WorkED

INTRO TO LINUX

WorkED

LINUX

- Unix-like operating system **distributed free of charge** under the **GNU License (** The GNU General Public License is a series of widely used free software licenses that guarantee end users the freedom to run, study, share, and modify the software to a certain extent.)
- Available in several “distributions” to **serve different purposes**. (bundles of included software)
- Originally written **by Linus Torvalds**.
- Now almost **10,000 developers** including **major technology companies** like Intel and IBM.

WorkED

WHERE IS LINUX USED?

Majority of internet servers run Linux
67% of the world's web-servers run Linux (2016)

Used in Research/High-Performance Computing
Google, Amazon, NSA, 100% of TOP500 Super-computers

Mobile devices
Android phones
Amazon Kindle

IoT devices
Smart TV, Roku box, etc.

WorkED

WHY LINUX?

Numerous Cybersecurity tools for Linux

Majority of tools are free!

Linux allows you complete control of the system

Puts user in driver's seat, trusts you know what you want

Linux can be made more secure

- Open Source code means it is free to explore, review, modify, secure, copy/reuse
- Linux is entirely customizable
- You can shut down processes that might be a security risk
- Windows and Mac have processes you cannot disable

WorkED

LINUX COMMAND LINE

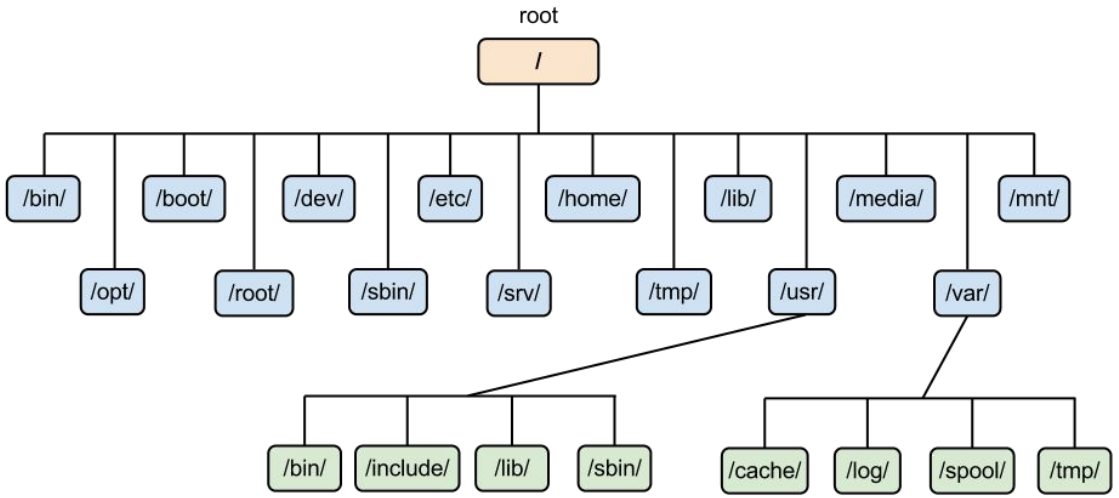
- Interface to the **underlying operating system**
  - Built-in commands
  - Environment variables
  - Programming control structures
- Linux **supports different shells** (interfaces)
  - Most common is perhaps bash

```
yourname@yourhost: ~
yourname@yourhost:~$ ls
backup  bin  documents  downloads  images  music  templates  tmp  videos
yourname@yourhost:~$ ls -l
total 36
drwxr-xr-x 2 yourname yourname 4096 Apr 30 21:17 backup
drwxr-xr-x 2 yourname yourname 4096 Apr 30 21:17 bin
drwxr-xr-x 2 yourname yourname 4096 Apr 30 21:17 documents
drwxr-xr-x 2 yourname yourname 4096 Apr 30 21:17 downloads
drwxr-xr-x 3 yourname yourname 4096 Apr 30 21:17 images
drwxr-xr-x 2 yourname yourname 4096 Apr 30 21:17 music
drwxr-xr-x 2 yourname yourname 4096 Apr 30 21:17 templates
drwxr-xr-x 2 yourname yourname 4096 Apr 30 21:17 tmp
drwxr-xr-x 2 yourname yourname 4096 Apr 30 21:17 videos
yourname@yourhost:~$
```

WorkED

LINUX: THE FILE SYSTEM

- The **structure** resembles an upside-down tree
- **Directories** (a.k.a. folders) are collections of files and other directories.
- Every directory has a **parent** except for the **root directory**.
- Many directories have **subdirectories**.



