

Needed software

Knoppix Live CD

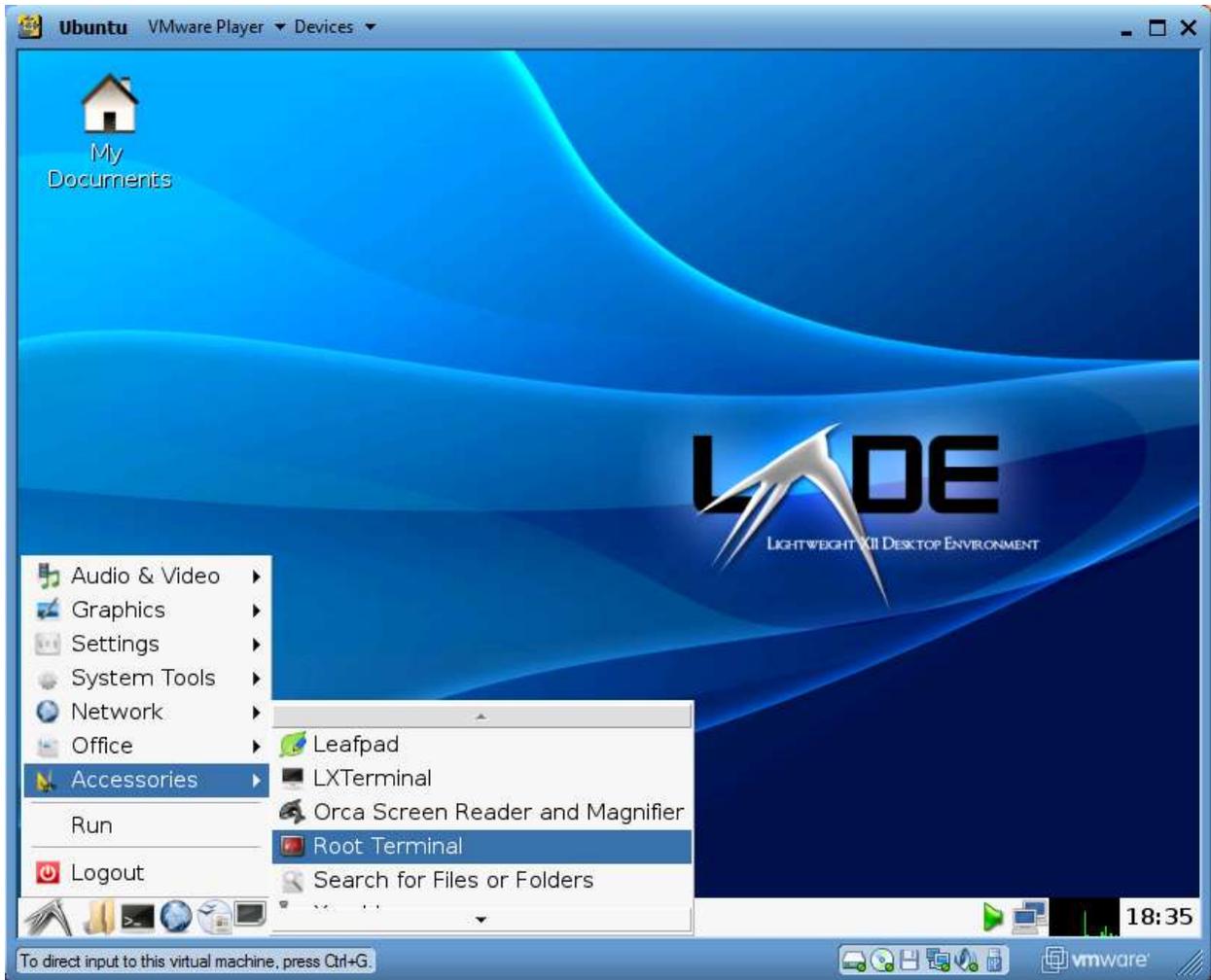
<http://www.knopper.net/knoppix-mirrors/index-en.html>

Just pick a ftp or http download site, I used <ftp.kernel.org> and downloaded the KNOPPIX_V6.0.1CD-2009-02-08-EN.iso file.

Starting Knoppix

Burn the ISO image to a CD using your cd burning software. Then restart your computer with the CD in the drive. Most computers are configured to automatically check the cdrom drive at start up and start loading off of the drive if a bootable cd is there. If your computer does not automatically start up off of the knoppix cd you may be required to press a key sequence when you first power on your machine to select a different startup device. Sometimes it's 'ESC' or 'F12'. Do not have your USB external hard drive connected at this point.

Once you get to the Knoppix desktop you need to launch the 'Root Terminal'

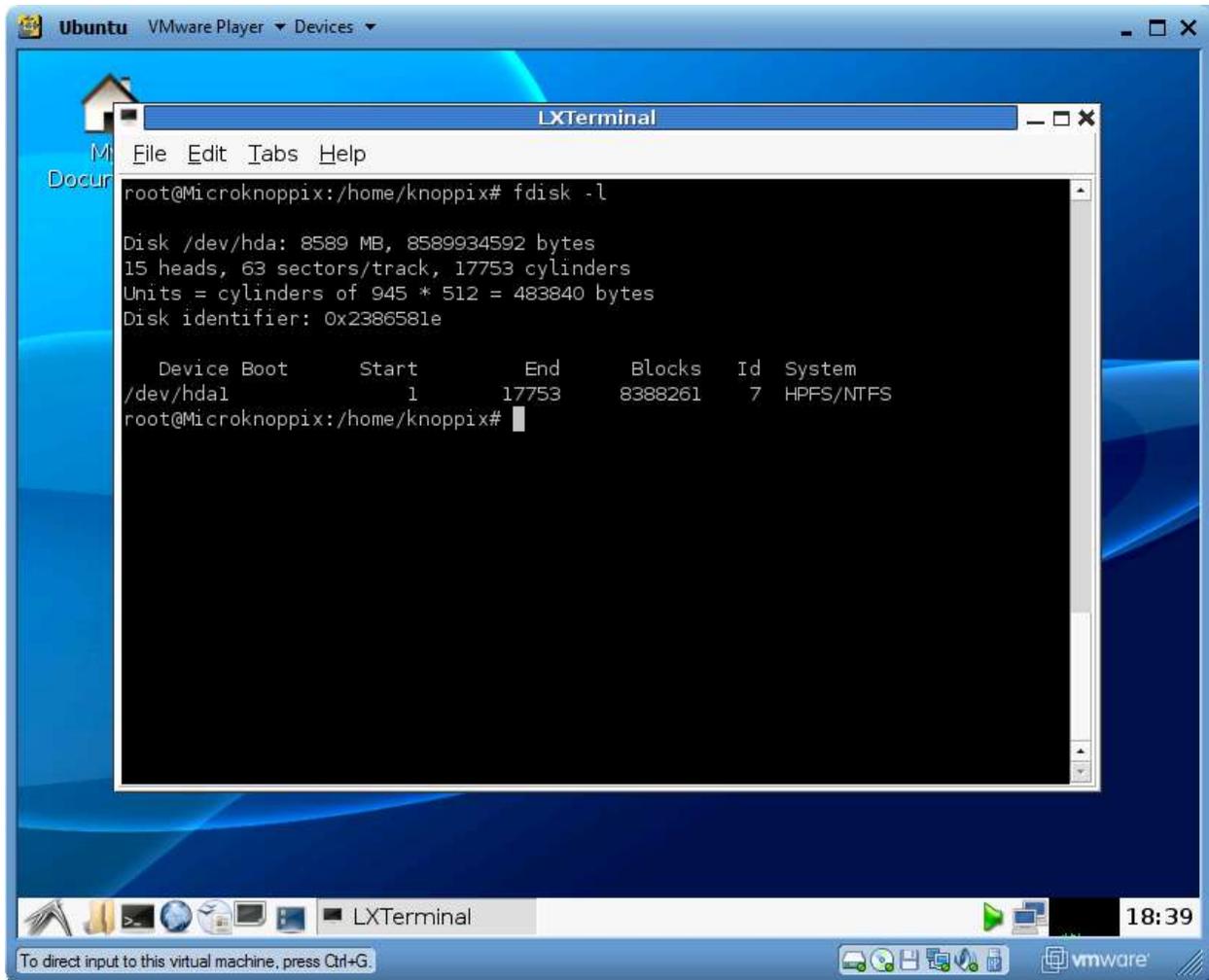


Close the Granted permissions without asking for password window.

