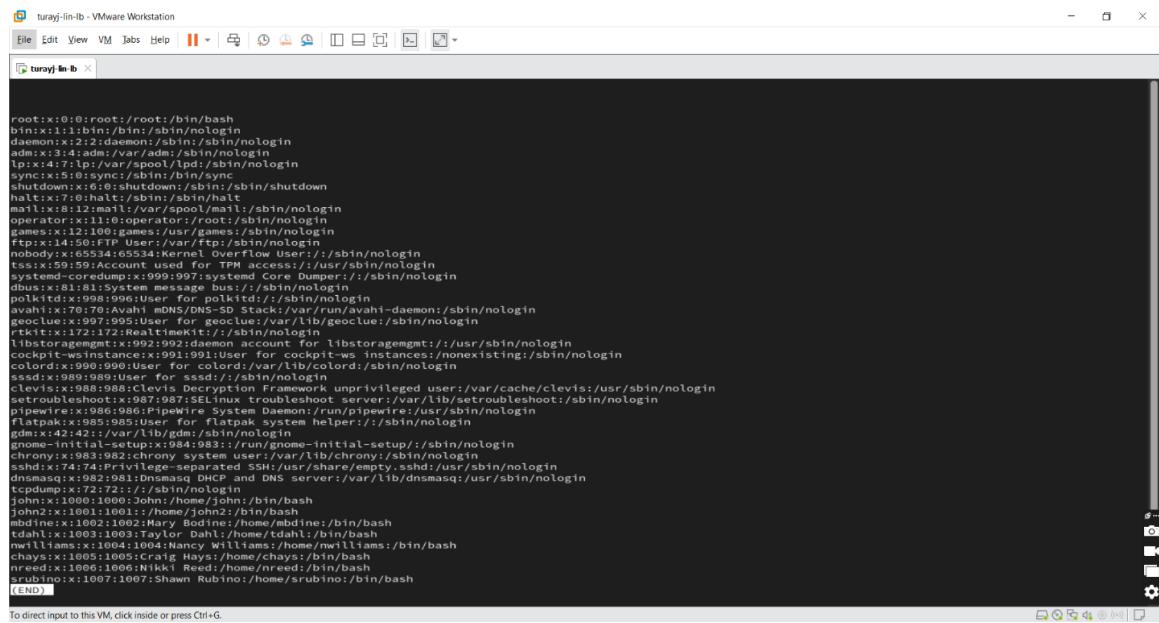


# Linux Users, Groups, and Permissions Project Documentation

This document contains my configuration steps and verification screenshots for setting up users, groups, permissions, and directory access on a Linux system for a web development team. Each screenshot section is followed by space to write explanation/documentation of what was done.

