Computer Engineering is
- developing efficient systems that combine hardware, software, and networking to interact with the physical world and/or solve information-based systems
- learning how to design, analyze, implement, and test such systems

What you can do with Computer Engineering:
- Cloud & Distributed Computing
- Applications (AI, robotics, graphics, mobile)
- Systems & Networking
- Architecture
- Devices & Integrated Circuits

An important question: what's the balance/boundary between hardware vs software? What's the purpose of the application?

An embedded system is
- A special purpose compute that is designed into a larger device to perform some amount of dedicated tasks

Laptops or desktops contain a **microprocessor**
Embedded systems contain **microcontrollers**
What's the differences?
- Microprocessor is part of a larger computer system w/ RAM and general purpose I/O
- Microcontroller is a single-chip with RAM and I/O to control specific electro/mechanical devices

Engineering is design with constraints. (Cost, resources, safety, …)

Instruction Cycle of processor:
- Fetch an instruction from memory
- Decode the instruction
- Execute the instruction

Memory: set of cells that store a group of bits
- Unique addresses assigned to each cell
- Data and instructions both stored in memory
- Tow operations: read and write
- RAM (random access memory): volatile
- ROM/Flash: non-volatile

Input/Output: keyboard, mouse, display, …