Computer Architecture

- **Definition**: The design and organization of a computer's fundamental components and systems, including processors, memory, input/output devices, and software.
- **Focus**:
    1. **Functionality**: Ensuring that the system processes data efficiently and performs required tasks.
    2. **Efficiency**: Optimizing performance, power consumption, and cost.
    3. **Scalability**: Designing for adaptability and future growth in computational needs.
    4. **Components**: CPUs, GPUs, RAM, storage, buses, and networks.
    5. **Standards**: Driven by technical constraints like Moore's Law, instruction set architecture (ISA), and industry protocols.
- **Process**:
    - Starts with abstract concepts like algorithms and workflows.
    - Involves layering (hardware, firmware, software).
    - Balances trade-offs between speed, power, and cost.

Human Architecture

- **Definition**: The art and science of designing buildings and spaces for human use and experience.
- **Focus**:
    1. **Aesthetics**: Creating visually appealing and inspiring designs.
    2. **Functionality**: Meeting the needs of occupants (e.g., living, working, leisure).
    3. **Sustainability**: Incorporating eco-friendly materials and energy-efficient designs.
    4. **Components**: Foundations, walls, roofs, utilities, and interior spaces.
    5. **Standards**: Guided by building codes, cultural traditions, and ergonomic principles.
- **Process**:
    - Begins with conceptual sketches or 3D models.
    - Balances form and function.
    - Considers materials, environmental factors, and user interaction.

Commonalities

1. **System Design**:
    - Both involve creating systems with interdependent components.
    - Require careful planning, simulation, and testing.
2. **Efficiency and Optimization**:
    - Aim for maximum utility and minimum waste.
    - Must accommodate constraints like cost, space, or power.
3. **Scalability**:

- Designs often anticipate future growth or changes.

4. **Innovation**:
   - Constantly evolve to integrate new technologies, materials, or methods.
5. **Human-Centric Approach**:
   - Ultimately serve human needs, whether by enabling computing tasks or providing physical shelter and spaces.

Differences

Aspect	Computer Architecture	Human Architecture
Purpose	Data processing, communication, computation	Space utilization, aesthetics, human activity
Medium	Electronic hardware and software	Physical materials like steel, concrete, glass
Timescale	Typically shorter, measured in months or years	Often longer, measured in decades or centuries
Constraints	Technical (e.g., transistors, clock speed)	Physical (e.g., gravity, weather, materials)