

./filesystems

How does the terminal + filesystem work?

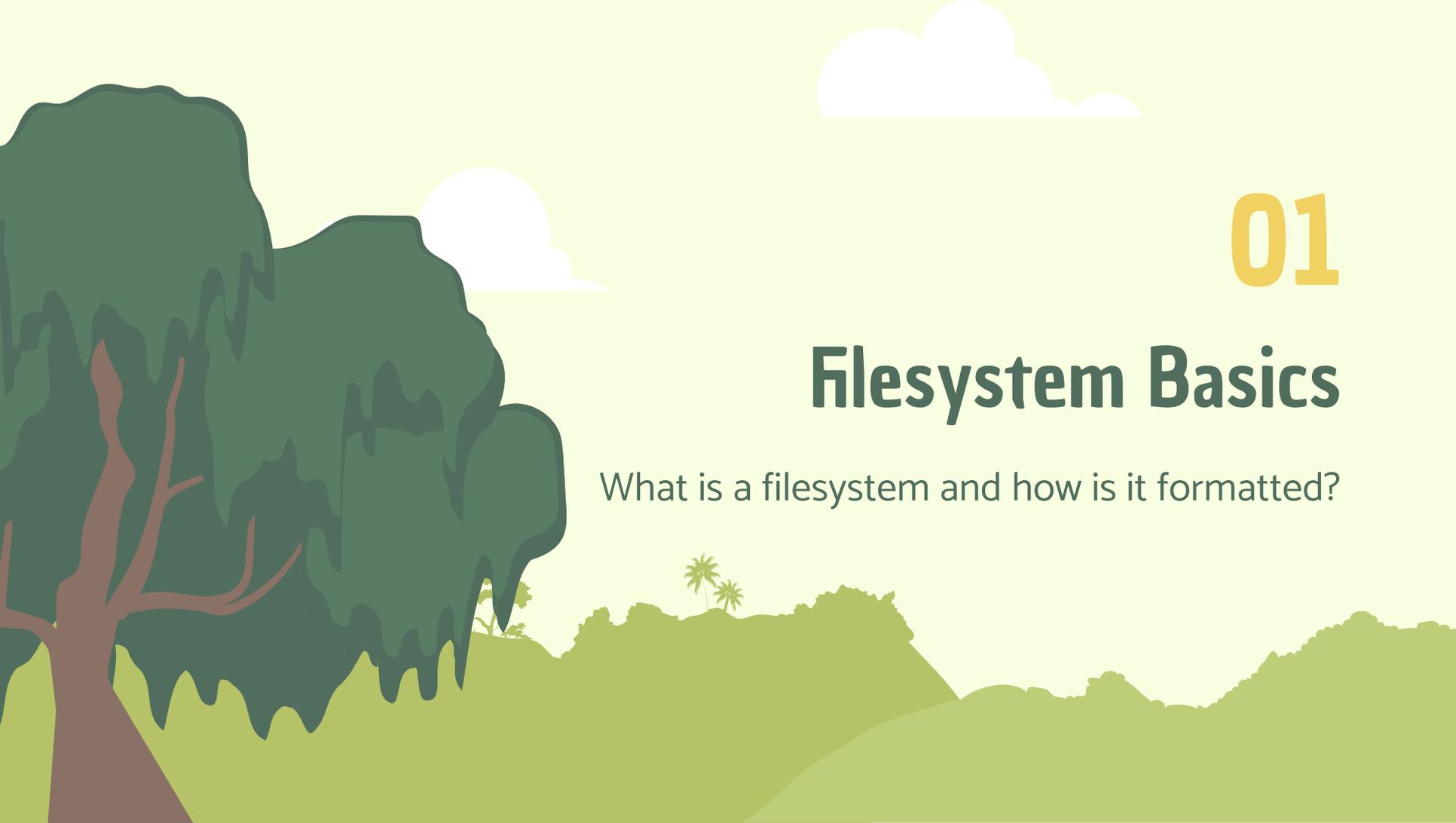
Pet tax!



