P1 Submission

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1 Task 1: Android Networking APKs

I was unable to install f-droid, presumably because of the security software packaged with my phone preventing it. Every time I would run the apk file, Lookout Mobile Security would say that it was unable to scan the file, even with the option to allow installing programs from other sources enabled. That said I was able to install all of the software from Google Play without issue.

1.1 AirDroid

I have used airdroid in the past. It is a very handy application for when I am at work and receive a text message, preventing me from having to completely lose track of my train of thought by switching devices. Very easy to use, though I find it a bit fishy that it requires so many permissions.

1.2 KeepPass

I have never used KeepPass before, but it seems pretty standard. I use LastPass persionally, and it seems to work a bit better, providing autofill for my desktop web browser and applications, as well as my android applications and web browser.

1.3 AIDE

I used this application somewhat briefly. It's neat that it has little tutorials to teach people how to program in different languages. That said, being on a phone makes it wildly impractical. Even with an external keyboard and mouse, phone screen are far too small. AIDE is certainly novel, but I don't think it's practical for people serious about learning to program, and more than likely harmful to the productivity of anyone who actually does know how to program.

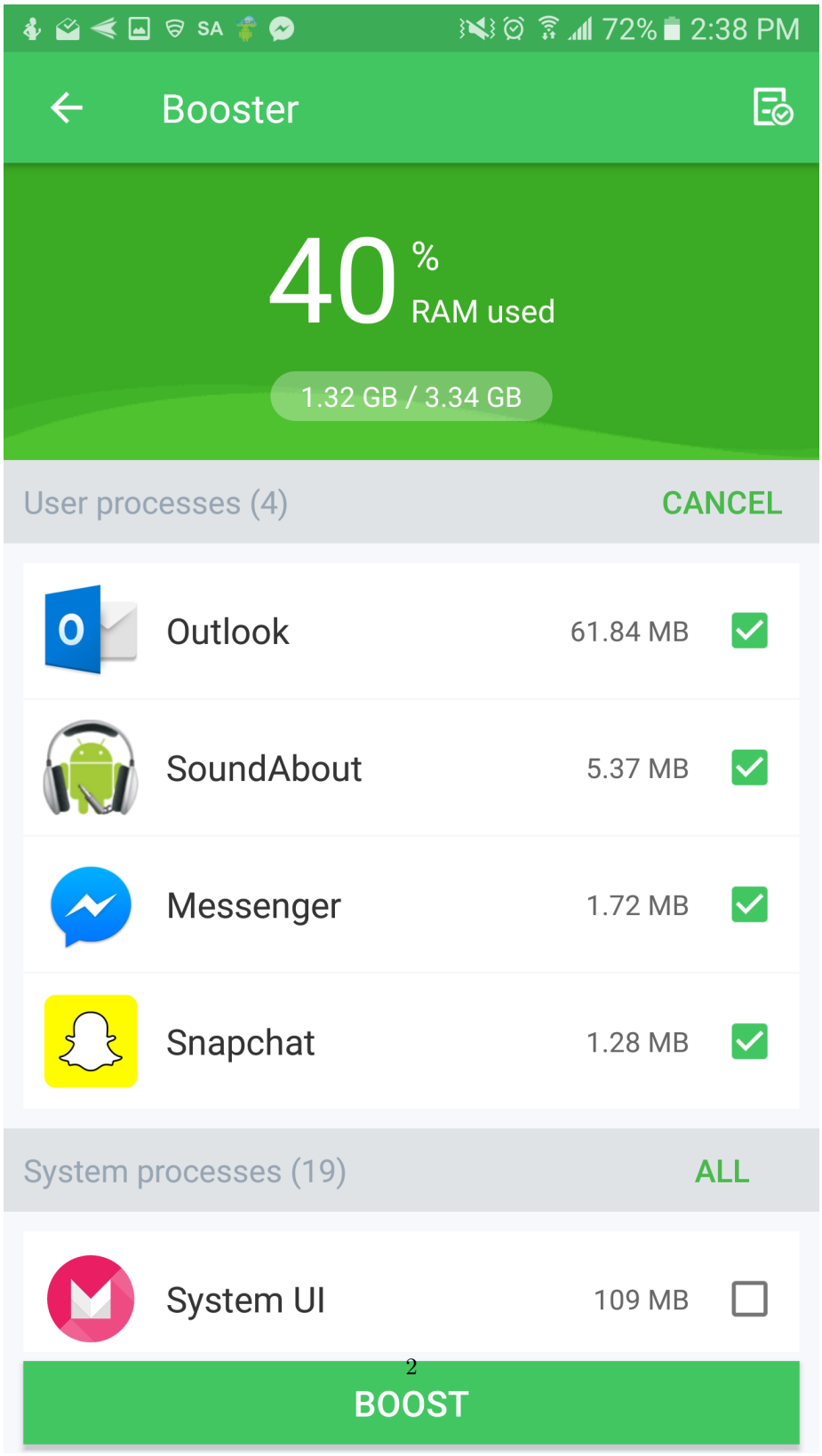

Figure 1: Airdroid RAM booster utility

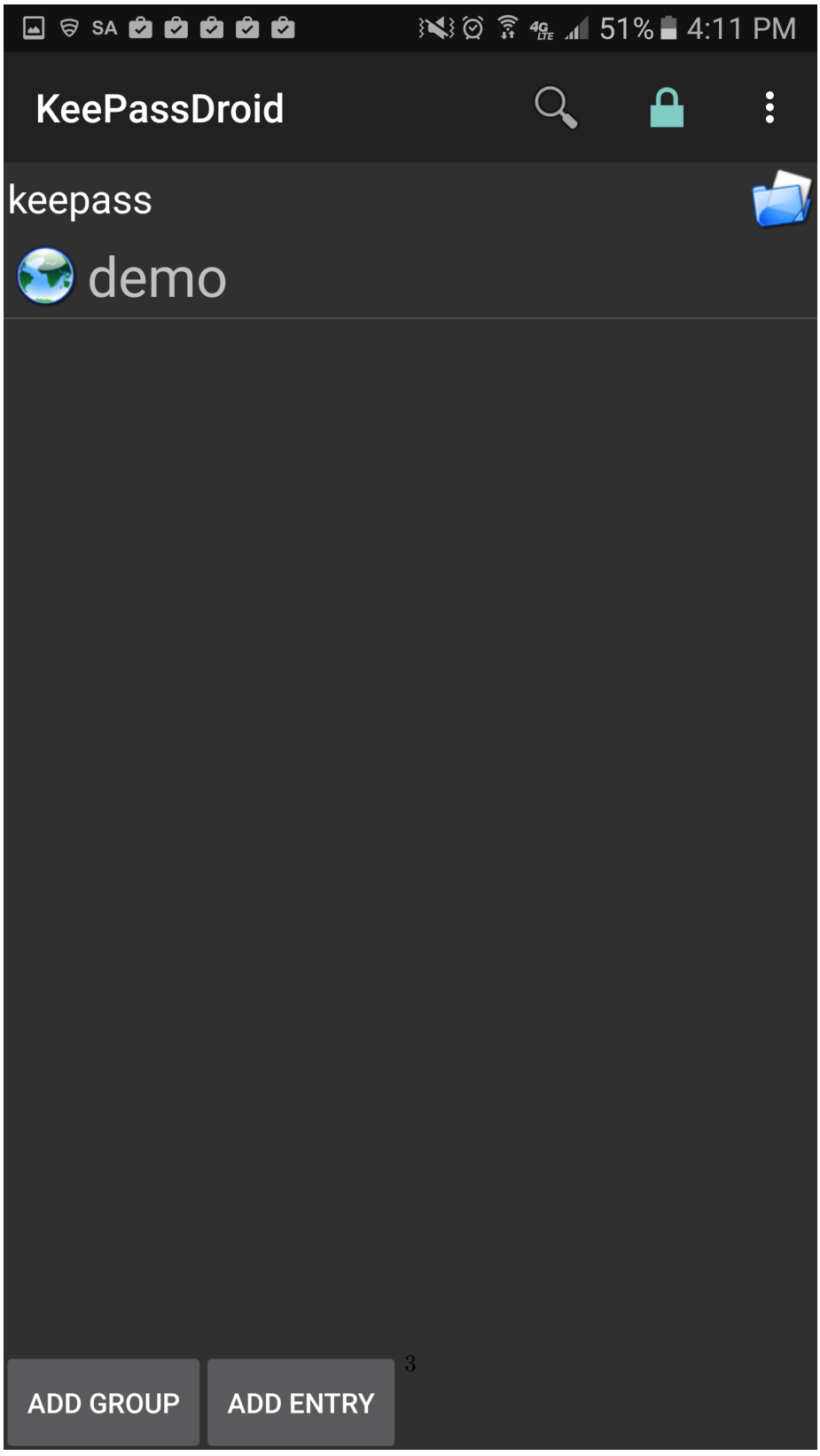

Figure 2: KeepPass with a single demo password entry.

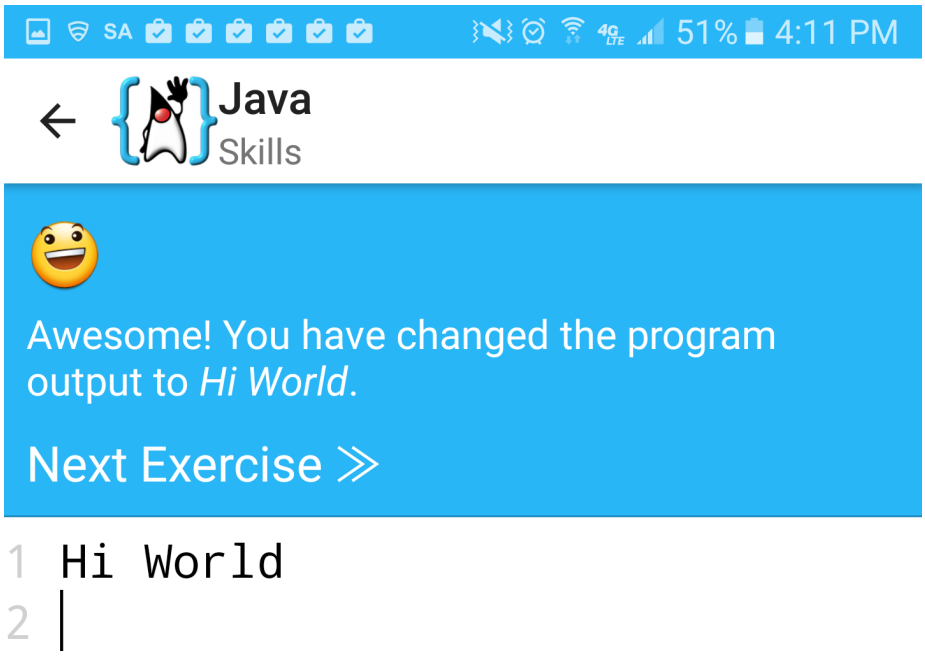

Figure 3: An early tutorial in AIDE's java lineup

1.4 sftp/ssh server