WorkED

LINUX: COMMAND LINE PROMPT

~ is shorthand for your **home directory**

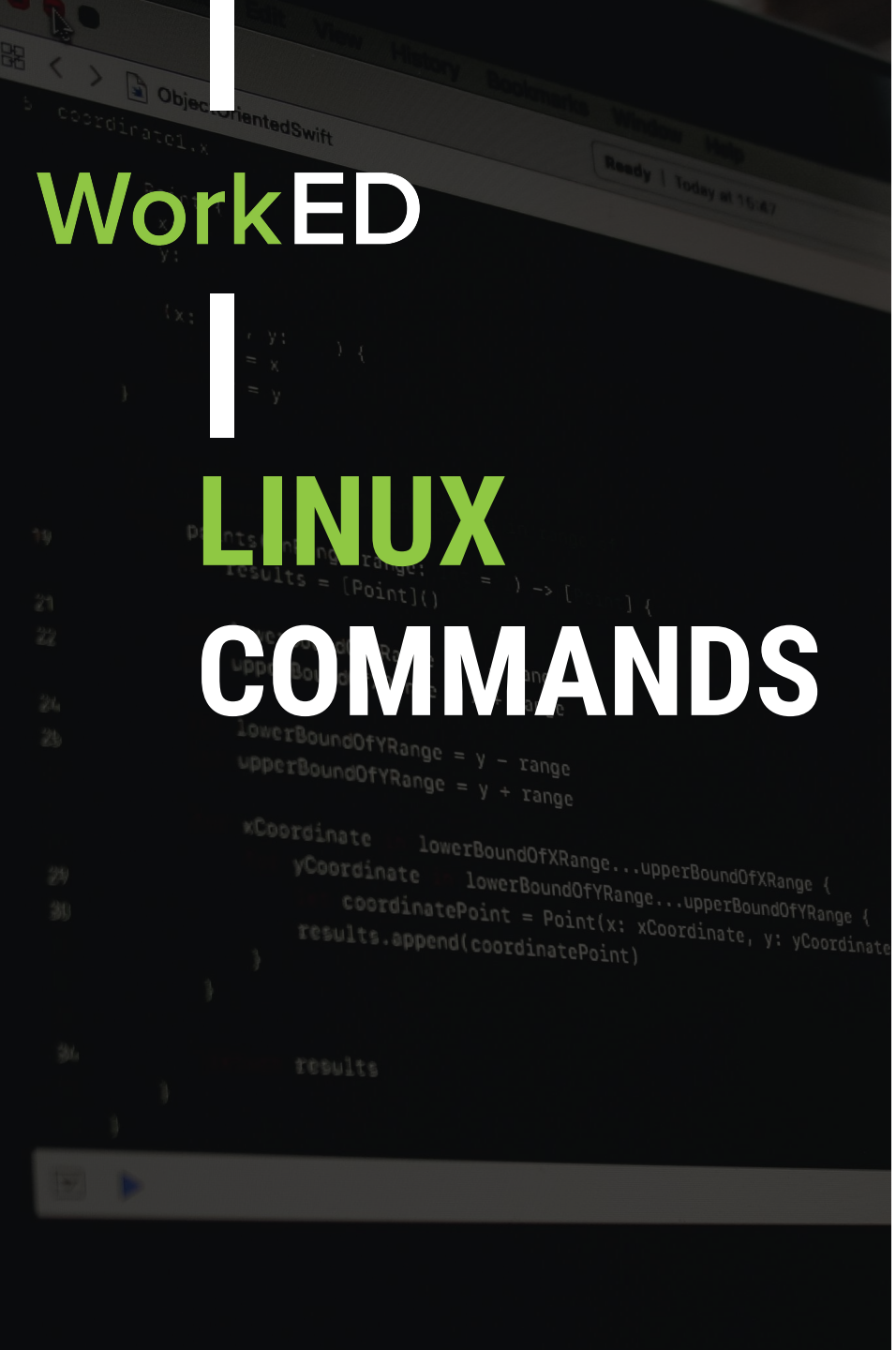
WorkED

LINUX: COMMANDS & ARGUMENTS

```
