**THE TECHNICAL UNIVERSITY OF KENYA**

**DEPARTMENT OF INFORMATION AND SOCIAL SCIENCES**

**BACHELOR OF SCIENCE IN INFORMATION SCIENCE**

**HUMAN INTERACTION COMPUTER CAT 2**

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1. **Describe any FIVE advantages of Graphical User Interface GUI over other forms of HCI.**

**User-Friendly Experience**: GUIs are designed to be intuitive, making it easier for users to understand and navigate. Icons, buttons, and visual aids reduce the learning curve compared to text-based interfaces.

**Visual Representation**: GUIs provide visual feedback and representations of actions, which helps users understand the system’s status. For example, progress bars and notifications enhance user awareness of ongoing processes.

**Accessibility**: GUIs can incorporate design features that enhance accessibility for users with disabilities. For instance, they can include larger icons, adjustable contrast, and screen reader compatibility, making technology more inclusive.

**Rich Interactivity**: GUIs allow for rich interactivity through drag-and-drop features, sliders, and touch gestures. This interactivity can enhance user engagement and make tasks more efficient compared to simpler interfaces that rely solely on keyboard input.

**Visual Learning**: GUIs cater to visual learners by providing graphic elements that help convey information. Charts, diagrams, and images can be more effective than text descriptions, making it easier for users to comprehend complex data.

1. **Describe any TWO emerging HCI styles.** **(6 marks)**

**Brain-Computer Interface (BCI):** BCIs enable direct communication between the brain and a computer, allowing users to control devices using their thoughts. This style bypasses traditional input methods altogether, making it particularly beneficial for individuals with mobility impairments.

Benefits: Enhances accessibility, enables control through thoughts, and has potential applications in healthcare and robotics.

**Natural User Interfaces (NUI)**: NUIs leverage natural human behaviors, such as touch, gestures, and voice commands, to interact with devices. This style eliminates the need for traditional input devices like keyboards and mice, allowing users to engage with technology in a more intuitive and fluid manner. Touchscreen devices, gesture-based controls (like those used in gaming consoles), and voice recognition systems (like virtual assistants e.g. Google Assistant) exemplify NUIs. These interfaces aim to create a seamless interaction that feels more like human communication than traditional computing.

1. **Explain any FOUR Rules of user interface design.**  **(4 marks)**

**Consistency**: Consistency in design means using similar elements for similar tasks throughout the interface. This includes consistent terminology, layout, colors, and visual styles. A consistent interface helps users learn and predict how to interact with the system, reducing confusion and improving usability.

**Visibility**: Important functions and elements should be prominently displayed and easily accessible. Users should not have to search for key features or information. Effective use of space, typography, and color can enhance visibility, ensuring that users can quickly locate what they need without unnecessary effort.

**Simplicity**: The design should be simple, avoiding unnecessary elements that could distract the user. By focusing on essential features and presenting them clearly, users can complete tasks more efficiently, leading to a more satisfying experience.

**Feedback**: Providing immediate and clear feedback for user actions is crucial. When users perform tasks, such as clicking a button or submitting a form, they should receive confirmation of their action (e.g., visual changes, sounds, or notifications). This feedback reassures users that their actions have been recognized and helps them understand the system's state.

1. **Explain how you can achieve ‘usability’ in HCI design for any FIVE categories of users.**  **(10 marks)**

**Novice Users**: Simplify the interface by minimizing complexity and providing clear guidance. Use tooltips, tutorials, and onboarding processes to introduce features gradually and offer **undo and help features** to assist with mistakes. Utilize recognizable icons and consistent terminology to help novices feel more comfortable navigating the system.

**Expert Users**: Provide shortcuts and advanced features that enhance efficiency. Implement keyboard shortcuts, customizable toolbars, and advanced settings that allow expert users to perform tasks quickly. Ensure that the interface supports complex workflows without overwhelming the user with unnecessary options.

**Elderly Users**: Design for accessibility and ease of use. Use larger text and buttons, high-contrast colors, and simple layouts to accommodate visual and cognitive challenges. Include voice commands and easy navigation options with minimal steps to simplify interaction.

**Users with Disabilities**: Ensure compliance with accessibility standards. Implement screen reader compatibility, keyboard navigation, and alternative text for images. Provide options for adjusting text size and color schemes to accommodate various disabilities, ensuring that the interface is usable for all.

**Children and Young Users:** Use interactive and engaging elements like animations and sounds.Implement simple language and icon-based navigation for better understanding and ensure parental controls and safety features to protect young users online.