For my sftp/ssh server I installed "SSH Server". The app is simple but the controls can be a bit unintuitive. Certainly good enough. Requires root for ssh, but is otherwise effective.

1.5 ssh client/terminal

For my ssh client I installed ConnectBot, a FOSS ssh client. Unfortunately (for this assignment), all of my devices require the use of PKE to connect, so I wasn't actually able to test it out.

1.6 local terminal

For the local terminal, I installed Termux. It seems to be a fairly standard terminal with an easy to use/read layout. No messing around with menus or any nonsense like that.

1.7 Hacker's Keyboard

This app was more neat than I anticipated. Good to have if you are for some reason running tmux on a phone, because of the addition of ctrl keys and others. Wouldn't really want to use the phone sideways to type much, but I suppose I wouldn't want to be using a shell literally on my phone either.

1.8 tmux

For tmux I ran apt install tmux inside of my local terminal. While I'm somewhat familiar with the program on full systems, I don't personally get much value from it as I use a tiling window manager (i3wm). It's like tmux but for all the programs.

2 Task 2: Android Development

Installing the IDE was simple enough, although I still need to add it to my $PATH. Building the application was much less easy. I struggled with it quite a bit the first time around and ended up just giving up. The docs are okay but a little more guidance on how to build this specific application would have gone a long way - it was really unclear to me that we were just doing 5 activities with buttons to go to the next one, and I ended up getting very in over my head the first time around. Luckily I had a friend who was familiar with android and he suggested just doing activities, and also showed me how to set up buttons and make them open other activities. Figures 8 through 11 show the application running.

