1、 小明写了一篇小说，但是对于其中的一段内容十分不满意，他计划用十天时间来反复修改这个部分，每天修改完后都会保存并提交，他为了方便管理和查阅自己的小说，希望从头到尾都将内容保存在一个文本文件中 ，但同时又希望能保存每一天修改过的版本方便在最后一天进行对比以便最后定稿，请为小明设计一套文件存储机制并帮助完成这十天的工作，形成文档记录你的工作内容和操作过程。

答：創建一個文本文檔，對所在磁盤進行分層掛載。

2、 为用户 user1-6 的家目录实现基于用户组的争抢式文件系统限额机制，设计争抢场景并观察记录实验结果。

a、由於前期沒有對新加的硬盤進行操作分區、格式化、掛載一系列的操作，首先對 /dev/vdb 進行分區，使用命令 fdisk /dev/vdb

```
[root@server ~]# fdisk /dev/vdb
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table
Building a new DOS disklabel with disk identifier 0x65251c61.

Command (m for help): p

Disk /dev/vdb: 21.5 GB, 21474836480 bytes, 41943040 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x65251c61

   Device Boot      Start         End      Blocks   Id  System

Command (m for help): n
Partition type:
   p   primary (0 primary, 0 extended, 4 free)
   e   extended
Select (default p):
Using default response p
Partition number (1-4, default 1):
First sector (2048-41943039, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-41943039, default 41943039): +5G
Partition 1 of type Linux and of size 5 GiB is set

Command (m for help):
Command (m for help): n
Partition type:
   p   primary (1 primary, 0 extended, 3 free)
   e   extended
Select (default p):
Using default response p
Partition number (2-4, default 2):
First sector (10487808-41943039, default 10487808):
Using default value 10487808
Last sector, +sectors or +size{K,M,G} (10487808-41943039, default 41943039): +5G
Partition 2 of type Linux and of size 5 GiB is set

Command (m for help): P

Disk /dev/vdb: 21.5 GB, 21474836480 bytes, 41943040 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x65251c61

   Device Boot      Start         End      Blocks   Id  System
/dev/vdb1            2048    10487807     5242880   83  Linux
/dev/vdb2        10487808    20973567     5242880   83  Linux

Command (m for help): W
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
```

b、然後使用 mount /dev/vdb1 /home/user -o grpquota，對 vdb1 進行掛載，接下來對 vdb1 用 mkfs.ext4 /dev/vdb1 命令做成 ext4 文件系統。

```
[root@server ~]# mount /dev/vdb1 /home/user -o grpquota
[root@server ~]# lsblk
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sr0     11:0    1 1024M  0 rom
vda    253:0    0  100G  0 disk
├─vda1 253:1    0    1G  0 part /boot
├─vda2 253:2    0 95.1G  0 part /
└─vda3 253:3    0  3.9G  0 part [SWAP]
vdb    253:16   0   20G  0 disk
├─vdb1 253:17   0    5G  0 part /home/user
└─vdb2 253:18   0    5G  0 part
vdc    253:32   0   20G  0 disk
vdd    253:48   0   20G  0 disk
```

```
[root@server ~]# mkfs.ext4 /dev/vdb1
mke2fs 1.42.9 (28-Dec-2013)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
327680 inodes, 1310720 blocks
65536 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=1342177280
40 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736

Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done
```

C、生成一個數據庫，使用命令 quotacheck -vugfmc /home/user，然後使用 quotaon -v /dev/vdb1，開啓數據庫。

```
[root@server ~]# quotacheck -vugfmc /home/user
quotacheck: Your kernel probably supports journaled quota but you are not using it. Consider switching to journaled quota to avoid running quot
acheck after an unclean shutdown.
quotacheck: Scanning /dev/vdb1 [/home/user] done
quotacheck: Old user file name could not been determined. Usage will not be subtracted.
quotacheck: Cannot stat old group quota file /home/user/aquota.group: No such file or directory. Usage will not be subtracted.
quotacheck: Checked 2 directories and 0 files
quotacheck: Old file not found.
[root@server ~]# quotaon -v /dev/vdb1
/dev/vdb1 [/home/user]: group quotas turned on
```

c、更改 user 的屬組信息，將 user 這個組的權限改爲 770。

```
[root@server home]# chown .user user
[root@server home]# ll
total 8
-rw-rw-rw-. 1 root user    0 9月  10 09:58 text4add.txt
-rw-rw-rw-. 1 root user    0 9月  10 09:58 text4all.txt
drwxrwxrwx. 3 root user 4096 9月  11 11:23 user
drwxrwxrw-. 2 1000 user 4096 9月   7 18:13 user1
```

```
[root@server home]# chmod 770 user
[root@server home]# ll
total 8
-rw-rw-rw-. 1 root user    0 9月  10 09:58 text4add.txt
-rw-rw-rw-. 1 root user    0 9月  10 09:58 text4all.txt
drwxrwx---. 3 root user 4096 9月  11 11:23 user
drwxrwxrw-. 2 1000 user 4096 9月   7 18:13 user1
```

d、使用 edquota -g user 進去編輯限額，如下圖。

```
[root@server ~]# edquota -g user
```

```
Disk quotas for group user (gid 1003):
  Filesystem                   blocks       soft       hard     inodes     soft     hard
  /dev/vdb1                         4          0          0          2        6        5
```

```
-sh-4.2$ cd user
-sh-4.2$ touch 001.txt
-sh-4.2$ exit
logout
-sh-4.2$ exit
```

```
[root@server ~]# su - user2
Last login: 二 9月 11 10:51:46 CST 2018 on pts/0
-sh-4.2$ touch 002.txt
-sh-4.2$ touch 003.txt
-sh-4.2$ id
uid=1002(user2) gid=1002(user2) groups=1002(user2),1003(user) c
```

```
-sh-4.2$ su - user3
Password:
Last login: Mon Sep 10 09:45:36 CST 2018 on pts/0
-sh-4.2$ id
uid=1003(user3) gid=1003(user) groups=1003(user) context=unconfined_u:uncon
-sh-4.2$ touch 004.txt
-sh-4.2$ 005.txt
-sh: 005.txt: command not found
-sh-4.2$ ls
001.txt  002.txt  003.txt  004.txt  aquota.group  lost+found
-sh-4.2$ su - root
```

設置爲 6 個限額環境問題只能實現到上線爲 5 個。