[username@hostname ~]$ command --option argument
```

COMMAND - program that does one thing

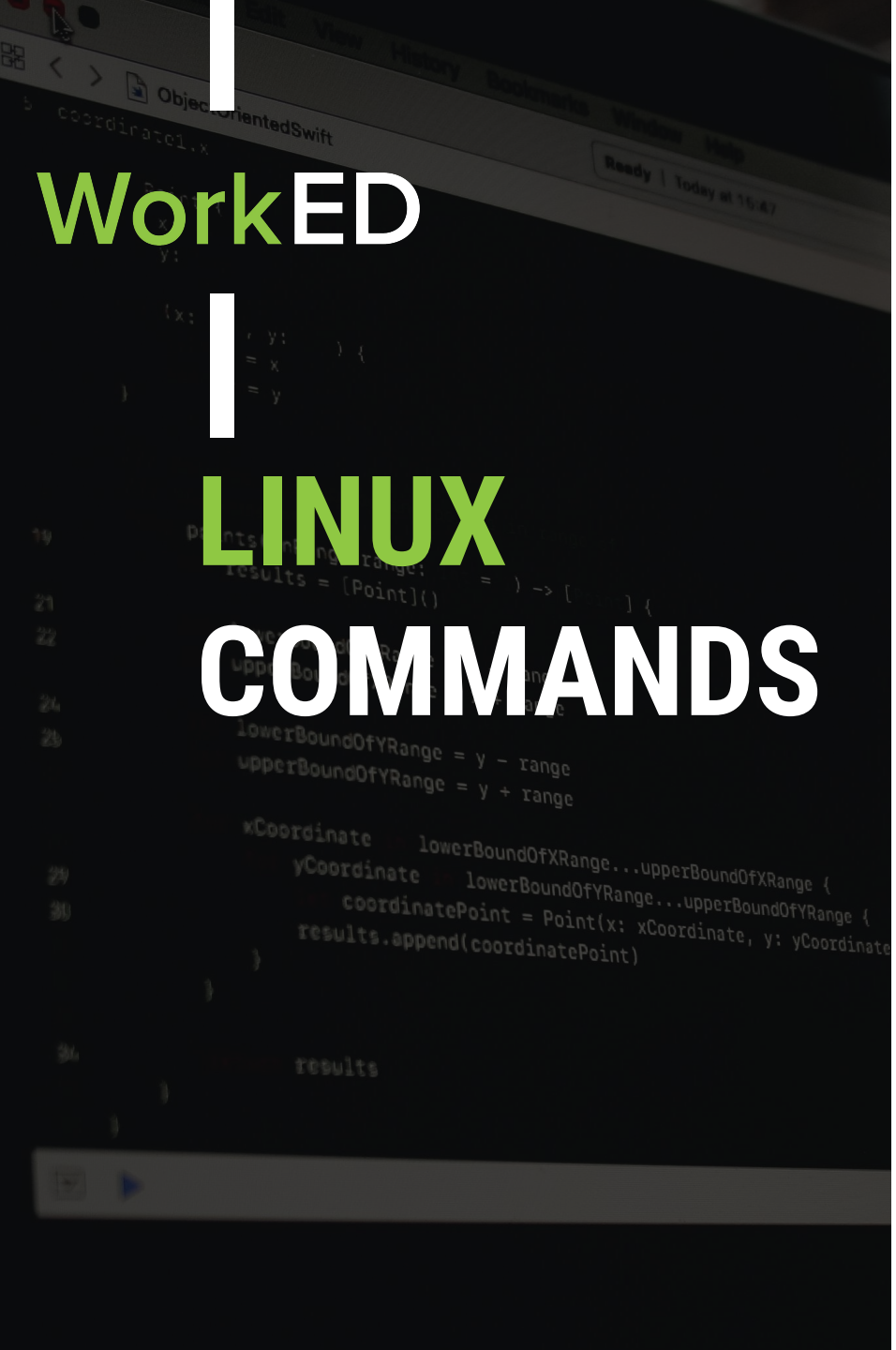
ARGUMENT - provides the input/output the command uses



