HCI

1. What is HCI?

Human-computer interaction (HCI) is **an interdisciplinary design science that leverages experimental psychology methods and applies them to the powerful tools offered by computer science**. The heart of HCI lies in **designing interactive systems for use by individuals without specialised qualifications or training**.

2. What is the role of interface designers and advantages of an effective HCI?

Interface designers play a crucial role in transforming complex technologies, like personal computers, into user-friendly devices that facilitate communication and collaboration. Their work has been instrumental in the immense success of mobile devices, enabling users to connect and interact in novel ways. They are also responsible for the shift from traditional desktop applications to powerful social tools that cater to the needs of global communities. These communities leverage these tools to engage in various activities, including conducting business, staying connected with loved ones, seeking medical advice, and creating and sharing user-generated content with billions of users worldwide.

A well-designed human-computer interface (HCI) is essential for creating positive user experiences, which can significantly impact on people's lives across different domains:

- **Aviation:** A well-designed HCI contributes to safer air travel by providing pilots with intuitive interfaces that enhance situational awareness and reduce cognitive load.
- **Education:** HCI plays a vital role in creating effective learning environments that cater to different learning styles and abilities, enabling children to learn more effectively.
- **Accessibility:** Good HCI practices are essential for designing systems that empower individuals with disabilities, helping them live more productive and fulfilling lives.
- **Creative Industries:** HCI can foster creativity by providing graphic artists and other creative professionals with intuitive tools that expand their creative possibilities.

3. What are the disadvantages of HCI?

1. **Job Loss**: As technology improves and tasks get automated, some jobs that were once done by humans are no longer needed. For example, jobs like telephone operators, typesetters, or travel agents have seen a decline because technology can now handle those tasks.

2. **User Confusion**: Even though the goal of HCI is to make things easier for users, poorly designed interfaces can still be frustrating. If menus are too complicated or if the design is unclear, users might make mistakes or give up in frustration. That's why testing and improving interfaces is so important.

3. **Spread of Harmful Content**: As social media and online platforms become more powerful, they also make it easier for harmful content, like hate speech or misinformation, to spread. Designers need to think about how to prevent these negative outcomes when creating user interfaces.

4. **Privacy Issues**: Many modern systems collect lots of data about their users to offer personalised experiences. But this also raises concerns about privacy. It's crucial that designers ensure data is used responsibly and that users' privacy is protected.

5. **Widening the Digital Divide**: Not everyone has the same access to technology or the same level of tech skills. As systems get more advanced, those without access or knowledge might get left behind, making the gap between tech-savvy users and others even bigger.

6. **Accessibility Challenges**: While HCI strives to be inclusive of all users, making systems accessible to people with different physical, cognitive, and sensory abilities is still difficult. Designers need to keep working on making technology easier to use for everyone, including those with disabilities.

> Final Thoughts:
> These downsides are not problems with HCI itself but challenges that come with advancements in technology. By focusing on ethical and responsible design, these issues can be reduced, ensuring that technology benefits everyone equally.

4. What is user-centric design?

User-centric design (UCD) is a design philosophy that prioritises the needs, expectations, and limitations of end-users throughout the entire design process.

5. What are the usability measures for practical evaluation

To evaluate how well a system works for users, these common usability measures are used:

1. **Learnability**: How easily new users can learn to use the system and complete basic tasks.

2. **Efficiency**: How quickly users can perform tasks once they know the system.

3. **Error Rate**: How often users make mistakes, how serious they are, and how easily they can recover.

4. **Memorability**: How well users remember how to use the system after not using it for a while.

5. **User Satisfaction**: How satisfied users are with the system, gathered through surveys or feedback.

By evaluating these measures, designers can figure out what works and what doesn't, helping to improve the system for a better user experience.

6. What is Universal Usability?

Creating systems that work for all kinds of users, regardless of their abilities, backgrounds, or preferences.

7. What are the consideration for universal usability?

- **Physical Abilities**: Designers must account for various body sizes and abilities. For example, phone buttons should be usable by people with different hand sizes.
- **Cognitive Abilities**:
  - **Perception**: Make interfaces intuitive by using design principles like grouping similar items together.
  - **Memory**: Keep tasks simple to minimise how much users need to remember.
  - **Visual Acuity**: Ensure critical info is easy to see for users with vision differences.
  - **Learning**: Offer clear instructions and consistent patterns to help users learn quickly.
  - **Skill Growth**: Allow users to become more efficient with shortcuts and customisation options.
- **Personality Differences**: Design flexible interfaces that work for all types of personalities, whether structured or freeform.
- **Cultural Diversity**: Adapt to cultural differences in design, such as language, symbols, and colors. Internationalizing interfaces is key for global usability.
- **Users with Disabilities**: Integrate accessibility features like screen readers for users with impairments.
- **Older Adults**: Cater to changes in vision, motor skills, and cognitive abilities by using large fonts and clear layouts, which benefit everyone.
- **Children**: Ensure designs for kids are age-appropriate, engaging, and safe.
- **Hardware/Software Diversity**: Create systems that work on a wide range of devices, from older tech to the latest smartphones, using responsive design.

