# SETTING UP DIRECTORY STRUCTURE, PERMISSIONS, AND ACLS

*Secure File Management for Project Teams*

By

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# OVERVIEW

Set up a directory structure within /projectk to represent different apps. Apply basic file permissions and then enhance them using ACLs to meet the specific needs of each team.

```
    /projectk
        - app1
            - app2
            - app3
```

apply 755 permissions to the app directories

TeamA requires read, write and execute permissions on all files within thier application directory 'app1’

TeamB (app2) needs read and write permissions but no execute permissions.

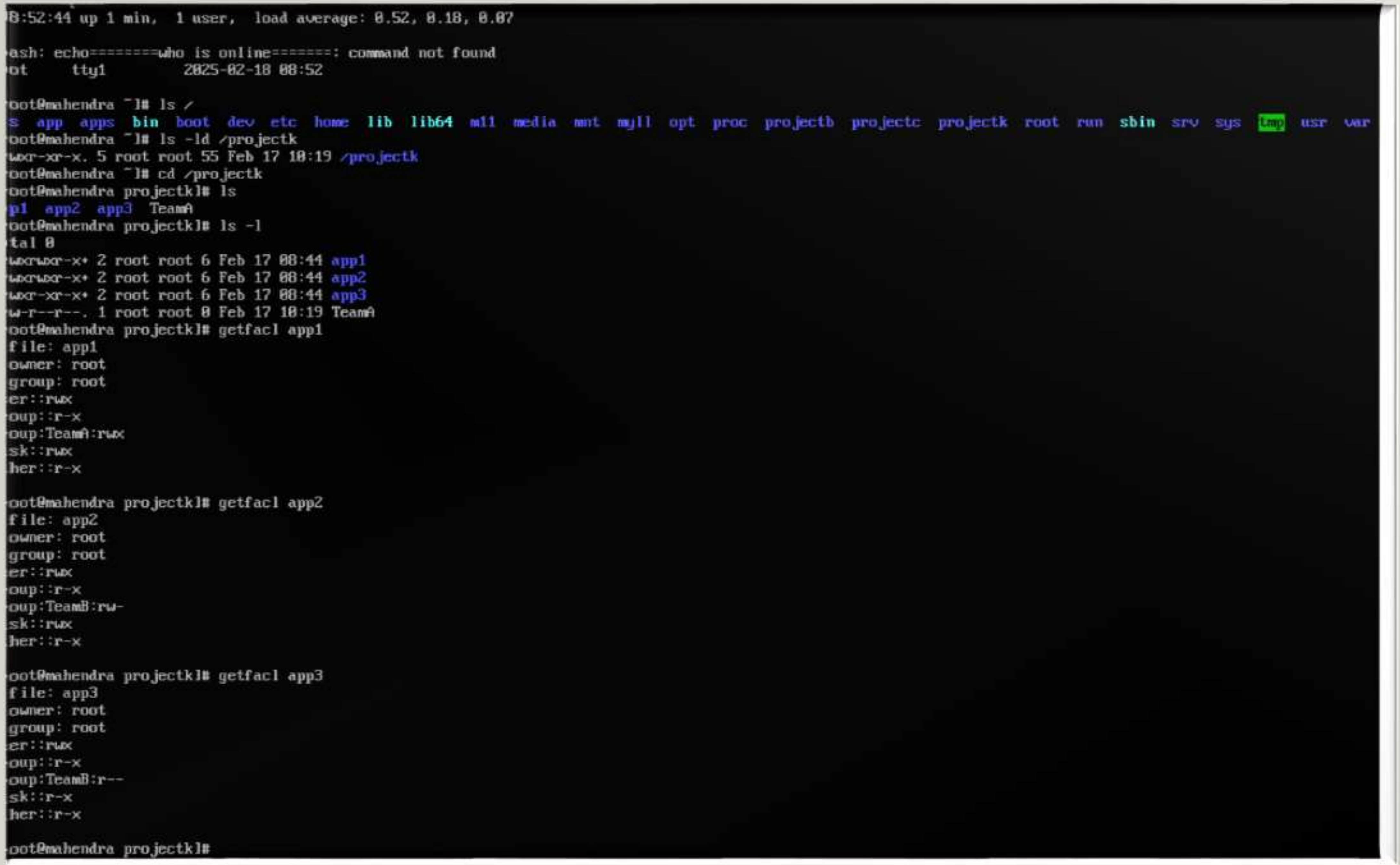
TeamC (app3) only requires read access to files

