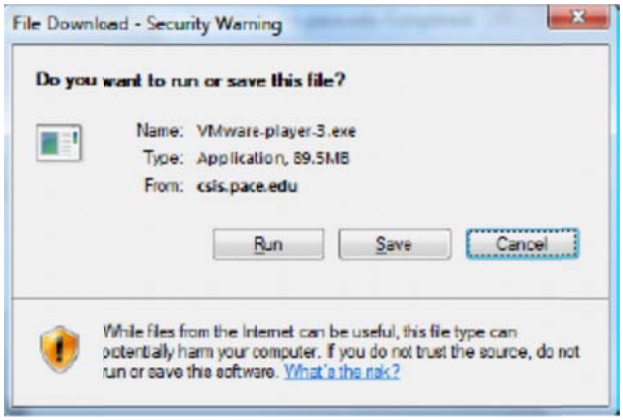
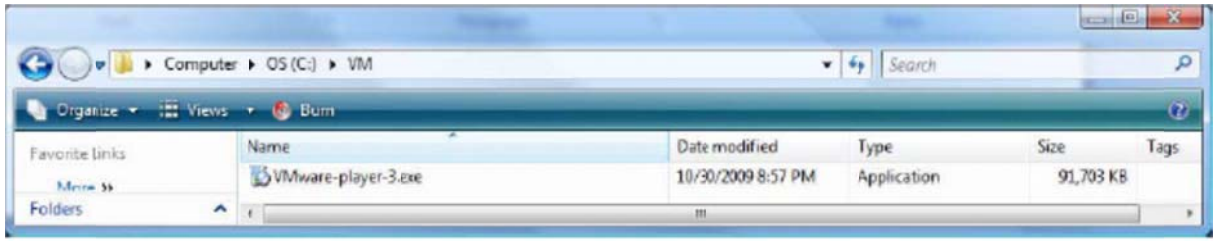
Lab#1: Install Linux in VMware and Introduction to Linux Essence

Project 1-1 Start your Linux in VMware Player

VMware Player is a free utility for running VMware Virtual Machines (VMs). It can run one VM a time. If you have *VMware Workstation* on a PC or *VMware Fusion* on a Mac, you can also create VMs and run multiple VMs at the same time. There are *VMware Player* versions for both Linux and Windows, and you can download them directly from http://www.vmware.com/download/player/. You should not install *VMware Player* if you already have *VMware Workstation* or *VMware Fusion* installed on your computer.

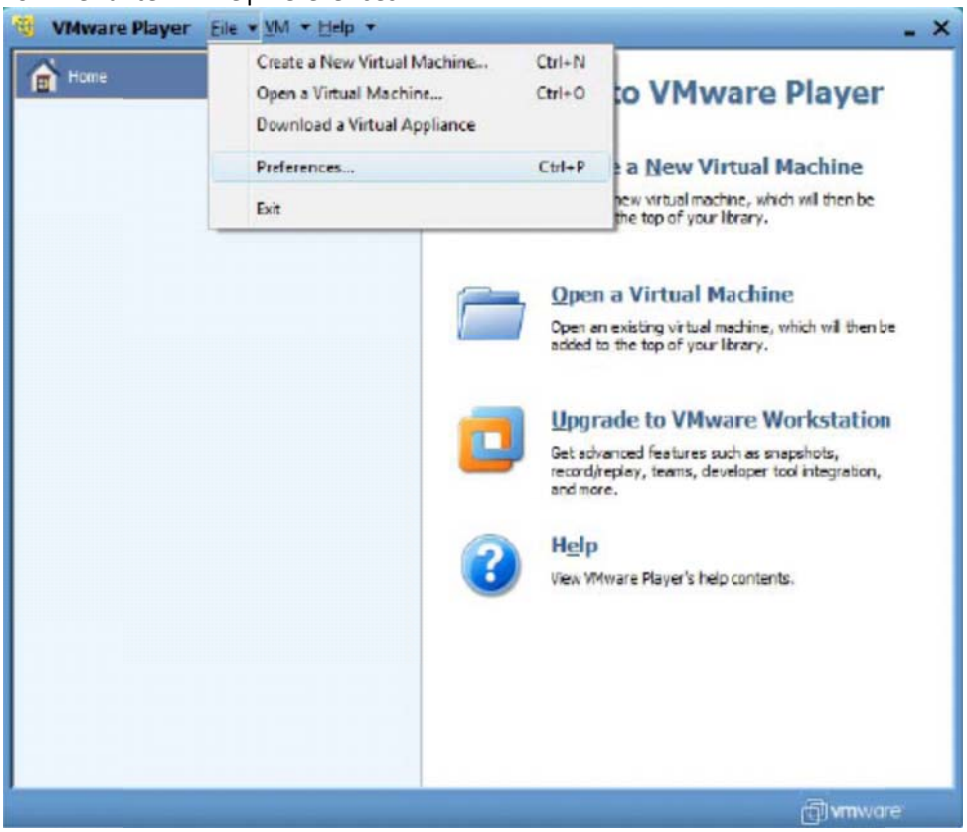
- If you have installed *VMware Player* versions earlier than V3.0, uninstall it and reboot your PC.
- In your PC, create a folder "C:\VM" with *Windows Explorer*.
- Use a web browser to visit http://csis.pace.edu/lixin/download/VMware-player-3.exe. Save file "VMware-player-3.exe" in folder "C:\VM" of your PC.



