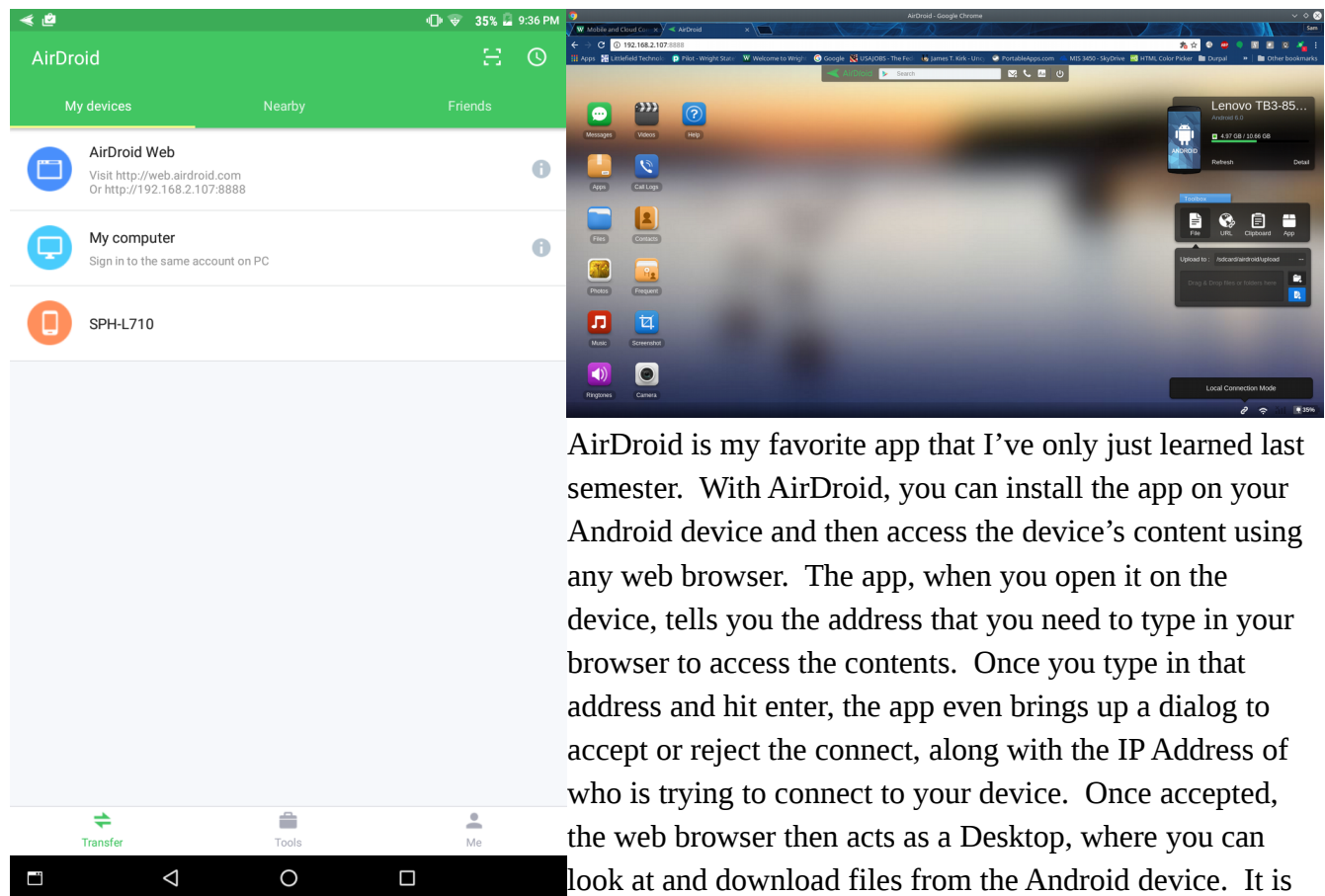


P1 – Intro

Task 1: Android Networking APKs

I had a few of these apps installed a while ago, but I'll write a little about them here. These apps were run on my Lenovo Tab3 8 or TB3-850F.

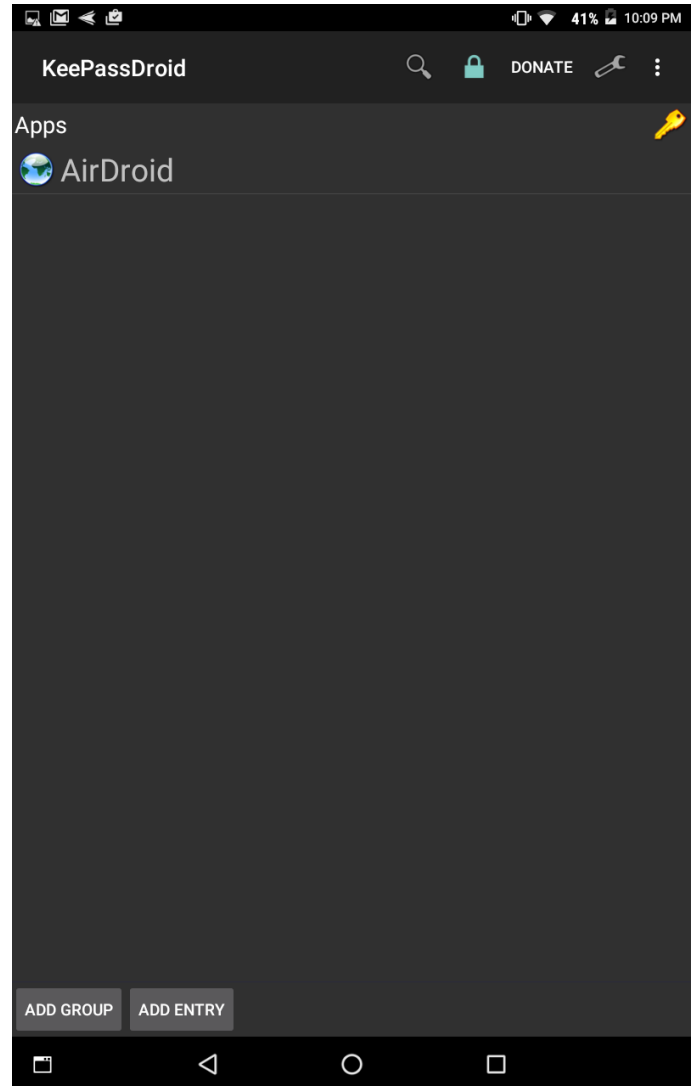
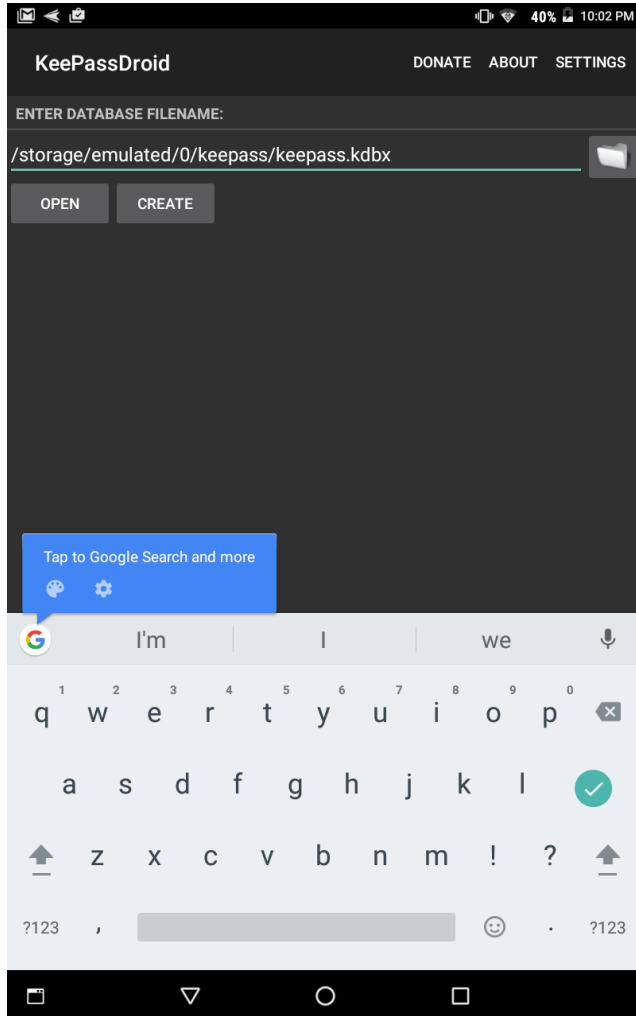
AirDroid



AirDroid is my favorite app that I've only just learned last semester. With AirDroid, you can install the app on your Android device and then access the device's content using any web browser. The app, when you open it on the device, tells you the address that you need to type in your browser to access the contents. Once you type in that address and hit enter, the app even brings up a dialog to accept or reject the connect, along with the IP Address of who is trying to connect to your device. Once accepted, the web browser then acts as a Desktop, where you can look at and download files from the Android device. It is very helpful if you don't want to deal with setting up a SFTP server on your Android device, or scan through the device on a USB connection to find files. The web browser front-end sets up every type of file to be easily found. Plus, you can also access the camera and other things on the device from the web browser.

P1 – Intro

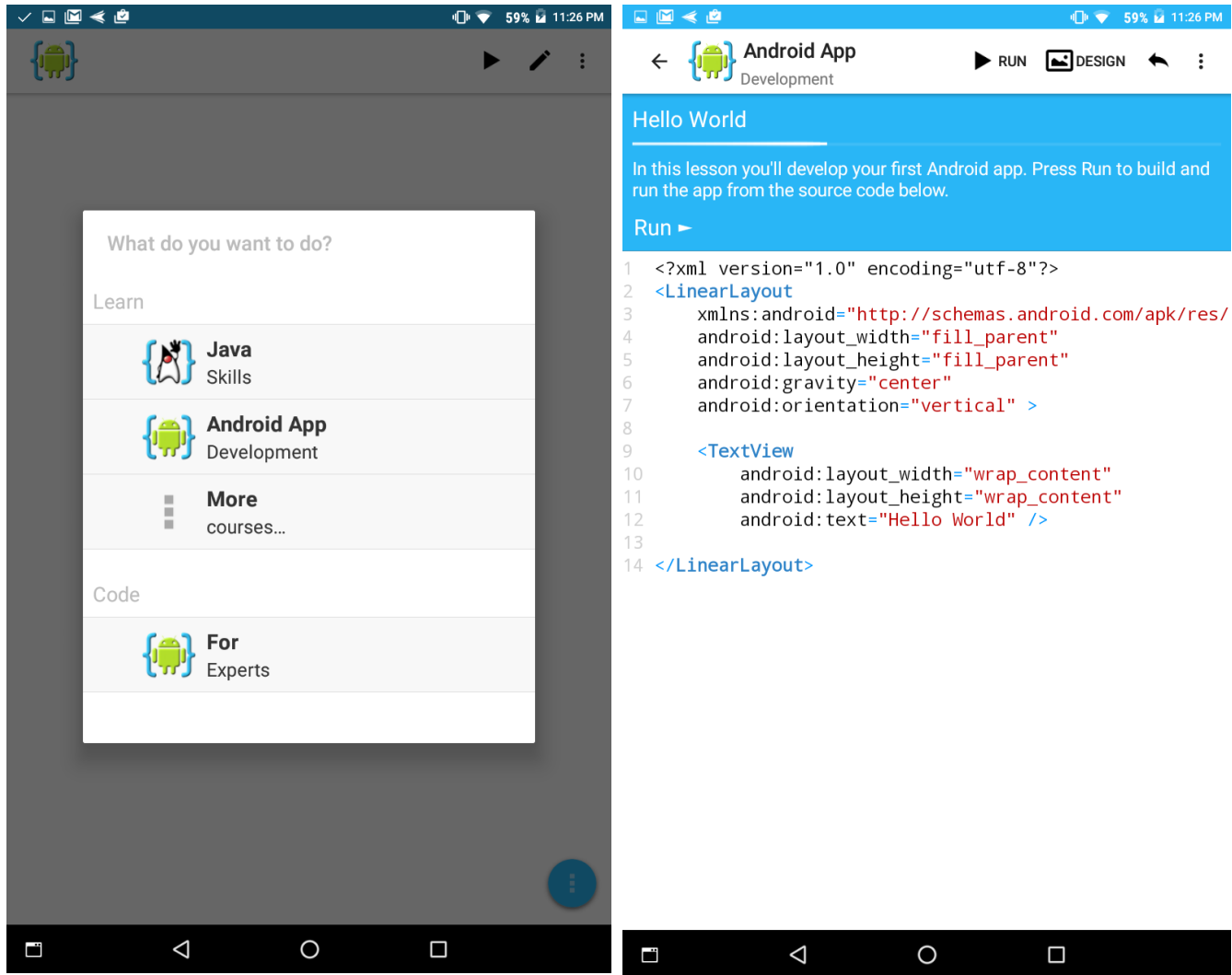
KeepPass



KeepPass was an app that I installed last year that I never really used. It can be used to save your passwords to an encrypted database file on your Android device. Here's an image of me setting up that database file, there was also a screen after that where I gave it a password and an optional key file. Once that was all setup, you get a blank list. The picture on the right is what it looks like after adding a Group and one entry to that Group. I probably won't use this app a whole lot since Google Chrome has saved all my passwords, and all my apps remember the passwords that I use with them. Plus, you have to open this app up, put in the Database password, find the entry, select the entry, select copy password (an option that is hidden at the top right, which is shown after clicking on the dots). The app just takes too many clicks to retrieve a password to use in an app or website.