Agenda



1. Filesystems Basics & the Terminal
 2. Navigating the filesystem
 3. SSH and SCP
 4. Reminders
- 



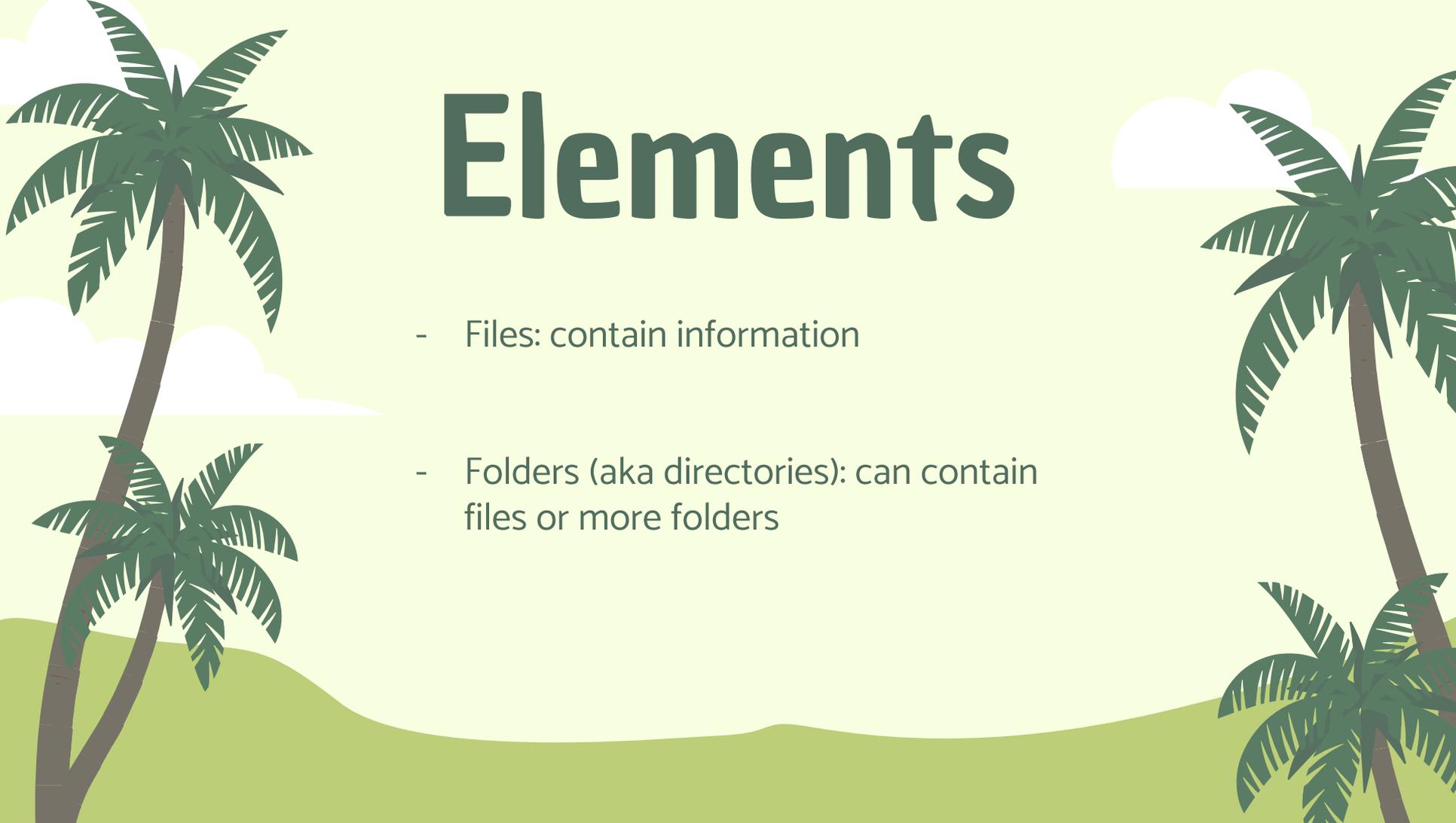
01

Filesystem Basics

What is a filesystem and how is it formatted?