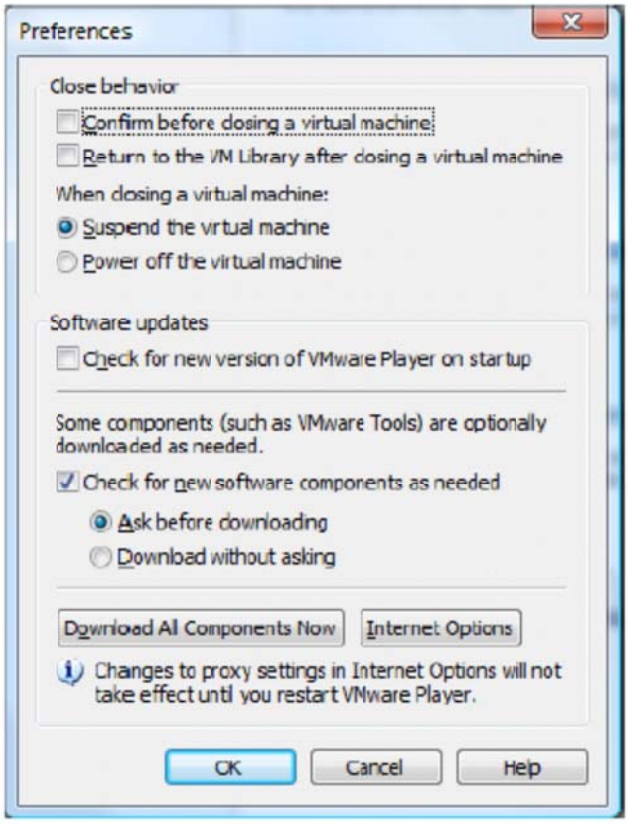


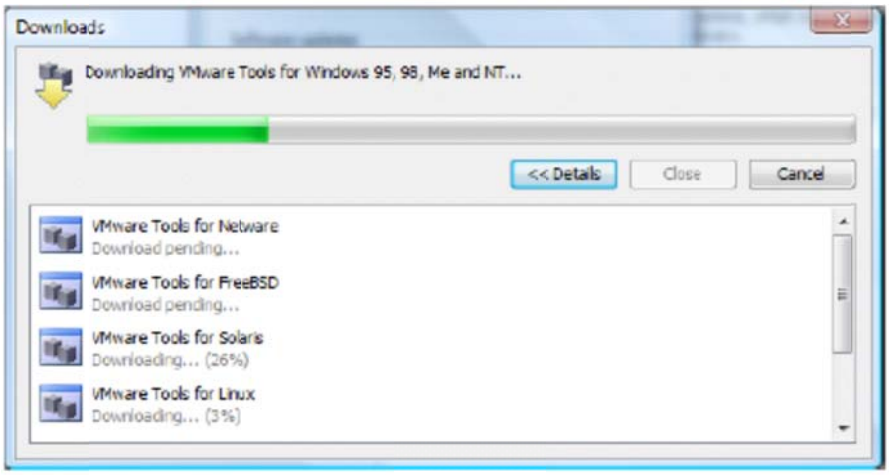
- Double click on file "VMware-player-3.exe" in *Windows Explorer* to install *VMware Player* with default values.
- Reboot your PC.
- Start *VMware Player*, and you will see a window like the following.

- Click on menu item “File|Preferences…”



- In the “Preferences” window, uncheck for software updates, and click on the “Download All Components Now” button so you can later install VMware Tools in your new VMs without Internet access. This step is optional.



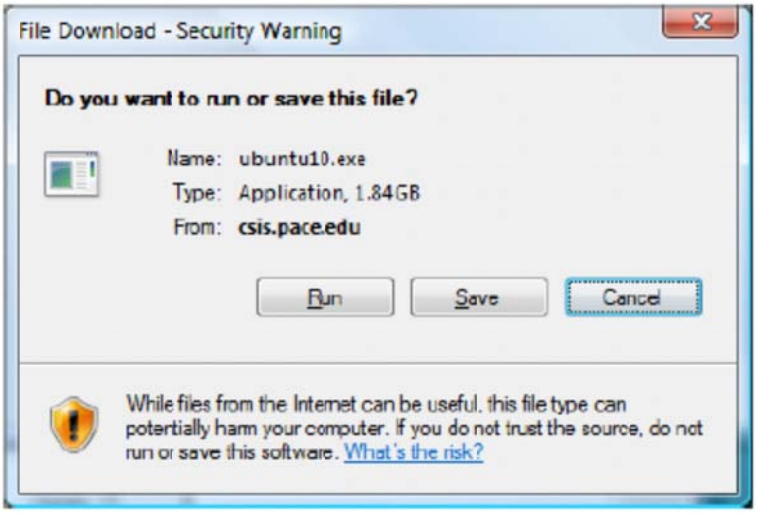


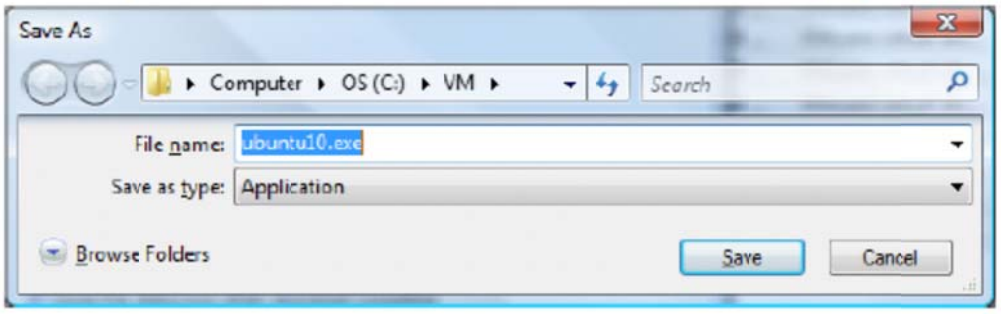
- Click on the OK button to close the “Preferences” window.
- Click on the “File|Exit” menu item to exit the “VMware Player” application.

(VM) named *ubuntu10*. This fully-loaded VM is a good tool for you to learn Linux and web technologies. In the following sections you will learn how to set up a basic *Ubuntu* V9.10 VM named *ubuntu10basic*, and install applications on *ubuntu10basic* to reproduce *ubuntu10* yourself.

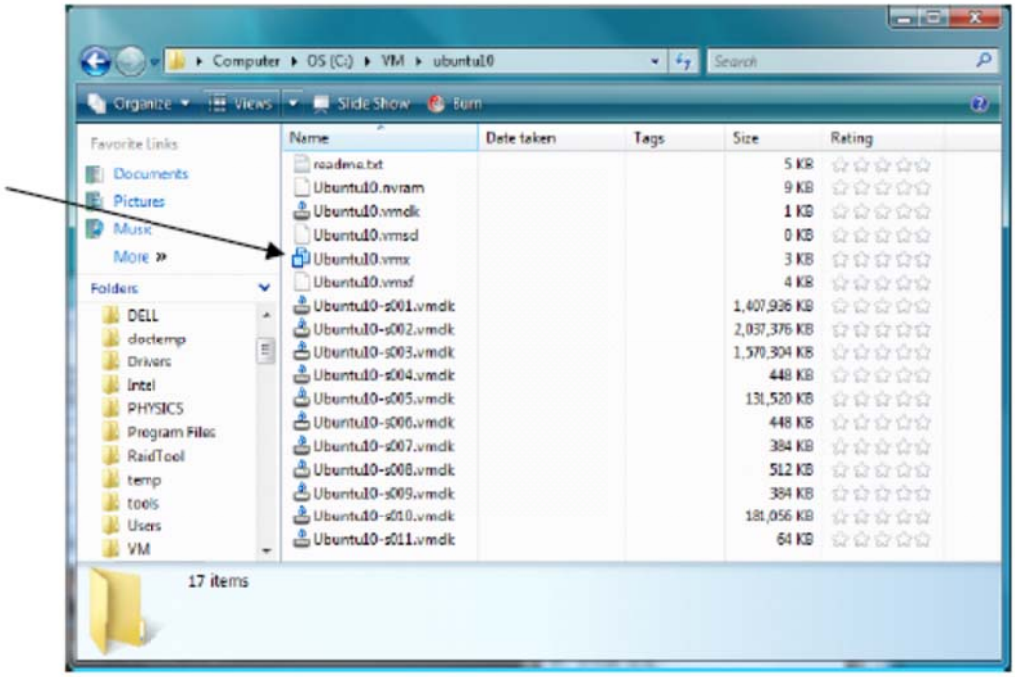
Before you can run a VM, you must have installed the latest *VMware Player* or its equivalent (*VMware Workstation* or *VMware Fusion*). If you have not installed *VMware Player*, refer to the last section to install it first.