P1 – Intro

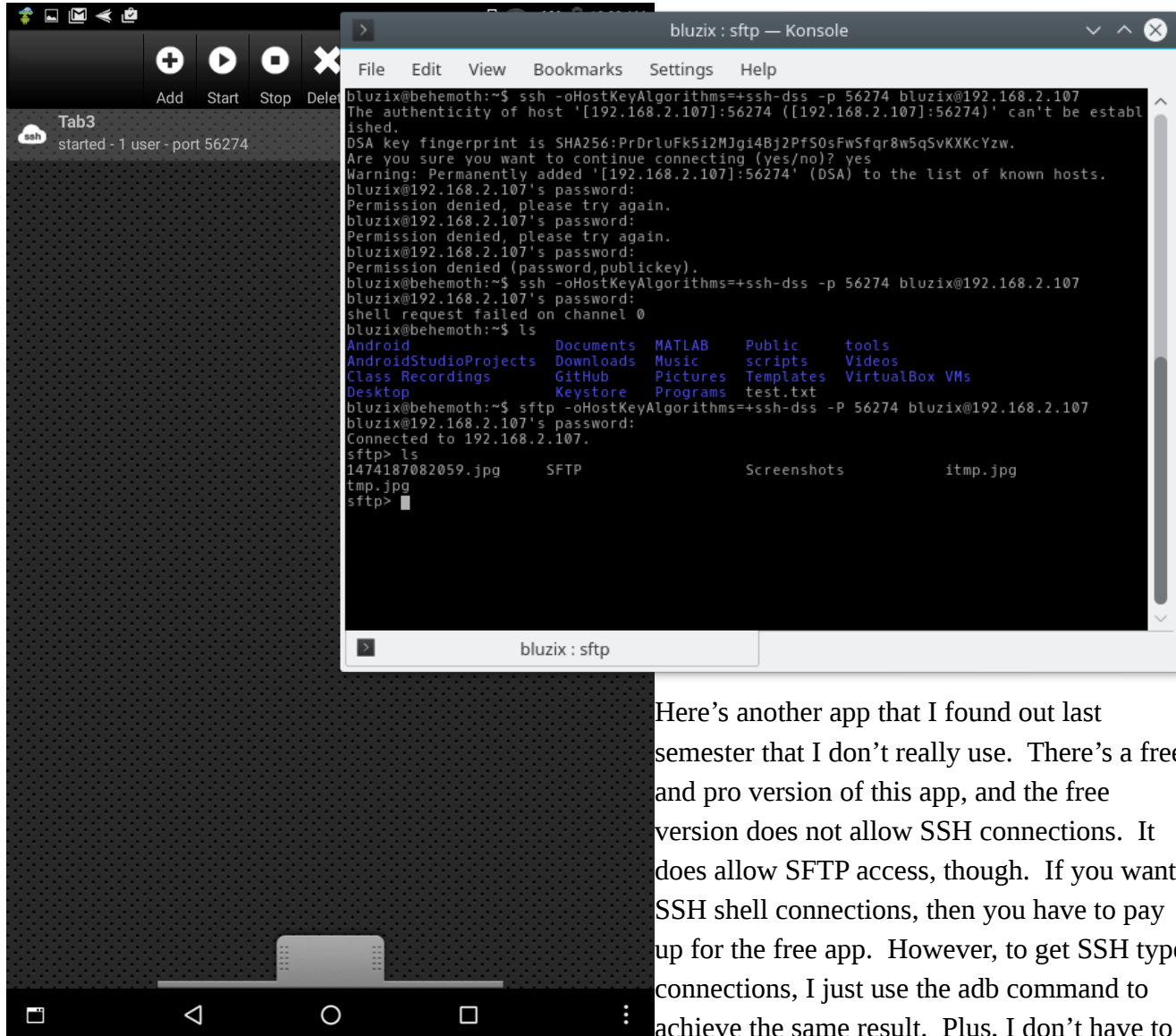
AIDE



Here's a cool app that I haven't really used, even though I found out about this one by myself a few years ago. When it first came out, it was just a normal IDE. However, over the years, it now has this really cool menu in the beginning to give you the option to code or learn stuff. I picked an Android App Development Lesson to quickly show off the app in this report. The lessons give you a certain objective to complete, but you can see that it gives you the XML design code to work with. The source code in the app can be ran and it spawns off a separate app.

P1 – Intro

SSH Server

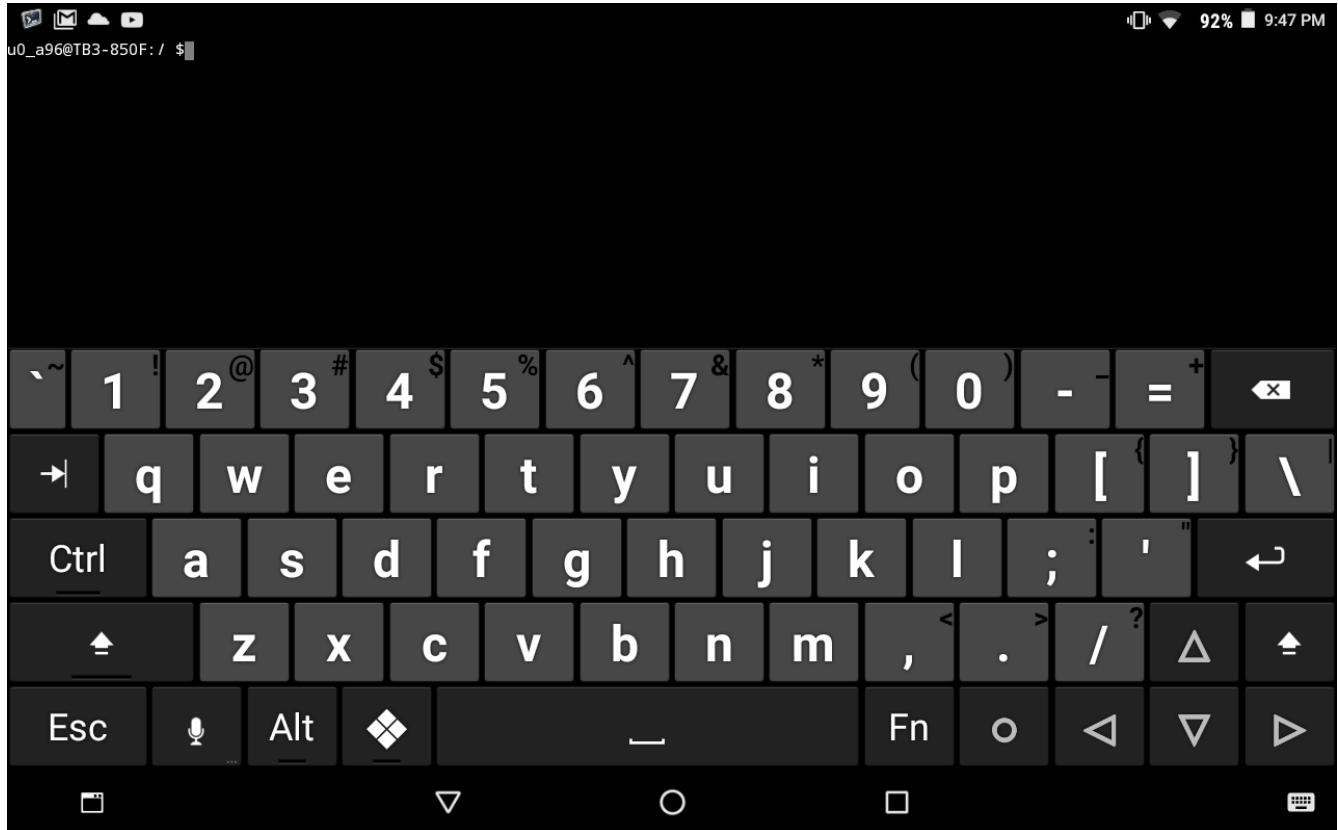


```
bluzix@behemoth:~$ ssh -oHostKeyAlgorithms=+ssh-dss -p 56274 bluzix@192.168.2.107
The authenticity of host '[192.168.2.107]:56274 ([192.168.2.107]:56274)' can't be established.
DSA key fingerprint is SHA256:PrDrluFk5i2MJgi4Bj2PfS0sFwSfqr8w5qSvKXKcYzw.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '[192.168.2.107]:56274' (DSA) to the list of known hosts.
bluzix@192.168.2.107's password:
Permission denied, please try again.
bluzix@192.168.2.107's password:
Permission denied, please try again.
bluzix@192.168.2.107's password:
Permission denied (password,publickey).
bluzix@behemoth:~$ ssh -oHostKeyAlgorithms=+ssh-dss -p 56274 bluzix@192.168.2.107
bluzix@192.168.2.107's password:
shell request failed on channel 0
bluzix@behemoth:~$ ls
Android          Documents        MATLAB           Public           tools
AndroidStudioProjects  Downloads       Music           scripts         Videos
Class Recordings  GitHub          Pictures        Templates       VirtualBox VMs
Desktop          Keystore        Programs        test.txt
bluzix@behemoth:~$ sftp -oHostKeyAlgorithms=+ssh-dss -P 56274 bluzix@192.168.2.107
Connected to 192.168.2.107.
sftp> ls
1474187082059.jpg      SFTP              Screenshots      itmp.jpg
tmp.jpg
sftp>
```

Here's another app that I found out last semester that I don't really use. There's a free and pro version of this app, and the free version does not allow SSH connections. It does allow SFTP access, though. If you want SSH shell connections, then you have to pay up for the free app. However, to get SSH type connections, I just use the adb command to achieve the same result. Plus, I don't have to remember to put in `-oHostKeyAlgorithms=+ssh-dss` when I use adb, unlike when I'm using this app.

P1 – Intro

Hacker's Keyboard and Terminal IDE



P1 – Intro



The screenshot shows a mobile terminal application interface. At the top, the status bar displays signal strength, Wi-Fi, 91% battery, and 9:51 PM. The terminal window has a black background with white text. The prompt is 'u0_a96@TB3-850F: / \$'. The command entered is 'ping 192.168.2.103'. The output shows 8 successful ping requests with varying response times. Below the output, a summary line states: '--- 192.168.2.103 ping statistics --- 8 packets transmitted, 8 received, 0% packet loss, time 7010ms rtt min/avg/max/mdev = 38.321/85.069/129.443/32.570 ms'. A virtual keyboard is overlaid on the bottom half of the screen, featuring standard QWERTY keys, function keys (Ctrl, Alt, Esc, Fn), and navigation keys (back, forward, home, recent apps). The keyboard is dark grey with white lettering.

```
verity_key
u0_a96@TB3-850F: / $ping 192.168.2.103
PING 192.168.2.103 (192.168.2.103) 56(84) bytes of data.
64 bytes from 192.168.2.103: icmp_seq=1 ttl=64 time=126 ms
64 bytes from 192.168.2.103: icmp_seq=2 ttl=64 time=129 ms
64 bytes from 192.168.2.103: icmp_seq=3 ttl=64 time=49.7 ms
64 bytes from 192.168.2.103: icmp_seq=4 ttl=64 time=72.4 ms
64 bytes from 192.168.2.103: icmp_seq=5 ttl=64 time=95.7 ms
64 bytes from 192.168.2.103: icmp_seq=6 ttl=64 time=107 ms
64 bytes from 192.168.2.103: icmp_seq=7 ttl=64 time=38.3 ms
64 bytes from 192.168.2.103: icmp_seq=8 ttl=64 time=60.8 ms
^C
--- 192.168.2.103 ping statistics ---
8 packets transmitted, 8 received, 0% packet loss, time 7010ms
rtt min/avg/max/mdev = 38.321/85.069/129.443/32.570 ms
u0_a96@TB3-850F: / $
```

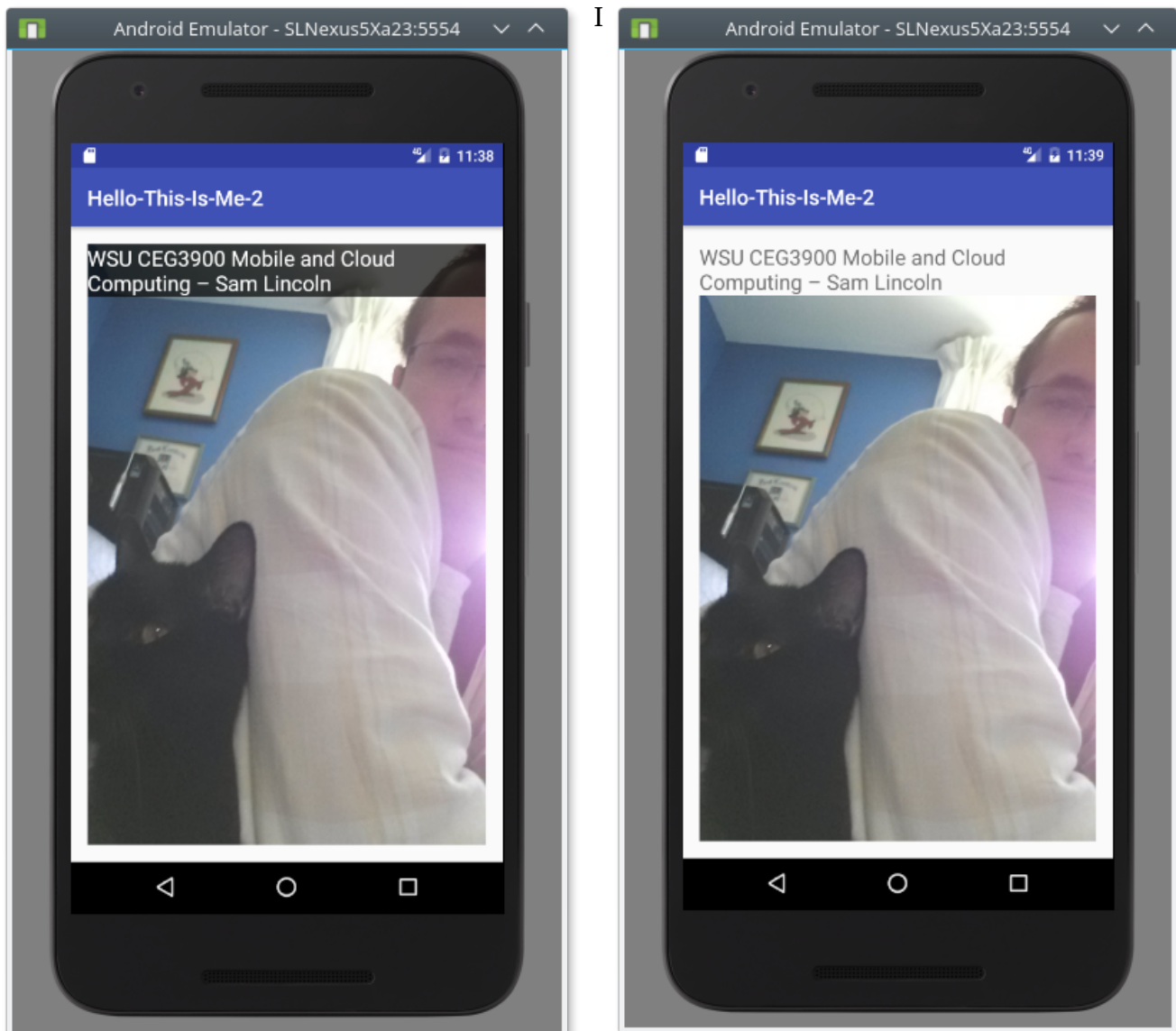
Hacker's Keyboard is something new that I just found out. I really like that has the arrow keys, but the arrow keys are only available when the device is tilted to landscape. I've had issues trying to move the cursor that this keyboard seems to fix. There's not a whole lot of other keys that would be useful in basic Android apps. However, this is a very nice keyboard for Terminal IDE. I would have to restart or shut down Terminal IDE after entering in the ping command, but this keyboard fixes that issue by allowing me to enter ctrl+c to stop the command. It's also very nice to see that Terminal IDE returns real data with the ping command. I once had another Terminal Android app that just returned simulated data, which was not helpful at all during my network classes back when I was studying MIS.