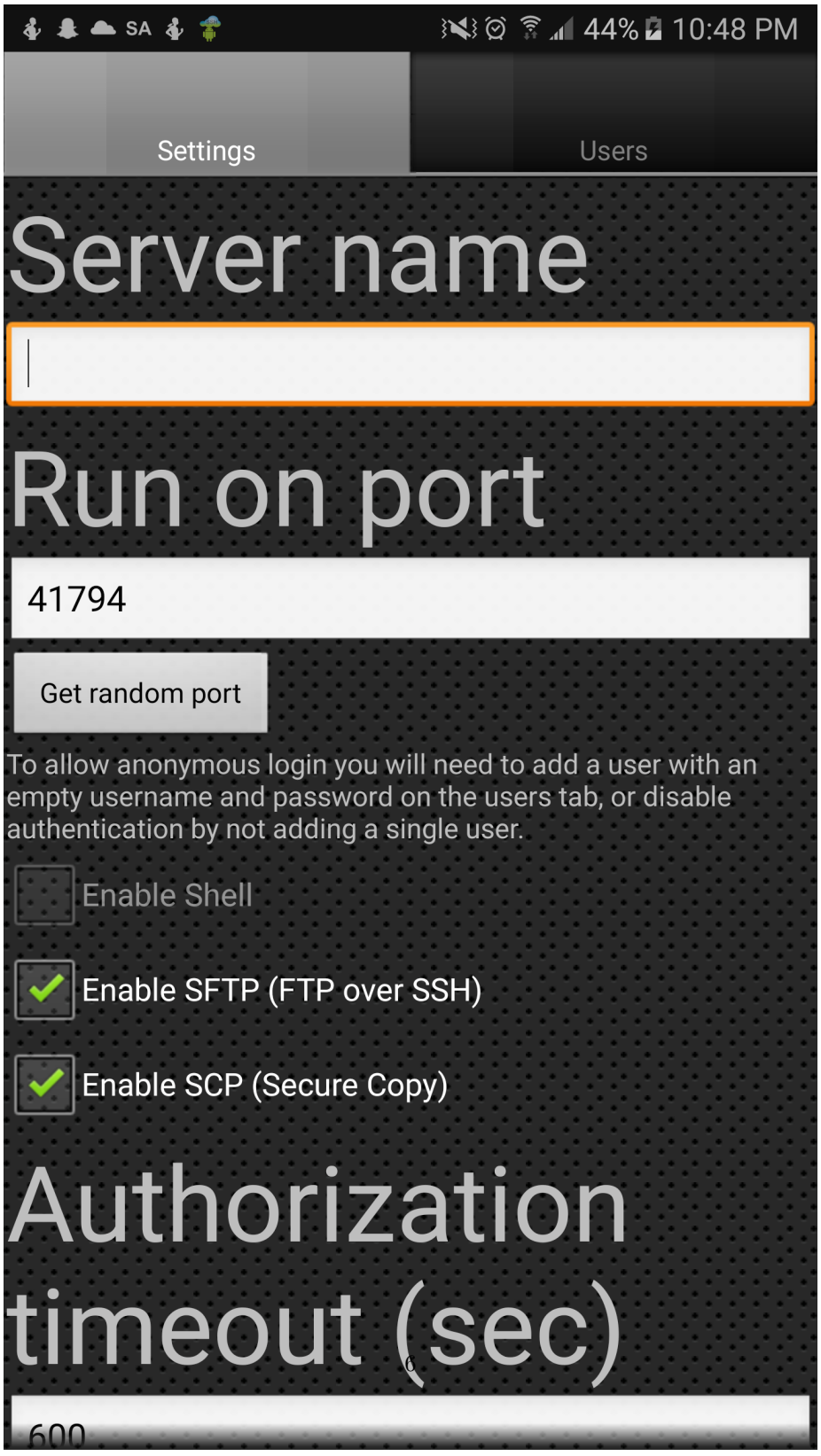

Figure 4: SSH Server - create a server interface. Large and clunky but good enough for most.

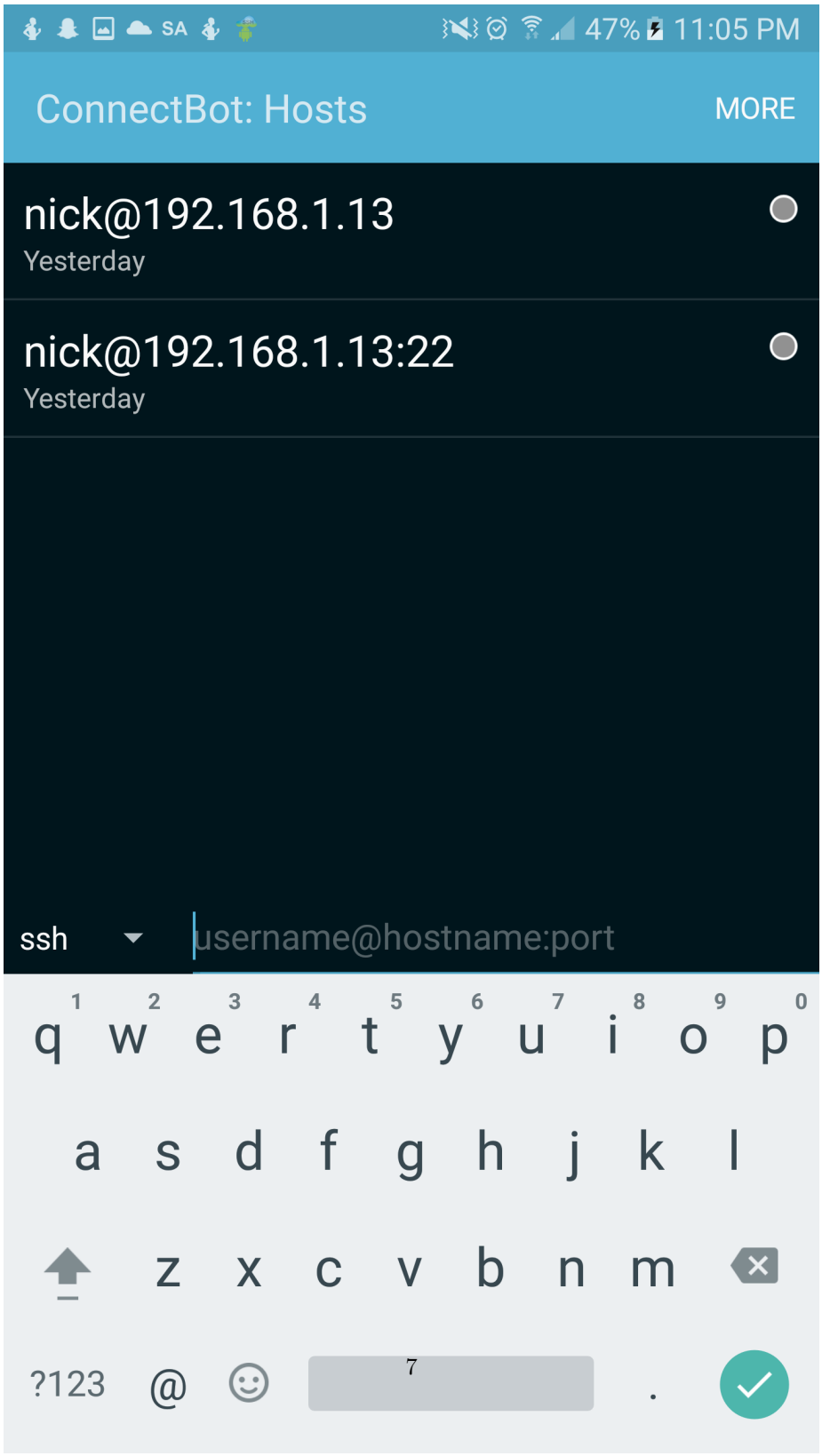

Figure 5: SSH Client ConnectBot's interface

Figure 6: Termuxś interface. Classic.

Figure 7: Hacker keyboard and tmux in one shot!

3 Task 3: Personally Build an Android Open Source App

I opted to build Firefox for Android, which has the codename fennec. Building the application was not particularly difficult because much of my environment was already set up, however I did run into a few issues with the gcc and also ran into issues where I was building the desktop version of the application on accident. This is because the official build instructions for mobile exclude the fact that the user needs to manually create the .mozconfig file which directs *mach* (the mozilla build runner) to build the mobile application. Once I figured that out, however, the build went pretty much seemlessly. Creating the .mozconfig file was the only major change I made.