Linux is case sensitive for commands so be sure to keep that in mind when typing them in. The first thing you want to do is find out what the path is for your computer's internal drives so that you don't accidentally run any repair commands on them. Make sure your external usb hard drive is not connected at this point and run:

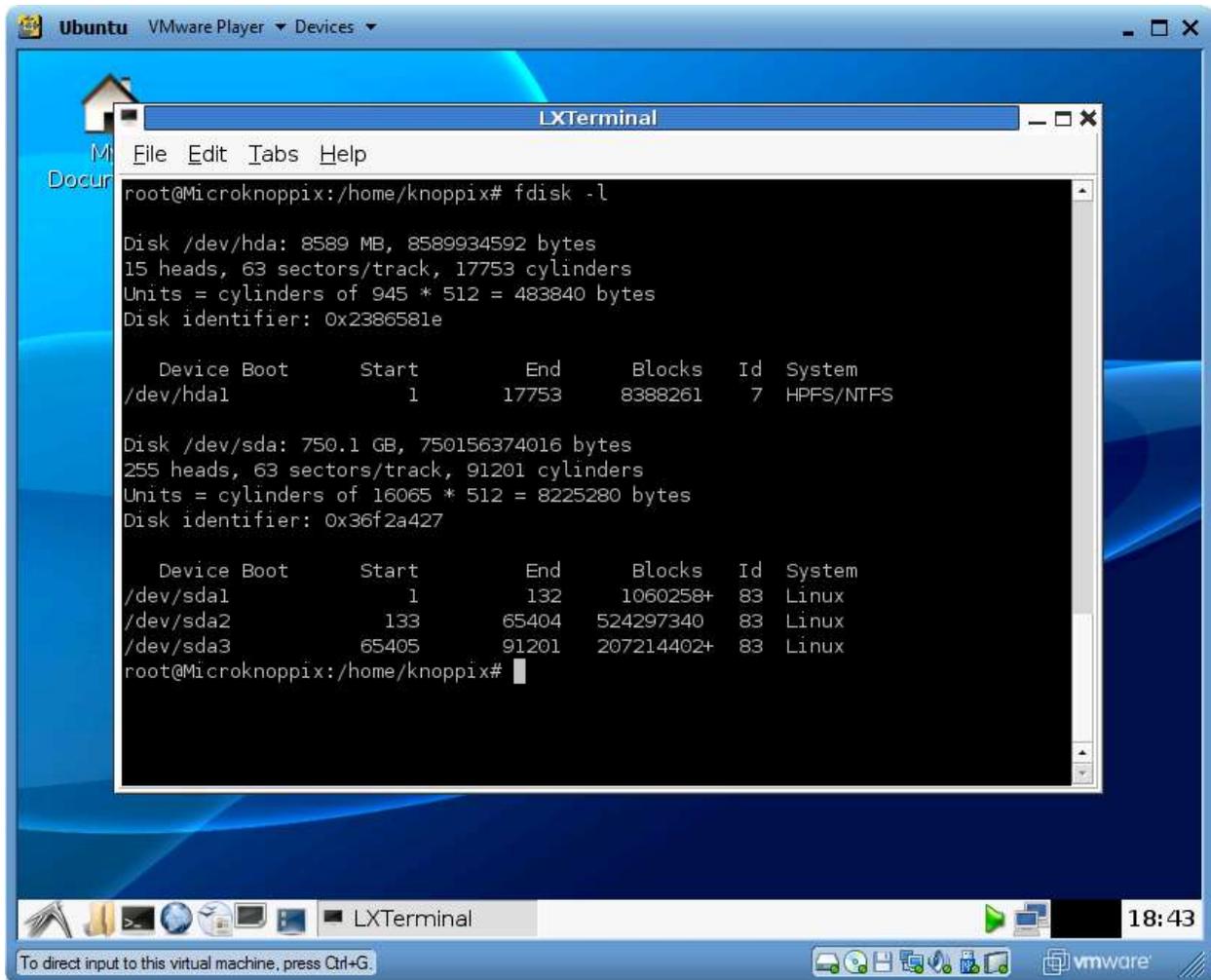
```
'fdisk -l'
```

That's a lower case L. that will list out any Hard drive devices that are in your computer.



Mine only has disk /dev/hda, yours may show something different. Make a note of what is listed and then connect your usb HD to your computer. Wait about 30 seconds for Knoppix to register the drive and then re-run the fdisk command:

'fdisk -l'



Now on my list it shows the original '/dev/hda' device but there a new one on the list that is 750GB called '/dev/sda' that disk has three partitions labeled '/dev/sda1', '/dev/sda2', and '/dev/sda3' those are the partitions that I want to run a file system repair on. I've heard that drives smaller than 750GB may only have 2 partitions on them so don't be worried if yours only has 2 listed on it.

The file system repair utility is called 'e2fsck' If you type that command by itself it will list the different options that can be used with it.

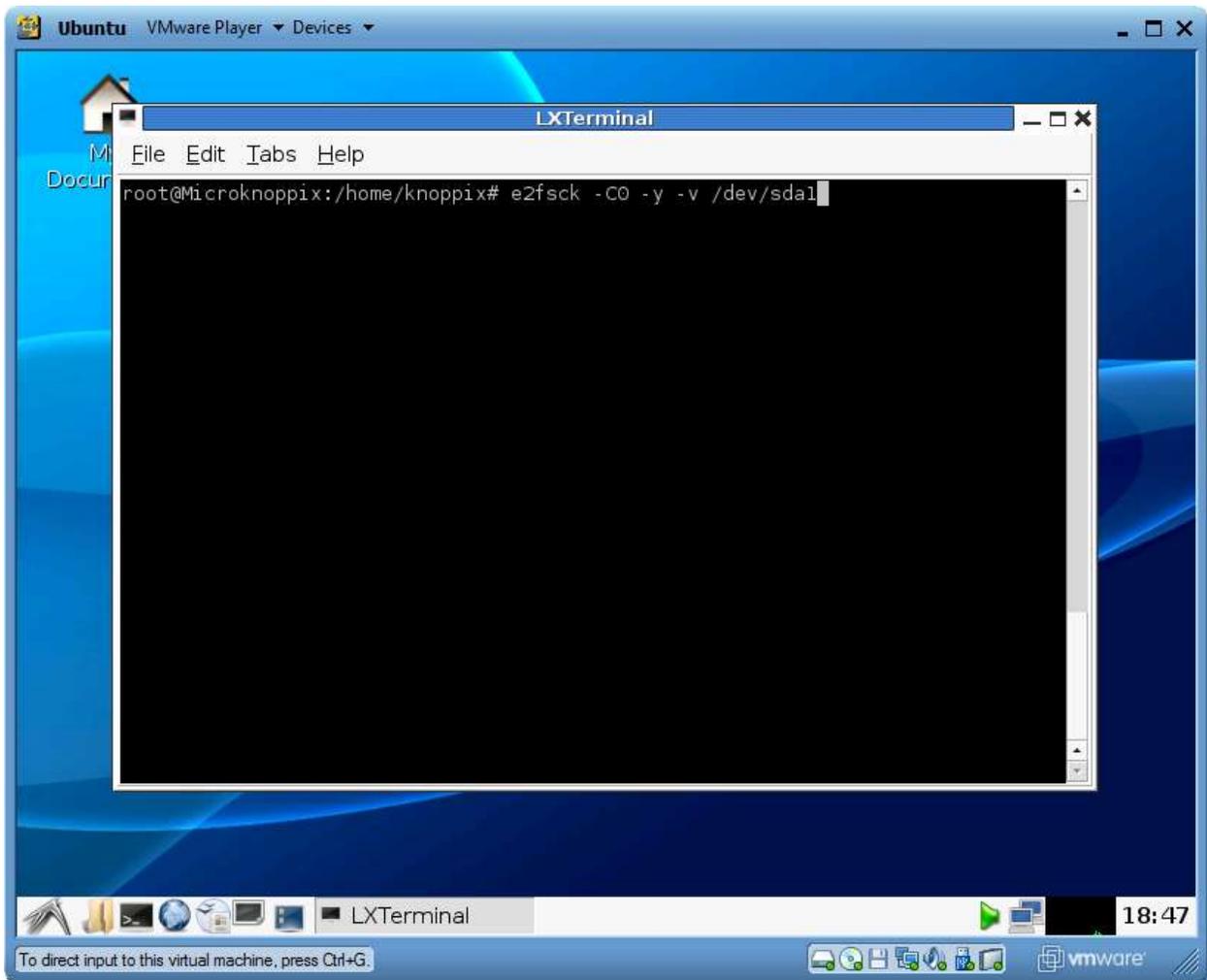
I'm going to run it against each of the paritions on the usb drive.