Test Access: As a member of each team, verify that the assined permissions and ACLs are working as expected:

Team A member should be able to create, modify, and execute file in /projectk/app1

Team B member should be able to read and write files in /projectk/app2

Team C member should only be able to read files in /projectk/app3

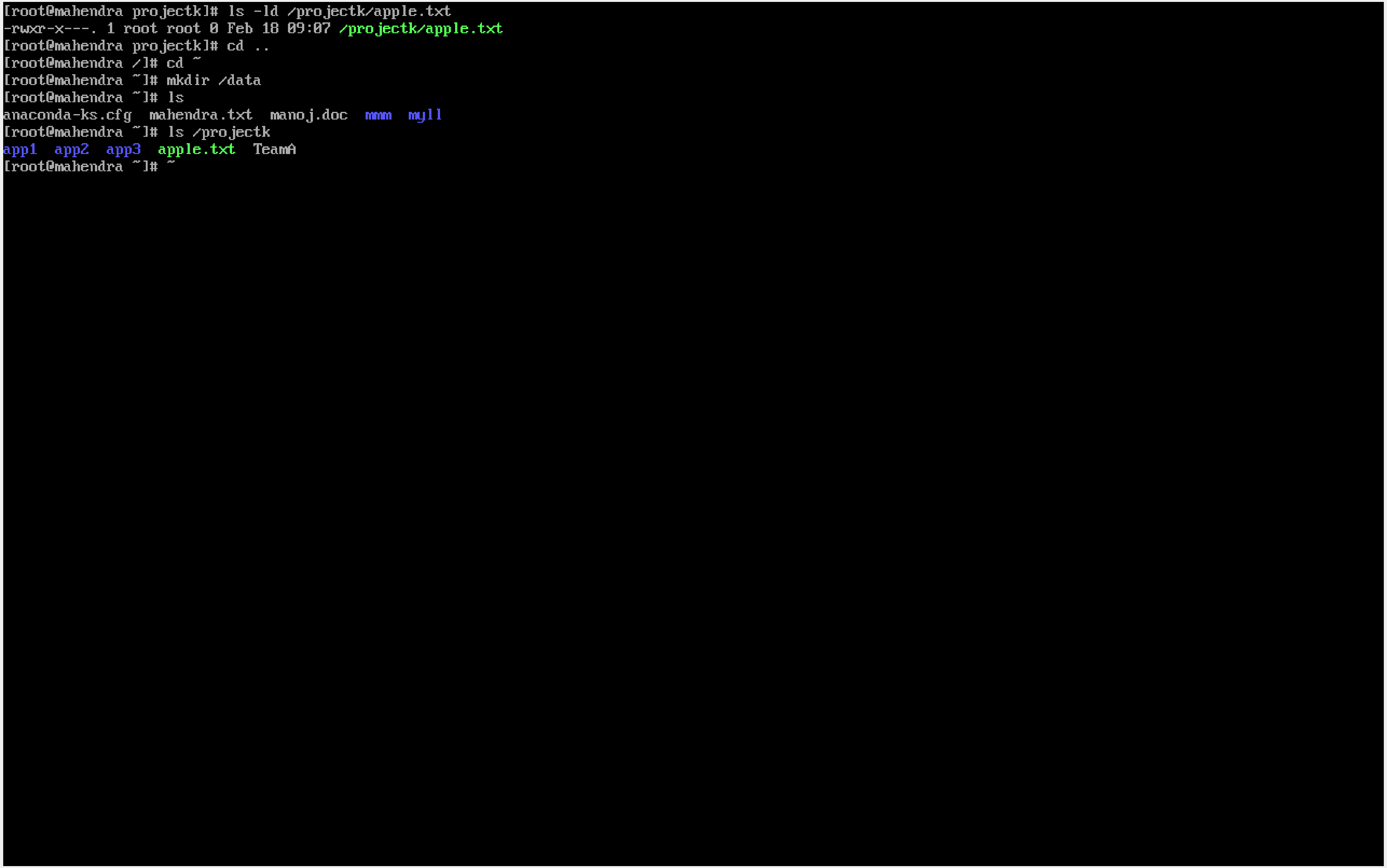


```
0:52:44 up 1 min,  1 user,  load average: 0.52, 0.18, 0.07

ash: echo========who is online=======: command not found
ot     tty1         2025-02-18 08:52

oot@mahendra ~]# ls /
s  app  apps  bin  boot  dev  etc  home  lib  lib64  m11  media  mnt  myll  opt  proc  projectb  projectc  projectk  root  run  sbin  srv  sys  tmp  usr  var
oot@mahendra ~]# ls -ld /projectk
wxr-xr-x. 5 root root 55 Feb 17 10:19 /projectk
oot@mahendra ~]# cd /projectk
oot@mahendra projectk]# ls
p1  app2  app3  TeamA
oot@mahendra projectk]# ls -l
tal 0
wxrwxr-x+ 2 root root 6 Feb 17 08:44 app1
wxrwxr-x+ 2 root root 6 Feb 17 08:44 app2
wxr-xr-x+ 2 root root 6 Feb 17 08:44 app3
w-r--r--. 1 root root 0 Feb 17 10:19 TeamA
oot@mahendra projectk]# getfacl app1
file: app1
owner: root
group: root
er::rwx
oup::r-x
oup:TeamA:rwx
sk::rwx
her::r-x

oot@mahendra projectk]# getfacl app2
file: app2
owner: root
group: root
er::rwx
oup::r-x
oup:TeamB:rw-
sk::rwx
her::r-x

oot@mahendra projectk]# getfacl app3
file: app3
owner: root
group: root
er::rwx
oup::r-x
oup:TeamB:r--
sk::r-x
her::r-x

oot@mahendra projectk]#
```