## Screenshot 1: /etc/passwd - List of User Accounts



```
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sys:x:5:10:sys:/var/sys:/sbin/nologin
shutdown:x:6:9:shutdown:/sbin:/sbin/shutdown
halt:x:7:10:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:10:12:operator:/root:/sbin/nologin
nobody:x:11:100:nobody:/var/nobody:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:65534:65534:kernel Overflow User:/sbin/nologin
tss:x:59:Account used for TSS access:/usr/sbin/nologin
systemd-journal:x:999:97:Journal Core Dumper:/sbin/nologin
dmesg:x:981:981:System core dump bus:/sbin/nologin
polkitd:x:998:996:User for polkitd:/sbin/nologin
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
geoclue:x:997:995:User for geoclue:/var/lib/geoclue:/sbin/nologin
rfkitd:x:998:998:Realtime kernel module:/sbin/nologin
cockpit-wsinstance:x:991:991:User for cockpit-wsinstance:/noneexisting:/sbin/nologin
colord:x:990:990:User for colord:/var/lib/colord:/sbin/nologin
sssd:x:989:989:User for sssd:/sbin/nologin
clevis:x:983:983:clevis: Directory for SELinux troubleshoot server:/var/lib/setroubleshoot:/sbin/nologin
pipewire:x:986:986:PipeWire System Daemon:/run/pipewire:/usr/sbin/nologin
flatpak:x:985:985:User for flatpak system helper:/sbin/nologin
gdm:x:42:42:/var/lib/gdm:/sbin/nologin
grub:x:43:43:GRUB boot loader:/sbin/nologin
chrony:x:983:982:chrony:system service:/lib/chrony:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/usr/share/empty.sshd:/usr/sbin/nologin
dnsmasq:x:982:981:dnsmasq DHCP and DNS server:/var/lib/dnsmasq:/usr/sbin/nologin
tcpdump:x:72:72::/sbin/nologin
john:x:1001:1001::/home/john:/bin/bash
johnd2:x:1001:1001::/home/johnd2:/bin/bash
mbdine:x:1002:1002:Mary Bodine:/home/mbdine:/bin/bash
tdahl:x:1003:1003:Taylor Dahl:/home/tdahl:/bin/bash
nwiliams:x:1004:1004:Nancy Williams:/home/nwiliams:/bin/bash
drreid:x:1006:1006:Dirk Ray:/home/drreid:/bin/bash
nreed:x:1006:1006:Nikki Reed:/home/nreed:/bin/bash
srubino:x:1007:1007:Shawn Rubino:/home/srubino:/bin/bash
(END)
```

To direct input to this VM, click inside or press Ctrl+G.

This screenshot shows the list of user accounts on the system from the /etc/passwd file. I used the command cat /etc/passwd to confirm that each team member's account was successfully created. Each entry contains the username, user ID, group ID, home directory, and default shell. This is important because it verifies that all users exist on the system and are configured with home directories and proper login shells.

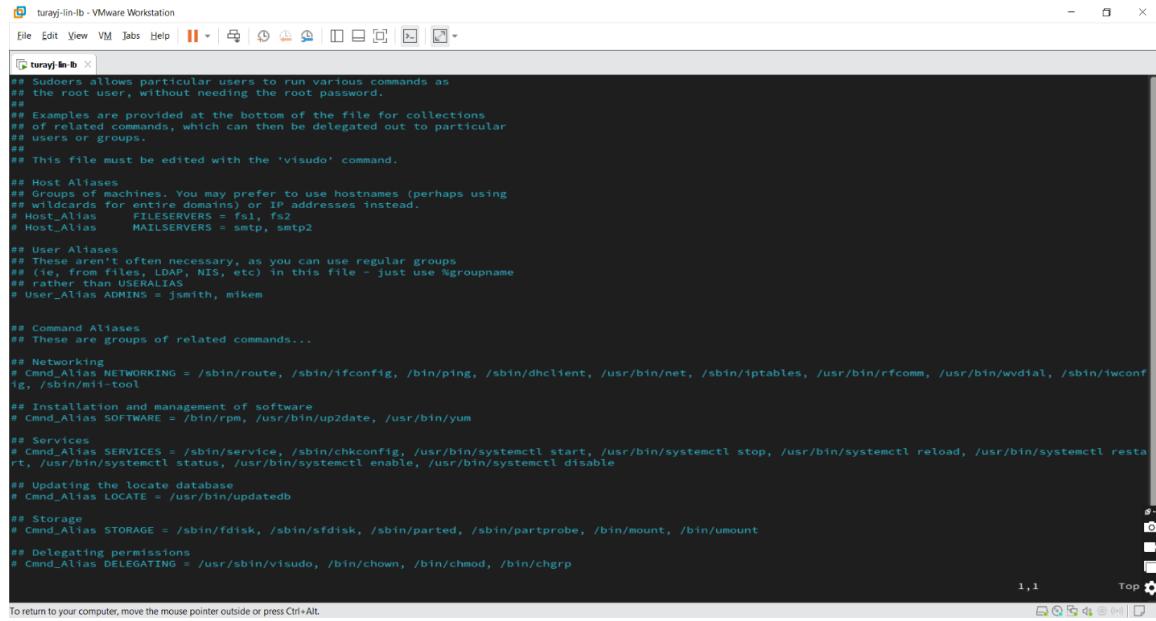
## Screenshot 2: /etc/shadow - Password Hashes

This screenshot displays the /etc/shadow file, which stores the encrypted password hashes for each user. I used sudo cat /etc/shadow to view it, since the file is protected for security reasons. This confirms that all user accounts have passwords set, and that the passwords are stored in hashed form. This is important for security because no plain-text passwords are ever stored on the system.