- In your PC, create a folder "C:\VM" with *Windows Explorer*.
- Use a web browser to visit http://csis.pace.edu/lixin/ubuntu/ubuntu10.exe, and save the downloaded file in "C:\VM".





- In a *Windows Explorer*, double-click on file "C:\VM\ubuntu10.exe" to run it, and the execution will generate a folder "C:\VM\ubuntu10".

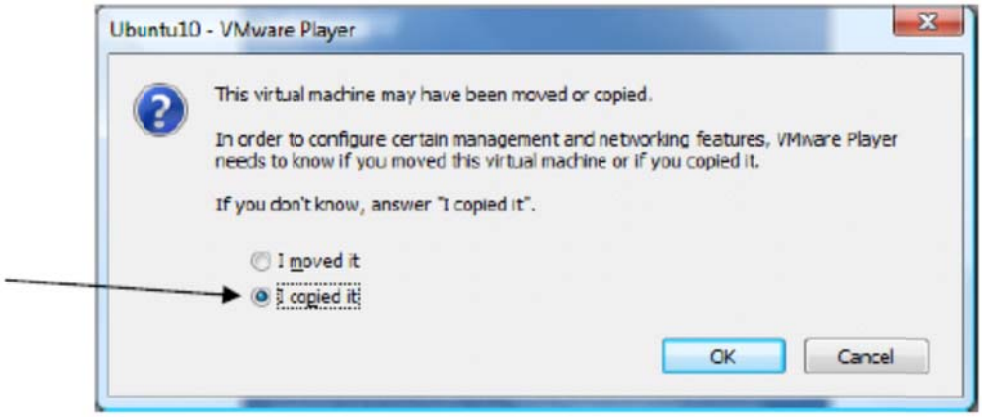


- Save file “C:\VM\ubuntu10.exe” for later regenerating the VM folder if the VM gets compromised.

In folder “C:\VM\ubuntu10”, file “readme.txt” tells you some information about this VM including the user names and passwords for this VM. There are two pre-set users “root” and “user”, both having password “12345678”. To try out the features of this VM, you must logon as “user”.

By this time you should have installed the latest version of *VMware Player* (or *VMware Workstation* on a PC, or *VMware Fusion* on a *Mac*), as described in the previous section. Otherwise you would not be able to see the same icons of the files. To launch the VM with *VMware Player*, double-click on file “Ubuntu10.vmx” (if you could not see the file name extension “.vmx”, then look for the icon of three partially overlapping blue squares). This file is the configuration file of the VM. Since it is a text file, you could open it with a text editor and make some simple changes, like increasing the memory size for the VM (only if you have more than one GB of physical memory).

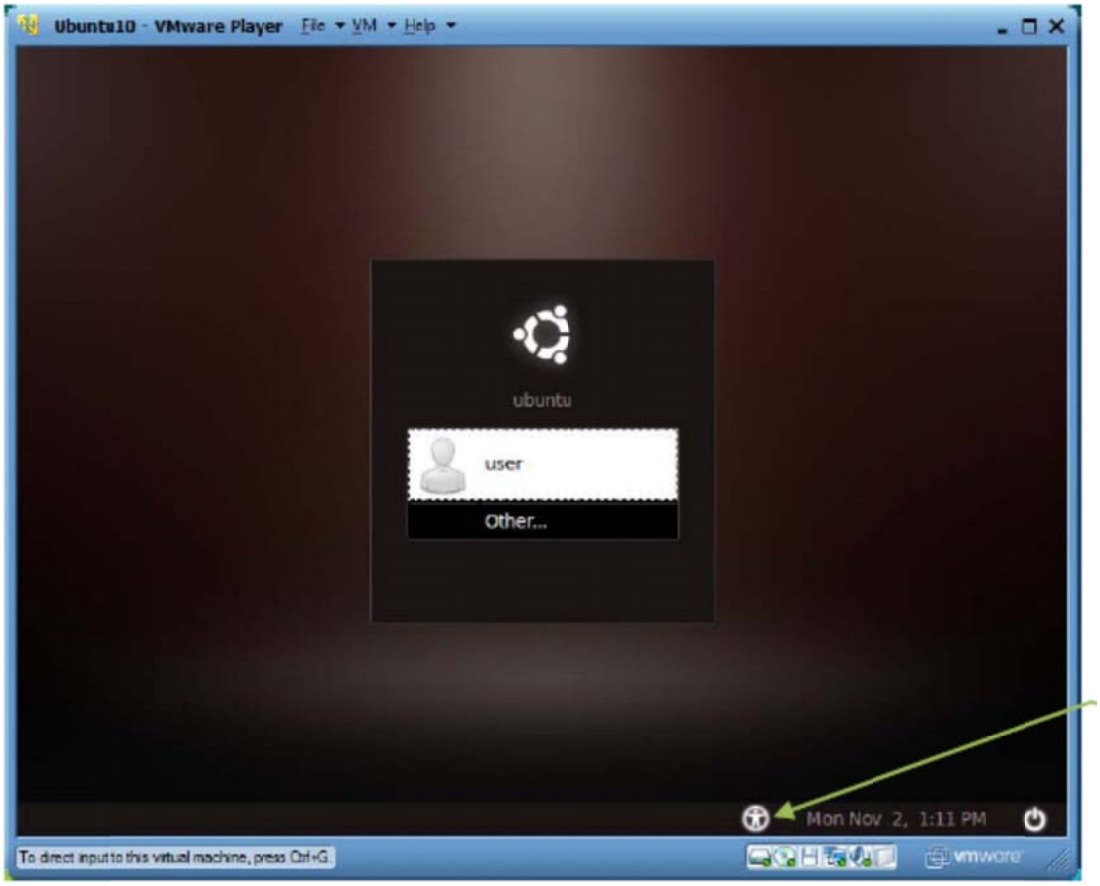
If this is your first time to launch the VM, you may see the following screen:



