Intro to Linux

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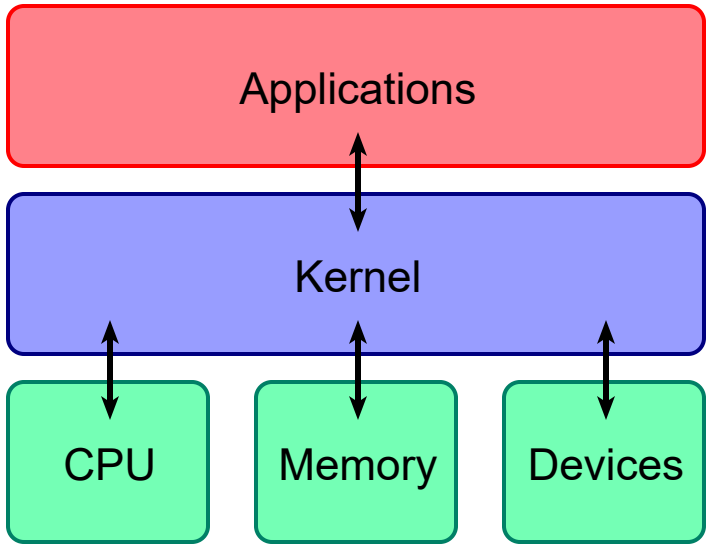
Who am I?

- UCC committee/wheel person
- UWA graduate, soon to be professional computer wrangler
- github.com/bir-d

What is Linux?

- A kernel
- Not necessarily an OS
- But a major building block towards one



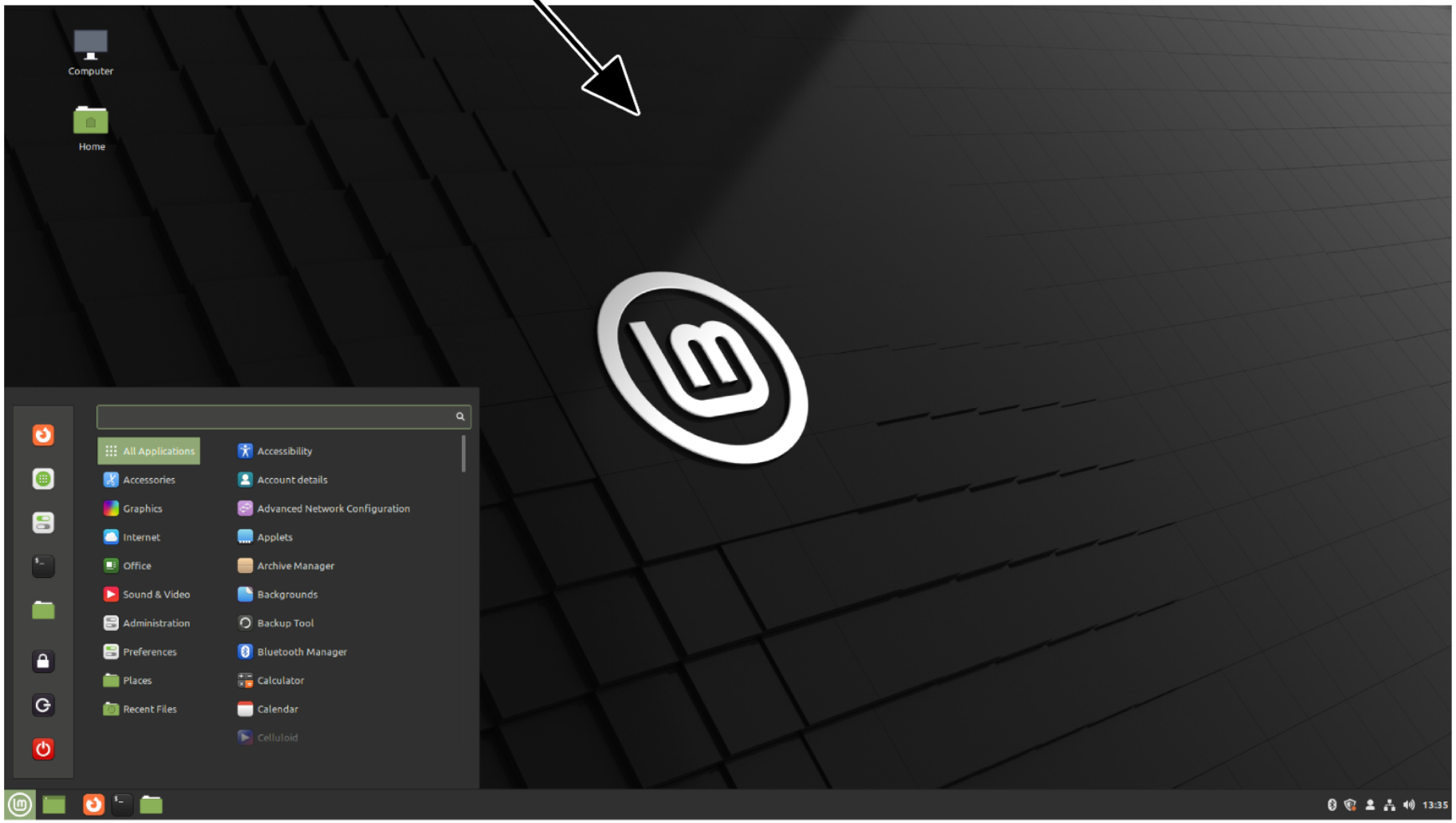
A little bit like this!

So what are these "distros" I keep hearing about?

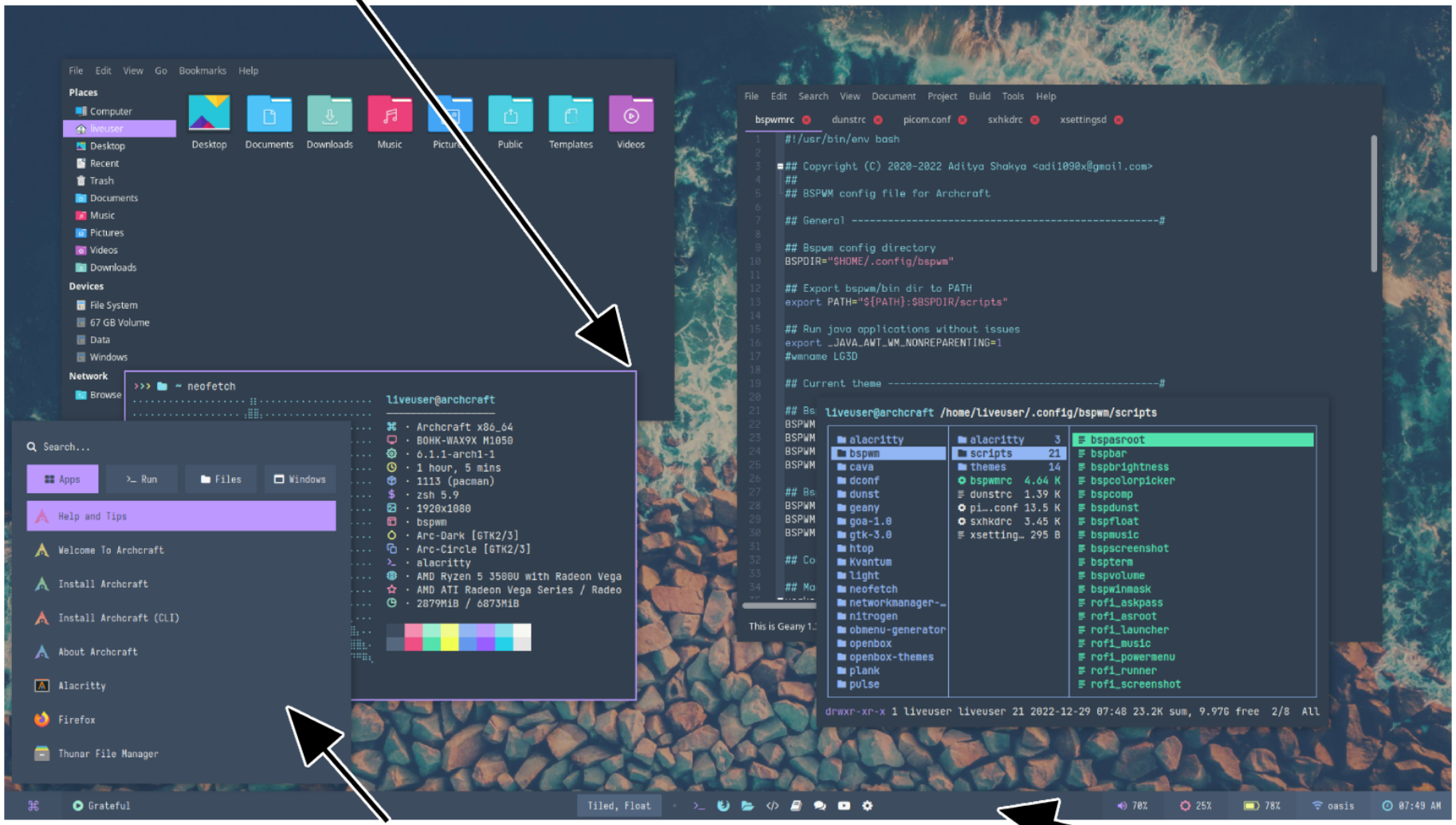
- A distro (distribution) is simply Linux + a bunch of other programs to help you get things done.
- For example, Ubuntu is Linux + a desktop environment (GNOME) + a bunch of other stuff.
- As a result....