# Changing File Permissions for /projectk/apple.txt

i) change the file permissions of /projectk/apple.txt to allow the owner to read, write and execute, the group to read and execute and others to have no permissions.

- confirm that the permissions for apple.txt have been successfully modified



```
[root@mahendra projectk]# ls -ld /projectk/apple.txt
-rwxr-x---. 1 root root 0 Feb 18 09:07 /projectk/apple.txt
[root@mahendra projectk]# cd ..
[root@mahendra /]# cd ~
[root@mahendra ~]# mkdir /data
[root@mahendra ~]# ls
anaconda-ks.cfg  mahendra.txt  manoj.doc  mmm  myll
[root@mahendra ~]# ls /projectk
app1  app2  app3  apple.txt  TeamA
[root@mahendra ~]# ~
```

# Creating and Configuring /data Directory

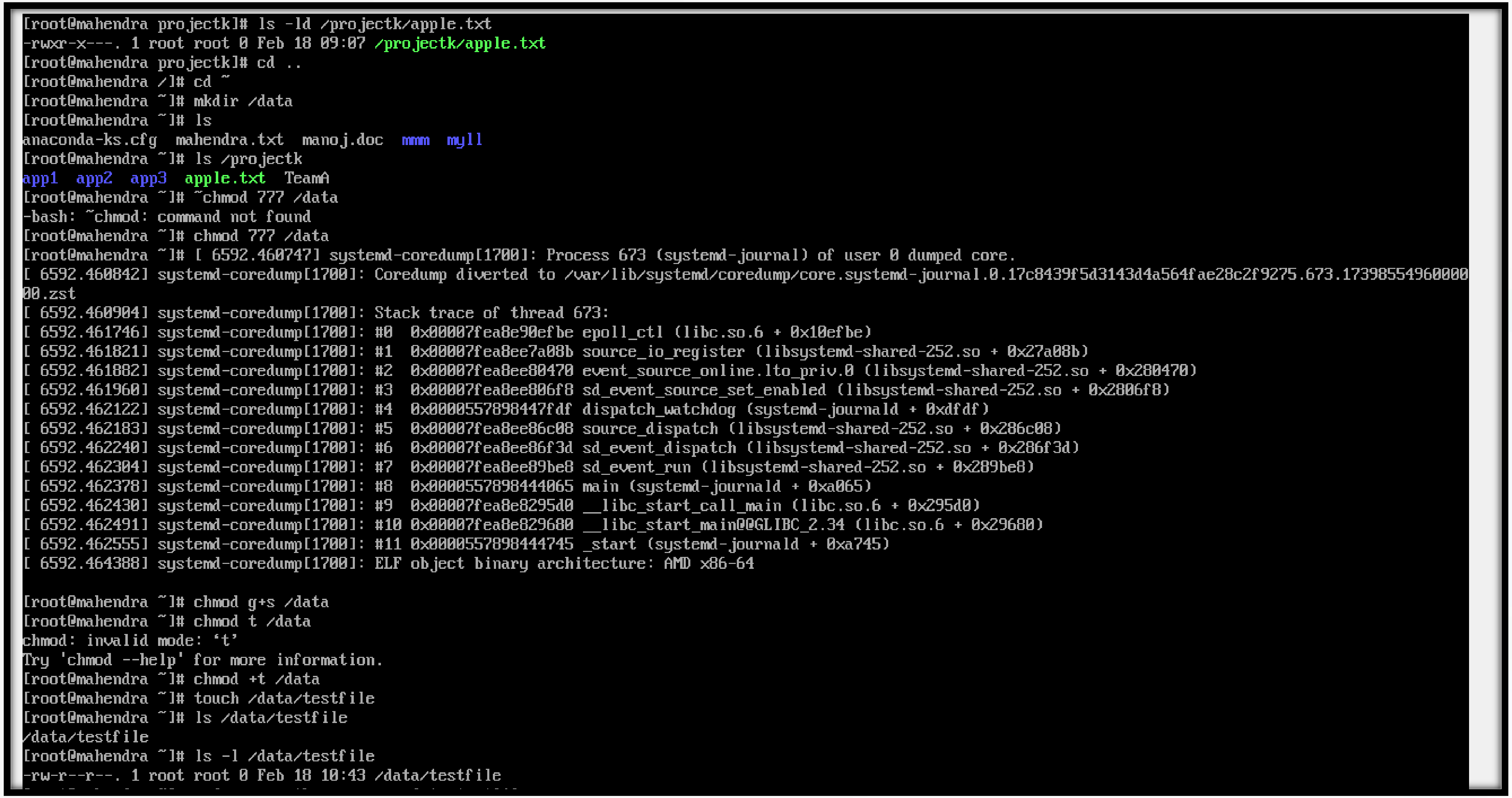
ii) create a directory named /data

- set full permissions for all
- set sgid permissions on this dir
- set stickybit on this dir

Test special permissions:

create a new file in /data and check the group ownership of the newly created file.