4 Task 4: adb (Android Debug Bridge)

```
Script started on Wed 25 Jan 2017 09:41:18 PM EST
nick@nick-lenovo:~/Android/Sdk/platform-tools$ ./adb devices
List of devices attached
561dbd06 device

nick@nick-lenovo:~/Android/Sdk/platform-tools$ ./adb install ~/Desktop/fennec-53.0a1.en-US.a

[  0%] /data/local/tmp/fennec-53.0a1.en-US.android-arm.apk
(truncated)
[100%] /data/local/tmp/fennec-53.0a1.en-US.android-arm.apk
```

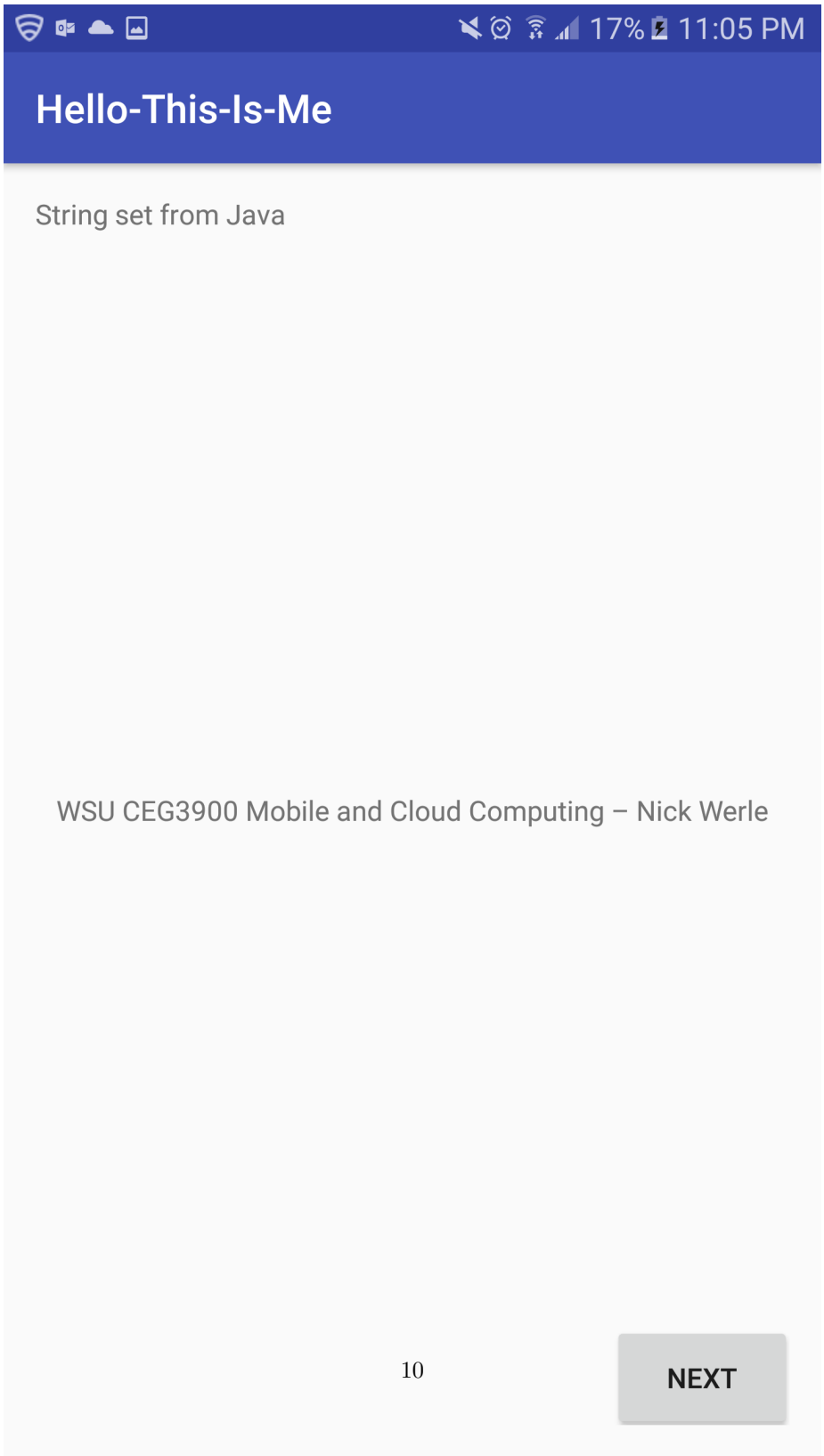

Figure 8: Page 1 of my custom application

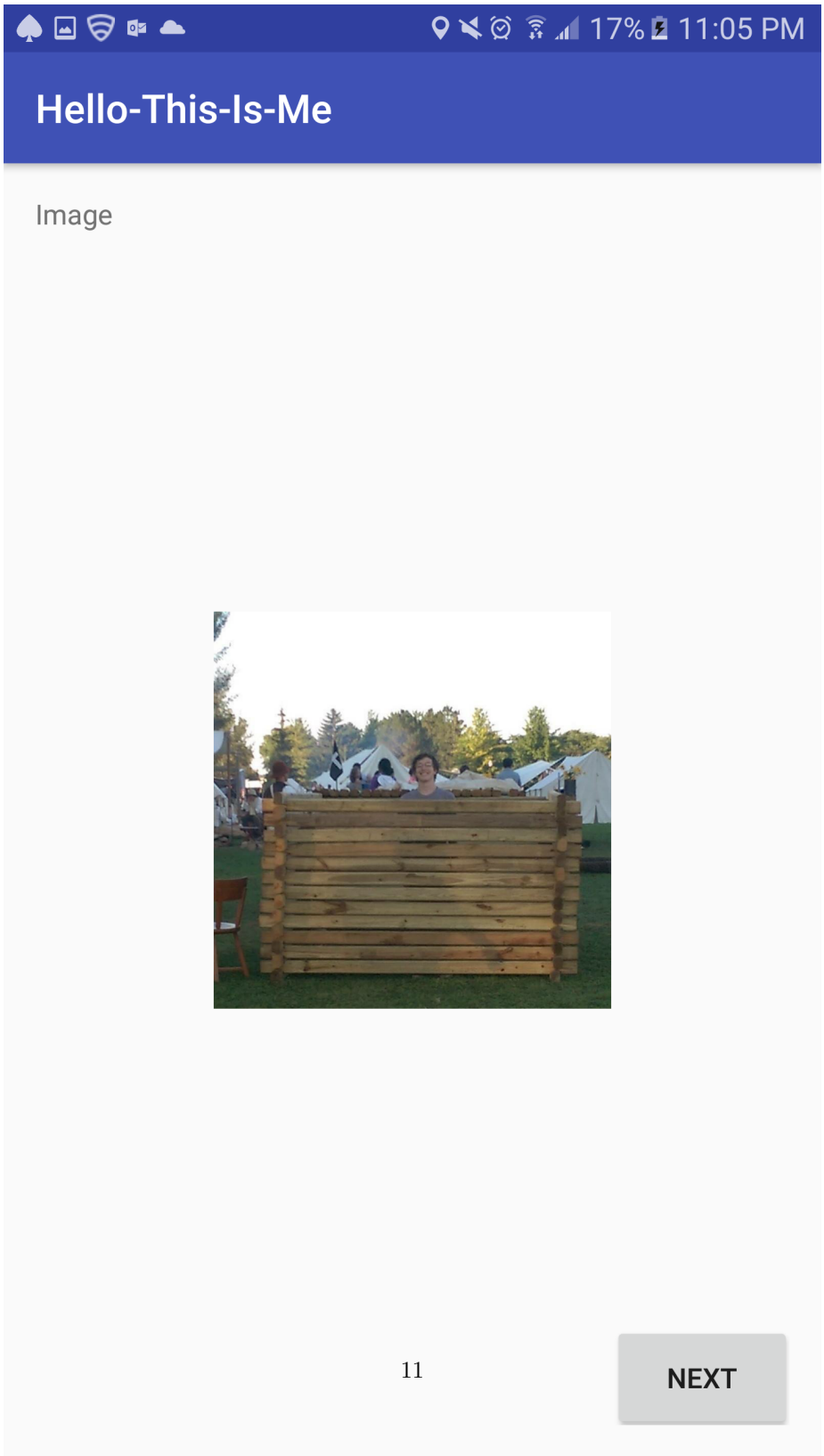

Figure 9: Page 3 of my custom application

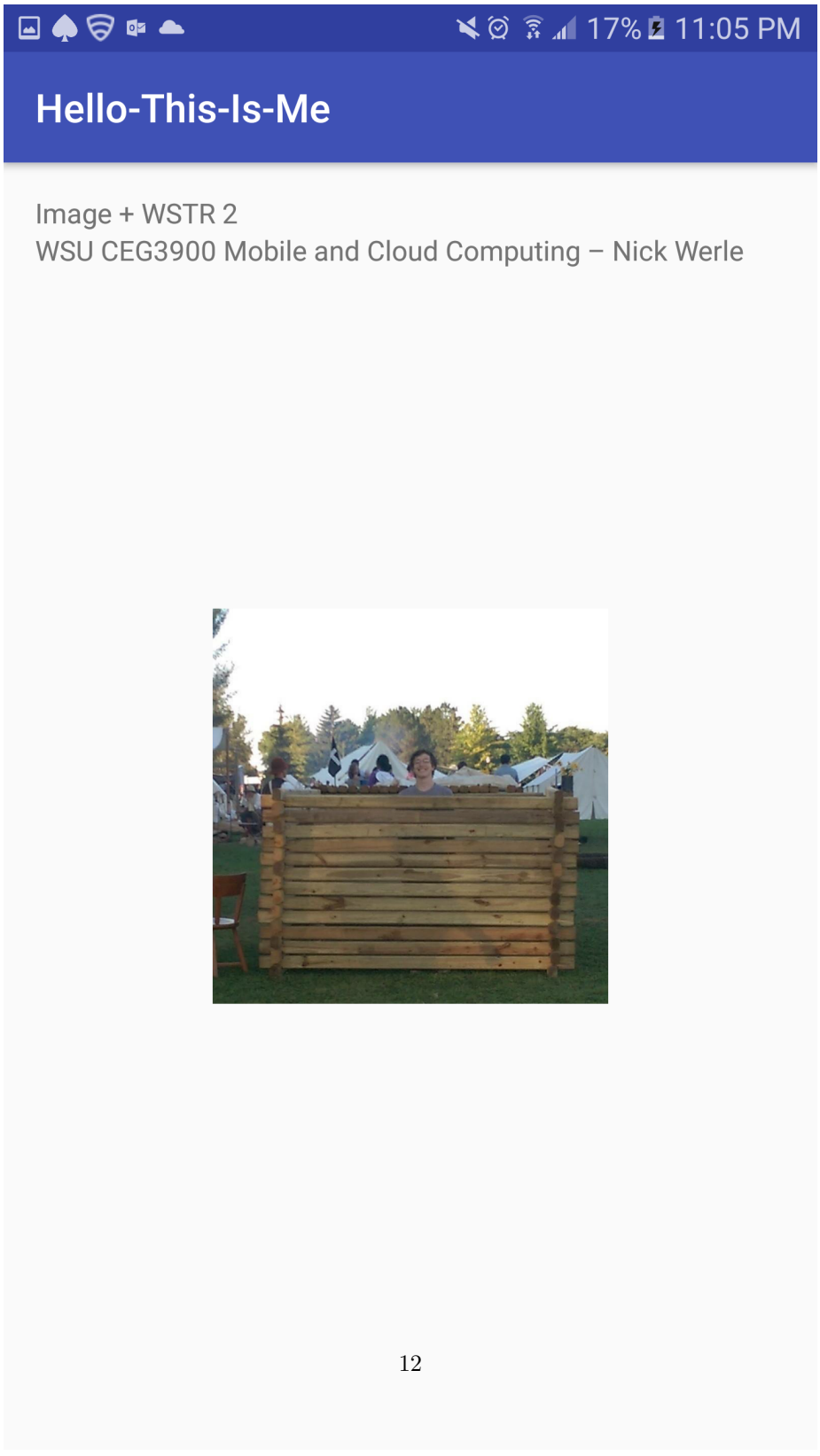

Figure 10: Page 5 of my custom application

```
pkg: /data/local/tmp/fennec-53.0a1.en-US.android-arm.apk

Failure [INSTALL_FAILED_ALREADY_EXISTS]

nick@nick-lenovo:~/Android/Sdk/platform-tools$ ./adb install ~/AndroidStudioProjects/WerleHe

[  2%] /data/local/tmp/app-debug.apk
(truncated)
[100%] /data/local/tmp/app-debug.apk
pkg: /data/local/tmp/app-debug.apk

Failure [INSTALL_FAILED_ALREADY_EXISTS]

nick@nick-lenovo:~/Android/Sdk/platform-tools$ ./adb shell
shell@heroqlteatt:/ $ ls /system/bin

ATFWD-daemon
IPSecService
PktRspTest
StoreKeybox
WifiLogger_app
acpi
adsprpcd
am
androidshmservice
apaservice
app_process
app_process32
app_process64
applypatch
appops
appwidget
at_distributor
athdiag
atrace
audiod
auditd
basename
bcc
bdt
bintvoutservice
blkid
blockdev
bmgr
bootanimation
bootchecker
```

```
brctl
bridgemgrd
btnvtool
bu
bugreport
bzcat
cal
cat
ccm_gen_cert
charon
chcon
chgrp
chmod
chown
chroot
cksum
clatd
clear
cmp
cnss-daemon
cnss_diag
comm
connfwexe
content
cp
cpio
cplay
cs
curl
cut
dalvikvm
dalvikvm32
dalvikvm64
date
dd
ddexe
debuggerd
debuggerd64
dex2oat
df
dhcpcd
diag_callback_sample
diag_dci_sample
diag_klog
diag_mdlog
diag_socket_log
```

```
diag_uart_log
dirname
dmesg
dnsmasq
dos2unix
dpm
drmserver
du
dumpstate
dumpsys
dun-server
e2fsck
ebtables
echo
edmaudit
egrep
energy-awareness
env
epmlogd
expand
expr
factory.adsp
fallocate
false
fgrep
find
fingerprintd
fm_qsoc_patches
fmconfig
fmfactorytest
fmfactorytestserver
free
fsck.exfat
fsck.f2fs
fsck_msdos
fstman
ftmdaemon
garden_app
gatekeeperd
getenforce
getevent
getprop
gptest
grep
groups
gzip
```

```
hci_qcomm_init
head
hid
hostapd
hostapd_cli
hostname
hwclock
icd
id
idmap
ifconfig
iftop
ime
