

1. Human-Computer Interaction (HCI)

HCI is about how people use computers and making technology easier and more enjoyable for everyone. It's a field where experts study users to design better technology.

1.1. Importance of HCI

- *Increased Productivity & User Satisfaction* → Well-designed interfaces lead to faster task completion, fewer errors, and happier users.
- *Reduced Errors & Improved Safety* → Intuitive designs minimize mistakes, preventing costly issues and even saving lives in critical applications.
- *Enhanced Accessibility & Wider Adoption* → Good HCI ensures technology is usable by diverse people, including those with disabilities, encouraging broader use.
- *Competitive Advantage* → Products with excellent user experiences often gain a significant market edge.

1.2. How HCI Works

HCI is primarily achieved through a User-Centered Design (UCD) process:

- **Understand Users** → Learn about their needs, what they want to do, how they do it, and where they use the technology.
- **Design** → Create interfaces based on user understanding (sketching, wireframing, prototyping).
- **Evaluate** → Try out the designs with people to see if they have any problems and get their feedback.
- **Implement** → Create the final version of the technology.

☰ Why Focus on HCI?

Without HCI, technology can be difficult to use, inefficient, error-prone, and inaccessible. HCI bridges the gap between humans and technology, creating systems that effectively serve human needs and enhance the overall experience.

1.4. Understanding the User

Before designing any interface, a deep understanding of the target user is fundamental. You gather information (through user research methods like interviews and surveys) about their:

- **Demographics** → Their age, gender, education, culture, how they live, and what motivates them.
- **Technical Proficiency** → How much experience they have with technology and similar things.
- **Goals, Tasks, Needs & Pain Points** → What they are trying to achieve, the specific steps they take, what they need, and what frustrates them.
- **Context of Use** → Where they will use it, when, how, and on what devices.
- **Mental Models & Prior Experiences** → What they expect the system to do and what other things they've used before.
- **Frequency of Use** → How regularly they will use the technology.

1.5. Cognitive Framework

Helps us understand how users interact with technology by considering their mental processes.

Key Aspects of Cognitive Framework:

- *Attention & Perception* → How users focus on and understand what they see.
- *Memory & Learning* → How users store information, find it again, and learn new things.
- *Problem Solving & Decision Making* → How users figure things out and decide what to do.
- *Language Processing & Mental Models* → How users understand language and their own ideas about how technology should work.

2. Design Principles

2.1. Usability Engineering Lifecycle (UEL)

This is a step-by-step way to design easy-to-use technology. Using it early helps you understand users and test designs to create a great product.

It has 3 main phases:

1. Requirements Analysis (Understanding User Needs) → Figure out:

- *User Profile*: Who will use it and their challenges?
- *Task Analysis*: How do users do things now?
- *Usability Goals*: What should users be able to do easily? (e.g., "complete profile in 5 minutes")
- *Platform Limits*: What can the technology do?
- *Design Rules*: Basic rules for good interfaces.

2. Design, Testing, and Development → Design the product in steps, getting feedback along the way:

- *Level 1 Design*: Basic ideas and how they work.
- *Level 2 Design*: Rules for how it looks and works.
- *Level 3 Design*: Detailed visual design.

3. Installation and Feedback (Release and Learn) → After launch:

- Collect user feedback (what they like and dislike).
- Share feedback with the team to make improvements.

✖ Product Development Lifecycle

The process of creating a product. It often involves brainstorming, defining the problem, designing solutions, testing, and refining.

2.4. UX (User Experience) Design

UX is about how users feel when interacting with a product or service – their overall perception. Good UX aims to create positive, meaningful, and valuable experiences crucial for a product's success.

Good UX is **Usable** (Easy to use), **Equitable** (Accessible to all), **Enjoyable** (Pleasant and satisfying) and **Useful** (Provides value).

Designing for Good UX involves:

- *Understanding & Defining* → Identifying user needs and problems.
- *Thinking & Prototyping* → Generating and creating test versions.
- *Testing & Evaluating* → Getting user feedback.
- *Iterating* → Improving based on feedback.
- *Considering the Entire User Journey* → Looking beyond single screens.
- *Focusing on Usability & Accessibility* → Making it easy for everyone.
- *Measuring & Analyzing* → Tracking and improving performance.

✖ UX Designer

A professional who focuses on how a user thinks and feels when using a product.
Types of UX Designers

- **Interaction Designers**: Focus on how users interact with a product.
- **Visual Designers**: Focus on how a product looks.
- **Motion Designers**: Focus on how elements move within a product.

2.3. UI (User Interface) Design

It is about making the parts of technology you see and touch look good and work well. It's a key part of making technology easy and enjoyable for everyone.

② Why is Good UI Important?

Good UI makes using technology less frustrating and more satisfying. It helps people do what they need to do without problems and makes them want to keep using the product. Good UI design creates a smooth and natural connection between people and technology.