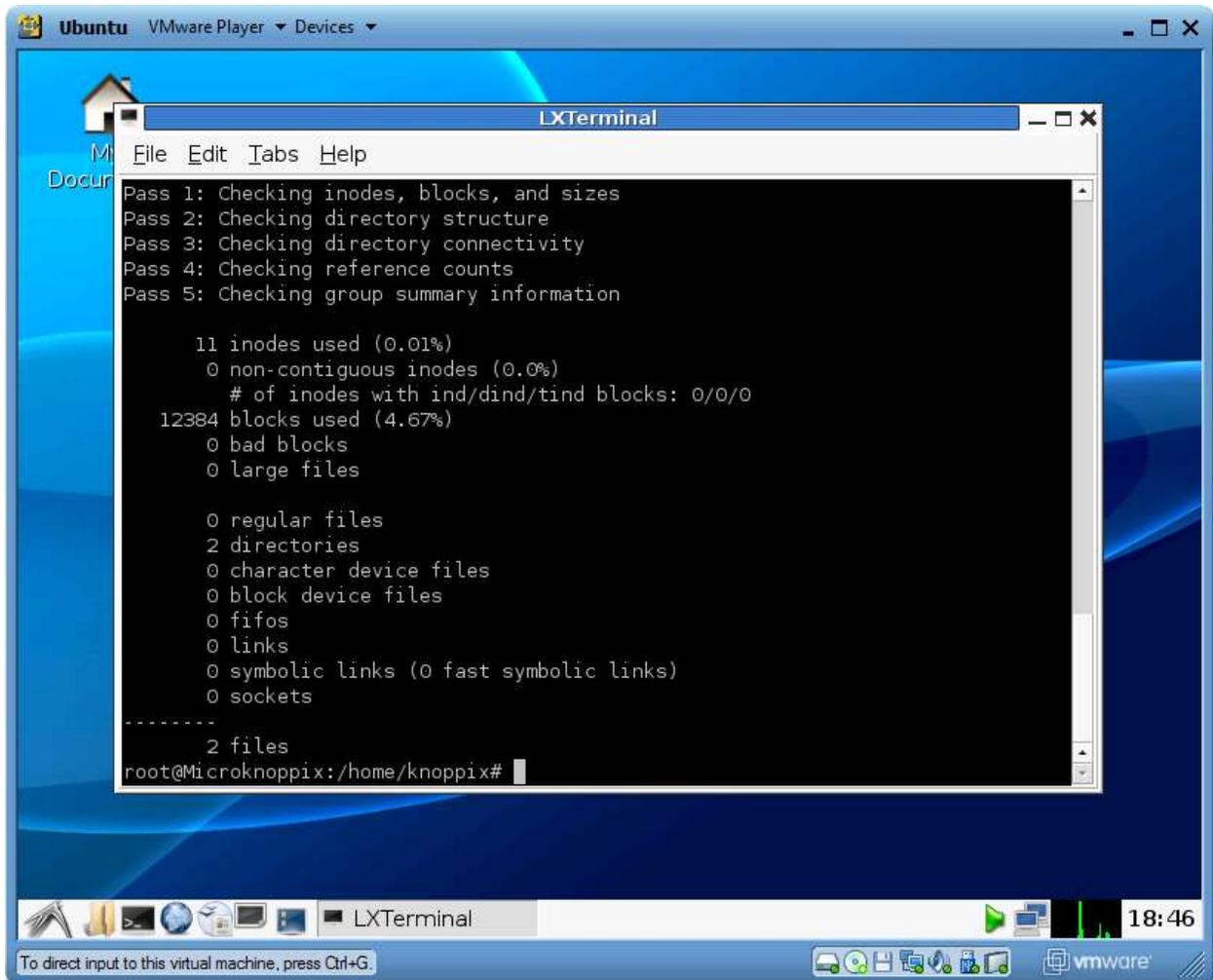
Paritition 1: /dev/sda1

The command is 'e2fsck -C0 -y -v /dev/sda1'

That's capital C followed by the number zero.

Partition 1: 'e2fsck -C0 -y -v /dev/sda1'

