



General

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Intro to Terminal and Setup

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Pwny CTF (ctf.sigpwny.com)

- Create an account right now!
- Where we put our challenges for you to build hands on experience
- Solve challenges, find flags, submit flags on website
- Talk to your neighbors and collaborate on challenges!
- If you already had an account, we have reset the scoreboard, so please submit your flags again.

Welcome

Discord Authentication	SIGPwny Discord	Welcome to SIGPwny!
50	50	50

board - Challenges

Admin Panel - Notifications

Challenge

0 Solves

X

Collaboration

10

Your collaboration token: XXXXXXXXXX

SIGPwny encourages working with the people around you! You can submit other user's collaboration tokens for a few points. If the text shows 'Successfully awarded points', you can check your profile to see an award for 10 points. **Don't share your code online – you should talk to others in-person.**

Flag

Submit



ctf.sigpwny.com

sigpwny{t3rm1n4l_h4ck43r}

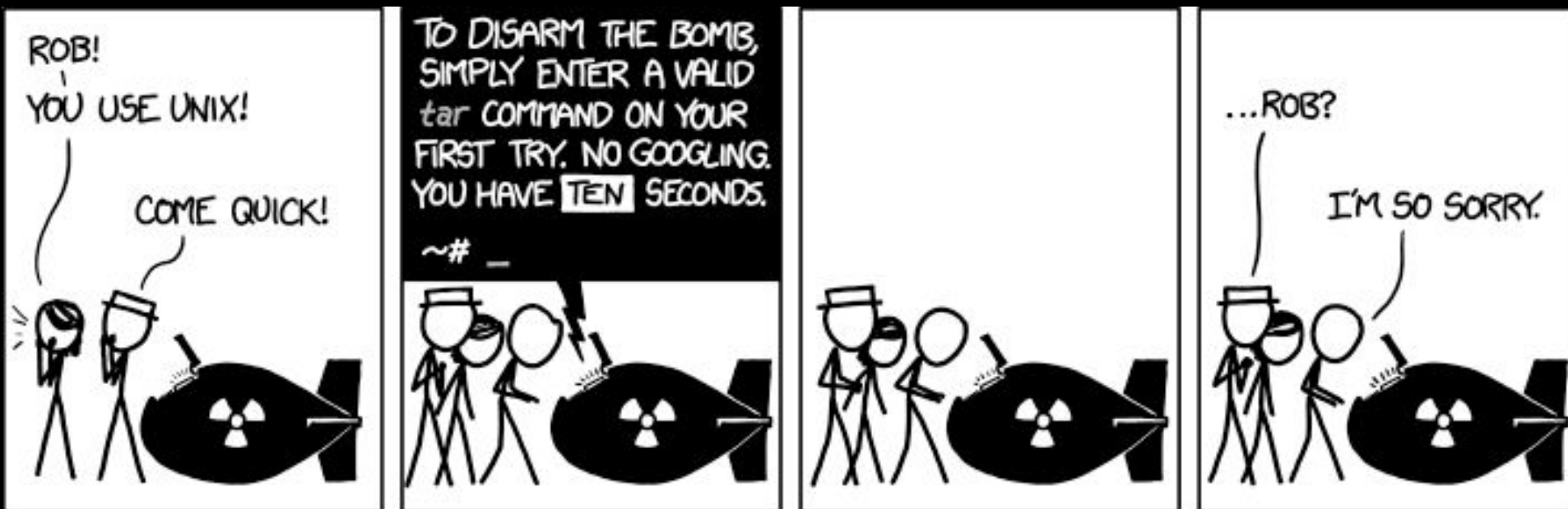


Table of Contents

1. What is a shell
 - *I want one!*
 - Install a package manager, terminal emulator
 - WSL or a virtual machine?
2. Using the shell
 - Platform differences
 - Useful builtins and utilities
3. Setup for reverse-engineering (rev) and binary exploitation (pwn) meetings
 - Installing Ghidra, pwntools, and GDB



> The Terminal

"It's where things happen" - Ravi



```
→ CSAW2020 ls
bard          grid          kui_blox1_sol.png
bard.hop      grid_solve.py libc-2.27.so
ezbreezy      krakme.exe    solve_ezbreezy.py
→ CSAW2020
```

```
mark@linux-desktop: ~
File Edit View Search Terminal Help
mark@linux-desktop:~$
```

```
tquig@THOMAS-PC: ~
tquig@THOMAS-PC:~$
```



Linux



You're good to go!



Windows



macOS



PowerShell? Command Prompt?

- Those are shells too!
- However, the Windows terminal is built differently than the Mac and Linux terminals (which are both UNIX based)
 - Different command structure/rules
 - Less support for CTF relevant applications



Windows Subsystem for Linux (WSL)

Mac users hold tight...

Linux users ... I hope you know this stuff already ;)



Installation (Windows Store)

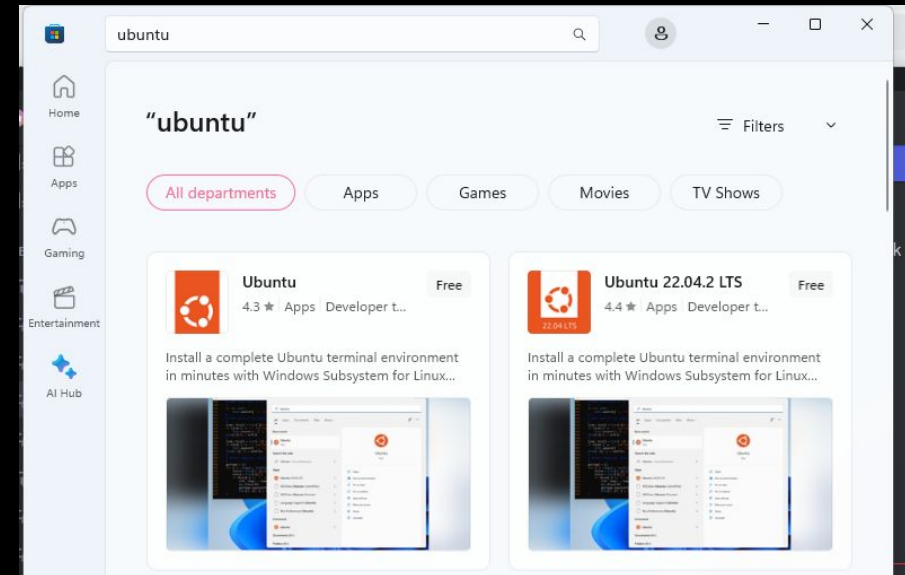
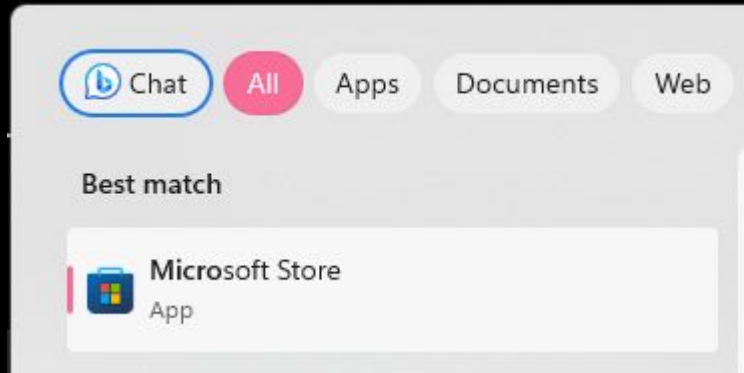
Open the
Microsoft Store



Search "Ubuntu"



Install "Ubuntu"
(use the one without
a version number)



Installation

- Open command prompt as administrator
 - (Start button → type **cmd** → right click → "Run as Administrator")
- Type **wsl --install [-d <distro>]**
- Restart computer
- You should be able to launch Ubuntu from the start menu

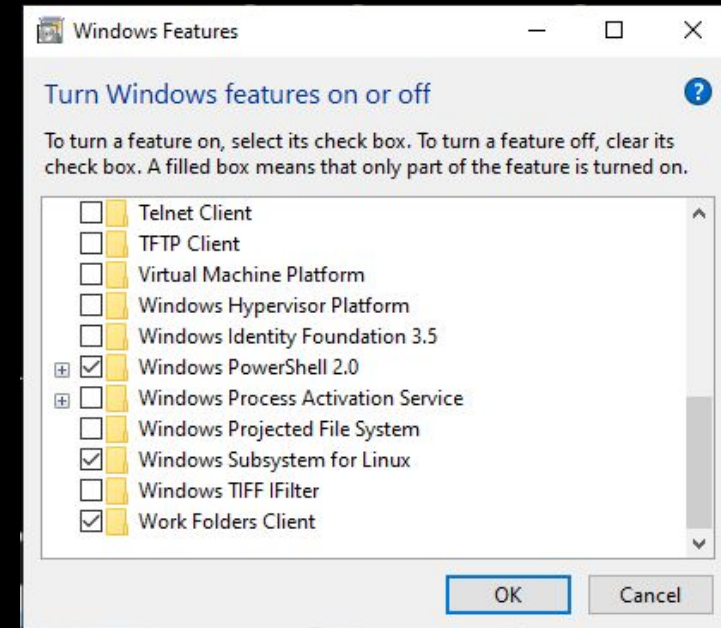
```
Administrator: Windows PowerShell
PS C:\Users\chris> wsl --install
Installing: Virtual Machine Platform
Virtual Machine Platform has been installed.
Installing: Windows Subsystem for Linux
Windows Subsystem for Linux has been installed.
Downloading: WSL Kernel
Installing: WSL Kernel
WSL Kernel has been installed.
Downloading: GUI App Support
Installing: GUI App Support
GUI App Support has been installed.
Downloading: Ubuntu
[===== 43.3%]
```



Installation (older Windows version)

If you get a command not found error when trying to run **ws1**
--install, try this

- Go to the Windows search bar
- Search "Turn Windows features on or off"
- Check "Virtual Machine Platform" and "Windows Subsystem for Linux"
- Restart computer



Do you have Docker for Windows?

- If you are in CS 128 or have previously installed Docker for Windows, then you already have WSL installed.
- Run `wsl --list` to view your installed Linux distros.
- Your default should be set to “Ubuntu”
- If it is set to docker-desktop or docker-desktop-data (or anything else) run `wsl --set-default Ubuntu`



Set a "root" username and password!

