UNIX and Linux Essentials

Activity Guide

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Practices for Lesson 1: Introduction

Chapter 1

Practices for Lesson 1: Introduction

Practices for Lesson 1

Practices Overview

This practice provides an introduction to your course assignment and the infrastructure, which you will use for performing the practices. The practices in this assignment are mapped to the respective lessons.

The following checklist will run throughout the practices showing your progress:

	UNIX and Linux Essentials - Activities Checklist
☑	**Introduction**
	Introduction to UNIX
	Working with Files and Directories
	Using the vi Editor
	Using Commands within the Default Shell
	Using Basic File Permissions
	Performing Basic Process Control
	Using Advanced Shell Functionalities in Shell Scripts
	Archiving Files and Remote Transfer

Practices Infrastructure

This section presents the architectural overview of the infrastructure required for the practices. Your practice environment is based on the Oracle VM VirtualBox virtualization software. The VirtualBox is a cross-platform virtualization application. It provides multiple virtual machines (VMs) that are configured on a private internal network (192.168.1). Each VM can communicate with other VMs on the same private network (see Figure 1). Internet access is not configured for these VMs.
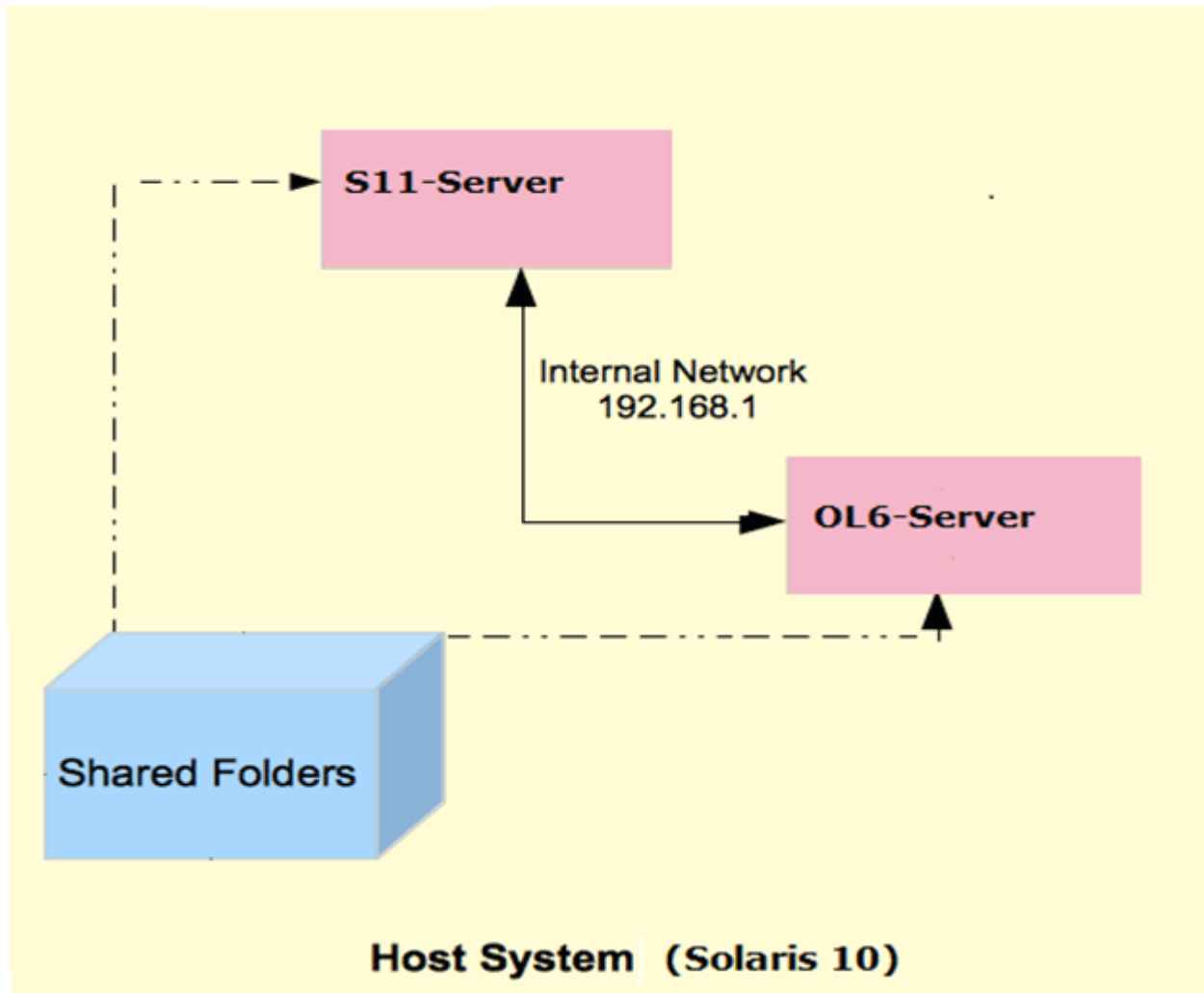
Figure 1: Virtual Pod Network Schema

Practices for Lesson 1: Introduction
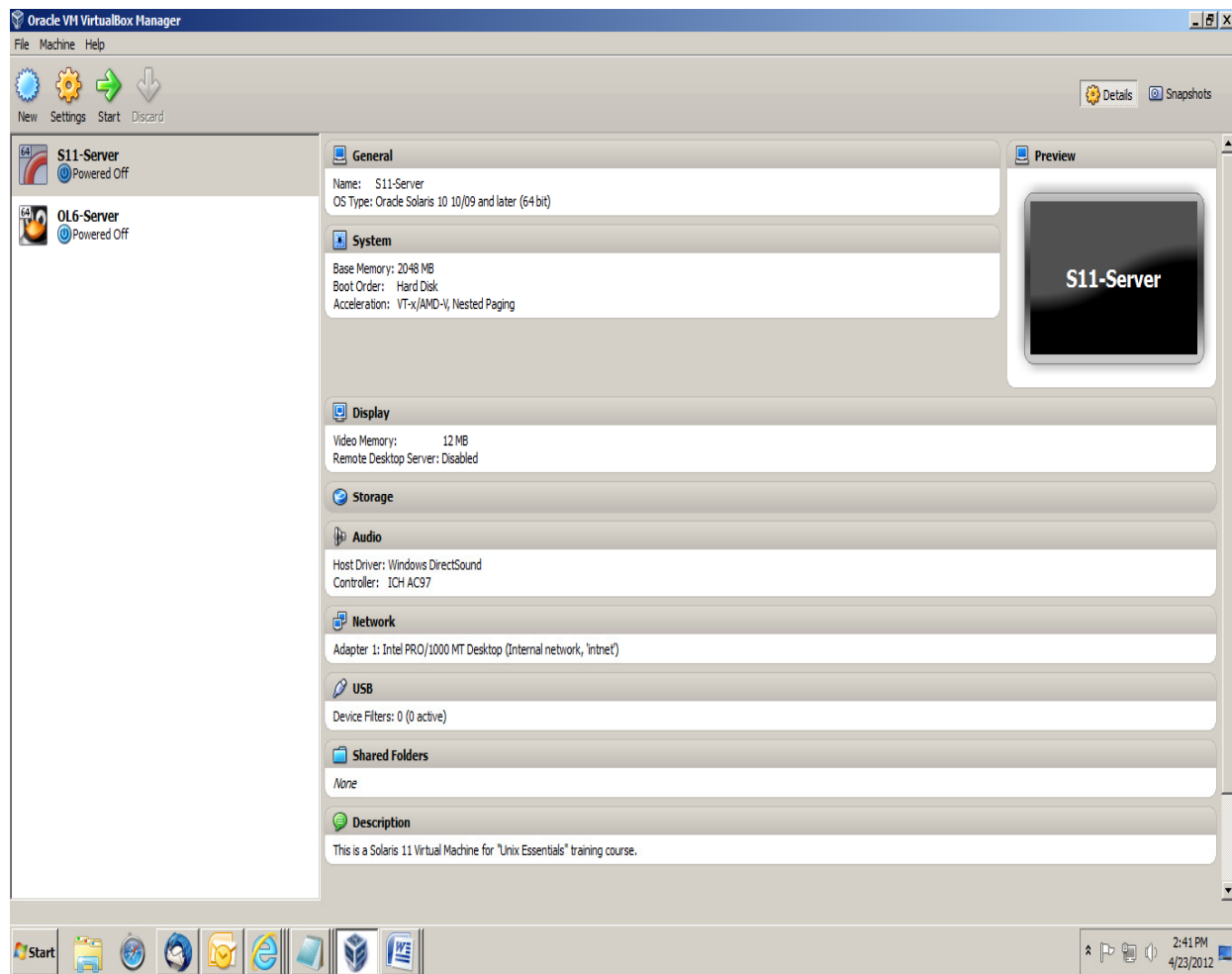
Figure 2: Configured Oracle VirtualBox VMs

Figure 2 shows the configured virtual machines. The VirtualBox environment consists of the following VMs:

Name of the VM	Description
S11-Server	This is the Oracle Solaris 11 guest OS image where the student performs the practice tasks related to Oracle Solaris 11 OS. This is the primary VM.
OL6-Server	This is Oracle Linux 6.2 guest OS image, which can be used as an alternative by students to perform the practice tasks.

The VMs are further configured to communicate with the host machine through the shared directory. The shared directories are listed in the following table:

Resource Name	Location	Description
Host share directory	`/opt/ora`	Contains various course files
Student Files	`/opt/ora/labs`	Contains lab bundle contents

The details of the shared directories can be verified in the respective VM settings.

Practices for Lesson 1: Introduction

User Credentials

VMs	Credentials
S11-Server	• Username: **student** • Password: **student1** **Note**: As a student user, use su to switch to the primary administrator (root) role. The password is oracle1. The root is configured as a role by default in Oracle Solaris 11. The first user name created on the system during the installation is the initial privileged user who can assume the primary administrator role. This can be verified in the /etc/user_attr file.
OL6-Server	• Username: **student** • Password: **student1** For administrative access, switch to root user using the su command as and when instructed by the instructor. • Username: **root** • Password: **oracle1**

Practice 1-1: Getting Familiar with Your Practice Environment

Task1: Starting the Oracle VM Virtual Box Manager

Perform the following steps when you first access your practice host environment:

On your host system, start the Oracle VM Virtual Box Manager by double-clicking its icon on your desktop.

Task2: Starting and Logging in to the Virtual Machine

1. In the Oracle VM VirtualBox Manager window, double-click the **S11-Server** VM to start it. Alternatively, you can select the **S11-Server** VM and click the **Start** button.
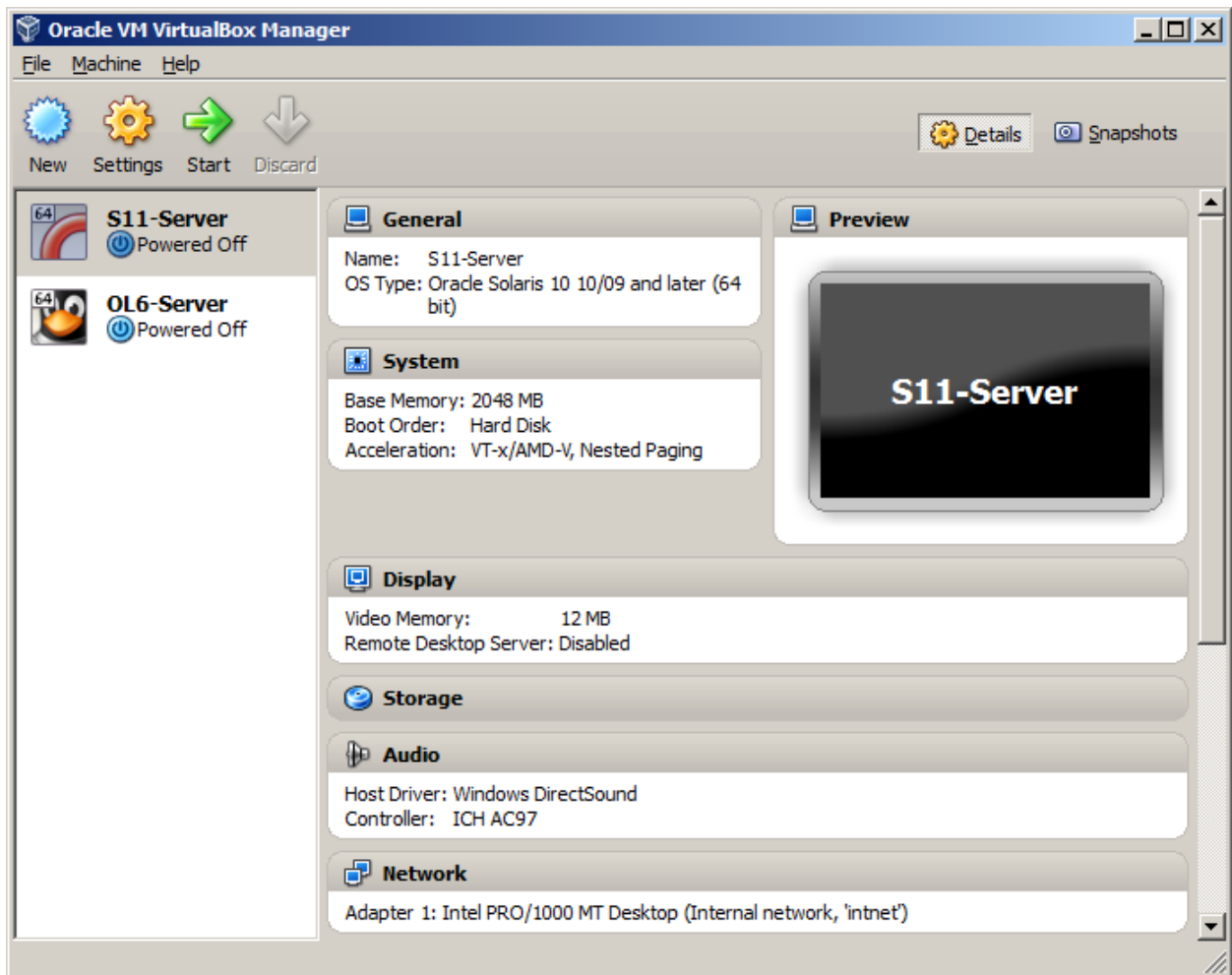
2. After the S11-Server VM is powered ON, log in with the username `student` and password `student1`.

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S11-Server

Username: student

Log In

3. Similarly, to start the OL6-Server VM, log in to the virtual machine with the username `student` and password `student1`.

   Note: All VMs use this login combination.

Task3: Opening a Terminal Window

1. After successfully logging in into the VMs, right-click on the desktop and select the **Open Terminal** option in the Oracle Solaris VM or the **Open in Terminal** option in the Oracle Linux VM.

   Note: In Oracle Linux VM, the default directory will be `/home/student/Desktop`. You would require switching to `/home/student` directory in order to perform practice tasks. Your instructor will guide you through this process as you proceed to later practices.

2. In the terminal window, type the `su` command to assume primary administrator privileges.

3. Enter `oracle1` when prompted for password.

```
student@S11-Server:~$ su
Password: oracle1
root@S11-Server:~#
```

Task4: Closing and Powering off a Virtual Machine

1. Close a VM by clicking the **close (X)** button that is located on the top-right corner of the VM's window.

2. In the Close Virtual Machine dialog box, select **Send the shutdown signal** option and click **OK.**

Close Virtual Machine

You want to:

💾 ○ Save the machine state

⏻ ● Send the shutdown signal

⚡ ○ Power off the machine

OK   Cancel   Help

Practices for Lesson 1: Introduction
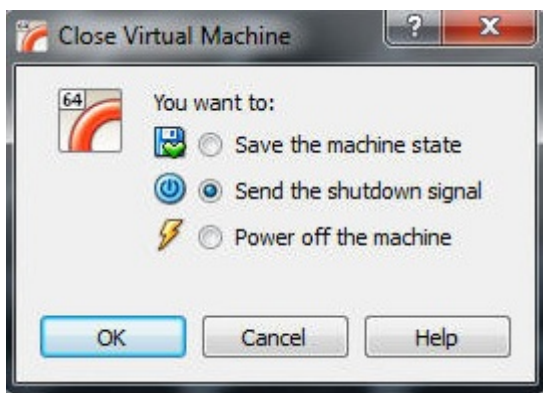
3. Repeat steps 7 and 8 to shut down the other VM, OL6-Server.
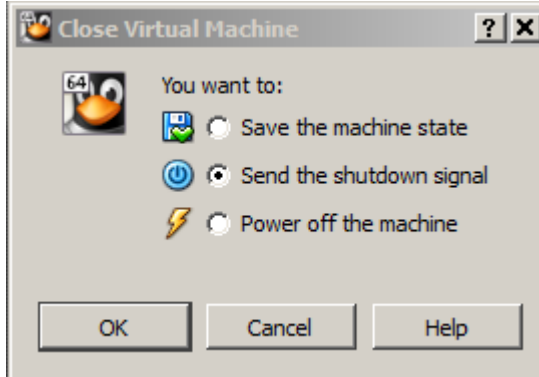
4. Verify that no VMs are running at this time, by viewing the status of the VMs in the Oracle VM VirtualBox Manager window. The status of the VMs should read **Powered Off**.

Special Instruction

- The practice tasks in this course are written for Oracle Solaris 11 environment (S11-Server), but can also be performed on Oracle Linux environment (OL6-Server). Therefore, it is recommended that one system be used at a time, preferably Oracle Solaris (S11-Server).
- Students will perform the exercises in the `/home/student` directory. For Oracle Linux, change the directory from `Desktop` to the /home/student directory. Your instructor will help with how to change the directory.
- The command output may vary from system to system.
- Shut down the VMs when not required. This releases system resources for the primary VM.
- Follow the instructions in the practices with diligence for a smooth learning experience.

Practices for Lesson 1: Introduction

Practices for Lesson 2: Introduction to UNIX

Chapter 2

Practices for Lesson 2

Practices Overview

In this practice, you will perform a set of tasks described in the corresponding lesson. Here is the list of those activities:

- Log in to the system
- Change your user login password
- Display system information using the command line
- Use the man pages
- Log out of the system

	UNIX and Linux Essentials - Activities Checklist
☑	Introduction
☑	**Introduction to UNIX**
	Working with Files and Directories
	Using the vi Editor
	Using Commands within the Default Shell
	Using Basic File Permissions
	Performing Basic Process Control
	Using Advanced Shell Functionalities in Shell Scripts
	Archiving Files and Remote Transfer

Practices for Lesson 2: Introduction to UNIX

Practice 2-1: Logging In and Changing Your User Password

Overview

In this practice, you learn to login, logout, and use some common date, time commands in a UNIX system.

Assumptions

It is highly recommended that one system is used at a time. Please make sure that the instructions are followed as it is. In the task 3, you need to reboot the system as asked in the step before performing the key combination.

Task 1: Logging in to the Oracle Solaris and Oracle Linux systems

Note: You will first perform the following steps in the S11-Server VM (Oracle Solaris 11) and then in the OL6-Server VM (Oracle Linux 6.2). These VMs are exact replicas of the actual OS environment.

1. In the Oracle VM VirtualBox Manager window, double-click the **S11-Server** VM to start it. Alternatively, you can select the **S11-Server** VM and click the **Start** button.
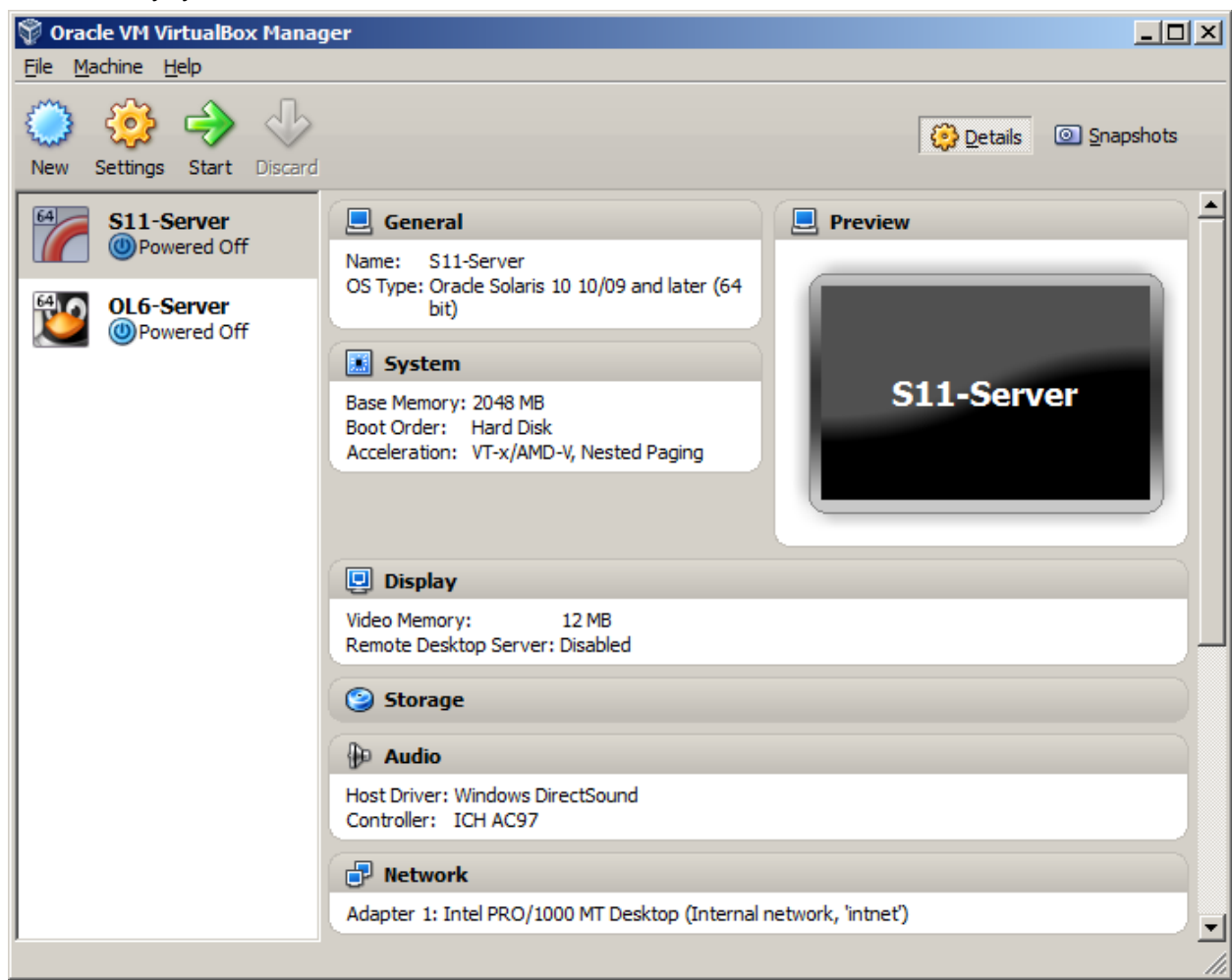
2. In the desktop Login screen, enter the user credentials.
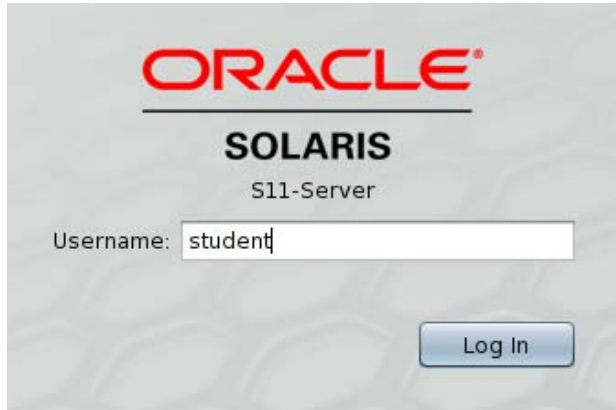
a.   Type the username, and press **Enter**.

b.   Username: **student**

c.   Type your password, and press **Enter** or the click the **Log In** button.

d.   Password: **student1**

3.   Similarly, in the Oracle VM VirtualBox Manager window, double-click the **OL6-Server** VM to start it. Alternatively, you can select the **OL6-Server** VM and click the **Start** button.

a.   In the desktop Login screen, enter the user credentials.