## Screenshot 3: /etc/group - Group Memberships

This screenshot shows the group configuration and membership from the /etc/group file. I used the command cat /etc/group to verify that each user was assigned to the correct group based on their job role. Lead Developers were added to all groups, Web Developers were added to the webdev group, and Application Developers were added to the appdev group. Verifying this ensures that the correct access permissions will apply later when working with shared directories.

#### Screenshot 4: /etc/sudoers - Sudo Permissions



The screenshot shows a terminal window titled "turayi-lin-ib - VMware Workstation". The window displays the contents of the /etc/sudoers file. The file contains various sections of sudoer rules, including Host Aliases, User Aliases, Command Aliases, Networking, Services, Storage, and Delegating permissions. The text is in a monospaced font, and the terminal interface includes standard Linux navigation keys at the bottom.

```
## Sudoers allows particular users to run various commands as
## the root user, without needing the root password.
##
## Examples are provided at the bottom of the file for collections
## of related commands, which can then be delegated out to particular
## users or groups.
##
## This file must be edited with the 'visudo' command.

## Host Aliases
## Groups of machines. You may prefer to use hostnames (perhaps using
## wildcards for entire domains) or IP addresses instead.
# Host_Alias    FILESERVERS = fs1, fs2
# Host_Alias    MAILSERVERS = smtp, smtp2

## User Aliases
## These aren't often necessary, as you can use regular groups
## (such as 'wheel', 'dial', 'NIS', etc) in this file - just use %groupname
## rather than USERALIAS
# User_Alias ADMINS = jsmith, mikem

## Command Aliases
## These are groups of related commands...

## Networking
# Cmnd_Alias NETWORKING = /sbin/route, /sbin/ifconfig, /bin/ping, /sbin/dhcclient, /usr/bin/net, /sbin/iptables, /usr/bin/rtcomm, /usr/bin/wvdial, /sbin/iwconfig, /sbin/mii-tool

## Installation and management of software
# Cmnd_Alias SOFTWARE = /bin/rpm, /usr/bin/up2date, /usr/bin/yum

## Services
# Cmnd_Alias SERVICES = /sbin/service, /sbin/chkconfig, /usr/bin/systemctl start, /usr/bin/systemctl stop, /usr/bin/systemctl reload, /usr/bin/systemctl restart, /usr/bin/systemctl status, /usr/bin/systemctl enable, /usr/bin/systemctl disable

## Updating the locate database
# Cmnd_Alias LOCATE = /usr/bin/updatedb

## Storage
# Cmnd_Alias STORAGE = /sbin/fdisk, /sbin/sfdisk, /sbin/parted, /sbin/partprobe, /bin/mount, /bin/umount

## Delegating permissions
# Cmnd_Alias DELEGATING = /usr/sbin/visudo, /bin/chown, /bin/chmod, /bin/chgrp
```

```

turayj@lin-lb: ~
Defaults env_keep += "MAIL_PSI PS2 QTDIR USERNAME LANG LC_ADDRESS LC_CTYPE"
Defaults env_keep += "LC_COLLATE LC_IDENTIFICATION LC_MEASUREMENT LC_MESSAGES"
Defaults env_keep += "LC_MONETARY LC_NAME LC_NUMERIC LC_PAPER LC_TELEPHONE"
Defaults env_keep += "LC_TIME LC_ALL LANGUAGE LINGUAS _XKB_CHARSET XAUTHORITY"

#
# Adding HOME to env_keep may enable a user to run unrestricted
# commands via sudo.
#
# Defaults env_keep += "HOME"

Defaults secure_path = /sbin:/bin:/usr/sbin:/usr/bin

## Next comes the main part: which users can run what software on
## which machines (the sudoers file can be shared between multiple
## hosts).
## Syntax:
##      user      MACHINE=COMMANDS
##      The COMMANDS section may have other options added to it.
##
## Allow root to run any commands anywhere
root    ALL=(ALL)        ALL
nobody  ALL=(ALL)        ALL
tutu   ALL=(ALL)        ALL
## Allows members of the 'sys' group to run networking, software,
## service management apps and more.
# %sys ALL = NETWORKING, SOFTWARE, SERVICES, STORAGE, DELEGATING, PROCESSES, LOCATE, DRIVERS
## Allows people in group wheel to run all commands
%wheel  ALL=(ALL)        NOPASSWD: ALL
## Same thing without a password
# %wheel  ALL=(ALL)        NOPASSWD: ALL
## Allows members of the users group to mount and umount the
## cdrom as root
# %users  ALL=/sbin/mount /mnt/cdrom, /sbin/umount /mnt/cdrom
## Allows members of the users group to shutdown this system
# %users  localhost:/sbin/shutdown -h now
## Read drop-in files from /etc/sudoers.d (the # here does not mean a comment)
#includedir /etc/sudoers.d
121,1          Bot
To return to your computer, move the mouse pointer outside or press Ctrl+Alt.