Linux

Desktop environment: Cinnamon

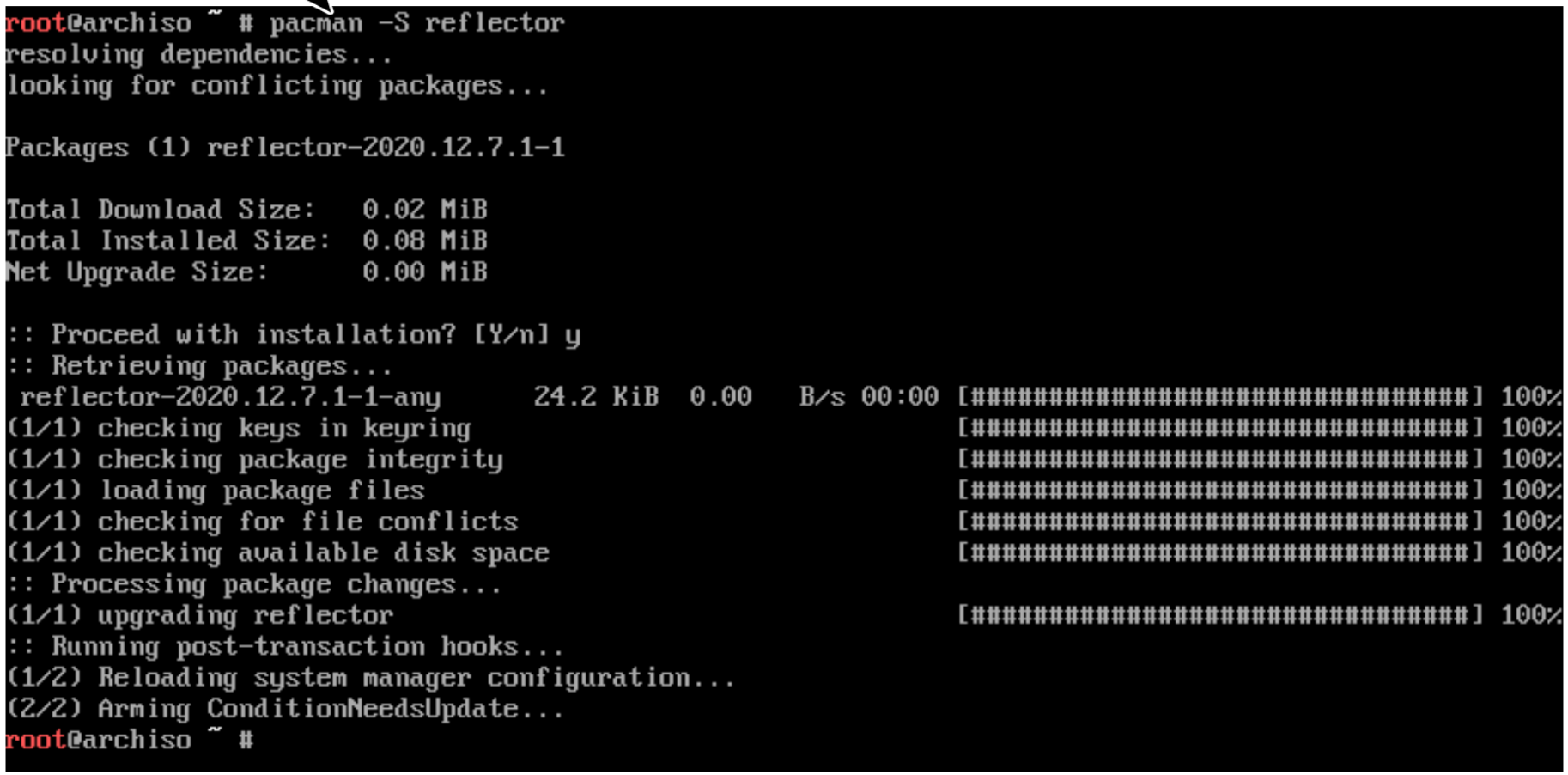


(also) Linux


Window manager: bspwm
Program lauuncher: rofi
Status bar: polybar

(I can't believe it's still) Linux

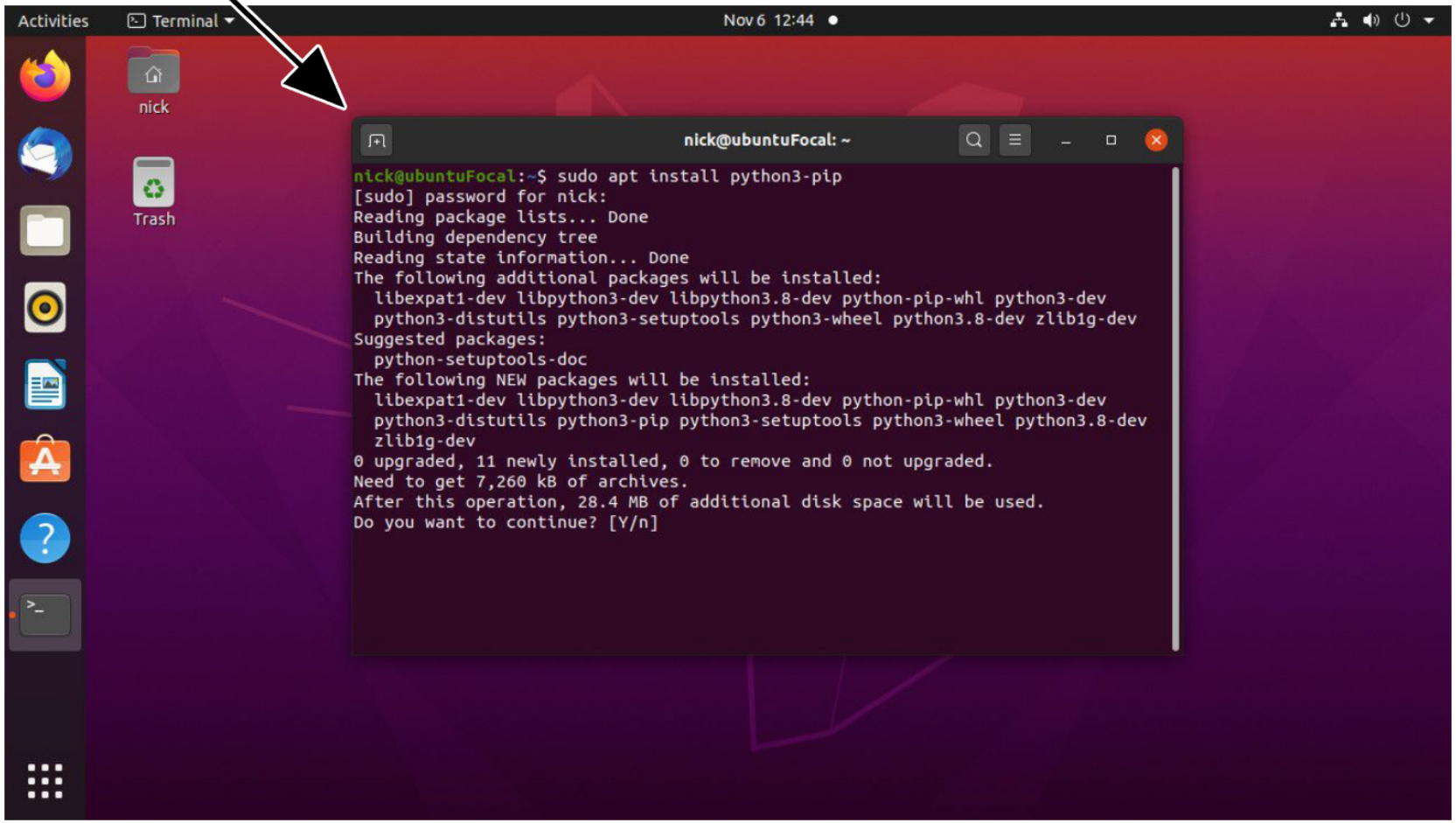
Package manager



Its a terminal...