Practices for Lesson 2: Introduction to UNIX

OL6-Server

student

Password: ••••••••

Cancel   Log In
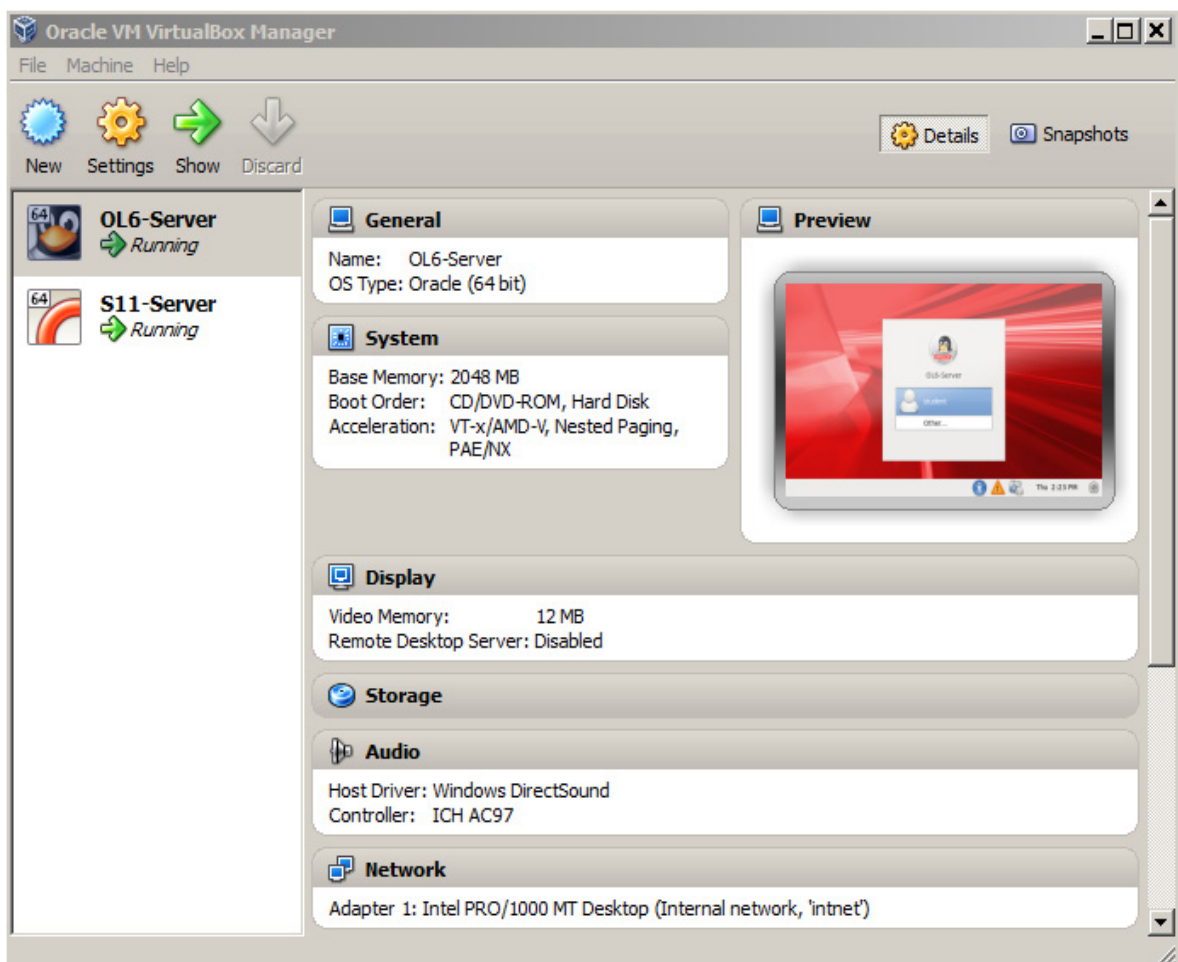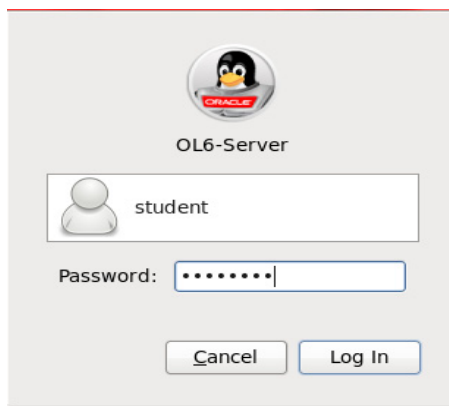
b.   The default username **student** is already listed there.

c.   Type your password, and press **Enter** or click the **Log In** button.

d.   Password: **student1**

Task 2: Changing your User Password

In Oracle Solaris 11:

1.   Right-click in the desktop background. The workspace menu opens.

2.   Select the **Open Terminal** option. A terminal window appears.

   Note: In Oracle Linux 6.2, the menu item is **Open in Terminal**.

3.   Use the passwd command to change your password to mypass1.

```
student@S11-Server:~$ passwd
passwd: Changing password for student
New Password:
Re-enter new Password:
passwd: password successfully changed for student
student@S11-Server:~$
```

4.   Close the terminal window.

5.   On the desktop window, click **System**.

6.   Next, click **Log Out <username>** to log out of the desktop environment. A logout confirmation window appears.

   Note: The username is student (without quotes).

Log out of this system now?

You are currently logged in as "student".
You will be automatically logged out in 50 seconds.

Switch User   Cancel   Log Out

Practices for Lesson 2: Introduction to UNIX
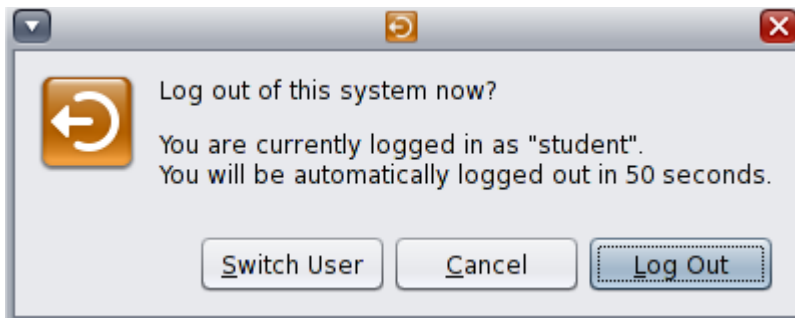
7. Click **Logout Anyway**.
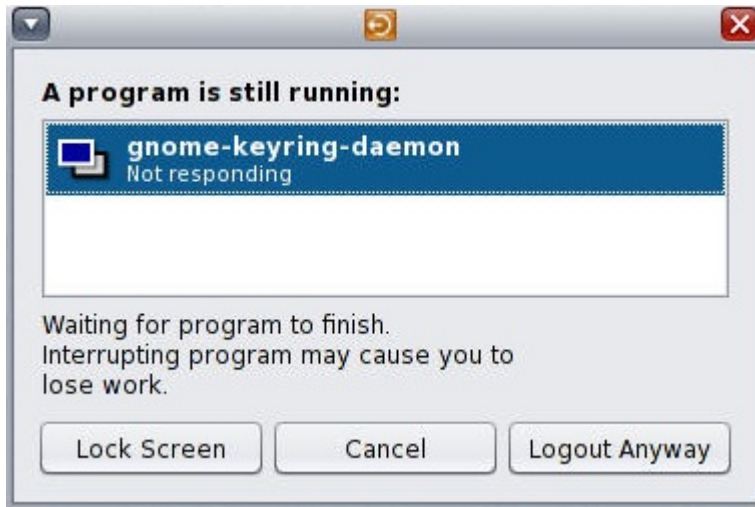
8. Now, enter the following incorrect username and password on the Login screen:

    Username: **student2**

    Password: **wrong**

    The following dialog box appears indicating authentication failure.

9. Click **OK** or press **Enter**. The Login screen reappears.
10. Login with correct user credentials.

    Username: **student**

    Password: **mypass1**

11. Now, repeat steps 1,2, and 3 to reset the default password of the user before moving to the next task. The default password is student1.

In Oracle Linux 6.2:

1. Right-click the desktop environment background. The workspace menu appears.
2. Select **Open in Terminal** from this menu. A terminal window appears.
3. Use the passwd command to change your password to mypass1.

    Note: Oracle Linux follows a stricter password authentication mechanism, by default. Therefore, you need to use a strong password.

```
[student@OL6-Server Desktop]$ passwd
Changing password for user student.
Changing password for student.
(current) UNIX password:
New password:
```

```
Retype new password:
passwd: all authentication tokens updated successfully.
[student@OL6-Server Desktop]$
```

4. Close the terminal window.
5. On the desktop environment, click **System.**
6. Next, click **Log Out <username>** to log out of the desktop environment. A logout confirmation window appears.
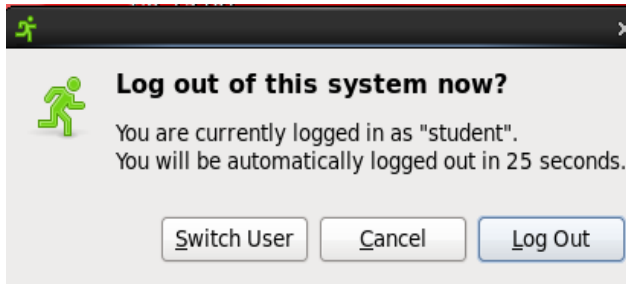
Note: Username is student.

7. Click **Log Out** or press **Enter** to continue with logging out.
8. Now click **Other** to try an incorrect username and password.
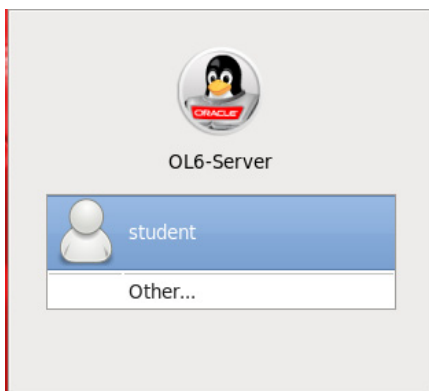
9. Enter the following incorrect username and password on the Login screen:

Username: **student2**

Password: **wrong**

10. The following dialog box appears indicating authentication failure.

Click **OK** or press **Enter.** The Login screen reappears.

Practices for Lesson 2: Introduction to UNIX
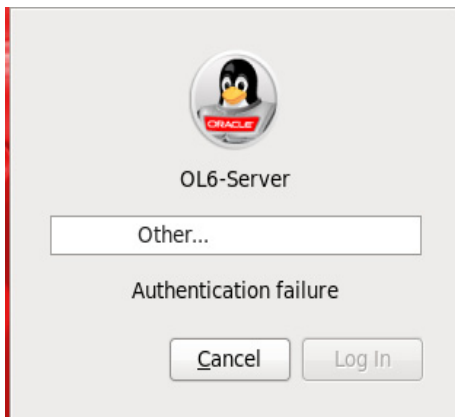
11. Log in with the correct user credentials.

Username: **student**

Password: **mypass1**

12. Now, repeat steps 1, 2, 3, and 4 to reset the default password of the user before moving to the next task. The default password is student1.

Task 3: Accessing a Terminal Window and Logging in using the Command Line

In Oracle Solaris 11 (S11-Server):

1. Restart the system by clicking on menu item – **System**. Choose **Shut Down** and then click the **Restart** button.

Practices for Lesson 2: Introduction to UNIX
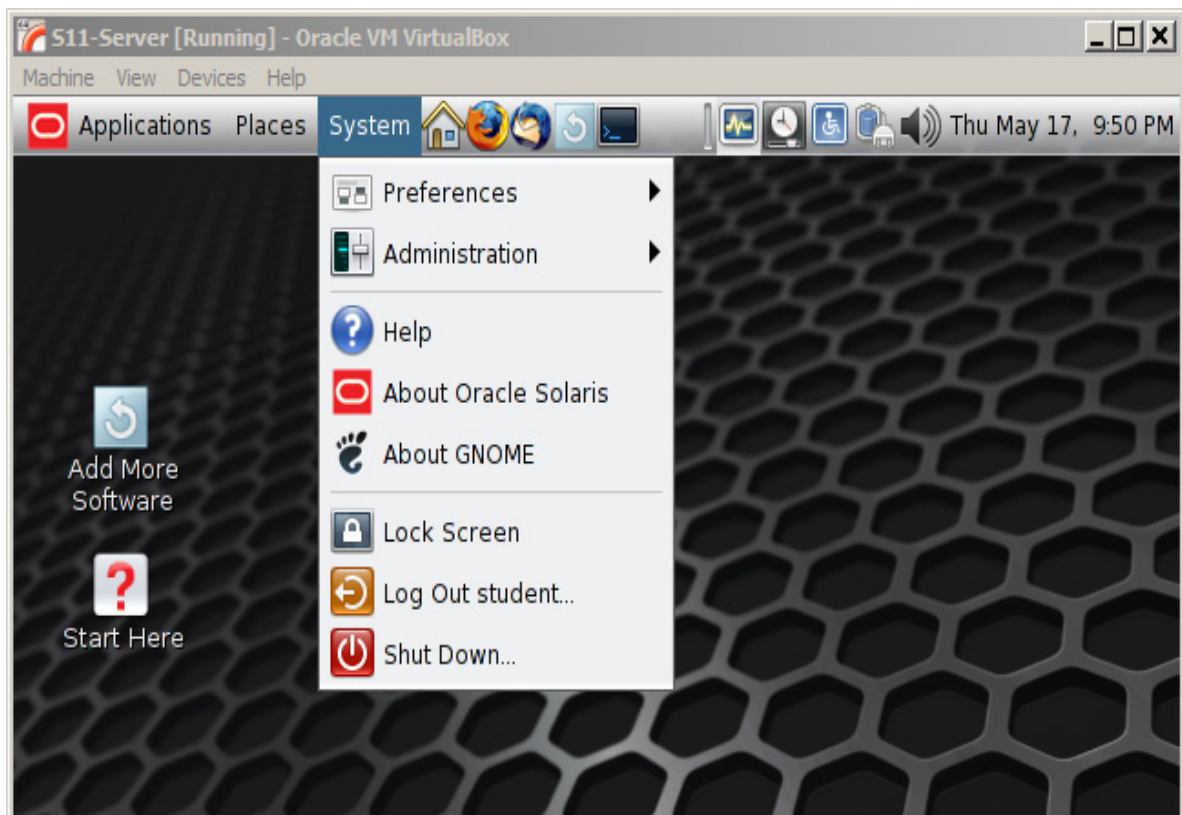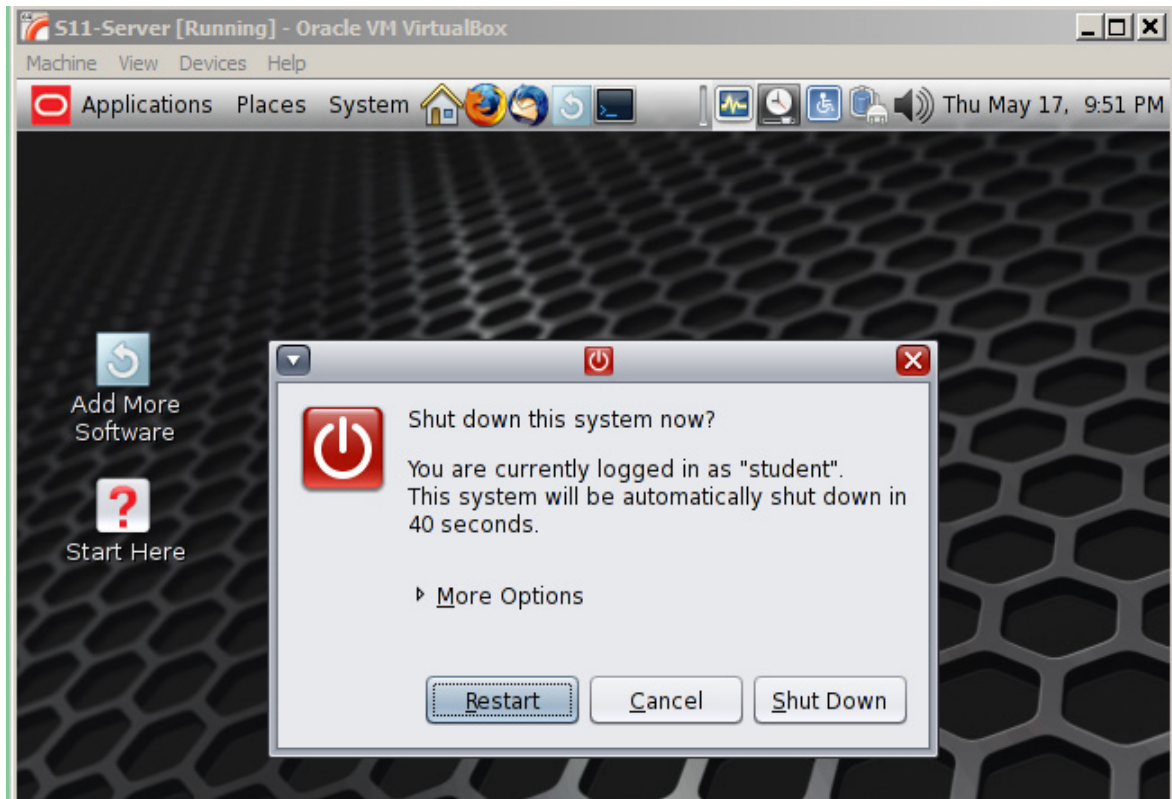
a. Once the system is restarted and graphical login window appears,

Practices for Lesson 2: Introduction to UNIX
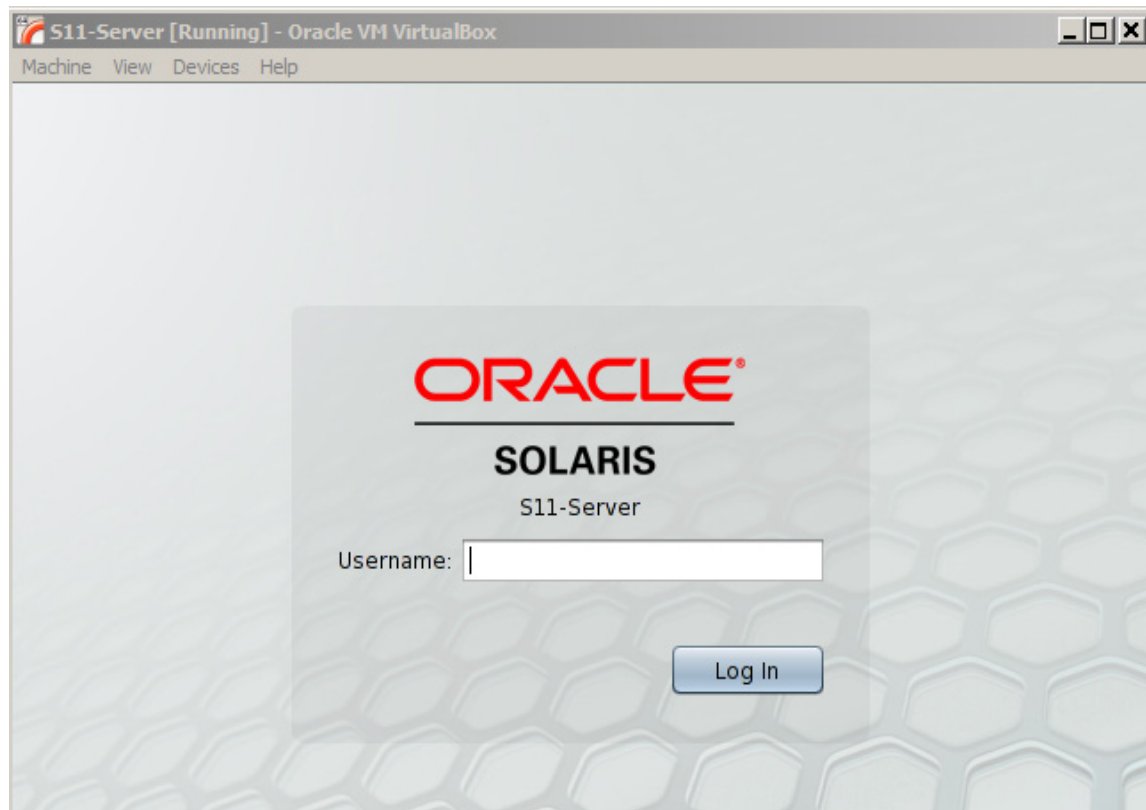
Press CTRL+ALT+F1 to switch to the command line login. This switches the view to console login.

b. On the console prompt, login with the username student and password student1.

c. To confirm the current working directory, use the pwd command.

```
S11-Server console login: student
Password: student1
Last login: Sat May 12 20:11:44 on rad/0
Oracle Corporation   SunOS 5.11 11.0  November 2011
You have new mail.
student@S11-Server:~$ pwd
/home/student
```

d. To revert to the graphics mode, Press CTRL+ALT+F7.