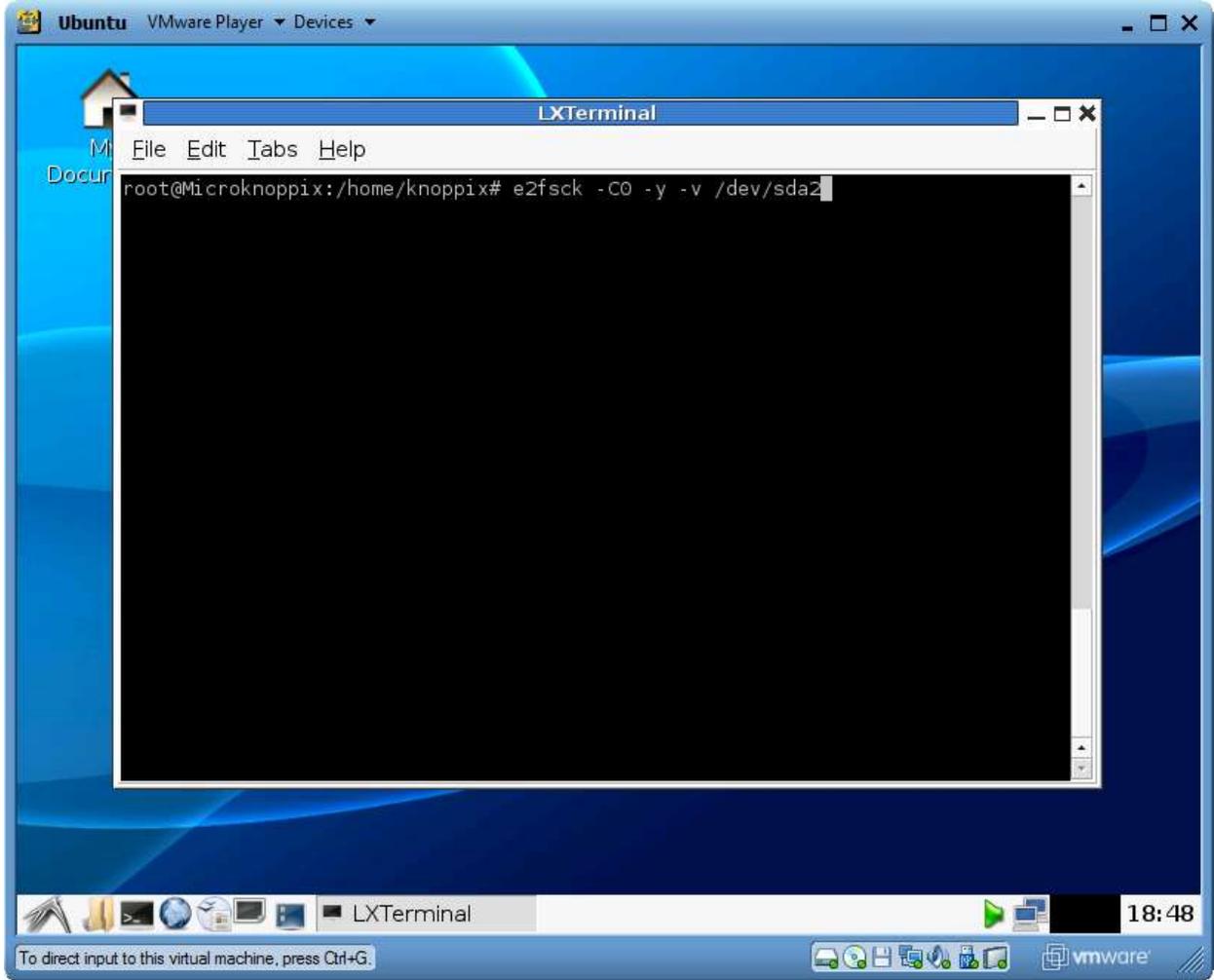


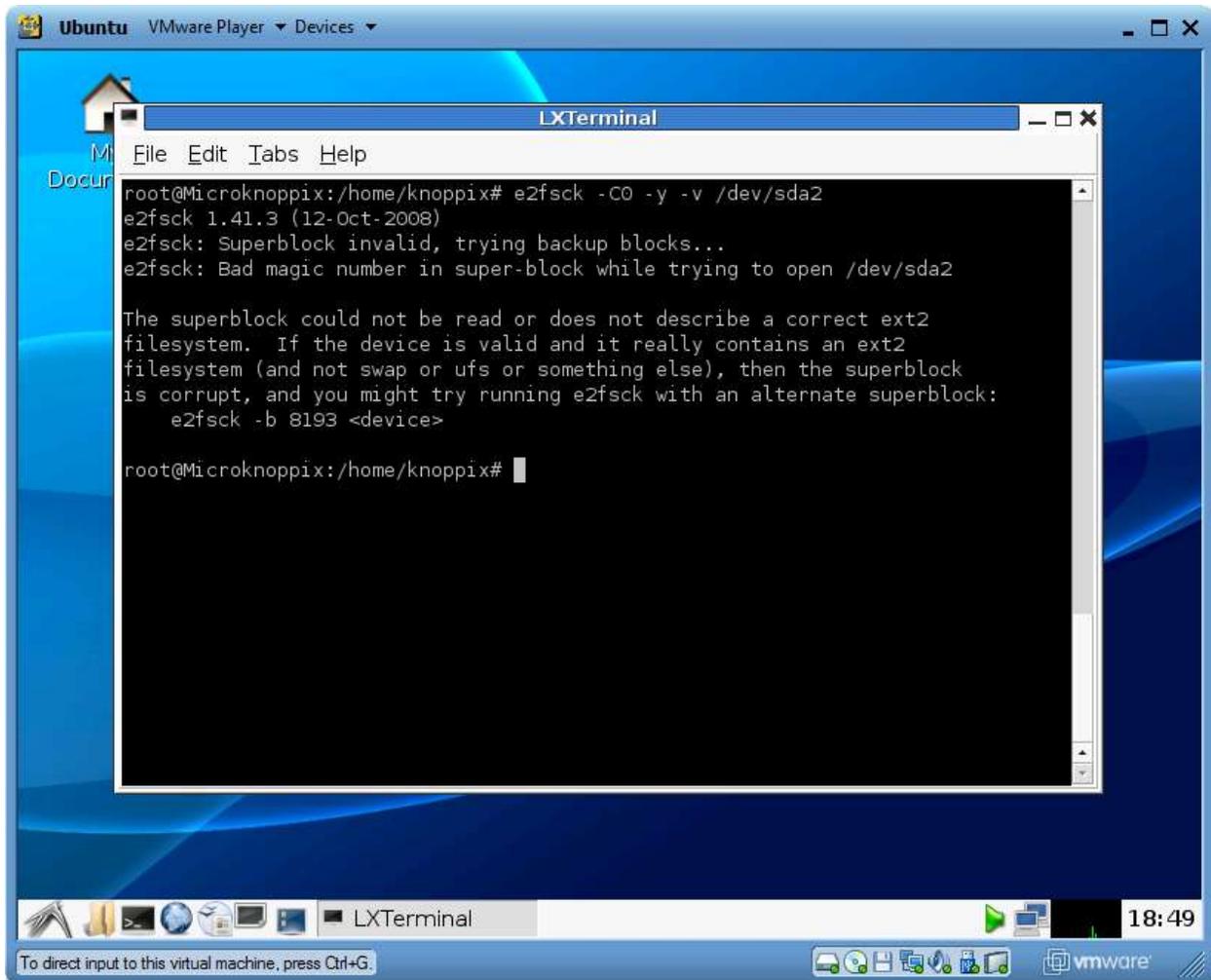


Pass finished without issues and returned to the prompt.

Now for Partition 2: /dev/sda2

```
'e2fsck -C0 -y -v /dev/sda2'
```



The image shows a screenshot of a VMware Player window titled 'Ubuntu'. Inside the player, there is an LXTerminal window. The terminal output shows the execution of the 'e2fsck' command on '/dev/sda2'. The command returns an error: 'e2fsck: Superblock invalid, trying backup blocks...' and 'e2fsck: Bad magic number in super-block while trying to open /dev/sda2'. Below this, a detailed error message explains that the superblock could not be read or does not describe a correct ext2 filesystem. It suggests that if the device is valid and contains an ext2 filesystem, the superblock is corrupted and can be repaired using 'e2fsck -b 8193 <device>'. The terminal prompt is currently at 'root@Microknoppix:/home/knoppix#'.

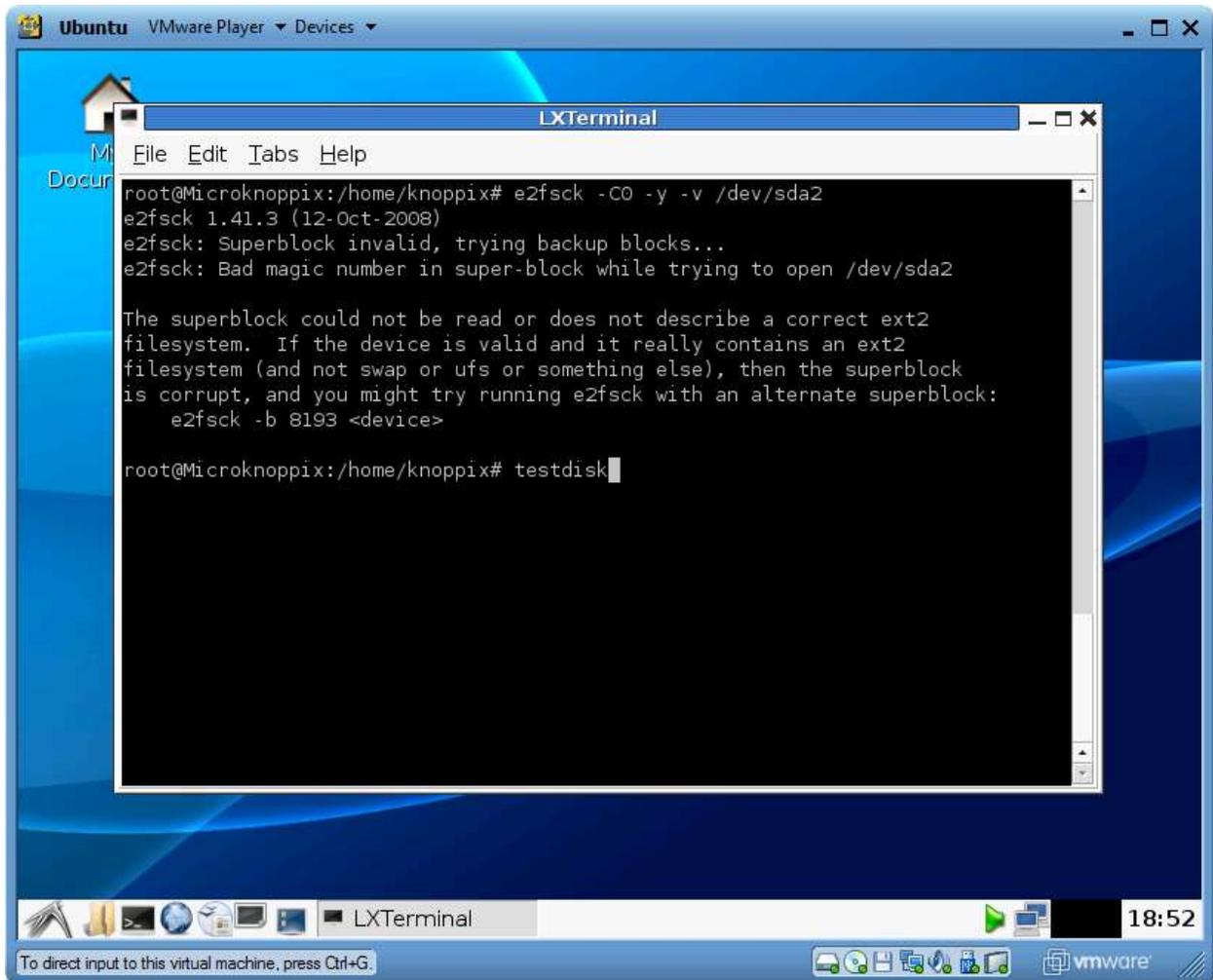
```
root@Microknoppix:/home/knoppix# e2fsck -C0 -y -v /dev/sda2
e2fsck 1.41.3 (12-Oct-2008)
e2fsck: Superblock invalid, trying backup blocks...
e2fsck: Bad magic number in super-block while trying to open /dev/sda2

The superblock could not be read or does not describe a correct ext2
filesystem.  If the device is valid and it really contains an ext2
filesystem (and not swap or ufs or something else), then the superblock
is corrupt, and you might try running e2fsck with an alternate superblock:
    e2fsck -b 8193 <device>

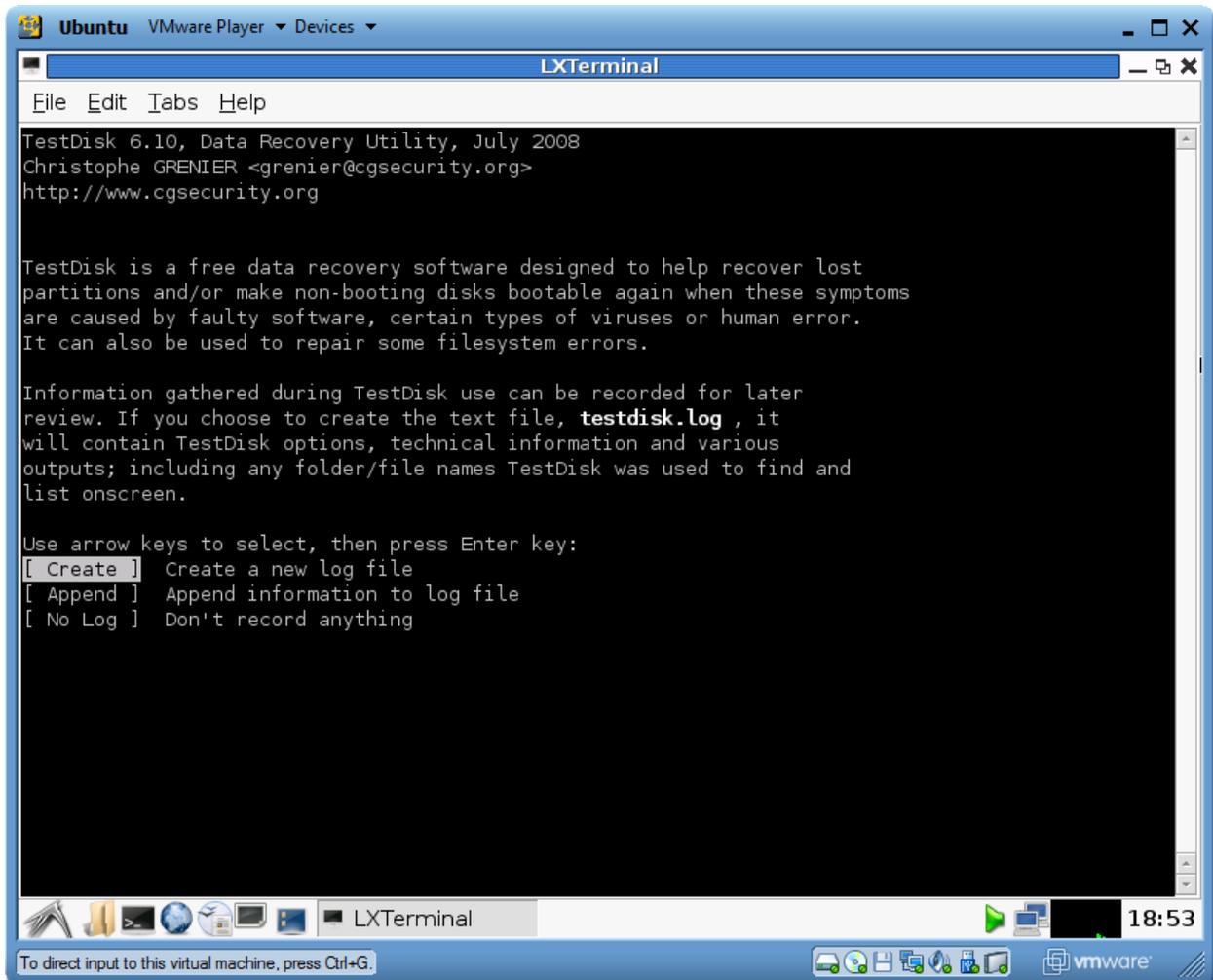
root@Microknoppix:/home/knoppix#
```

