Project 8-1

In this hands-on project, you use and configure the GRUB boot loader.

1. When your system has booted, switch to a command-line terminal (tty2) by pressing Ctrl+Alt+F2 and log in to the terminal using the user name of root and the password of secret.

2. At the command prompt, type `cat /boot/grub/grub.conf` and press Enter to view the GRUB configuration file. Can you tell where the boot loader is installed? What does each entry indicate?

3. At the command prompt, type `vi /boot/grub/grub.conf` and press Enter to edit the GRUB configuration file. Change the value of timeout to 0. Save your changes and quit the vi editor. How long do you have to interact with the GRUB boot loader after POST before the default OS is booted? Do you need to reinstall GRUB after making changes to the /boot/grub/grub.conf file?

4. Reboot your system by typing `reboot` and press Enter. Was the graphical GRUB boot screen shown after POST?

5. When your system has booted, switch to a command-line terminal (tty2) by pressing Ctrl+Alt+F2 and log in to the terminal using the user name of root and the password of secret.

6. At the command prompt, type `vi /boot/grub/grub.conf` and press Enter to edit the GRUB configuration file. Change the value of timeout to 10. Save your changes and quit the vi editor. How long do you have to interact with the GRUB boot loader after POST before the default OS is booted?

7. Reboot your system by typing `reboot` and pressing Enter. After the POST, note the graphical GRUB boot screen. How many seconds do you have to interrupt the automatic boot process? Press any key on your keyboard to interact with the GRUB boot menu.

8. At the GRUB boot menu, type `e` to edit the configuration of GRUB. Do you recognize the entries listed? Next, type `c` at the GRUB boot menu to open a grub> prompt.

9. At the grub> prompt, type `help` and press Enter to view a list of commands you can use at the grub> prompt. Next, type `displaymem` at the grub> prompt and press Enter. Does GRUB recognize all the memory in your computer correctly?

10. At the grub> prompt, type `cat /boot/grub/grub.conf` and press Enter to view the /boot/grub/grub.conf file. Why did you have to specify the full path to grub.conf within the GRUB boot loader?

11. At the grub> prompt, type the kernel line shown in Step 10 and press Enter. This loads the kernel into memory. 12. At the grub> prompt, type the initrd line shown in Step 10 and press Enter. This loads the initialization ramdisk image into memory.
13. At the grub> prompt, type **boot** and press Enter to continue the boot process using the Linux kernel and initialization ramdisk image loaded into memory during the previous two steps. Allow the system to boot normally.

14. After the system has loaded successfully, switch to a command-line terminal (tty2) by pressing **Ctrl+Alt+F2** and log in to the terminal using the user name of root and the password of secret.

15. At the command prompt, type **grub-md5-crypt** and press Enter. When prompted, type **secret** and press Enter. Repeat the password when prompted again and press Enter. Record the encrypted password returned for future reference.

16. At the command prompt, type **vi /boot/grub/grub.conf** and press Enter to edit the GRUB configuration file. While in the vi editor, position the cursor on the line that says splashimage=(hd0,0)/boot/grub/splash.xpm.

17. Next, type **o** to open a line underneath the splashimage line in insert mode, and type the following (**where <encrypted password> is the encrypted password you recorded in Step 15**): **password --md5 <encrypted password>**

18. Save your changes and quit the vi editor.

19. Reboot your system by typing **reboot** and pressing Enter. At the graphical GRUB boot screen, press any key on your keyboard to open the GRUB boot menu. Observe the splashimage=(hd0,0)/boot/grub/splash.xpm.gz legend. Note that you must press the **p** key to access the configuration of GRUB. Type **p** to edit the configuration of GRUB. Enter the password of secret and press Enter. Is the GRUB boot menu displayed?

20. Press Enter to boot the default OS.
Project 8- 2

In this hands-on project, you explore runlevels and the / etc/ initab file used to change runlevels at system startup and afterward.

1. Switch to a command-line terminal (tty2) by pressing Ctrl+ Alt+ F2 and log in to the terminal using the user name of root and the password of secret.

2. At the command prompt, type runlevel and press Enter. What is your current runlevel? What is the most recent runlevel?

3. At the command prompt, type cat / etc/ initab and press Enter. Which line in this file determines the default runlevel at boot time? Can this be changed?

4. At the command prompt, type init 2 and press Enter. Press Enter again to obtain your command prompt. What was displayed on your terminal screen? Are any daemons started? Are any daemons stopped? Why?

5. Next, type runlevel at the command prompt and press Enter. What is your current runlevel? What is the most recent runlevel?