```

This screenshot shows the section of the /etc/sudoers file where I granted admin access to the Lead Developer accounts. I used the command sudo visudo, which safely opens the sudoers configuration. I added both Lead Developer accounts so they have the ability to run system-level administrative commands with sudo. This is necessary because Lead Developers may need to install software, manage services, or adjust permissions in the environment.

## Screenshot 5: Permissions for /development and Subdirectories

```

turayj@lin-lb: ~]$
[johnneturay@lin-lb ~]$ sudo ll /share
/etc/sudoers:101:25: syntax error
abdiine All:(All)          All
^~~
/etc/sudoers:102:25: syntax error
tdahl  All:(All)          All
^~~
sudo: ll: command not found
[johnneturay@lin-lb ~]$ ll /share/
ls: cannot access '/share/': No such file or directory
[johnneturay@lin-lb ~]$ ll /development/
total 0
drwxr-xr-x  4 root Webdeveloper 8 Feb  6 14:03 website
[johnneturay@lin-lb ~]$ ll /development/website/images
bash: ll:/development/website/images: No such file or directory
[johnneturay@lin-lb ~]$ ll /development/website/images
total 12
-rw-r--r--  1 root Webdeveloper 8680 Feb  6 13:03 underconstruction.jpg
[johnneturay@lin-lb ~]$ ll /development/development/*
ls: cannot access '/development/development/*': No such file or directory
[johnneturay@lin-lb ~]$ ls -l
total 4
drwxr-xr-x  2 john john  6 Jan 22 11:18 Desktop
drwxr-xr-x  3 john john 19 Feb  5 23:17 Documents
drwxr-xr-x  2 john john 29 Feb  6 13:15 Downloads
drwxr-xr-x  2 john john  8 Jan 22 11:18 Images
drwxr-xr-x  2 john john 4096 Feb  5 15:56 Pictures
drwxr-xr-x  2 john john  6 Jan 22 11:18 Public
drwxr-xr-x  2 john john  6 Jan 22 11:18 Templates