Took 2 hours, 15 minutes, and 49 seconds to complete this Task

P1 – Intro

Task 2: Android Development

I had Android Studio previously installed, so all I had to do was call `studio` from my Kubuntu's Terminal to get it up and running. The `studio` command is actually an alias that I have defined in my `.bashrc` file. That command actually is short for `'/usr/local/android-studio/bin/studio.sh &'`.



completely created this new app from scratch. What I did was use a relative layout to a linear (vertical) layout for this app. I put in a different picture from my app that I had created in CEG 4440. Also, the pictures are now buttons, all you have to do is tap on an image to switch layouts.

P1 – Intro

Took 1 hour, 30 minutes, and 9 seconds to complete Task 2; 3 hours, 45 minutes, and 58 seconds total

Task 3: Build an Android Open Source APK

I decided to try to download and build MirakelX/mirakel-android from <https://github.com/MirakelX/mirakel-android>. All I had to do to download the source code was go to my GitHub folder I created, and type in `git clone https://github.com/MirakelX/mirakel-android.git` because I had previously downloaded `git` through `apt-get`.

I opened up the entire folder that was pulled from `git` inside of Android Studio. I had to wait for Android Studio to update the SDK, but afterwards, I downloaded the build tools for version 23.0.1. I was able to build it, but it had a few errors. One of the errors was that it was unable to locate a ‘./local.properties’ file on line 64 of the `new_ui/build.gradle`. I poked around the directory and found a `local.properties.dist`, so I just added the `.dist` to the file name on line 64. After the IDE finished that build, it asked if I wanted to upgrade the project’s Android Gradle plugin to version 2.1.3. I agreed to this, the IDE did its thing, and it finished with 146 warnings. I wasn’t able to get it to run. One of the developers decided to include a requirement for a `debug.keystore` file in the `new_ui` before I could build and run the thing. The problem was, that `debug.keystore` file was not included. I feel like the hour and a half I spent on this is good enough; plus, then instructions just say I have to get the app to build, and nothing about having it run correctly. I’m just going to build release APK, and we’ll see if it works or not later. Also, this app takes way too long to build between each attempt to run it.

Changes:

- Updated Android Gradle plugin to version 2.1.3 in `build.gradle` in `mirakel-android`
- Changed line 64 of `build.gradle` in `mirakel-android/new_ui` to load `local.properties.dist`
- Deleted the `signingConfigs` starting on line 65 of `build.gradle` in `mirakel-android/new_ui`
- Deleted the use of `signingConfigs` on lines 84 and 91 of `build.gradle` in `mirakel-android/new_ui`

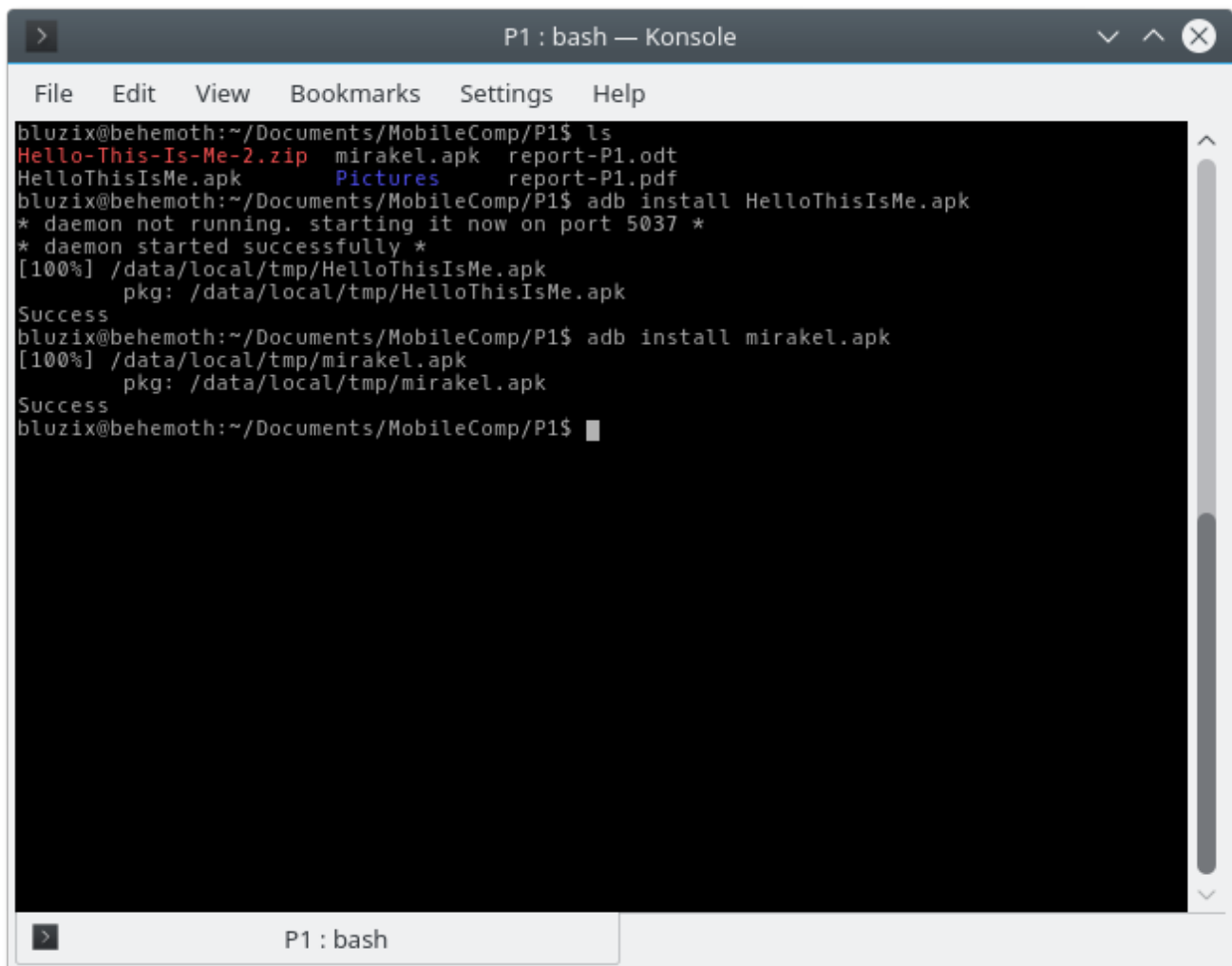
Took 1 hour, 45 minutes, and 4 seconds to complete this task; 5 hours, 31 minutes, and 2 seconds total

P1 – Intro

Task 4: adb (Android Debug Bridge)

Install APKs

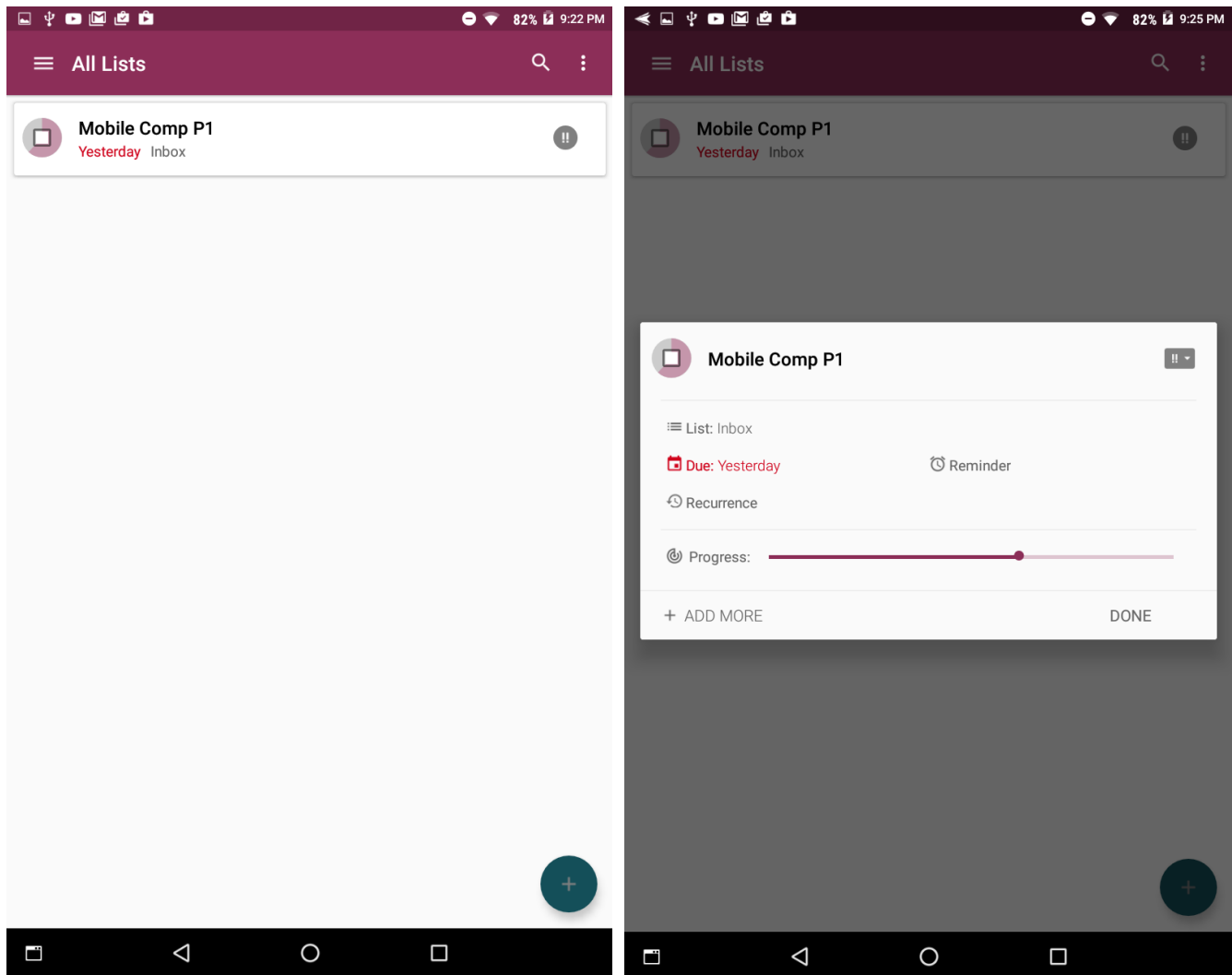
What I did was connect my Lenovo Tab3 to my computer using a USB cable. In the Terminal, I moved to the correct directory and typed in `adb install apkName` where the `apkName` is replaced with `HelloThisIsMe.apk` and `mirakel.apk`. Below is a picture that shows the success of those operations.



```
P1 : bash — Konsole
File Edit View Bookmarks Settings Help
bluzix@behemoth:~/Documents/MobileComp/P1$ ls
Hello-This-Is-Me-2.zip  mirakel.apk  report-P1.odt
HelloThisIsMe.apk     Pictures     report-P1.pdf
bluzix@behemoth:~/Documents/MobileComp/P1$ adb install HelloThisIsMe.apk
* daemon not running. starting it now on port 5037 *
* daemon started successfully *
[100%] /data/local/tmp/HelloThisIsMe.apk
      pkg: /data/local/tmp/HelloThisIsMe.apk
Success
bluzix@behemoth:~/Documents/MobileComp/P1$ adb install mirakel.apk
[100%] /data/local/tmp/mirakel.apk
      pkg: /data/local/tmp/mirakel.apk
Success
bluzix@behemoth:~/Documents/MobileComp/P1$
```

I then started up Mirakel on my Tab3, because I was curious to see if it was working. Well, it looks like generating a signed APK worked. I even took the time to create an entry for it, to make sure that it worked. Everything looks in order; I've placed two pictures on the next page to show off the app working.

P1 – Intro



It's a decent app, but I wish it had a check list for each entry; then a could just have the app calculate Progress for me instead of awkwardly entering it manually. Plus, it could use an explanation on what sub tasks mean; because, they are not the checklist I thought they were, even though they have a check mark as their icon.

I called `adb shell` to access the shell of my Tab3 through the adb connection. Once I was in the shell of my device, I called `cd directory` where directory was `/system/bin` and `/system/xbin`. Since I forgot to call `script` before entering the shell, what I did was call `ls > /storage/sdcard0/Download/fileName` where the fileName was `binFiles.txt` and `xBinFiles.txt` to get a listing of the files located inside these system directories. Once I created these file, I called `adb pull /storage/sdcard0/Download/fileName` to grab the files. The next few pages shows the contents of these two files.

P1 – Intro

/system/bin

6620_launcher

6620_wmt_concurrency

6620_wmt_lpbk

AcidApiDaemon

MATest

MtkCodecService

acpi

aee

aee_archive

aee_core_forwarder

aee_dumpstate

akmd09911

akmd8963

akmd8975

am

ami304d

app_process

app_process32

app_process64

applypatch

applysig

appops

appwidget

atci_service

atcid

P1 – Intro

atrace
audiocmdservice_atci
autobt
autokd
badblocks
basename
batterywarning
bcc
blkid
blockdev
bmgr
bmm050d
boot_logo_updater
bootanimation
bu
bugreport
bzcat
cal
capture_audio.sh
cat
ccci_fsd
ccci_mdinit
chcon
chgrp
chmod
chown

P1 – Intro

chroot
cksum
clatd
clear
cmp
comm
content
cp
cpio
cut
dalvikvm
dalvikvm32
dalvikvm64
date
dd
debuggerd
debuggerd64
dex2oat
df
dhcp6c
dhcp6ctl
dhcp6s
dhcpcd
dirname
dm_agent_binder
dmesg

P1 – Intro

dmlog
dnsmasq
dos2unix
downloader
dpm
drmserver
du
dumpstate
dumpsys
e2fsck
echo
egrep
em_svr
env
epdg_wod
expand
expr
factory
fallocate
false
fgrep
find
free
fsck.f2fs
fsck_msdos
fsck_msdos_mtk

P1 – Intro

fuelgauged
gas_srv
gatekeeperd
ged_srv
geomagneticd
getenforce
getevent
getprop
grep
groups
gsm0710muxd
gsm0710muxdmd2
guiext-server
gzip
gzip_static
head
hid
hostapd
hostapd_cli
hostname
hwclock
id
idmap
ifconfig
iftop
ime

P1 – Intro

init.lct.bootcheck.sh

inotifyd

input

insmod

install-recovery.sh

installd

ioctl

ionice

ip

ip6tables

ipod

iptables

keystore

kill

kpoc_charger

lcdc_screen_cap

ld.mc

linker

linker64

lmkd

ln

load_policy

log

logcat

logd

logname

P1 – Intro

logwrapper

losetup

ls

lsm303md

lsmod

lsof

lsusb

magd

make_ext4fs

make_f2fs

matv

mc6420d

md5sum

md_ctrl

mdnsd

media

mediaserver

memorydumper

memsicd

memsicd3416x

meta_tst

mkdir

mke2fs

mknod

mkswap

mktemp

P1 – Intro

mmp
mobile_log_d
modinfo
monkey
more
mount
mountpoint
msensord
mtdinfo
mtkrild
mtkrildmd2
mtpd
muxreport
mv
nandread
ndc
netd
netdiag
netstat
newfs_msdos
nice
nl
nohup
nvram_agent_binder
nvram_daemon
oatdump