Practices for Lesson 2: Introduction to UNIX
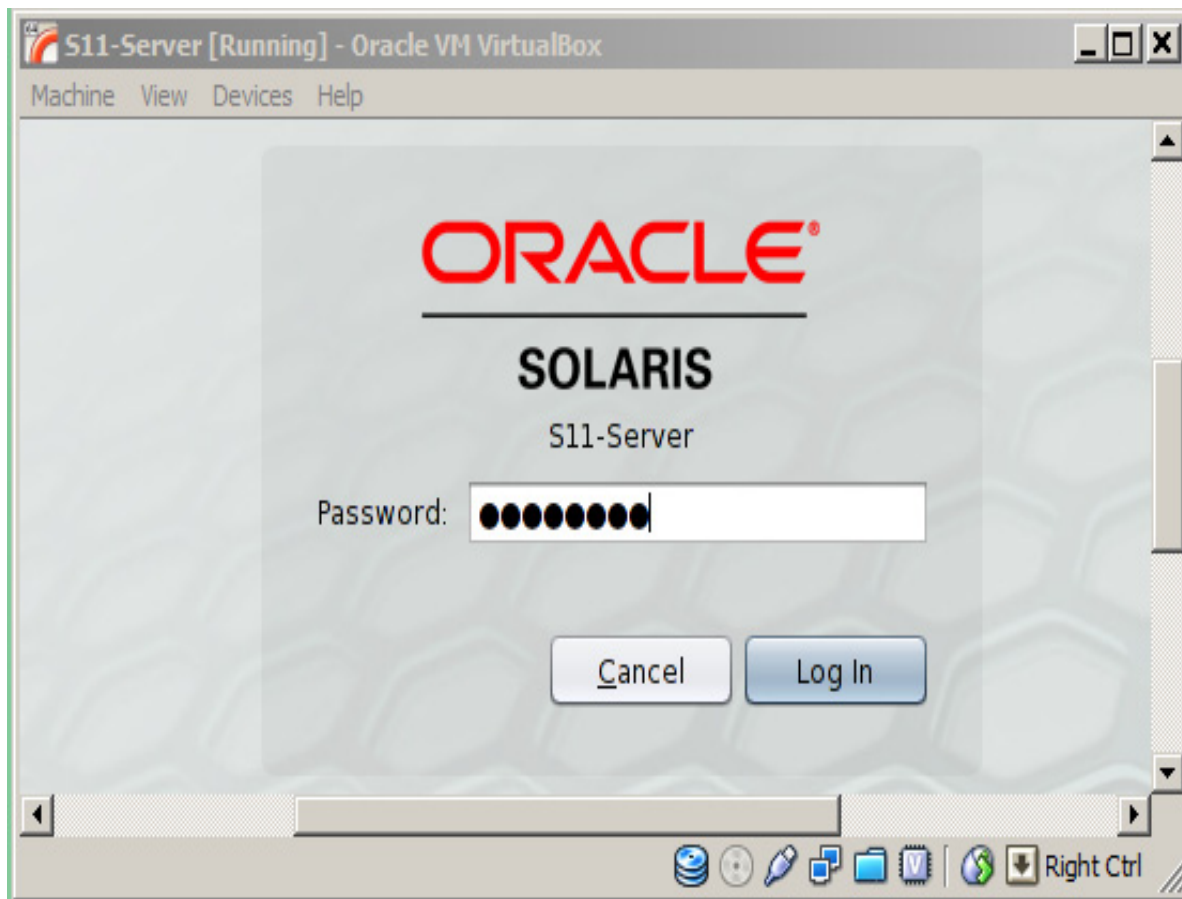
e.   In the Login window, enter the user credentials.

Username: **student**

Password: **student1**

f.   Click the **Log In** button.

g.   Right-click the Desktop and select the **Open Terminal** option.

h.   Again, view the current directory using the pwd command.

```
student@S11-Server:~$
student@S11-Server:~$ pwd
/home/student
student@S11-Server:~$
```

In Oracle Linux 6.2 (OL6-Server):

1.   Restart the system by clicking on menu item – **System**. Choose **Shut Down** and then click the **Restart** button.

Practices for Lesson 2: Introduction to UNIX
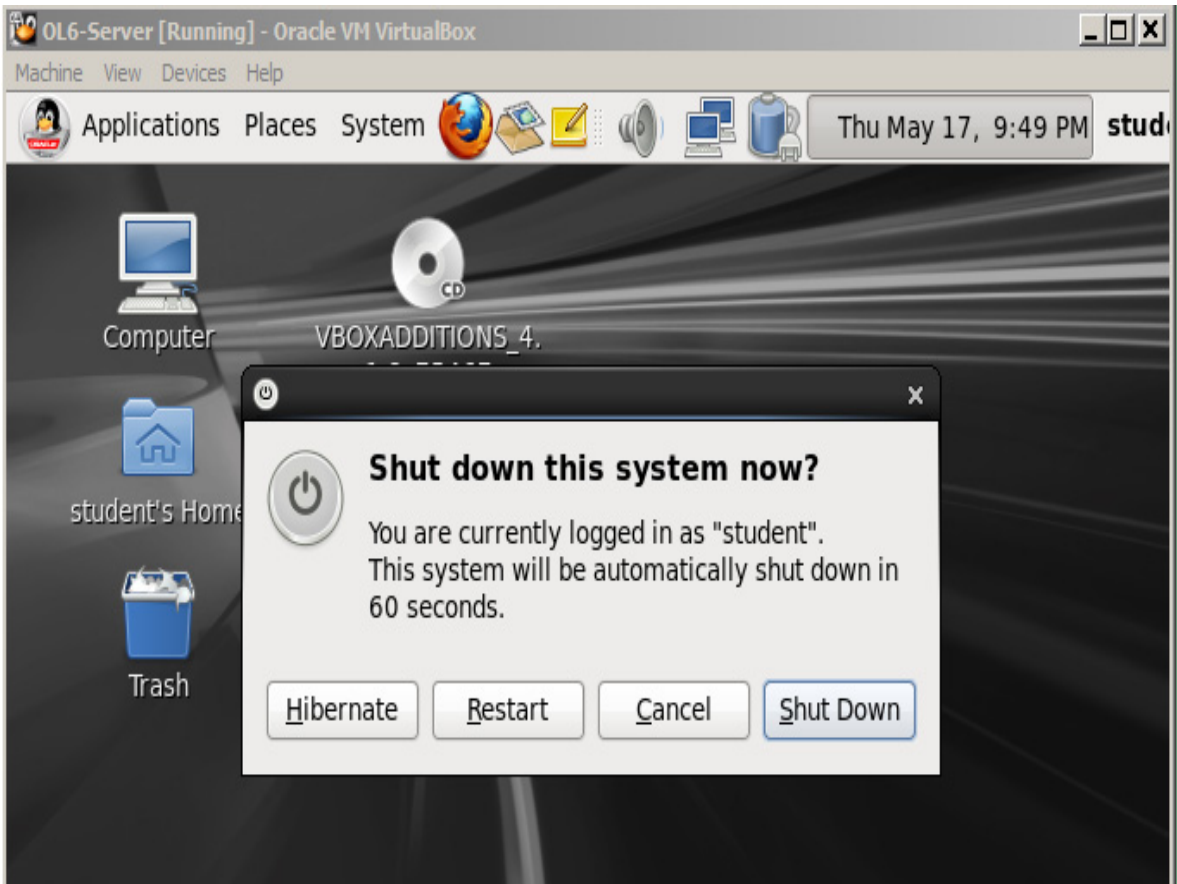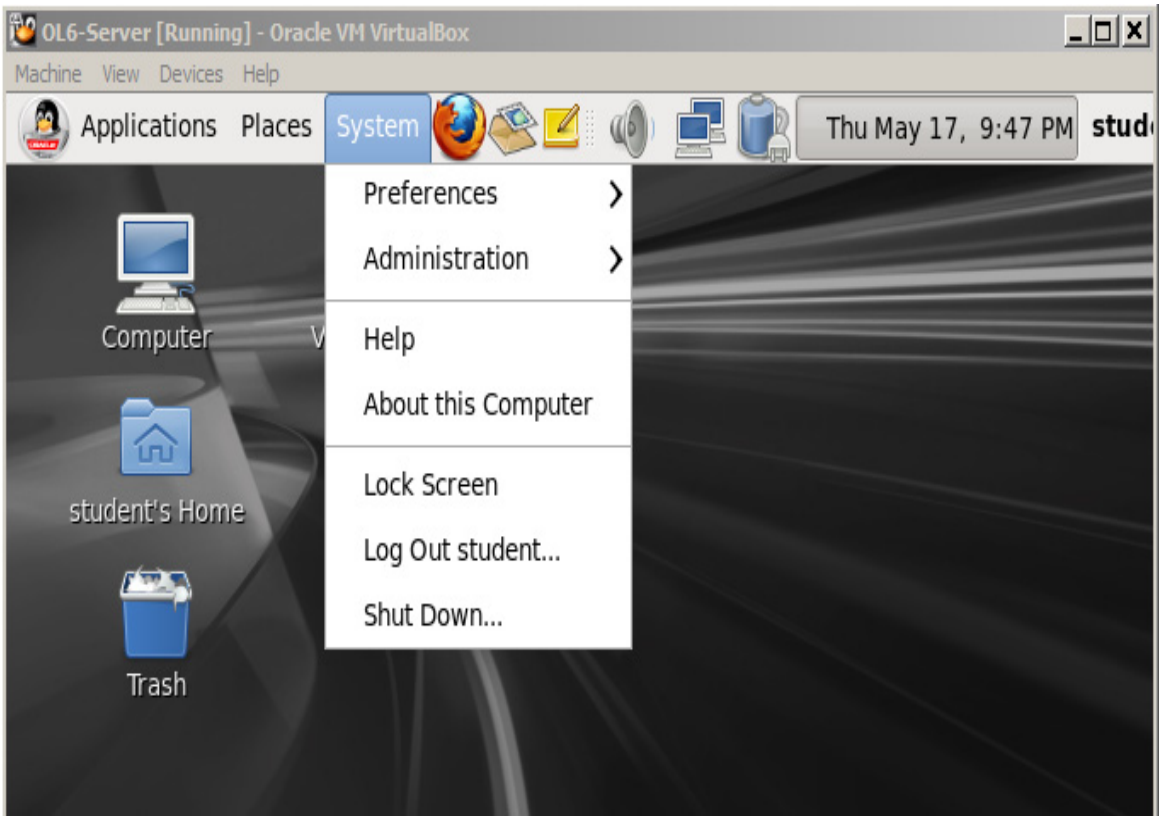
2. Once the system is restarted and the graphical login window appears, press CTRL+ALT+F6 on the login window to switch to a text console and perform a non-GUI login.
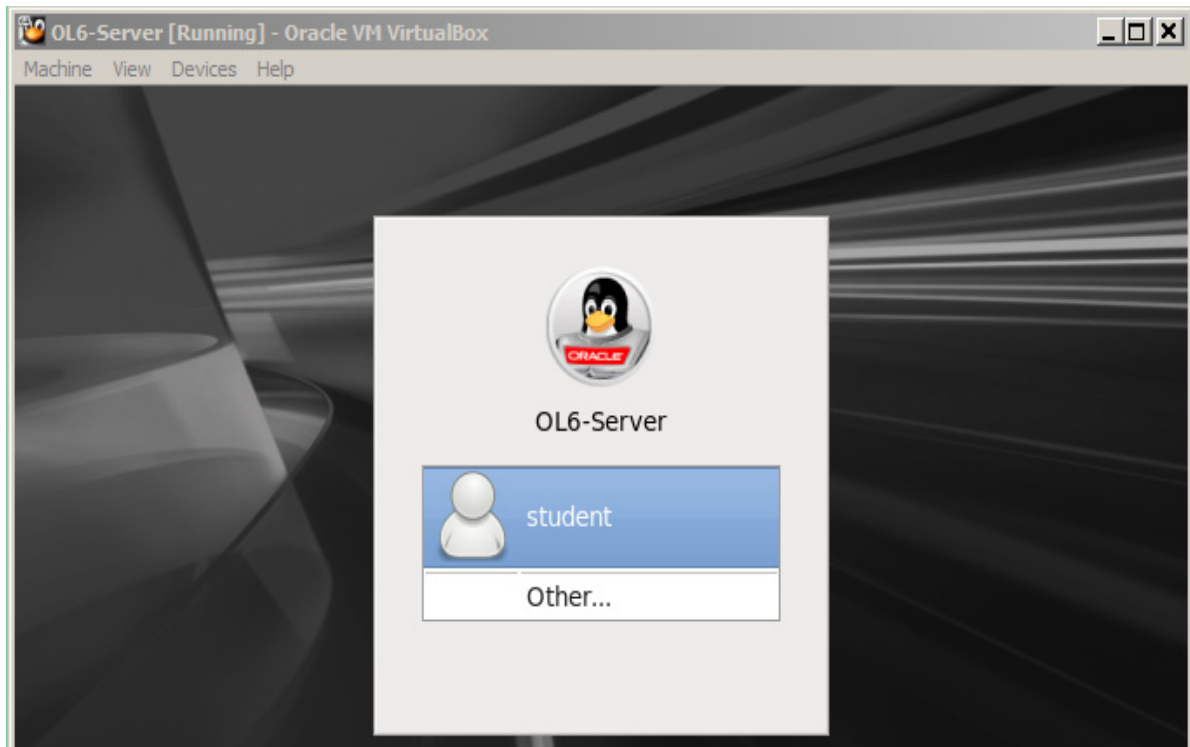
This switches the view to console login.

3. In the console prompt, log in with the username student and password student1

Practices for Lesson 2: Introduction to UNIX
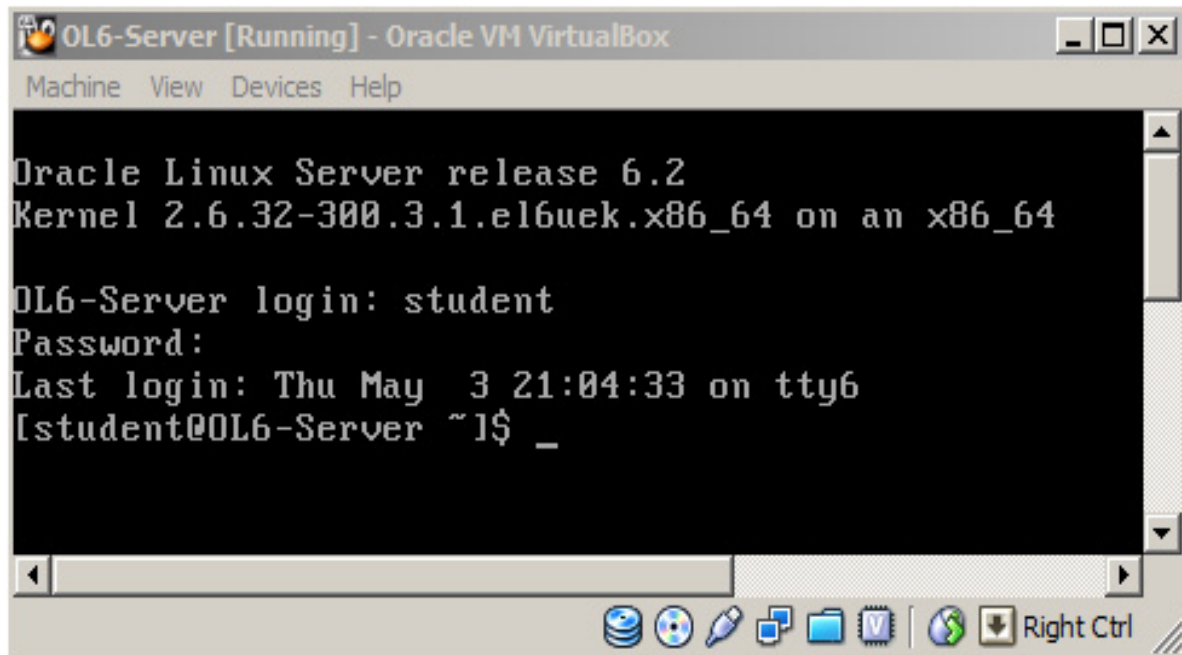
4. To confirm the current working directory, enter the `pwd` command.

```
OL6-Server login: student
Password: student1
Last login: Mon May 14 12:19:27 from s11-server.suned.sun.com
[student@OL6-Server ~]$ pwd
/home/student
[student@OL6-Server ~]$
```

5. To revert to the graphical mode, press `CTRL+ALT+F1`.

6. You may be prompted to enter the password information for the user student. When done, the GUI interface is launched.
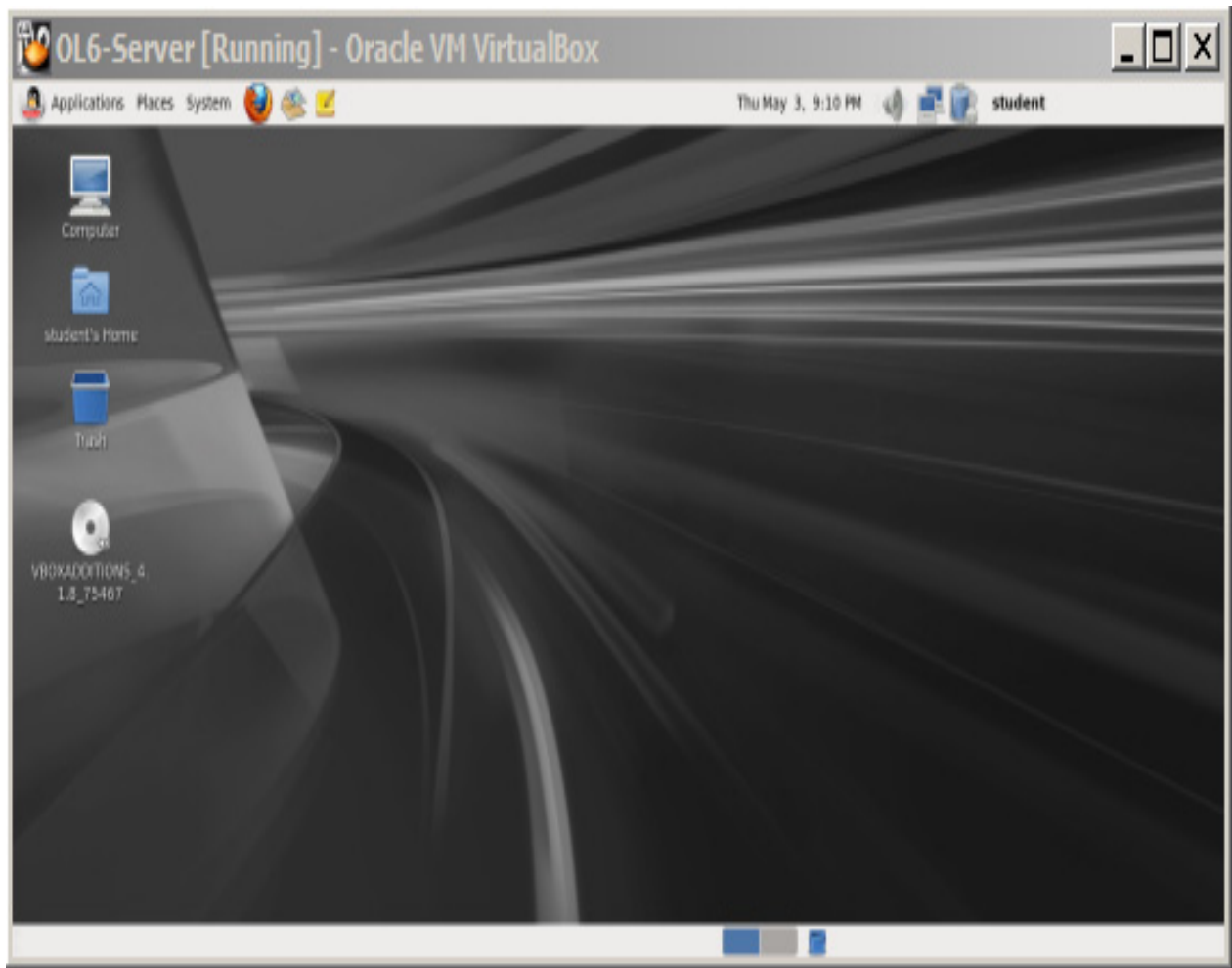
Note: If you have already logged out, you will be prompted to enter both the user name and password.

Practice 2-2: Displaying System Information Using the Command Line

Overview

In this practice, you will display information about the OS and system.

Assumptions

It is recommended to use one system at a time. Students will perform the exercises in the `/home/student` directory. For Oracle Linux change the directory from `Desktop` to the `/home/student` directory. Your instructor will help you on how to change the directory. The output may vary from system to system.

Tasks

Ensure that the S11-Server is running.

1. To open a terminal window, right-click on the desktop and select the **Open Terminal** option.
2. Display information about the OS and system.

   ```
   student@S11-Server:~$ uname -a
   SunOS S11-Server 5.11 11.0 i86pc i386 i86pc


   Note: Operating system x 86 versions of SUNOS
   ```

3. Display information about the OS name.

   ```
   student@S11-Server:~$ uname -s
   SunOS
   ```

4. Display information about the OS release level.

   ```
   student@S11-Server:~$ uname -r
   5.11
   student@S11-Server:~$


   Note: OS release level is 5.11
   ```

5. Display the current data and time.

   ```
   student@S11-Server:~$ date
   Monday, April 30, 2012 06:14:21 PM IST
   ```

6. Display the current month's calendar.

   ```
   student@S11-Server:~$ cal
      April 2012
    S  M Tu  W Th  F  S
    1  2  3  4  5  6  7
    8  9 10 11 12 13 14
   15 16 17 18 19 20 21
   22 23 24 25 26 27 28
   29 30
   ```

7. Display the calendar with a specific month and year; for example, June 2012.

```
student@S11-Server:~$ cal 06 2012
    June 2012
 S  M Tu  W Th  F  S
               1  2
 3  4  5  6  7  8  9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
```

8. Clear the terminal window.

```
student@S11-Server:~$ clear
```

9. Display the current date and host system name.

```
student@S11-Server:~$ date; hostname
Wednesday, May 23, 2012 03:28:42 PM IST
S11-Server
```

   Note: Hostname value for Oracle Linux will be OL6-Server.

10. Display the calendar for March 2012, the current date, and the OS release information.

```
student@S11-Server:~$ cal 03 2012; date; cat /etc/release
    March 2012
 S  M Tu  W Th  F  S
               1  2  3
 4  5  6  7  8  9 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30 31


Wednesday, May 23, 2012 03:29:10 PM IST


                     Oracle Solaris 11 11/11 X86
   Copyright (c) 1983, 2011, Oracle and/or its affiliates.  All
rights reserved.
                          Assembled 18 October 2011
student@S11-Server:~$
```

   Note: In OL6-Server run `cat /etc/*-release` command.

Practice 2-3: Using the Man Pages

Overview

In this practice, you learn to use the `man` command to extract additional information about system commands.

Assumption

It is recommended that one system be used at a time. Students will perform the exercises in the `/home/student` directory. For Oracle Linux, change the directory from `Desktop` to the `/home/student` directory. Your instructor will help on how to change the directory.

Tasks

1. Displaying a man page and man page section

   a. To display the man page for the `exit` command, run the `man` command.