Archaic but effective

Terminal (emulator!)



A reoccuring theme

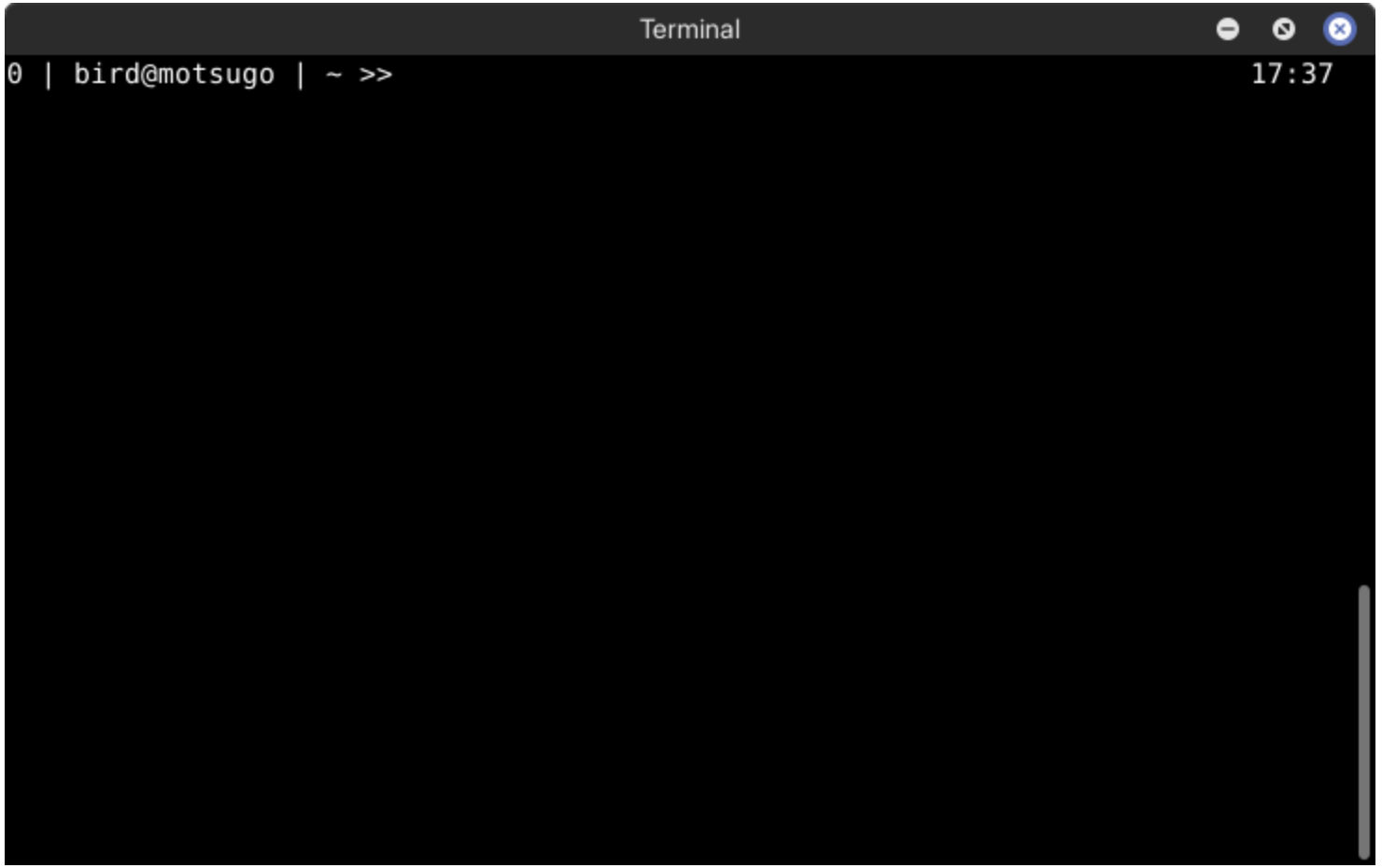
Pretty much *everything* is just a bunch of smaller programs stuck together

(I wish it was this nice...)

The key

Understand which of these programs you care about and how to interact with them.

Let's talk more about the shell



(this thing)

Why?

- We need some way to get stuff done on the computer, and
  - As we've seen, a graphical environment is *nice*, but **not guaranteed!**
    - Linux with no display manager or window manager installed is still Linux!
- However, the shell is typically always available -- and ubiquitous across every distro.
- The shell is also **VERY GOOD** at interacting with very specific programs -- in very specific ways.

What is the shell?

- (yet another) program
- Also known as a "command line" or "terminal"
- Multiple available
  - The most popular of which is `bash`
    - It's worth noting that MacOS also uses this!
- Most often, this will be run on your own computer (local shell), or you will be interacting with a remote shell (via SSH)

Let's talk about commands

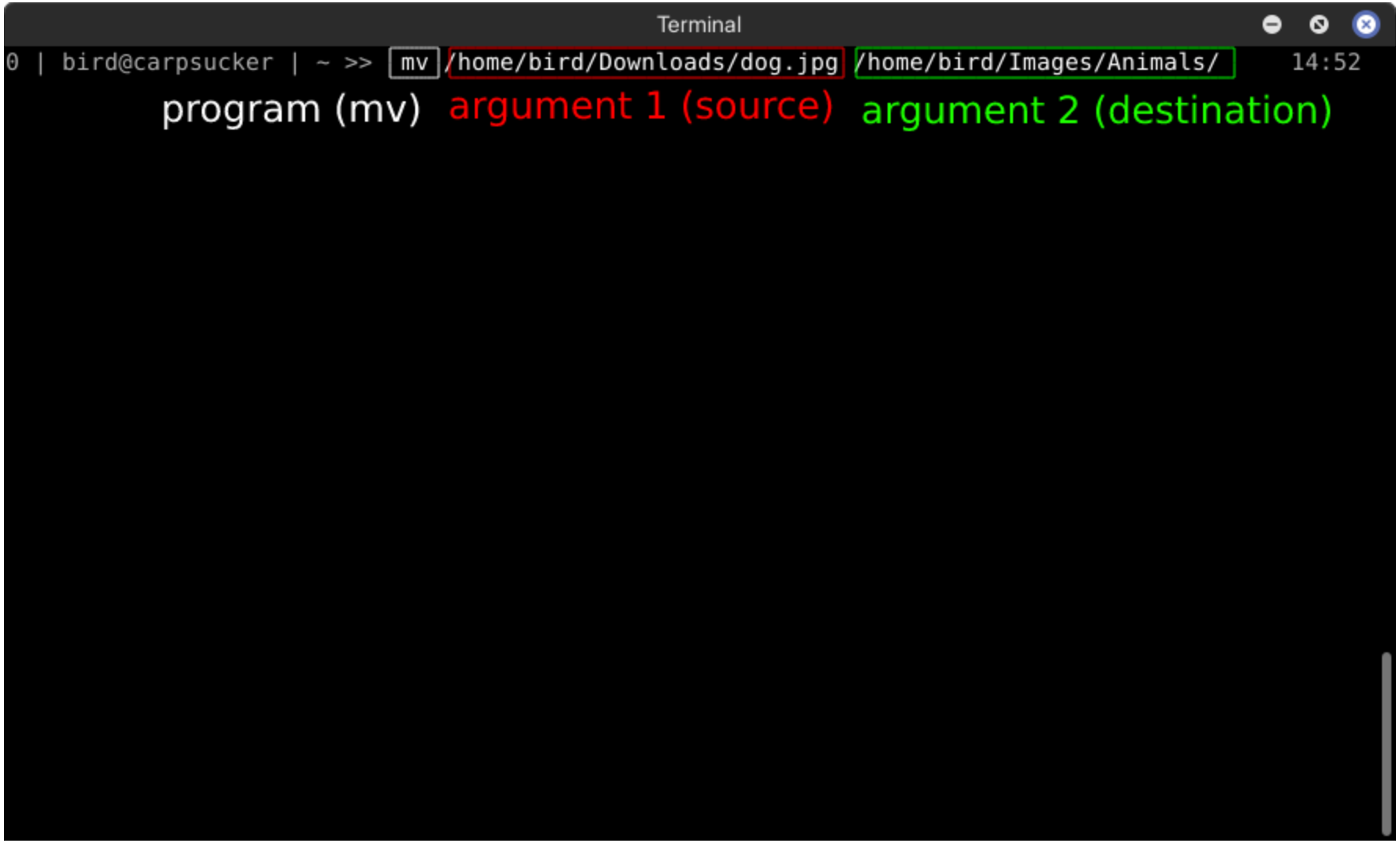
Essentially: the name of a program, any required *flags*, then as many required *arguments* as input