P1 – Intro

od

orientationd

paste

patch

patchoat

perf_native_test

pgrep

pidof

ping

ping6

pkill

playback_audio.sh

pm

pmap

ppl_agent

pppd

pppd_dt

pq

printenv

printf

prlimit

program_binary_service

ps

pwd

racoona

radvd

P1 – Intro

readlink

realpath

reboot

renice

requestsync

resize2fs

resize_ext4

restorecon

rm

rmdir

rmmod

route

rs2spir

rtt

run-as

runcon

s62xd

schedtest

screencap

screenrecord

sdcard

sed

sendevent

sensorservice

seq

service

P1 – Intro

servicemanager

setenforce

setprop

setsid

settings

sgdisk

sh

sha1sum

sink

sleep

slpd

sm

sn

sort

source

spir2cl

split

spm_loader

start

stat

stop

stp_dump3

strings

superumount

surfaceflinger

svc

P1 – Intro

swapoff

swapon

sync

sysctl

tac

tail

tar

taskset

tc

tee

telecom

terservice

tertestclient

thermal

thermal_manager

thermald

time

timeout

tiny_mkswap

tiny_swapoff

tiny_swapon

toolbox

top

touch

toybox

tr

P1 – Intro

true

truncate

tune2fs

tzdatacheck

ubiattach

ubidetach

ubiformat

ubimkvol

ubinfo

ubirmvol

ubiupdatevol

uiautomator

umount

uname

uncrypt

uniq

unix2dos

uptime

usleep

vdc

vmstat

vold

vtservice

watchprops

wc

which

P1 – Intro

whoami
wifi2agps
wm
wmt_loader
wpa_cli
wpa_supplicant
xargs
xlog
yes

/system/xbin

BGW
dexdump
mnlld
showmap
tcpdump

mounts

To capture the mount points of my Tab3, I first exited the adb shell and called `script mounts.txt` to begin logging the Terminal's output to a new mounts.txt file on my computer. I then called `adb shell` to access my device's shell, and then called `mount` to get a listing of all the mount points on the device. To stop logging the Terminal's output and create the mounts.txt file, I had to call `exit` twice: once to exit the adb shell, and another to stop `script` from logging Terminal's output. Normally, `script` will stop logging Terminal output unless your doing things similar to `adb shell`. Below and on the next page, I have what `script` was able to capture for `mount`.

```
rootfs / rootfs ro,seclabel 0 0
tmpfs /dev tmpfs rw,seclabel,nosuid,relatime,mode=755 0 0
devpts /dev/pts devpts rw,seclabel,relatime,mode=600 0 0
proc /proc proc rw,relatime 0 0
```


P1 – Intro

```
sysfs /sys sysfs rw,seclabel,relatime 0 0
selinuxfs /sys/fs/selinux selinuxfs rw,relatime 0 0
debugfs /sys/kernel/debug debugfs rw,seclabel,relatime 0 0
none /acct cgroup rw,relatime,cpuacct 0 0
none /sys/fs/cgroup tmpfs rw,seclabel,relatime,mode=750,gid=1000 0 0
tmpfs /mnt tmpfs rw,seclabel,relatime,mode=755,gid=1000 0 0
none /dev/cpuctl cgroup rw,relatime,cpu 0 0
pstore /sys/fs/pstore pstore rw,seclabel,relatime 0 0
/dev/block/dm-0 /system ext4 ro,seclabel,relatime,data=ordered 0 0
/dev/block/platform/mtk-msdc.0/11230000.msd0/by-name/cache /cache ext4
rw,seclabel,nosuid,nodev,noatime,discard,noauto_da_alloc,data=ordered 0 0
/dev/block/platform/mtk-msdc.0/11230000.msd0/by-name/protect1 /protect_f ext4
rw,seclabel,nosuid,nodev,noatime,nodelalloc,noauto_da_alloc,commit=1,data=ordered 0 0
/dev/block/platform/mtk-msdc.0/11230000.msd0/by-name/protect2 /protect_s ext4
rw,seclabel,nosuid,nodev,noatime,nodelalloc,noauto_da_alloc,commit=1,data=ordered 0 0
/dev/block/platform/mtk-msdc.0/11230000.msd0/by-name/nvdata /nvdata ext4
rw,seclabel,nosuid,nodev,noatime,discard,noauto_da_alloc,data=ordered 0 0
adb /dev/usb-ffs/adb functionfs rw,relatime 0 0
tmpfs /storage tmpfs rw,seclabel,relatime,mode=755,gid=1000 0 0
/dev/block/dm-1 /data ext4
rw,seclabel,nosuid,nodev,noatime,discard,noauto_da_alloc,resuid=10010,data=ordered 0 0
/dev/fuse /mnt/runtime/default/emulated fuse
rw,nosuid,nodev,noexec,noatime,user_id=1023,group_id=1023,default_permissions,allow_other 0 0
/dev/fuse /storage/emulated fuse
rw,nosuid,nodev,noexec,noatime,user_id=1023,group_id=1023,default_permissions,allow_other 0 0
/dev/fuse /mnt/runtime/read/emulated fuse
rw,nosuid,nodev,noexec,noatime,user_id=1023,group_id=1023,default_permissions,allow_other 0 0
/dev/fuse /mnt/runtime/write/emulated fuse
rw,nosuid,nodev,noexec,noatime,user_id=1023,group_id=1023,default_permissions,allow_other 0 0
```

P1 – Intro

I completed Task 4 in 49 minutes; 6 hours, 20 minutes, and 2 seconds total

Task 5: Staring AWS Cloud Computing

Storage

I already had a Google Drive account and a OneDrive account. Here's my music folder in both of those accounts. They both have the same ten music files; however, the Google Drive has one extra file.

The image displays two side-by-side screenshots of cloud storage interfaces. The top screenshot is Google Drive, showing a 'Music' folder with a table of files. The bottom screenshot is OneDrive, showing a 'Music' folder with a grid of file thumbnails.

Google Drive Music Folder:

Name	Owner	Last modified	File size
1-03 21XX War Was Beginning [MMX5 - Opening Stage X] (Fishy)....	me	Mar 15, 2012 me	6 MB
2-01 Zero and the Plight of Iris [MMX4 - Opening Stage Zero] (BON...	me	Mar 15, 2012 me	8 MB
2-02 On the Highway [MMX - Opening Stage] (Dominic Ninmark)....	me	Mar 15, 2012 me	9 MB
2-05 Glorious Crystal Glean [MMX2 - Crystal Snail Stage] (Vurez)....	me	Mar 15, 2012 me	7 MB
2-08 Put Ya Guns On [MMX5 - Zero Stage 2] (Diggi Dis).mp3	me	Mar 15, 2012 me	8 MB
2-09 Dusty Dune Devil [MMX2 - Overdrive Ostrich Stage] (Vurez).m...	me	Mar 15, 2012 me	6 MB
2-10 Stay Frosty [MMX4 - Frost Walrus Stage 1, Frost Walrus Stag...	me	Mar 15, 2012 me	10 MB
2-11 Let There Be Light [MMX - Dr. Light, Get a Weapon, MMX2 - D...	me	Mar 15, 2012 me	7 MB
2-12 Repliforce's Honor [MMX4 - Final Weapon Stage 1] (Gario).mp3	me	Mar 15, 2012 me	13 MB
3-02 The 4th Coming [MMX4 - Opening Stage X] (The Dual Dragon...	me	Mar 15, 2012 me	9 MB
57094_newgrounds_megama.wav	me	Dec 23, 2012 me	3 MB

OneDrive Music Folder:

The OneDrive interface shows a grid of 10 music file thumbnails, each with a 'MEGA MAN X' title and a red background. The files are:

- 1-03 21XX War Was Be...
- 2-01 Zero and the Plig...
- 2-02 On the Highway [...]
- 2-05 Glorious Crystal ...
- 2-08 Put Ya Guns On [...]
- 2-09 Dusty Dune Devil...
- 2-10 Stay Frosty [MM...
- 2-11 Let There Be Ligh...
- 2-12 Repliforce's Hono...
- 3-02 The 4th Coming [...]

P1 – Intro

Amazon EC2

I already had an Amazon account, so I got to skip setting one up. Once I logged into the EC2 site, I picked the Services at the top, then picked EC2 from the window that showed up. I selected launch instance button, filtered by Free Tier only, I chose the Ubuntu 16.04 LTS (HVM) SSD Volume 64-bit; I couldn't find version 12.04 sadly. I then picked the t2.micro type (only one available for free), checked to make sure the default storage was 8 GiB, tagged it with "CEG3900-WSU-Cloud-Lab", left security groups alone, and then I created a key-pair after clicking launch. I created the key "slincoln-ceg3900-aws-ec2-key" and stored it in ~/keystore/EC2. Public DNS was ec2-54-213-198-66.us-west-2.compute.amazonaws.com.

To make things easier for me to document, I'll just post my stuff from a few script commands. If I make any comments, I'll highlight them to separate them from the script output. Plus, I'll still continue my headers to help sort through this mess.

Logging in and doing #4

I logged in and did everything for question 4 in one go. I even copied everything from dpkg -l, but the total count is 448 programs.

```
#]0;bluzix@behemoth:
~/Documents/MobileComp/P1#bluzix@behemoth:~/Documents/MobileComp/P1$ ssh -X -i
s###[K~/Keystore/EC2/slincoln-ceg3900-aws-
-ec2-key.pem ubuntu@ec2-54-213-198-66.us-west-
2.compute.amazonaws.com#####1Pcompute.amazonaws.com#####
#####.compute.amazonaws.com#####[C#[C#[C#[C#[C#[C#[C#[C#[C
#[C#[C#[C#[C#[C#[C#[C#[C#####
The authenticity of host 'ec2-54-213-198-66.us-west-2.compute.amazonaws.com (54.213.198.66)' can't
be established.
ECDSA key fingerprint is SHA256:uZdbIOpeLdn0KRGm4qhcOXBQXP096UyuHKsc1MgyU5U.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ec2-54-213-198-66.us-west-2.compute.amazonaws.com,54.213.198.66'
(ECDSA) to the list of known hosts.
```

Welcome to Ubuntu 16.04.1 LTS (GNU/Linux 4.4.0-53-generic x86_64)

P1 – Intro

- * Documentation: <https://help.ubuntu.com>
- * Management: <https://landscape.canonical.com>
- * Support: <https://ubuntu.com/advantage>

Get cloud support with Ubuntu Advantage Cloud Guest:

<http://www.ubuntu.com/business/services/cloud>

0 packages can be updated.

0 updates are security updates.

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

/usr/bin/xauth: file /home/ubuntu/.Xauthority does not exist

To run a command as administrator (user "root"), use "sudo <command>".

See "man sudo_root" for details.

```
#]0;ubuntu@ip-172-31-22-202: ~#ubuntu@ip-172-31-22-202:~$ ps -aux; df -Th; more /etc/passwd
```

USER	PID	%CPU	%MEM	VSZ	RSS	TTY	STAT	START	TIME	COMMAND
------	-----	------	------	-----	-----	-----	------	-------	------	---------

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root	1	0.2	0.5	37956	6060	?	Ss	03:57	0:03	/sbin/init
root	2	0.0	0.0	0	0	?	S	03:57	0:00	[kthreadd]
root	3	0.0	0.0	0	0	?	S	03:57	0:00	[ksoftirqd/0]
root	5	0.0	0.0	0	0	?	S<	03:57	0:00	[kworker/0:0H]
root	6	0.0	0.0	0	0	?	S	03:57	0:00	[kworker/u30:0]
root	7	0.0	0.0	0	0	?	S	03:57	0:00	[rcu_sched]
root	8	0.0	0.0	0	0	?	S	03:57	0:00	[rcu_bh]
root	9	0.0	0.0	0	0	?	S	03:57	0:00	[migration/0]
root	10	0.0	0.0	0	0	?	S	03:57	0:00	[watchdog/0]
root	11	0.0	0.0	0	0	?	S	03:57	0:00	[kdevtmpfs]
root	12	0.0	0.0	0	0	?	S<	03:57	0:00	[netns]
root	13	0.0	0.0	0	0	?	S<	03:57	0:00	[perf]
root	14	0.0	0.0	0	0	?	S	03:57	0:00	[xenwatch]
root	15	0.0	0.0	0	0	?	S	03:57	0:00	[xenbus]
root	17	0.0	0.0	0	0	?	S	03:57	0:00	[khungtaskd]
root	18	0.0	0.0	0	0	?	S<	03:57	0:00	[writeback]
root	19	0.0	0.0	0	0	?	SN	03:57	0:00	[ksmd]
root	20	0.0	0.0	0	0	?	SN	03:57	0:00	[khugepaged]
root	21	0.0	0.0	0	0	?	S<	03:57	0:00	[crypto]
root	22	0.0	0.0	0	0	?	S<	03:57	0:00	[kintegrityd]
root	23	0.0	0.0	0	0	?	S<	03:57	0:00	[bioset]
root	24	0.0	0.0	0	0	?	S<	03:57	0:00	[kblockd]
root	25	0.0	0.0	0	0	?	S<	03:57	0:00	[ata_sff]
root	26	0.0	0.0	0	0	?	S<	03:57	0:00	[md]
root	27	0.0	0.0	0	0	?	S<	03:57	0:00	[devfreq_wq]
root	28	0.0	0.0	0	0	?	S	03:57	0:00	[kworker/u30:1]

P1 – Intro

root	30	0.0	0.0	0	0 ?	S	03:57	0:00	[kswapd0]
root	31	0.0	0.0	0	0 ?	S<	03:57	0:00	[vmstat]
root	32	0.0	0.0	0	0 ?	S	03:57	0:00	[fsnotify_mark]
root	33	0.0	0.0	0	0 ?	S	03:57	0:00	[ecryptfs-kthrea]
root	49	0.0	0.0	0	0 ?	S<	03:57	0:00	[kthrotld]
root	50	0.0	0.0	0	0 ?	S<	03:57	0:00	[acpi_thermal_pm]
root	51	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	52	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	53	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	54	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	55	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	56	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	57	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	58	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	59	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	60	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	61	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	62	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	63	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	64	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	65	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	66	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	67	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	68	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	69	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]
root	70	0.0	0.0	0	0 ?	S<	03:57	0:00	[bioset]