   ```
   student@S11-Server:~$ man exit
   ```

   b. To display the man page section 1 for the `exit` command, run the command as below.

   ```
   student@S11-Server:~$ man exit -s1
   ```

   c. To display the man page section 2 for the `exit` command, run the command as below:

   ```
   student@S11-Server:~$ man exit -s2
   ```

   Note: You can use the keys and related functions of the `man` command as listed in the table in the following step.

   d. Scrolling in a man page.

   To learn how to search for online documentation using `man` command, use the keys or the functions as mentioned in the below table.

   ```
   student@S11-Server:~$ man uname -s1
   ```

   Note: Practice the key options provided in the table below with the above command to achieve the desired functions as mentioned.

2.

Keys	Function
Space bar	Displays the next screen of a `man` page
Return	Displays the next line of a `man` page
b	Move back one full screen of the man page
/pattern	Searches forward for a pattern
n	Find the next occurrence of the pattern
Q	Quits the `man` command and returns to the shell prompt

   Display the man page for the `uname` command.

   ```
   student@S11-Server:~$ man uname
   ```

3. Display section 1 of the man page for the `uname` command.

   ```
   student@S11-Server:~$ man uname -s1
   ```

Practices for Lesson 2: Introduction to UNIX

4. Search the man pages for information on the man command using the keyword "`man`".

```
student@S11-Server:~$ man man | grep man
```

5. Display section 1 of the man page for the man command and review its contents.

```
student@S11-Server:~$ man man -s1
```

6. To quit the man page, press `q`.

```
student@S11-Server:~$ man man <Enter>
(Press 'q')
Reformatting page.  Please Wait... done
```

7. To logout from the system, type the `exit` command.

```
student@S11-Server:~$
student@S11-Server:~$ exit


Note: The exit command will close the terminal
```

Practices for Lesson 2: Introduction to UNIX

Practices for Lesson 3: Working with Files and Directories

Chapter 3

Practices for Lesson 3

Practices Overview

In this practice, you will perform a set of tasks described in the corresponding lesson. Here is the list of those activities:

- Display user information
- Display directory contents
- Display file types
- Change directories
- Access files
- Copy files and directories
- Move files and directories
- Create files and directories
- Remove files and directories
- Use symbolic links
- Search files and directories

	UNIX and Linux Essentials - Activities Checklist
☑	Introduction
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☑	**Working with Files and Directories**
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	Performing Basic Process Control
	Using Advanced Shell Functionalities in Shell Scripts
	Archiving Files and Remote Transfer

Practices for Lesson 3: Working with Files and Directories

Practice 3-1: Accessing Files and Directories

Overview

In this practice, you will be directed to run some file and directory access commands. Also, in a few instances, you will be prompted to answer some questions

Assumptions

It is recommended that one system be used at a time. Students will perform the exercises in the /home/student directory. For Oracle Linux, change the directory from Desktop to the /home/student directory. Your instructor will help with changing the directory. In a few instances, the output may vary on your system.

Preparation

In this practice, you need to use the files and directories available in the /home/student/lab directory.

Tasks

1. Open a terminal window by right-clicking on the desktop.
2. Select the **Open Terminal** option.
3. Display user information using the id command.

    ```
    student@S11-Server:~$ id
    uid=60004(student) gid=10(staff)
    student@S11-Server:~$
    ```

    Note: The output may differ in Linux environment.

4. Display your current working directory using the pwd command.

    ```
    student@S11-Server:~$ pwd
    /home/student
    ```

5. Change to your home directory from any location using the cd command.

    ```
    student@S11-Server:~$ cd
    student@S11-Server:~$ pwd
    /home/student
    student@S11-Server:~$
    ```

6. Display the contents of your current working directory using the ls command.

    ```
    student@S11-Server:~$ ls
    Desktop    Documents  Downloads lab   Public
    student@S11-Server:~$


    ```

    Note: Command output may vary from system to system.

7. Display all files, including any hidden files, using the ls -a command.

    ```
    student@S11-Server:~$ ls -a
    .                           .local
    ..                          .nautilus
    ```

```
.audioctl                    .profile
.bash_history                .recently-used.xbel
.bashrc                      .updatemanager
.config                      .vboxclient-clipboard.pid
.dbus                        .vboxclient-display.pid
.dbus-keyrings               .vboxclient-seamless.pid
.dmrc                        .vp
.gconf                       .xsession-errors
.gconfd                      .xsession-errors.old
.gnome2                     Desktop
.gnome2_private             Documents
.gstreamer-0.10             Downloads
.gtk-bookmarks              lab
.ICEauthority               Public
student@S11-Server:~$
```

8. Display a long list of the contents of the current working directory using the `ls -l` command.

```
student@S11-Server:~$ ls -l
total 12
drwxr-xr-x   2 student  staff        5 Apr  9 19:03 Desktop
drwxr-xr-x   6 student  staff        6 Apr  9 19:03 Documents
drwxr-xr-x   2 student  staff        2 Apr  9 19:03 Downloads
drwxr-xr-x   17 student root        39 Apr 30 19:30 lab
drwxr-xr-x   2 student  staff        2 Apr  9 19:03 Public
student@S11-Server:~$
```

9. Display the file types in your current working directory using the `ls -F` command.

```
student@S11-Server:~$ ls -F
Desktop/    Documents/  Downloads/        lab/  Public
student@S11-Server:~$
```

10. Change to the `dir1` directory using the `cd` command.

```
student@S11-Server:~$ cd lab
student@S11-Server:~/lab$ cd dir1
student@S11-Server:~/lab/dir1$
```

11. Display a long list of the contents of the current working directory using `ls -l` command.

```
student@S11-Server:~/lab/dir1$ ls -l
total 9
drwxr-xr-x   3 root    root         5 Apr 30 19:30 coffees
drwxr-xr-x   2 root    root         2 Apr 30 19:30 fruit
drwxr-xr-x   2 root    root         2 Apr 30 19:30 trees
student@S11-Server:~/lab/dir1$
```

Practices for Lesson 3: Working with Files and Directories

12. Change to the `fruit` directory using the `cd` command.

```
student@S11-Server:~/lab/dir1$ cd fruit
student@S11-Server:~/lab/dir1/fruit$ pwd
/home/student/lab/dir1/fruit
student@S11-Server:~/lab/dir1/fruit$
```

13. Change to the `planets` directory available under `$HOME/dir3` directory using the relative path name.

```
student@S11-Server:~/lab/dir1/fruit$ cd ../../dir3/planets
student@S11-Server:~/lab/dir3/planets$ pwd
/home/student/lab/dir3/planets


Now, return to the home directory


student@S11-Server:~/lab/dir3/planets$ cd
student@S11-Server:~$ pwd
/home/student
student@S11-Server:~$
```

14. Change to the `dir1` directory by using the absolute path name.

```
student@S11-Server:~$ cd /home/student/lab/dir1
student@S11-Server:~/lab/dir1$ pwd
/home/student/lab/dir1
student@S11-Server:~/lab/dir1$ cd ~/lab/dir1
student@S11-Server:~/lab/dir1$ cd
student@S11-Server:~$ pwd
/home/student
student@S11-Server:~$
```

15. Change to the `/etc` directory by using the relative path name.

```
student@S11-Server:~$ pwd
/home/student
student@S11-Server:~$ cd ../../../etc
student@S11-Server:/etc$ pwd
/etc
student@S11-Server:/etc$
student@S11-Server:/etc$ cd ~/lab
student@S11-Server:~/lab$
student@S11-Server:/lab$ cd dir1


 Now, return to the home directory


student@S11-Server:~/lab/dir1$ cd
student@S11-Server:~$ pwd
```

```
/home/student
student@S11-Server:~$
```

16. Display the contents of the `fruit` file by using the `cat` command.

```
student@S11-Server:~$ cd lab
student@S11-Server:~/lab$ cat fruit
lemon
orange
apple
banana
pear
mango
tomato
pomegranate
```

17. Under what circumstances must you refrain from using the `cat` command?

   The `cat` command should not be used for viewing binary files.

18. Display the contents of the `fruit` and `fruit2` files using a single command.

```
student@S11-Server:~/lab$ cat fruit fruit2
lemon
orange
apple
banana
pear
mango
tomato
pomegranate

lemon
orange
apple
banana
tomato
guava
mango
pomegranate
student@S11-Server:~/lab$
```

19. Display the first five lines of the `/usr/dict/words` file on the screen.

```
student@S11-Server:~/lab$ head -5 /usr/dict/words
10th
1st
2nd
3rd
4th
student@S11-Server:~/lab$


Note: In the Oracle Linux environment (OL6-Server), the file path is
/usr/share/dict/words.
```

20. Display the last eight lines of the `/usr/dict/words` file on the screen.

```
student@S11-Server:~/lab$ tail -8 /usr/dict/words
Zorn
Zoroaster
Zoroastrian
zounds
z's
zucchini
Zurich
Zygote
student@S11-Server:~/lab$
```

21. How to distinguish between the `head` and `tail` commands?

The `head` command displays the first 10 lines of a file, while the `tail` command displays the last 10 lines of a file.

22. Determine the total number of lines contained in the `/usr/dict/words` file using `wc -l` command.

```
student@S11-Server:~/lab$ wc -l /usr/dict/words
   25146 /usr/dict/words


Note: Output may vary from system to system
```

23. What does the ~ symbol represent?

The ~ symbol represents the user's home directory.

Practice 3-2: Using File and Directory Commands

Overview

In this practice, you will perform some actions on files and directories using file and directory commands.

Assumptions

It is recommended that one system be used at a time. Students will perform the exercises in the /home/student directory. For Oracle Linux, change the directory from Desktop to the /home/student directory. Your instructor will help with changing the directory. In a few instances, the output may vary on your system.

Tasks

To use file and directory commands, complete the following steps:

1. Return to your home directory, if you need to, and list the content in that directory.

    ```
    student@S11-Server:~/lab$ cd
    student@S11-Server:~$ pwd
    /home/student
    student@S11-Server:~$ ls
    Desktop    Documents  Downloads  lab        Public
    student@S11-Server:~$
    ```

2.   The files and directories are located in the lab directory in your home directory. Therefore, to switch to the lab directory, use the cd command.

    ```
    student@S11-Server:~$ cd lab
    ```

3. Copy the /dir1/coffees/beans/beans file into the dir4 directory, and call it roses.

    ```
    student@S11-Server:~/lab$ cp dir1/coffees/beans/beans dir4/roses
    ```

4. Create a directory called vegetables in dir3.

    ```
    student@S11-Server:~/lab$ mkdir dir3/vegetables
    ```

5. Move the dir1/coffees/beans/beans file into the dir2/recipes directory.

    ```
    student@S11-Server:~/lab$ mv dir1/coffees/beans/beans
    dir2/recipes
    ```

6. Command options for the reference in the table below:

7.

Option	Description
cp -i	Prevents you from accidentally overwriting existing files or directories
-r	Includes the contents of a directory, including the contents of all subdirectories, when you copy a directory

    From your lab directory, create a directory called practice1.

    ```
    student@S11-Server:~/lab$ mkdir practice1
    ```

8. Using a single command, copy the file.1 and file.2 files to the practice1 directory.

    ```
    student@S11-Server:~/lab$ cp file.1 file.2 practice1
    ```

9. Copy `dir3/planets/mars` file to the `practice1` directory, and name the file `addresses`.

```
student@S11-Server:~/lab$ cp dir3/planets/mars
practice1/addresses
```

10. Create a directory called `play` in your `practice1` directory, and move the `practice1/addresses` file to the play directory.

```
student@S11-Server:~/lab$ mkdir practice1/play
student@S11-Server:~/lab$ mv practice1/addresses practice1/play
```

11. Using a single command, copy the `play` directory in the `practice1` directory to a new directory in the `practice1` directory called `appointments`.

```
student@S11-Server:~/lab$ cp -r practice1/play
practice1/appointments
```

12. Recursively list the contents of the `practice1` directory.

```
student@S11-Server:~/lab$ ls -R practice1
practice1:
appointments   file.1        file.2        play

practice1/appointments:
addresses

practice1/play:
addresses
student@S11-Server:~/lab$
```

13. In your home directory, create a directory called `house` with a subdirectory called `furniture` using a single command.

```
student@S11-Server:~/lab$ cd; mkdir -p house/furniture
```

14. Create an empty file called `chairs` in the new `furniture` directory.

```
student@S11-Server:~$ touch house/furniture/chairs
```

15. Using a single command, create three directories called `records`, `memos`, and `misc` in your `home` directory.

```
student@S11-Server:~$ mkdir records memos misc
```

16. Create a new file called `carrot`, and rename it to `celery`.

```
student@S11-Server:~$ touch carrot
student@S11-Server:~$ mv carrot celery
```

17. Using a single command, remove the directories called `memos` and `misc` from your home directory.

```
student@S11-Server:~$ rmdir memos misc
     or
student@S11-Server:~$ rm -r memos misc
```

18. Try to remove the directory called house/furniture with the rm (no options) command. Observe what happens.

```
student@S11-Server:~$ rm house/furniture
rm: house/furniture is a directory
```

19. Identify the command to remove a directory that is not empty. Remove the house/furniture directory. List the contents of the house directory to verify that the furniture directory has been removed.

```
student@S11-Server:~$ rm -r house/furniture
student@S11-Server:~$ ls house
student@S11-Server:~$
```

20. Create a new directory named newname, and rename it veggies.

```
student@S11-Server:~$ mkdir newname
student@S11-Server:~$ mv newname veggies
student@S11-Server:~$
```

21. Create a file named mycontents that is a symbolic link to the file /var/sadm/install/contents.

(In Solaris)

```
student@S11-Server:~$ ln -s /var/sadm/install/contents
mycontents
```

(In Linux)

```
[student@OL6-Server ~]$ ln -s /home/student/lab/myvars  newvars
```

Note: Subsequent commands are listed for the Solaris environment. For Linux, VM use the respective file named, newvars as shown above.

22. Verify that the symbolic link works.

```
student@S11-Server:~$ more mycontents
/dev/vboxguest=../devices/pci@0,0/pci80ee,cafe@4:vboxguest s
none SUNWv
boxguest
/etc/fs/vboxfs d none 0755 root bin SUNWvboxguest
/etc/fs/vboxfs/mount=../../../opt/VirtualBoxAdditions/i386/vboxf
smount
s none SUNWvboxguest
/opt/VirtualBoxAdditions d none 0755 root bin SUNWvboxguest
/opt/VirtualBoxAdditions/1099.vboxclient f none 0755 root bin
1531 6218
4 1324300136 SUNWvboxguest
/opt/VirtualBoxAdditions/LICENSE f none 0644 root bin 20137
29940 13243
00136 SUNWvboxguest
/opt/VirtualBoxAdditions/VBox.sh f none 0755 root bin 1547 59419
132430
0136 SUNWvboxguest
```

```
/opt/VirtualBoxAdditions/VBoxClient=VBoxControl l none
SUNWvboxguest
/opt/VirtualBoxAdditions/VBoxControl f none 0755 root bin 11004
15922 1
324300136 SUNWvboxguest
/opt/VirtualBoxAdditions/VBoxISAExec=VBoxControl l none
SUNWvboxguest
/opt/VirtualBoxAdditions/VBoxService=VBoxControl l none
SUNWvboxguest
/opt/VirtualBoxAdditions/amd64 d none 0755 root bin
SUNWvboxguest
<q> Type q to quit the mycontents file view.
student@S11-Server:~$
```

23. Remove the symbolic link that you created in Step 21.

```
student@S11-Server:~$ rm mycontents
student@S11-Server:~$ ls mycontents
mycontents: No such file or directory
student@S11-Server:~$
```

Practices for Lesson 3: Working with Files and Directories

Practice 3-3: Locating Files and Text

Overview

In this practice, you will use `grep` and related commands to locate files and text in files.

Assumptions

In the below tasks, we will use `/etc/system` file, which is the system configuration file in Oracle Solaris. The equivalent file in Oracle Linux is `/etc/sysctl.conf`. It is recommended that one system be used at a time. Students will perform the exercises in the `/home/student` directory. For Oracle Linux, change the directory from `Desktop` to the `/home/student` directory. In a few instances, the output may vary on your system.

Tasks

1. How do the `grep`, `egrep`, and `fgrep` commands differ?

    * *The `grep` command searches the contents of one or more files for a character pattern.*

    * *The `egrep` command searches the contents of one or more files for one or more patterns using extended regular expression metacharacters.*

    * *The `fgrep` command searches a file for a literal string or a group of characters.*

2. Search for the text string `root` in the `/etc/group` file and display it on to the screen.

```
student@S11-Server:~$ grep root /etc/group
root::0:
other::1:root
bin::2:root,daemon
sys::3:root,bin,adm
adm::4:root,daemon
uucp::5:root
mail::6:root
tty::7:root,adm
lp::8:root,adm
nuucp::9:root
daemon::12:root
student@S11-Server:~$
```

3. Using the `grep` command, look for all lines in the `file4` file located in the `lab` directory under your home directory that does not contain the letter `M`.

```
student@S11-Server:~$ cd lab
student@S11-Server:~/lab$ grep -v M file4
The budget for quarter 2 is:
student@S11-Server:~/lab$
```

4. Display all lines in the `dante`, `file1`, and `dante_1` files that contain the pattern, "he".

```
student@S11-Server:~/lab$ grep he dante file1 dante_1
dante:            The Life and Times of Dante
dante:"Dante," instead, and the whole world knows whom you mean. For
```

Practices for Lesson 3: Working with Files and Directories

```
dante:Dante Alighieri, like Raphael, Michelangelo, Galileo, etc.
is usually
dante:referred to by his first name.  There is only one Dante,
as we recognize
dante:one Raphael, one Michelangelo, and one Galileo.
dante:Who is this Dante, whom T.S. Eliot calls "the most
universal of poets
dante:in the modern languages?"
<lot of output …>
student@S11-Server:~/lab$
```

5. Display all the lines in the file `file4` that contains either the pattern, "`Sales`" or
    "`Finance`".

```
student@S11-Server:~/lab$ egrep 'A(Sales|Finance)' file4
student@S11-Server:~/lab$ egrep '(Sales|Finance)' file4
Sales................12M
Finance...............4.5M
```

6. Which option is peculiar to the `grep` command but does not apply to the `egrep` and
    `fgrep` commands?

    The `-w` option is peculiar to the `grep` command alone.

7. Display all the lines that have the pattern "`load`" in the `/etc/system` file.

```
student@S11-Server:~/lab$ grep load /etc/system
*    Modules appearing in the moddir path which are NOT to be
loaded,
* forceload:
*    Cause these modules to be loaded at boot time, (just before
mounting
*    forceload expects a filename which includes the directory.
Also
*    note that loading a module does not necessarily imply that
it will
*        forceload: drv/foo
```

Note: In Oracle Linux VM (OL6-Server), use the pattern "`kernel`" in the
`/etc/sysctl.conf` file.

8. Use the `grep` command to display the number of lines that contain at least one instance of
    the word "`module`", both in uppercase and lowercase, in the `/etc/system` file.

```
student@S11-Server:~/lab$ grep -ic module /etc/system
10
```

Note: Output may vary from system to system.

9. Use the grep command to record how many instances of the word Module (uppercase M only) are there in the /etc/system file.

```
student@S11-Server:~/lab$ grep -c Module /etc/system
1


Note: Output may vary from system to system.
```

10. Starting with the lab directory, find all the files that were modified in the last one day.

```
student@S11-Server:~/lab$ find /home/student -mtime -1
/home/student
/home/student/.gconfd
/home/student/.gconfd/saved_state
/home/student/.vboxclient-clipboard.pid
/home/student/celery
/home/student/.bash_history
/home/student/.gnome2
<lot of output …>
student@S11-Server:~/lab$
```

11. Starting with your home directory, find all files of type f for file.

```
student@S11-Server:~/lab$ cd
student@S11-Server:~$ find ~ -type f
/home/student/.gconfd/saved_state
/home/student/.vboxclient-clipboard.pid
/home/student/Desktop/.os-icons-installed
/home/student/Desktop/os-next-steps.desktop
/home/student/Desktop/addmoresoftware.desktop
<lot of output ...>
```

12. In your home directory, find all files of type d for directory.

```
student@S11-Server:~$ find ~ -type d
/home/student
/home/student/.gconfd
/home/student/Desktop
/home/student/Public
/home/student/.gnome2
/home/student/.gnome2/keyrings
<lot of output ...>
```

Practices for Lesson 3: Working with Files and Directories

13. Run the `find` command to search for ordinary files of size 0 (zero) in the /tmp directory. Include an option prompting you with yes or no option before removing any files.

```
student@S11-Server:~$ pwd
/home/student
student@S11-Server:~$ find /tmp -type f -size 0 -ok rm A{} \;
find: cannot read dir /tmp/gdm-auth-cookies-zEaqxb: Permission
denied
find: cannot read dir /tmp/hsperfdata_root: Permission denied
< rm ... /tmp/crontab.826 >?   No
< rm ... /tmp/.ai.pkg.zone.lock-afdb66cf-1dd1-11b2-a049-
000d560ddc3e >?   No
student@S11-Server:~$
```

Note: Ensure that you answer no when prompted to remove any files. The output may vary from system to system.

Practices for Lesson 3: Working with Files and Directories

Practices for Lesson 4: Using the vi Editor

Chapter 4

Practices for Lesson 4: Using the vi Editor

Practices for Lesson 4

Practices Overview

In this practice, you will use the vi editor commands to create and modify files in Oracle Solaris 11 VM (S11-Server).

	UNIX and Linux Essentials - Activities Checklist
☑	Introduction
☑	Introduction to UNIX
☑	Working with Directories and Files
☑	**Using the vi Editor**
	Using Commands within the Default Shell
	Using Basic File Permissions
	Performing Basic Process Control
	Using Advanced Shell Functionality and Shell Scripts
	Archiving Files and Remote Transfer

.

Practice 4-1: Using the vi Editor

Overview

In this practice, you will perform tasks mentioned below using the in-built tutorial `tutor.vi`. You will use file creation and modification commands documented in this tutorial.

Note: Oracle Linux uses `vim` editor which is an enhanced version of the `vi` editor. In fact Vim is the default editor in both Oracle Solaris 11 and Oracle Linux.

Assumptions

The following tasks are performed in the Oracle Solaris 11 VM (S11-Server). The tasks can also be replicated in the Oracle Linux VM (OL6-Server) with little modifications, mentioned where applicable. It is recommended to use one system at a time and perform theses task in `/home/student` directory. For Oracle Linux, change the directory from `Desktop` to the `/home/student` directory.

Task

Perform the following task:

1. To open the `tutor.vi` file, first ensure that you are in the `home` directory. Now, switch to the `lab` directory using the `cd` command.