- You can then do all sorts of stuff with the output!

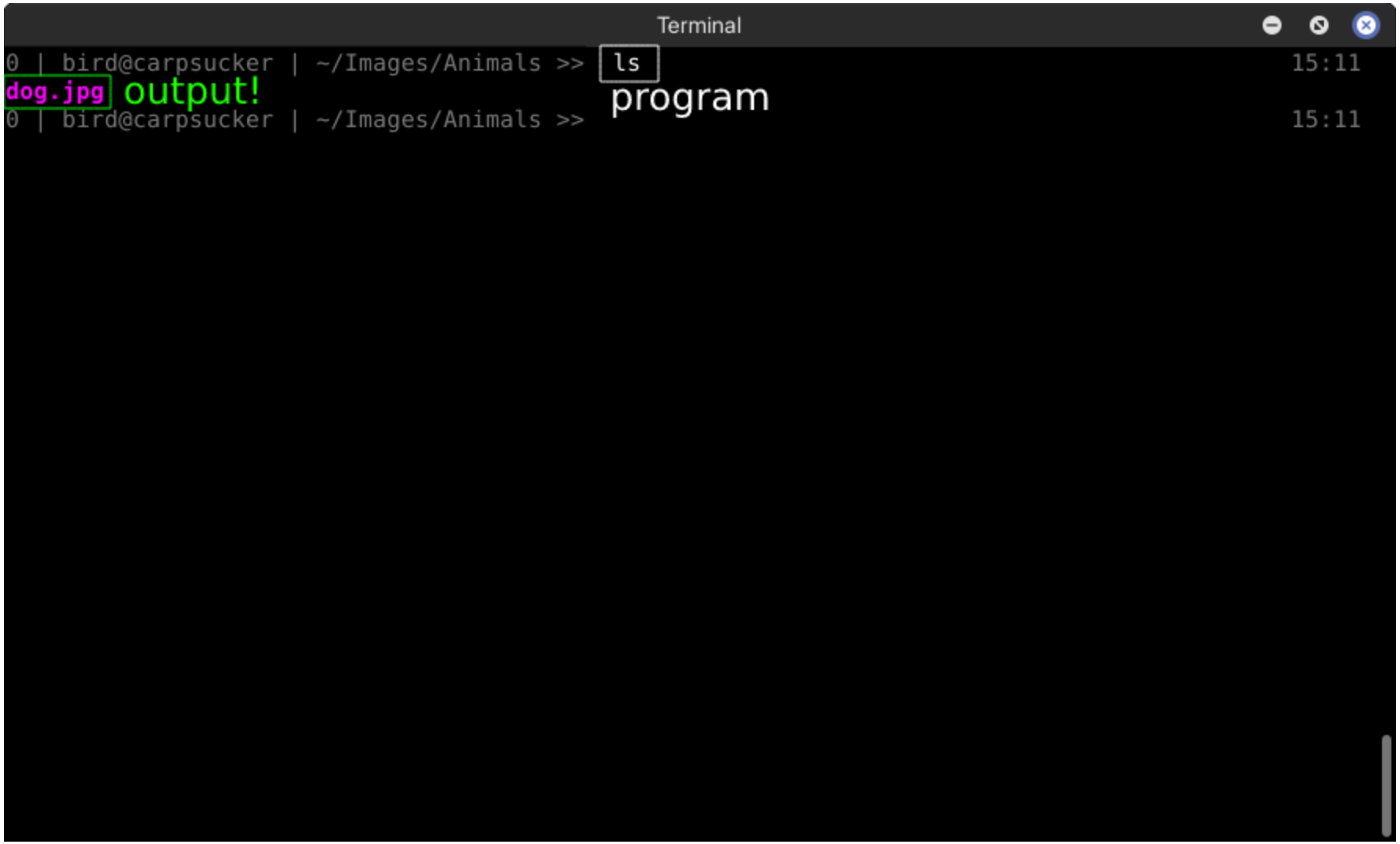
Common patterns?

- `program`
- `program` `FLAGS` `TARGET`
- `program` `FLAGS` `SOURCE` `DESTINATION`

Commands...


Terminal
0 | bird@carpsucker | ~ >> mv /home/bird/Downloads/dog.jpg /home/bird/Images/Animals/ 14:52
program (mv)
argument 1 (source)
argument 2 (destination)