How to Design Good UI

1. *Know Your Users* → Understand who will use it and what they need.
2. *Organize Clearly* → Plan how everything will be arranged logically.
3. *Make Simple Mock-ups* → Create basic visuals to test ideas.
4. *Use Good Visuals* → Choose the right colors, fonts, and layout, and keep things consistent.
5. *Make it Easy to Interact* → Design buttons and controls that are clear and work for everyone.
6. *Test and Improve* → Get feedback and make changes based on it.
7. *Match the Brand* → Make sure the design fits the company's style.

3. Design Elements



3.1. Sketching

Rapid, informal rough drawings of interfaces or flows for quick visualization and idea exploration.

② How to make a Sketch?

1. **Tools:** Paper and pen/pencil.
2. **Focus:** Visualize the core concept and flow.
3. **Techniques:** Use basic shapes, labels, and arrows to show key elements and interactions.
4. **Process:** Iterate quickly and get feedback on your rough ideas.

3.2. Wireframe

Low-to-mid-fidelity visual blueprint of a UI, focusing on layout, structure, and basic interactions.

② How to make a Wireframe?

1. **Understand & Define:** Identify key content, features, and organization.
2. **Create Layouts:** Placeholders for content and indicate basic interactions.
3. **Focus on Structure:** Visually prioritize information consistently.
4. **Annotate & Iterate:** Explain key elements and improve based on feedback.

3.3. Visual Design

The strategic process of planning and creating the look and feel of a user interface to solve problems and enhance user experience. It goes beyond decoration, aiming for intuitive and enjoyable interactions through the thoughtful arrangement of elements.

Key Visual Elements:

- *Layout Grid:* Organizes content and controls.
- *Visual Flow:* Guides user attention and interaction.
- *Typography:* Presents readable and appropriate text.
- *Lines/Shapes:* Defines objects and conveys meaning.
- *Negative/White Space:* Enhances readability and focus.
- *Volume/Height:* Adds visual depth.
- *Value:* Creates contrast and hierarchy through light/darkness.
- *Color & Texture:* Evoke emotions, highlight elements, and add visual interest.

Key Principles of Visual Design

- **Visual Focus:** Directing the user's attention.
- **Consistency:** Making the design predictable.
- **Modularity (Grouping):** Organizing information into clear groups.
- **Adaptability (Responsiveness):** Designing for different screen sizes.
- **Simplicity:** Avoiding unnecessary complexity.

3.4. Typography

The art of arranging letters and text to make it easy to read, clear, and visually appealing. It involves choosing the right font style, how it looks, and its structure to create certain feelings and deliver specific messages. Essentially, typography brings the text to life on the screen.

Main Styles (for Visibility)

- **Font Size & Line Height** → Use adequate size and vertical spacing to improve how easy it is to read.
- **Letter Spacing** → Adjust the space between letters for better legibility.
- **Contrast** → Ensure enough color difference between the text and background so it's easy to read (WCAG guidelines).
- **Weight & Alignment** → Use bold text to emphasize; left-aligned text is generally easiest to read.
- **Hierarchy & White Space** → Use different font styles to guide the reader; surround text with empty space to reduce clutter.

Main Font Families

- **Sans-Serif Fonts** → Clean, simple fonts better for computer screens (e.g., Helvetica, Arial, Open Sans).
- **Serif Fonts** → Fonts with small decorative strokes; better for long printed text but use carefully on screens (e.g., Times New Roman, Georgia).

3.5. Logo Design

 Creating a visual symbol that represents a brand.

General Approach to Logo Design

1. Understand & Research → Know what the brand stands for and look at what other similar brands do.
2. Brainstorm & Sketch → Come up with ideas and make rough sketches.
3. Develop Digital Concepts → Make the best sketches into computer drawings.
4. Apply Design Principles → Focus on making it simple, easy to remember, lasting, usable in different ways, and fitting for the brand.
5. Explore Logo Types → Consider just words, just pictures, or a mix.
6. Choose Colors & Typography → Pick things that match the brand's personality.
7. Refine & Test → Change it based on feedback and see how it looks in different places.
8. Create Brand Guidelines → Write down how the logo should be used.

4. Design Considerations

4.1. Ergonomics

The science of designing things people use and the places they work in to fit their needs and make them comfortable, healthy, and able to work better. It looks at how people interact with tools, workplaces, and how work is done to make systems better for everyone.

Why is Ergonomics Important in HCI?

Ergonomics helps us design technology, like computer interfaces and physical devices, that are the right size and shape for people to use easily. By understanding different user characteristics, ergonomics makes sure designs are comfortable and prevent strain or injury. This can lead to happier and more productive users.

Ergonomics in an Office/Home Space

For physical spaces related to using technology, ergonomics involves things like: Adjustable chairs, Correct desk and monitor height, Ergonomic keyboards and mice, Good lighting, Regular breaks and an organized workspace.