    ```
    student@S11-Server:~$ pwd
    /home/student
    student@S11-Server:~$ cd lab
    student@S11-Server:~/lab$
    ```

2. To view the files in the read-only mode, use `view` command.

    ```
    student@S11-Server:~/lab$ view tutor.vi
    ```

3. To move the cursor, press h, j, k, and l to move right, down, up, and left respectively.

4. To quit the file without saving, press **ESC** to enter into command mode and then use the `:q!` command. Notice that `:q!` appears at the bottom of the terminal window screen.

5. Next, create a file called `example`. The terminal window screen will be replaced by the `vi` interface. At the top of the terminal window is the blinking cursor. At the bottom of the terminal window, you will see "example" [New File]. Press i to change to input mode and insert the following text:

    Hello World

    What is your

    Waht id today's date?

    ```
    student@S11-Server:~/lab$ vi example
    Hello World
    What is your
    Waht id today's date?
    ~
    ~
    ~
    "example" [New File]
    ```

Practices for Lesson 4: Using the vi Editor

Note: To move to next line to insert the sentence, press **Enter**.

6. To append text to the line `What is your`, press **ESC** to enter command mode. Pressing the key 'k' will place the cursor at the last character of the line. Further, press the key 'a' to append and insert a space with the next string "`name?`".

```
Hello World
What is your name?
Waht id today's date?
~
~
"example" [New File]
```

7. To replace character `d` with character `s` in the line, What **id** today's date?, press **ESC** to return to command mode. Then move the cursor to the third line by pressing the key 'j'. This will move the cursor down. To move the cursor to the left, press the key 'h'. Bring the cursor to the character `d` in the string "`id`". Press the key 'r,' and then insert character `s`. This will replace the character `d` with the appropriate character `s`.

```
Hello World
What is your name?
Waht is today's date?
~
~
~
"example" [New File]
```
Note: Ensure that you are in the command mode before you press the "r" command.

8. To change the word `Waht` to `What`, press **ESC** and move the cursor to the third line. Place your cursor on the character 'a' of the word `Waht` and execute the `cw` command. Enter the text `hat`. This will replace the whole word `Waht` to `what`.

```
Hello World
What is your name?
What is today's date?
~
~
~
```
Note: Ensure you are in the command mode before executing the "cw" command.

9. To copy and paste the line `Hello World`, press **ESC** to return to the command mode. Move the cursor to the beginning of the `Hello World` line by pressing the keys 'k' followed by 'h' . Execute the `yy` command to copy the string. Then move the cursor to the end of the same line by pressing the 'l' key and press the `p` command to paste the string. The whole line is copied and pasted.

```
Hello World
Hello World
What is your name?
What is today's date?
~
```

Practices for Lesson 4: Using the vi Editor

```
~
```

Note: Ensure you are in the command mode before pressing the `yy` and `p` commands.

10. To delete the additional "`Hello World`" line, press **ESC** to enter the command mode. Move the cursor to the beginning of the second line "`Hello World`" and press `dd` command. The entire line is deleted.

```
Hello World
What is your name?
What is today's date?
~
~
~
```

  Note: Ensure you are in command mode before you press `dd` command.

11. To search for a string "`What`", press **ECS** to enter the command mode. Now press forward slash (/). Enter the text "`What`" and press **Enter**. The cursor automatically moves to the first string in the file that it encounters. Notice that "`/What`" appears at the bottom of the terminal window screen.

```
Hello World
What is your name?
What is today's date?
~
~
~
/What

```

Note: Ensure you are in the command mode before you press the forward slash key.

12. To search for the next occurrence of the same string press `n`. Now the cursor will move to the second string in the file.

```
Hello World
What is your name?
What is today's date?
~
~
~
search hit BOTTOM, continuing at TO

```

Note: Make sure you are in command mode before you press `n` command.

Practices for Lesson 4: Using the vi Editor

13. To customize the session by displaying the line numbers, press **ESC** to enter the command mode. Then enter the `:set nu` command and press **Enter**. Notice that `:set nu` appears at the bottom of the terminal window screen.

```
Hello World
What is your name?
What is today's date?
~
~
:set nu
```

The output displayed is:

```
        1 Hello World
        2 What is your name?
        3 What is today's date?
~
~
~
:set nu

```

Note: Ensure you are in the command mode before you enter the `:set nu` command.

14. To remove the line numbers, press **ECS** to enter the command mode. Next, type the `:set nonu` command and press **Enter**. The line numbers disappear.

```
Hello World
What is your name?
What is today's date?
~
~
~
:set nonu

```

Note: Make sure you are in command mode before you press `:set nonu` command.

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15. To quit and save the file with the changes, press **ESC** to enter the command. Then type :wq and press **Enter**. Notice that :wq appears at the bottom of the terminal window screen. The file is saved and the prompt returns. To switch to home directory, type the cd command.

```
Hello World
What is your name?
What is today's date?
~
~
~
:wq


student@S11-Server:~/lab$
student@S11-Server:~/lab$ cd
student@S11-Server:~/$


Note: Ensure you are in the command mode before you enter :wq command.
```

Note: For more information, refer to the tutor.vi file.

Practices for Lesson 4: Using the vi Editor

Practices for Lesson 5: Using Commands Within the Default Shell

Chapter 5

Practices for Lesson 5

Practices Overview

In this practice, you will perform a set of tasks described in this lesson. Here is the list of those activities:

- Use the shell metacharacters
- Use variables in the Bash shell
- Display the command history
- Use the redirecting commands
- Customize the user's work environment

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.

Practice 5-1: Using the Shell Metacharacters

Overview

In this practice, you will use shell metacharacters to simplify commands, structure, and output.
Note: Bash is the default shell which is used in both Oracle Solaris 11 and Oracle Linux 6.2.

Assumptions

The following tasks are performed in the Oracle Solaris 11 VM (S11-Server). The tasks can also be replicated in the Oracle Linux VM (OL6-Server) with little modifications, mentioned where applicable. In a few instances, the output may vary on your system. It is recommended to use one system at a time. Students will perform the exercises in the /home/student directory. For Oracle Linux change the directory from Desktop to the /home/student directory.

Tasks

1. To verify that the default shell, bash, is running, run the echo command on the Oracle Solaris VM and Oracle Linux VM.

```
student@S11-Server:~$ echo $SHELL
/usr/bin/bash
[student@OL6-Server Desktop]$ echo $SHELL
/bin/bash
```

Metacharacter	Symbol	Choices or Values
tilde	~	Represents home directory of current user
dash	-	Represents previous working directory
asterisk	*	Match any number of characters
question mark	?	Match single character
square bracket	[ ]	Match range of characters

2. Switch to the user home directory using the ~ metacharacter with the cd command.

```
student@S11-Server:~$ pwd
/home/student
student@S11-Server:~$ cd lab/Documents
student@S11-Server:~/lab/Documents$ cd ~
student@S11-Server:~$
student@S11-Server:~$ pwd
/home/student
```

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3. Switch between the `student` and `tmp` directory using the – metacharacter.

```
student@S11-Server:~$ cd /tmp
student@S11-Server:/tmp$ pwd
/tmp
student@S11-Server:/tmp$ cd -
/home/student
student@S11-Server:~$ cd -
/tmp
student@S11-Server:/tmp$ cd
student@S11-Server:~$
```

4. List all the files and directories in the `lab` directory that end with the number `2`.

```
student@S11-Server:~$ cd lab
student@S11-Server:~/lab$ ls *2
file.2  file2   fruit2

dir2:
beans    notes    recipes
student@S11-Server:~/lab$
```

5. List all the files and directories that start with the string "file" and are followed by any other character.

```
student@S11-Server:~/lab$ ls file?
file1  file2  file3  file4
student@S11-Server:~/lab$
```

6. List all the files and directories that start with letters `m` through `z` using square brackets.

```
student@S11-Server:~/lab$ ls [m-z]*
myvars    tutor.vi

practice:
mailbox    project    projection research    results
student@S11-Server:~/lab$ cd
student@S11-Server:~$
```

Note: The command output may vary from system to system.

Practice 5-2: Using Variables in the Bash Shell

Overview

In this practice, you will use variables to store values.

Assumption

It is recommended to use one system at a time. Students will perform the exercises in the `/home/student` directory. For Oracle Linux, change the directory from `Desktop` to the `/home/student` directory. The output may vary from system to system.

Tasks

1. Display the value stored inside a shell variable using the `echo` command.

```
student@S11-Server:~$ echo $SHELL
/usr/bin/bash
```

2. List all shell variables and their values using the `set` command.

```
student@S11-Server:~$ set
A__z='"*SHLVL'
BASH=/usr/bin/bash
BASHOPTS=cmdhist:expand_aliases:extquote:force_fignore:hostcompl
ete:interactive_comments:progcomp:promptvars:sourcepath:xpg_echo
………….
………….
………….
<lot of output…>
………….
………….
_=/usr/bin/bash
_AST_FEATURES='UNIVERSE - att'
<end>
```

Note: The output may vary for a different system.

3. Customize shell prompt string by editing the shell variable `PS1`.

```
student@S11-Server:~$ PS1="$LOGNAME@`uname -n` \$PWD $ "
student@S11-Server /home/student $
```

In the above task, the prompt displays the login name of the user, host name, and the current working directory.

Note: Type the command as it is. These symbols do not represent single quotation marks.

4. To revert to the default prompt, type the following command:

```
student@S11-Server /home/student $ PS1="$LOGNAME@`uname -n`:~$"
student@S11-Server:~$
```

Note: This will revert the prompt to default prompt.

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or

```
student@S11-Server :~$ exit


Note: This will exit the current terminal session.
```

5. Launch a new terminal session by right-clicking the desktop and selecting "**Open terminal**."
    Display current values in the PATH variable.

```
student@S11-Server:~$ echo $PATH
/usr/bin:/usr/sbin


Note: The PATH  variablle is used to store reference to the commands directory.
```

6.   Add home directory of student to the PATH variable using the echo $PATH command.

```
student@S11-Server:~$ PATH=$PATH:~
student@S11-Server:~$ echo $PATH
/usr/bin:/usr/sbin:/home/student
```

Practices for Lesson 5: Using Commands Within the Default Shell

Practice 5-3: Using the Command History

Overview

In this practice, you will view and set values for command history.

Assumption

It is recommended to use one system at a time. Students will perform the exercises in the /home/student directory. For Oracle Linux, change the directory from Desktop to the /home/student directory. The output may vary from system to system.

Tasks

1. Check the current size of the history command and set the size to 20 using the HISTSIZE variable.

   ```
   student@S11-Server:~$ echo $HISTSIZE
   45
   student@S11-Server:~$ HISTSIZE=20
   ```

   Note: The number may vary from system to system.

2. Confirm that the command history database size is updated to 20.

   ```
   student@S11-Server:~$ echo $HISTSIZE
   20
   ```

3. View the page-wise output of the history command.

   ```
   student@S11-Server:~$ history | more
      28  cd ~/lab
      29  cd
      30  pwd
      31  cd /etc
      32  cd
      33  pwd
      34  cd /etc/group
      35  cat /etc/group
      36  grep other /etc/group
      37  grep root /etc/group
      38  history
      39  history | more
      40  history | tail -10
      41  history | tail -10
      42  history | tail -10
      43  history | wc -l
      44  history | wc -l
      45  HISTSIZE=20
      46  history | wc -l
   ```

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```
   47  history | more
```

Note: The command output may vary from system to system.

4. To view the last 10 commands from the history database, use the option `tail -10`.

```
student@S11-Server:~$ history | tail -10
   39  history | more
   40  history | tail -10
   41  history | tail -10
   42  history | tail -10
   43  history | wc -l
   44  history | wc -l
   45  HISTSIZE=20
   46  history | wc -l
   47  history | more
   48  history | tail -10
```

Note: The command output may vary from system to system.

5. To execute a specific command from history, use `!46` (Repeats command # 46). Please choose the relevant command number that appears on your system.

```
student@S11-Server:~$ history | more
   30  pwd
   31  cd /etc
   32  cd
   33  pwd
   34  cd /etc/group
   35  cat /etc/group
   36  grep other /etc/group
   37  grep root /etc/group
   38  history
   39  history | more
   40  history | tail -10
   41  history | tail -10
   42  history | tail -10
   43  history | wc -l
   44  history | wc -l
   45  HISTSIZE=20
   46  history | wc -l
   47  history | more
   48  history | tail -10
   49  history | more

student@S11-Server:~$ !46
```

```
history | wc -l
      20
student@S11-Server:~$
```

Note: The command output may vary from system to system.

6. Use the `-c` option to clear previous history.

```
student@S11-Server:~$ history -c
```

7. The following are the various methods for repeating the previous command quickly:

- Use the up arrow to view the previous command and press Enter to execute it.
- Type `!!` and press Enter from the command line.
- Type `!-1` and press Enter from the command line.

Practice 5-4: Using Redirecting Commands

Overview

In this practice, you will perform input, output, and standard error redirection by using the <, >, and | (pipe) metacharacters.

Assumption

It is recommended to use one system at a time. Students will perform the exercises in the /home/student directory. For Oracle Linux, change the directory from Desktop to the /home/student directory. The output may vary from system to system.

Tasks

1. Start a terminal session by right-clicking the desktop and selecting the **Open Terminal** option.

2. Redirect the list of files and subdirectories of the home directory into the directory_list file.

```
student@S11-Server:~$ pwd
/home/student
student@S11-Server:~$ ls -l > directory_list
student@S11-Server:~$ ls
Desktop          Documents        file1            lab
practice1
directory_list   Downloads        file2            perm
Public
student@S11-Server:~$ cat directory_list
total 31
drwxr-xr-x   2 student   staff           5 Apr  9 19:03 Desktop
-rw-r--r--   1 student   staff           0 May 10 17:05
directory_list
drwxr-xr-x   6 student   staff           6 Apr  9 19:03 Documents
drwxr-xr-x   2 student   staff           2 Apr  9 19:03 Downloads
drwxr-xr-x   2 student   staff           2 Apr  9 19:03 Public
student@S11-Server:~$
```

3. Remove the directory directory_list by using rm command.

```
student@S11-Server:~$ rm directory_list
student@S11-Server:~$ ls -l
total 17
drwxr-xr-x   2 student   staff           5 Apr  9 19:03 Desktop
drwxr-xr-x   6 student   staff           6 Apr  9 19:03 Documents
drwxr-xr-x   2 student   staff           2 Apr  9 19:03 Downloads
drwxr-xr-x  17 root      root           39 May  2 13:51 lab
drwxr-xr-x   2 student   staff           2 Apr  9 19:03 Public
student@S11-Server:~$
```

4. Redirect the standard error message to a newly created file called `error`.

```
student@S11-Server:~$ cd lab
student@S11-Server:~/lab$ touch error
student@S11-Server:~/lab$ ls /var /test 1> error 2>&1
student@S11-Server:~/lab$ cat error
/test: No such file or directory
/var:
adm
apache2
<lot of output>.........
student@S11-Server:~/lab$
```

5. Remove the file `error` by using the `rm` command.

```
student@S11-Server:~/lab$ rm error
student@S11-Server:~/lab$ ls
dir1       dir5       file.3       file4      myvars
dante      dir2       Documents    file1      fruit       practice
dante_1    dir3       file.1       file2      fruit2      tutor.vi
Desktop    dir4       file.2       file3      greetings
student@S11-Server:~/lab$
```

6. View a list of all the subdirectories located in the `/etc` directory using redirection symbol |
(pipe).

```
student@S11-Server:~/lab$ ls -F /etc | grep "/"
acct/
amd64/
anthy/
apache2/
avahi/
<lot of output>
student@S11-Server:~/lab$ cd
```

Note: The command output may vary from system to system.

Practices for Lesson 5: Using Commands Within the Default Shell

Practice 5-5: Customizing the User's Work Environment

Overview

In this practice, you will study the user's profile file to understand the user's work environment.

Note: In Oracle Solaris, .profile is the profile file. In Oracle Linux, .bash_profile is the profile file.

Assumption

It is recommended to use one system at a time. Students will perform the exercises in the /home/student directory. For Oracle Linux, change the directory from Desktop to the /home/student directory. The output may vary from system to system.

Tasks

1. Confirm that you are currently in the parent directory by using pwd command and then open the .profile file.

```
student@S11-Server:~$ pwd
/home/student
student@S11-Server:~$ cat .profile
#
# Simple profile places /usr/bin at front, followed by
/usr/sbin.
#
# Use less(1) or more(1) as the default pager for the man(1)
command.
#
export PATH=/usr/bin:/usr/sbin

if [ -f /usr/bin/less ]; then
    export PAGER="/usr/bin/less -ins"
elif [ -f /usr/bin/more ]; then
    export PAGER="/usr/bin/more -s"
fi


#
# Define default prompt to <username>@<hostname>:<path><"($|#)
">
# and print '#' for user "root" and '$' for normal users.
#
# Currently this is only done for bash/pfbash(1).
#

case ${SHELL} in
*bash)
    typeset +x PS1="\u@\h:\w\\$ "
```

```
    ;;
esac


student@S11-Server:~$
```

Note: Study the entries made to the file with the help of your instructor to understand options available for customizing a user's work environment. The file content may vary from system to system.

Practices for Lesson 6: Using Basic File Permissions

Chapter 6

Practices for Lesson 6: Using Basic File Permissions

Practices for Lesson 6

Practices Overview

In these practices, you will perform a set of tasks described in this lesson. Here is the list of those activities:

- Changing file ownership
- Changing file permissions
- Using the symbolic mode to change permissions
- Using octal mode to change permissions
- Modifying default permissions
- Viewing the default `umask`
- Changing the `umask` setting

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Practice 6-1: Changing File Ownership

Overview

In this practice, you will view and change file ownership.

Assumptions

The following tasks are performed in the Oracle Solaris 11 VM (S11-Server). The tasks can also be replicated in the Oracle Linux VM (OL6-Server) with little modifications, mentioned where applicable. In a few instances, the output may vary on your system. It is recommended to use one system at a time. Students will perform the exercises in the `/home/student` directory. For Oracle Linux, change the directory from `Desktop` to the `/home/student` directory.

Tasks

1. To find the owner of the existing `Documents` directory within the `lab` directory, use the `ls -l` command. Ensure that you are in the `lab` directory currently.

```
student@S11-Server:~$ pwd
/home/student
student@S11-Server:~$ cd lab
student@S11-Server:~/lab$ ls -l
total 110
-rwxr-xr-x   1 student   root         1319 May  2 13:51 dante
-rwxr-xr-x   1 student   root          368 May  2 13:51 dante_1
drwxr-xr-x   2 student   root            2 May  2 13:51 Desktop
drwxr-xr-x   5 student   root            5 May  2 13:51 dir1
drwxr-xr-x   4 student   root            5 May  2 13:51 dir2
drwxr-xr-x   3 student   root            3 May  2 13:51 dir3
drwxr-xr-x   2 student   root            2 May  2 13:51 dir4
drwxr-xr-x   2 student   root            2 May  2 13:51 dir5
drwxr-xr-x   2 root      root            4 May  9 14:30 Documents
-rwxr-xr-x   1 student   root            0 May  2 13:51 file.1
-rwxr-xr-x   1 student   root            0 May  2 13:51 file.2
-rwxr-xr-x   1 student   root            0 May  2 13:51 file.3
-rwxr-xr-x   1 student   root         1610 May  2 13:51 file1
-rwxr-xr-x   1 student   root          105 May  2 13:51 file2
-rwxr-xr-x   1 student   root          218 May  2 13:51 file3
-rwxr-xr-x   1 student   root          137 May  2 13:51 file4
-rwxr-xr-x   1 student   root           57 May  2 13:51 fruit
-rwxr-xr-x   1 student   root           57 May  2 13:51 fruit2
-rwxr-xr-x   1 student   root           59 May  2 13:51 greetings
-rwxr-xr-x   1 student   root           67 May  2 13:51 myvars
drwxr-xr-x   2 student   root            7 May  2 13:51 practice
-rwxr-xr-x   1 student   root        28709 May  2 13:51 tutor.vi
```

Note: The command output may vary on your system.

For additional details about the command output, refer to the table below.

Symbol	Meaning	Comments
d	directory	If begins with – it means a regular file
r	read	
w	write	
x	executable	
ugo	user, group, and others	rwx (u) r-x (g) r-x (o) read, write and executable permissions for respective entity. – means not permitted.)
2	number of links	
root	owner	
root	group	
4 May 9 14:30	Day, Month, Year and Hours:Minutes	Last modified date time information
Documents	directory/file name	

2. Identify the owner of the content in the Documents directory.

```
student@S11-Server:~/lab$ ls -l Documents
total 4
-rwxrwxr-x   1 root      root           24 May  9 14:30 misc.txt
-rwxrwxr-x   1 root      root           27 May  9 14:29 sample.txt
```

Observe that root is the owner of the content in the Documents directory.

3. To change the ownership of the Documents directory, switch to the root user and run the chown command.

```
student@S11-Server:~/lab$ su
Password:
root@S11-Server:~/lab# chown student Documents
root@S11-Server:~/lab# ls -l
total 110
-rwxr-xr-x   1 student   root          1319 May  2 13:51 dante
-rwxr-xr-x   1 student   root           368 May  2 13:51 dante_1
drwxr-xr-x   2 student   root             2 May  2 13:51 Desktop
drwxr-xr-x   5 student   root             5 May  2 13:51 dir1
drwxr-xr-x   4 student   root             5 May  2 13:51 dir2
drwxr-xr-x   3 student   root             3 May  2 13:51 dir3
drwxr-xr-x   2 student   root             2 May  2 13:51 dir4
```

```
drwxr-xr-x   2 student   root              2 May   2 13:51 dir5
drwxr-xr-x   2 student   root              4 May   9 14:30 Documents
-rwxr-xr-x   1 student   root              0 May   2 13:51 file.1
-rwxr-xr-x   1 student   root              0 May   2 13:51 file.2
-rwxr-xr-x   1 student   root              0 May   2 13:51 file.3
-rwxr-xr-x   1 student   root           1610 May   2 13:51 file1
-rwxr-xr-x   1 student   root            105 May   2 13:51 file2
-rwxr-xr-x   1 student   root            218 May   2 13:51 file3
-rwxr-xr-x   1 student   root            137 May   2 13:51 file4
-rwxr-xr-x   1 student   root             57 May   2 13:51 fruit
-rwxr-xr-x   1 student   root             57 May   2 13:51 fruit2
-rwxr-xr-x   1 student   root             59 May   2 13:51 greetings
-rwxr-xr-x   1 student   root             67 May   2 13:51 myvars
drwxr-xr-x   2 student   root              7 May   2 13:51 practice
-rwxr-xr-x   1 student   root          28709 May   2 13:51 tutor.vi
```

Note: The password for `root` is `oracle1`. Output may vary from system to system.

4. Confirm the ownership of the `Documents` directory and change the ownership of its contents to `student`, and then run the `chown` command again.

