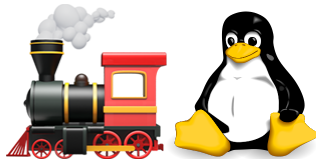# Linux101 Express
Introduction to GNU/Linux/Bash

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Linux

- created in 1991 by Linus Torvalds
- GNU/Linux: most used operating system on servers
- Open source

Bash

- Born Again SHell
- interpreter
- textual interface with your computer

Getting the context

```
# Where am I?
pwd
whoami
```

Getting the context

```
# Who am i?
id
```

Getting the context

```
# What's in my directory?
ls
```

Getting the context

```
# What am I connected to?
uname -a
```

Getting the context

```
# What am I connected to?
ip a
```

Read the f(ancy|ucking) manual

Almost all commands display help when you type:

```
man bash
# or
bash --help
```

Moving around directories

```
cd /home/louis # Change Directory
cat, xxd, head, tail, diff, less
mkdir
touch, rm
cp
mv
nano, vim
```

Ownership and permissions

Use the **sudo** prefix to execute the command as the superuser (admin).

```
sudo
chmod
chown
```

Finding files

```
find
locate
which
```

Piping

You can pipe commands together and use the output of a command into another command:

```
grep -v '#' main.py | wc -l
```

Stream redirection

- two primary streams: stdin (input) and stdout (output)

```
base64 -w 0 < summary.txt > summary.txt.b64
```

Installing programs (Debian/Ubuntu)

```
apt update # download packages information
apt install vim
```

Compressing and archiving

```
tar xvf archive.tar.gz
gzip -d archive.gz
unzip archive.zip
```

Never forgetti

If you forget a command that you already typed, check your history!

```
history
history | grep 'ssh'
```

You can also use Ctrl+R to search in your history directly from the command line.

Networking

```
ping # send ICMP requests
nc # raw TCP sessions
ssh # Secure SHell
curl # send HTTP requests
wget # send HTTP requests
traceroute # see the route of a TCP packet to a given host
nslookup # send DNS requests
dig # send DNS requests
```

Processes

```
ps # list all processes
pstree # list all processes with parents/children
systemctl # service manager
```

Bash scripting

```bash
for offset in {1..100}
do
    curl http://images.amazing.school/$offset
done
```

Linux

- **EVERYTHING** is a file
  - e.g. keyboard events are accessible @ /dev/input/event0, the brightness of your screen @ /sys/class/backlight
- a file is a collection of data stored in one unit

Going further

- *The Missing Semester of Your CS Education* at https://missing.csail.mit.edu/