drwxr-xr-x  2 john john  6 Jan 22 11:18 Videos
[johnneturay@lin-lb ~]$ ls -l /development
total 0
drwxr-xr-x  4 root Webdeveloper 48 Feb  6 14:03 website
[johnneturay@lin-lb ~]$ pwd
/home/john
[johnneturay@lin-lb ~]$ ls -l /development
total 0
drwxr-xr-x  4 root Webdeveloper 48 Feb  6 14:03 website
[johnneturay@lin-lb ~]$ ls -l /development/website
total 0
drwxr-xr-x  2 root Webdeveloper 35 Feb  6 23:15 Images
drwxr-xr-x  1 root Webdeveloper 98 Feb  6 14:03 index.html
drwxr-xr-x  2 root Applicationdeveloper 6 Feb  5 15:04 js
[johnneturay@lin-lb ~]$ ls -l /development/website/js
total 0
[johnneturay@lin-lb ~]$ 
To return to your computer, move the mouse pointer outside or press Ctrl+Alt.

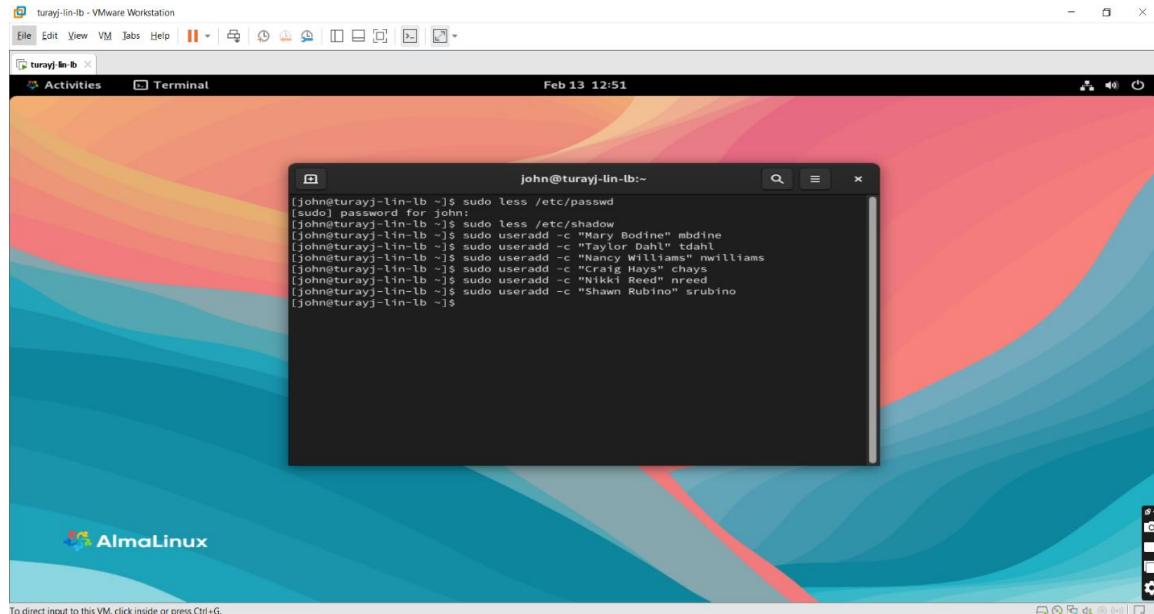
```

This screenshot shows the directory structure and permission settings for /development and its subfolders. I used the command ls -lR /development to display all folders and their permission values. The directory ownership was set to the appropriate groups, and permission mode 775 was applied so that group members can read, write, and execute, while others only have read/execute access. This ensures that each role has the proper access needed for their work while still maintaining security.

## Final Notes / Reflection

Overall, this project strengthened my understanding of Linux system administration and access control. I learned how to manage users, assign groups, and apply permissions in a professional environment. These are core skills for roles in system administration, DevOps, and cybersecurity because they directly relate to protecting data, enforcing least privilege, and supporting secure workflows across development teams.