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```

root    71  0.0  0.0    0  0 ?    S<  03:57  0:00 [bioset]
root    72  0.0  0.0    0  0 ?    S<  03:57  0:00 [bioset]
root    73  0.0  0.0    0  0 ?    S<  03:57  0:00 [bioset]
root    74  0.0  0.0    0  0 ?    S<  03:57  0:00 [bioset]
root    75  0.0  0.0    0  0 ?    S   03:57  0:00 [scsi_eh_0]
root    76  0.0  0.0    0  0 ?    S<  03:57  0:00 [scsi_tmf_0]
root    77  0.0  0.0    0  0 ?    S   03:57  0:00 [scsi_eh_1]
root    78  0.0  0.0    0  0 ?    S<  03:57  0:00 [scsi_tmf_1]
root    80  0.0  0.0    0  0 ?    S<  03:57  0:00 [bioset]
root    84  0.0  0.0    0  0 ?    S<  03:57  0:00 [ipv6_addrconf]
root    98  0.0  0.0    0  0 ?    S<  03:57  0:00 [deferwq]
root    99  0.0  0.0    0  0 ?    S<  03:57  0:00 [charger_manager]
root   139  0.0  0.0    0  0 ?    S<  03:57  0:00 [bioset]
root   140  0.0  0.0    0  0 ?    S<  03:57  0:00 [bioset]
root   141  0.0  0.0    0  0 ?    S<  03:57  0:00 [bioset]
root   142  0.0  0.0    0  0 ?    S<  03:57  0:00 [bioset]
root   143  0.0  0.0    0  0 ?    S<  03:57  0:00 [bioset]
root   144  0.0  0.0    0  0 ?    S<  03:57  0:00 [bioset]
root   145  0.0  0.0    0  0 ?    S<  03:57  0:00 [bioset]
root   146  0.0  0.0    0  0 ?    S<  03:57  0:00 [bioset]
root   147  0.0  0.0    0  0 ?    S<  03:57  0:00 [kpsmoused]
root   261  0.0  0.0    0  0 ?    S<  03:57  0:00 [raid5wq]
root   294  0.0  0.0    0  0 ?    S<  03:57  0:00 [bioset]
root   318  0.0  0.0    0  0 ?    S   03:57  0:00 [jbd2/xvda1-8]
root   319  0.0  0.0    0  0 ?    S<  03:57  0:00 [ext4-rsv-conver]
root   377  0.0  0.6 36932 6924 ?    Ss  03:57  0:00 /lib/systemd/systemd-jo

```

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```

root    397 0.0 0.0    0  0 ?    S< 03:57  0:00 [iscsi_eh]
root    402 0.0 0.0    0  0 ?    S< 03:57  0:00 [ib_addr]
root    403 0.0 0.0    0  0 ?    S< 03:57  0:00 [ib_mcast]
root    404 0.0 0.0    0  0 ?    S< 03:57  0:00 [ib_nl_sa_wq]
root    405 0.0 0.0    0  0 ?    S< 03:57  0:00 [ib_cm]
root    406 0.0 0.0    0  0 ?    S< 03:57  0:00 [iw_cm_wq]
root    407 0.0 0.0    0  0 ?    S  03:57  0:00 [kauditd]
root    408 0.0 0.0    0  0 ?    S< 03:57  0:00 [rdma_cm]
root    435 0.0 0.1 94772 1696 ?    Ss 03:57  0:00 /sbin/lvmetad -f
root    454 0.0 0.0    0  0 ?    S  03:57  0:00 [kworker/0:4]
root    470 0.0 0.4 42768 4128 ?    Ss 03:57  0:00 /lib/systemd/systemd-ud
root    540 0.0 0.0    0  0 ?    S< 03:57  0:00 [kworker/0:1H]
systemd+ 542 0.0 0.2 100324 2552 ?    Ssl 03:57  0:00 /lib/systemd/systemd-ti
root    930 0.0 0.2 16120 2828 ?    Ss 03:57  0:00 /sbin/dhclient -1 -v -p
root   1086 0.0 0.0   5224 160 ?    Ss 03:57  0:00 /sbin/iscsid
root   1087 0.0 0.3   5724 3524 ?    S<Ls 03:57  0:00 /sbin/iscsid
root   1093 0.0 1.3 258188 13796 ?    Ssl 03:57  0:00 /usr/lib/snapd/snapd
root   1096 0.0 0.2  26068 2588 ?    Ss 03:57  0:00 /usr/sbin/cron -f
syslog 1104 0.0 0.9 260632 9828 ?    Ssl 03:57  0:00 /usr/sbin/rsyslogd -n
root   1117 0.0 0.1  95368 1384 ?    Ssl 03:57  0:00 /usr/bin/lxcfs /var/lib
root   1122 0.0 0.5 272944 5836 ?    Ssl 03:57  0:00 /usr/lib/accountsservic
daemon 1124 0.0 0.2  26044 2184 ?    Ss 03:57  0:00 /usr/sbin/atd -f
root   1143 0.0 0.3  28548 3076 ?    Ss 03:57  0:00 /lib/systemd/systemd-lo
root   1145 0.0 0.1   4400 1320 ?    Ss 03:57  0:00 /usr/sbin/acpid
message+ 1152 0.0 0.3 42900 3760 ?    Ss 03:57  0:00 /usr/bin/dbus-daemon --
root   1202 0.0 0.0  13376 172 ?    Ss 03:57  0:00 /sbin/mdadm --monitor -

```


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```
root    1208  0.0  0.5 277180 6084 ?    Ssl 03:57  0:00 /usr/lib/policykit-1/po
root    1277  0.0  0.1 12844 1820 ttyS0  Ss+ 03:57  0:00 /sbin/agetty --keep-bau
root    1279  0.0  0.1 14660 1748 tty1   Ss+ 03:57  0:00 /sbin/agetty --noclear
root    1322  0.0  0.5 65520 5488 ?    Ss  03:57  0:00 /usr/sbin/sshd -D
root    1369  0.0  0.0   0   0 ?    S   04:13  0:00 [kworker/0:0]
root    1392  0.0  0.6 95368 6880 ?    Ss  04:21  0:00 sshd: ubuntu [priv]
ubuntu  1394  0.0  0.4 45248 4692 ?    Ss  04:22  0:00 /lib/systemd/systemd --
root    1396  0.0  0.0   0   0 ?    S   04:22  0:00 [kworker/0:1]
ubuntu  1397  0.0  0.2 61408 2128 ?    S   04:22  0:00 (sd-pam)
root    1402  0.0  0.0   0   0 ?    S   04:22  0:00 [kworker/0:2]
ubuntu  1450  0.0  0.3 95368 3316 ?    S   04:22  0:00 sshd: ubuntu@pts/0
ubuntu  1453  0.0  0.5 21396 5196 pts/0  Ss  04:22  0:00 -bash
ubuntu  1478  0.0  0.3 36084 3336 pts/0  R+  04:23  0:00 ps -aux
```

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
------------	------	------	------	-------	------	------------

udev	devtmpfs	490M	0	490M	0%	/dev
tmpfs	tmpfs	100M	4.3M	95M	5%	/run
/dev/xvda1	ext4	7.8G	916M	6.5G	13%	/
tmpfs	tmpfs	496M	0	496M	0%	/dev/shm
tmpfs	tmpfs	5.0M	0	5.0M	0%	/run/lock
tmpfs	tmpfs	496M	0	496M	0%	/sys/fs/cgroup
tmpfs	tmpfs	100M	0	100M	0%	/run/user/1000

root:x:0:0:root:/root:/bin/bash

daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin

bin:x:2:2:bin:/bin:/usr/sbin/nologin

sys:x:3:3:sys:/dev:/usr/sbin/nologin

sync:x:4:65534:sync:/bin:/bin/sync

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games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-timesync:x:100:102:systemd Time Synchronization,,,:/run/systemd:/bin/false
systemd-network:x:101:103:systemd Network Management,,,:/run/systemd/netif:/bin/false
systemd-resolve:x:102:104:systemd Resolver,,,:/run/systemd/resolve:/bin/false
systemd-bus-proxy:x:103:105:systemd Bus Proxy,,,:/run/systemd:/bin/false
syslog:x:104:108::/home/syslog:/bin/false
_apt:x:105:65534::/nonexistent:/bin/false
lxd:x:106:65534::/var/lib/lxd:/bin/false
messagebus:x:107:111::/var/run/dbus:/bin/false
uidd:x:108:112::/run/uidd:/bin/false
dnsmasq:x:109:65534:dnsmasq,,,:/var/lib/misc:/bin/false
sshd:x:110:65534::/var/run/sshd:/usr/sbin/nologin
pollinate:x:111:1::/var/cache/pollinate:/bin/false
ubuntu:x:1000:1000:Ubuntu:/home/ubuntu:/bin/bash

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```
#]0;ubuntu@ip-172-31-22-202: ~#ubuntu@ip-172-31-22-202:~$ wget
http://www.cs.wright.edu/~pmateti/Courses/3900/Lectures/
Cloud/worms12.cpp
--2017-01-27 04:24:20--
http://www.cs.wright.edu/~pmateti/Courses/3900/Lectures/Cloud/worms12.cpp
Resolving www.cs.wright.edu (www.cs.wright.edu)... 130.108.74.59
Connecting to www.cs.wright.edu (www.cs.wright.edu)|130.108.74.59|:80... connected.
HTTP request sent, awaiting response... 302 Found
Location: http://cecs.wright.edu/~pmateti/Courses/3900/Lectures/Cloud/worms12.cpp [following]
--2017-01-27 04:24:21-- http://cecs.wright.edu/~pmateti/Courses/3900/Lectures/Cloud/worms12.cpp
Resolving cecs.wright.edu (cecs.wright.edu)... 130.108.74.79
Connecting to cecs.wright.edu (cecs.wright.edu)|130.108.74.79|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 13933 (14K) [text/x-c]
Saving to: 'worms12.cpp'
```

```
worms12.cpp      0%[                ]    0 --.-KB/s
worms12.cpp      100%[=====>] 13.61K --.-KB/s  in 0.1s
```

2017-01-27 04:24:21 (99.9 KB/s) - 'worms12.cpp' saved [13933/13933]

```
#]0;ubuntu@ip-172-31-22-202: ~#ubuntu@ip-172-31-22-202:~$ dpkgv##[K -l
Desired=Unknown/Install/Remove/Purge/Hold
| Status=Not/Inst/Conf-files/Unpacked/halF-conf/Half-inst/trig-aWait/Trig-pend
|/ Err?=(none)/Reinst-required (Status,Err: uppercase=bad)
||/ Name          Version      Architecture Description
```

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+++-----
=====

- ii accountsservice 0.6.40-2ubuntu1 amd64 query and manipulate user account info
- ii acl 2.2.52-3 amd64 Access control list utilities
- ii acpid 1:2.0.26-1ubuntu1 amd64 Advanced Configuration and Power Interface
- ii adduser 3.113+nmu3ubuntu1 all add and remove users and groups
- ii apparmor 2.10.95-0ubuntu1 amd64 user-space parser utility for AppArmor
- ii apport 2.20.1-0ubuntu1 all automatically generate crash reports
- ii apport-symptoms 0.20 all symptom scripts for apport
- ii apt 1.2.15ubuntu0 amd64 commandline package manager
- ii apt-transport-https 1.2.15ubuntu0 amd64 https download transport for APT
- ii apt-utils 1.2.15ubuntu0 amd64 package management related utility programs
- ii at 3.1.18-2ubuntu1 amd64 Delayed job execution and batch processing
- ii base-files 9.4ubuntu4.3 amd64 Debian base system miscellaneous files
- ii base-passwd 3.5.39 amd64 Debian base system master password and group files
- ii bash 4.3-14ubuntu1 amd64 GNU Bourne Again SHell
- ii bash-completion 1:2.1-4.2ubuntu1 all programmable completion for the bash
- ii bcache-tools 1.0.8-2 amd64 bcache userspace tools
- ii bind9-host 1:9.10.3.dfsg amd64 Version of 'host' bundled with BIND 9
- ii bsdmainutils 9.0.6ubuntu3 amd64 collection of more utilities from FreeBSD
- ii bsdutils 1:2.27.1-6ubuntu1 amd64 basic utilities from 4.4BSD-Lite
- ii btrfs-tools 4.4-1 amd64 Checksumming Copy on Write Filesystem
- ii busybox-initramfs 1:1.22.0-15ubuntu1 amd64 Standalone shell setup for initramfs
- ii busybox-static 1:1.22.0-15ubuntu1 amd64 Standalone rescue shell with tons of utilities
- ii byobu 5.106-0ubuntu1 all text window manager, shell multiplexer
- ii bzip2 1.0.6-8 amd64 high-quality block-sorting file compressor
- ii ca-certificates 20160104ubuntu1 all Common CA certificates

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ii	cloud-guest-util	0.27-0ubuntu2	all	cloud guest utilities
ii	cloud-init	0.7.8-49-g9e9	all	Init scripts for cloud instances
ii	cloud-initramfs-	0.27ubuntu1.2	all	copy initramfs modules into root file
ii	cloud-initramfs-	0.27ubuntu1.2	all	write a network interface file in /ru
ii	command-not-foun	0.3ubuntu16.0	all	Suggest installation of packages in i
ii	command-not-foun	0.3ubuntu16.0	amd64	Set of data files for command-not-fou
ii	console-setup	1.108ubuntu15	all	console font and keymap setup program
ii	console-setup-li	1.108ubuntu15	all	Linux specific part of console-setup
ii	coreutils	8.25-2ubuntu2	amd64	GNU core utilities
ii	cpio	2.11+dfsg-5ub	amd64	GNU cpio -- a program to manage archi
ii	cron	3.0pl1-128ubu	amd64	process scheduling daemon
ii	cryptsetup	2:1.6.6-5ubun	amd64	disk encryption support - startup scr
ii	cryptsetup-bin	2:1.6.6-5ubun	amd64	disk encryption support - command lin
ii	curl	7.47.0-1ubunt	amd64	command line tool for transferring da
ii	dash	0.5.8-2.1ubun	amd64	POSIX-compliant shell
ii	dbus	1.10.6-1ubunt	amd64	simple interprocess messaging system
ii	debconf	1.5.58ubuntu1	all	Debian configuration management syste
ii	debconf-i18n	1.5.58ubuntu1	all	full internationalization support for
ii	debianutils	4.7	amd64	Miscellaneous utilities specific to D
ii	dh-python	2.20151103ubu	all	Debian helper tools for packaging Pyt
ii	diffutils	1:3.3-3	amd64	File comparison utilities
ii	distro-info-data	0.28ubuntu0.2	all	information about the distributions'
ii	dmeventd	2:1.02.110-1u	amd64	Linux Kernel Device Mapper event daem
ii	dmidecode	3.0-2ubuntu0.	amd64	SMBIOS/DMI table decoder
ii	dmsetup	2:1.02.110-1u	amd64	Linux Kernel Device Mapper userspace
ii	dns-root-data	2015052300+h+	all	DNS root data including root zone and