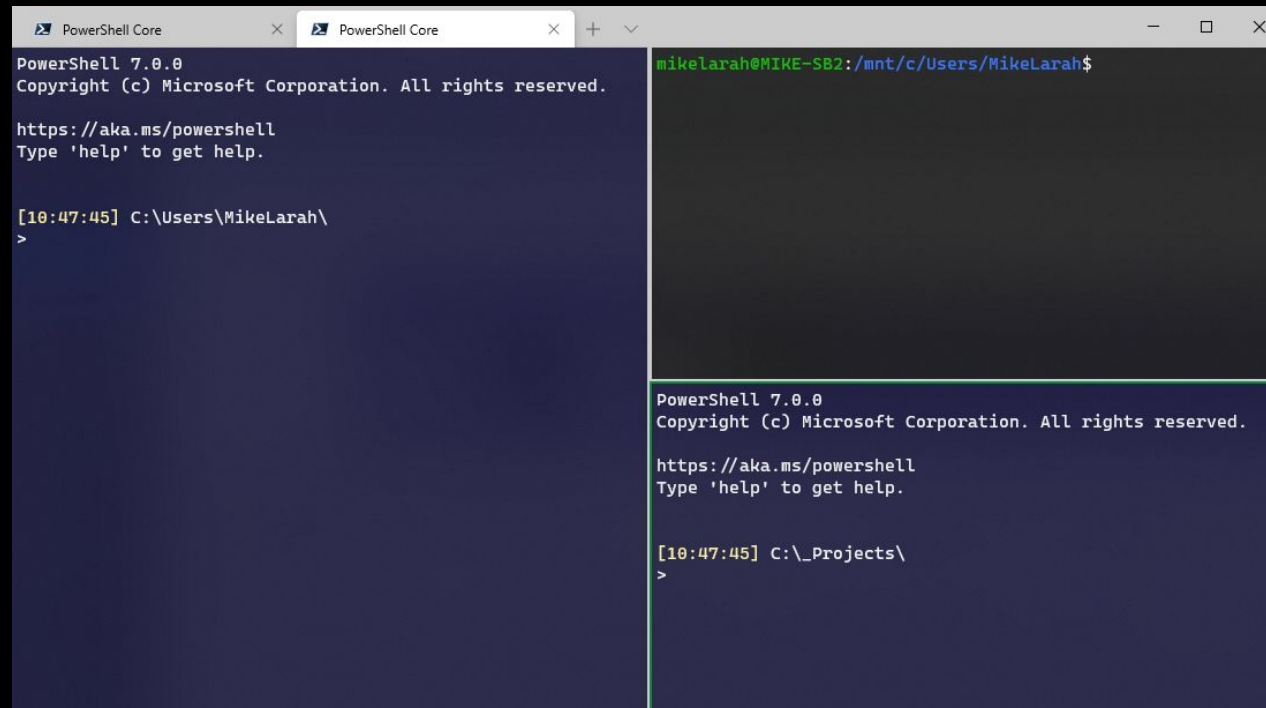
Select a username and password for your administrative user.

```
hayden@T470s ~  
Installing, this may take a few minutes...  
Please create a default UNIX user account. The username does not need to match your Windows username.  
For more information visit: https://aka.ms/wslusers  
Enter new UNIX username: hayden  
Enter new UNIX password:  
Retype new UNIX password:  
passwd: password updated successfully  
Installation successful!  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
hayden@T470s:~$
```



Windows Terminal (Optional)

- Nice for managing multiple types of shells (e.g. tabs for PowerShell, Kali on WSL, Debian on WSL, all in one terminal)
- Download from the [Microsoft Store](#)



macOS Terminal

Command
+ Space



Search “Terminal”



```
⏏ 🔍 /dev/ttys000
→ CSAW2020 ls
bard          grid          kui_blox1_sol.png
bard.hop      grid_solve.py libc-2.27.so
ezbreezy      krakme.exe   solve_ezbreezy.py
→ CSAW2020
```

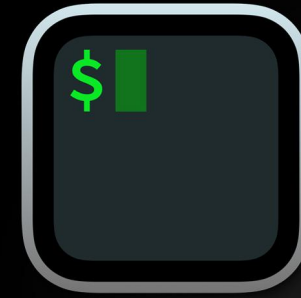


Homebrew

- AKA "brew"
- Popular package installation tool on macOS
- Install: <https://brew.sh>
- Search: <https://formulae.brew.sh/>
- To install tools with brew, use `brew install <package>`
- Example: `brew install wget`



iTerm2 (Optional)



iTerm2

iTerm2 is a terminal emulator for macOS that does amazing things.

- Modern replacement for the basic macOS Terminal
- <https://iterm2.com>
- See also: [kitty](#), [Alacritty](#), [WezTerm](#), [Hyper](#)...



Installing Python



Potential Python Dependencies

If you have a brand new wsl instance you may need these dependencies.

```
sudo apt update
```

```
sudo apt install -y build-essential zlib1g-dev libncurses-dev  
libgdbm-dev libnss3-dev libssl-dev libreadline-dev libffi-dev  
libsqlite3-dev wget curl llvm libbz2-dev xz-utils tk-dev liblzma-dev  
cmake
```



Installing Python

pyenv allows you to easily manage and switch between different Python versions (e.g. 3.12 and 3.8)

This is **preferred** over a system installation of Python - but both will work fine!

```
$ curl https://pyenv.run | bash
- add the EXPORT ... snippet in output to the
  end of your ~/.bashrc OR ~/.zshrc
$ pyenv install 3.11
$ source ~/.bashrc / source ~/.zshrc
$ pyenv global 3.11
```