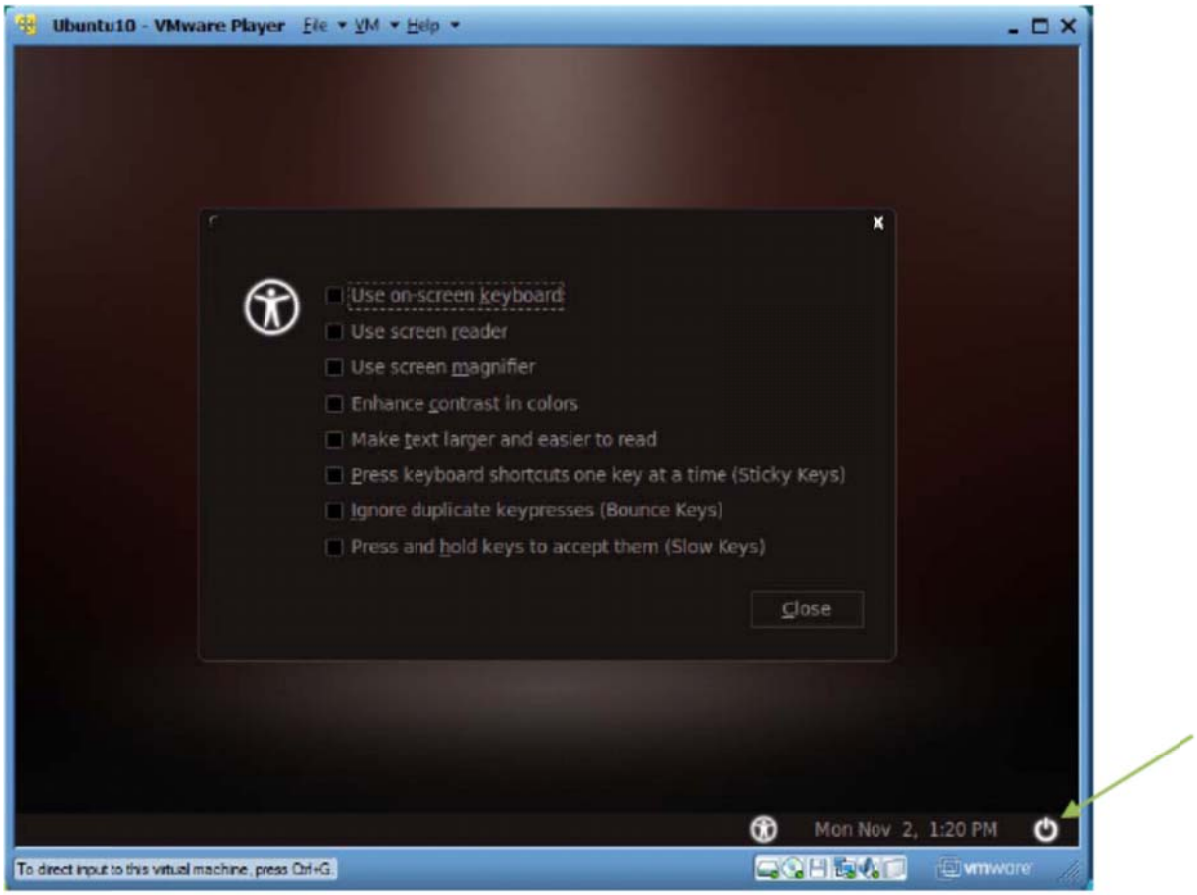
It is better to check the checkbox for “I copied it” and then click on the *OK* button. If you check for “I moved it”, the virtual hard disk would keep its unique virtual disk signature used for the licensing of some software as well as its unique virtual MAC (Media Access Control) address of your virtual network card.

If you check “I copied it”, the virtual hard disk would have a new unique virtual hard disk signature thus may invalidate some software licenses. Since we only install open-source software, they don’t make differences for us. If you plan to run multiple VMs concurrently, then each of the VMs must have a unique virtual MAC address so it could get a unique IP address from your DHCP (Dynamic Host Configuration Protocol) server.

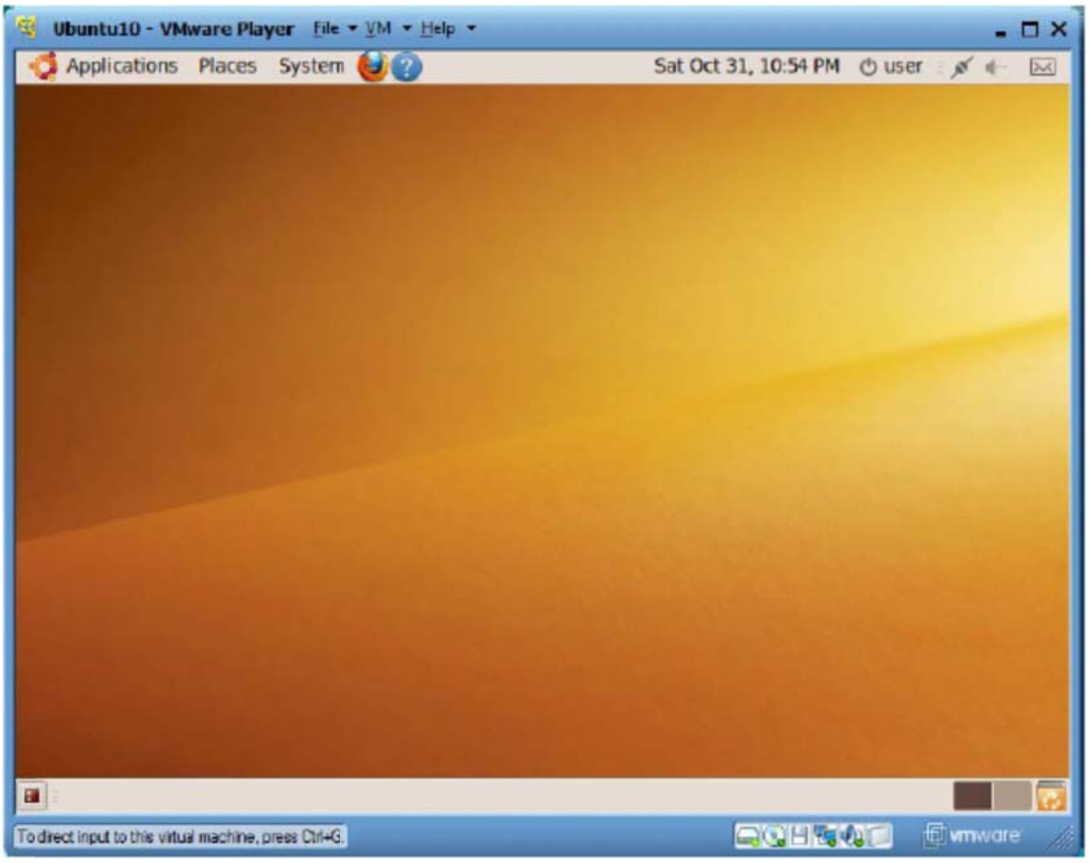
After a few seconds you will see the following *Ubuntu* window ready for use.