imscmservice
imsd
inotifyd
input
insmod
install-recovery.sh
installd
insthk
ioctl
ionice
iop
ip
ip6tables
ipacm
iptables
irsc_util
jackd
jackservice
keystore
kill
ld.mc
linker
linker64
lmkd
ln
load_policy
loc_launcher
log
logcat
logd
logname
logwrapper
losetup
```

```
lowi-server
lpm
ls
lsmod
lsof
lsusb
macloader
make_ext4fs
make_f2fs
mcDriverDaemon
mct-unit-test-app
md5sum
mdnsd
media
mediaserver
mfgloader
mkdir
mkfs.exfat
mknod
mkswap
mktemp
mm-audio-ftm
mm-pp-dpps
mm-qcamera-app
mm-qcamera-daemon
mm-qjpeg-dec-test
mm-qjpeg-enc-test
mm-qomx-idec-test
mm-qomx-ienc-test
mm-vidc-omx-test
mmi
mmi_agent32
mmi_agent64
mmi_debug
mmi_diag
modinfo
monkey
more
mount
mountpoint
msm_irqbalance
mtpd
mv
myftm
nandread
ndc
```

```
netd
netmgrd
netstat
newfs_msdos
nice
nl
nl_listener
nohup
npsmobex
oatdump
od
olsrd
otp_server
paste
patch
patchoat
pgrep
pidof
ping
ping6
pkill
pktlogconf
pm
pm-proxy
pm-service
pmap
port-bridge
pppd
prepare_param.sh
printenv
printf
prlimit
ps
pwd
qfipsverify
qjpeg-dma-test
qmuxd
qrngtest
qseecom_sample_client
qseecom_security_test
qseecomd
racoon
radish
readlink
realpath
reboot
```

```
renice
requestsync
resetreason
resize2fs
restorecon
rild
rm
rmdir
rmmod
rmnetcli
rmt_storage
route
run-as
runcon
samsungpowersoundplay
schedtest
screencap
screenrecord
scs
sdcard
sdp_cryptod
secdiscard
secure_camera_sample_client
secure_storage_daemon
secure_storage_pm
secure_ui_sample_client
sed
sem_daemon
sendevent
sensorhubservice
sensors.qcom
sensorservice
seq
service
servicemanager
setenforce
setprop
setsid
settings
setup_fs
sfotahelper
sgdisk
sh
sha1sum
sleep
sm
```

```
smdexe
sort
split
ss_conn_daemon
ss_kbservice_daemon
start
stat
stop
strings
surfaceflinger
svc
swapoff
swapon
sync
sysctl
tac
tail
tar
taskset
tbaseLoader
tc
tee
telecom
test_bet_8996
test_diag
test_module_pproc
tftp_server
tima_dump_log
time
time_daemon
timeout
tinycap
tinymix
tinypcminfo
tinyplay
tlc_server
toolbox
top
touch
toybox
tr
true
truncate
tunman
tzdatacheck
uiautomator
```

```
umount
uname
uncrypt
uniq
unix2dos
uptime
usf_proximity
usf_tester
usleep
vdc
vmstat
vold
vpnclientd
watchprops
wc
wdsdaemon
which
whoami
wlandutservice
wm
wpa_supplicant
wvkprov
xargs
xtwifi-client
xtwifi-inet-agent
yes
yuvtool
shell@heroqlteatt:/ $ ls /system/xbin

dexdump
jack_connect
jack_disconnect
jack_lsp
jack_showtime