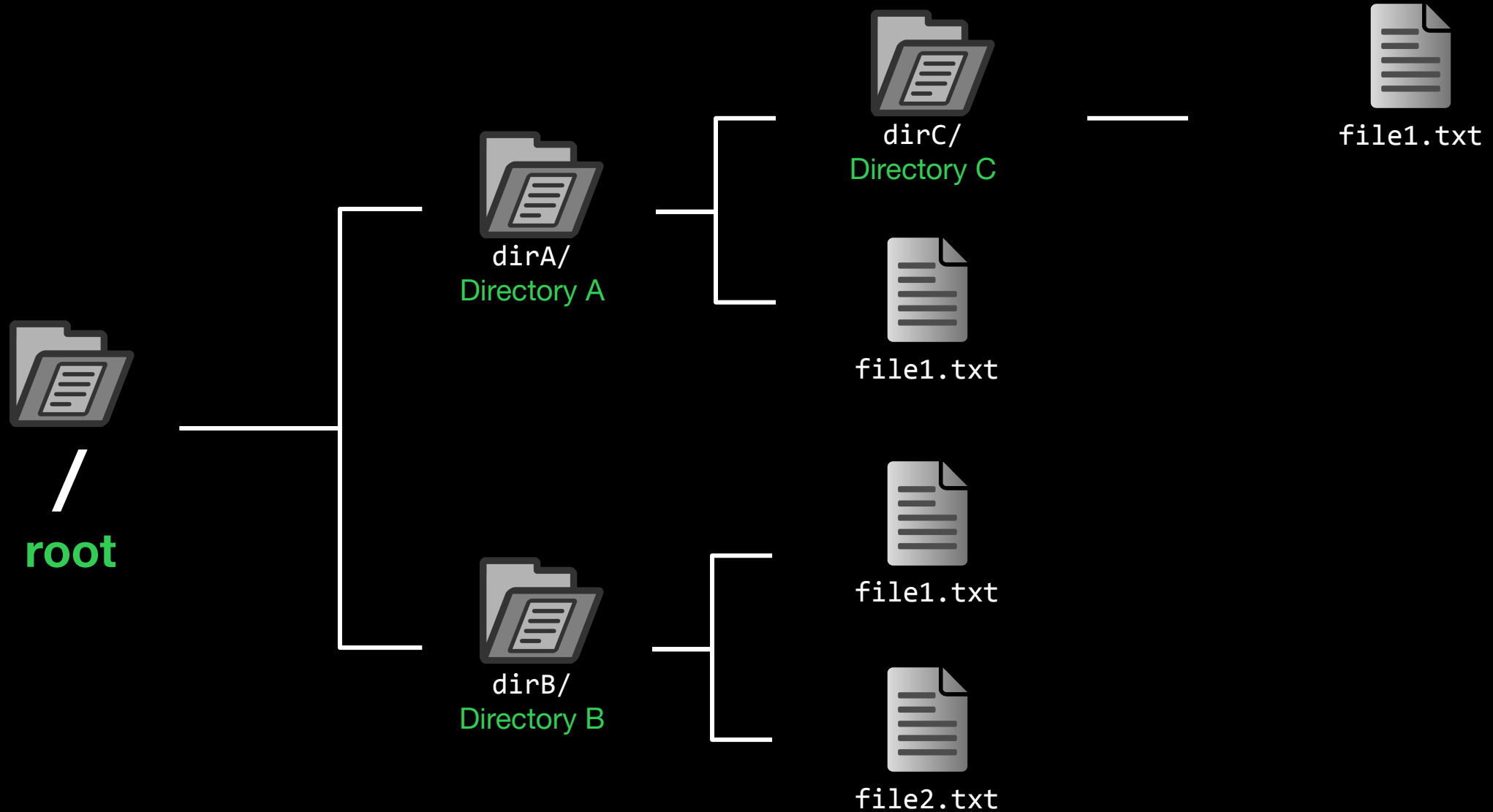


Unix Crash Course

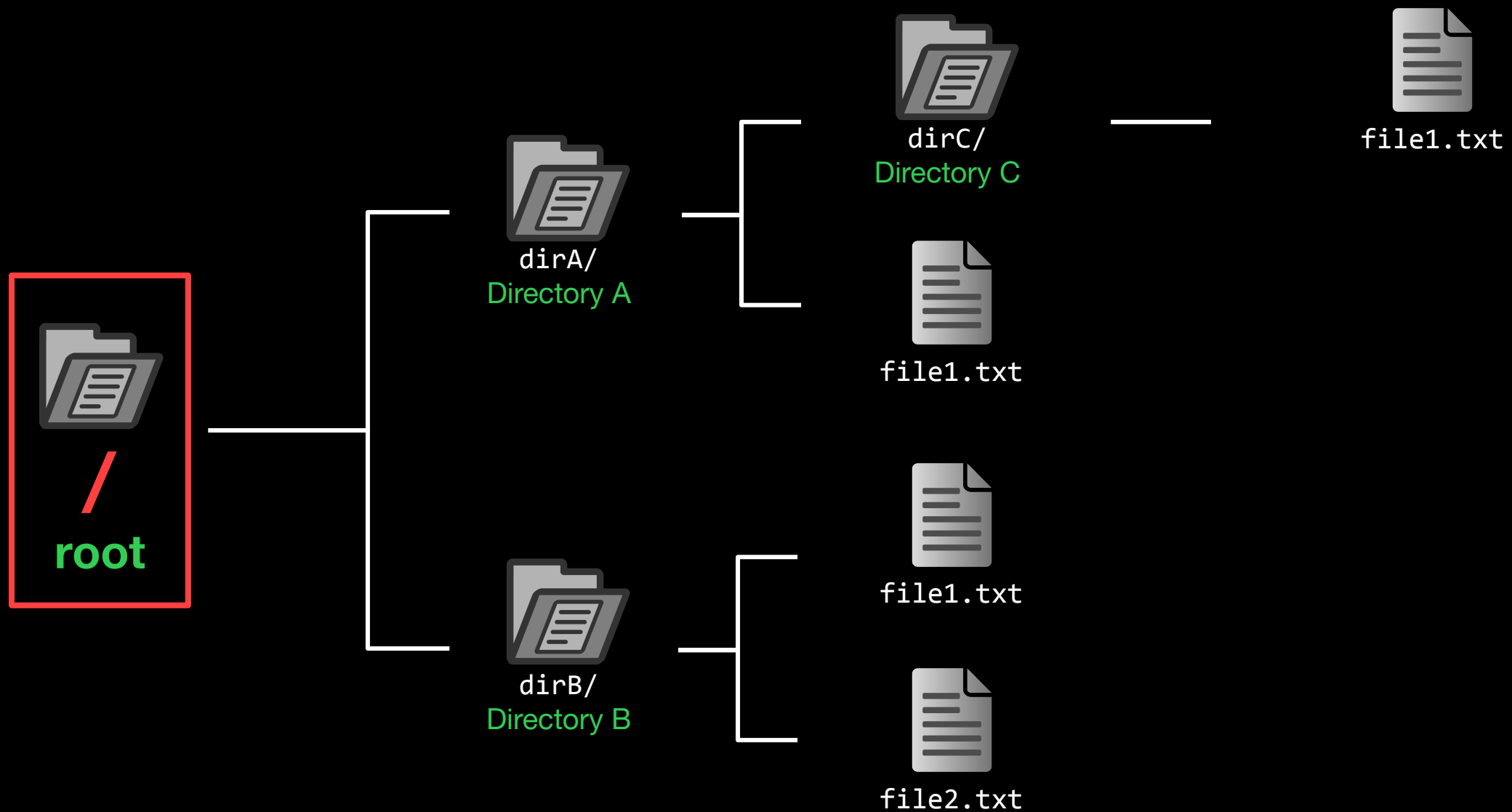
Navigate a file system!