This error shows that the repair utility could not correctly read from partition 2. You need to help it out by pointing the utility to a backup copy of the superblock. To do that you need to run another utility called 'testdisk' to scan the drive to find that information. If you didn't get the above error message and the e2fsck utility ended similar to the screenshot I have of /dev/sda1 then you can skip this section and go on to test out partition 3 if you have it.

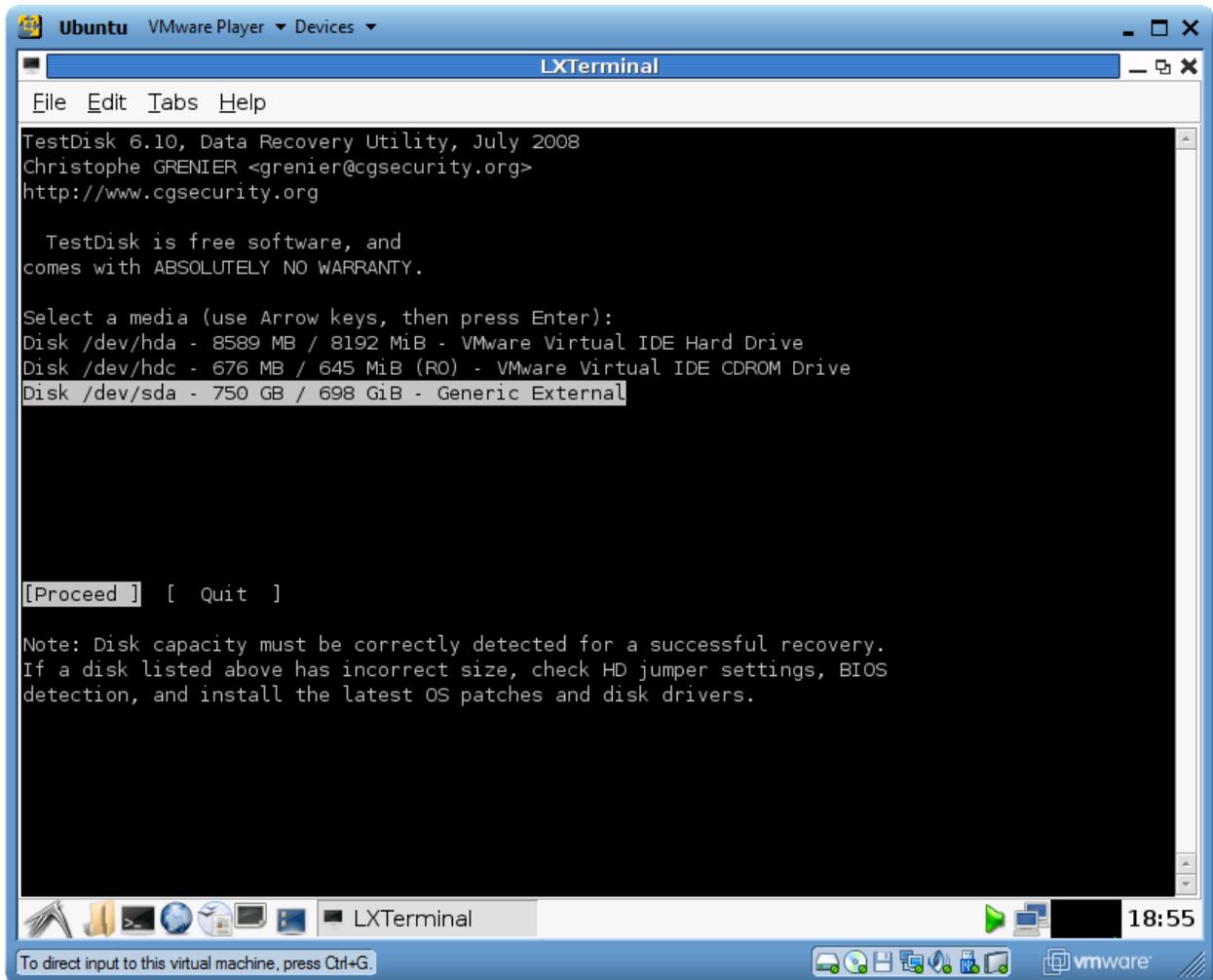
Run 'testdisk' – if it errors out saying that it needs more lines to work just make your terminal window larger.