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- ii dnsmasq-base 2.75-1ubuntu0 amd64 Small caching DNS proxy and DHCP/TFTP
- ii dnsutils 1:9.10.3.dfsg amd64 Clients provided with BIND
- ii dosfstools 3.0.28-2ubunt amd64 utilities for making and checking MS-
- ii dpkg 1.18.4ubuntu1 amd64 Debian package management system
- ii e2fslibs:amd64 1.42.13-1ubun amd64 ext2/ext3/ext4 file system libraries
- ii e2fsprogs 1.42.13-1ubun amd64 ext2/ext3/ext4 file system utilities
- ii eatmydata 105-3 all Library and utilities designed to dis
- ii ed 1.10-2 amd64 classic UNIX line editor
- ii eject 2.1.5+deb1+cv amd64 ejects CDs and operates CD-Changers u
- ii ethtool 1:4.5-1 amd64 display or change Ethernet device set
- ii file 1:5.25-2ubunt amd64 Determines file type using "magic" nu
- ii findutils 4.6.0+git+201 amd64 utilities for finding files--find, xa
- ii fonts-ubuntu-fon 1:0.83-0ubunt all Ubuntu Font Family Linux console font
- ii friendly-recover 0.2.31 all Make recovery more user-friendly
- ii ftp 0.17-33 amd64 classical file transfer client
- ii fuse 2.9.4-1ubuntu amd64 Filesystem in Userspace
- ii gawk 1:4.1.3+dfsg- amd64 GNU awk, a pattern scanning and proce
- ii gcc-5-base:amd64 5.4.0-6ubuntu amd64 GCC, the GNU Compiler Collection (bas
- ii gcc-6-base:amd64 6.0.1-0ubuntu amd64 GCC, the GNU Compiler Collection (bas
- ii gdisk 1.0.1-1build1 amd64 GPT fdisk text-mode partitioning tool
- ii geoip-database 20160408-1 all IP lookup command line tools that use
- ii gettext-base 0.19.7-2ubunt amd64 GNU Internationalization utilities fo
- ii gir1.2-glib-2.0: 1.46.0-3ubunt amd64 Introspection data for GLib, GObject,
- ii git 1:2.7.4-0ubun amd64 fast, scalable, distributed revision
- ii git-man 1:2.7.4-0ubun all fast, scalable, distributed revision
- ii gnupg 1.4.20-1ubunt amd64 GNU privacy guard - a free PGP replac

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ii	gpgv	1.4.20-1ubuntu1 amd64	GNU privacy guard - signature verification
ii	grep	2.25-1~16.04. amd64	GNU grep, egrep and fgrep
ii	groff-base	1.22.3-7 amd64	GNU troff text-formatting system (base)
ii	grub-common	2.02~beta2-36 amd64	GRand Unified Bootloader (common files)
ii	grub-gfxpayloads	0.7 amd64	GRUB gfxpayload blacklist
ii	grublegacy-ec2	0.7.8-49-g9e9 all	Handles update-grub for ec2 instances
ii	grub-pc	2.02~beta2-36 amd64	GRand Unified Bootloader, version 2 (PC BIOS)
ii	grub-pc-bin	2.02~beta2-36 amd64	GRand Unified Bootloader, version 2 (PC BIOS)
ii	grub2-common	2.02~beta2-36 amd64	GRand Unified Bootloader (common files)
ii	gzip	1.6-4ubuntu1 amd64	GNU compression utilities
ii	hdparm	9.48+ds-1 amd64	tune hard disk parameters for high performance
ii	hostname	3.16ubuntu2 amd64	utility to set/show the host name or domain name
ii	ifenslave	2.7ubuntu1 all	configure network interfaces for parallel bonding
ii	ifupdown	0.8.10ubuntu1 amd64	high level tools to configure network interfaces
ii	info	6.1.0.dfsg.1- amd64	Standalone GNU Info documentation browser
ii	init	1.29ubuntu3 amd64	System-V-like init utilities - meta-packages
ii	init-system-help	1.29ubuntu3 all	helper tools for all init systems
ii	initramfs-tools	0.122ubuntu8. all	generic modular initramfs generator (base)
ii	initramfs-tools	0.122ubuntu8. amd64	binaries used by initramfs-tools
ii	initramfs-tools	0.122ubuntu8. all	generic modular initramfs generator (base)
ii	initscripts	2.88dsf-59.3u amd64	scripts for initializing and shutting down
ii	insserv	1.14.0-5ubuntu1 amd64	boot sequence organizer using LSB init scripts
ii	install-info	6.1.0.dfsg.1- amd64	Manage installed documentation in info database
ii	iproute2	4.3.0-1ubuntu1 amd64	networking and traffic control tools
ii	iptables	1.6.0-2ubuntu1 amd64	administration tools for packet filtering
ii	iputils-ping	3:20121221-5u amd64	Tools to test the reachability of network hosts

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- ii iputils-tracepat 3:20121221-5u amd64 Tools to trace the network path to a
- ii irqbalance 1.1.0-2ubuntu amd64 Daemon to balance interrupts for SMP
- ii isc-dhcp-client 4.3.3-5ubuntu amd64 DHCP client for automatically obtaini
- ii isc-dhcp-common 4.3.3-5ubuntu amd64 common files used by all of the isc-d
- ii iso-codes 3.65-1 all ISO language, territory, currency, sc
- ii kbd 1.15.5-1ubunt amd64 Linux console font and keytable utili
- ii keyboard-configu 1.108ubuntu15 all system-wide keyboard preferences
- ii klibc-utils 2.0.4-8ubuntu amd64 small utilities built with klibc for
- ii kmod 22-1ubuntu4 amd64 tools for managing Linux kernel modul
- ii krb5-locales 1.13.2+dfsg-5 all Internationalization support for MIT
- ii language-selecto 0.165.4 all Language selector for Ubuntu
- ii less 481-2.1ubuntu amd64 pager program similar to more
- ii libaccountsservi 0.6.40-2ubunt amd64 query and manipulate user account inf
- ii libacl1:amd64 2.2.52-3 amd64 Access control list shared library
- ii libapparmor-perl 2.10.95-0ubun amd64 AppArmor library Perl bindings
- ii libapparmor1:amd 2.10.95-0ubun amd64 changehat AppArmor library
- ii libapt-inst2.0:a 1.2.15ubuntu0 amd64 deb package format runtime library
- ii libapt-pkg5.0:am 1.2.15ubuntu0 amd64 package management runtime library
- ii libasn1-8-heimda 1.7~git201509 amd64 Heimdal Kerberos - ASN.1 library
- ii libasprintf0v5:a 0.19.7-2ubunt amd64 GNU library to use fprintf and friend
- ii libatm1:amd64 1:2.5.1-1.5 amd64 shared library for ATM (Asynchronous
- ii libattr1:amd64 1:2.4.47-2 amd64 Extended attribute shared library
- ii libaudit-common 1:2.4.5-1ubun all Dynamic library for security auditing
- ii libaudit1:amd64 1:2.4.5-1ubun amd64 Dynamic library for security auditing
- ii libbind9-140:amd 1:9.10.3.dfsg amd64 BIND9 Shared Library used by BIND
- ii libblkid1:amd64 2.27.1-6ubunt amd64 block device ID library

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- ii libbsd0:amd64 0.8.2-1 amd64 utility functions from BSD systems -
- ii libbz2-1.0:amd64 1.0.6-8 amd64 high-quality block-sorting file compr
- ii libc-bin 2.23-0ubuntu5 amd64 GNU C Library: Binaries
- ii libc6:amd64 2.23-0ubuntu5 amd64 GNU C Library: Shared libraries
- ii libcap-ng0:amd64 0.7.7-1 amd64 An alternate POSIX capabilities libra
- ii libcap2:amd64 1:2.24-12 amd64 POSIX 1003.1e capabilities (library)
- ii libcap2-bin 1:2.24-12 amd64 POSIX 1003.1e capabilities (utilities
- ii libcomerr2:amd64 1.42.13-1ubun amd64 common error description library
- ii libcryptsetup4:a 2:1.6.6-5ubun amd64 disk encryption support - shared libr
- ii libcurl3-gnutls: 7.47.0-1ubunt amd64 easy-to-use client-side URL transfer
- ii libdb5.3:amd64 5.3.28-11 amd64 Berkeley v5.3 Database Libraries [run
- ii libdbus-1-3:amd6 1.10.6-1ubunt amd64 simple interprocess messaging system
- ii libdbus-glib-1-2 0.106-1 amd64 simple interprocess messaging system
- ii libdebconfclient 0.198ubuntu1 amd64 Debian Configuration Management Syste
- ii libdevmapper-eve 2:1.02.110-1u amd64 Linux Kernel Device Mapper event supp
- ii libdevmapper1.02 2:1.02.110-1u amd64 Linux Kernel Device Mapper userspace
- ii libdns-export162 1:9.10.3.dfsg amd64 Exported DNS Shared Library
- ii libdns162:amd64 1:9.10.3.dfsg amd64 DNS Shared Library used by BIND
- ii libdrm2:amd64 2.4.67-1ubunt amd64 Userspace interface to kernel DRM ser
- ii libdumbnet1:amd6 1.12-7 amd64 dumb, portable networking library --
- ii libeatmydata1:am 105-3 amd64 Library and utilities to disable fsyn
- ii libedit2:amd64 3.1-20150325- amd64 BSD editline and history libraries
- ii libelf1:amd64 0.165-3ubuntu amd64 library to read and write ELF files
- ii liberror-perl 0.17-1.2 all Perl module for error/exception handl
- ii libestr0 0.1.10-1 amd64 Helper functions for handling strings
- ii libevent-2.0-5:a 2.0.21-stable amd64 Asynchronous event notification libra

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ii libexpat1:amd64 2.1.0-7ubuntu amd64	XML parsing C library - runtime libra
ii libfdisk1:amd64 2.27.1-6ubuntu amd64	fdisk partitioning library
ii libffi6:amd64 3.2.1-4 amd64	Foreign Function Interface library ru
ii libfreetype6:amd 2.6.1-0.1ubuntu amd64	FreeType 2 font engine, shared librar
ii libfribidi0:amd6 0.19.7-1 amd64	Free Implementation of the Unicode Bi
ii libfuse2:amd64 2.9.4-1ubuntu amd64	Filesystem in Userspace (library)
ii libgcc1:amd64 1:6.0.1-0ubuntu amd64	GCC support library
ii libgcrypt20:amd6 1.6.5-2ubuntu amd64	LGPL Crypto library - runtime library
ii libgdbm3:amd64 1.8.3-13.1 amd64	GNU dbm database routines (runtime ve
ii libgeoip1:amd64 1.6.9-1 amd64	non-DNS IP-to-country resolver librar
ii libgirepository- 1.46.0-3ubuntu amd64	Library for handling GObject introspe
ii libglib2.0-0:amd 2.48.1-1~ubuntu amd64	GLib library of C routines
ii libglib2.0-data 2.48.1-1~ubuntu all	Common files for GLib library
ii libgmp10:amd64 2:6.1.0+dfsg- amd64	Multiprecision arithmetic library
ii libgnutls-openssl 3.4.10-4ubuntu amd64	GNU TLS library - OpenSSL wrapper
ii libgnutls30:amd6 3.4.10-4ubuntu amd64	GNU TLS library - main runtime librar
ii libgpg-error0:am 1.21-2ubuntu1 amd64	library for common error values and m
ii libgpm2:amd64 1.20.4-6.1 amd64	General Purpose Mouse - shared librar
ii libgssapi-krb5-2 1.13.2+dfsg-5 amd64	MIT Kerberos runtime libraries - krb5
ii libgssapi3-heimd 1.7~git201509 amd64	Heimdal Kerberos - GSSAPI support lib
ii libhcrypto4-heim 1.7~git201509 amd64	Heimdal Kerberos - crypto library
ii libheimbase1-hei 1.7~git201509 amd64	Heimdal Kerberos - Base library
ii libheimntlm0-hei 1.7~git201509 amd64	Heimdal Kerberos - NTLM support libra
ii libhogweed4:amd6 3.2-1 amd64	low level cryptographic library (publ
ii libhx509-5-heimd 1.7~git201509 amd64	Heimdal Kerberos - X509 support libra
ii libicu55:amd64 55.1-7 amd64	International Components for Unicode

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ii libidn11:amd64 1.32-3ubuntu1 amd64	GNU Libidn library, implementation of
ii libisc-export160 1:9.10.3.dfsg amd64	Exported ISC Shared Library
ii libisc160:amd64 1:9.10.3.dfsg amd64	ISC Shared Library used by BIND
ii libisccc140:amd64 1:9.10.3.dfsg amd64	Command Channel Library used by BIND
ii libisccfg140:amd64 1:9.10.3.dfsg amd64	Config File Handling Library used by
ii libjson-c2:amd64 0.11-4ubuntu2 amd64	JSON manipulation library - shared li
ii libk5crypto3:amd64 1.13.2+dfsg-5 amd64	MIT Kerberos runtime libraries - Cryp
ii libkeyutils1:amd64 1.5.9-8ubuntu amd64	Linux Key Management Utilities (libra
ii libklibc 2.0.4-8ubuntu amd64	minimal libc subset for use with init
ii libkmod2:amd64 22-1ubuntu4 amd64	libkmod shared library
ii libkrb5-26-heimd 1.7~git201509 amd64	Heimdal Kerberos - libraries
ii libkrb5-3:amd64 1.13.2+dfsg-5 amd64	MIT Kerberos runtime libraries
ii libkrb5support0: 1.13.2+dfsg-5 amd64	MIT Kerberos runtime libraries - Supp
ii libldap-2.4-2:amd64 2.4.42+dfsg-2 amd64	OpenLDAP libraries
ii liblocale-gettext 1.07-1build1 amd64	module using libc functions for inter
ii liblvm2app2.2:amd64 2.02.133-1ubu amd64	LVM2 application library
ii liblvm2cmd2.02:amd64 2.02.133-1ubu amd64	LVM2 command library
ii liblwres141:amd64 1:9.10.3.dfsg amd64	Lightweight Resolver Library used by
ii liblxc1 2.0.5-0ubuntu amd64	Linux Containers userspace tools (lib
ii liblz4-1:amd64 0.0~r131-2ubu amd64	Fast LZ compression algorithm library
ii liblzma5:amd64 5.1.1alpha+20 amd64	XZ-format compression library
ii liblzo2-2:amd64 2.08-1.2 amd64	data compression library
ii libmagic1:amd64 1:5.25-2ubunt amd64	File type determination library using
ii libmnl0:amd64 1.0.3-5 amd64	minimalistic Netlink communication li
ii libmount1:amd64 2.27.1-6ubunt amd64	device mounting library
ii libmpdec2:amd64 2.4.2-1 amd64	library for decimal floating point ar