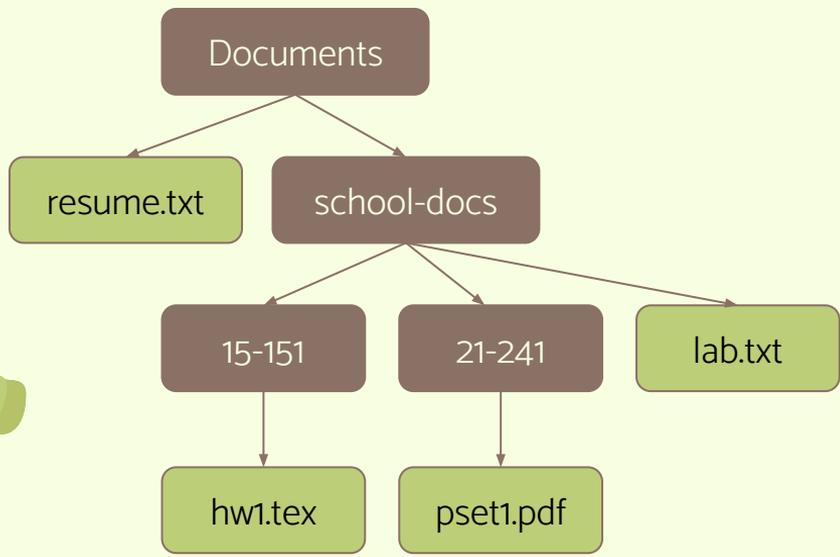
What?

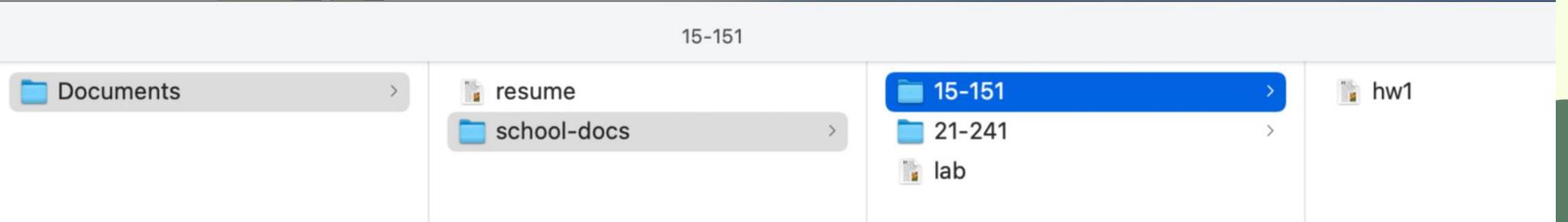
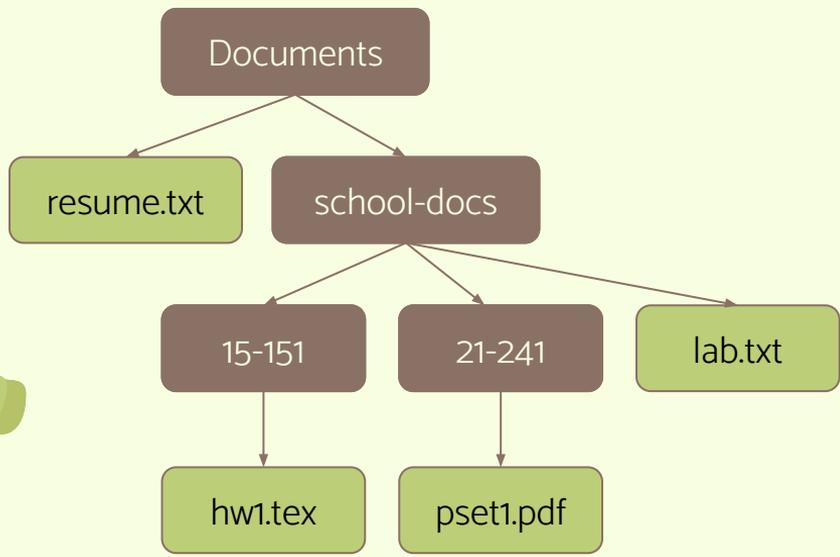
- The way your computer orders and stores files and folders
- Unique way of identifying each element based on the path