4.2. Website Efficiency

It is about how well a website performs in terms of speed, usability, and resource utilization, leading to better user experience, SEO, and lower costs.

How to Improve Website Efficiency

- *Performance Optimization* (Speed) → Make pictures smaller, clean up the website code, use browser memory, use a special network to deliver content faster, make the server respond quickly, reduce the number of things the browser has to ask for, and compress files.
- *Usability Optimization* → Have clear ways to get around the site, design for phones first, make it load quickly, have clear buttons to click, make the text easy to read, have simple forms, and make it usable for everyone.
- *Resource Utilization* → Write good code, make sure extra tools from other websites are efficient, and always check how the website is performing.

4.3. Information Architecture (don't memorize)

The structure and organization of information within a product to make it easy to find and understand.

Design Patterns

Reusable solutions to common design problems in IA and UI. Examples include:

- **Two-Panel Selector:** Showing a list and details side-by-side.

- **Canvas + Palette:** A workspace with tools.
- **One-Window Drilldown:** Showing content step-by-step in a single view.
- **Alternative Views:** Letting users choose different ways to see information.
- **Wizard:** Guiding users through a process step-by-step.
- **Extras on Demand:** Showing main information with an option to see details.
- **Multi-Level Help:** Providing different ways to get help within the interface.

✖ Navigation

Helping users find their way within a product.

- **Signposts:** Visual cues like titles and logos.
- **Wayfinding:** Good signage and clear paths.
- **Global Navigation:** Consistent links to main sections.
- **Breadcrumbs:** Showing the user's location within the site structure.
- **Sequence Map:** Showing steps in a process.
- **Color-Coded Sections:** Using color to identify different areas.
- **Escape Hatch:** Providing a way to easily go back or exit.

⚠ Importance of Minimizing Distance (Clicks)

The "3-Click Rule" suggests users might leave if they can't find what they need within three clicks.

| 5. Drawings

Some things Sir might tell us to draw 💀 💀 💀.

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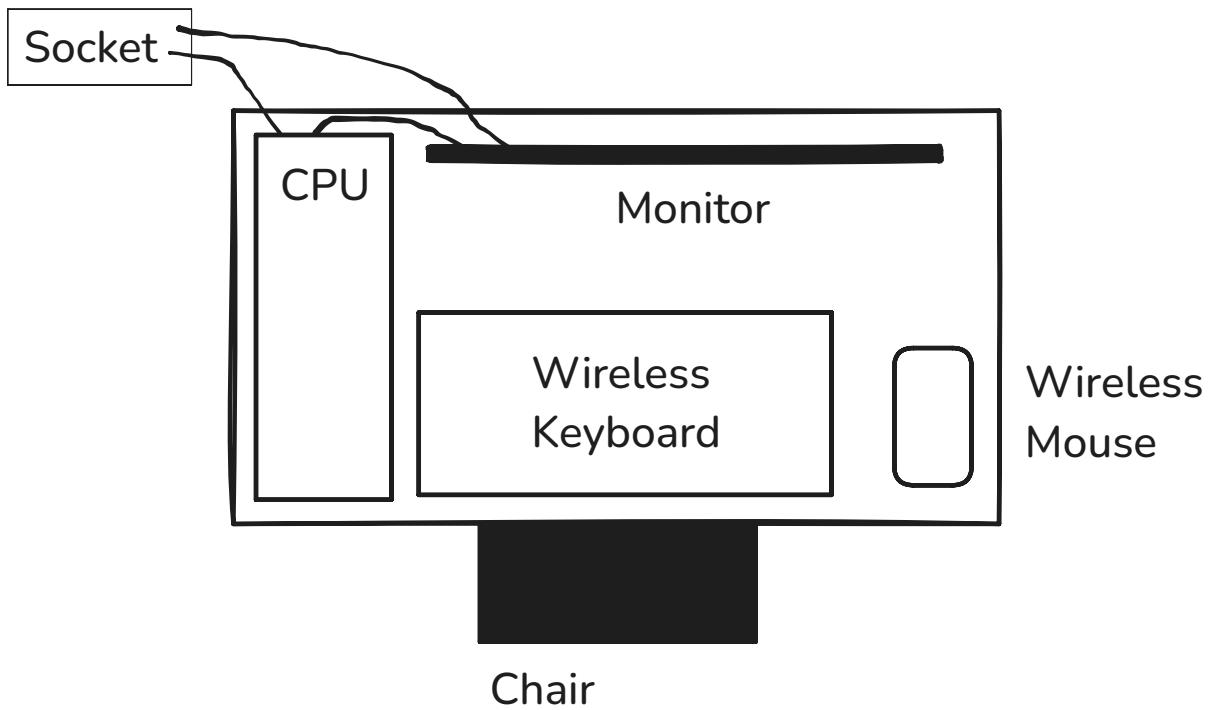
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There is also the possibility of him giving Assignment Tasks as questions...

- UI Design
- Hardware Design
- Surrounding Design
- Logo Design