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- ii libmpfr4:amd64 3.1.4-1 amd64 multiple precision floating-point com
- ii libmspack0:amd64 0.5-1 amd64 library for Microsoft compression for
- ii libncurses5:amd64 6.0+20160213- amd64 shared libraries for terminal handlin
- ii libncursesw5:amd64 6.0+20160213- amd64 shared libraries for terminal handlin
- ii libnetfilter-con 1.0.5-1 amd64 Netfilter netlink-conntrack library
- ii libnettle6:amd64 3.2-1 amd64 low level cryptographic library (symm
- ii libnewt0.52:amd64 0.52.18-1ubun amd64 Not Erik's Windowing Toolkit - text m
- ii libnfnlink0:amd64 1.0.1-3 amd64 Netfilter netlink library
- ii libnih1:amd64 1.0.3-4.3ubun amd64 NIH Utility Library
- ii libnuma1:amd64 2.0.11-1ubunt amd64 Libraries for controlling NUMA policy
- ii libp11-kit0:amd64 0.23.2-5~ubun amd64 library for loading and coordinating
- ii libpam-modules:a 1.1.8-3.2ubun amd64 Pluggable Authentication Modules for
- ii libpam-modules-b 1.1.8-3.2ubun amd64 Pluggable Authentication Modules for
- ii libpam-runtime 1.1.8-3.2ubun all Runtime support for the PAM library
- ii libpam-systemd:a 229-4ubuntu12 amd64 system and service manager - PAM modu
- ii libpam0g:amd64 1.1.8-3.2ubun amd64 Pluggable Authentication Modules libr
- ii libparted2:amd64 3.2-15 amd64 disk partition manipulator - shared l
- ii libpcap0.8:amd64 1.7.4-2 amd64 system interface for user-level packe
- ii libpci3:amd64 1:3.3.1-1.1ub amd64 Linux PCI Utilities (shared library)
- ii libpcre3:amd64 2:8.38-3.1 amd64 Perl 5 Compatible Regular Expression
- ii libperl5.22:amd64 5.22.1-9 amd64 shared Perl library
- ii libpipeline1:amd64 1.4.1-2 amd64 pipeline manipulation library
- ii libplymouth4:amd64 0.9.2-3ubuntu amd64 graphical boot animation and logger -
- ii libpng12-0:amd64 1.2.54-1ubunt amd64 PNG library - runtime
- ii libpolkit-agent- 0.105-14.1 amd64 PolicyKit Authentication Agent API
- ii libpolkit-backen 0.105-14.1 amd64 PolicyKit backend API

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ii libpolkit-gobjec 0.105-14.1 amd64	PolicyKit Authorization API
ii libpopt0:amd64 1.16-10 amd64	lib for parsing cmdline parameters
ii libprocps4:amd64 2:3.3.10-4ubu amd64	library for accessing process informa
ii libpython3-stdli 3.5.1-3 amd64	interactive high-level object-oriente
ii libpython3.5:amd 3.5.2-2ubuntu amd64	Shared Python runtime library (versio
ii libpython3.5-min 3.5.2-2ubuntu amd64	Minimal subset of the Python language
ii libpython3.5-std 3.5.2-2ubuntu amd64	Interactive high-level object-oriente
ii libreadline5:amd 5.2+dfsg-3bui amd64	GNU readline and history libraries, r
ii libreadline6:amd 6.3-8ubuntu2 amd64	GNU readline and history libraries, r
ii libroken18-heimd 1.7~git201509 amd64	Heimdal Kerberos - roken support libr
ii librtmp1:amd64 2.4+20151223. amd64	toolkit for RTMP streams (shared libr
ii libsasl2-2:amd64 2.1.26.dfsg1- amd64	Cyrus SASL - authentication abstracti
ii libsasl2-modules 2.1.26.dfsg1- amd64	Cyrus SASL - pluggable authentication
ii libsasl2-modules 2.1.26.dfsg1- amd64	Cyrus SASL - pluggable authentication
ii libseccomp2:amd6 2.2.3-3ubuntu amd64	high level interface to Linux seccomp
ii libselinux1:amd6 2.4-3build2 amd64	SELinux runtime shared libraries
ii libsemanage-comm 2.3-1build3 all	Common files for SELinux policy manag
ii libsemanage1:amd 2.3-1build3 amd64	SELinux policy management library
ii libsepol1:amd64 2.4-2 amd64	SELinux library for manipulating bina
ii libsigsegv2:amd6 2.10-4 amd64	Library for handling page faults in a
ii libslang2:amd64 2.3.0-2ubuntu amd64	S-Lang programming library - runtime
ii libsmartcols1:am 2.27.1-6ubunt amd64	smart column output alignment library
ii libsqlite3-0:amd 3.11.0-1ubunt amd64	SQLite 3 shared library
ii libss2:amd64 1.42.13-1ubun amd64	command-line interface parsing librar
ii libssl1.0.0:amd6 1.0.2g-1ubunt amd64	Secure Sockets Layer toolkit - shared
ii libstdc++6:amd64 5.4.0-6ubuntu amd64	GNU Standard C++ Library v3

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- ii libsystemd0:amd64 229-4ubuntu12 amd64 systemd utility library
- ii libtasn1-6:amd64 4.7-3ubuntu0. amd64 Manage ASN.1 structures (runtime)
- ii libtext-charwidth 0.04-7build5 amd64 get display widths of characters on t
- ii libtext-iconv-pe 1.7-5build4 amd64 converts between character sets in Pe
- ii libtext-wrapi18n 0.06-7.1 all internationalized substitute of Text:
- ii libtinfo5:amd64 6.0+20160213- amd64 shared low-level terminfo library for
- ii libudev1:amd64 229-4ubuntu12 amd64 libudev shared library
- ii libusb-0.1-4:amd 2:0.1.12-28 amd64 userspace USB programming library
- ii libusb-1.0-0:amd 2:1.0.20-1 amd64 userspace USB programming library
- ii libustr-1.0-1:am 1.0.4-5 amd64 Micro string library: shared library
- ii libutempter0:amd 1.1.6-3 amd64 privileged helper for utmp/wtmp updat
- ii libuuid1:amd64 2.27.1-6ubunt amd64 Universally Unique ID library
- ii libwind0-heimdal 1.7~git201509 amd64 Heimdal Kerberos - stringprep impleme
- ii libwrap0:amd64 7.6.q-25 amd64 Wietse Venema's TCP wrappers library
- ii libx11-6:amd64 2:1.6.3-1ubun amd64 X11 client-side library
- ii libx11-data 2:1.6.3-1ubun all X11 client-side library
- ii libxau6:amd64 1:1.0.8-1 amd64 X11 authorisation library
- ii libxcb1:amd64 1.11.1-1ubunt amd64 X C Binding
- ii libxdmcp6:amd64 1:1.1.2-1.1 amd64 X11 Display Manager Control Protocol
- ii libxext6:amd64 2:1.3.3-1 amd64 X11 miscellaneous extension library
- ii libxml2:amd64 2.9.3+dfsg1-1 amd64 GNOME XML library
- ii libxmuu1:amd64 2:1.1.2-2 amd64 X11 miscellaneous micro-utility libra
- ii libxtables11:amd 1.6.0-2ubuntu amd64 netfilter xtables library
- ii libyaml-0-2:amd64 0.1.6-3 amd64 Fast YAML 1.1 parser and emitter libr
- ii linux-base 4.0ubuntu1 all Linux image base package
- ii linux-headers-4. 4.4.0-53.74 all Header files related to Linux kernel

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ii	linux-headers-4.4.0-53.74	amd64	Linux kernel headers for version 4.4.
ii	linux-headers-ge 4.4.0.53.56	amd64	Generic Linux kernel headers
ii	linux-headers-vi 4.4.0.53.56	amd64	Transitional package.
ii	linux-image-4.4.0-53.74	amd64	Linux kernel image for version 4.4.0
ii	linux-image-virt 4.4.0.53.56	amd64	This package will always depend on th
ii	linux-virtual 4.4.0.53.56	amd64	Minimal Generic Linux kernel and head
ii	locales 2.23-0ubuntu5	all	GNU C Library: National Language (loc
ii	login 1:4.2-3.1ubuntu	amd64	system login tools
ii	logrotate 3.8.7-2ubuntu	amd64	Log rotation utility
ii	lsb-base 9.20160110ubu	all	Linux Standard Base init script funct
ii	lsb-release 9.20160110ubu	all	Linux Standard Base version reporting
ii	lshw 02.17-1.1ubuntu	amd64	information about hardware configurat
ii	lsuf 4.89+dfsg-0.1	amd64	Utility to list open files
ii	ltrace 0.7.3-5.1ubuntu	amd64	Tracks runtime library calls in dynam
ii	lvm2 2.02.133-1ubu	amd64	Linux Logical Volume Manager
ii	lxc-common 2.0.5-0ubuntu	amd64	Linux Containers userspace tools (com
ii	lxcfs 2.0.4-0ubuntu	amd64	FUSE based filesystem for LXC
ii	lxd 2.0.8-0ubuntu	amd64	Container hypervisor based on LXC - d
ii	lxd-client 2.0.8-0ubuntu	amd64	Container hypervisor based on LXC - c
ii	makedev 2.3.1-93ubunt	all	creates device files in /dev
ii	man-db 2.7.5-1	amd64	on-line manual pager
ii	manpages 4.04-2	all	Manual pages about using a GNU/Linux
ii	mawk 1.3.3-17ubunt	amd64	a pattern scanning and text processin
ii	mdadm 3.3-2ubuntu7.	amd64	tool to administer Linux MD arrays (s
ii	mime-support 3.59ubuntu1	all	MIME files 'mime.types' & 'mailcap',
ii	mlocate 0.26-1ubuntu2	amd64	quickly find files on the filesystem

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ii	mount	2.27.1-6ubuntu0 amd64	tools for mounting and manipulating f
ii	mtr-tiny	0.86-1ubuntu0 amd64	Full screen ncurses traceroute tool
ii	multiarch-support	2.23-0ubuntu5 amd64	Transitional package to ensure multia
ii	nano	2.5.3-2 amd64	small, friendly text editor inspired
ii	ncurses-base	6.0+20160213- all	basic terminal type definitions
ii	ncurses-bin	6.0+20160213- amd64	terminal-related programs and man pag
ii	ncurses-term	6.0+20160213- all	additional terminal type definitions
ii	net-tools	1.60-26ubuntu amd64	NET-3 networking toolkit
ii	netbase	5.3 all	Basic TCP/IP networking system
ii	netcat-openbsd	1.105-7ubuntu amd64	TCP/IP swiss army knife
ii	ntfs-3g	1:2015.3.14AR amd64	read/write NTFS driver for FUSE
ii	open-iscsi	2.0.873+git0. amd64	iSCSI initiator tools
ii	open-vm-tools	2:10.0.7-3227 amd64	Open VMware Tools for virtual machine
ii	openssh-client	1:7.2p2-4ubun amd64	secure shell (SSH) client, for secure
ii	openssh-server	1:7.2p2-4ubun amd64	secure shell (SSH) server, for secure
ii	openssh-sftp-ser	1:7.2p2-4ubun amd64	secure shell (SSH) sftp server module
ii	openssl	1.0.2g-1ubunt amd64	Secure Sockets Layer toolkit - crypto
ii	os-prober	1.70ubuntu3 amd64	utility to detect other OSes on a set
ii	overlayroot	0.27ubuntu1.2 all	use an overlayfs on top of a read-onl
ii	parted	3.2-15 amd64	disk partition manipulator
ii	passwd	1:4.2-3.1ubun amd64	change and administer password and gr
ii	pastebinit	1.5-1 all	command-line pastebin client
ii	patch	2.7.5-1 amd64	Apply a diff file to an original
ii	pciutils	1:3.3.1-1.1ub amd64	Linux PCI Utilities
ii	perl	5.22.1-9 amd64	Larry Wall's Practical Extraction and
ii	perl-base	5.22.1-9 amd64	minimal Perl system

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- ii perl-modules-5.2 5.22.1-9 all Core Perl modules
- ii plymouth 0.9.2-3ubuntu amd64 boot animation, logger and I/O multip
- ii plymouth-theme-u 0.9.2-3ubuntu amd64 boot animation, logger and I/O multip
- ii policykit-1 0.105-14.1 amd64 framework for managing administrative
- ii pollinate 4.23-0ubuntu1 all seed the pseudo random number generat
- ii popularity-cont 1.64ubuntu2 all Vote for your favourite packages auto
- ii powermgmt-base 1.31+nmu1 all Common utils and configs for power ma
- ii procps 2:3.3.10-4ubu amd64 /proc file system utilities
- ii psmisc 22.21-2.1buil amd64 utilities that use the proc file syst
- ii python-apt-commo 1.1.0~beta1bu all Python interface to libapt-pkg (local
- ii python3 3.5.1-3 amd64 interactive high-level object-oriente
- ii python3-apport 2.20.1-0ubunt all Python 3 library for Apport crash rep
- ii python3-apt 1.1.0~beta1bu amd64 Python 3 interface to libapt-pkg
- ii python3-blinker 1.3.dfsg2-1bu all fast, simple object-to-object and bro
- ii python3-cffi-bac 1.5.2-1ubuntu amd64 Foreign Function Interface for Python
- ii python3-chardet 2.3.0-2 all universal character encoding detector
- ii python3-commandn 0.3ubuntu16.0 all Python 3 bindings for command-not-fou
- ii python3-configob 5.0.6-2 all simple but powerful config file reade
- ii python3-cryptogr 1.2.3-1ubuntu amd64 Python library exposing cryptographic
- ii python3-dbus 1.2.0-3 amd64 simple interprocess messaging system
- ii python3-debian 0.1.27ubuntu2 all Python 3 modules to work with Debian-
- ii python3-distupgr 1:16.04.19 all manage release upgrades
- ii python3-gdbm:amd 3.5.1-1 amd64 GNU dbm database support for Python 3
- ii python3-gi 3.20.0-0ubunt amd64 Python 3 bindings for gobject-introsp
- ii python3-idna 2.0-3 all Python IDNA2008 (RFC 5891) handling (
- ii python3-jinja2 2.8-1 all small but fast and easy to use stand-