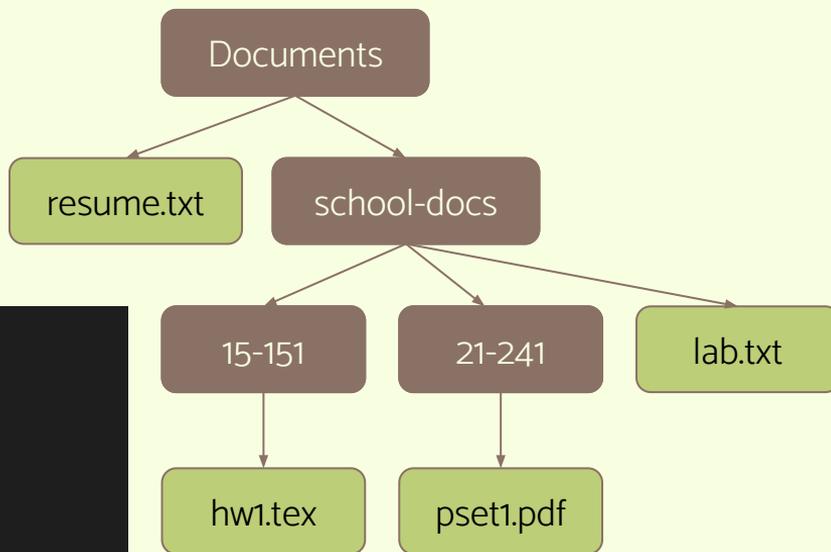
The background of the slide is a light green color with a tropical theme. On the left and right sides, there are stylized palm trees with dark green fronds and brown trunks. The sky is light green with white, fluffy clouds. The ground is a darker green color with a wavy horizon line.

Elements

- Files: contain information
- Folders (aka directories): can contain files or more folders







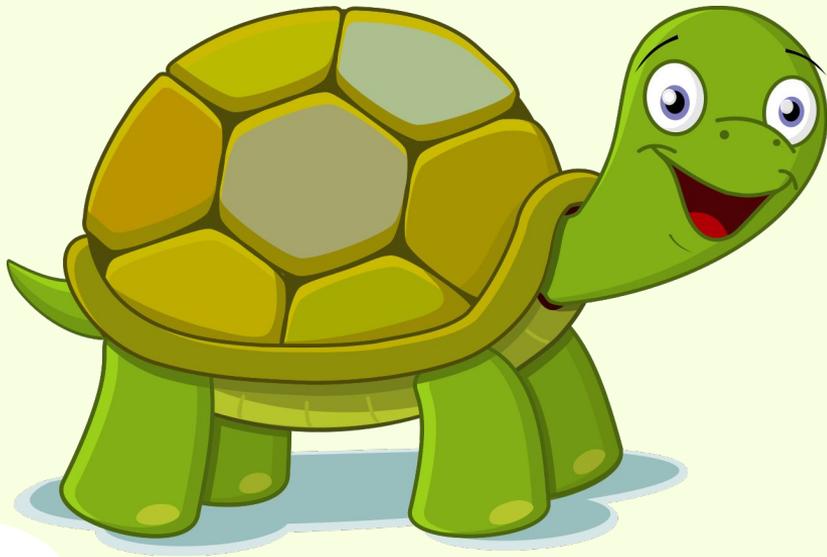
```
•  
├── resume.txt  
├── school-docs  
│   ├── 15-151  
│   │   └── pset1.tex  
│   ├── 21-241  
│   │   └── hw1.pdf  
│   └── lab.txt
```