## Step-by-Step Documentation:



```
turaylin-lb - VMware Workstation
File Edit View VM Tabs Help ||| x
turaylin-lb x

root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
syslogd:x:3:3:syslogd:/var/log:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mailx:x:8:12:mail:/var/spool/mail:/sbin/nologin
nobody:x:99:99:nobody:/var/empty:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:65534:65534:Kernel Overflow User:/sbin/nologin
tss:x:15:59:Account used for TPM access:/sbin/nologin
avahi-daemon:x:199:199:Avahi mDNS+SSDP Stack:/sbin/nologin
dbus:x:81:81:System message bus:/sbin/nologin
polkitd:x:998:996:User for polkitd:/sbin/nologin
avahi:x:70:90:Avahi mDNS+SSD Stack:/var/run/avahi-daemon:/sbin/nologin
geoclue:x:997:995:User for geoclue:/var/lib/geoclue:/sbin/nologin
libstoragemgmt:x:992:992:daemontools account for libstoragemgmt:/usr/sbin/nologin
cockpit-ws-Instance:x:991:991:User for cockpit-ws instances:/nonexisting:/sbin/nologin
colord:x:990:990:User for colord:/var/lib/colord:/sbin/nologin
sssd:x:998:998:User for sssd:/sbin/nologin
clevfs:x:988:988:clevfs: Unprivileged user:/var/cache/clevfs:/usr/sbin/nologin
chrony:x:993:993:chrony: Decryption framework rootless troubleshoot server:/var/lib/chrony:/sbin/nologin
pipewire:x:986:986:PipeWire System Daemon:/run/pipewire:/usr/sbin/nologin
flatpak:x:985:985:User for flatpak system helper:/sbin/nologin
dnsmasq:x:42:42::/var/lib/gdm:/sbin/nologin
gnome-initial-setup:x:984:983:/run/gnome-initial-setup:/sbin/nologin
root:x:0:0:root:/root:/bin/bash
chrony:x:993:993:chrony: System user:/var/lib/chrony:/sbin/nologin
sshd:x:74:74:Privileged separator user:/var/lib/sshd:/empty:/sbin/nologin
dnsmasq:x:982:981:Dnsmasq: DHCP and DNS server:/var/lib/dnsmasq:/usr/sbin/nologin
tcpdump:x:72:72::/sbin/nologin
john:x:1000:1000:John:/home/john:/bin/bash
tdahl:x:1001:1002:Taylor Dahl:/home/tdahl:/bin/bash
williams:x:1004:1004:Nancy Williams:/home/williams:/bin/bash
chays:x:1005:1005:Chay Hayes:/home/chays:/bin/bash
nreed:x:1006:1006:Nikki Reed:/home/nreed:/bin/bash
srubino:x:1007:1007:Shawn Rubino:/home/srubino:/bin/bash
(END)
```

To direct input to this VM, click inside or press Ctrl+G.

To direct input to this VM, click inside or press Ctrl+G.

To direct input to this VM, click inside or press Ctrl+G.

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```
turaylin-lb - VMware Workstation
```

```
File Edit View VM Help || _ < > < > < > < > < >
```

```
turaylin-lb
```

```
Defaults env_keep += "MAIL PS1 PS2 QTDIR USERNAME LANG LC_ADDRESS LC_CTYPE"
Defaults env_keep += "LC_COLLATE LC_IDENTIFICATION LC_MEASUREMENT LC_MESSAGES"
Defaults env_keep += "LC_MONETARY LC_NAME LC_NUMERIC LC_PAPER LC_TELEPHONE"
Defaults env_keep += "LC_TIME LC_ALL LANGUAGE LINGUAS _XKB_CHARSET XAUTHORITY"

# Adding HOME to env_keep may enable a user to run unrestricted
# commands via sudo.
# Defaults env_keep += "HOME"

Defaults secure_path = /sbin:/bin:/usr/sbin:/usr/bin

## Next comes the main part: which users can run what software on
## different machines (the sudoers file can be shared between multiple
## systems).
## Syntax:
##     user      MACHINE=COMMANDS
##     user      MACHINE=COMMANDS
## The COMMANDS section may have other options added to it.
##
## Allow root to run any commands anywhere
root    ALL=(ALL)        ALL
craig  ALL=(ALL)        ALL
cdahli ALL=(ALL)        ALL
## Allows members of the 'sys' group to run networking, software,
## service management apps and more.
# %sys ALL = NETWORKING, SOFTWARE, SERVICES, STORAGE, DELEGATING, PROCESSES, LOCATE, DRIVERS
##
## Allows people in group wheel to run all commands
%wheel  ALL=(ALL)        ALL