6. At the command prompt, type init 5 and press Enter. Were daemons started? Was the gdm started?

7. Switch back to tty2 by pressing Ctrl+ Alt+ F2 and press Enter to obtain your command prompt.

8. Next, type runlevel at the command prompt and press Enter. What is your current runlevel? What is the most recent runlevel?

9. At the command prompt, type init 1 and press Enter. What is displayed on your terminal screen? Are most daemons started or stopped? Why?

10. Next, type runlevel at the command prompt and press Enter. Note that both your current and most recent runlevels refer to single user mode. This is because the process that tracks runlevel is stopped when entering single user mode.

11. At the command prompt, type init 6 and press Enter. What does this command do?
Project 8- 3

In this hands-on project, you examine the system runlevel directories, start and stop daemons manually, and configure daemon startup by runlevel.

1. Once your system has booted, switch to a command-line terminal (tty2) by pressing Ctrl+ Alt+ F2 and log in to the terminal using the user name of root and the password of secret.

2. At the command prompt, type `ls /etc/rc.d` and press Enter. What directories are listed? What is contained within each directory?

3. At the command prompt, type `ls -F /etc/rc.d/rc0.d` and press Enter. What type of files are listed? In which order will these files be executed by the init daemon? How many of these start with K compared to S? Why?

4. At the command prompt, type `ls -F /etc/rc.d/rc5.d` and press Enter. What types of files are listed? How many of these start with K compared to S? Why?

5. At the command prompt, type `ls -F /etc/rc.d/init.d` and press Enter. What types of files are listed? What happens when you execute a file from this directory?

6. At the command prompt, type `/etc/rc.d/init.d/atd stop` and press Enter. What happened?

7. At the command prompt, type `/etc/rc.d/init.d/atd start` and press Enter. What happened?

8. At the command prompt, type `/etc/rc.d/init.d/atd restart` and press Enter. What happened?

9. At the command prompt, type `service atd stop` and press Enter to perform the same action as Step 6.

10. At the command prompt, type `service atd start` and press Enter to perform the same action as Step 7.

11. At the command prompt, type `service atd restart` and press Enter to perform the same action as Step 8.

12. At the command prompt, type `chkconfig --list httpd` and press Enter. In which runlevels are Apache (httpd) daemons started?

13. At the command prompt, type `chkconfig --level 235 httpd on` and press Enter. Next, type `chkconfig --list httpd` and press Enter. In which runlevels are Apache (httpd) daemons started?
14. At the command prompt, type `chkconfig -- level 23 httpd off` and press Enter. Next, type `chkconfig -- list httpd` and press Enter. In which runlevels are Apache (httpd) daemons started?

15. At the command prompt, type `ntsysv -- level 5` and press Enter. Next, navigate to the httpd daemon listing. Is there an asterisk (*) indicating that the daemon is started upon entering this runlevel? Use your Spacebar to remove the * next to httpd. Press Tab to navigate to the OK button and press Enter to exit the ntsysv utility. What other graphical utility can be used to perform the same action?

16. Type `exit` and press Enter to log out of your shell.
Project 8-4

In this hands-on project, you configure a fake daemon process to execute upon system startup.

1. Once your system has booted, switch to a command-line terminal (tty2) by pressing Ctrl+Alt+F2 and log in to the terminal using the user name of root and the password of secret.

2. At the command prompt, type vi /etc/rc.d/init.d/etc/rc.d/init.d/sample and press Enter to create a fake daemon in the /etc/rc.d/init.d directory.

3. Enter the following information in the vi editor. When finished, save your changes and quit the vi editor. (Note: The variable $1 refers to the first argument given when executing the shell script on the command line.)

```bash
#!/bin/bash

if [ $1="start" ]
then
  echo "The sample daemon has started" sleep 2

elif [ $1="stop" ]
then
  echo "The sample daemon has been stopped" sleep 2

elif [ $1="restart" ]
then
  echo "The sample daemon has been restarted" sleep 2

fi
```

4. At the command prompt, type ls -l /etc/rc.d/init.d/etc/rc.d/init.d/sample and press Enter. What are the permissions on the file?

5. At the command prompt, type chmod 755 /etc/rc.d/init.d/etc/rc.d/init.d/sample and press Enter to allow the sample file to be executed.

6. At the command prompt, type ln -s /etc/rc.d/init.d/etc/rc.d/init.d/sample/etc/rc.d/rc5.d/S50sample and press Enter. What does this command do? What will happen at system startup?

7. At the command prompt, type reboot and press Enter to reboot the system. When the graphical boot screen appears, press the Esc key on your keyboard. Pay close
attention to the list of daemons as they are started. Does the sample daemon start? Why? Allow the system to boot normally.

