

4 - Operating systems and Linux!

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In this lesson, participants will be introduced to operating system fundamentals. We will explore the boot sequence of a laptop computer in detail, and present the high-level features of a modern operating system. Finally, participants will begin to use the Linux command line.

Overview

Learning objectives

By the end of the lesson, students will be able to:

- Explain the boot sequence of a typical modern computer.
- Name some key features of a modern operating system, such as user isolation, memory protection, and hardware abstraction.
- Use a (bash-compatible) Linux shell for basic file management such as changing directories, moving/copying files, creating files and directories, and viewing text files.
- Use an editor from the vi family to edit files

Materials

To run this lesson, the following materials are necessary:

- The slides, available here: <https://www.computing-workshop.com/pdf/4-Operating-systems-and-Linux.pdf>
- Each participant requires a computer with VirtualBox installed, and each participant needs to download and unzip the prepared virtual machine: <https://files.jerrington.me/arch.zip>.
- In particular, this prepared VM contains a Linux command line scavenger hunt activity, available here: <https://github.com/tsani/scavenger-hunt>

Instructional sequence

5 mins. Facilitators will greet the participants and present the recap and lesson agenda.

20 mins. Two things happen concurrently during this period:

- A few participants will be pulled aside by one facilitator and will discuss the boot sequence of a computer following a video: <https://www.youtube.com/watch?v=zyHoBzm5taw>
- The remaining participants will reboot a computer multiple times and take note of visible and audible changes in the computer, in order to try to empirically figure out what the different stages of the boot sequence are. These participants will construct a timeline of events that take place during the boot sequence.

- 10 mins. The participants that were taken aside will work the participants who observed the boot sequence to bridge their knowledge. They will work together to annotate the timeline with the different stages of the boot sequence outlined in the slides.
- 5 mins. Facilitators will show a Crash Course Computer Science video on operating systems.
- 5 mins. Facilitators will introduce Linux by distinguishing distributions from kernels from other types of Linux OSes such as Android. Then, participants will boot up their virtual machines and log in. Facilitators will briefly touch on the `cd` and `ls` commands to prepare participants to do the scavenger hunt activity.
- 25 mins. Participants will complete the scavenger hunt activity as facilitators circulate to assist them.
- 5 mins. Facilitators will briefly recap the lesson and mention the topics to be discussed next week.