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- ii python3-json-poi 1.9-3 all resolve JSON pointers - Python 3.x
- ii python3-jsonpatch 1.19-3 all library to apply JSON patches - Python
- ii python3-jwt 1.3.0-1 all Python 3 implementation of JSON Web T
- ii python3-markupsa 0.23-2build1 amd64 HTML/XHTML/XML string library for Pyt
- ii python3-minimal 3.5.1-3 amd64 minimal subset of the Python language
- ii python3-newt 0.52.18-1ubuntu1 amd64 NEWT module for Python3
- ii python3-oauthlib 1.0.3-1 all generic, spec-compliant implementatio
- ii python3-pkg-reso 20.7.0-1 all Package Discovery and Resource Access
- ii python3-prettytable 0.7.2-3 all library to represent tabular data in
- ii python3-problem- 2.20.1-0ubuntu1 all Python 3 library to handle problem re
- ii python3-pyasn1 0.1.9-1 all ASN.1 library for Python (Python 3 mo
- ii python3-pycurl 7.43.0-1ubuntu1 amd64 Python bindings to libcurl (Python 3)
- ii python3-requests 2.9.1-3 all elegant and simple HTTP library for P
- ii python3-serial 3.0.1-1 all pyserial - module encapsulating acces
- ii python3-six 1.10.0-3 all Python 2 and 3 compatibility library
- ii python3-software 0.96.20.5 all manage the repositories that you inst
- ii python3-systemd 231-2build1 amd64 Python 3 bindings for systemd
- ii python3-update-m 1:16.04.4 all python 3.x module for update-manager
- ii python3-urllib3 1.13.1-2ubuntu1 all HTTP library with thread-safe connect
- ii python3-yaml 3.11-3build1 amd64 YAML parser and emitter for Python3
- ii python3.5 3.5.2-2ubuntu1 amd64 Interactive high-level object-oriente
- ii python3.5-minima 3.5.2-2ubuntu1 amd64 Minimal subset of the Python language
- ii readline-common 6.3-8ubuntu2 all GNU readline and history libraries, c
- ii rename 0.20-4 all Perl extension for renaming multiple
- ii resolvconf 1.78ubuntu2 all name server information handler
- ii rsync 3.1.1-3ubuntu1 amd64 fast, versatile, remote (and local) f

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ii	rsyslog	8.16.0-1ubuntu1 amd64	reliable system and kernel logging da
ii	run-one	1.17-0ubuntu1 all	run just one instance of a command an
ii	screen	4.3.1-2build1 amd64	terminal multiplexer with VT100/ANSI
ii	sed	4.2.2-7 amd64	The GNU sed stream editor
ii	sensible-utils	0.0.9 all	Utilities for sensible alternative se
ii	sgml-base	1.26+nmu4ubuntu all	SGML infrastructure and SGML catalog
ii	shared-mime-info	1.5-2ubuntu0. amd64	FreeDesktop.org shared MIME database
ii	snap-confine	1.0.43-0ubuntu amd64	Support executable to apply confineme
ii	snappy	2.17.1ubuntu1 amd64	Tool to interact with Ubuntu Core Sna
ii	software-properties	0.96.20.5 all	manage the repositories that you inst
ii	sosreport	3.2+git276-g7 amd64	Set of tools to gather troubleshootin
ii	squashfs-tools	1:4.3-3ubuntu amd64	Tool to create and append to squashfs
ii	ssh-import-id	5.5-0ubuntu1 all	securely retrieve an SSH public key a
ii	strace	4.11-1ubuntu3 amd64	System call tracer
ii	sudo	1.8.16-0ubuntu amd64	Provide limited super user privileges
ii	systemd	229-4ubuntu12 amd64	system and service manager
ii	systemd-sysv	229-4ubuntu12 amd64	system and service manager - SysV lin
ii	sysv-rc	2.88dsf-59.3u all	System-V-like runlevel change mechani
ii	sysvinit-utils	2.88dsf-59.3u amd64	System-V-like utilities
ii	tar	1.28-2.1ubuntu amd64	GNU version of the tar archiving util
ii	tcpd	7.6.q-25 amd64	Wietse Venema's TCP wrapper utilities
ii	tcpdump	4.7.4-1ubuntu amd64	command-line network traffic analyzer
ii	telnet	0.17-40 amd64	basic telnet client
ii	time	1.7-25.1 amd64	GNU time program for measuring CPU re
ii	tmux	2.1-3build1 amd64	terminal multiplexer
ii	tzdata	2016j-0ubuntu all	time zone and daylight-saving time da

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ii	ubuntu-cloudimag	2013.11.11	all	GnuPG keys of the Ubuntu Cloud Image
ii	ubuntu-core-laun	1.0.43-0ubuntu	amd64	Launcher for ubuntu-core (snappy) app
ii	ubuntu-keyring	2012.05.19	all	GnuPG keys of the Ubuntu archive
ii	ubuntu-minimal	1.361	amd64	Minimal core of Ubuntu
ii	ubuntu-release-u	1:16.04.19	all	manage release upgrades
ii	ubuntu-server	1.361	amd64	The Ubuntu Server system
ii	ubuntu-standard	1.361	amd64	The Ubuntu standard system
ii	ucf	3.0036	all	Update Configuration File(s): preserv
ii	udev	229-4ubuntu12	amd64	/dev/ and hotplug management daemon
ii	ufw	0.35-0ubuntu2	all	program for managing a Netfilter fire
ii	uidmap	1:4.2-3.1ubun	amd64	programs to help use subuids
ii	unattended-upgra	0.90ubuntu0.2	all	automatic installation of security up
ii	update-manager-c	1:16.04.4	all	manage release upgrades
ii	update-notifier-	3.168.2	all	Files shared between update-notifier
ii	ureadahead	0.100.0-19	amd64	Read required files in advance
ii	usbutils	1:007-4	amd64	Linux USB utilities
ii	util-linux	2.27.1-6ubunt	amd64	miscellaneous system utilities
ii	uuid-runtime	2.27.1-6ubunt	amd64	runtime components for the Universall
ii	vim	2:7.4.1689-3u	amd64	Vi IMproved - enhanced vi editor
ii	vim-common	2:7.4.1689-3u	amd64	Vi IMproved - Common files
ii	vim-runtime	2:7.4.1689-3u	all	Vi IMproved - Runtime files
ii	vim-tiny	2:7.4.1689-3u	amd64	Vi IMproved - enhanced vi editor - co
ii	vlan	1.9-3.2ubuntu	amd64	user mode programs to enable VLANs on
ii	wget	1.17.1-1ubunt	amd64	retrieves files from the web
ii	whiptail	0.52.18-1ubun	amd64	Displays user-friendly dialog boxes f
ii	xauth	1:1.0.9-1ubun	amd64	X authentication utility

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- ii xdg-user-dirs 0.15-2ubuntu6 amd64 tool to manage well known user direct
- ii xfsprogs 4.3.0+nmu1ubu amd64 Utilities for managing the XFS filesy
- ii xkb-data 2.16-1ubuntu1 all X Keyboard Extension (XKB) configurat
- ii xml-core 0.13+nmu2 all XML infrastructure and XML catalog fi
- ii xz-utils 5.1.1alpha+20 amd64 XZ-format compression utilities
- ii zerofree 1.0.3-1 amd64 zero free blocks from ext2, ext3 and
- ii zlib1g:amd64 1:1.2.8.dfsg- amd64 compression library - runtime

```
#]0;ubuntu@ip-172-31-22-202: ~#ubuntu@ip-172-31-22-202:~$ ping
69.81.74.112#####C#[C#[C#[C-
69.81.74.112#####n69.81.74.112#####
69.81.74.112#####569.81.74.112##### 69.81.74.112#####
```

connect: Invalid argument

```
#]0;ubuntu@ip-172-31-22-202: ~#ubuntu@ip-172-31-22-202:~$ ping -n 5
69.81.74.112#####[1P#[1@c
```

PING 69.81.74.112 (69.81.74.112) 56(84) bytes of data.

64 bytes from 69.81.74.112: icmp_seq=1 ttl=35 time=104 ms

64 bytes from 69.81.74.112: icmp_seq=2 ttl=35 time=107 ms

64 bytes from 69.81.74.112: icmp_seq=3 ttl=35 time=104 ms

64 bytes from 69.81.74.112: icmp_seq=4 ttl=35 time=104 ms

64 bytes from 69.81.74.112: icmp_seq=5 ttl=35 time=104 ms

--- 69.81.74.112 ping statistics ---

5 packets transmitted, 5 received, 0% packet loss, time 4006ms

rtt min/avg/max/mdev = 104.339/105.071/107.653/1.339 ms

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X11 apps

Here I'm going to cut out a lot of stuff, but I just want to show that I had to install `x11-apps`. I wasn't able to capture an image of `xclock`, but I did get one of `xcalc`.

```
#]0;ubuntu@ip-172-31-22-202: ~#ubuntu@ip-172-31-22-202:~$ xclock &
```

```
[1] 1487
```

```
#]0;ubuntu@ip-172-31-22-202: ~#ubuntu@ip-172-31-22-202:~$ The program 'xclock' is currently not installed. You can install it by typing:
```

```
sudo apt install x11-apps
```

```
[1]+  Exit 127          xclock
```

```
#]0;ubuntu@ip-172-31-22-202: ~#ubuntu@ip-172-31-22-202:~$ echo $DISPLAY
```

```
localhost:10.0
```

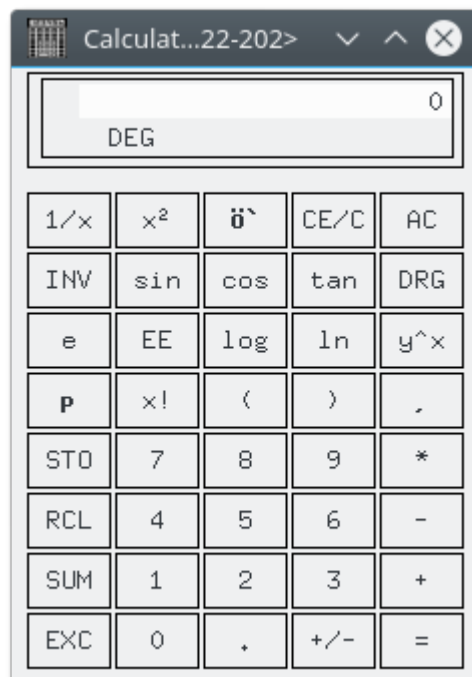
```
#]0;ubuntu@ip-172-31-22-202: ~#ubuntu@ip-172-31-22-202:~$ sudo apt install x11-apps
```

A bunch of junk was downloaded, but I've cut it for the report. Below is my call for `xclock`.

```
#7#[0;34r#8#[1A#[J#]0;ubuntu@ip-172-31-22-202: ~#ubuntu@ip-172-31-22-202:~$  
xlco##[K##[K##[Kclock
```

I nearly forgot that I needed to call TWO X11 apps, so here's `xcalc`.

```
#]0;ubuntu@ip-172-31-22-202: ~#ubuntu@ip-172-31-22-202:~$ xcl##[Klx##[Kc
```



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Compile Worms12.cpp

I couldn't really get this to compile correctly. I installed g++, but I have no idea what you were trying to tell me in the instructions for this part of the lab/project. What does "Compile it as follows: = g++ -c worms12.cpp; ls -l worms*= Link as follows: <= g++ worms12.o -l ncurses -o worms12=" mean? I tried g++ worms12.cpp, but it would fail due to lack of ncurses; which, would not give me the worms12.o files to do the "Link as follows..." part of the instructions. Script also forgot to capture wget, but I called it before trying g++.

```
#7#[0;34r#8#[1A#[J#]0;ubuntu@ip-172-31-22-202: ~#ubuntu@ip-172-31-22-202:~$ g++ -c worms12.cpp
```

```
#[01m#[Kworms12.cpp:103:21:#[m#[K #[01;31m#[Kfatal error: #[m#[Kncurses.h: No such file or directory
```

compilation terminated.

```
#]0;ubuntu@ip-172-31-22-202: ~#ubuntu@ip-172-31-22-202:~$ g++ -c worms12.cpp; ls-##[K -l wormss*##[K##[K*
```

```
#[01m#[Kworms12.cpp:103:21:#[m#[K #[01;31m#[Kfatal error: #[m#[Kncurses.h: No such file or directory
```

compilation terminated.

Cloud File Transfer

I tried to download the file directly using the Google Drive Share link. That did not work. I guess I'll need an app to download to get my stuff from Google Drive.

```
#]0;ubuntu@ip-172-31-22-202: ~#ubuntu@ip-172-31-22-202:~$ wget https://drive.google.com/open?id=0BxLxA3AhetqsNmtVcFdRT2
```

EzdXc

```
--2017-01-27 04:56:20-- https://drive.google.com/open?id=0BxLxA3AhetqsNmtVcFdRT2EzdXc
```

Resolving drive.google.com (drive.google.com)... 172.217.3.174, 2607:f8b0:400a:800::200e

Connecting to drive.google.com (drive.google.com)|172.217.3.174|:443... connected.

HTTP request sent, awaiting response... 302 Moved Temporarily

Location: https://drive.google.com/folderview?

id=0BxLxA3AhetqsNmtVcFdRT2EzdXc&usp=drive_web [following]

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--2017-01-27 04:56:21-- https://drive.google.com/folderview?id=0BxLxA3AhetqsNmtVcFdRT2EzdXc&usp=drive_web

Reusing existing connection to drive.google.com:443.

HTTP request sent, awaiting response... 302 Moved Temporarily

Location: https://drive.google.com/drive/folders/0BxLxA3AhetqsNmtVcFdRT2EzdXc?usp=drive_web [following]

--2017-01-27 04:56:21-- https://drive.google.com/drive/folders/0BxLxA3AhetqsNmtVcFdRT2EzdXc?usp=drive_web

Reusing existing connection to drive.google.com:443.

HTTP request sent, awaiting response... 200 OK

Length: unspecified [text/html]

Saving to: 'open?id=0BxLxA3AhetqsNmtVcFdRT2EzdXc'

open?id=0B [<=>] 0 --.-KB/s


open?id=0Bx [<=>] 112.48K 354KB/s

open?id=0BxLxA3Ahetqs [<=>] 132.54K 417KB/s in 0.3s

2017-01-27 04:56:21 (417 KB/s) - 'open?id=0BxLxA3AhetqsNmtVcFdRT2EzdXc' saved [135720]

Terminate EC2 Instance

I right clicked the entry on the webpage, and selected the Terminate action.

<input type="checkbox"/>	Name ▾	Instance ID ▾	Instance Type ▾	Availability Zone ▾	Instance State ▾
<input type="checkbox"/>	CEG3900-W...	i-0537bf6d6772c297b	t2.micro	us-west-2a	 terminated

It took me 1 hour, 59 minutes, and 50 seconds to complete this Task; 7 hours, 30 minutes, and 52 seconds total

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Feedback

This lab or project was WAY too long. I feel that Task 1 needs an app limit: tell us about the apps, but only require us to write about two or three of them. There could also be more links added for Task 3. The top 12 Open Source apps does not include GitHub links for the apps that it talks about. There was this really cool site that you were showing off for Google's Sprayscape, and that would make a nice addition to the list. I'm still not skilled enough in Android Development to bypass something like the need for signed debug apps; which was the issue I ran into with mine. The Cloud Intro lab could use some rework: the set-up steps for AWS EC2 are out of order in the instructions, and I have no idea what you were trying to tell me about compiling the worms12.cpp file. I also didn't know what you wanted to show that we did for the Cloud Intro lab, so I decided to copy some of my Terminal output while doing it. However, that added about 20 pages on this report.