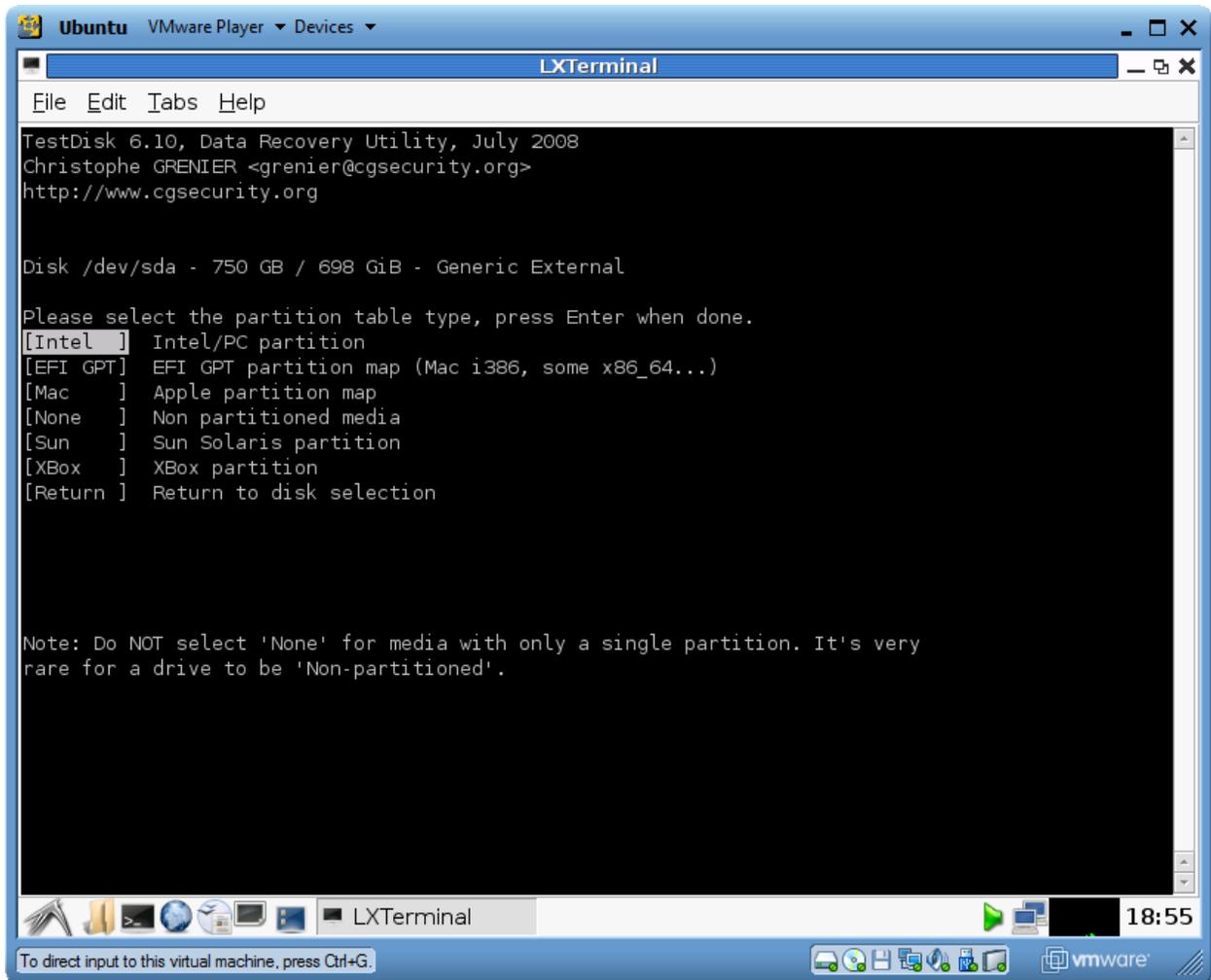
Create a new log file



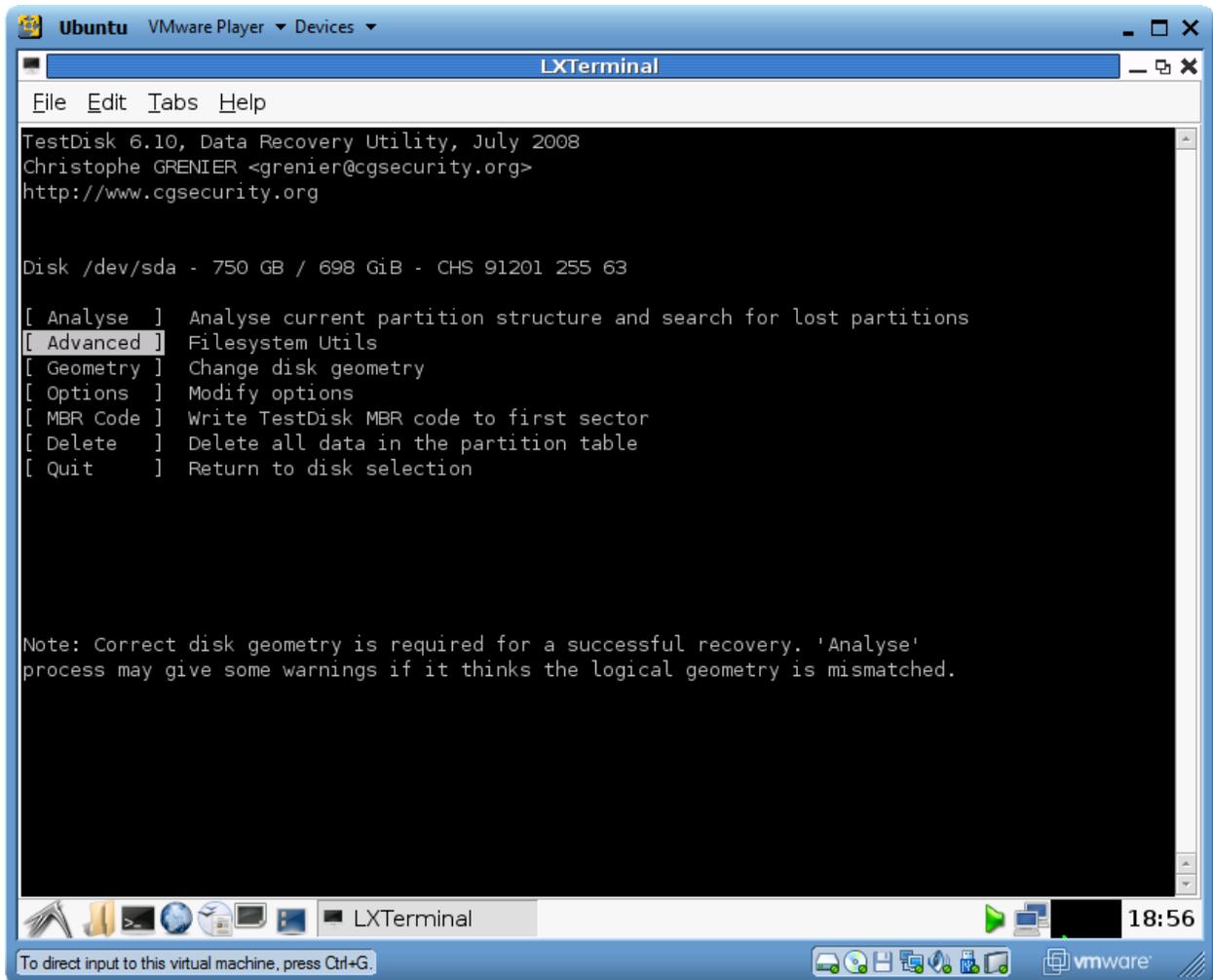
Highlight your USB drive – use the name and size to validate, mine is /dev/sda and hit enter to proceed



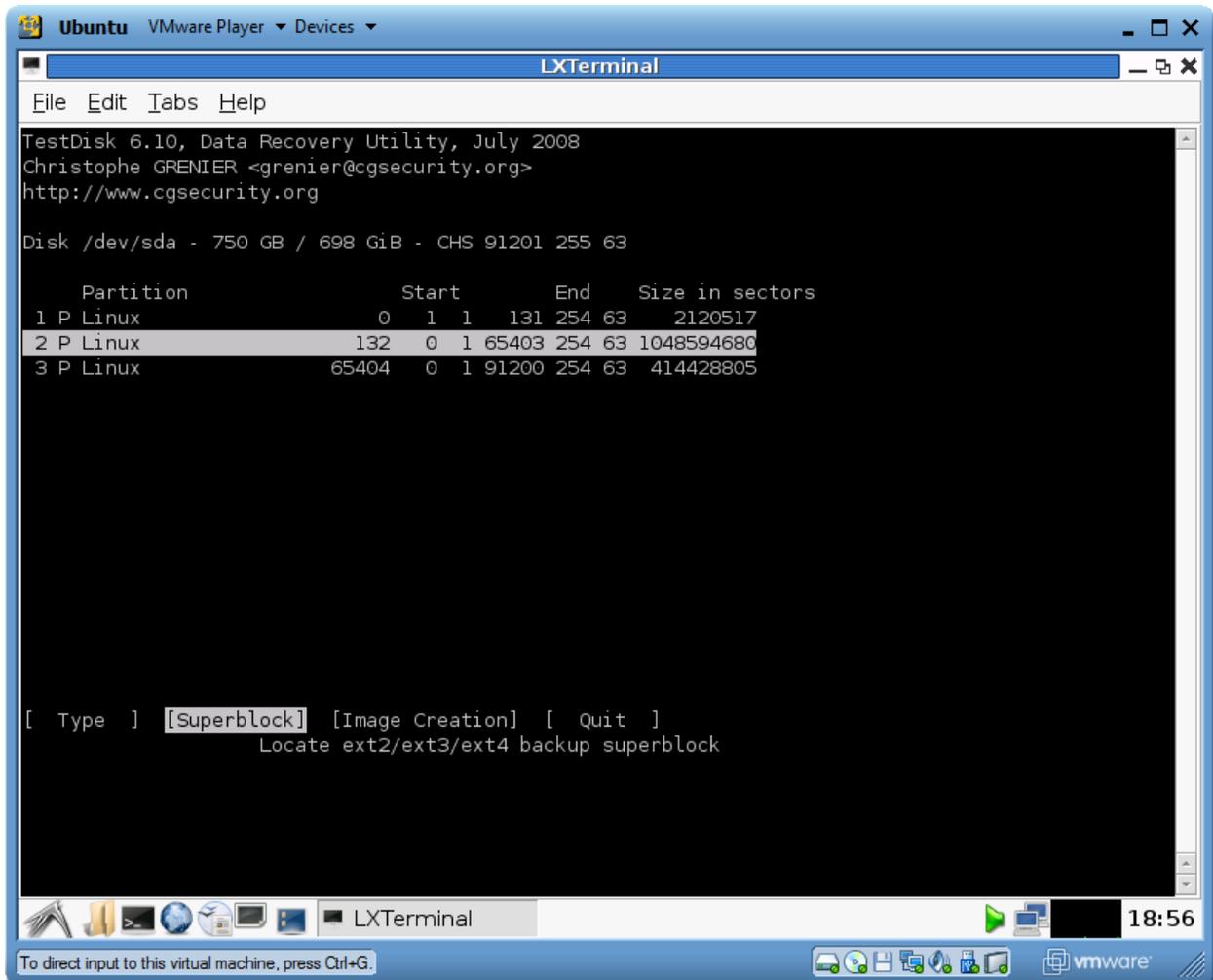
select intel / pc partition and hit enter