8. What are the benefits of universal usability?

- **Wider Audience**: More people can use the product, increasing market reach.
- **Happier Users**: Usable and accessible systems boost satisfaction.
- **Lower Costs**: Addressing usability early on prevents expensive fixes later.
- **Inclusivity**: Universal design gives everyone equal access to technology.

9. What are HCI guidelines?

Navigating the Interface

- **Consistency:** Keep task steps the same across the system to reduce confusion.
- **Clear Links:** Use descriptive links like "View Pricing" instead of "Click Here."
- **Distinct Headings:** Make headings informative and unique for easy navigation.
- **Radio Buttons:** Use them for single-choice options to avoid confusion.
- **Print-Friendly:** Ensure pages print properly without cutting off content.
- **Thumbnails:** Provide small previews for large images to save loading time.

Accessibility

- **Text for Media:** Provide text descriptions for images and videos for screen readers.
- **Captions/Transcripts:** Offer alternatives for videos and audio.
- **Good Contrast:** Ensure text and background colors are readable.
- **Simple Layouts:** Keep predictable and familiar designs.

Displaying Information

- **Consistency:** Use the same formats, colors, and terms across the system.
- **Clarity:** Present information in an easy-to-scan way.
- **Ease Memory Load:** Don't force users to remember info between screens.
- **Align Input & Display:** Make data entry forms match how info will appear.
- **Customization:** Let users adjust display options for their needs.

Getting Attention

- **Limit Intensity:** Use bold or bright elements sparingly for key points.
- **Highlight Important Info:** Use underlines, boxes, or arrows to draw attention.
- **Control Font Use:** Stick to 1-2 fonts to keep the design clean.
- **Simple Animation & Sound:** Use them only for feedback or important alerts.

Simplifying Data Entry

- **Consistent Input:** Follow the same process for similar tasks across the system.
- **Minimise Steps:** Use shortcuts, defaults, and auto-fill to reduce user effort.
- **Reduce Memory Load:** Provide clear prompts and examples for users.
- **Flexibility:** Let users control how they enter data, like skipping fields.

10. What are HCI design principles?

1. **Know Your User**: Understand who your users are (age, tech skills, disabilities). Design accordingly.
   - *Example:* Larger buttons for older users with weaker eyesight.
2. **Identify the Tasks**: Focus on the main tasks users need to complete and make them easy.
   - *Example:* Quick access to the "Buy Now" button on shopping sites.
3. **Choose an Interaction Style**: Pick a style that suits the task and user:
   - **Direct Manipulation**: Drag-and-drop actions (e.g., dragging files).
   - **Menu Selection**: Dropdown options for beginners.
   - **Form Fill-In**: Structured forms (e.g., booking a flight).
   - **Command Language**: Text commands for experts (e.g., coding terminal).
   - **Natural Language**: Everyday speech or text (e.g., Siri).

11. What are the golden rules of Interface?:

- **Consistency**: Keep actions and visuals uniform.
- **Universal Design**: Make it usable for everyone (e.g., accessible to disabilities).
- **Feedback**: Inform users about their actions (e.g., progress bars).
- **Task Closure**: Show completion messages.
- **Error Prevention**: Minimize mistakes (e.g., warnings for wrong inputs).
- **Undo Option**: Let users backtrack easily.
- **User Control**: Keep users in charge.
- **Reduce Memory Load**: Simplify information to avoid overload.

12. What are the UI evaluation theories?

1. **Motor-Task Performance Theory**: Measures how quickly and accurately users perform actions like clicking. Useful for tasks needing speed and precision.
2. **Perceptual Theories**: Focus on how users process visual information. Helps in designing easy-to-scan and understand interfaces.
3. **Information Foraging Theory**: Compares user info-seeking to animal foraging. Clear links and labels improve how users find info.
4. **Explanatory Theories**:
   - **Conceptual Level**: User's mental model of the system.
   - **Semantic Level**: Meaning of actions and feedback.
   - **Syntactic Level**: Structure of user commands.
   - **Lexical Level**: Physical actions like clicks and keystrokes.
5. **Stages-of-Action Model**: Steps users take from setting a goal to evaluating results. Highlights gaps between intentions and system responses.

6. **Predictive Theories**:
    - **GOMS**: Breaks tasks into goals, actions, and methods to predict performance.
    - **Keystroke-Level Model (KLM)**: Estimates task time based on basic actions.
7. **Widget-Level Theories**: Evaluate usability of individual interface elements like buttons.
8. **Context-of-Use Theories**: Considers the environment where the interface is used, affecting design choices.