3 directories, 4 files

```
kessler — bash — 130x31
Last login: Thu Jul 12 14:06:05 on ttys004
Tophers-Laptop:~ kessler$ find ~/Library/Preferences -name "*.lockfile"
/Users/tkessler/Library/Preferences/AdobeUse.plist.lockfile
/Users/tkessler/Library/Preferences/AOSMigrateAgent.plist.lockfile
/Users/tkessler/Library/Preferences/at.obdev.LittleSnitchConfiguration.plist.lockfile
/Users/tkessler/Library/Preferences/at.obdev.LittleSnitchNetworkMonitor.plist.lockfile
/Users/tkessler/Library/Preferences/ByHost/.GlobalPreferences.B302F989-8B8C-5874-8E7B-62C463FA9D91.plist.lockfile
/Users/tkessler/Library/Preferences/ByHost/Installer.B302F989-8B8C-5874-8E7B-62C463FA9D91.plist.lockfile
/Users/tkessler/Library/Preferences/ByHost/MicrosoftCommunicatorRegistrationDB.B302F989-8B8C-5874-8E7B-62C463FA9D91.plist.lockfile
/Users/tkessler/Library/Preferences/ByHost/MicrosoftRegistrationDB.B302F989-8B8C-5874-8E7B-62C463FA9D91.plist.lockfile
/Users/tkessler/Library/Preferences/ByHost/Safari Webpage Preview Fetcher.B302F989-8B8C-5874-8E7B-62C463FA9D91.plist.lockfile
/Users/tkessler/Library/Preferences/ByHost/vine loader.B302F989-8B8C-5874-8E7B-62C463FA9D91.plist.lockfile
/Users/tkessler/Library/Preferences/ca.lanpage.wacrawler.plist.lockfile
/Users/tkessler/Library/Preferences/com.adobe.AdobeOnlineHelp.plist.lockfile
/Users/tkessler/Library/Preferences/com.adobe.CSXSPreferences.plist.lockfile
/Users/tkessler/Library/Preferences/com.adobe.illustrator.plist.lockfile
/Users/tkessler/Library/Preferences/com.adobe.mediabrowser.plist.lockfile
/Users/tkessler/Library/Preferences/com.adobe.Photoshop.plist.lockfile
/Users/tkessler/Library/Preferences/com.apple.ActivityMonitor.plist.lockfile
/Users/tkessler/Library/Preferences/com.apple.AddressBook.abd.plist.lockfile
/Users/tkessler/Library/Preferences/com.apple.AddressBook.plist.lockfile
/Users/tkessler/Library/Preferences/com.apple.AddressBook.sync.plist.lockfile
/Users/tkessler/Library/Preferences/com.apple.AddressBookSourceSync.plist.lockfile
/Users/tkessler/Library/Preferences/com.apple.adminframework.plist.lockfile
/Users/tkessler/Library/Preferences/com.apple.airport.airportutility.plist.lockfile
/Users/tkessler/Library/Preferences/com.apple.applescript.plist.lockfile
/Users/tkessler/Library/Preferences/com.apple.applesid.Feedback-Assistant.plist.lockfile
/Users/tkessler/Library/Preferences/com.apple.appstore.plist.lockfile
/Users/tkessler/Library/Preferences/com.apple.archiveutility.plist.lockfile
/Users/tkessler/Library/Preferences/com.apple.audio.AudioMIDISetup.plist.lockfile
/Users/tkessler/Library/Preferences/com.apple.audio.aulab.plist.lockfile
```

Terminal!

A text input/output environment that allows you to communicate with the internal shell of your laptop



Shell!

Interface that executes custom commands which directly affect the computer (e.g. file/process management, processing, monitoring)

Most computers use bash, but some other common examples include zsh, sh, and csh.

Why use a text-based terminal over a GUI?



Faster



Batch processes



Flex on the GUIers



Required in classes



More granularity



Get used to trees!

Absolute paths

“/” to separate

- The full path of the file / directory
- File paths are separated with the forward* slash
- This gives an “absolute path” to every file
- **E.g.:**
/Documents/school-docs/15-151/pset1.tex

```
.  
├── resume.txt  
├── school-docs  
│   ├── 15-151  
│   │   └── pset1.tex  
│   ├── 21-241  
│   │   └── hw1.pdf  
│   └── lab.txt
```

3 directories, 4 files



Simplifying paths

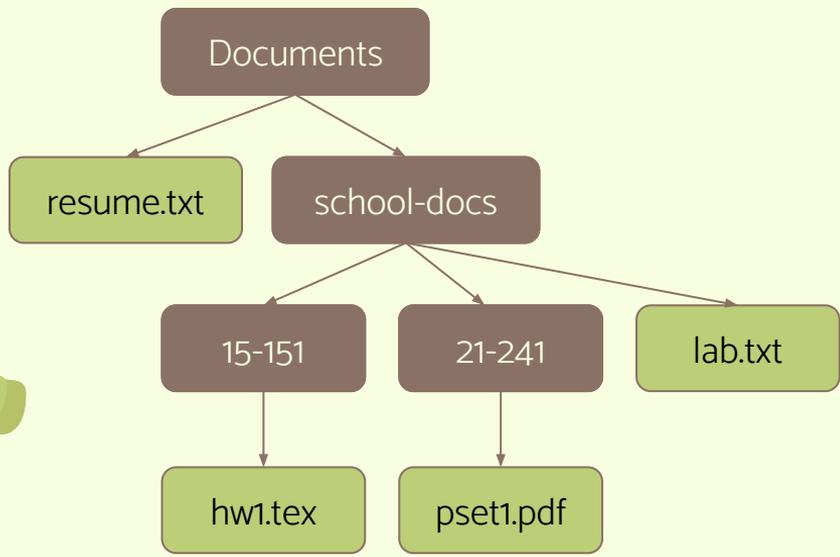
Sometimes path names get very long, but there's an easier way to refer to them!