Another one

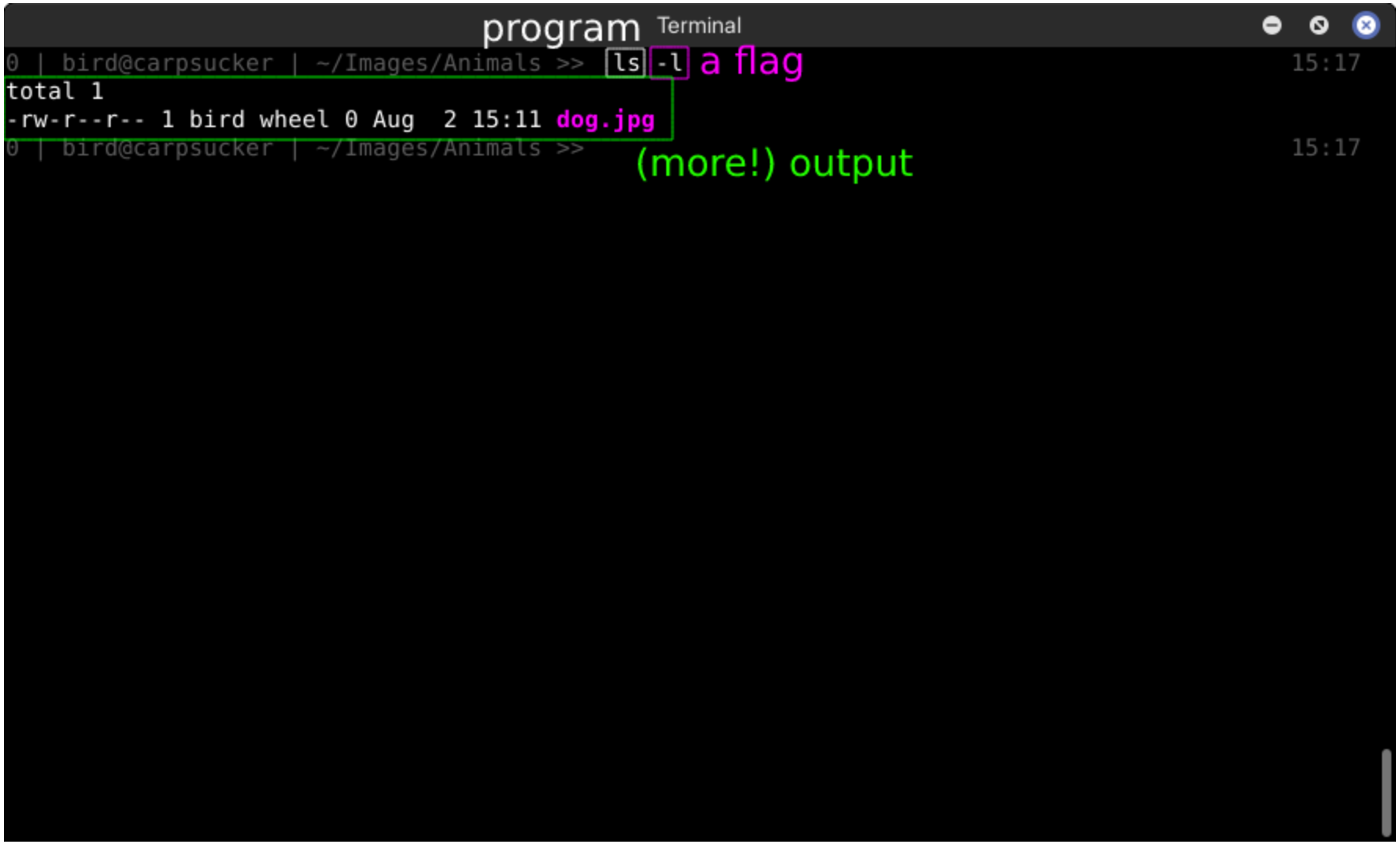

Terminal
0 | bird@carpsucker | ~/Images/Animals >> ls
15:11
dog.jpg
output!
program
0 | bird@carpsucker | ~/Images/Animals >>
15:11

Introducing flags

Alters a programs *behaviour*

- ls
  - Prints all non-hidden files in the current directory
- ls **-l**
  - Prints all non-hidden files, as well as additional information.
- You can string these together
  - Try `ls -l -t -r -a -p`
    - shorter: `ls -ltrap`
- The manual page lists all of the flags (and more!) for any program with an entry
  - Try `man`, and pass it a programs name as its first argument! (`man ls`)

Introducing flags

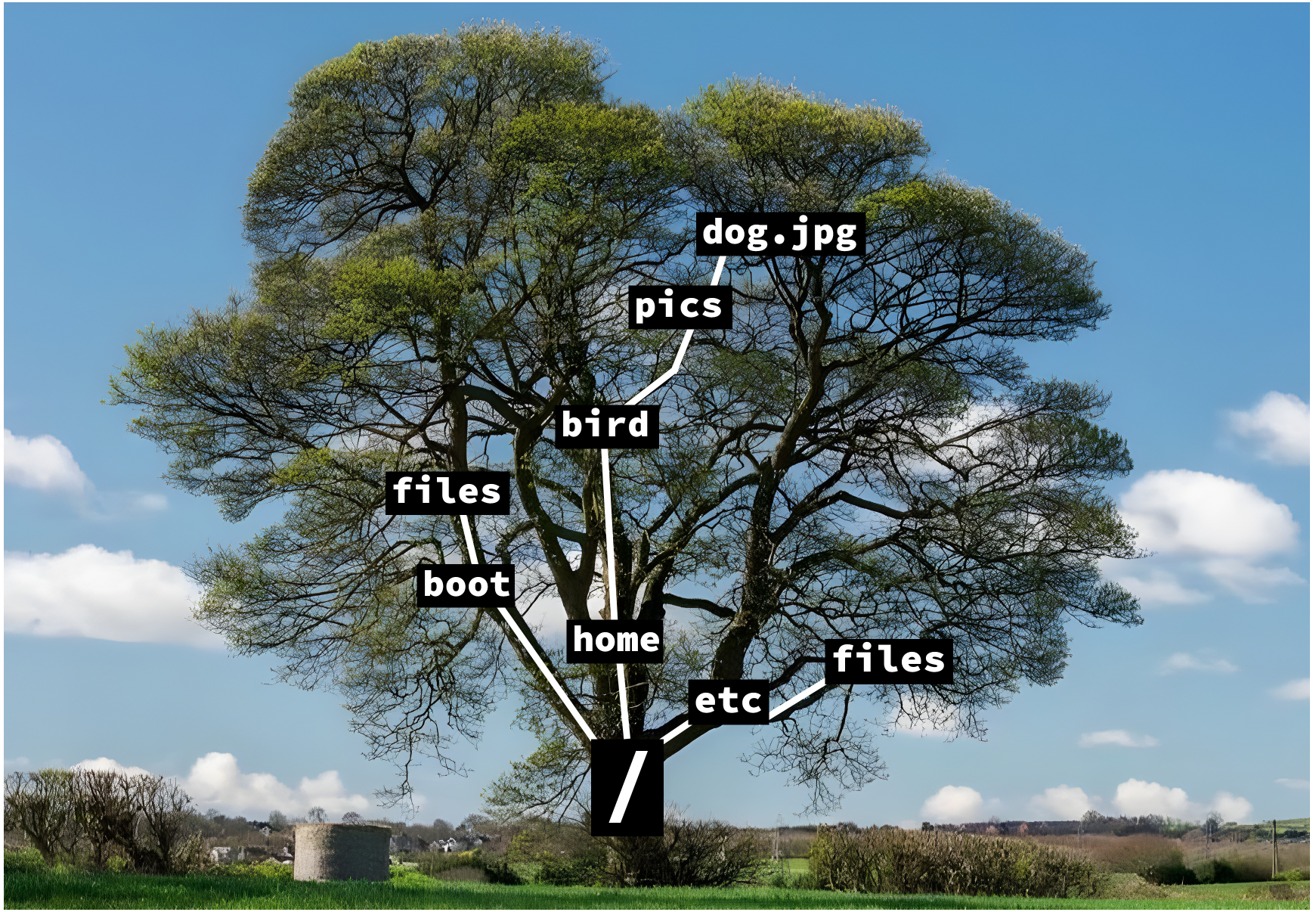


The file tree

- Programs will typically operate on files!
- Files sit in your filesystem
- Visualise this as a tree!