attempt to delete a file from /data as a regular user or another user

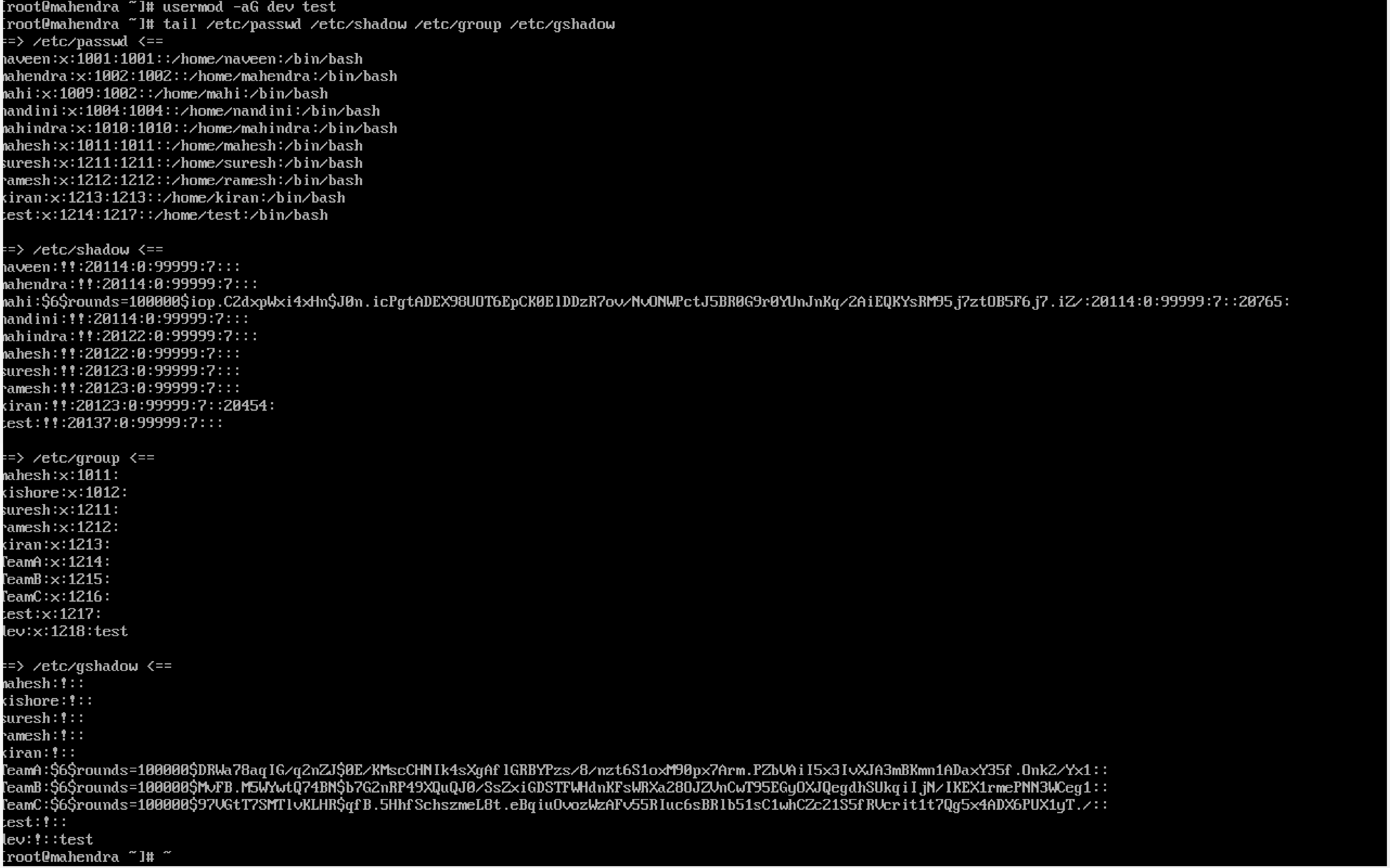


```
[root@mahendra projectk]# ls -ld /projectk/apple.txt
-rwxr-x---. 1 root root 0 Feb 18 09:07 /projectk/apple.txt
[root@mahendra projectk]# cd ..
[root@mahendra /]# cd ~
[root@mahendra ~]# mkdir /data
[root@mahendra ~]# ls
anaconda-ks.cfg  mahendra.txt  manoj.doc  mmm  myll
[root@mahendra ~]# ls /projectk
app1  app2  app3  apple.txt  TeamA
[root@mahendra ~]# ~chmod 777 /data
-bash: ~chmod: command not found
[root@mahendra ~]# chmod 777 /data
[root@mahendra ~]# [ 6592.460747] systemd-coredump[1700]: Process 673 (systemd-journal) of user 0 dumped core.
[ 6592.460842] systemd-coredump[1700]: Coredump diverted to /var/lib/systemd/coredump/core.systemd-journal.0.17c8439f5d3143d4a564fae28c2f9275.673.17398554960000
00.zst
[ 6592.460904] systemd-coredump[1700]: Stack trace of thread 673:
[ 6592.461746] systemd-coredump[1700]: #0  0x00007fea8e90efbe epoll_ctl (libc.so.6 + 0x10efbe)
[ 6592.461821] systemd-coredump[1700]: #1  0x00007fea8ee7a08b source_io_register (libsystemd-shared-252.so + 0x27a08b)
[ 6592.461882] systemd-coredump[1700]: #2  0x00007fea8ee80470 event_source_online.lto_priv.0 (libsystemd-shared-252.so + 0x280470)
[ 6592.461960] systemd-coredump[1700]: #3  0x00007fea8ee806f8 sd_event_source_set_enabled (libsystemd-shared-252.so + 0x2806f8)