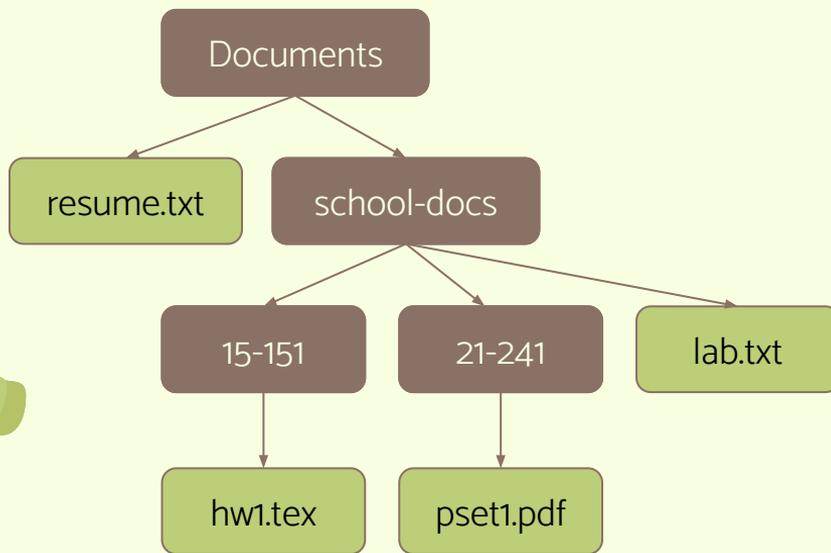
Present Working Directory - where you are right now! You can make relative paths around this

- Ex: if you've already made your way into the /Documents/school-docs/15-151 folder, you can just use `./hw1.tex` to access the file

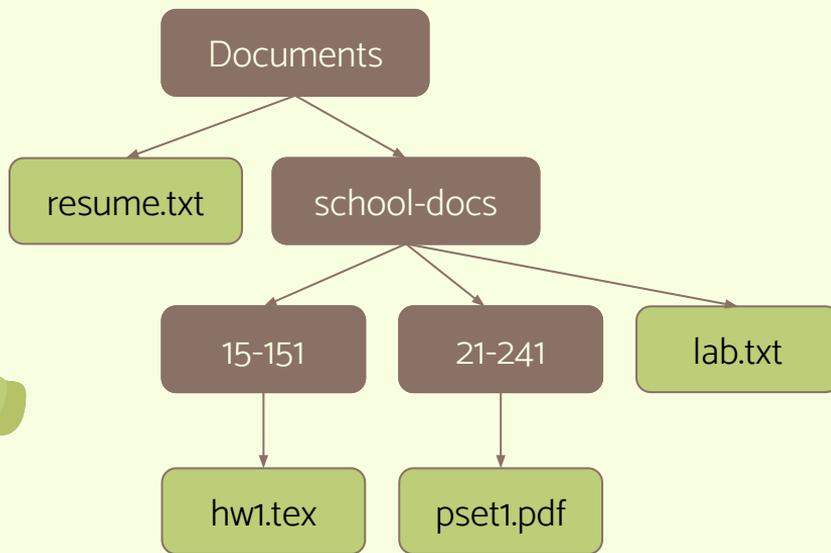


```
~/private/gpi-ta/Documents/school-docs/15-151$
```