The file tree

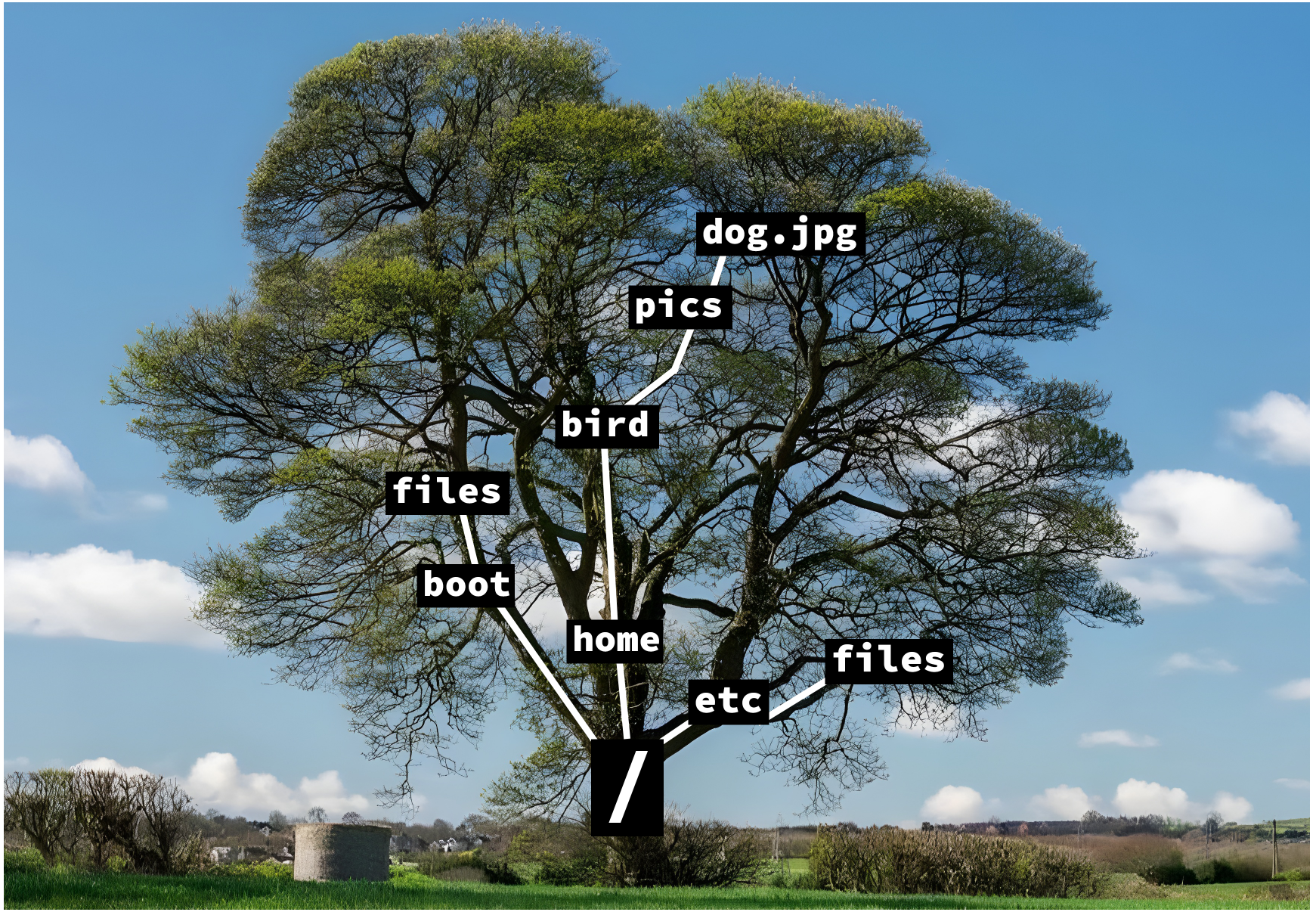
The file tree



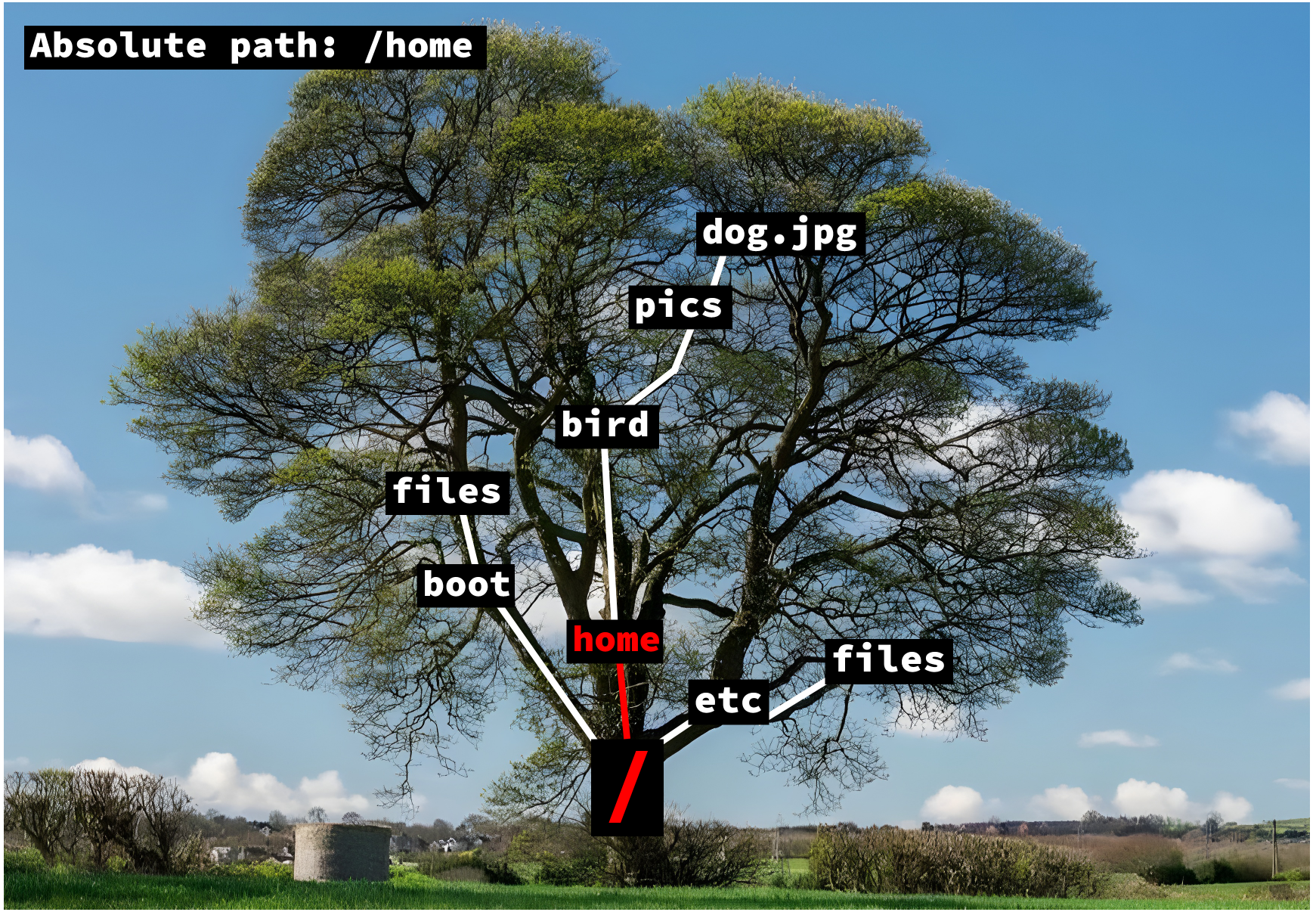
Referencing files

- When referring to files, you will typically refer to an *absolute* or *relative* path to the file
    - Think of a file path as directions to a file.
- So far you've seen what is called an *absolute path*
    - This is a path which specifies a file from the root `/` allll the way to the destination!
    - For example:

