Overview of Computer System and OS

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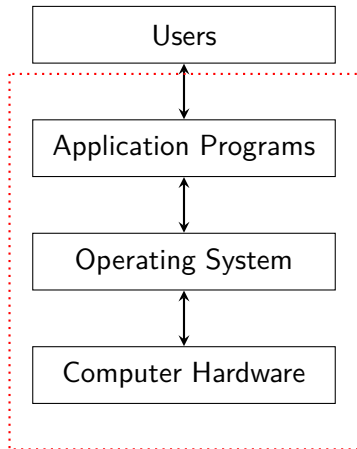# Outline

Let's have a group discussion

You have been using computers and operating systems. Otherwise, how did you get on this Zoom class? Your computer may run Windows, OS X, or the others. Let's have a group discussion.

1. What computers have you used before?
2. Where are these computers?
3. What do you use these computers for?
4. Do these computers have operating systems? What are these operating systems?
5. What do we need these operating systems for? In other words, what do these operating systems do?

A View of Computer Systems

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┌─────────────────────────────┐
│            Users            │
└─────────────────────────────┘
              ↕
┌─────────────────────────────┐
│    Application Programs      │
└─────────────────────────────┘
              ↕
┌─────────────────────────────┐
│      Operating System       │
└─────────────────────────────┘
              ↕
┌─────────────────────────────┐
│     Computer Hardware       │
└─────────────────────────────┘
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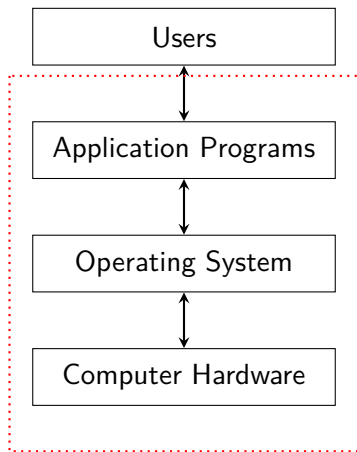
Operating Systems

- ▶ User view (ease of use)
- ▶ System view (efficient use of resources)

Running User Programs

Computers are for running useful programs. Is this the only way to run useful programs (i.e., as an application program in an operating system)?

Virtualization and Emulation

▶ Virtualization is a technology to abstract the hardware of a single computer to create the illusion of having multiple private computers on a single system.

  ▶ Virtualization allows operating systems to run as applications within other operating systems.

  ▶ Hypervisor vs. emulation

Ways to Run Programs?

Experiment with Computer Systems

To understand and help us review a few concepts of computer systems, let's do a few experiments.

1. Setting up Oracel VirtualBox (if not done before)
2. Setting up a Linux operating system (Debian) on a VirtualBox Virtual Machine (Linux VM)
3. Setting up QEMU on the Linux VM