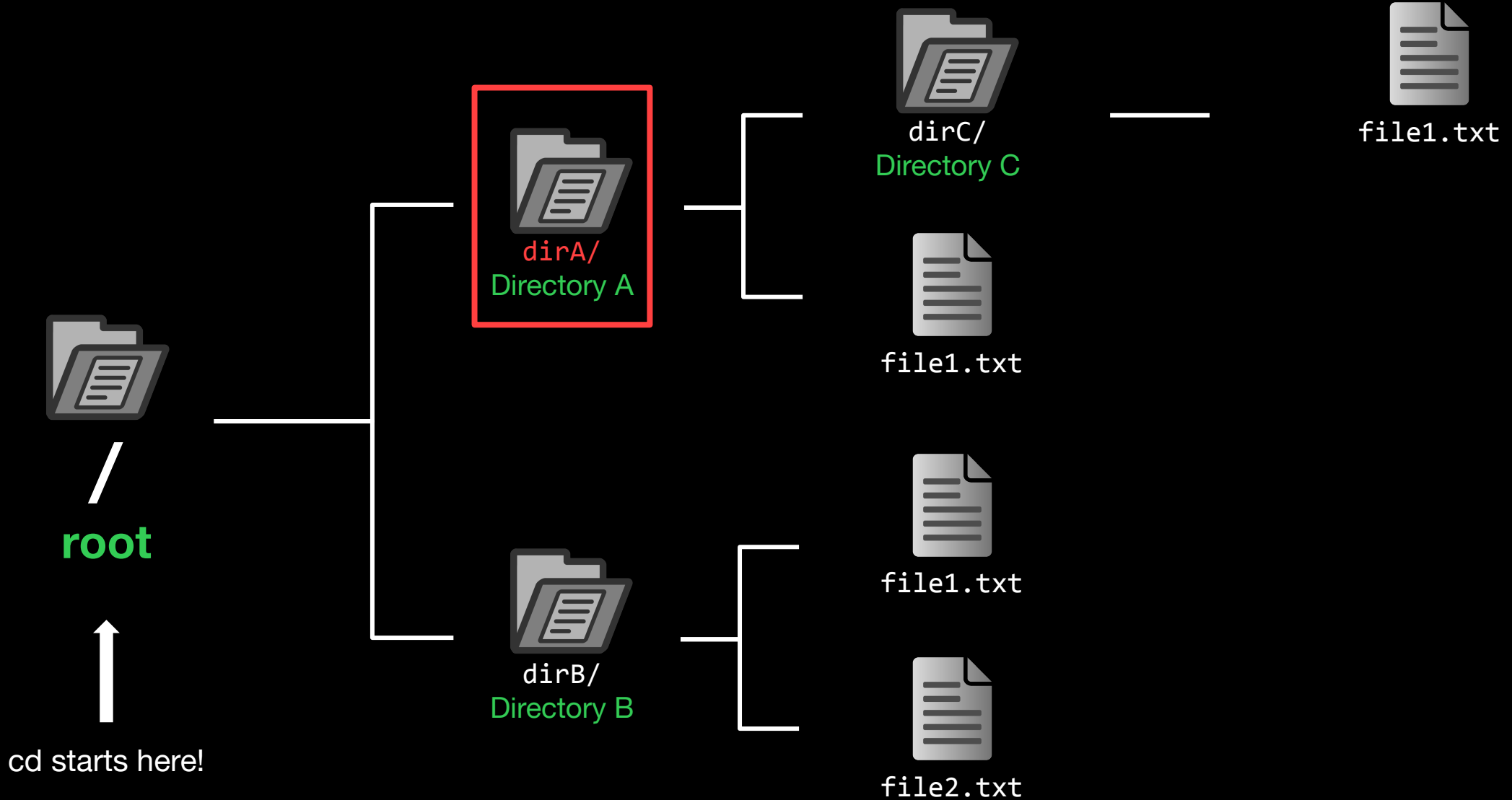
Filesystems



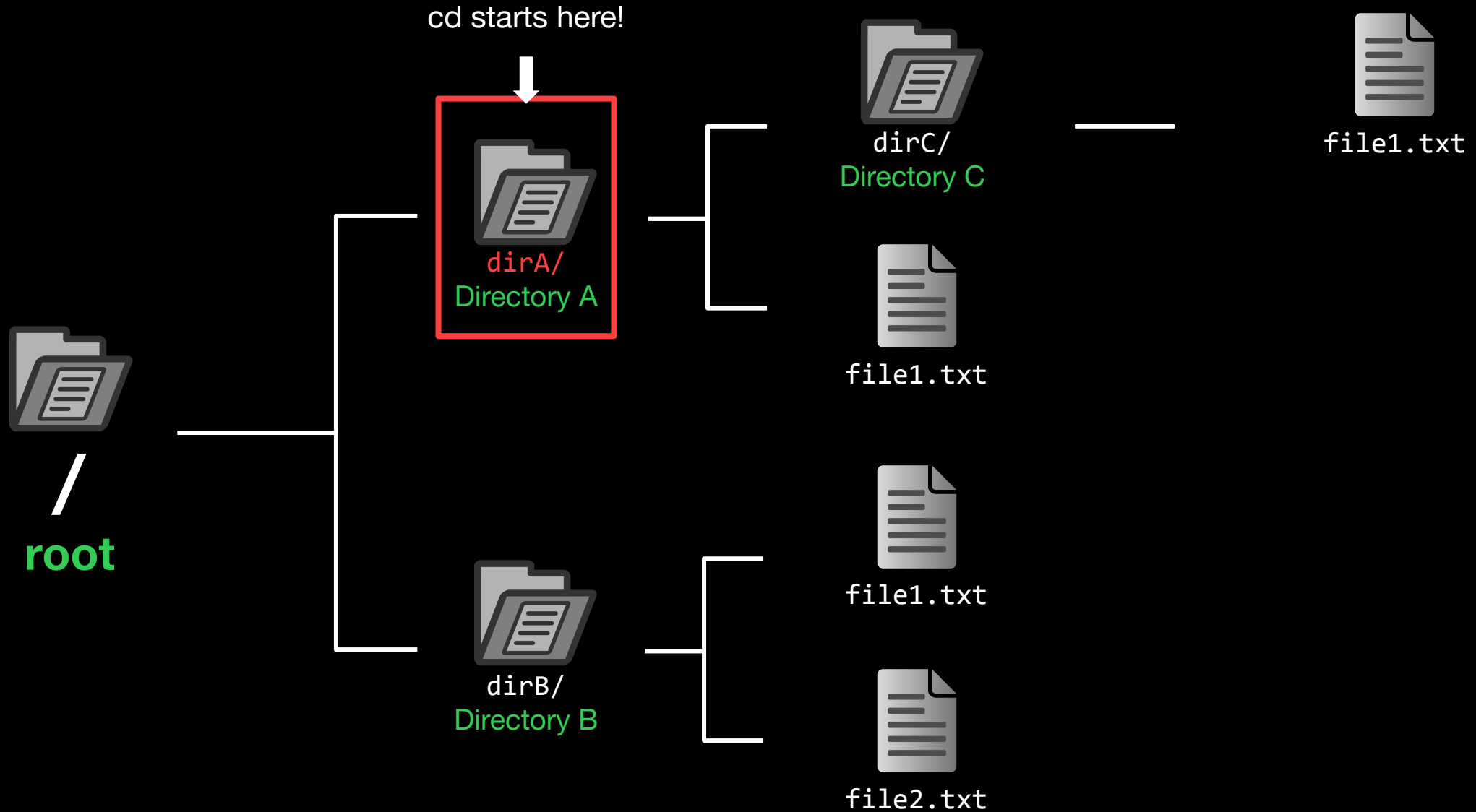
cd /

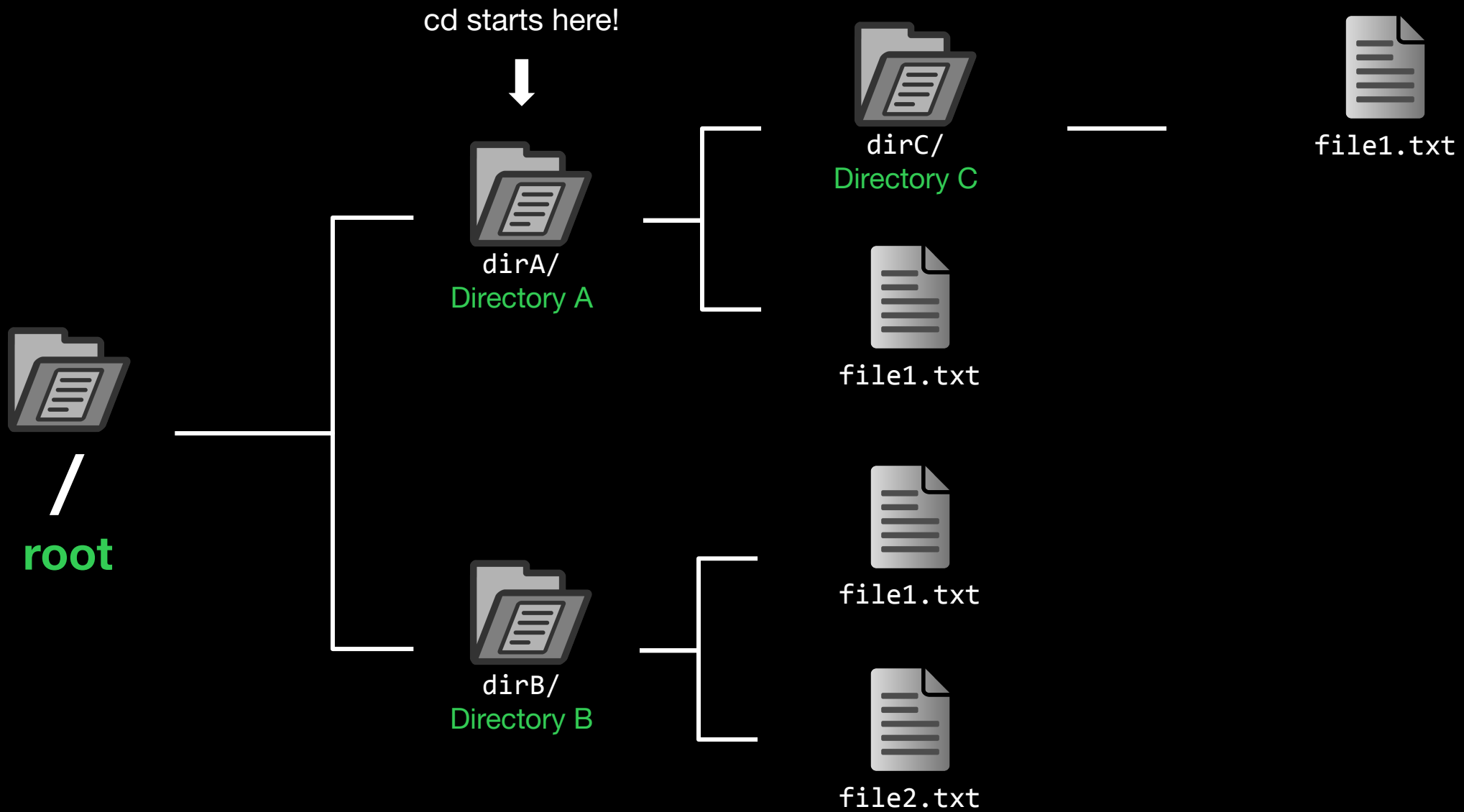


cd dirA

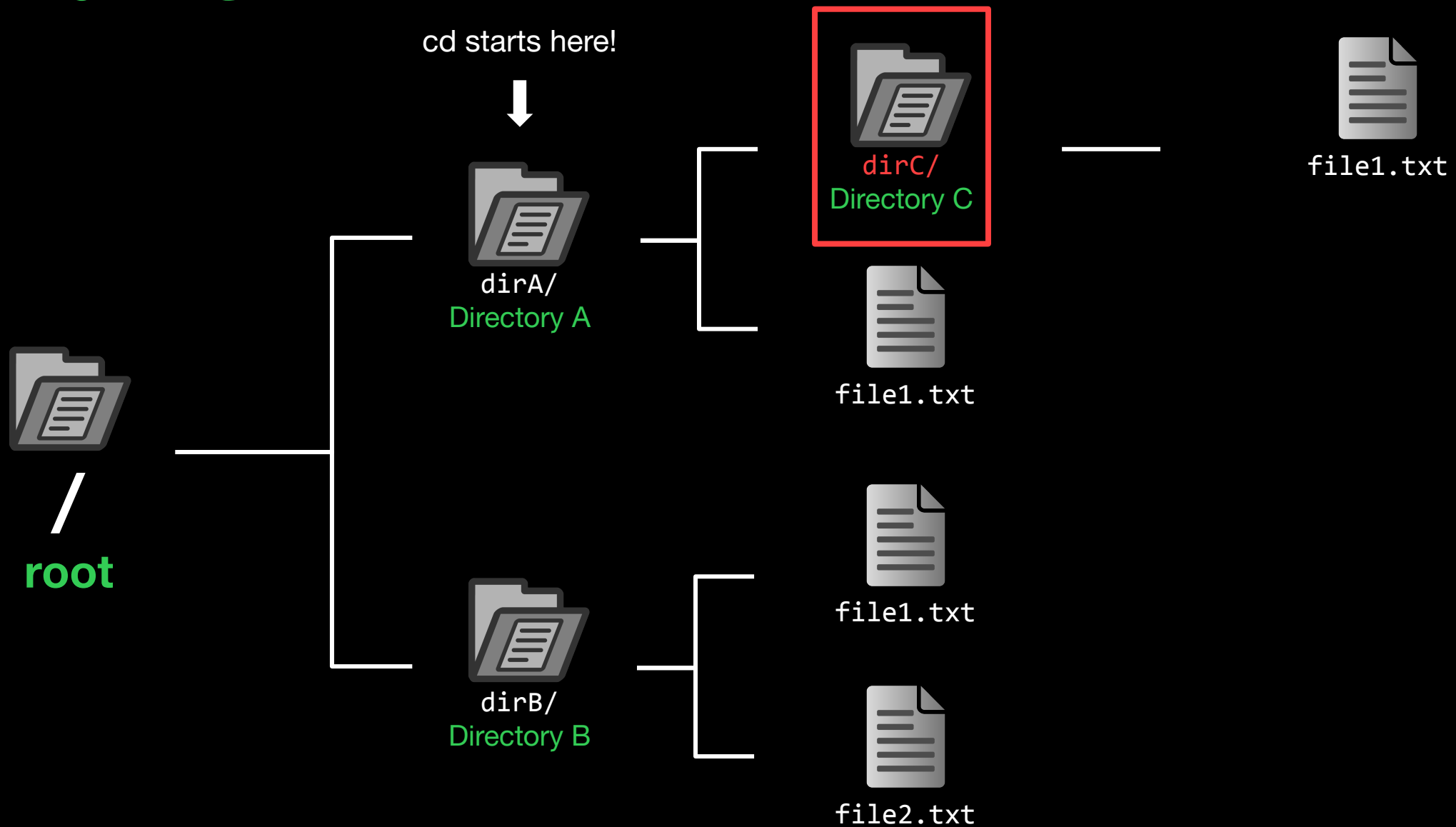


cd dirA