jack_simple_client
jack_transport

shell@heroqlteatt:/ $ df
/mnt/secure/asec: Permission denied
/mnt/knox/default/knox-emulated: Permission denied
/mnt/knox/read/knox-emulated: Permission denied
/mnt/knox/write/knox-emulated: Permission denied
/mnt/runtime/default/emulated: Permission denied
/mnt/runtime/read/emulated: Permission denied
/mnt/runtime/write/emulated: Permission denied
Filesystem                  Size     Used     Free   Blksize
```

```
/                          1.6G    11.0M     1.6G      4.0K
/dev                       1.7G   160.0K     1.7G      4.0K
/sys/fs/cgroup             1.7G    12.0K     1.7G      4.0K
/mnt                       1.7G     0.0K     1.7G      4.0K
/mnt/secure                1.7G     0.0K     1.7G      4.0K
/system                    4.6G     4.5G   118.0M      4.0K
/efs                      15.7M   504.0K    15.2M      4.0K
/cache                   991.9M     2.4M   989.5M      4.0K
/persist                  27.5M   124.0K    27.4M      4.0K
/dsp                      11.7M     4.1M     7.6M      4.0K
/firmware                 70.0M    28.8M    41.1M     16.0K
/firmware-modem           95.0M    71.5M    23.5M     16.0K
/persdata/absolute         4.9M    40.0K     4.9M      4.0K
/storage                   1.7G     0.0K     1.7G      4.0K
/data                     23.3G     6.8G    16.6G      4.0K
/mnt/knox                 23.3G     6.8G    16.6G      4.0K
/mnt/shell/enc_media      23.3G     6.8G    16.5G      4.0K
/storage/emulated         23.3G     6.8G    16.5G      4.0K
/data/enc_user            23.3G     6.8G    16.6G      4.0K
/mnt/shell/enc_emulated   23.3G     6.8G    16.5G      4.0K

shell@heroqlteatt:/ $ exit

nick@nick-lenovo:~/Android/Sdk/platform-tools$ exit
exit

Script done on Wed 25 Jan 2017 10:22:56 PM EST
```

5 Task 5: Get Started with AWS Cloud Computing

5.1 AWS

5.2 Public DNS:

ec2-52-25-68-217.us-west-2.compute.amazonaws.com

5.3 System Log (Partial):

```
[    0.000000] Initializing cgroup subsys cpuset
[    0.000000] Initializing cgroup subsys cpu
[    0.000000] Initializing cgroup subsys cpuacct
[    0.000000] Linux version 4.4.0-53-generic (buildd@lcy01-28) (gcc version 5.4.0 20160609
[    0.000000] Command line: BOOT_IMAGE=/boot/vmlinuz-4.4.0-53-generic root=UUID=cabbbcb6-0
[    0.000000] KERNEL supported cpus:
```