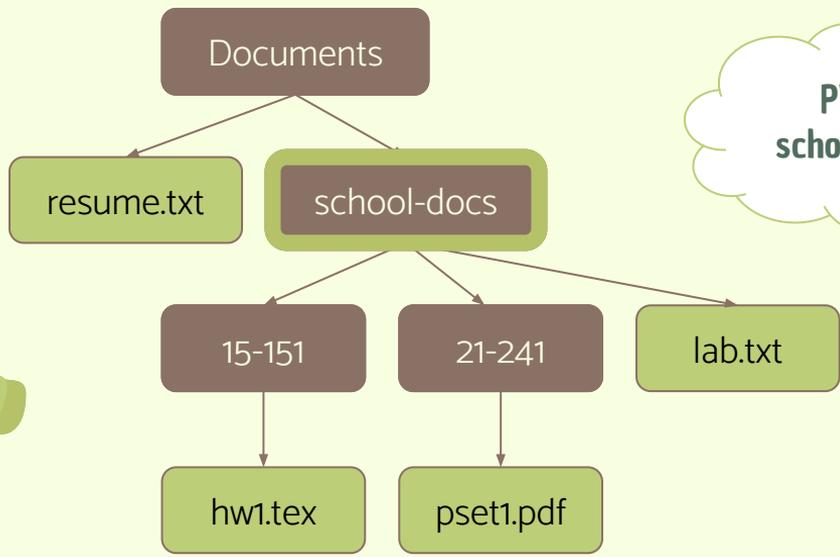




What is the absolute path of pset1.pdf?

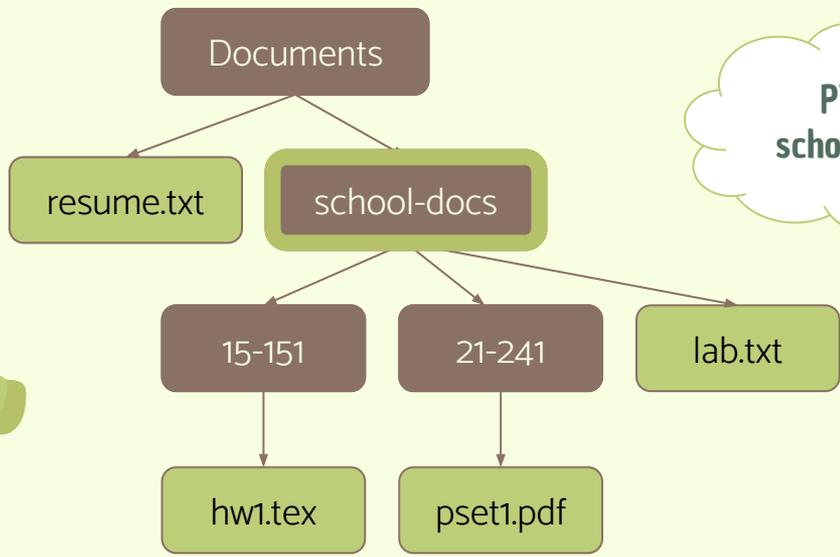


`-/Documents/school-docs/21-241/pset1.pdf`



PWD:
school-docs

If your PWD is school-docs, what is the shortest path to pset1.pdf?



PWD:
school-docs

`./21-241/pset1.pdf`



02

Navigating the filesystem

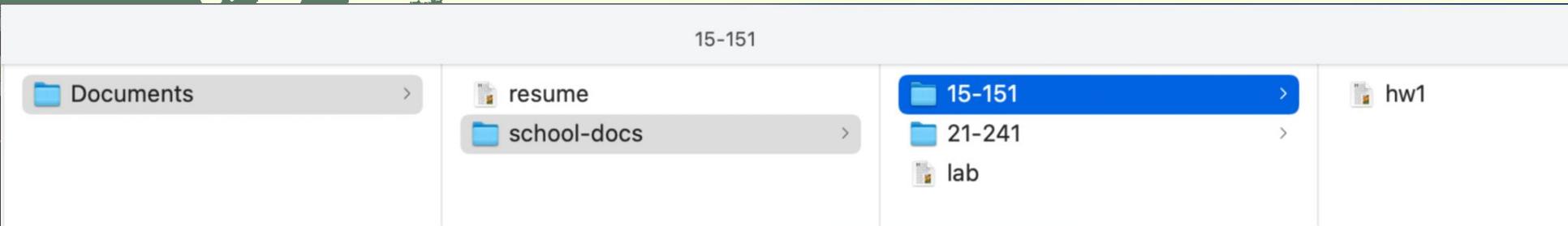
Now that we know what it looks like, how do we use our terminal to move around in it?