[ 6592.462122] systemd-coredump[1700]: #4  0x0000557898447fdf dispatch_watchdog (systemd-journald + 0xdfdf)
[ 6592.462183] systemd-coredump[1700]: #5  0x00007fea8ee86c08 source_dispatch (libsystemd-shared-252.so + 0x286c08)
[ 6592.462240] systemd-coredump[1700]: #6  0x00007fea8ee86f3d sd_event_dispatch (libsystemd-shared-252.so + 0x286f3d)
[ 6592.462304] systemd-coredump[1700]: #7  0x00007fea8ee89be8 sd_event_run (libsystemd-shared-252.so + 0x289be8)
[ 6592.462378] systemd-coredump[1700]: #8  0x0000557898444065 main (systemd-journald + 0xa065)
[ 6592.462430] systemd-coredump[1700]: #9  0x00007fea8e8295d0 __libc_start_call_main (libc.so.6 + 0x295d0)
[ 6592.462491] systemd-coredump[1700]: #10 0x00007fea8e829680 __libc_start_main@@GLIBC_2.34 (libc.so.6 + 0x29680)
[ 6592.462555] systemd-coredump[1700]: #11 0x0000557898444745 _start (systemd-journald + 0xa745)
[ 6592.464388] systemd-coredump[1700]: ELF object binary architecture: AMD x86-64

[root@mahendra ~]# chmod g+s /data
[root@mahendra ~]# chmod t /data
chmod: invalid mode: ‘t’
Try 'chmod --help' for more information.
[root@mahendra ~]# chmod +t /data
[root@mahendra ~]# touch /data/testfile
[root@mahendra ~]# ls /data/testfile
/data/testfile
[root@mahendra ~]# ls -l /data/testfile
-rw-r--r--. 1 root root 0 Feb 18 10:43 /data/testfile
```