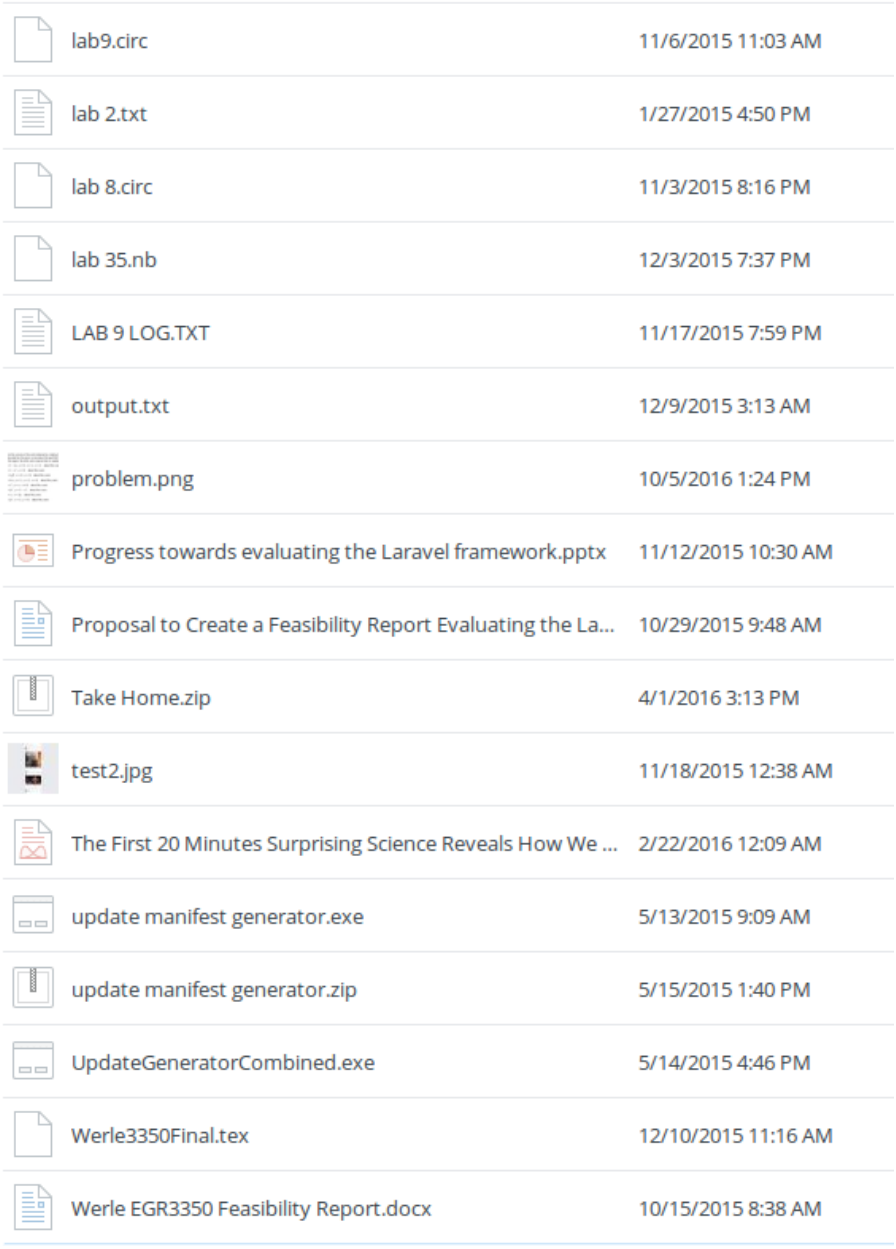

Figure 11: A directory listing from my dropbox

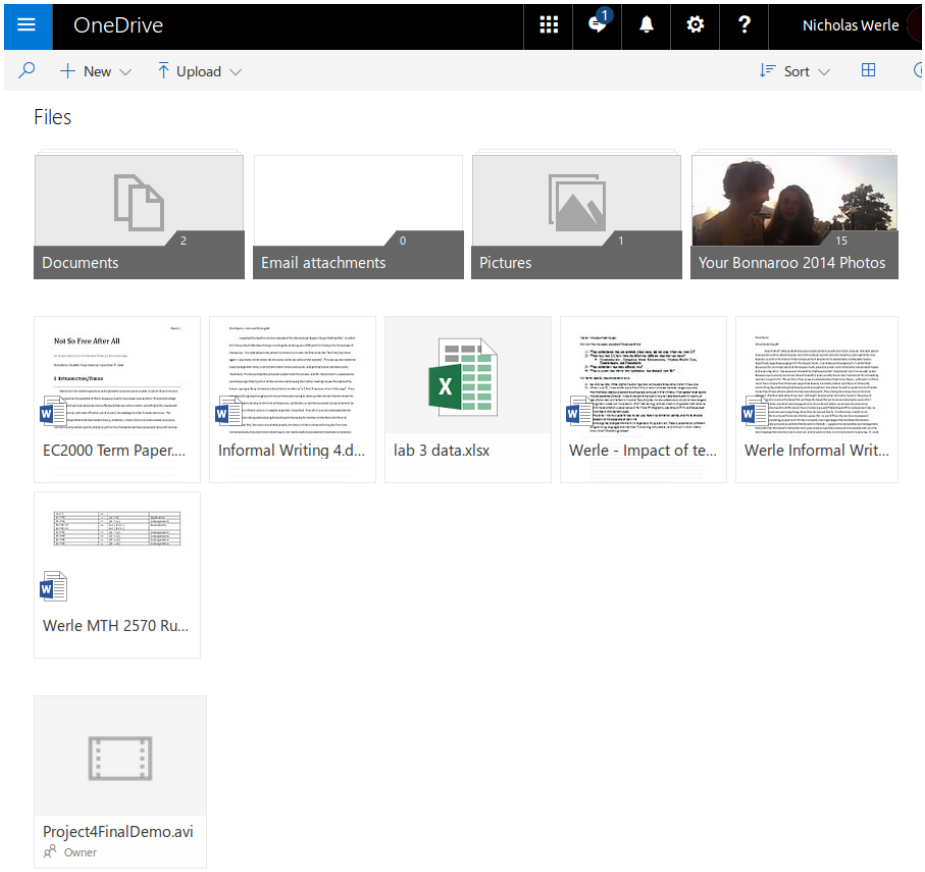

Figure 12: A directory listing from my onedrive.

```
[    0.000000]   Intel GenuineIntel
[    0.000000]   AMD AuthenticAMD
[    0.000000]   Centaur CentaurHauls
[    0.000000] x86/fpu: xstate_offset[2]:  576, xstate_sizes[2]:  256
[    0.000000] x86/fpu: Supporting XSAVE feature 0x01: 'x87 floating point registers'
[    0.000000] x86/fpu: Supporting XSAVE feature 0x02: 'SSE registers'
[    0.000000] x86/fpu: Supporting XSAVE feature 0x04: 'AVX registers'
[    0.000000] x86/fpu: Enabled xstate features 0x7, context size is 832 bytes, using 'stanc
[    0.000000] x86/fpu: Using 'eager' FPU context switches.
[    0.000000] e820: BIOS-provided physical RAM map:
[    0.000000] BIOS-e820: [mem 0x0000000000000000-0x000000000009dfff] usable
[    0.000000] BIOS-e820: [mem 0x000000000009e000-0x000000000009ffff] reserved
[    0.000000] BIOS-e820: [mem 0x00000000000e0000-0x00000000000fffff] reserved
[    0.000000] BIOS-e820: [mem 0x0000000000100000-0x000000003fffffff] usable
[    0.000000] BIOS-e820: [mem 0x00000000fc000000-0x00000000ffffffff] reserved
[    0.000000] NX (Execute Disable) protection: active
[    0.000000] SMBIOS 2.4 present.
[    0.000000] Hypervisor detected: Xen
[    0.000000] Xen version 4.2.
[    0.000000] Netfront and the Xen platform PCI driver have been compiled for this kernel:
[    0.000000] Blkfront and the Xen platform PCI driver have been compiled for this kernel:
[    0.000000] You might have to change the root device
[    0.000000] from /dev/hd[a-d] to /dev/xvd[a-d]
[    0.000000] in your root= kernel command line option
[    0.000000] e820: last_pfn = 0x40000 max_arch_pfn = 0x400000000
[    0.000000] x86/PAT: Configuration [0-7]: WB  WC  UC- UC  WB  WC  UC- WT
[    0.000000] found SMP MP-table at [mem 0x000fbc80-0x000fbc8f] mapped at [ffff8800000fbc80
[    0.000000] Scanning 1 areas for low memory corruption
[    0.000000] RAMDISK: [mem 0x36f5a000-0x377a4fff]
```