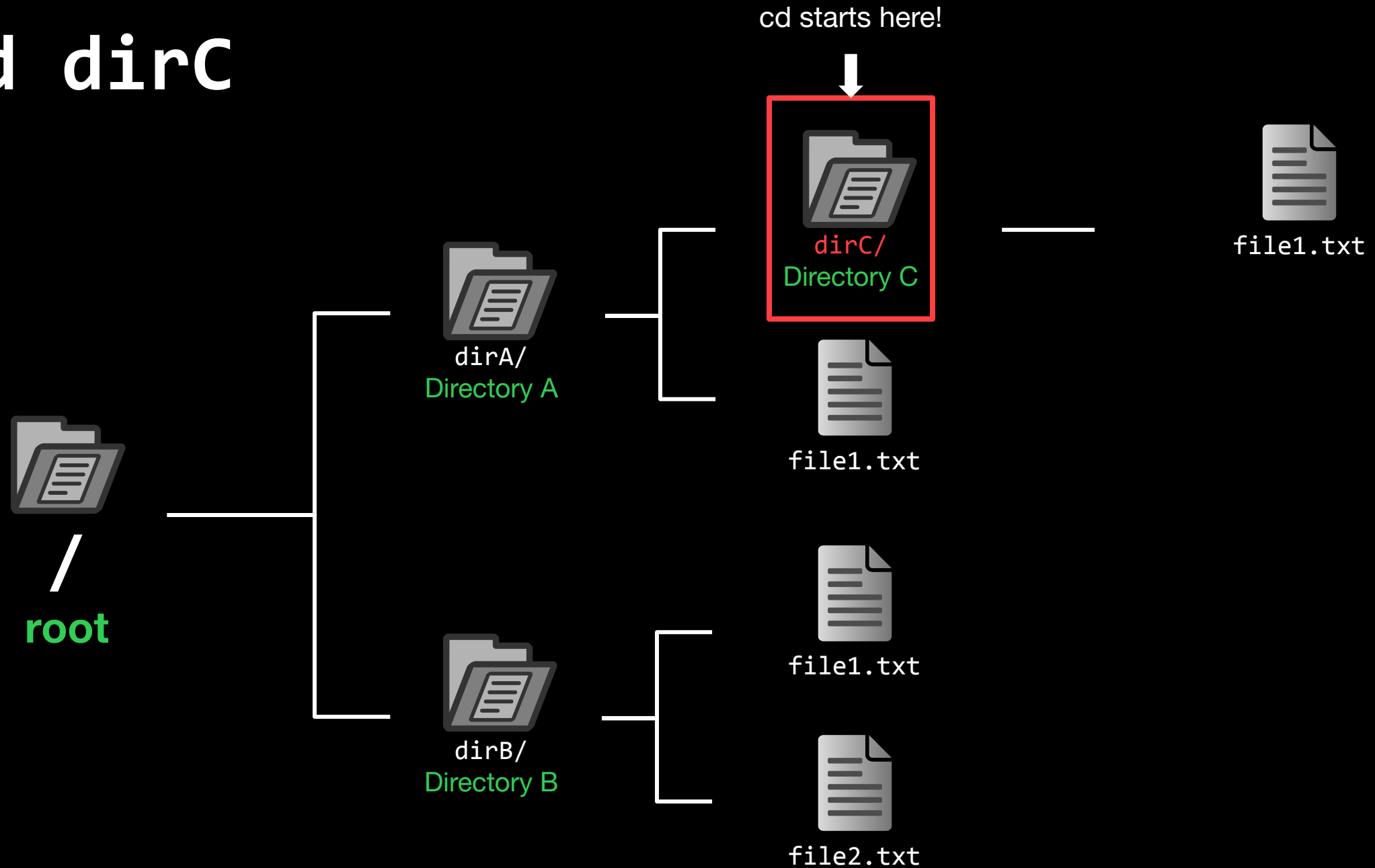


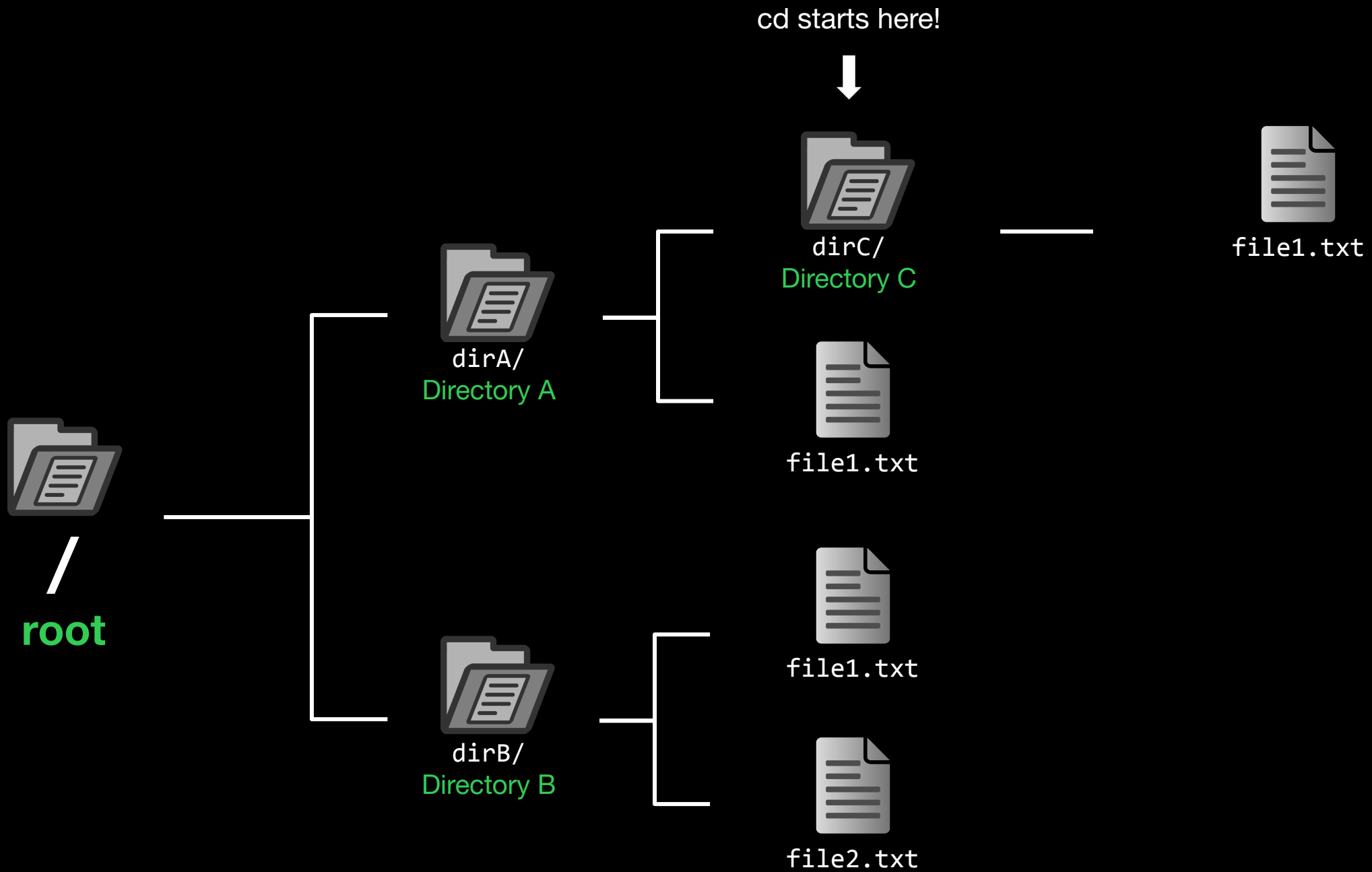


cd dirC



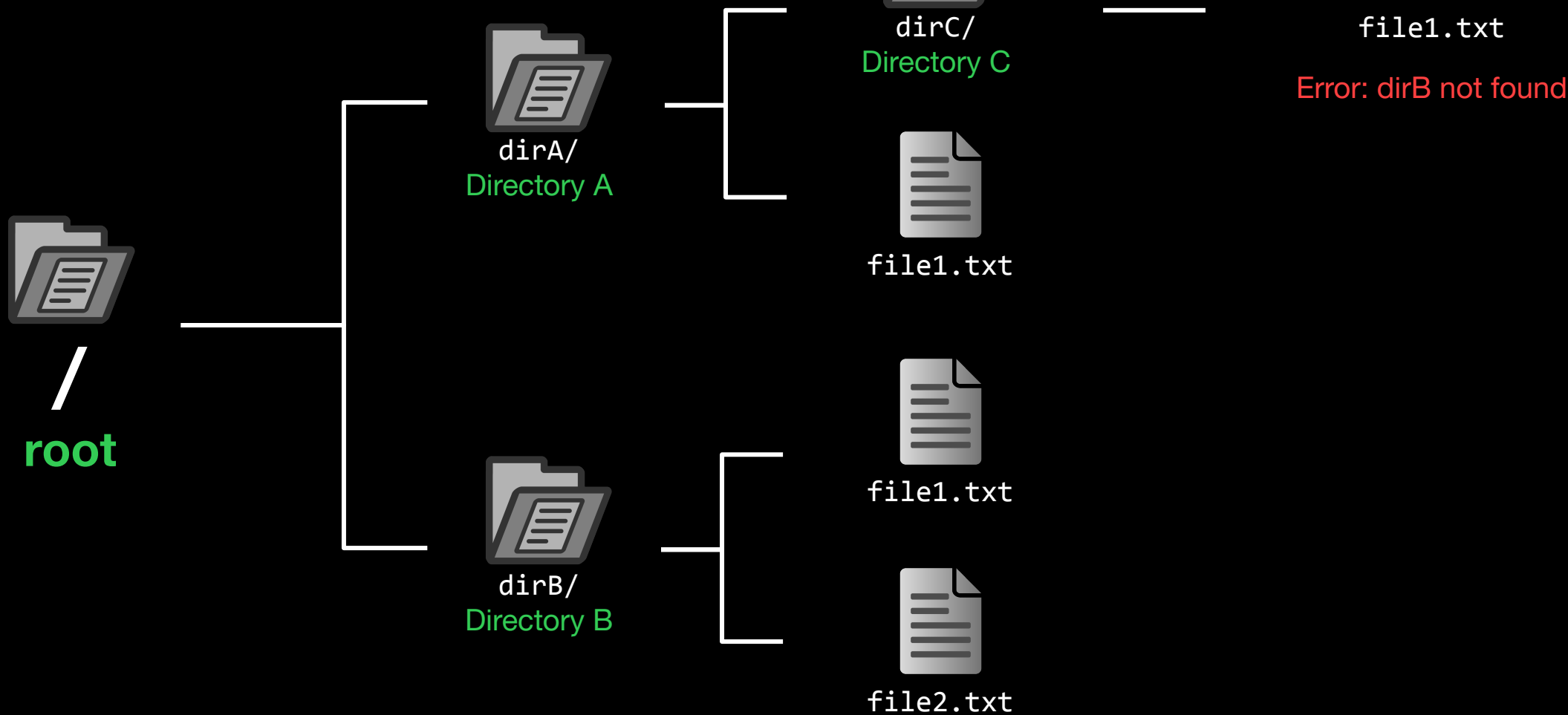
cd dirC



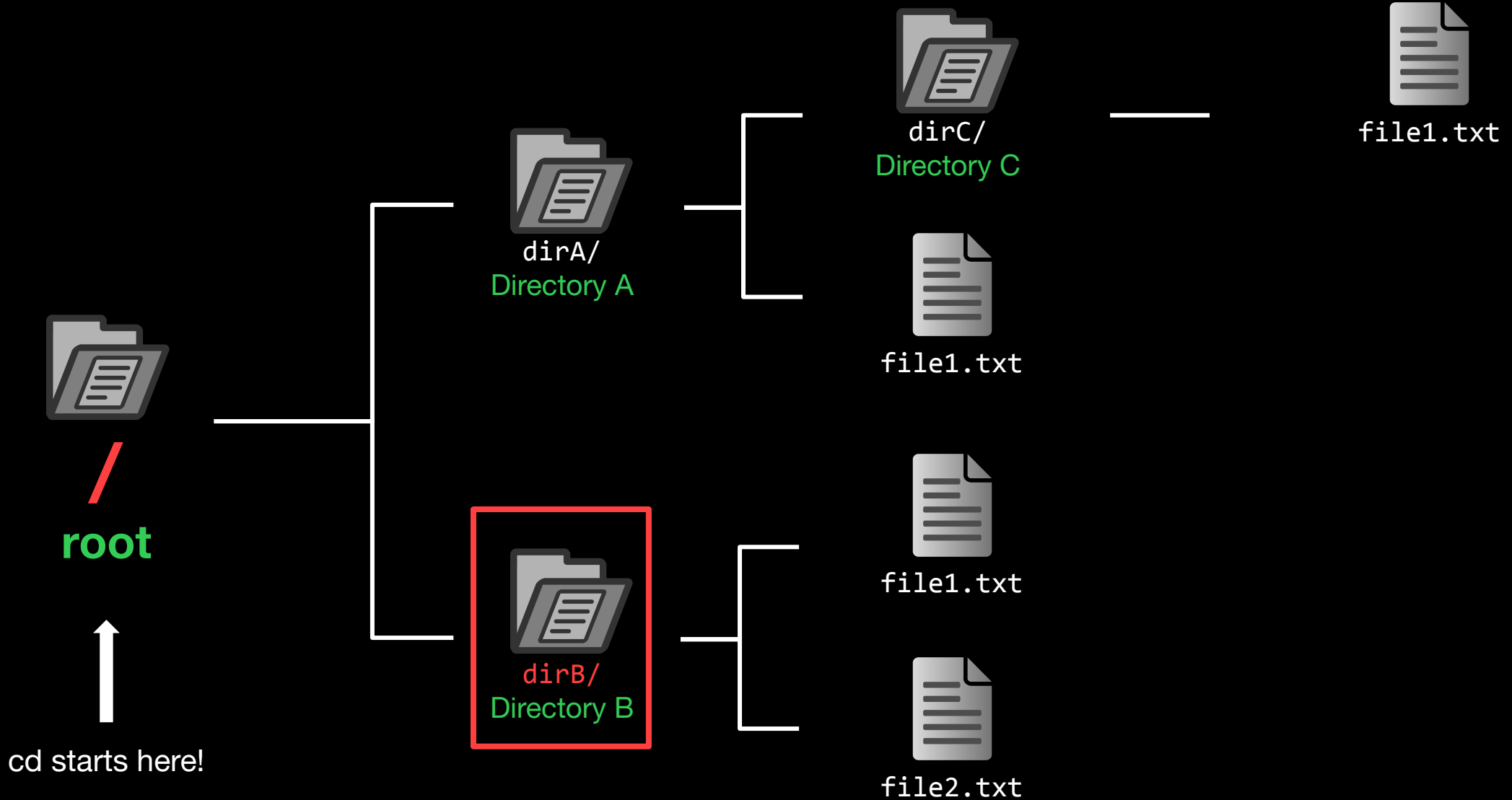


cd dirB

cd starts here!