# Adding ACL for User "test" on /data

iii) add ACL that allows a user called "test" to have read and write access to /data

- confirm that ACL entry has been added successfully



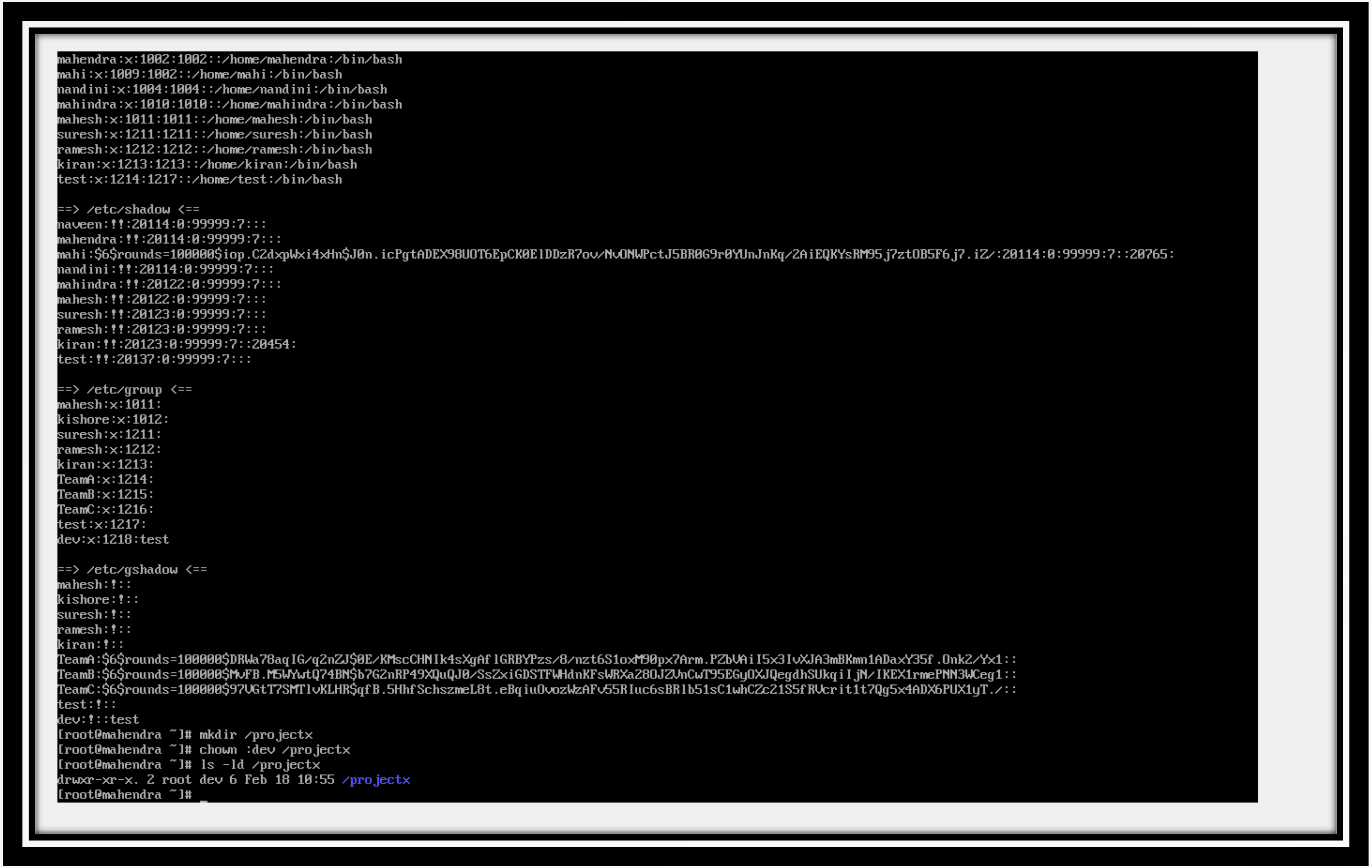
```
[root@mahendra ~]# usermod -aG dev test
[root@mahendra ~]# tail /etc/passwd /etc/shadow /etc/group /etc/gshadow
==> /etc/passwd <==
naveen:x:1001:1001::/home/naveen:/bin/bash
mahendra:x:1002:1002::/home/mahendra:/bin/bash
mahi:x:1009:1002::/home/mahi:/bin/bash
nandini:x:1004:1004::/home/nandini:/bin/bash
mahindra:x:1010:1010::/home/mahindra:/bin/bash
mahesh:x:1011:1011::/home/mahesh:/bin/bash
suresh:x:1211:1211::/home/suresh:/bin/bash
ramesh:x:1212:1212::/home/ramesh:/bin/bash
kiran:x:1213:1213::/home/kiran:/bin/bash
test:x:1214:1217::/home/test:/bin/bash

==> /etc/shadow <==
naveen:!!:20114:0:99999:7:::
mahendra:!!:20114:0:99999:7:::
mahi:$6$rounds=100000$iop.C2dxpWxi4xHn$J0n.icPgtADEX98UOT6EpCK0ElDDzR7ov/NvONWPctJ5BR0G9r0YUnJnKq/2AiEQKYsRM95j7ztOB5F6j7.iZ/:20114:0:99999:7::20765:
nandini:!!:20114:0:99999:7:::
mahindra:!!:20122:0:99999:7:::
mahesh:!!:20122:0:99999:7:::
suresh:!!:20123:0:99999:7:::
ramesh:!!:20123:0:99999:7:::
kiran:!!:20123:0:99999:7::20454:
test:!!:20137:0:99999:7:::

==> /etc/group <==
mahesh:x:1011:
kishore:x:1012:
suresh:x:1211:
ramesh:x:1212:
kiran:x:1213:
TeamA:x:1214:
TeamB:x:1215:
TeamC:x:1216:
test:x:1217:
dev:x:1218:test

==> /etc/gshadow <==
mahesh:!::
kishore:!::
suresh:!::
ramesh:!::
kiran:!::
TeamA:$6$rounds=100000$DRWa78aqIG/q2nZJ$0E/KMscCHNIk4sXgAflGRBYPzs/8/nzt6S1oxM90px7Arm.PZbVAiI5x3IvXJA3mBKmn1ADaxY35f.Onk2/Yx1::
TeamB:$6$rounds=100000$MvFB.M5WYwtQ74BN$b7G2nRP49XQuQJ0/SsZxiGDSTFWHdnKFsWRXa28OJZVnCwT95EGyOXJQegdhSUkqilj N/IKEX1rmePNN3WCeg1::
TeamC:$6$rounds=100000$97VGtT7SMTlvKLHR$qfB.5HhfSchszmeL8t.eBqiuOvozWzAFv55Rluc6sBRlb51sC1whCZc21S5fRVcrit1t7Qg5x4ADX6PUX1yT./::
test:!::
dev:!::test
[root@mahendra ~]# ~
```