5.4 Running ssh commands:

```
ubuntu@ip-172-31-47-62:~$ ps -aux; df -Th; more /etc/passwd
USER       PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root         1  0.2  0.5  38084  6036 ?        Ss   04:18   0:03 /sbin/init
root         2  0.0  0.0      0     0 ?        S    04:18   0:00 [kthreadd]
root         3  0.0  0.0      0     0 ?        S    04:18   0:00 [ksoftirqd/0]
root         4  0.0  0.0      0     0 ?        S    04:18   0:00 [kworker/0:0]
root         5  0.0  0.0      0     0 ?        S<   04:18   0:00 [kworker/0:0H]
root         6  0.0  0.0      0     0 ?        S    04:18   0:00 [kworker/u30:0]
root         7  0.0  0.0      0     0 ?        S    04:18   0:00 [rcu_sched]
root         8  0.0  0.0      0     0 ?        S    04:18   0:00 [rcu_bh]
--snip--
/lib/systemd/sy
ubuntu    1447  0.0  0.2  61536  2244 ?        S    04:36   0:00 (sd-pam)
ubuntu    1482  0.0  0.4  95368  4284 ?        S    04:36   0:00 sshd: ubuntu@pt
```

```
ubuntu    1483  0.0  0.5  21396  5200 pts/0    Ss   04:36   0:00 -bash
root      1505  0.0  0.0      0     0 ?        S    04:37   0:00 [kworker/u30:2]
ubuntu    1506  0.0  0.3  36084  3248 pts/0    R+   04:37   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
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/nologi
n
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-timesync:x:100:102:systemd Time Synchronization,,,:/run/systemd:/bin/fal
se
systemd-network:x:101:103:systemd Network Management,,,:/run/systemd/netif:/bin/
false
ubuntu@ip-172-31-47-62:~$ wget http://www.cs.wright.edu/~pmateti/Courses/3900/Lectures/Cloud
--2017-01-26 04:40:48--  http://www.cs.wright.edu/~pmateti/Courses/3900/Lectures/Cloud/worms
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
--2017-01-26 04:40:49--  http://cecs.wright.edu/~pmateti/Courses/3900/Lectures/Cloud/worms12
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
```

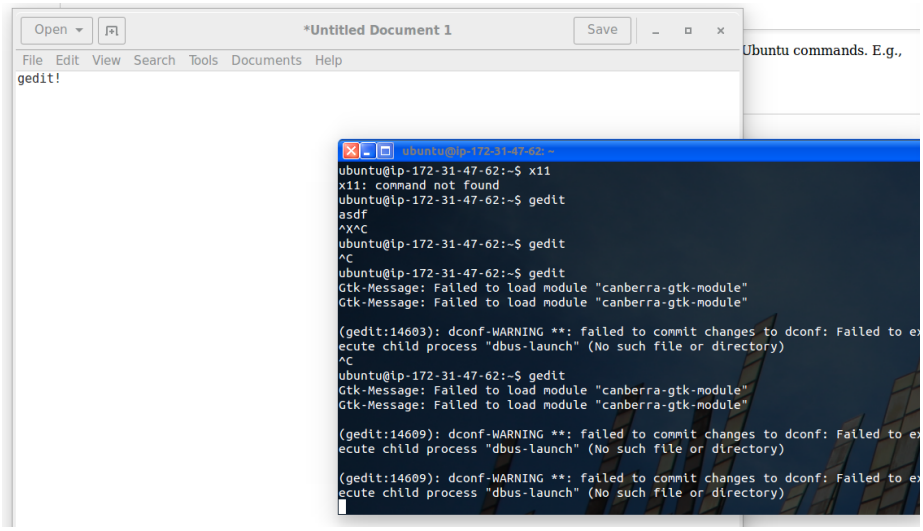

Figure 13: Gedit over ssh -X

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

2017-01-26 04:40:49 (98.7 KB/s) - worms12.cpp saved [13933/13933]

ubuntu@ip-172-31-47-62:~$ dpkg --list | wc -l
648
```

5.5 Installed programs: 648

5.6 X11 Programs

I ran gedit and gnome-calculator, both of which I installed via apt

5.7 compiling worms12

```
ubuntu@ip-172-31-47-62:~$ sudo apt-get install libncurses5-dev
ubuntu@ip-172-31-47-62:~$ g++ -c worms12.cpp; ls -l
total 32
-rw-rw-r-- 1 ubuntu ubuntu 13933 Dec 23  2012 worms12.cpp
-rw-rw-r-- 1 ubuntu ubuntu 15880 Jan 26 04:55 worms12.o
ubuntu@ip-172-31-47-62:~$ g++ worms12.o -l ncurses -o worms12
ubuntu@ip-172-31-47-62:~$ ./worms12
ubuntu@ip-172-31-47-62:~$
```

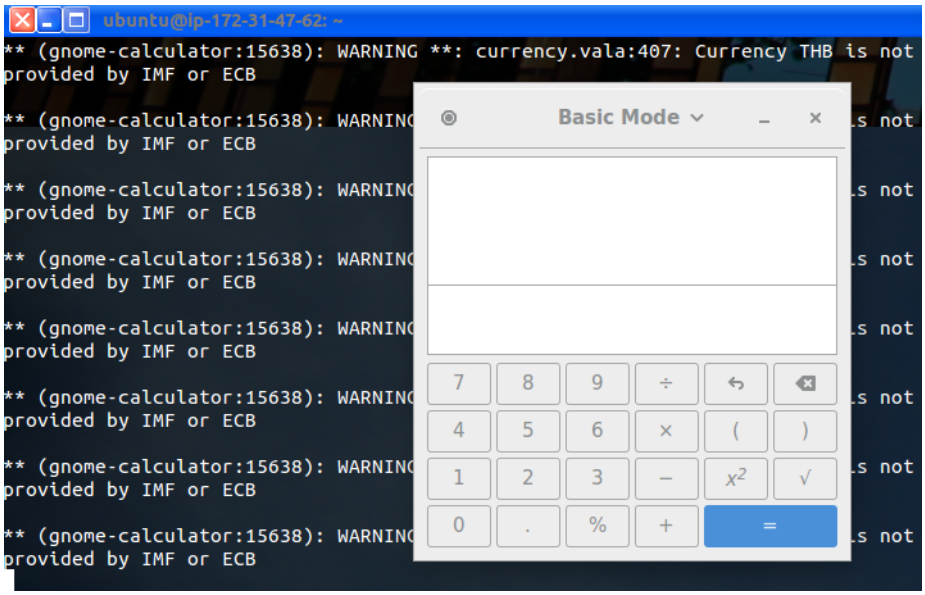

Figure 14: gnome-calculator over ssh -X

5.8 file upload/download:

To upload a file you can use scp or rsync or another similar utility. For example I run the following command to update my motherś website:

```
rsync -urazv ./ nick@<omitted>:/home/website/Code/bolt/ --exclude='.git/'
```