Select advanced and hit enter

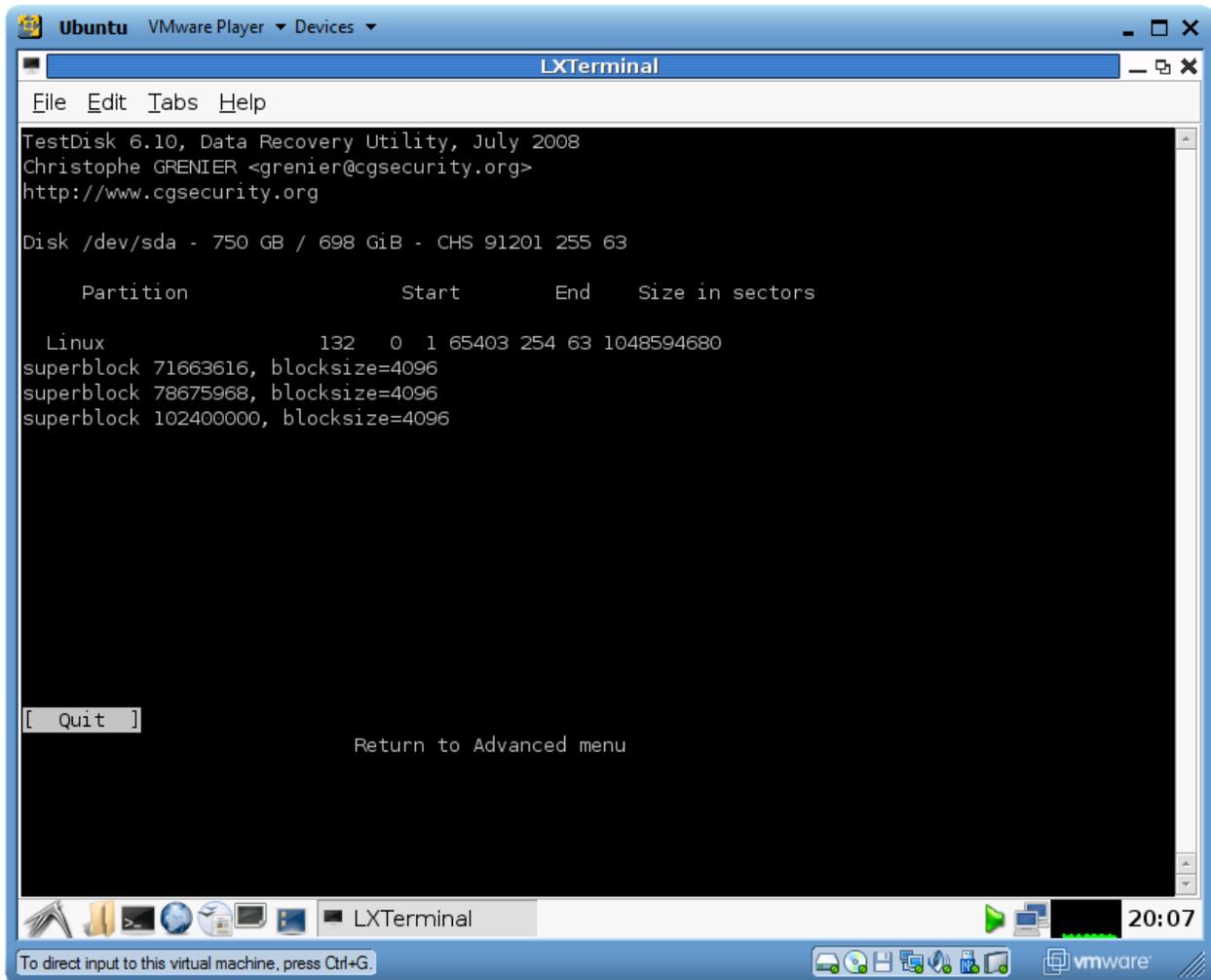


Highlight the partition number with the problem – mine is partition 2 and hit enter for the superblock location



This process may take a while as the utility scans the hard drive for the location of a backup superblock. It didn't find the first backup superblock on mine until it had scanned about 68% of the drive.

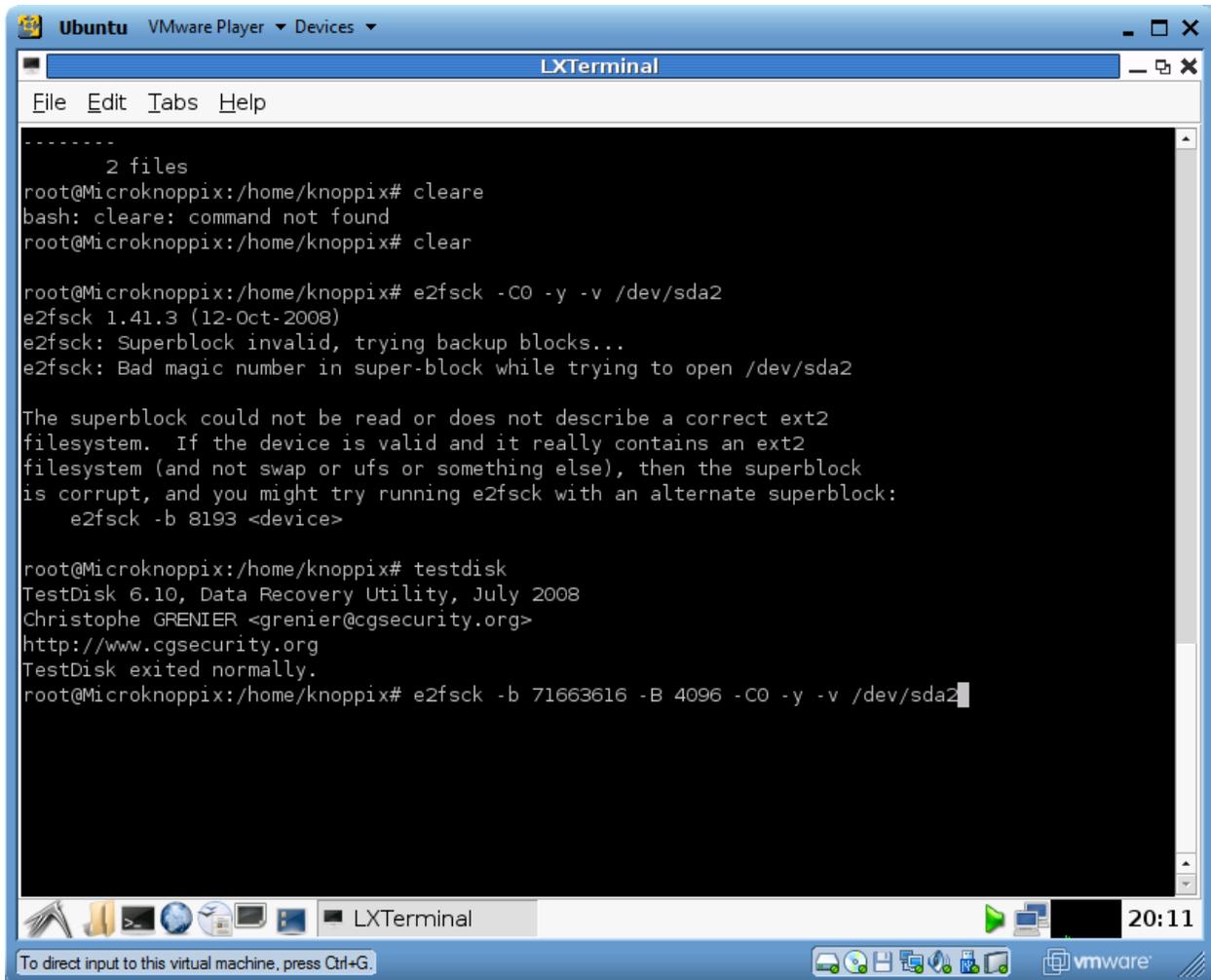
Write down the information for each of the backup superblock locations found



Arrow key over to quit on each of the menus until you have exited the testdisk utility.