```
root@S11-Server:~/lab# ls -l Documents
total 4
-rwxrwxr-x   1 root      root             24 May   9 14:30 misc.txt
-rwxrwxr-x   1 root      root             27 May   9 14:29 sample.txt
root@S11-Server:~/lab# chown student Documents/*
root@S11-Server:~/lab# ls -l Documents
total 4
-rwxrwxr-x   1 student   root             24 May   9 14:30 misc.txt
-rwxrwxr-x   1 student   root             27 May   9 14:29 sample.txt
root@S11-Server:~/lab# exit
exit
student@S11-Server:~/lab$
```

Note: The output may vary from system to system.

Practices for Lesson 6: Using Basic File Permissions

Practice 6-2: Changing File Permissions

Overview

In this practice, you will view and change permissions on files.

Assumptions

The following tasks are performed in the Oracle Solaris 11 VM (S11-Server). The tasks can also be replicated in the Oracle Linux VM (OL6-Server) with little modifications, mentioned where applicable. In a few instances, the output may vary on your system. It is recommended to use one system at a time. Students will perform the exercises in the /home/student directory. For Oracle Linux, change the directory from Desktop to the /home/student directory.

Preparation

Ensure that the umask value is set to 0022 on your system. To verify, run the umask command.

```
student@S11-Server:~/lab$ umask
0022
```

If not, set the umask value to 0022 by running the following command:

```
$ umask 0022
```

Tasks

1. Perform the following commands in the lab directory of your home directory:

```
student@S11-Server:~/lab$ mkdir perm
student@S11-Server:~/lab$ cd /etc
student@S11-Server:/etc$ ls -l group motd shadow vfstab
-rw-r--r--    1 root        sys            408 Apr  9 20:12 group
-rw-r--r--    1 root        sys             49 Oct 21  2011 motd
-r--------    1 root        root           661 Apr  9 19:38 shadow
-rw-r--r--    1 root        sys            438 May  2 13:47 vfstab
student@S11-Server:/etc$ cp group motd shadow vfstab ~/lab/perm
cp: cannot open shadow: Permission denied
```

Note: For Linux, use the file /etc/fstab instead of /etc/vfstab.

a. When trying to copy the shadow file, the error message cp: cannot open shadow: Permission denied appears. Why?

Only the owner of this file, in this case, root, has read permission.

```
student@S11-Server:/etc$ ls -l ~/lab/perm
total 6
-rw-r--r--    1 student  staff          408 May  9 15:11 group
-rw-r--r--    1 student  staff           49 May  9 15:11 motd
-rw-r--r--    1 student  staff          438 May  9 15:11 vfstab
student@S11-Server:/etc$ cd
student@S11-Server:~$ cd lab
student@S11-Server:~/lab$ cp -r /etc/skel perm
student@S11-Server:~/lab$
```

Practices for Lesson 6: Using Basic File Permissions

b. Change to the `perm` directory and list the contents of the directory.

```
student@S11-Server:~/lab$ cd perm
student@S11-Server:~/lab/perm$ ls -l
total 9
-rw-r--r--   1 student  staff        408 May  9 15:11 group
-rw-r--r--   1 student  staff         49 May  9 15:11 motd
drwxr-xr-x   2 student  staff          7 May  9 15:20 skel
-rw-r--r--   1 student  staff        438 May  9 15:11 vfstab
student@S11-Server:~/lab/perm$ cd
student@S11-Server:~$
```

c. In the following table, fill in the permission sets for each file and write the three-digit octal number that represents the combined set of permissions.

File or Directory	Permissions			Octal Value
	Owner	Group	Other	
group	rw-	r--	r--	644
motd	rw-	r--	r--	644
skel	rw-	r-x	r-x	755
vfstab	rw-	r--	r--	644

2. Create a new file `test1` and a new directory `test`.

```
student@S11-Server:~$ cd lab
student@S11-Server:~/lab$ touch test1
student@S11-Server:~/lab$ mkdir test
```

a. What are the default permissions of the new file?

```
student@S11-Server:~/lab$ ls -l test1
```

    rw-r--r—

b. What are the default permissions of the new directory?

```
student@S11-Server:~/lab$ ls -ld test
```

    drwxr-xr-x

3. Describe the difference between the symbolic mode and the octal mode.

    The symbolic mode uses a combination of letters and symbols to add or remove permissions for each type of user.

    The octal mode uses octal numbers to represent permissions. The octal mode is also referred to as the absolute mode.

4. Using the symbolic mode, add write permission for the group to the `motd` file.

```
student@S11-Server:~/lab$ cd perm
student@S11-Server:~/lab/perm$
student@S11-Server:~/lab/perm$ chmod g+w motd
student@S11-Server:~/lab/perm$ ls -l
total 9
```

```
-rw-r--r--    1 student   staff          408 May  9 15:11 group
-rw-rw-r--    1 student   staff           49 May  9 15:11 motd
drwxr-xr-x    2 student   staff            7 May  9 15:20 skel
-rw-r--r--    1 student   staff          438 May  9 15:11 vfstab
student@S11-Server:~/lab/perm$
```

5. Using the octal mode, change the permissions on the `motd` file to `-rwxrw----`.

```
student@S11-Server:~/lab/perm$ chmod 760 motd
student@S11-Server:~/lab/perm$ ls -l
total 9
-rw-r--r--    1 student   staff          408 May  9 15:11 group
-rwxrw----    1 student   staff           49 May  9 15:11 motd
drwxr-xr-x    2 student   staff            7 May  9 15:20 skel
-rw-r--r--    1 student   staff          438 May  9 15:11 vfstab
student@S11-Server:~/lab/perm$
```

6. Using the octal mode, add write permission for other on the file named group.

```
student@S11-Server:~/lab/perm$ chmod 646 group
student@S11-Server:~/lab/perm$ ls -ldi
    397 drwxr-xr-x   3 student   staff           6 May  9 15:20 .
student@S11-Server:~/lab/perm$
```

7. Identify the GID and UID for the motd file. Which command did you use?

```
student@S11-Server:~/lab/perm$ ls -n motd
-rwxrw----    1 60004   10               49 May  9 15:11 motd
student@S11-Server:~/lab/perm$
```

8. Create a new file called memo in your dir4 directory.

```
student@S11-Server:~/lab/perm$ touch ~/lab/dir4/memo
```

9. Remove the read permission for the owner from the memo file in the `dir4` directory. Use either the symbolic mode or the octal mode.

```
student@S11-Server:~/lab/perm$ chmod u-r ~/lab/dir4/memo
    or
student@S11-Server:~/lab/perm$ chmod 244 ~/lab/dir4/memo
```

a. What happens when you try to use the `cat` command to view the memo file?

You cannot use the `cat` command, because read permission has been removed from the user. Even though you are part of the group, the permissions are viewed in the order in which they appear. *The following message appears when you use the `cat` command:*

```
cat: cannot open /home/student/lab/dir4/memo: Permission denied.
```

Practices for Lesson 6: Using Basic File Permissions

b. What happens when you try to copy the `memo` file?

You cannot copy the file, because the user has no read permission. The following message appears:

```
cp: cannot open /home/student/lab/dir4/memo: permission denied
```

```
student@S11-Server:~/lab/perm$ cd
student@S11-Server:~$ cp ~/lab/dir4/memo ~/lab
cp: cannot open /home/student/lab/dir4/memo: permission denied
student@S11-Server:~$
```

Practices for Lesson 6: Using Basic File Permissions

Practice 6-3: Modifying Default Permissions

Overview

In this practice, you modify the default permissions of files and directories.

Assumptions

The following tasks are performed in the Oracle Solaris 11 VM (S11-Server). The tasks can also be replicated in the Oracle Linux VM (OL6-Server) with little modifications, mentioned where applicable. In a few instances, the output may vary on your system. It is recommended to use one system at a time. Students will perform the exercises in the /home/student directory. For Oracle Linux, change the directory from Desktop to the /home/student directory.

Tasks

1. What is the function of the umask utility? What is the default umask that exists on your system?

    The umask utility modifies the default permissions set for files and directories at the time of creation. To view the default umask value on your system, run the umask command.

    ```
    student@S11-Server:~$ umask
    0022
    ```

2. Change the umask to 027. Which command did you run?

    ```
    student@S11-Server:~$ umask 027
    ```

3. Create a new file and a new directory in the lab directory. Record the access permissions. Which command did you run?

    ```
    student@S11-Server:~$ cd lab
    student@S11-Server:~/lab$ touch testfile
    student@S11-Server:~/lab$ mkdir testdir
    student@S11-Server:~/lab$ ls -l testfile
    -rw-r-----   1 student  staff           0 May  9 15:41 testfile
    student@S11-Server:~/lab$ ls -ld testdir
    drwxr-x---   2 student  staff           2 May  9 15:41 testdir
    ```

4. Change the umask back to 0022.

    ```
    student@S11-Server:~/lab$ umask 0022
    ```

5. Create a new file and a new directory.

    ```
    student@S11-Server:~/lab$ touch test2file
    student@S11-Server:~/lab$ mkdir test2dir
    ```

6. Record the access permissions.

    ```
    student@S11-Server:~/lab$ ls -l test2file
    -rw-r--r--   1 student  staff           0 May  9 15:41 test2file
    student@S11-Server:~/lab$ ls -ld test2dir
    drwxr-xr-x   2 student  staff           2 May  9 15:41 test2dir
    student@S11-Server:~/lab$ cd
    student@S11-Server:~$
    ```

Practices for Lesson 7: Performing Basic Process Control

Chapter 7

Practices for Lesson 7

Practices Overview

In this practice, you will use the commands described in this lesson to determine PIDs, view a process tree, and `kill` processes.

This practice introduces the `tty` command, which displays the name of the current terminal window. The name displayed by the `tty` command includes a unique identification number assigned by the Solaris OS to each open terminal window (for example, `/dev/pts/2`). In the tasks illustrating the `tty` command, the unique identification number is displayed as `/dev/pts/n`, where *n* is a numeral.

Here is the list of the tasks that you will perform in this practice:

- List system processes.
- Control system processes.
- Terminate a process.

	UNIX Essentials Activities Checklist
☑	Introduction
☑	Introduction to UNIX
☑	Working with Directories and Files
☑	Using the `vi` Editor
☑	Using Commands within the Default Shell
☑	Using Basic File Permissions
☑	**Performing Basic Process Control**
	Using Advanced Shell Functionality and Shell Scripts
	Archiving Files and Remote Transfer

Practices for Lesson 7: Performing Basic Process Control

Practice 7-1: Controlling System Processes

Overview

In this practice, you will determine the PIDs, view a process tree, and kill processes.

Assumptions

Oracle Solaris VM (S11-Server) is currently running. The tasks mentioned below are performed in Solaris 11 environment (S11-Server) VM. They can also be practiced as it is with Oracle Linux VM (OL6-Server) with little modifications (mentioned where applicable). In few cases, the output on your system may vary. It is recommended to use one system at a time. Students will perform the exercises in the /home/student directory. For Oracle Linux, change the directory from Desktop to the /home/student directory.

Tasks

Perform the following steps:

1. Use the following ps commands to list the processes currently running on your system. What information does each command provide?

    ```
    student@S11-Server:~$ ps
      PID TTY          TIME CMD
     3162 pts/1        0:00 bash
     3163 pts/1        0:00 ps
    ```

    This command prints information for the current user and terminal.

    ```
    student@S11-Server:~$ ps -f
         UID    PID   PPID   C     STIME TTY          TIME CMD
     student   3162   3159   0 12:11:03 pts/1        0:00 bash
     student   3164   3162   0 12:11:18 pts/1        0:00 ps -f
    ```

    This command prints a full listing of the ps command.

    ```
    student@S11-Server:~$ ps -e
      PID TTY          TIME CMD
        0 ?            0:04 sched
        5 ?            0:11 zpool-rp
        6 ?            0:01 kmem_tas
        1 ?            0:00 init
        2 ?            0:00 pageout
        3 ?            1:05 fsflush
        7 ?            0:00 intrd
        8 ?            0:00 vmtasks
      116 ?            0:00 pfexecd
       11 ?            0:05 svc.star
       13 ?            1:47 svc.conf
    <lot of output> ......
    ```

Practices for Lesson 7: Performing Basic Process Control

This command prints information about every process running.

```
(In Terminal window t1)
student@S11-Server:~$ ps -ef
     UID   PID  PPID   C    STIME TTY          TIME CMD
    root     0     0   0   May 07 ?            0:04 sched
    root     5     0   0   May 07 ?            0:11 zpool-rpool
    root     6     0   0   May 07 ?            0:01 kmem_task
    root     1     0   0   May 07 ?            0:00
/usr/sbin/init
    root     2     0   0   May 07 ?            0:00 pageout
    root     3     0   0   May 07 ?            1:05 fsflush
    root     7     0   0   May 07 ?            0:00 intrd
    root     8     0   0   May 07 ?            0:00 vmtasks
    root   116     1   0   May 07 ?            0:00
/usr/lib/pfexecd
    root    11     1   0   May 07 ?            0:05
/lib/svc/bin/svc.startd
    root    13     1   0   May 07 ?            1:47
/lib/svc/bin/svc.configd
    root   105     1   0   May 07 ?            0:03
/lib/inet/in.mpathd
  netcfg    39     1   0   May 07 ?            0:02
/lib/inet/netcfgd
<lot of output> ……

student  3159     1   1 12:11:03 ?            0:00 gnome-terminal
 student  3079  2957   0 18:25:26 ?            0:00 python2.6
/usr/lib/system-config-printer/applet.py
  student  3166  3162   0 12:11:26 pts/1       0:00 ps -ef
    root  3088  3087   0 18:25:30 ?            0:00 hald-runner
student@S11-Server:~$ exit
```

Note: The command output on your system may vary

2. Open another terminal window, t2, and execute the ps -ef command in a terminal window. Identify the process ID related to the ps -ef command.

```
(In Terminal window t2)
student@S11-Server:~$ ps -ef
     UID   PID  PPID   C    STIME TTY          TIME CMD
    root     0     0   0   May 07 ?            0:04 sched
    root     5     0   0   May 07 ?            0:11 zpool-rpool
    root     6     0   0   May 07 ?            0:01 kmem_task
    root     1     0   0   May 07 ?            0:00
/usr/sbin/init
```

```
    root      2      0    0   May 07 ?              0:00 pageout
    root      3      0    0   May 07 ?              1:05 fsflush
    root      7      0    0   May 07 ?              0:00 intrd
    root      8      0    0   May 07 ?              0:00 vmtasks
    root    116      1    0   May 07 ?              0:00
/usr/lib/pfexecd
    root     11      1    0   May 07 ?              0:05
<lot of output> ………

..............................

...........................
 student  3159      1    1 12:11:03 ?              0:02 gnome-
terminal
 student  3079   2957    0 18:25:26 ?              0:00 python2.6
/usr/lib/system-config-printer/applet.py
 student  3172   3171    0 12:13:43 pts/2          0:00 ps -ef
    root   3088   3087    0 18:25:30 ?              0:00 hald-runner
```

Close the terminal windows by executing `exit` command.

```
student@S11-Server:~$ exit
```

Note: The PID differs from system to system.

3. Open a terminal window, referred as t1, and enter the following command:

(In terminal window t1,)

```
student@S11-Server:~$ gcalctool
```
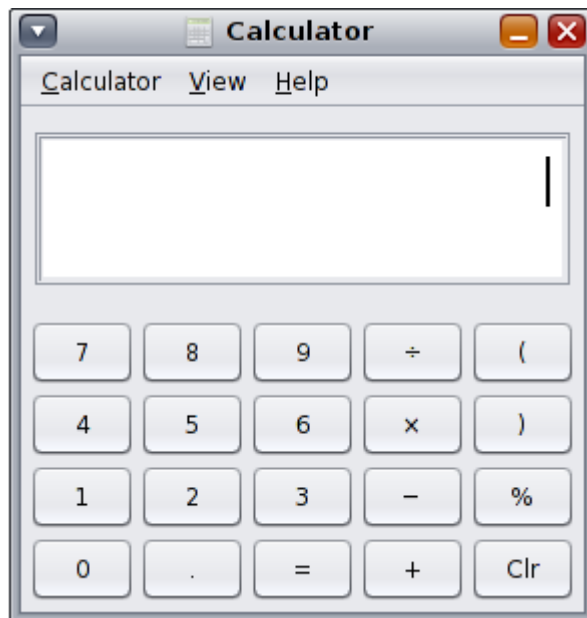

Note: This command launches the calculator, which is terminated by using the `kill` command from another terminal window in a subsequent task.

Practices for Lesson 7: Performing Basic Process Control

4. Open another terminal window, called t2. Use the `ps` or `pgrep` command to identify the PID of the `gcalctool` command.

```
student@S11-Server:~$ ps -ef | grep gcalctool
student  3185  3184   1 12:39:50 pts/1       0:00 gcalctool
student@S11-Server:~$ pgrep gcalctool
3185
student@S11-Server:~$
```

5. In terminal window t2, terminate the `gcalctool` command by using the PID.

```
student@S11-Server:~$ kill PID
```

Note: 3185 is the PID value of the `gcalctool`.

6. In terminal window 2, enter the `tty` command to identify the name of this terminal window. The name appears as `/dev/pts/n`, where *n* is a numeral (for example, `/dev/pts/4`).

```
student@S11-Server:~$ tty
/dev/pts/2
```

This name differs from system to system.

7. Move back to terminal window 1. Use the `pgrep` command to find the PID associated with the name of terminal window 2.

```
student@S11-Server:~$ pgrep -t pts/2
3189
```

Note: The PID differs from system to system.

8. In terminal window 1, use the `kill` command to terminate terminal window 2.

```
student@S11-Server:~$ kill 3189
```

Did it work?

No.

9. Use the kill command with the `-9` option to terminate terminal window 2.

```
student@S11-Server:~$ kill -9 3189
```

Did it work?

Yes.

10. Name the commands used to search for a specific process.

The pgrep command and the ps command with the grep command

11. Run the following `kill` commands to identify the signal names associated with signal numbers.

```
student@S11-Server:~$ kill -l 9
KILL
```

The signal name is KILL.

```
student@S11-Server:~$ kill -l 15
TERM
```

The signal name is TERM.

12. What is the difference between a process and a job?

    Every program that runs in UNIX creates a process. A process that a shell can manage is called a job.

13. What is the difference between the `pkill` command and the `kill` command?

    You can terminate a job using the `kill` command. You can terminate a specific process using the `pkill` command.

14. In a terminal window, enter the command `sleep 500 &`.

```
student@S11-Server:~$ sleep 500 &
[1] 3206
student@S11-Server:~$
```

15. In the same terminal window, use the `ps` command to identify the shell process running in that window.

```
student@S11-Server:~$ ps
PID TTY TIME CMD
3184 pts/1 0:00 bash
3207 pts/1 0:00 ps
3206 pts/1 0:00 sleep
```

16. Open another terminal window, t2 and use the `ptree` command using the shell PID from Step 14 as the argument.

```
student@S11-Server:~$ ptree 3184
3181 gnome-terminal
3184 ksh
3206 sleep 500
```

Note: `ptree` equivalent command in Oracle Linux is `pstree`. The output may vary between systems.

17. In this terminal window, use the `kill` command with the PID as the argument that was used in Step 15. Does the window close?

    Yes

```
student@S11-Server:~$ kill -9 3184
```

Practices for Lesson 8: Using Advanced Shell Features in Shell Scripts

Chapter 8

Practices for Lesson 8

Practices Overview

In this practice, you will perform a range of tasks described in this lesson. Here is the list of those activities:

- Manage jobs in the Bash shell
- Create an alias
- Use Bash shell functions
- Set Bash shell options
- Create and run shell scripts
- Pass values to a shell script
- Use the test command
- Execute conditional commands

	UNIX and Linux Essentials - Activities Checklist
☑	Introduction
☑	Introduction to UNIX
☑	Working with Files and Directories
☑	Using the `vi` Editor
☑	Using Commands within the Default Shell
☑	Using Basic File Permissions
☑	Performing Basic Process Control
☑	**Using Advanced Shell Functionalities in Shell Scripts**
	Archiving Files and Remote Transfer

Practice 8-1: Using Advanced Bash Shell Functionality

Overview

In this practice, you will perform some tasks using the job control commands described in this lesson.

Assumptions

It is recommended to use one system at a time. Students will perform the exercises in the /home/student directory. For Oracle Linux, change the directory from Desktop to the /home/student directory. The output may vary from system to system. Bash is the default shell in both Oracle Solaris 11 and Oracle Linux. To confirm, run the following commands at the respective prompt:

Oracle Solaris 11 VM (S11-VM)

```
student@S11-Server:~$ echo $SHELL
/usr/bin/bash
student@S11-Server:~$
```

Oracle Linux VM (OL6-VM)

```
[student@OL6-Server ~]$ echo $SHELL
/bin/bash
[student@OL6-Server ~]$
```

Note: The following tasks are performed in the S11-Server VM. The same tasks can be replicated on the OL6-Server VM. Only in some instances, the output may vary slightly.

Tasks

Write the commands to perform each of the following tasks in the space provided.

1. Run the following command in the background:

```
student@S11-Server:~$ sleep 500 &
[1] 3244
```

2. Confirm by using the jobs command that the sleep command executed in the previous step is currently running.

```
student@S11-Server:~$ jobs
[1]+  Running                 sleep 500 &
```

3. Bring the job to the foreground, and then put it back in the background. To stop a command and get back to the prompt, use CTRL+Z.

```
student@S11-Server:~$ fg %1
sleep 500
^Z
[1]+  Stopped                 sleep 500
student@S11-Server:~$ bg %1
[1]+ sleep 500 &
student@S11-Server:~$
```

4. What are job control commands? Name any two commands and mention their function.

Job control commands enable you to place jobs in the foreground or background, and to start or stop jobs. Two of the job control commands are the `jobs` command and the `bg %n` command.

- *The `jobs` command lists all jobs that are currently running or are stopped in the background.*
- *The `bg` command runs the current or specified job in the background (`n` is the job ID).*

5. Terminate a job by running the `kill` command. To reconfirm, run the `jobs` command at the prompt.

```
student@S11-Server:~$ kill %1
student@S11-Server:~$ jobs
[1]+  Terminated              sleep 500
```

6. Enable the `noclobber` option, and use the `set` command to verify that this is enabled.

```
student@S11-Server:~$ set -o noclobber
student@S11-Server:~$ set -o | more
allexport         off
braceexpand       on
emacs             on
errexit           off
errtrace          off
functrace         off
hashall           on
histexpand        on
history           on
ignoreeof         off
interactive-comments on
keyword           off
monitor           on
noclobber         on
noexec            off
noglob            off
nolog             off
notify            off
nounset           off
onecmd            off
physical          off
pipefail          off
--More--
[1]+  Stopped
<lot of output>………  ^[Z] or q
```

Note: To stop the command output, use `CTRL + Z or q`.

Practices for Lesson 8: Using Advanced Shell Features in Shell Scripts

7. Display all predefined aliases.