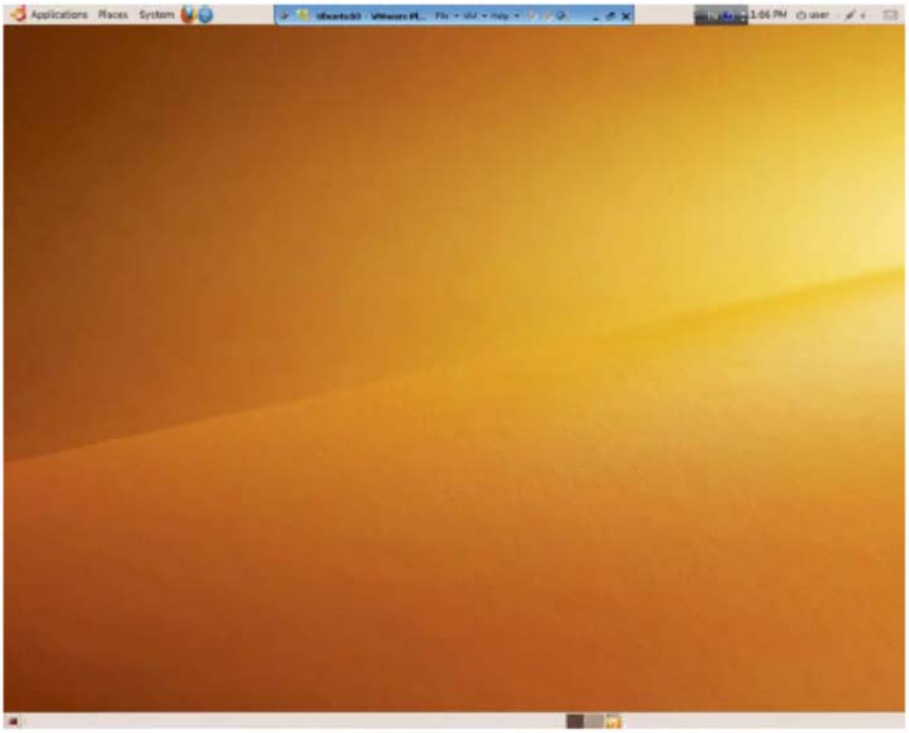
If you click on the person icon in the right-bottom corner, you could set up some user interface details with the following popup window.



If you click on the power button in the right-bottom corner, then you would have options to hibernate, restart or shut down the VM.
Click on user name “user” (coincident), and enter 12345678 as password, you will see the following screen. If you have created other user accounts on this VM, then you could click on “Other” and type other user names for login.

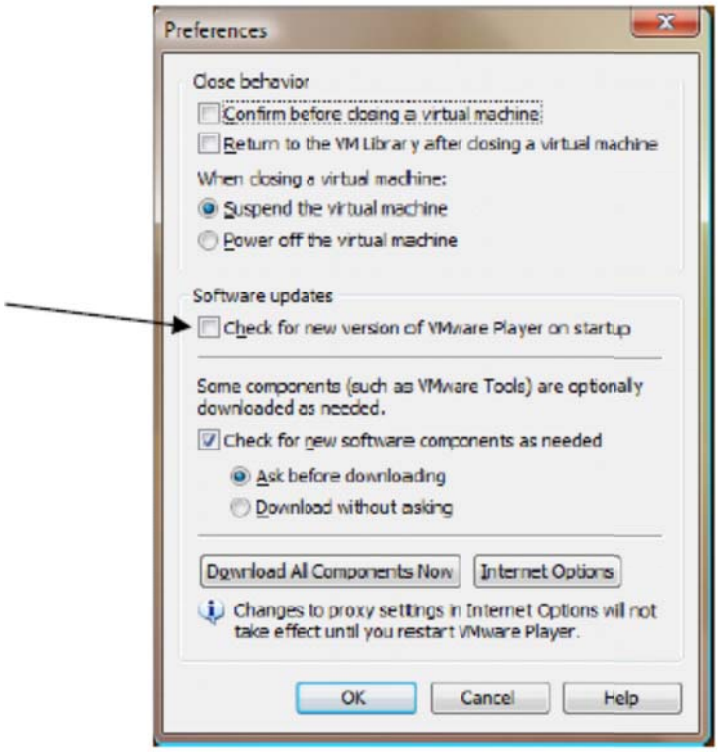


If you maximize the *VMware Player* window, the VM will take over the complete display. If you put your mouse cursor close to the top middle margin, the *VMware Player* menu bar will show up for you to use, as shown below.



To log out, restart, or shut down the VM, you can click on the right-upper corner “user” (the current user’s login name, which happens to be “user”), and then you will be presented with the following choices.

To avoid repeated requests of updating your *VMware Player* during your VM launching, you could click on the top menu item “File|Preferences…”, and uncheck the checkbox for “Check for new version of VMware Player on startup”, as shown in the next “Preferences” window:



