1 Overview

1.1 What Operating Systems Do

- hardware, software, data } Computer System
  - Hardware
    - CPU (Central Processing Unit)
    - Memory
    - I/O (Input/Output) Devices
  - Application Programs — defines how resources are used
  - **Operating System** — controls and coordinates hardware

Components of a Modern Computer System

An **operating system** is a software that
- manages and controls a computer's hardware;
- coordinates and optimizes utilization of hardware;
- provides a basis for application programs.

An operating system is similar to a *government*, who performs no useful function, but provides an environment within which other programs can do useful work.

- User View
  - **Ease of Use** — One user monopolizes all resources.
  - **Maximizing Utilization** — Multiple users utilize resources simutaneously.
  - **Compromise** — OS assigns and shares resources to different users.
  - **Little or no User View**
- System View
  - **Resource Allocator** — processes numerous and possibly conflicting requests.
  - **Control Program** — manages the execution of user programs

1.2 Computer-System Organization

1.2.1 Computer-System Operation

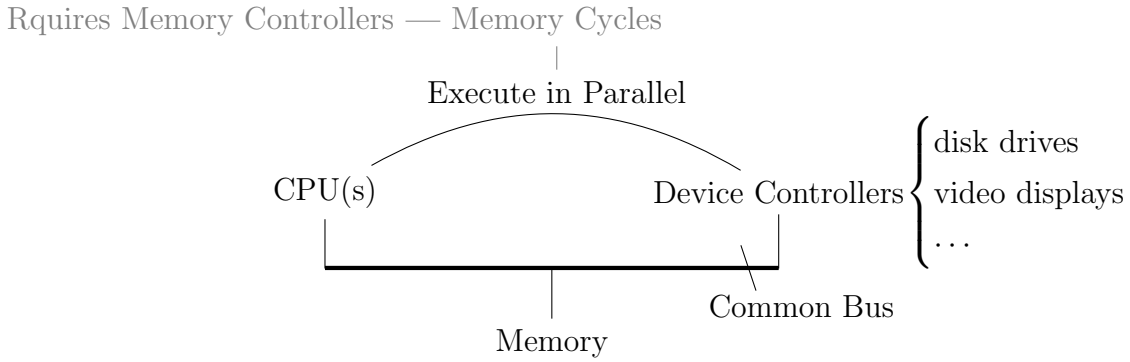


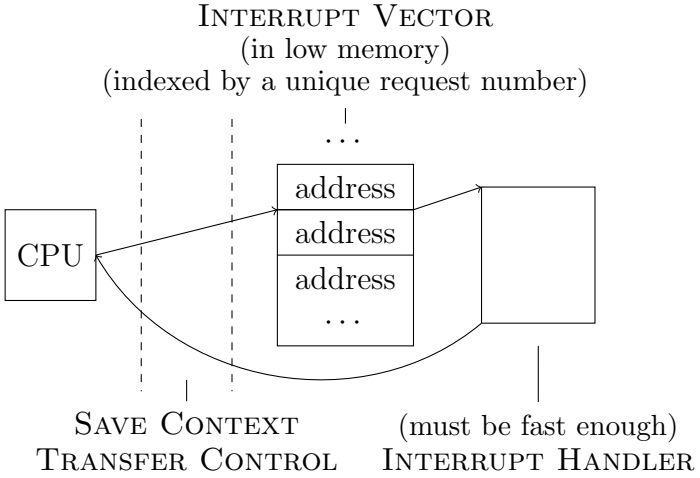
Figure: Components of Modern General-Purpose Computer

For a computer to start running, it
1. runs **bootstamp program**, which
   - tends to be simple.
   - is stored in **read-only memory** (ROM), or electrically erasable programmable ROM

- initializes all aspects of the operating system, including $\begin{cases} \text{CPU registers} \\ \text{device controllers} \\ \text{memory content} \end{cases}$
- locates the operating system and loads it to memory ($\Longleftarrow$ know how to load and start)

2. loads service programs (**system daemons**: outside kernel, loaded at boot, runs entire time)

The event is signaled by an **interrupt** from either hardware or software.



1.2.2 Storage Structure