Moving Around

`cd <path>`

Command to **change directories**,
just give it the absolute or relative
path

```
Downloads % cd school-docs/15-151
```



Path Shortcuts

Replace the path with the following shortcuts

- specifies the present working directory
“./filename.pdf” refers to the file under your pwd
- specifies the parent of the present working directory
“cd ..” brings you back to your parent
- ~ specifies the home directory (the root of the tree)
“cd ~” brings you back to the root directory



Important commands



ls

“list” - it **lists** all the files/folders under your current working directory (not recursively!)

EX: using ls under the “school-docs” folder will return “15-151 21-241 lab.txt”



tree

Shows all files and folders recursively

```
.
├── resume.txt
├── school-docs
│   ├── 15-151
│   │   └── pset1.tex
│   ├── 21-241
│   │   └── hw1.pdf
│   └── lab.txt
```

Important commands

IMPORTANT NOTE!

Unix has “hidden files” which are named beginning with a “.” and don’t show up using just “ls”.

Use the “-a” flag to show the file!

“list”
under your

EX: ls un
return

```
/15-151$ ls -a
```

```
.. .hidden pset1.tex
```

Usually files
you’re not
supposed to
touch

Interacting

goal	for files...	for directories...	argument
create/make	touch	mkdir	<target>
copy	cp	cp -r	<src> <dst>
rename/ move	mv	mv	<src> <dst>
delete/ remove	rm	rm -r	<target>

Interacting

goal	f	argument
create		t>
c		t>
		>

PRO TIP

“man <command>” if you’re ever not sure what a certain command does

“man -help” gives more info ab man pages

Google is also a great resource for commands

A tropical-themed background featuring a light green sky with a large white sun in the upper right, white clouds, and a green horizon line. Two palm trees are positioned on the left and right sides, each with a smaller palm tree in front of it. The word "DEMO" is centered in the middle of the image.

DEMO

A stylized landscape illustration with a light green background. On the left, a large, dark green tree with a brown trunk stands prominently. In the background, there are rolling green hills, a few palm trees, and a white sun partially obscured by a white cloud. Another white cloud is visible in the upper right sky area.

03

SSH and SCP

For our GPI labs...

AFS: Andrew File System

Invented at CMU!

Quota of space to access
anywhere

OldFiles

Backed up once
nightly in case you
delete something

NOTE!

Do not rely on
oldfiles - most
places don't have it
so think before
deleting!

Private and
public dirs

fs lq

Command to see
how much
"listquota" you're
using

NOTE!

Classwork/homework
should go into private
directory (can be an
AIV)



How to access AFS?

SSH

- SSH stands for “**S**ecure **S**hell”
 - Reminder a shell let’s you execute commands that will directly affect your computer
- Fancy way to get a shell on your computer over the internet.
- When you use SSH, you are running commands on a computer that is not your personal laptop
 - aka running commands on AFS instead

```
~ % ssh andrewid@unix.andrew.cmu.edu
```

SSH

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 - aka running commands on AFS instead

**Or use:
ssh andrew**

```
~ % ssh andrewid@unix.andrew.cmu.edu
```

SCP

scp stands for “**secure copy**”. It’s a program for copying files from one machine to another machine. Be careful about the direction in which you copy – you should be on the same system as your “source”.

It uses the same authentication and security as SSH.

```
scp [-r] <source> <destination>
```

```
~ % scp andrewid@unix.andrew.cmu.edu:~/private/gpi-labs/trainerlab/handin.zip Downloads/
```

A tropical-themed background featuring a light green sky with a large white sun in the upper right, white clouds, and a green ground area with rolling hills. Two palm trees are positioned on the left side, and another two are on the right side. The word "DEMO" is centered in the middle of the image in a dark green, bold, sans-serif font.

DEMO

Class Updates

1. Extratation (Summer Opportunities!!!!!!!!!!!!!!)
 - a. Saturday @ 1:00 - 2:00pm in GHC 4215
2. Feedback Form
3. OH Calendar
4. HackCMU - (9/16-17)

trainerlab tips

- Make sure you go back to the trainerlab folder before running “./professor”
- Make sure you capture pokemon with your pokeball....not yourself. Pokeballs don't work on humans
- If you `mv <src> <dst>` and if `<dst>` is not a directory, it will rename the file, so be careful about the order of your arguments
- Refer to the Readme for submission instructions (scp command is there)