8. When the system has booted successfully, switch to a command-line terminal (tty2) by pressing Ctrl+Alt+F2 and log in to the terminal using the user name of root and the password of secret.

9. At the command prompt, type service sample stop and press Enter. What happened?

10. At the command prompt, type service sample start and press Enter. What happened?

11. At the command prompt, type service sample restart and press Enter. What happened?

12. Type exit and press Enter to log out of your shell.
Project 8-5

In this hands-on project, you examine X Windows configuration utilities, start X Windows using various methods, switch desktop environments, and explore the compiz window manager.

1. Switch to a command-line terminal (tty2) by pressing `Ctrl+Alt+F2` and log in to the terminal using the user name of root and the password of secret.

2. At the command prompt, type `ls / etc/ X11` and press Enter. Is there an xorg. conf file present in this directory by default? Why?

3. At the command prompt, type `yum install system-config-display` and press Enter. Press y when prompted to install the necessary packages from the Internet, and press y again (if necessary) to confirm the GPG key used for authentication.

4. Switch to the gdm by pressing `Ctrl+Alt+F1` or `Ctrl+Alt+F7` and log in to the GNOME Desktop Environment as user1.

5. Open a Terminal application and type `system-config-display` at the BASH shell prompt. Supply the root password of secret when prompted and click OK. Navigate the three tabs within this utility and note your default resolution and color depth, as well as your video card and monitor model. Optionally, make a change to your resolution and color depth that are supported by your video card and monitor. Click OK when finished, and click OK again to close the information dialog window indicating that a new xorg. conf file has been written.

6. Switch back to tty2 by pressing `Ctrl+Alt+F2`, type `ls / etc/ X11` at the command prompt, and press Enter. Is there an xorg. conf file present in this directory now? Why?

7. At the command prompt, type `less / etc/ X11/ xorg.conf` and press Enter. View the information about your keyboard, video card, and monitor, and press q to quit when finished.

8. At the command prompt, type `mouse-test` and press Enter. Observe the output and press `Ctrl+c` when finished.

9. Switch to the gdm by pressing `Ctrl+Alt+F1` or `Ctrl+Alt+F7`, and type `system-config-keyboard` at the BASH shell prompt in the Terminal window. Supply the root password of secret when prompted and click OK. Observe your default keyboard layout and click OK.

10. Log out of the GNOME Desktop Environment when finished.

11. At the gdm, click sample user one and then choose KDE from the Session dialog box. Supply the password of secret for user1 and click Log In to log in to the KDE Desktop Environment.
12. Click the start button in the lower left of the screen and navigate to Applications, System, Terminal to open a BASH shell terminal. At the prompt, type `cat ~/.dmrc` and press Enter. Did the gdm record your latest desktop environment preference as KDE?

13. Click the start button again and click Leave and then Logout. Click Logout again to return to the gdm.

14. At the gdm, click sample user one. Is KDE listed as the default session in the Session dialog box? Choose GNOME from the Session dialog box, supply the password of secret for user1, and click Log In to log in to the GNOME Desktop Environment.

15. Click the System menu and select Preferences, Desktop Effects. If your video card has 3D hardware acceleration support, select Compiz, click Use this setting when prompted, and select the two standard desktop effects. If you instead receive an error message indicating the lack of 3D support on your video card, skip to Step 17.

16. Hold down the Ctrl and Alt keys on your keyboard. While holding them down, use your cursor keys to move the desktop cube left and right. Next, while holding down the Ctrl and Alt keys, drag the menu bar using your mouse to view the entire desktop cube. Next, open an application of your choice. Click and hold the upper-left corner of the window and drag it around your desktop to view the window effect. Next, minimize your application and then log out of the GNOME Desktop Environment.

17. Switch back to tty2 by pressing Ctrl+Alt+F2, type `init 3` at the command prompt, and press Enter. Press Enter again to obtain your command.

18. At the command prompt, type `startx` and press Enter. Close any root user warning dialog boxes. Why was GNOME started? Log out of the GNOME Desktop Environment.

19. At the command prompt, type `vi .xinitrc` and press Enter. Add the line `exec startkde` to the `.xinitrc` file, save your changes, and quit the vi editor.

20. At the command prompt, type `startx` and press Enter. Close any root user warning dialog boxes. Why was KDE started? Log out of the KDE Desktop Environment.

21. At the command prompt, type `gdm` and press Enter to start the GNOME Display Manager in `runlevel 3`. What is another way to start the gdm?