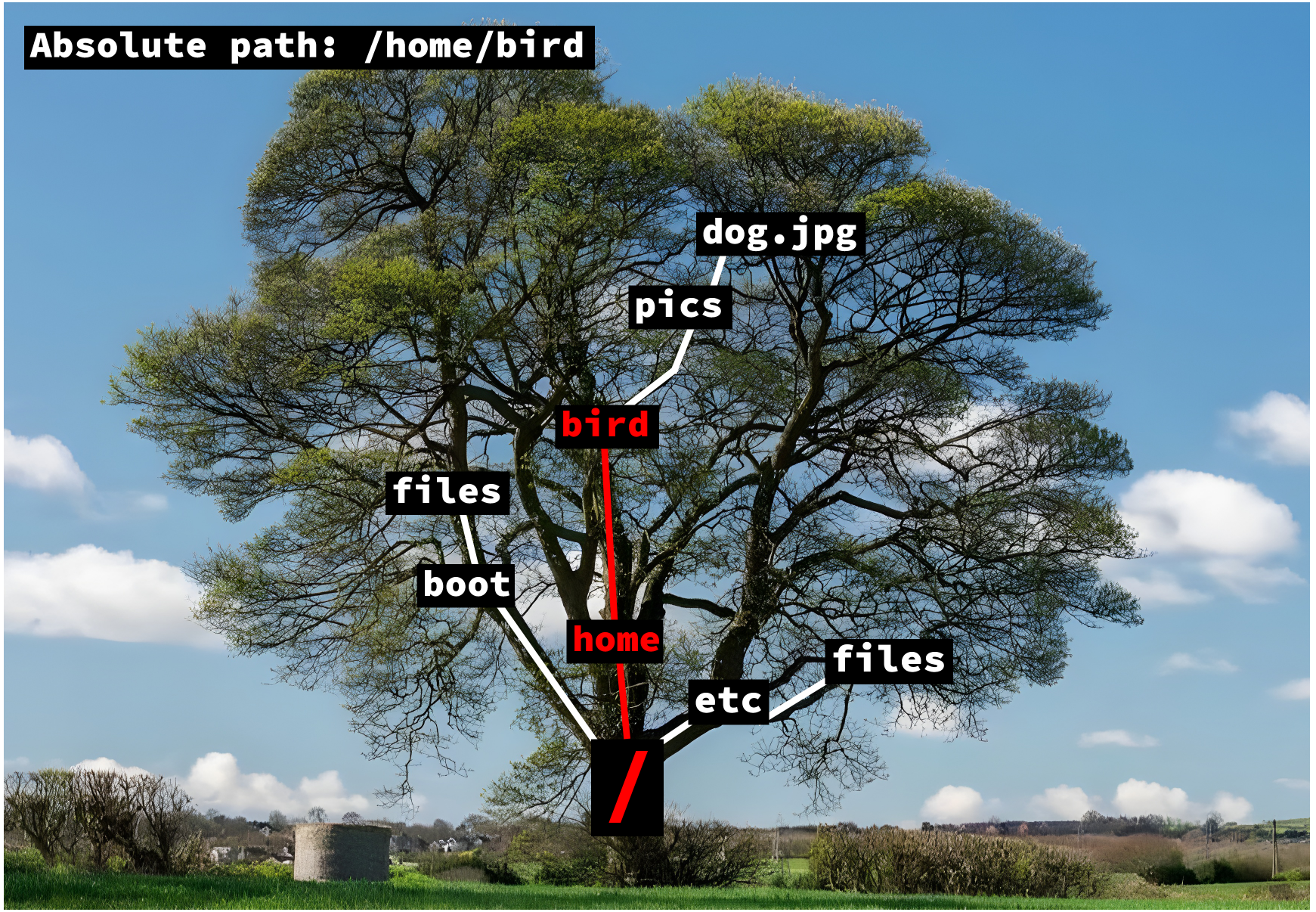
Absolute file path



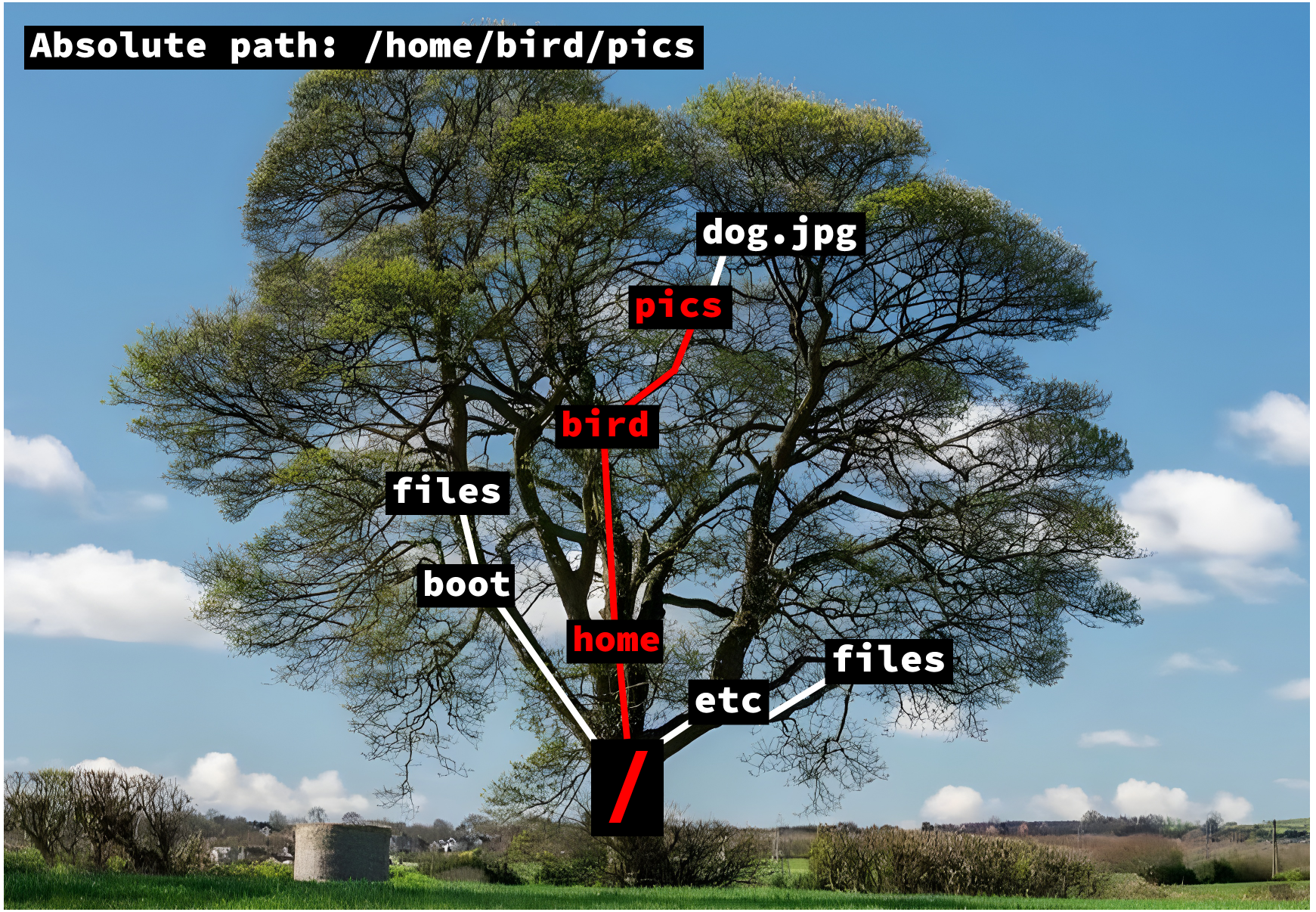
Absolute file path



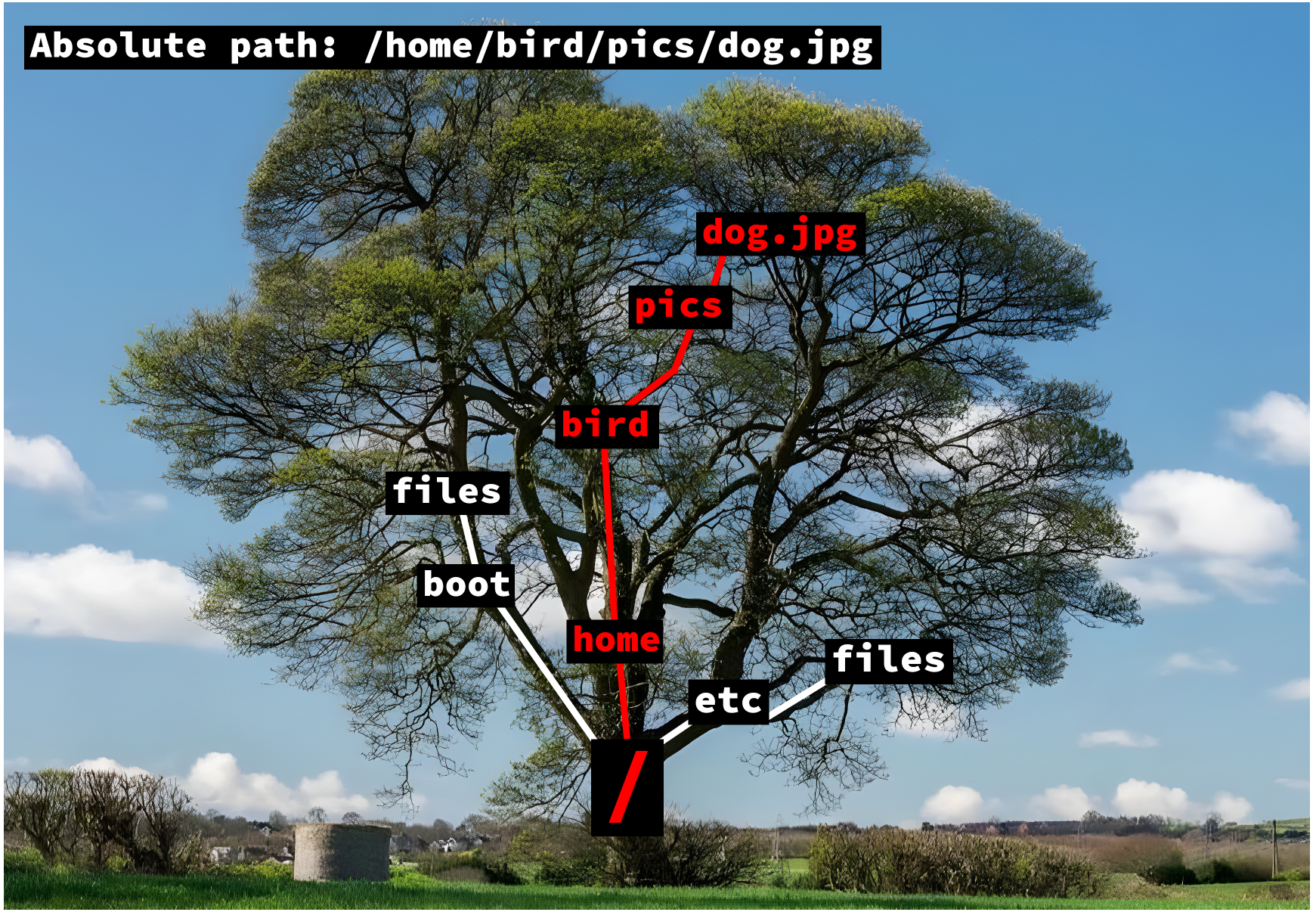
Absolute file path



Absolute file path



Absolute file path



Absolute file path

- Lets use our path to `dog.jpg` and supply it to `tiv`, a program for viewing images on the terminal