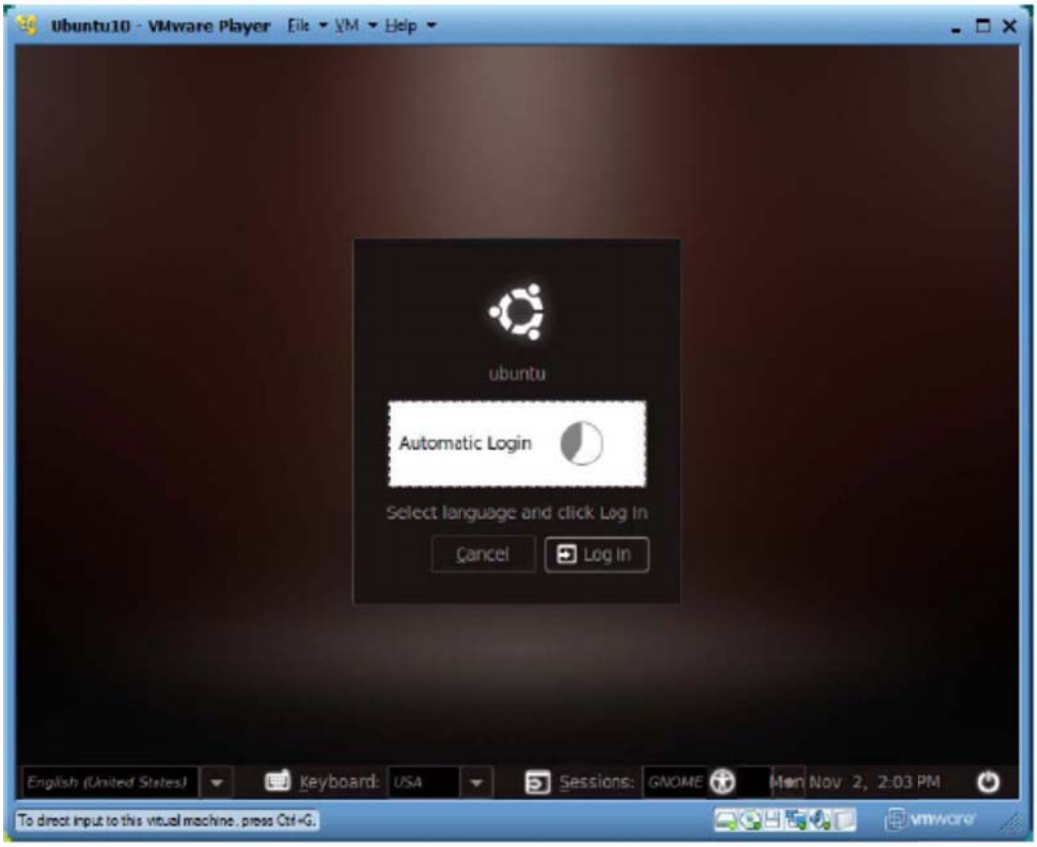
With this same “Preferences” window you can also set close behavior (when you click on the VM’s close icon, should the VM suspend or power off the VM, and whether you need to provide a confirmation), and whether *VMware Player* should download all available optional components now or on demand.
If you prefer the VM to log in as “user” automatically at VM launch time, click on menu item “System|Administration|Login Screen”

and you will see the following “Login Screen Settings” window:

Click on the *Unlock* button and you will see the following “Authenticate” window:

Enter **12345678** as your password and click on the *Authenticate* button, the "Authenticate" window should disappear (if you are running *VMware Player* earlier version, you may need to close this "Authenticate" window manually). You may need to click on the *Unlock* button again to be able to change the settings as below:

Here I have chosen to give the user 10 seconds to type in a different user name before the VM automatically log in as "user". Click on the *Close* button and you are done with this task. When you restart your VM, you will see a login screen as below:

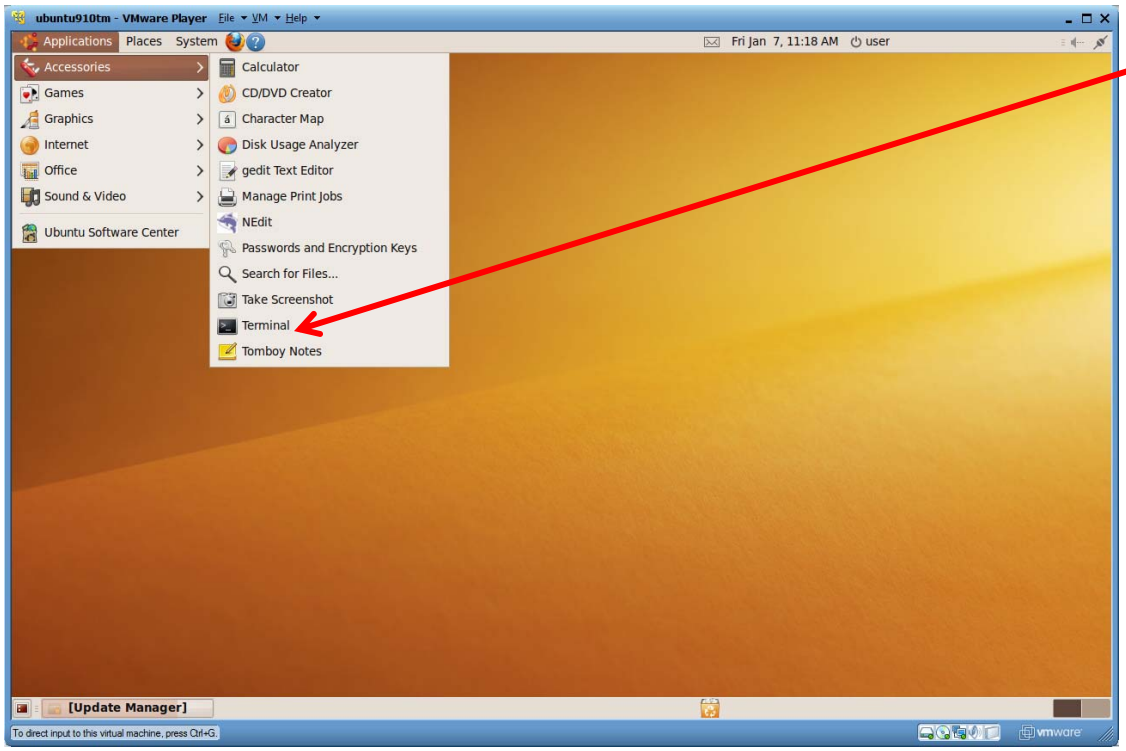


You will be logged in as "**user**" automatically if you don't type another user name within 10 seconds.