## Same thing without a password
# %wheel  ALL=(ALL)        NOPASSWD: ALL

## Allows members of the users group to mount and umount the
## cdrom as root
# %users  ALL=/sbin/mount /mnt/cdrom, /sbin/umount /mnt/cdrom
##
## Allows members of the users group to shutdown this system
# %users  localhost:/sbin/shutdown -h now

## Read drop-in files from /etc/sudoers.d (the # here does not mean a comment)
#includeadir /etc/sudoers.d
/etc/sudoers.tmp" 121L, 4384B
```

To return to your computer, move the mouse pointer outside or press Ctrl+Alt

```
turayj-lin-lb ~$ sudo less /etc/group
Usage: groupadd [options] GROUP

Options:
  -f, --force          exit successfully if the group already exists,
                      and cancel -f if the GID is already used
  -g, --gid GID        use GID for the new group
  -h, --help            display this help message and exit
  -K, --key KEY=VALUE  override /etc/login.defs defaults
  -o, --non-unique      allow to create groups with duplicate
                        (non-unique) GID
  -p, --password PASSWORD
  -r, --system          create a system account
  -R, --root CHROOT_DIR
  -P, --prefix PREFIX_D
  -U, --users USERS    list of user members of this group

[john@turayj-lin-lb ~]$ sudo groupadd Leadeveloper
/etc/sudoers:101:25: syntax error
mbdine All:(All)          All
^~~
/etc/sudoers:102:25: syntax error
tdahl All:(All)          All
^~~
[john@turayj-lin-lb ~]$ sudo groupadd Webdeveloper
/etc/sudoers:101:25: syntax error
mbdine All:(All)          All
^~~
/etc/sudoers:102:25: syntax error
tdahl All:(All)          All
^~~
[john@turayj-lin-lb ~]$ sudo groupadd Applicationdeveloper
/etc/sudoers:101:25: syntax error
mbdine All:(All)          All
^~~
/etc/sudoers:102:25: syntax error
tdahl All:(All)          All
^~~
[john@turayj-lin-lb ~]$
```

To return to your computer, move the mouse pointer outside or press Ctrl+Alt.

```
turayj-lin-lb ~$ sudo less /etc/group
users:x:100:
nobody:x:65534:
utmp:x:22:
utemux:x:35:
salt_keys:x:10:
tssx:x:59:cleviis
input:x:999:
kvm:x:36:
remnux:x:998:
systemd-journal:x:190:
systemd--coredump:x:997:
dbus:x:81:
polkitd:x:996:
avahi:x:95:
geooclue:x:995:
printadmin:x:994:
rtkit:x:172:
sgx:x:993:
nvidia-xnpmpgtx:x:992:
cockpit-wsinstance:x:991:
colord:x:990:
sssd:x:989:
cleviis:x:988:
salt_keys:x:987:
pipewire:x:986:
flatpak:x:985:
brlapit:x:984:
gdm:x:42:
gnome-initial-setup:x:983:
chrony:x:982:
slocate:x:21:
sshd:x:74:
dnsmasq:x:981:
kerneld:x:73:
john:x:1000:
john2:x:1001:
mbdine:x:1002:
tdahl:x:1003:
newwilliams:x:1004:
chays:x:1005:
nreedi:x:1006:
srubino:x:1007:
Leadeveloper:x:1008:
Webdeveloper:x:1009:
Applicationdeveloper:x:1010:
(END)
```

To return to your computer, move the mouse pointer outside or press Ctrl+Alt.



