined & widespread.
- e.g. Advancements in virtual assistants like Alexa or Siri will lead to more conversational interfaces.

iii) Brain-computer Interfaces (BCI):

- BCI's will enable users to control computers or devices with their brain activity. This will revolutionize assistive technologies, gaming & communication.
- e.g. Facebook's Reality Labs & Neuralink are exploring BCI to allow users to interact with devices directly thr thoughts.

iv) AI-driven personalization:

- AI will make systems more adaptive & personalized based on user preferences, behaviours & contexts.
- e.g. AI powered recommendations on platforms like Netflix or Amazon will evolve into personalized UI elements.

v) Human-Robot Interaction (HRI):

- Human interaction with robots will become more natural & intuitive, driven by advancements in AI-ML.