# Creating Group "dev" and Configuring /projectx Directory

iv) create a group "dev" and add a user called "test into the dev group

create a directory "/projectx" to store projectx files

allow only owner and dev group users to read, write and execute and other to have no permissions



```
mahendra:x:1002:1002::/home/mahendra:/bin/bash
mahi:x:1009:1002::/home/mahi:/bin/bash
nandini:x:1004:1004::/home/nandini:/bin/bash
mahindra:x:1010:1010::/home/mahindra:/bin/bash
mahesh:x:1011:1011::/home/mahesh:/bin/bash
suresh:x:1211:1211::/home/suresh:/bin/bash
ramesh:x:1212:1212::/home/ramesh:/bin/bash
kiran:x:1213:1213::/home/kiran:/bin/bash
test:x:1214:1217::/home/test:/bin/bash

==> /etc/shadow <==
naveen:!!:20114:0:99999:7:::
mahendra:!!:20114:0:99999:7:::
mahi:$6$rounds=100000$iop.C2dxpWxi4xHn$J0n.icPgtADEX98UOT6EpCK0ElDDzR7ov/NvONWPctJ5BR0G9r0YUnJnKq/2AiEQKYsRM95j7ztOB5F6j7.iZ/:20114:0:99999:7::20765:
nandini:!!:20114:0:99999:7:::
mahindra:!!:20122:0:99999:7:::
mahesh:!!:20122:0:99999:7:::
suresh:!!:20123:0:99999:7:::
ramesh:!!:20123:0:99999:7:::
kiran:!!:20123:0:99999:7::20454:
test:!!:20137:0:99999:7:::

==> /etc/group <==
mahesh:x:1011:
kishore:x:1012:
suresh:x:1211:
ramesh:x:1212:
kiran:x:1213:
TeamA:x:1214:
TeamB:x:1215:
TeamC:x:1216:
test:x:1217:
dev:x:1218:test

==> /etc/gshadow <==
mahesh:!::
kishore:!::
suresh:!::
ramesh:!::
kiran:!::
TeamA:$6$rounds=100000$DRWa78aqIG/q2nZJ$0E/KMscCHNIk4sXgAflGRBYPzs/8/nzt6S1oxM90px7Arm.PZbVAiI5x3IvXJA3mBKmn1ADaxY35f.Onk2/Yx1::
TeamB:$6$rounds=100000$MvFB.M5WYwtQ74BN$b7G2nRP49XQuQJ0/SsZxiGDSTFWHdnKFsWRXa28OJZVnCwT95EGyOXJQegdhSUkqiIjN/IKEX1rmePNN3WCeg1::
TeamC:$6$rounds=100000$97VGtT7SMTlvKLHR$qfB.5HhfSchszmeL8t.eBqiuOvozWzAFv55RIuc6sBRlb51sC1whCZc21S5fRVcrit1t7Qg5x4ADX6PUX1yT./::
test:!::
dev:!::test
[root@mahendra ~]# mkdir /projectx
[root@mahendra ~]# chown :dev /projectx
[root@mahendra ~]# ls -ld /projectx
drwxr-xr-x. 2 root dev 6 Feb 18 10:55 /projectx
[root@mahendra ~]# _
```