```
turayj-lin-lb ~]$ sudo chown -R root: Applicationdeveloper /development/website/js
/etc/sudoers:101:25: syntax error
mbdine All:(All)  All
/etc/sudoers:102:25: syntax error
tdahl  All:(All)  All
chown: cannot access 'Applicationdeveloper': No such file or directory
[john@turayj-lin-lb ~]$ sudo chown -R root:Applicationdeveloper /development/website/js
/etc/sudoers:101:25: syntax error
mbdine All:(All)  All
/etc/sudoers:102:25: syntax error
tdahl  All:(All)  All
chown: cannot access 'Applicationdeveloper': No such file or directory
[john@turayj-lin-lb ~]$ sudo chmod -R 755 /development
/etc/sudoers:101:25: syntax error
mbdine All:(All)  All
/etc/sudoers:102:25: syntax error
tdahl  All:(All)  All
[john@turayj-lin-lb ~]$ sudo chmod -R 755 /development/website
/etc/sudoers:101:25: syntax error
mbdine All:(All)  All
/etc/sudoers:102:25: syntax error
tdahl  All:(All)  All
[john@turayj-lin-lb ~]$ sudo chmod -R 755 /development/website/images
/etc/sudoers:101:25: syntax error
mbdine All:(All)  All
/etc/sudoers:102:25: syntax error
tdahl  All:(All)  All
[john@turayj-lin-lb ~]$ sudo chmod -R 755 /development/website/js
/etc/sudoers:101:25: syntax error
mbdine All:(All)  All
/etc/sudoers:102:25: syntax error
tdahl  All:(All)  All
[john@turayj-lin-lb ~]$ ls
To return to your computer, move the mouse pointer outside or press Ctrl+Alt.
```

```
turayj-lin-lb ~]$ sudo visudo
/etc/sudoers:101:25: syntax error
mbdine All:(All)  All
/etc/sudoers:102:25: syntax error
tdahl  All:(All)  All
/etc/sudoers:101:25: syntax error
mbdine All:(All)  All
/etc/sudoers:102:25: syntax error
tdahl  All:(All)  All
What now? Q
[john@turayj-lin-lb ~]$ ls -al
total 96
drwx-----, 14 John John 4096 Feb  6 15:55 .
drwxr-xr-x-, 10 root root 116 Feb 13 12:51 ..
-rw-r--r--,  1 john john 5067 Feb 10 16:32 .bash_history
-rw-r--r--,  1 john john 18 Apr 30 2024 .bash_logout
-rw-r--r--,  1 john john 141 Apr 30 2024 .bash_profile
-rw-r--r--,  1 john john 4096 Feb  6 13:02 .bashrc
drwx-----, 12 john john 4096 Jan 27 10:52 config
drwxr-xr-x-,  2 john john  6 Jan 22 11:18 desktop
drwxr-xr-x-,  3 john john  19 Feb  5 23:17 Documents
drwxr-xr-x-,  2 john john  2 Feb  6 13:02 Downloads
-rw-r--r--,  1 john john 12288 Feb  5 11:02 index.html.swn
-rw-r--r--,  1 john john 12288 Feb  5 11:51 .index.html.swp
drwx-----,  4 john john  32 Jan 22 11:18 local
drwxr-xr-x-,  5 john john  57 Feb  6 13:02 mozilla
drwxr-xr-x-,  2 john john  6 Jan 22 11:18 music
drwxr-xr-x-,  2 john john 4096 Feb  5 15:56 Pictures
drwxr-xr-x-,  2 john john  6 Jan 22 11:18 Public
-rw-----,  1 john john 12288 Jan 27 10:52 .swp
drwxr-xr-x-,  2 john john  6 Jan 22 11:18 Templates
drwxr-xr-x-,  2 john john  6 Jan 22 11:18 .vmlinu
-rw-----,  1 john john  8553 Feb  6 15:55 .viminfo
[john@turayj-lin-lb ~]$ ls
```