```
student@S11-Server:~$ alias


```
Note: If you do not see an alias list, it implies that there is no predefined alias on the system.

8. Create an alias named `cls` that clears the terminal screen.

```
student@S11-Server:~$ alias cls=clear
```

9. Create an alias named `dir` that displays a long listing of all the files and directories in the current directory.

```
student@S11-Server:~$ alias dir='ls -l'
```

10. Create an alias named `h` that lists your command `history`.

```
student@S11-Server:~$ alias h=history
```

11. Unalias the history command and the clear command.

```
student@S11-Server:~$ unalias h
student@S11-Server:~$ unalias cls
```

12. Display all defined functions.

```
student@S11-Server:~$ typeset -f


```
Note: In Oracle Linux, the output may display a lot more data.

13. Create and test a function called data that performs the following activities:
    a. Clears the terminal screen
    b. Displays date and time
    c. Displays users logged in to the system
    d. Displays the path of the current working directory
    e. Lists current working directory in a long format

```
student@S11-Server:~$ function data { clear; date; who; pwd; ls
-l; }
```

14. To confirm that the function is created, run typeset -f again.

```
student@S11-Server:~$ typeset -f
data ()
{
    clear;
    date;
    who;
    pwd;
    ls -l
}
```
Note: In Oracle Linux (OL6-Server) VM, the output may vary slightly.

15. Use vi to edit the `.profile` file in your home directory:

```
student@S11-Server:~$ vi ~/.profile
```

Note: The equivalent profile file in Oracle Linux is `.bash_profile`.

Add the following line entries in the `.profile` file:

```
set -o vi
alias h='history'
alias cls='clear'
alias lf='pwd ; ls -lF'
```

```
#
# Simple profile places /usr/bin at front, followed by
/usr/sbin.
#
# Use less(1) or more(1) as the default pager for the man(1)
command.
#
export PATH=/usr/bin:/usr/sbin

if [ -f /usr/bin/less ]; then
    export PAGER="/usr/bin/less -ins"
elif [ -f /usr/bin/more ]; then
    export PAGER="/usr/bin/more -s"
fi


#
# Define default prompt to <username>@<hostname>:<path><"($|#)
">
# and print '#' for user "root" and '$' for normal users.
#
# Currently this is only done for bash/pfbash(1).
#
ENV=$HOME/.bash
export ENV
case ${SHELL} in
*bash)
    typeset +x PS1="\u@\h:\w\\ $ "
    ;;
esac
set -o vi
alias h='history'
alias cls='clear'
alias If='pwd; ls -lF'
```

Note: The file content may vary from system to system.

16. Run the following commands:

In Oracle Solaris VM

```
student@S11-Server:~$ . ~/.profile
```

In Oracle Linux VM

```
[student@OL6-Server]:~$ . ~/.bash_profile
```

17. Test your new aliases and functions.

```
student@S11-Server:~$ h
    1  which bash
    2  clear
    3  pwd
    4  clear
    5  sleep 500 &
    6  jobs
    7  fg %1
    8  bg %1
    9  gedit /opt/ora/4.doc
   10  kill %1
   11  set -o noclobber
   12  set -0 | more
   13  set -o | more
   14  gedit /opt/ora/1.doc
   15  alias
   16  alias cls=clear
   17  alias dir='ls -l'
   18  alias h=history
   19  unalias h
   20  unalias cls
   21  typeset -f
   22  function data {clear; date; who; pwd; ls -l;}
   23  function data { clear; date; who; pwd; ls -l; }
   24  vi ~/.kshrc
   25  gedit /opt/ora/2.doc
   26  typeset -f
   27  gedit /opt/ora/3.doc
   28  vi ~/.profile
   29  . ~/.profile
   30  h
student@S11-Server:~$ cls


student@S11-Server:~$ lf
/home/student
total 33
```

```
drwxr-xr-x   2 student   staff           5 Apr  9 19:03 Desktop/
-rw-r--r--   1 student   staff         630 May 10 17:05
directory_list
drwxr-xr-x   6 student   staff           6 Apr  9 19:03 Documents/
drwxr-xr-x   2 student   staff           2 Apr  9 19:03 Downloads/
drwxr-xr-x  20 student   root           47 May 10 17:11 lab/
drwxr-xr-x   2 student   staff           2 Apr  9 19:03 Public/
student@S11-Server:~$ exit
```

Note: This will close the terminal. The command output may vary for systems and environments. In some cases, first use of exit command may throw a message "There are stopped jobs". Please ignore. Run the exit command again.

Practice 8-2: Using Shell Scripts

Overview

In this practice, you will create, edit, and run shell scripts using some of the test and conditional statements.

Assumptions

It is recommended to use one system at a time. Students will perform the exercises in the /home/student directory. For Oracle Linux, change the directory from Desktop to the /home/student directory. The output may vary from system to system.

Tasks

1. In this task, you will create and run a simple shell script called info.sh, which displays date, time, username, and current directory.

   a. Switch to the lab directory in your home directory. Open the vi editor and create a shell script file, info.sh as shown. Ensure that you are in the lab directory of your home directory.

   Note: For your benefit, the file info.sh is already available in the lab directory. You can use this file in Solaris environment. However, for Oracle Linux you would require to edit the file and replace /usr/bin/bash at the top of the script with /bin/bash.

   ```
   student@S11-Server:~$ cd lab
   student@S11-Server:~/lab$
   student@S11-Server:~/lab$ vi info.sh
   #!/usr/bin/bash
   #info.sh
   # This script displays the date, time, username and the current
   directory.
       echo "Date and time is:"
       date
       echo
       echo "Your username is: `whoami` \n"
       echo "Your current directory is: \c"
       pwd


   "info.sh" 10 lines, 232 characters


   ```

   Note: Exit the file by pressing the ESC key followed by executing the vi quit command :q. The first entry #!/usr/bin/bash indicates that the script should be run in the bash shell.

   b. Grant execute permission to the script by running the chmod command. (Confirm by running the ls -l command).

   ```
   student@S11-Server:~/lab$ chmod +x info.sh
   student@S11-Server:~/lab$ ls -l info.sh
   -rwxr-xr-x   1 student  staff          232 May 11 19:34 info.sh
   ```

c. To execute the script, run the command as shown below:

```
student@S11-Server:~/lab$ ./info.sh
Date and time is:
Friday, May 11, 2012 07:57:09 PM IST


Your username is: student


Your current directory is: /home/student/lab
```

2. In this task, you will pass values to the greetings shell script, which is available in the lab directory.

   a. View greetings by running the cat command.

```
student@S11-Server:~/lab$ cat greetings
#!/bin/sh
echo $1 $2 #echo the first two parameters passed
```

   b. Add execute permissions to greetings.

```
student@S11-Server:~/lab$ chmod u+x greetings
```

   c. Run greetings with the hello and world values.

```
student@S11-Server:~/lab$ ./greetings hello world
hello world
student@S11-Server:~/lab$
```

3. In this task, you will practice using the test command.

   Test whether the value of the LOGNAME variable is student.

```
student@S11-Server:~/lab$ echo $LOGNAME
student
student@S11-Server:~/lab$ test "$LOGNAME" = "student"
student@S11-Server:~/lab$ echo $?
0
student@S11-Server:~/lab$


Note: The test command does not return any output. For a true condition, the exit
status of the test command is set to 0.
```

   Now test, whether the value of the LOGNAME variable is user.

4. In this task, you will practice using the conditional statements. Using the conditional if statement, test if we are in a leap year or now.

   a. Create a shell script called leaptest.sh using the vi editor.

   Note: For your benefit leaptest.sh script is available for use in the lab directory. You can use this file as it is in Solaris environment. For Oracle Linux, replace /usr/bin/bash at the top of the script with /bin/bash.

```
student@S11-Server:~/lab$ vi leaptest.sh
#!/usr/bin/bash
# This script will test if the year is a leap year.


year=`date +%Y`


if [ $[$year % 400] -eq "0" ]; then
  echo "This is a leap year.  February has 29 days."
elif [ $[$year % 4] -eq 0 ]; then
        if [ $[$year % 100] -ne 0 ]; then
           echo "This is a leap year, February has 29 days."
        else
           echo "This is not a leap year.  February has 28 days."
        fi
else
  echo "This is not a leap year.  February has 28 days."
fi


~
~
"leaptest.sh" 17 lines, 466 characters
```

b. Add execute permission to the script.

```
student@S11-Server:~/lab$ chmod u+x leaptest.sh
```

c. Find the current year using the date command and then subsequently run the
   leaptest script to find whether the current year is a leap year.

```
student@S11-Server:~/lab$ date
Friday, May 11, 2012 09:11:58 PM IST
student@S11-Server:~/lab$ ./leaptest.sh
This is a leap year, February has 29 days.
student@S11-Server:~/lab$ cd
student@S11-Server:~$
```

Practices for Lesson 8: Using Advanced Shell Features in Shell Scripts

Practices for Lesson 9: Archiving Files and Remote Transfer

Chapter 9

Practices for Lesson 9

Practices Overview

In this practice, you will perform a range of tasks described in this lesson. A list of those activities is as follows:

- Create an archive file on a disk
- View an archive file on a disk
- Retrieve archive data from a disk
- Compress files
- View compressed files
- Uncompress files
- Establish a remote login session
- Copy files or directories to and from another system
- Transfer files between systems

	UNIX and Linux Essentials - Activities Checklist
☑	Introduction
☑	Introduction to UNIX
☑	Working with Files and Directories
☑	Using the `vi` Editor
☑	Using Commands within the Default Shell
☑	Using Basic File Permissions
☑	Performing Basic Process Control
☑	Using Advanced Shell Functionalities in Shell Scripts
☑	**Archiving Files and Remote Transfer**

Practice 9-1: Archiving and Retrieving Files

Overview

In this practice, you will perform tasks to create, view, and retrieve archived files.

Assumptions

Ensure that the S11-Server VM is up and running. The tasks and steps below are performed in the Oracle Solaris environment, but can be replicated in the Oracle Linux environment. The command's output may vary slightly on your systems. Students will perform the exercises in the /home/student directory. For Oracle Linux, change the directory from Desktop to the /home/student directory. Output may vary from system to system. Run chmod 775 on the lab directory, before starting this practice.

```
student@S11-Server:~$ chmod -R 775 lab
[student@OL6-Server ~]$ chmod -R 775 lab
```

Tasks

1. What type of file does the tar command create?

    A tar file

2. Archive the lab directory in your home directory to a file called lab.tar by using the tar command.

```
student@S11-Server:~$ pwd
/home/student
student@S11-Server:~$ ls -l
total 24
lrwxrwxrwx   1 student   staff          26 May 17 07:56 contents -
> /var/sadm/install/contents
drwxr-xr-x   2 student   staff           5 Apr  9 19:03 Desktop
drwxr-xr-x   6 root      staff           6 Apr  9 19:03 Documents
drwxr-xr-x   2 student   staff           2 Apr  9 19:03 Downloads
drwxr-xr-x   2 student   staff           2 May 17 07:55 house
drwxr-xr-x  17 student   staff          42 May 17 18:54 lab
drwxr-xr-x   2 student   staff           2 Apr  9 19:03 Public
drwxr-xr-x   2 student   staff           2 May 17 07:44 records

student@S11-Server:~$ tar cvf lab.tar lab
a lab/ 0K
a lab/dir4/ 0K
a lab/.recently-used 0K
a lab/dante_1 1K
a lab/.gnome/ 0K
a lab/Documents/ 0K
a lab/Documents/misc.txt 1K
```

Practices for Lesson 9: Archiving Files and Remote Transfer

```
a lab/Documents/sample.txt 1K
a lab/tutor.vi 29K
a lab/.ICEauthority 1K
a lab/file.3 0K
a lab/.sh_history 1K
a lab/.gconf/ 0K
a lab/file2 1K
a lab/.metacity/ 0K
a lab/dir3/ 0K
a lab/dir3/planets/ 0K
a lab/dir3/planets/pluto 1K
a lab/dir3/planets/mars 1K
a lab/.rhosts 1K
a lab/Desktop/ 0K
a lab/.kshrc 1K
a lab/.profile 1K
a lab/.gnome2/ 0K
a lab/.gconfd/ 0K
a lab/greetings 1K
a lab/.Xauthority 1K
a lab/leaptest.sh 1K
a lab/file1 2K
a lab/info.sh 1K
a lab/.nautilus/ 0K
a lab/file3 1K
a lab/dir2/ 0K
a lab/dir2/recipes/ 0K
a lab/dir2/notes 0K
a lab/dir2/beans/ 0K
a lab/practice/ 0K
a lab/practice/research 0K
a lab/practice/mailbox 0K
a lab/practice/project 0K
a lab/practice/projection 0K
a lab/practice/results 0K
a lab/file.2 0K
a lab/hello.sh 1K
a lab/dir5/ 0K
a lab/dante 2K
a lab/file4 1K
a lab/myvars 1K
a lab/dir1/ 0K
```

Practices for Lesson 9: Archiving Files and Remote Transfer

```
a lab/dir1/coffees/ 0K
a lab/dir1/coffees/nuts 0K
a lab/dir1/coffees/beans/ 0K
a lab/dir1/coffees/beans/beans 12K
a lab/dir1/coffees/brands 0K
a lab/dir1/fruit/ 0K
a lab/dir1/trees/ 0K
a lab/file.1 0K
a lab/.gnome2_private/ 0K
a lab/fruit 1K
a lab/fruit2 1K
a lab/.gtkrc-1.2-gnome2 1K


student@S11-Server:~$ ls -l /home/student
total 201
lrwxrwxrwx   1 student  staff            26 May 17 07:56 contents -
> /var/sadm/install/contents
drwxr-xr-x   2 student  staff             5 Apr  9 19:03 Desktop
drwxr-xr-x   6 root     staff             6 Apr  9 19:03 Documents
drwxr-xr-x   2 student  staff             2 Apr  9 19:03 Downloads
drwxr-xr-x   2 student  staff             2 May 17 07:55 house
drwxr-xr-x  17 student  staff            42 May 17 18:54 lab
-rw-r--r--   1 student  staff         90112 May 22 09:40 lab.tar
drwxr-xr-x   2 student  staff             2 Apr  9 19:03 Public
drwxr-xr-x   2 student  staff             2 May 17 07:44 records
```

Note: You can follow similar steps to create and archive the file to another drive or an external drive. The command's output may vary from system to system.

3. Create a new directory under the lab directory of your home directory called retrieve. Use the cd command to move to the new directory. You can use the new directory to practice retrieving files from archives. Retrieve the contents of the lab.tar file that you just created.

```
student@S11-Server:~$ cd lab
student@S11-Server:~/lab$ mkdir retrieve
student@S11-Server:~/lab$ cd retrieve
student@S11-Server:~/lab/retrieve$ tar xvf /home/student/lab.tar
x lab, 0 bytes, 0 tape blocks
x lab/dir4, 0 bytes, 0 tape blocks
x lab/.recently-used, 0 bytes, 0 tape blocks
x lab/dante_1, 368 bytes, 1 tape blocks
x lab/.gnome, 0 bytes, 0 tape blocks
x lab/Documents, 0 bytes, 0 tape blocks
x lab/Documents/misc.txt, 21 bytes, 1 tape blocks
```

```
x lab/Documents/sample.txt, 28 bytes, 1 tape blocks
x lab/tutor.vi, 28709 bytes, 57 tape blocks
x lab/.ICEauthority, 520 bytes, 2 tape blocks
x lab/file.3, 0 bytes, 0 tape blocks
x lab/.sh_history, 526 bytes, 2 tape blocks
x lab/.gconf, 0 bytes, 0 tape blocks
x lab/file2, 105 bytes, 1 tape blocks
x lab/.metacity, 0 bytes, 0 tape blocks
x lab/dir3, 0 bytes, 0 tape blocks
x lab/dir3/planets, 0 bytes, 0 tape blocks
x lab/dir3/planets/pluto, 42 bytes, 1 tape blocks
x lab/dir3/planets/mars, 68 bytes, 1 tape blocks
x lab/.rhosts, 2 bytes, 1 tape blocks
x lab/Desktop, 0 bytes, 0 tape blocks
x lab/.kshrc, 507 bytes, 1 tape blocks
x lab/.profile, 724 bytes, 2 tape blocks
x lab/.gnome2, 0 bytes, 0 tape blocks
x lab/.gconfd, 0 bytes, 0 tape blocks
x lab/greetings, 59 bytes, 1 tape blocks
x lab/.Xauthority, 200 bytes, 1 tape blocks
x lab/leaptest.sh, 466 bytes, 1 tape blocks
x lab/file1, 1610 bytes, 4 tape blocks
x lab/info.sh, 232 bytes, 1 tape blocks
x lab/.nautilus, 0 bytes, 0 tape blocks
x lab/file3, 218 bytes, 1 tape blocks
x lab/dir2, 0 bytes, 0 tape blocks
x lab/dir2/recipes, 0 bytes, 0 tape blocks
x lab/dir2/notes, 0 bytes, 0 tape blocks
x lab/dir2/beans, 0 bytes, 0 tape blocks
x lab/practice, 0 bytes, 0 tape blocks
x lab/practice/research, 0 bytes, 0 tape blocks
x lab/practice/mailbox, 0 bytes, 0 tape blocks
x lab/practice/project, 0 bytes, 0 tape blocks
x lab/practice/projection, 0 bytes, 0 tape blocks
x lab/practice/results, 0 bytes, 0 tape blocks
x lab/file.2, 0 bytes, 0 tape blocks
x lab/hello.sh, 32 bytes, 1 tape blocks
x lab/dir5, 0 bytes, 0 tape blocks
x lab/dante, 1319 bytes, 3 tape blocks
x lab/file4, 137 bytes, 1 tape blocks
x lab/myvars, 67 bytes, 1 tape blocks
x lab/dir1, 0 bytes, 0 tape blocks
```

Practices for Lesson 9: Archiving Files and Remote Transfer

```
x lab/dir1/coffees, 0 bytes, 0 tape blocks
x lab/dir1/coffees/nuts, 0 bytes, 0 tape blocks
x lab/dir1/coffees/beans, 0 bytes, 0 tape blocks
x lab/dir1/coffees/beans/beans, 12288 bytes, 24 tape blocks
x lab/dir1/coffees/brands, 0 bytes, 0 tape blocks
x lab/dir1/fruit, 0 bytes, 0 tape blocks
x lab/dir1/trees, 0 bytes, 0 tape blocks
x lab/file.1, 0 bytes, 0 tape blocks
x lab/.gnome2_private, 0 bytes, 0 tape blocks
x lab/fruit, 57 bytes, 1 tape blocks
x lab/fruit2, 57 bytes, 1 tape blocks
x lab/.gtkrc-1.2-gnome2, 96 bytes, 1 tape blocks
student@S11-Server:~/lab/retrieve$

student@S11-Server:~/lab/retrieve$ ls
lab
student@S11-Server:~/lab/retrieve$ ls -l
total 5
drwxr-xr-x  17 student  staff        42 May 17 18:54 lab
student@S11-Server:~/lab/retrieve$ cd
student@S11-Server:~$
```

Note: The command output may vary between the system and the environment.

Practices for Lesson 9: Archiving Files and Remote Transfer

Practice 9-2: Compressing and Restoring Files

Overview
In this practice you compress, view, and uncompress files.

Assumptions
It is recommended to use one system at a time. Students will perform the exercises in the /home/student directory. For Oracle Linux, change the directory from Desktop to the /home/student directory. The command output may vary on your system.

Tasks
1. In the lab directory of your home directory, use the compress command to compress the dante and file1 files.

```
student@S11-Server:~$ pwd
/home/student
student@S11-Server:~$ cd lab
student@S11-Server:~/lab$ compress dante
student@S11-Server:~/lab$ compress file1


Note: Oracle Linux does not support compress command. Use gzip to compress
and gunzip to uncompress.  For Linux environment, the output file extension will be
.gz  instead of .z
```

2. What are the new names for the compressed versions of the dante and file1 files?