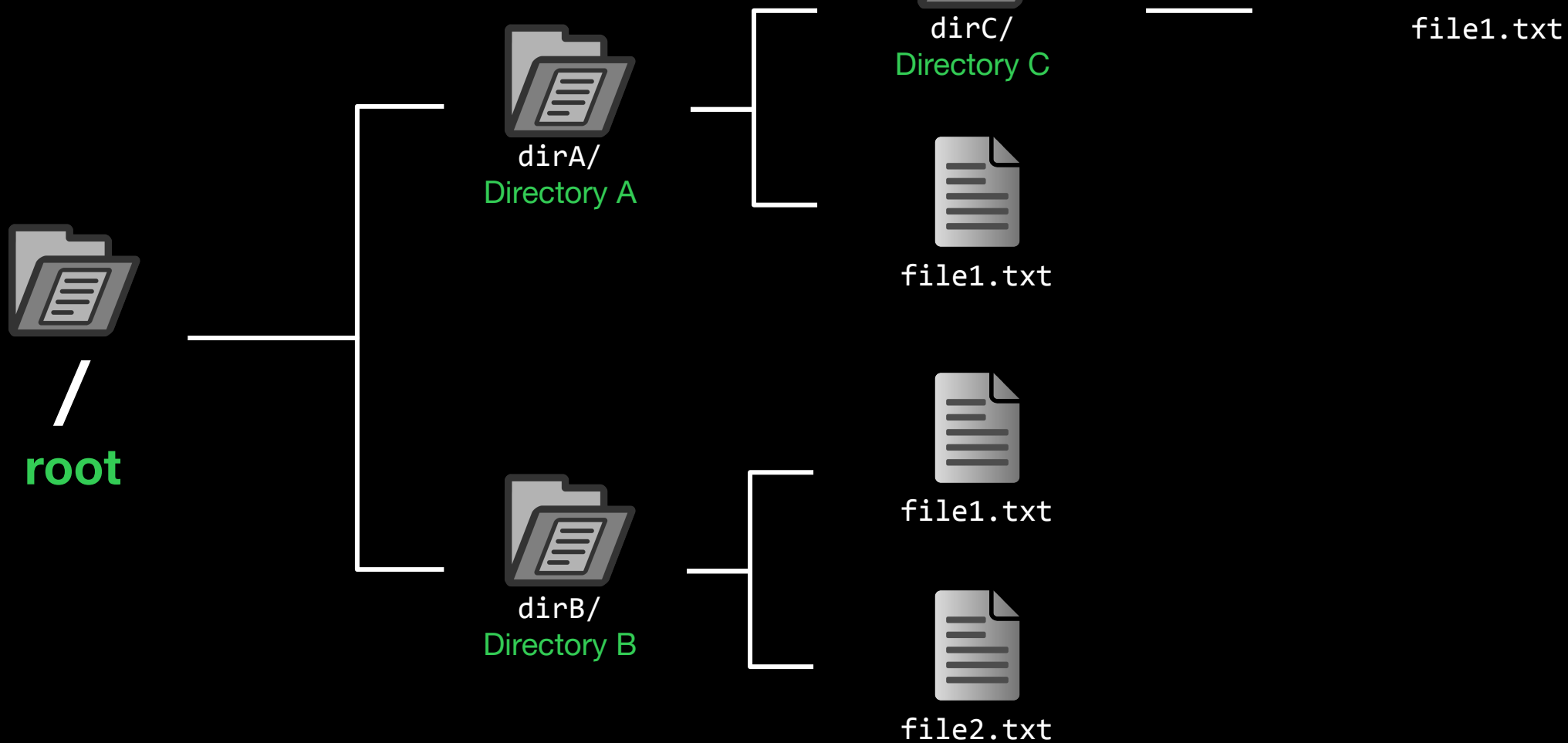


cd /dirB



cd ../../dirB

cd starts here!



cd ../../dirB

cd starts here!



dirC/
Directory C



file1.txt



dirA/
Directory A



/
root



file1.txt



file1.txt



dirB/
Directory B



file2.txt



cd ../../dirB

cd starts here!



dirC/
Directory C



file1.txt



file1.txt



file1.txt



file2.txt



dirA/
Directory A



dirB/
Directory B



root



cd ../../dirB

cd starts here!