Project 1-2 Using Basic Ubuntu Tools

- *Launching a Terminal Window*

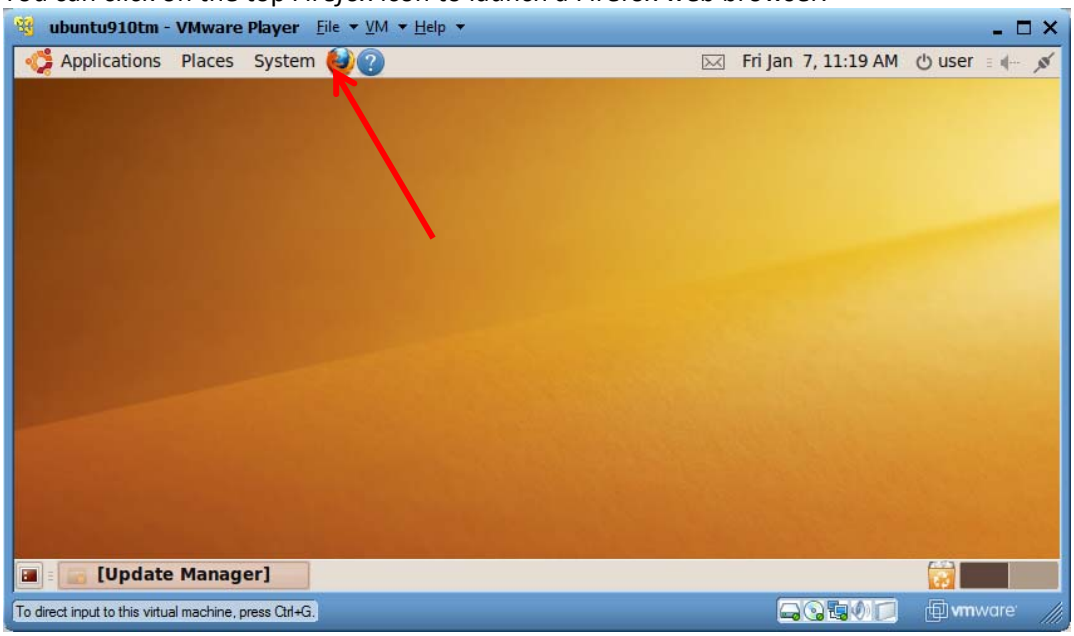
To open a terminal window to run some Linux commands, you can double-click on menu item "**Applications|Accessories|Terminal**":



You can open multiple terminal windows.

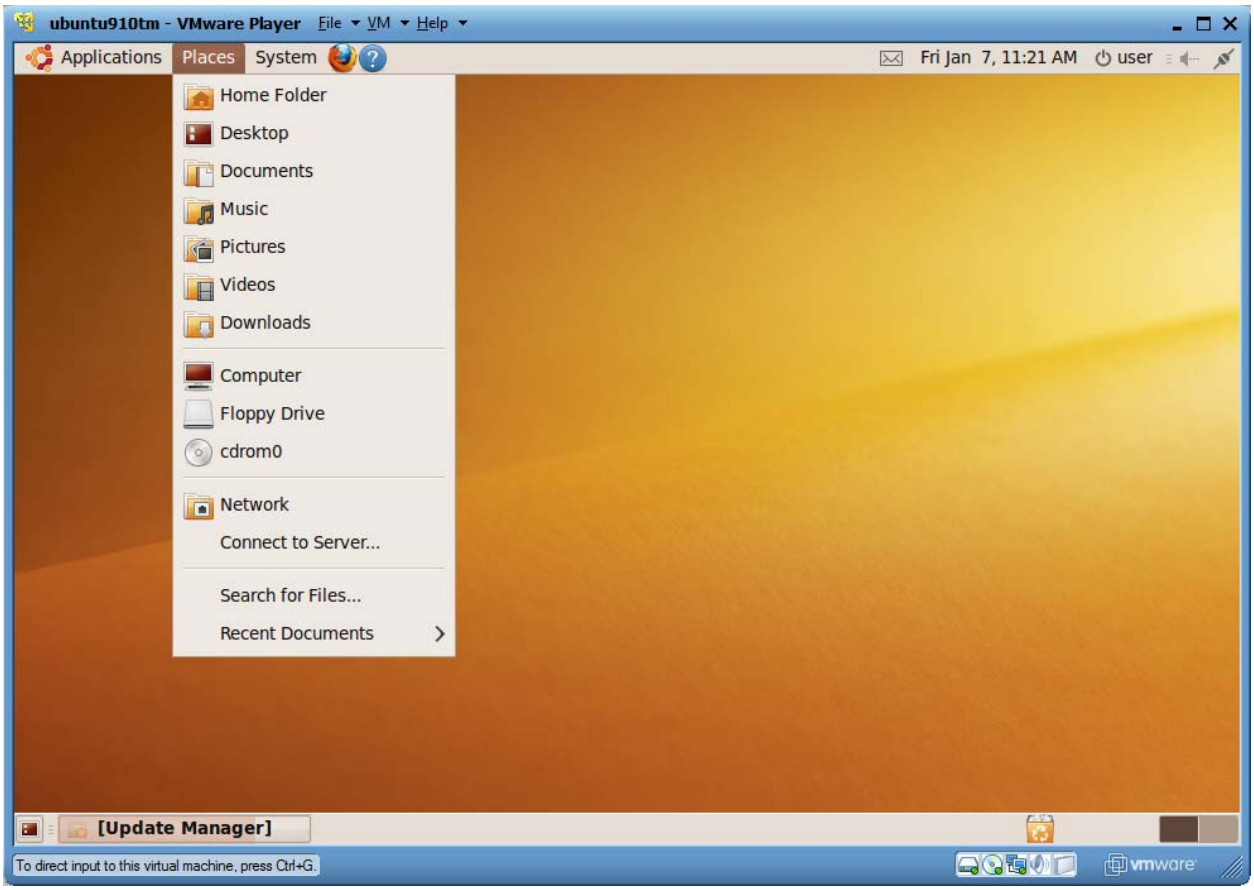
- *Launching a Firefox Web Browser*

You can click on the top *Firefox* icon to launch a Firefox web browser.