WorkED

LINUX COMMANDS

`ls`	List files in current directory
`ls -al`	List files in current directory show all files and display details in long format
`cd directory`	Change Directory followed target name (cd with no target will go back to “home” directory)
`cd ..`	Go “up” one directory
`mkdir name`	Make Directory followed by new directory name
`rmdir name`	Remove Directory, followed by target name
`cat file`	Print contents of *file* to screen (literally “concatenate” file’s contents to screen)
`CTRL+C`	Will typically stop or exit most any command



WorkED

LINUX COMMANDS

`hostname`	Name of computer
`uname -a`	System details (kernel information)
`cat /proc/cpuinfo`	Print information about CPU
`cat /proc/meminfo`	Print information about RAM
`tree`	Show “tree-like structure of current directory and subdirectories. (CTRL+C to quit)

WorkED

LINUX COMMANDS

`more` *`file`*	Print contents of file one screen-full at a time Press SPACE to see next screen-full
`less` *`file`*	Just like more (“less is more”) but allows arrow keys to scroll up and down (Q to Quit)
`head` *`file`*	Print first 10 lines of file
`head -n 2` *`file`*	Print only first 2 lines of file
`tail` *`file`*	Print last 10 lines of file
`tail -n 6` *`file`*	Print only last 6 lines of file
`sort` *`file`*	Sort the contents of file and print to screen
`diff` *`file1 file2`*	Highlight differences between file1 and file2
`grep` *`term file`*	Find keyword term in file, print lines that match

WorkED

LINUX TEXT EDITORS

`nano`	• Simple word command line editor (text document)
`emacs`	• Customizable editor • Support for all most programming languages
`vi`	• Lightweight, powerful editor • POSIX-standard (included on all Unix systems) • Steep learning curve
`sed`	• Simple “stream editor” for command line file edits • Most experienced users will simply use a text editor • Useful for automating an edit process

WorkED

LINUX NETWORKING TOOLS

`ifconfig`	Network interface configuration tool Used to determine IP address, MAC address and state of network link
`ping addr`	Tool used to test latency in a network connection to address addr (IP address or hostname)
`traceroute addr`	Print the route packets take to address addr
`nslookup domain`	Query DNS server for information about domain
`dig domain`	In-depth query of DNS server about domain
`dig domain ANY`	Return all DNS information about domain (including mail, aliases, and other IPs)

WorkED

DO ONE THING WELL

- Most Linux commands **only do one thing**, but they do that one thing **in many ways**.
- **String commands** together using the ‘pipe’ operator: |
- **Search for term** “failed” in log file then “pipe” the output into the sort command for sorted output:

```
grep failed login-attempts.log | sort
```

- **Show tree structure** of home directory but display using ‘less’ to allow scrolling up and down (Q to Quit)

```
tree /home | less
```

WorkED

SUDO

- To perform some actions reserved for a system administrator, you must have **ability to act as the root user**.
- The **command sudo** instructs a command to do the command as the "**super user**" (aka root)

```
MAKE ME A SANDWICH.
                    WHAT?
          MAKE IT YOURSELF.

SUDO MAKE ME A SANDWICH.
                    OKAY.
```

WorkED

INTRO TO LINUX

QUESTIONS?

THANK YOU