More on file paths

- A good thing about absolute file paths is that there's *no* ambiguity.
- If you specify the whole path, from the root, every time, the file can be in only *one* place.
    - Follow the tree!
- They can be tedious to type though, especially when your path is more than a few folders long.
- The solution: relative paths!

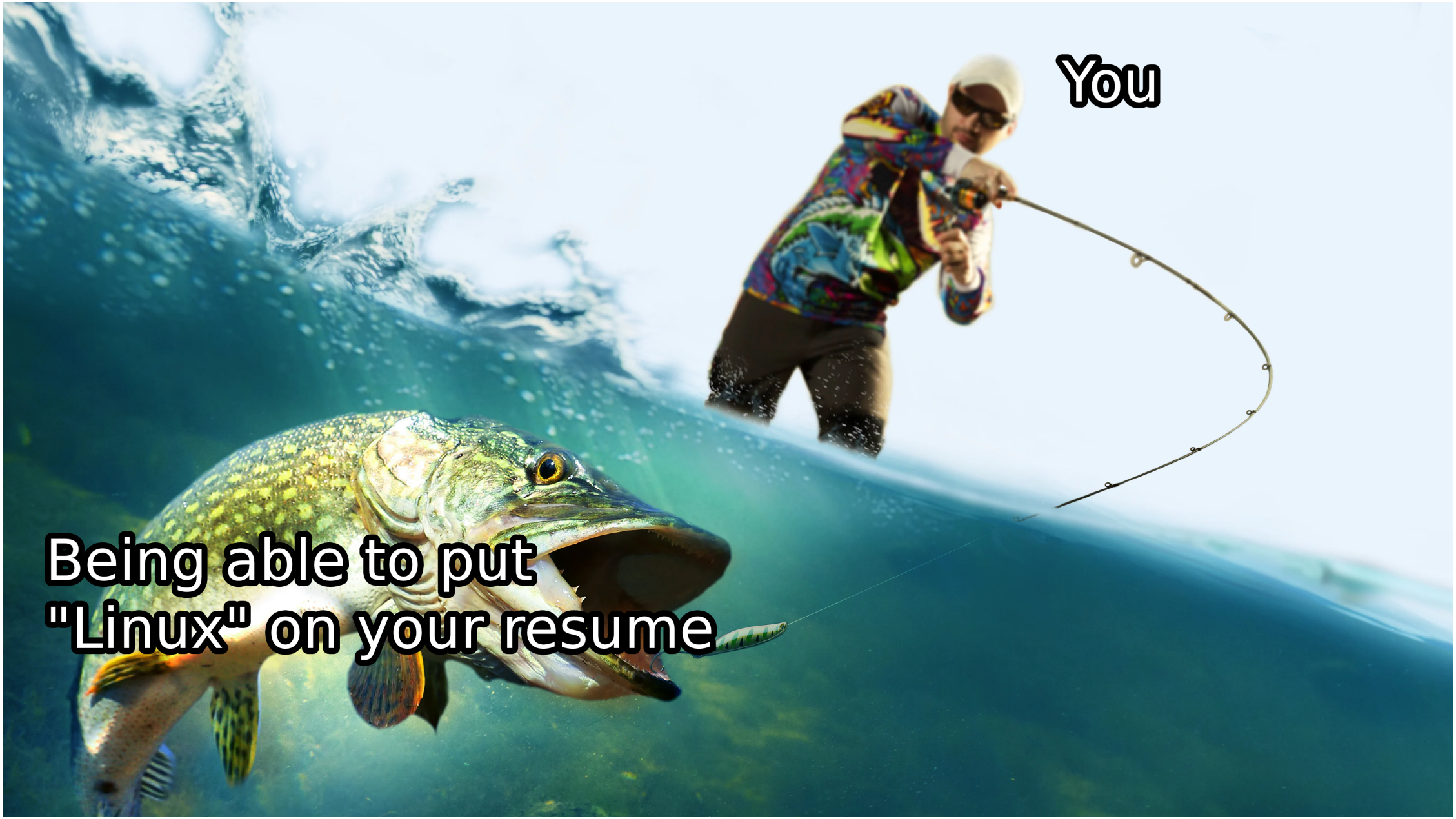
Relative? Relative to what?

- A relative path is relative to your *current working directory*
  - This is just a way of expressing "the folder you are in currently"
- To construct a relative path, just express directions from your current working directory to the file in question.
- In the case of `/home/bird/pics/dog.jpg`:
  - If my current working directory is `/home/bird/`, I can specify a relative path as `pics/dog.jpg`
  - If my current working directory is `/home/bird/pics`, I can specify a relative path as just `dog.jpg` (!!!)

Saving more time with shortcuts

- What if building relative paths is still too slow for me?
- There are shortcuts...
- `~`: represents your home directory
  - `~` == `/home/bird`
  - `~/pics` == `/home/bird/pics`
- `.`: represents your current working directory
  - This is implicit when specifying most relative paths: `./dog.jpg` == `dog.jpg`
- `..`: represents the folder *above* your current working directory!
  - If your CWD is `/home/bird/pics`, `..` == `/home/bird`

Teaching you how to fish



Teaching you how to fish

- By now, we've talked about the shell, how to construct commands, and how to refer to files.
- I could go over how to accomplish all sorts of tasks
  - But there are far too many for the time provided in this talk.
  - And theres no guarantee that this would even apply to the distribution of Linux you're using!

This doesn't matter though, because:

- Most tasks you need to do can be worked out logically, and
- You now have the tools to do this!

Let's go fishing

- Google is still your friend!
- In terms of getting a starting point for a lot of problems, it is *invaluable*
- However, it won't find everything.
    - This is where you need to strike a balance between reliance on it's results, and tailoring it to your needs.

Quick note on where to fish

- Generally, things will boil down to interacting with a program, or editing a file.
- So a lot of solutions on Google will tell you to do one or both of these.
- This is where its important to be aware of the composition of your Linux distribution.
    - Instructions on interacting with `apt`, the package manager on Debian, isn't as useful on Arch, where they use `pacman`
    - This is going to be the majority of your tailoring.

LIVE FISHING LIVESTREAM

Getting started/picking a distro

- There are hundreds of Linux distros out there
- This is a testament to it's versatility.
- Most of the time, you'll have the choice of which one to pick!

Ubuntu

Ubuntu

- Definitely the most popular
- This means you'll get plenty of help!
- Has desktop and server versions.
- Uses `apt` for package manager.
- My recommendation for beginners
    - Even if just for google-bility

Going beyond

- If Ubuntu isn't to your liking, there are other distributions, with varying compositions.
- Ubuntu itself is based on Debian.
- Explore!

Final notes

- The best way to learn is to use it!
- From least to most committal: VM/WSL, Dual boot, Full boot.
- Generally, the more you commit to it, the faster you learn as you're forced to interact with all it's parts.
- And if you're using something like Ubuntu, you can't really go wrong!
- UCC itself is a great place for guidance.
- If you haven't already: head over to `ucc.asn.au/discord`

Thank you!

slides available here: github.com/bir-d/intro2linux