dirC/
Directory C



file1.txt



file1.txt



file1.txt



file2.txt



dirA/
Directory A



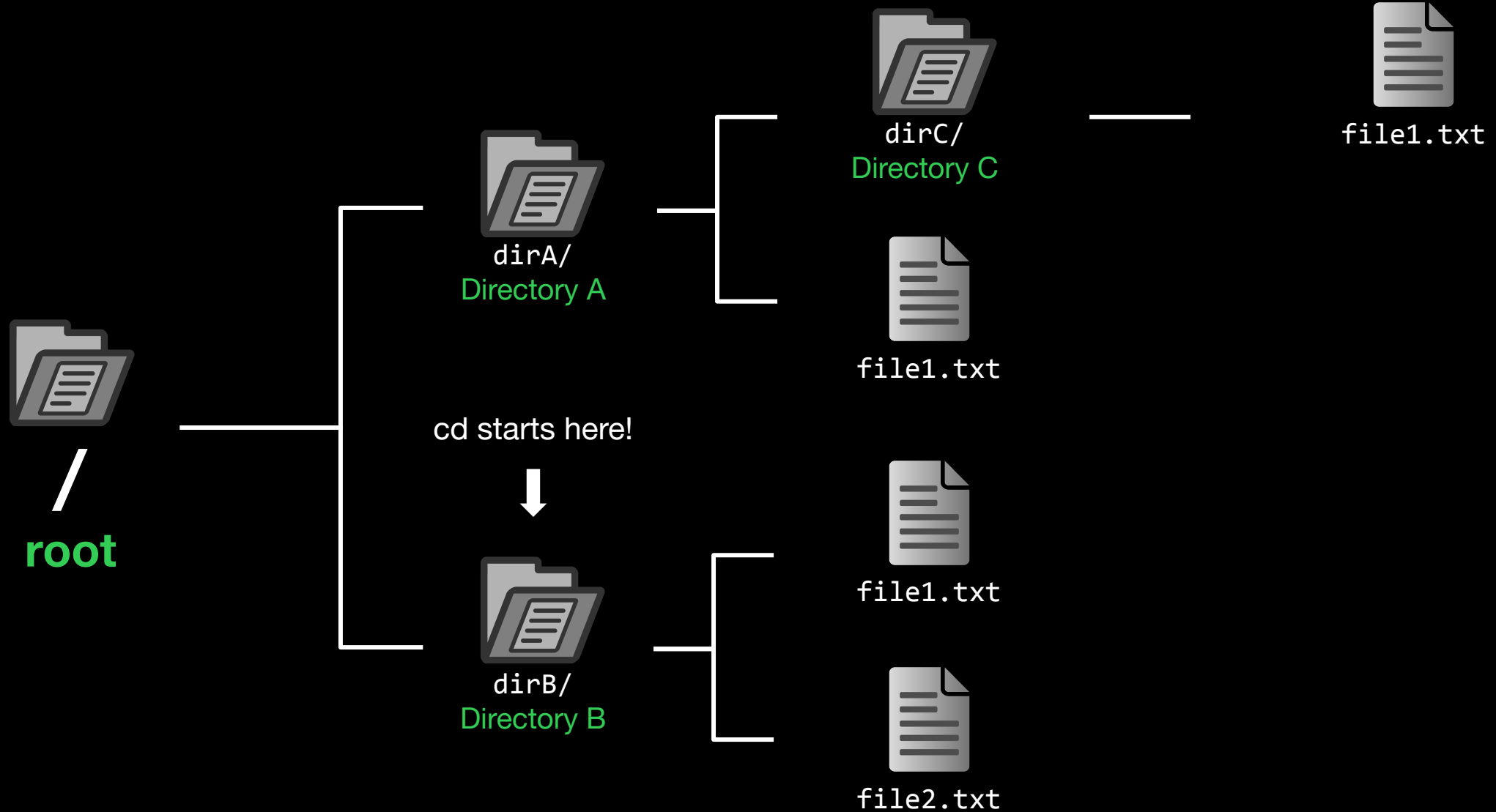
/
root



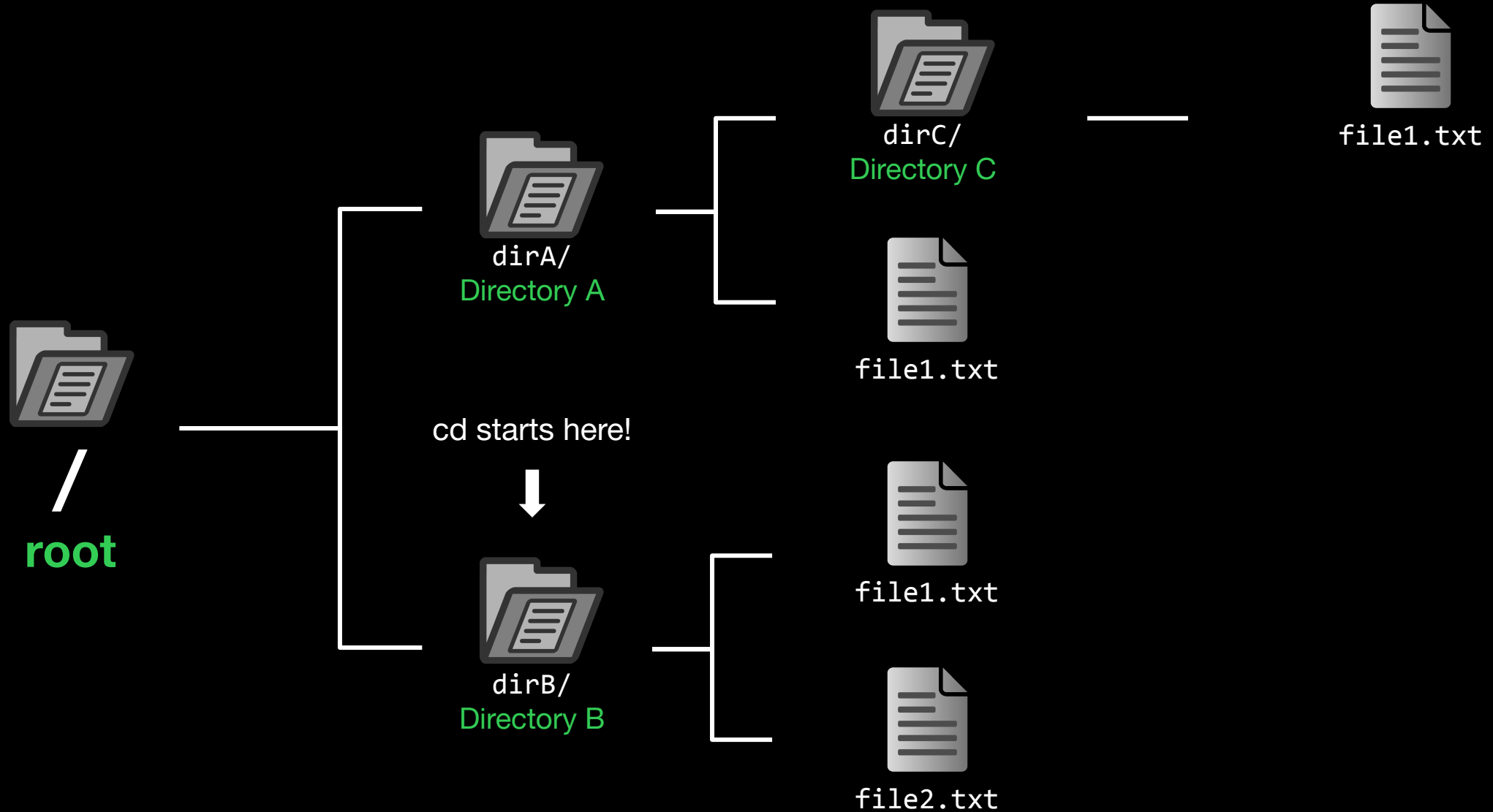
dirB/
Directory B



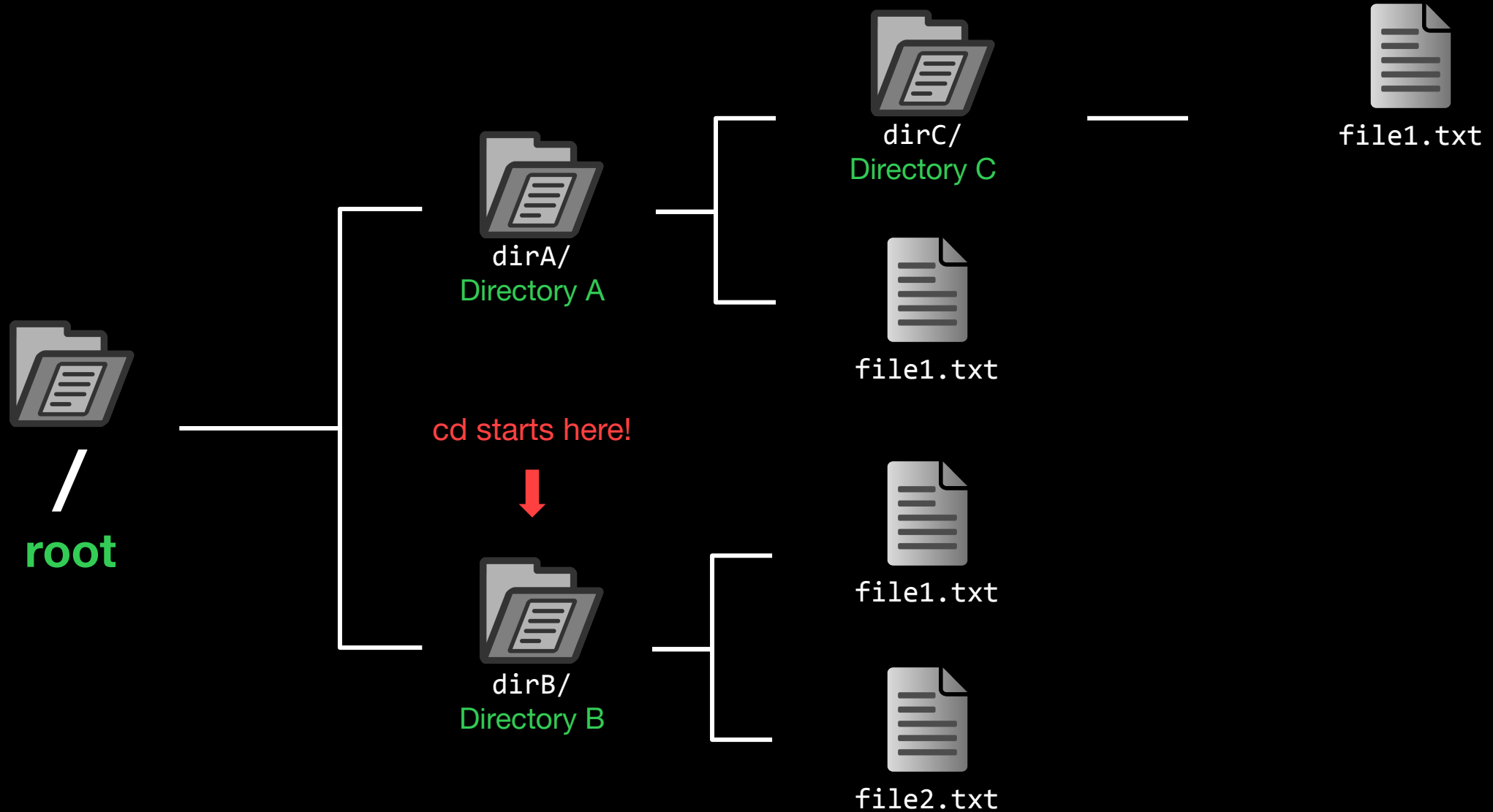
cd ../../dirB



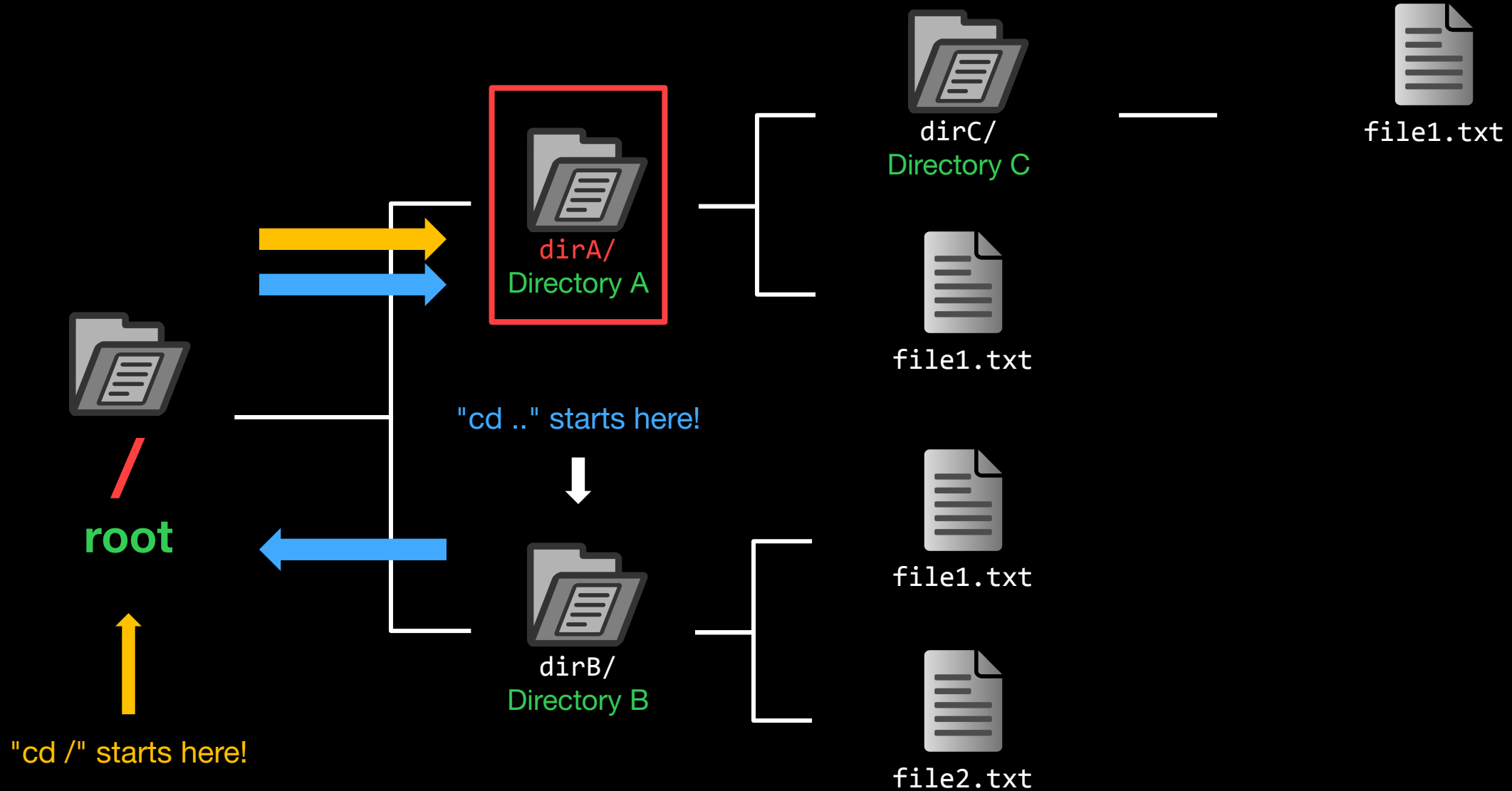
How to get to dirA?



How to get to dirA?