Now that you know the location of a backup superblock, pick one and run the e2fsck command again referencing that block location.

In my case: 'e2fsck -b 71663616 -B 4096 -C0 -y -v /dev/sda2'



The screenshot shows a terminal window titled "LXTerminal" within an "Ubuntu VMWare Player" environment. The terminal output is as follows:

```
-----
      2 files
root@Microknoppix:/home/knoppix# cleare
bash: cleare: command not found
root@Microknoppix:/home/knoppix# clear

root@Microknoppix:/home/knoppix# e2fsck -CO -y -v /dev/sda2
e2fsck 1.41.3 (12-Oct-2008)
e2fsck: Superblock invalid, trying backup blocks...
e2fsck: Bad magic number in super-block while trying to open /dev/sda2

The superblock could not be read or does not describe a correct ext2
filesystem.  If the device is valid and it really contains an ext2
filesystem (and not swap or ufs or something else), then the superblock
is corrupt, and you might try running e2fsck with an alternate superblock:
    e2fsck -b 8193 <device>

root@Microknoppix:/home/knoppix# testdisk
TestDisk 6.10, Data Recovery Utility, July 2008
Christophe GRENIER <grenier@cgsecurity.org>
http://www.cgsecurity.org
TestDisk exited normally.
root@Microknoppix:/home/knoppix# e2fsck -b 71663616 -B 4096 -CO -y -v /dev/sda2
```

The terminal window includes a menu bar with "File", "Edit", "Tabs", and "Help". The system tray at the bottom shows the time as 20:11 and the VMware logo. A status bar at the very bottom reads "To direct input to this virtual machine, press Ctrl+G."

With the backup superblock information the repair should be able to run to completion.

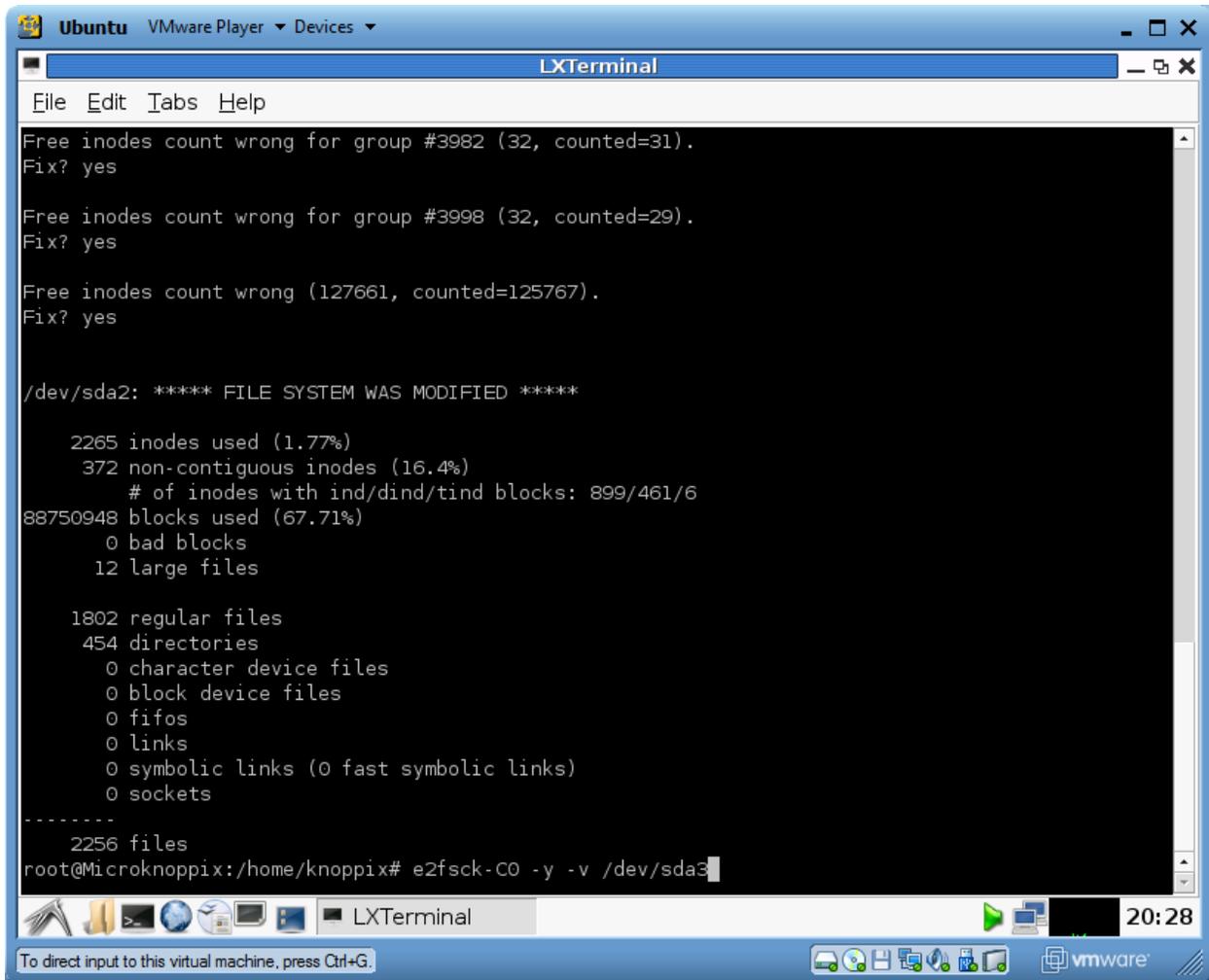
```
-----
      2 files
root@Microknoppix:/home/knoppix# cleare
bash: cleare: command not found
root@Microknoppix:/home/knoppix# clear

root@Microknoppix:/home/knoppix# e2fsck -C0 -y -v /dev/sda2
e2fsck 1.41.3 (12-Oct-2008)
e2fsck: Superblock invalid, trying backup blocks...
e2fsck: Bad magic number in super-block while trying to open /dev/sda2

The superblock could not be read or does not describe a correct ext2
filesystem.  If the device is valid and it really contains an ext2
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    e2fsck -b 8193 <device>

root@Microknoppix:/home/knoppix# testdisk
TestDisk 6.10, Data Recovery Utility, July 2008
Christophe GRENIER <grenier@cgsecurity.org>
http://www.cgsecurity.org
TestDisk exited normally.
root@Microknoppix:/home/knoppix# e2fsck -b 71663616 -B 4096 -C0 -y -v /dev/sda2
e2fsck 1.41.3 (12-Oct-2008)
/dev/sda2 was not cleanly unmounted, check forced.
Pass 1: Checking inodes, blocks, and sizes
/dev/sda2: |= / 1.7%
```

Once that completes then scan the last partition with the: 'e2fsck -C0 -y -v /dev/sda3'



```
File Edit Tabs Help
Free inodes count wrong for group #3982 (32, counted=31).
Fix? yes

Free inodes count wrong for group #3998 (32, counted=29).
Fix? yes

Free inodes count wrong (127661, counted=125767).
Fix? yes

/dev/sda2: ***** FILE SYSTEM WAS MODIFIED *****

 2265 inodes used (1.77%)
 372 non-contiguous inodes (16.4%)
   # of inodes with ind/dind/tind blocks: 899/461/6
88750948 blocks used (67.71%)
 0 bad blocks
 12 large files

1802 regular files
 454 directories
 0 character device files
 0 block device files
 0 fifos
 0 links
 0 symbolic links (0 fast symbolic links)
 0 sockets
-----
2256 files
root@Microknoppix:/home/knoppix# e2fsck-C0 -y -v /dev/sda3
```

To direct input to this virtual machine, press Ctrl+G.

20:28

vmware

At this point you can shut down the knoppix os, remove your usb drive and reconnect it to your DVR. Remove the Knoppix CD from your computer and when you restart it it will boot back up into your regular operating system.