Exercise 18.2 Mounting Options

In this exercise you will need to either create a fresh partition, or use a loopback file. The solution will differ slightly and we will provide details of both methods.

1. Use **fdisk** to create a new 250 MB partition on your system, probably on `/dev/sda`. Or create a file full of zeros to use as a loopback file to simulate a new partition.
2. Use **mkfs** to format a new filesystem on the partition or loopback file just created. Do this three times, changing the block size each time. Note the locations of the superblocks, the number of block groups and any other pertinent information, for each case.
3. Create a new subdirectory (say `/mnt/tempdir`) and mount the new filesystem at this location. Verify it has been mounted.
4. Unmount the new filesystem, and then remount it as read-only.
5. Try to create a file in the mounted directory. You should get an error here, why?
6. Unmount the filesystem again.
7. Add a line to your `/etc/fstab` file so that the filesystem will be mounted at boot time.
8. Mount the filesystem.
9. Modify the configuration for the new filesystem so that binary files may not be executed from the filesystem (change defaults to `noexec` in the `/mnt/tempdir` entry). Then remount the filesystem and copy an executable file (such as `/bin/ls`) to `/mnt/tempdir` and try to run it. You should get an error: why?

When you are done you will probably want to clean up by removing the entry from `/etc/fstab`.

Solution 18.2

Physical Partition Solution

1. We won't show the detailed steps in **fdisk**, as it is all ground covered earlier. We will assume the partition created is `/dev/sda11`, just to have something to show.

   ```
   $ sudo fdisk /dev/sda
   .....
   w
   $ partprobe -s
   ```

   Sometimes the **partprobe** won't work, and to be sure the system knows about the new partition you have to reboot.

2. ```
   $ sudo mkfs -t ext4         -v /dev/sda11
   $ sudo mkfs -t ext4 -b 2048 -v /dev/sda11
   $ sudo mkfs -t ext4 -b 4096 -v /dev/sda11
   ```

   Note the `-v` flag (verbose) will give the requested information; you will see that for a small partition like this the default is 1024 byte blocks.

3. ```
   $ sudo mkdir /mnt/tempdir
   $ sudo mount /dev/sda11 /mnt/tempdir
   $ mount | grep tempdir
   ```

4. ```
   $ sudo umount /mnt/tempdir
   $ sudo mount -o ro /dev/sda11 /mnt/tempdir
   ```

   If you get an error while unmounting, make sure you are not currently in the directory.

5. ```
   $ sudo touch /mnt/tempdir/afile
   ```

6. ```
   $ sudo umount /mnt/tempdir
   ```


   ```

7. Put this line in /etc/fstab:

```
/dev/sda11 /mnt/tempdir ext4 defaults 1 2
```

8. ```
   $ sudo mount /mnt/tempdir
   $ sudo mount | grep tempdir
   ```

9. Change the line in /etc/fstab to:

   ```
   /dev/sda11 /mnt/tempdir ext4 noexec 1 2
   ```

   Then do:

   ```
   $ sudo mount -o remount /mnt/tempdir
   $ sudo cp /bin/ls /mnt/tempdir
   $ /mnt/tempdir/ls
   ```

   You should get an error here, why?

Loopback File Solution

1. ```
   $ sudo dd if=/dev/zero of=/imagefile bs=1M count=250
   ```

2. ```
   $ sudo mkfs -t ext4         -v
   $ sudo mkfs -t ext4 -b 2048 -v /imagefile
   $ sudo mkfs -t ext4 -b 4096 -v /imagefile
   ```

   You will get warned that this is a file and not a partition, just proceed.

   Note the -v flag (verbose) will give the requested information; you will see that for a small partition like this the default is 1024 byte blocks.

3. ```
   $ sudo mkdir /mnt/tempdir
   $ sudo mount -o loop /imagefile /mnt/tempdir
   $ mount | grep tempdir
   ```

4. ```
   $ sudo umount /mnt/tempdir
   $ sudo mount -o ro,loop /imagefile /mnt/tempdir
   ```

   If you get an error while unmounting, make sure you are not currently in the directory.

5. ```
   $ sudo touch /mnt/tempdir/afile
   ```

6. ```
   $ sudo umount /mnt/tempdir
   ```

7. Put this line in /etc/fstab:

   ```
   /imagefile /mnt/tempdir ext4 loop 1 2
   ```

8. ```
   $ sudo mount /mnt/tempdir
   $ sudo mount | grep tempdir
   ```

9. Change the line in /etc/fstab to:

   ```
   /imagefile /mnt/tempdir ext4 loop,noexec 1 2
   ```

   Then do:

   ```
   $ sudo mount -o remount /mnt/tempdir
   $ sudo cp /bin/ls /mnt/tempdir
   $ /mnt/tempdir/ls
   ```

   You should get an error here, why?