"cd /dirA" or "cd ../dirA"



Paths

Absolute Path

The full path that always starts at root (/)

`/dirA/file1.txt`

`/dirA/dirC/file1.txt`

Relative Path

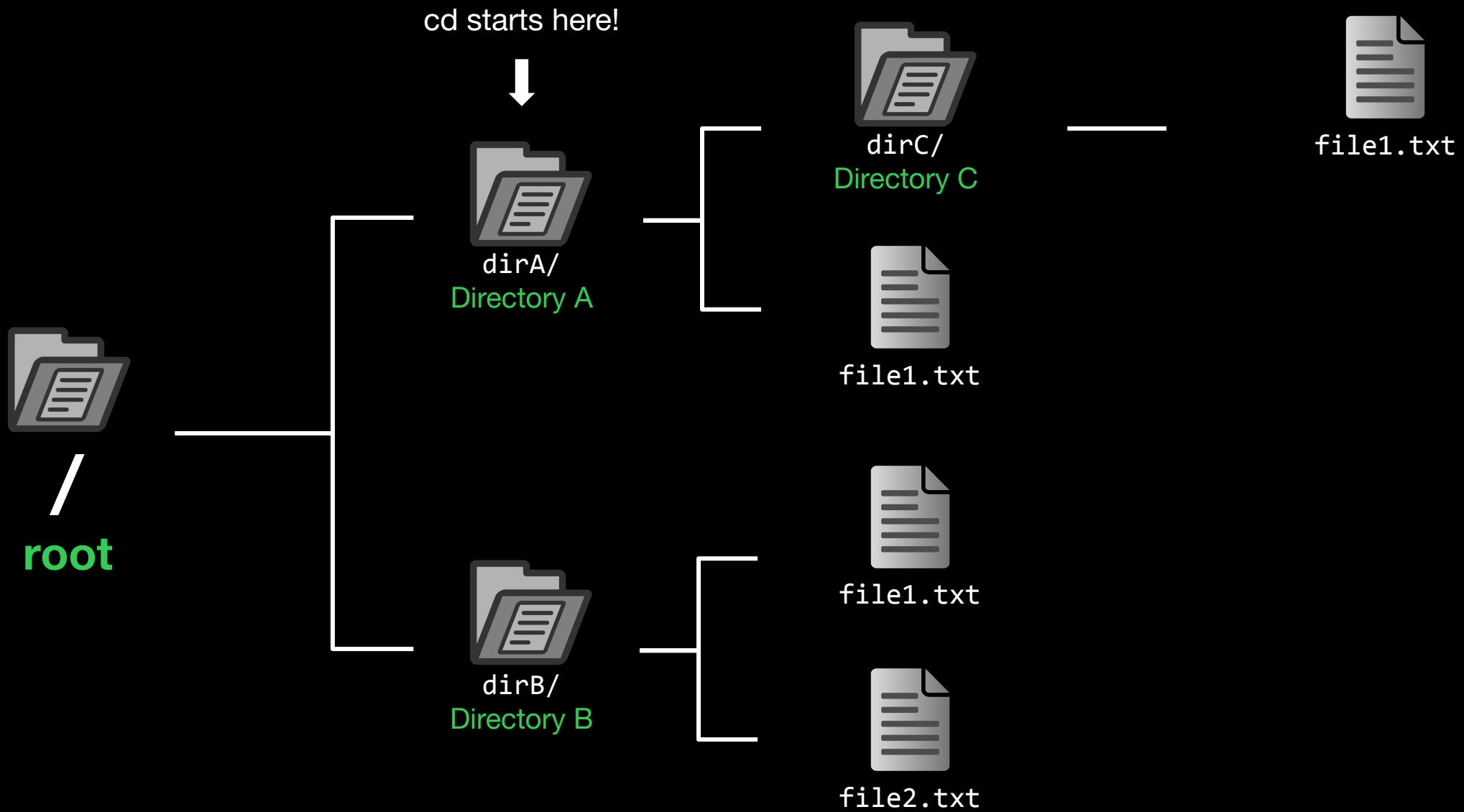
The partial path relative to where you are currently in the terminal

(Relative to dirA)

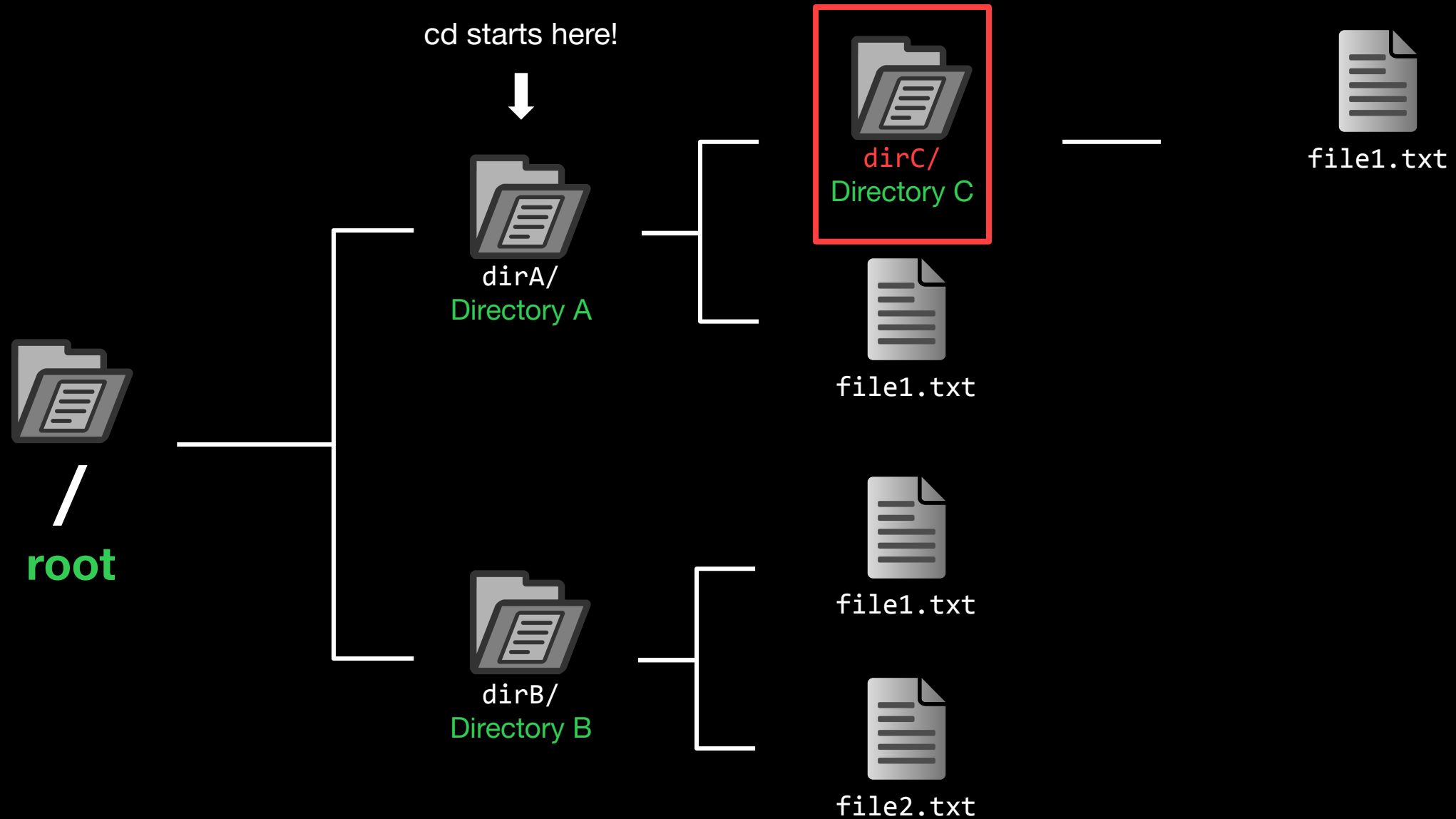
`file1.txt`

`dirC/file1.txt`





"cd dirC" or "cd ./dirC" or "cd dirC/"



`./dirC == dirC == dirC/`

Also `../dirC` and `.././dirC` and `../././dirC` and...

These are just conventions!



What the `. * ? $ ` & > | ~` is going on?

Every directory has special `.` and `..` files for the current directory and the parent directory

Piping (`|`), redirection (`><`), job control (`&`)... the shell is very powerful!

Wildcards (glob patterns) like `*` and `?` can match multiple files

`export ENV=VALUE` sets variables in your environment (add to `~/ .bashrc` to make persistent)



Useful Commands - Filesystem

`ls [-la...] [directory]`: lists files in your current directory or specified directory

`cd <directory>`: changes your current directory to specified directory

`mv <sources> <dest>`: moves file(s) from source to dest (rename), if dest is a directory, move source

`rm [-r...] <sources>`: removes file(s) (**NOT REVERSIBLE**)

`cat <file>`: prints the contents of file (sometimes it prints gibberish: why might that happen?)

`./file`: executes whatever is at file (see also `$PATH`, [How programs get run](#) for a deep dive)

`man <command>`: lets you see info about a command and all of its parameters/options

`<parameter>` means it's a required parameter

`[parameter]` means it's an optional parameter



Useful Commands - Networking

`nc <ip> <port>`: Netcat, connect to `ip` (or hostname) on port `port`

`ssh <user@host> [-p port]`: Secure Shell, run a shell as `user` on `host` ([SSH keys](#))

`ping <ip>`: see if an IP address is up using ICMP (sometimes blocked by firewalls)

`curl <url>`: versatile network access tool that is mainly used to access websites from the terminal

`wget <url>`: download the file at `url`



Networking Fundamentals

`nc <ip> <port>`: Netcat, connect to `ip` (or hostname) on port `port`

`nc -l <port>`: Open a network socket to listen on `port`

Ports: communication endpoints on your computer (1-65535)

- Ports numbers ≤ 1024 are reserved for other programs



Next Steps - Bandit

```
ssh bandit0@bandit.labs.overthewire.org -p 2220
```



Next Steps - Bandit

```
ssh bandit0@bandit.labs.overthewire.org -p 2220
```

command
user

IP

port



Next Steps - Terminal Challenges

- **netcat**
 - Refer back to the slides!
- **Shell Basics**
 - Learn the ins and outs of using the terminal
- **A Very Special Character**
 - Intro to the ASCII table and Netcat



More Resources

- SIGPwny!
 - [Meeting archive](#)
 - #ask-for-help in Discord
- [The Missing Semester](#)
- [The Linux Command Line](#), [GNU Coreutils manual](#)
- Google



Questions/Issues?

- **We're here to help!**
 - Ask your friendly neighborhood helper
 - *#ask-for-help* in the SIGPwny Discord
- Consult Google/GitHub
 - Someone may have encountered and fixed your issue already
 - Writeups from past CTFs can be very informative (check [CTFtime](#))



Next Meetings

2026-09-06 • This Sunday 5-6 PM

- Web Hacking I
- Come learn about the technology that runs the web, how it works, and how to manipulate it!

2026-09-20 • Fall CTF 2026



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sigpwny{t3rm1n4l_h4ck43r}

Meeting content can be found at
sigpwny.com/meetings.