```
student@S11-Server:~/lab$ ls -l
total 129
-rwxr-xr-x   1 student   root       368 May   2 13:51 dante_1
-rwxr-xr-x   1 student   staff      896 May   2 13:51 dante.Z
drwxr-xr-x   2 student   root         2 May   2 13:51 Desktop
drwxr-xr-x   5 student   root         5 May   2 13:51 dir1
drwxr-xr-x   4 student   root         5 May   2 13:51 dir2
drwxr-xr-x   3 student   root         3 May   2 13:51 dir3
drwxr-xr-x   2 student   root         3 May   9 15:28 dir4
drwxr-xr-x   2 student   root         2 May   2 13:51 dir5
drwxr-xr-x   2 student   root         4 May   9 14:30 Documents
-rw-r--r--   1 student   staff      248 May 10 17:11 err
-rw-r--r--   1 student   staff      248 May 10 17:10 error
-rw-r--r--   1 student   staff      248 May 10 17:09 file
-rwxr-xr-x   1 student   root         0 May   2 13:51 file.1
-rwxr-xr-x   1 student   root         0 May   2 13:51 file.2
-rwxr-xr-x   1 student   root         0 May   2 13:51 file.3
-rwxr-xr-x   1 student   staff     1035 May   2 13:51 file1.Z
-rwxr-xr-x   1 student   root       105 May   2 13:51 file2
-rwxr-xr-x   1 student   root       218 May   2 13:51 file3
```

```
-rwxr-xr-x   1 student   root          137 May   2 13:51 file4
-rwxr-xr-x   1 student   root           57 May   2 13:51 fruit
-rwxr-xr-x   1 student   root           57 May   2 13:51 fruit2
-rwxr-xr-x   1 student   root           59 May   2 13:51 greetings
-rwxr--r--   1 student   staff          32 May  11 20:39 hello.sh
-rwxr-xr-x   1 student   staff         232 May  11 19:34 info.sh
-rwxr--r--   1 student   staff         466 May  11 21:11
leaptest.sh
-rwxr-xr-x   1 student   root           67 May   2 13:51 myvars
drwxr-xr-x   3 student   staff           6 May   9 15:20 perm
drwxr-xr-x   2 student   root            7 May   2 13:51 practice
drwxr-xr-x   3 student   staff           3 May  12 18:52 retrieve
drwxr-xr-x   2 student   staff           2 May   9 15:41 test2dir
-rw-r--r--   1 student   staff           0 May   9 15:41 test2file
drwxr-x---   2 student   staff           2 May   9 15:41 testdir
-rw-r-----   1 student   staff           0 May   9 15:41 testfile
-rwxr-xr-x   1 student   root        28709 May   2 13:51 tutor.vi
student@S11-Server:~/lab$
```

The new names for compressed versions are `dante.Z` and `file1.Z`.

3. Identify the commands you can use to view the contents of a file that was compressed with the `compress` command.

    - `uncompress -c filename`

    - `zcat filename`

    - `gzcat filename`

```
student@S11-Server:~/lab$ uncompress -c dante.Z
                The Life and Times of Dante


                        by Dante Pocai



Mention "Alighieri" and few may know about whom you are talking.
Say
<output truncated> …………


student@S11-Server:~/lab$ zcat dante.Z
                The Life and Times of Dante


                        by Dante Pocai



Mention "Alighieri" and few may know about whom you are talking.
Say
```

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```
<output truncated> ............


student@S11-Server:~/lab$ gzcat dante.Z
                  The Life and Times of Dante


                      by Dante Pocai



Mention "Alighieri" and few may know about whom you are talking.
Say
<output truncated> ............
```

4. Use the `gzip` command to compress the `file2` and `dante_1` files.

```
student@S11-Server:~/lab$ gzip file2 dante_1
```

5. What are the new names for the compressed versions of the `file2` and `dante_1` files?

- `file2.gz`
- `dante_1.gz`

```
student@S11-Server:~/lab$ ls -l
total 132
-rwxr-xr-x   1 student   staff        268 May   2 13:51 dante_1.gz
-rwxr-xr-x   1 student   staff        896 May   2 13:51 dante.Z
drwxr-xr-x   2 student   root           2 May   2 13:51 Desktop
drwxr-xr-x   5 student   root           5 May   2 13:51 dir1
drwxr-xr-x   4 student   root           5 May   2 13:51 dir2
drwxr-xr-x   3 student   root           3 May   2 13:51 dir3
drwxr-xr-x   2 student   root           3 May   9 15:28 dir4
drwxr-xr-x   2 student   root           2 May   2 13:51 dir5
drwxr-xr-x   2 student   root           4 May   9 14:30 Documents
-rw-r--r--   1 student   staff        248 May 10 17:11 err
-rw-r--r--   1 student   staff        248 May 10 17:10 error
-rw-r--r--   1 student   staff        248 May 10 17:09 file
-rwxr-xr-x   1 student   root           0 May   2 13:51 file.1
-rwxr-xr-x   1 student   root           0 May   2 13:51 file.2
-rwxr-xr-x   1 student   root           0 May   2 13:51 file.3
-rwxr-xr-x   1 student   staff       1035 May   2 13:51 file1.Z
-rwxr-xr-x   1 student   staff        112 May   2 13:51 file2.gz
-rwxr-xr-x   1 student   root         218 May   2 13:51 file3
-rwxr-xr-x   1 student   root         137 May   2 13:51 file4
-rwxr-xr-x   1 student   root          57 May   2 13:51 fruit
-rwxr-xr-x   1 student   root          57 May   2 13:51 fruit2
-rwxr-xr-x   1 student   root          59 May   2 13:51 greetings
-rwxr--r--   1 student   staff         32 May 11 20:39 hello.sh
```

Practices for Lesson 9: Archiving Files and Remote Transfer

```
-rwxr-xr-x   1 student   staff           232 May 11 19:34 info.sh
-rwxr--r--   1 student   staff           466 May 11 21:11
leaptest.sh
-rwxr-xr-x   1 student   root             67 May  2 13:51 myvars
drwxr-xr-x   3 student   staff             6 May  9 15:20 perm
drwxr-xr-x   2 student   root              7 May  2 13:51 practice
drwxr-xr-x   3 student   staff             3 May 12 18:52 retrieve
drwxr-xr-x   2 student   staff             2 May  9 15:41 test2dir
-rw-r--r--   1 student   staff             0 May  9 15:41 test2file
drwxr-x---   2 student   staff             2 May  9 15:41 testdir
-rw-r-----   1 student   staff             0 May  9 15:41 testfile
-rwxr-xr-x   1 student   root          28709 May  2 13:51 tutor.vi
student@S11-Server:~/lab$
```

6. What is the difference between the `gzip` and `zip` command?

    The `gzip` command reduces the file size, whereas the `zip` command compresses one or more files into a single zip archive.

7. Use the zip command to compress the `file3`, `fruit2`, and `tutor.vi` files to the `files.zip` file.

```
student@S11-Server:~/lab$ zip files.zip file3 fruit2 tutor.vi
  adding: file3 (deflated 26%)
  adding: fruit2 (deflated 14%)
  adding: tutor.vi (deflated 74%)
```

8. Which command would you use for viewing the compressed archive file called `files.zip`?

```
student@S11-Server:~/lab$ unzip -l files.zip
Archive:  files.zip
  Length      Date    Time    Name
---------  ---------- -----   ----
      218  05-02-2012 13:51   file3
       57  05-02-2012 13:51   fruit2
    28709  05-02-2012 13:51   tutor.vi
---------                     -------
    28984                     3 files
```

9. Do the original versions of the `file3`, `fruit2`, and `tutor.vi` files still exist after compression?

    Yes.

10. Uncompress the `dante.Z` and `file1.Z` files.

```
student@S11-Server:~/lab$ uncompress dante.Z
student@S11-Server:~/lab$ uncompress file1.Z
```

Do the `dante` and `file1` files still have a `.Z` extension in their file names?

No.

```
student@S11-Server:~/lab$ ls -l
```

Practices for Lesson 9: Archiving Files and Remote Transfer

```
total 153
-rwxr-xr-x   1 student   staff          1319 May   2 13:51 dante
-rwxr-xr-x   1 student   staff           268 May   2 13:51 dante_1.gz
drwxr-xr-x   2 student   root             2 May   2 13:51 Desktop
drwxr-xr-x   5 student   root             5 May   2 13:51 dir1
drwxr-xr-x   4 student   root             5 May   2 13:51 dir2
drwxr-xr-x   3 student   root             3 May   2 13:51 dir3
drwxr-xr-x   2 student   root             3 May   9 15:28 dir4
drwxr-xr-x   2 student   root             2 May   2 13:51 dir5
drwxr-xr-x   2 student   root             4 May   9 14:30 Documents
-rw-r--r--   1 student   staff           248 May 10 17:11 err
-rw-r--r--   1 student   staff           248 May 10 17:10 error
-rw-r--r--   1 student   staff           248 May 10 17:09 file
-rwxr-xr-x   1 student   root             0 May   2 13:51 file.1
-rwxr-xr-x   1 student   root             0 May   2 13:51 file.2
-rwxr-xr-x   1 student   root             0 May   2 13:51 file.3
-rwxr-xr-x   1 student   staff          1610 May   2 13:51 file1
-rwxr-xr-x   1 student   staff           112 May   2 13:51 file2.gz
-rwxr-xr-x   1 student   root           218 May   2 13:51 file3
-rwxr-xr-x   1 student   root           137 May   2 13:51 file4
-rw-r--r--   1 student   staff          7983 May 12 19:24 files.zip
-rwxr-xr-x   1 student   root            57 May   2 13:51 fruit
-rwxr-xr-x   1 student   root            57 May   2 13:51 fruit2
-rwxr-xr-x   1 student   root            59 May   2 13:51 greetings
-rwxr--r--   1 student   staff           32 May 11 20:39 hello.sh
-rwxr-xr-x   1 student   staff           232 May 11 19:34 info.sh
-rwxr--r--   1 student   staff           466 May 11 21:11
leaptest.sh
-rwxr-xr-x   1 student   root            67 May   2 13:51 myvars
drwxr-xr-x   3 student   staff            6 May   9 15:20 perm
drwxr-xr-x   2 student   root             7 May   2 13:51 practice
drwxr-xr-x   3 student   staff            3 May 12 18:52 retrieve
drwxr-xr-x   2 student   staff            2 May   9 15:41 test2dir
-rw-r--r--   1 student   staff            0 May   9 15:41 test2file
drwxr-x---   2 student   staff            2 May   9 15:41 testdir
-rw-r-----   1 student   staff            0 May   9 15:41 testfile
-rwxr-xr-x   1 student   root         28709 May   2 13:51 tutor.vi
student@S11-Server:~/lab$
```

11. Which command would you use to uncompress the `file2` and `dante_1` files?

The `gunzip file2.gz dante_1.gz` *command*

```
student@S11-Server:~/lab$ gunzip file2.gz dante_1.gz
```

Do the `file2` and `dante_1` files still have a `.gz` extension in their file names?

No.

```
student@S11-Server:~/lab$ ls -l
total 153
-rwxr-xr-x   1 student   staff       1319 May  2 13:51 dante
-rwxr-xr-x   1 student   staff        368 May  2 13:51 dante_1
drwxr-xr-x   2 student   root           2 May  2 13:51 Desktop
drwxr-xr-x   5 student   root           5 May  2 13:51 dir1
drwxr-xr-x   4 student   root           5 May  2 13:51 dir2
drwxr-xr-x   3 student   root           3 May  2 13:51 dir3
drwxr-xr-x   2 student   root           3 May  9 15:28 dir4
drwxr-xr-x   2 student   root           2 May  2 13:51 dir5
drwxr-xr-x   2 student   root           4 May  9 14:30 Documents
-rw-r--r--   1 student   staff        248 May 10 17:11 err
-rw-r--r--   1 student   staff        248 May 10 17:10 error
-rw-r--r--   1 student   staff        248 May 10 17:09 file
-rwxr-xr-x   1 student   root           0 May  2 13:51 file.1
-rwxr-xr-x   1 student   root           0 May  2 13:51 file.2
-rwxr-xr-x   1 student   root           0 May  2 13:51 file.3
-rwxr-xr-x   1 student   staff       1610 May  2 13:51 file1
-rwxr-xr-x   1 student   staff        105 May  2 13:51 file2
-rwxr-xr-x   1 student   root         218 May  2 13:51 file3
-rwxr-xr-x   1 student   root         137 May  2 13:51 file4
-rw-r--r--   1 student   staff       7983 May 12 19:24 files.zip
-rwxr-xr-x   1 student   root          57 May  2 13:51 fruit
-rwxr-xr-x   1 student   root          57 May  2 13:51 fruit2
-rwxr-xr-x   1 student   root          59 May  2 13:51 greetings
-rwxr--r--   1 student   staff         32 May 11 20:39 hello.sh
-rwxr-xr-x   1 student   staff        232 May 11 19:34 info.sh
-rwxr--r--   1 student   staff        466 May 11 21:11
leaptest.sh
-rwxr-xr-x   1 student   root          67 May  2 13:51 myvars
drwxr-xr-x   3 student   staff          6 May  9 15:20 perm
drwxr-xr-x   2 student   root           7 May  2 13:51 practice
drwxr-xr-x   3 student   staff          3 May 12 18:52 retrieve
drwxr-xr-x   2 student   staff          2 May  9 15:41 test2dir
-rw-r--r--   1 student   staff          0 May  9 15:41 test2file
drwxr-x---   2 student   staff          2 May  9 15:41 testdir
-rw-r-----   1 student   staff          0 May  9 15:41 testfile
-rwxr-xr-x   1 student   root       28709 May  2 13:51 tutor.vi
student@S11-Server:~/lab$
```

12. Which command would you use to unarchive the `file3`, `fruit2`, and `tutor.vi` files from the zip file created in Step 7?

```
student@S11-Server:~/lab$ unzip files.zip
Archive: files.zip
replace file3? [y]es, [n]o, [A]ll, [N]one, [r]ename: A
inflating: file3
inflating: fruit2
inflating: tutor.vi
student@S11-Server:~/lab$ cd
student@S11-Server:~$
```

Does the `files.zip` file still exist in the directory?

Yes

Practice 9-3: Performing Remote Connections and File Transfers

Overview

In this practice, you will use some of the remote connection and file transfer commands explained in this lesson.

Assumptions

In this practice, S11-Server VM is used as the host system and OL6-Server VM is used as the remote system. Both the VMs have pre-installed and enabled `ssh` service to be able to perform remote connections and secure file transfers. You can follow similar commands in the reverse order as well.

Ensure both VMs, S11-Server and OL6-Server, are up and running before beginning this practice.

Launch the calculator on the remote system, OL6-Server, prior to beginning the practice, by performing the `gcalctool` command.

Note: The above action is required in order to perform task 4 in this practice where you will try to perform a command on a remote system to kill the process related to this application.

Open a terminal and run the command as shown below.

```
[student@OL6-Server ~]$ gcalctool
```
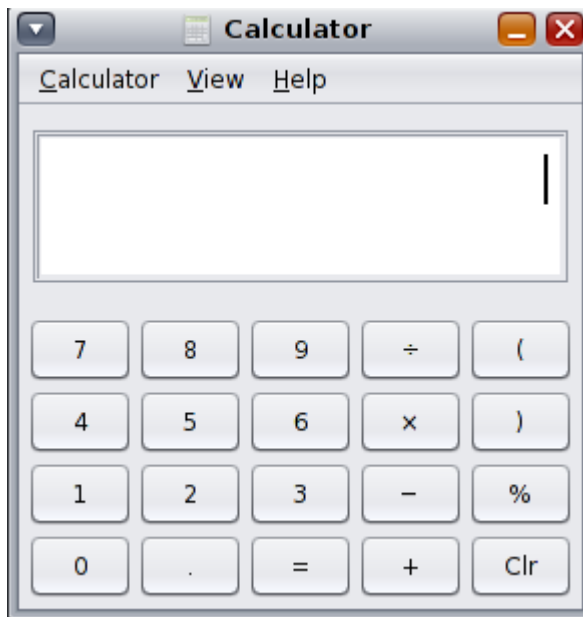

Tasks

1. Open a terminal in the S11-Server VM and use the `ssh` command to log in to OL6-Server in your virtual network.

```
student@S11-Server:~$ ssh student@OL6-Server
student@ol6-server's password:
Last login: Sat May 12 19:58:12 2012 from s11-
server.suned.sun.com
[student@OL6-Server ~]$ pwd
/home/student
```

```
[student@OL6-Server ~]$
```

Or

```
student@S11-Server:~$ ssh -l student OL6-Server
student@ol6-server's password:
Last login: Sat May 12 19:58:46 2012 from s11-
server.suned.sun.com
[student@OL6-Server ~]$ pwd
/home/student
```

Note: Password for the user student is student1. The default directory on the remote machine will be the user's home directory. In this case, it is /home/student. The output message may differ on your system.

2. Use the uname command to display the host name of the current system.

```
[student@OL6-Server ~]$ uname -n
OL6-Server
[student@OL6-Server ~]$
```

3. Use the ps command to identify the PID of the gcalctool command on the remote system.

```
[student@OL6-Server ~]$ ps -ef | grep gcalctool
student   3357   3343   0 12:17 pts/0      00:00:00 gcalctool

Note: The output may differ from system to system.
```

4. Terminate the gcalctool command using the PID.

```
[student@OL6-Server ~]$ kill 3357
```

Are you able to terminate the process? Why or why not?

If you log in to the remote system as root, you can terminate the process. If you log in to the remote system as the same user (same UID) as the user who started the process on the remote system, then also you can terminate the process. However, if you log in to the remote system as some other user, you cannot terminate the process because you do not own the process and do not have the appropriate permission.

5. Log out of the remote system.

```
[student@OL6-Server ~]$ exit
logout
Connection to OL6-Server closed
```

6. Display the host name of your current system to determine whether you have returned to your host system.

```
student@S11-Server:~$ uname -n
S11-Server
```

7. Which remote connection command allows you to run a program remotely?

The ssh command

8. Which command copies files remotely?

   The scp command

9. Copy the dante file from the lab directory of your home directory to the
   /home/student/lab/dir1 directory on the remote host.

```
student@S11-Server:~$ cd lab
student@S11-Server:~/lab$ ls
dante          file.1        info.sh
dante_1        file.2        leaptest.sh
Desktop        file.3        myvars
dir1           file1         perm
dir2           file2         practice
dir3           file3         retrieve
dir4           file4         test2dir
dir5           files.zip     test2file
Documents      fruit         testdir
err            fruit2        testfile
error          greetings     tutor.vi
file           hello.sh
student@S11-Server:~/lab$ pwd
/home/student/lab
student@S11-Server:~/lab$ scp dante OL6-
Server:/home/student/lab/dir1
student@ol6-server's password:
dante                    0%      0        --:-dante
100%  1319       00:00
student@S11-Server:~/lab$
```

   Note: Password for the user student on the remote system, OL6-Server is
   student1. Command output may vary from system to system.

10. Copy the dante file from the remote system back to the dir2 directory on your local
    system.

```
student@S11-Server:~/lab$ scp OL6-
Server:/home/student/lab/dir1/dante /home/student/lab/dir2
student@ol6-server's password:
dante                    100% |***************|  1319       00:00
student@S11-Server:~/lab$
```

11. Copy the practice directory in the lab directory of your home directory to the home directory
    of the remote system, OL6-Server.

```
student@S11-Server:~/lab$ scp -r practice OL6-
Server:/home/student
student@ol6-server's password:
mailbox                  100% |***************|    0         00:00
research                 100% |***************|    0         00:00
```

```
project              100% |***************|      0       00:00
results              100% |***************|      0       00:00
projection           100% |***************|      0       00:00
```

Which command allows you to copy remote directories?

scp -r

12. Retrieve the file `myvars` from the remote system, OL6-Server to the `/home/student` directory on the host, `S11-Server`.

```
student@S11-Server:~/lab$ cd
student@S11-Server:~$ pwd
/home/student
student@S11-Server:~$ sftp OL6-Server
Connecting to OL6-Server...
student@ol6-server's password:
sftp> pwd
Remote working directory: /home/student
sftp> get lab/myvars
Fetching /home/student/lab/myvars to myvars
/home/student/lab/myvars       100%   67      0.1KB/s   00:00
sftp> exit
student@S11-Server:~$ ls
Desktop          lab
directory_list   myvars
Documents        perm
Downloads        practice1
file1            Public
file2
student@S11-Server:~$
```

a. Which remote connection command transfers files securely from system to system, including binary files?

The sftp command

b. How do you end an `ftp` session?

Type exit or quit or bye at the sftp> prompt.

13. Transfer multiple files from the `/home/student/lab` directory starting with the string "file" from a remote system to your current working directory on your local system.

```
student@S11-Server:~$ sftp OL6-Server
Connecting to OL6-Server...
student@ol6-server's password:
sftp> cd lab
sftp> mget file*
Fetching /home/student/lab/file.1 to file.1
Fetching /home/student/lab/file.2 to file.2
```

```
Fetching /home/student/lab/file.3 to file.3
Fetching /home/student/lab/file1 to file1
/home/student/lab/file1          100% 1610      1.6KB/s    00:00
Fetching /home/student/lab/file2 to file2
/home/student/lab/file2          100%  105      0.1KB/s    00:00
Fetching /home/student/lab/file3 to file3
/home/student/lab/file3          100%  218      0.2KB/s    00:00
Fetching /home/student/lab/file4 to file4
/home/student/lab/file4          100%  137      0.1KB/s    00:00
sftp> exit
student@S11-Server:~$ ls -l
total 42
drwxr-xr-x   2 student   staff            5 Apr  9 19:03 Desktop
-rw-r--r--   1 student   staff          630 May 10 17:05
directory_list
drwxr-xr-x   6 student   staff            6 Apr  9 19:03 Documents
drwxr-xr-x   2 student   staff            2 Apr  9 19:03 Downloads
-rwxr-xr-x   1 student   staff            0 May 14 13:29 file.1
-rwxr-xr-x   1 student   staff            0 May 14 13:29 file.2
-rwxr-xr-x   1 student   staff            0 May 14 13:29 file.3
-rwxr-xr-x   1 student   staff         1610 May 14 13:29 file1
-rwxr-xr-x   1 student   staff          105 May 14 13:29 file2
-rwxr-xr-x   1 student   staff          218 May 14 13:29 file3
-rwxr-xr-x   1 student   staff          137 May 14 13:29 file4
drwxr-xr-x  21 student   root            52 May 12 19:39 lab
-rwxr-xr-x   1 student   staff           67 May 14 13:15 myvars
drwxr-xr-x   2 student   staff            7 May  9 15:15 perm
drwxr-xr-x   2 student   staff            2 May  9 14:25 practice1
drwxr-xr-x   2 student   staff            2 Apr  9 19:03 Public
student@S11-Server:~$
```

14. Transfer the file `myvars` from `/home/student` to the `student` home directory on the
    remote system, `OL6-Server`.

```
student@S11-Server:~$ sftp OL6-Server
Connecting to OL6-Server...
student@ol6-server's password:
sftp> put myvars
Uploading myvars to /home/student/myvars
myvars                           100%   67      0.1KB/s    00:01
sftp> exit
student@S11-Server:~$
```

Practices for Lesson 9: Archiving Files and Remote Transfer

Which command is used to transfer the file to a remote system?

put

15. Transfer multiple files starting with the string "file" from the home directory
/home/student of the local system to a directory on the remote system by using the
mput command.

```
student@S11-Server:~$ sftp OL6-Server
Connecting to OL6-Server...
student@ol6-server's password:
sftp> mput file*
Uploading file.1 to /home/student/file.1
file.1                              100%    0     0.0KB/s    00:00
Uploading file.2 to /home/student/file.2
file.2                              100%    0     0.0KB/s    00:00
Uploading file.3 to /home/student/file.3
file.3                              100%    0     0.0KB/s    00:00
Uploading file1 to /home/student/file1
file1                               100% 1610    1.6KB/s    00:00
Uploading file2 to /home/student/file2
file2                               100%  105    0.1KB/s    00:00
Uploading file3 to /home/student/file3
file3                               100%  218    0.2KB/s    00:00
Uploading file4 to /home/student/file4
file4                               100%  137    0.1KB/s    00:00

sftp> exit
student@S11-Server:~$ ls -l
total 42
drwxr-xr-x   2 student   staff              5 Apr   9 19:03 Desktop
-rw-r--r--   1 student   staff            630 May 10 17:05
directory_list
drwxr-xr-x   6 student   staff              6 Apr   9 19:03 Documents
drwxr-xr-x   2 student   staff              2 Apr   9 19:03 Downloads
-rwxr-xr-x   1 student   staff              0 May 14 13:29 file.1
-rwxr-xr-x   1 student   staff              0 May 14 13:29 file.2
-rwxr-xr-x   1 student   staff              0 May 14 13:29 file.3
-rwxr-xr-x   1 student   staff           1610 May 14 13:29 file1
-rwxr-xr-x   1 student   staff            105 May 14 13:29 file2
-rwxr-xr-x   1 student   staff            218 May 14 13:29 file3
-rwxr-xr-x   1 student   staff            137 May 14 13:29 file4
drwxr-xr-x  21 student   root              52 May 12 19:39 lab
-rwxr-xr-x   1 student   staff             67 May 14 13:15 myvars
drwxr-xr-x   2 student   staff              7 May   9 15:15 perm
drwxr-xr-x   2 student   staff              2 May   9 14:25 practice1
```

```
drwxr-xr-x   2 student  staff          2 Apr  9 19:03 Public
student@S11-Server:~$ exit
```

16. Close the terminal windows.

17. Power off the S11-Server and OL6-Server virtual machines.

Practices for Lesson 9: Archiving Files and Remote Transfer