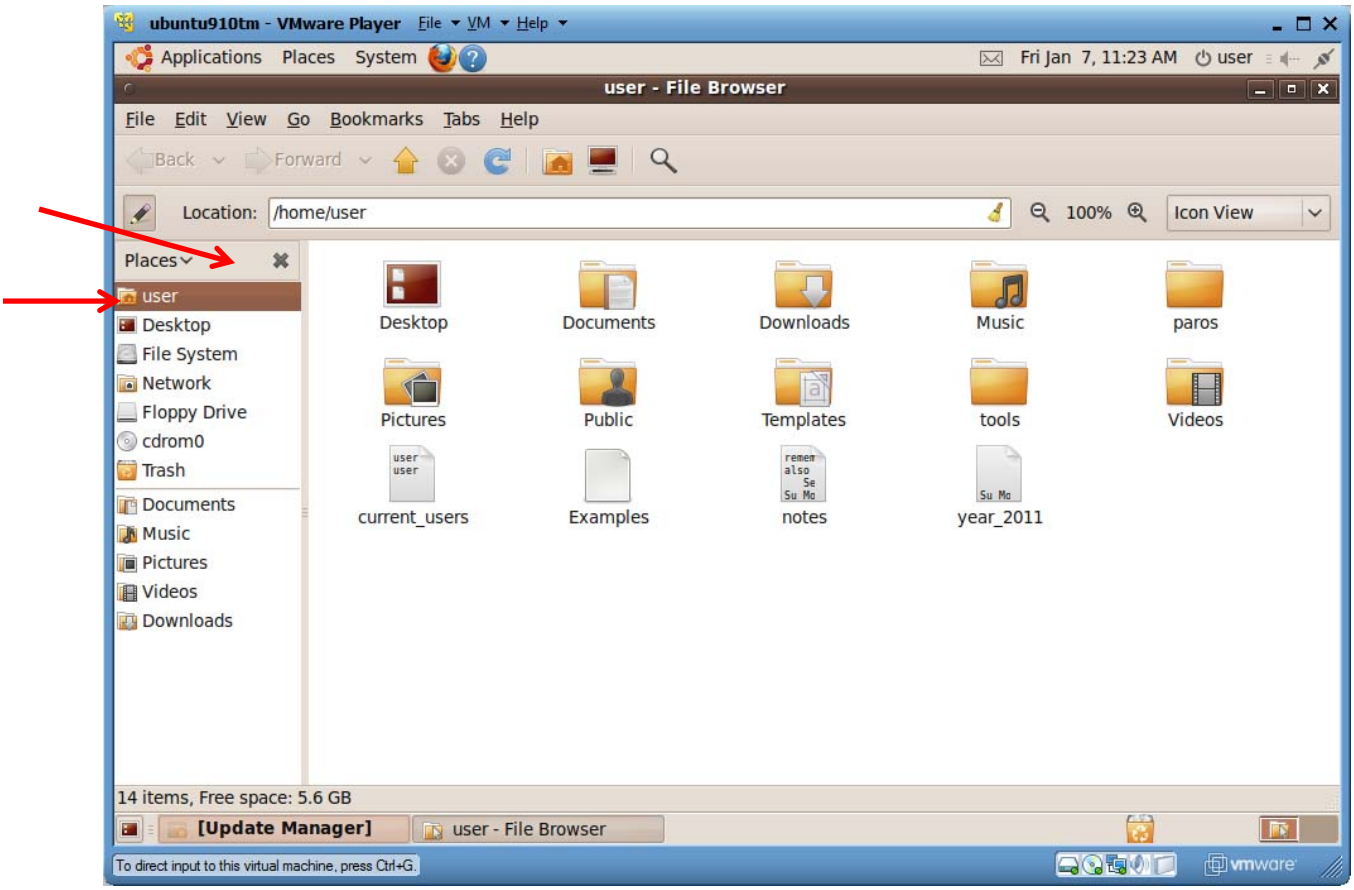


- *Launching a Nautilus File Browser*

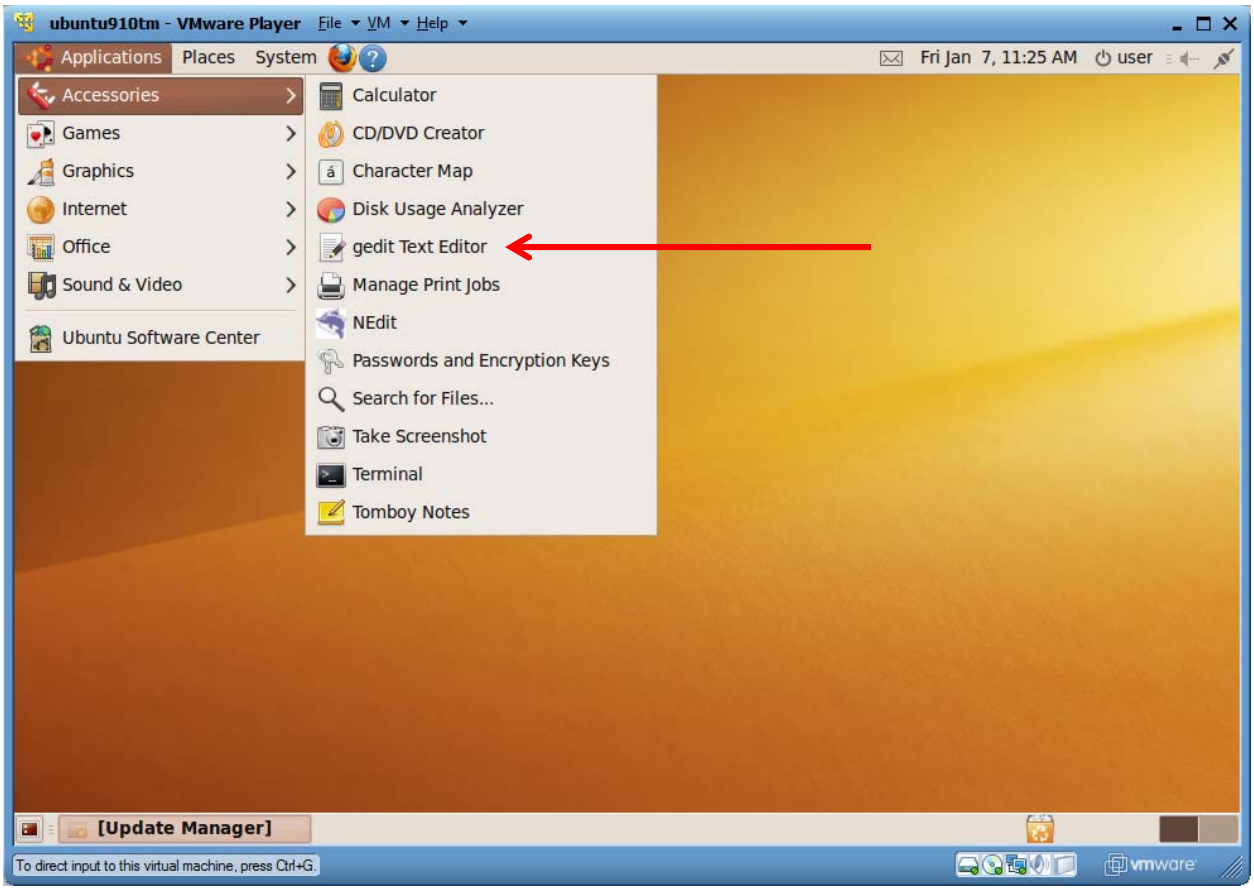
Ubuntu menu "Places" lets you browse files in various places of the file system with a *Nautilus* file browser.



For example, if you double-click on the "**Places|Home Folder**" menu item, you will see the following file browser:

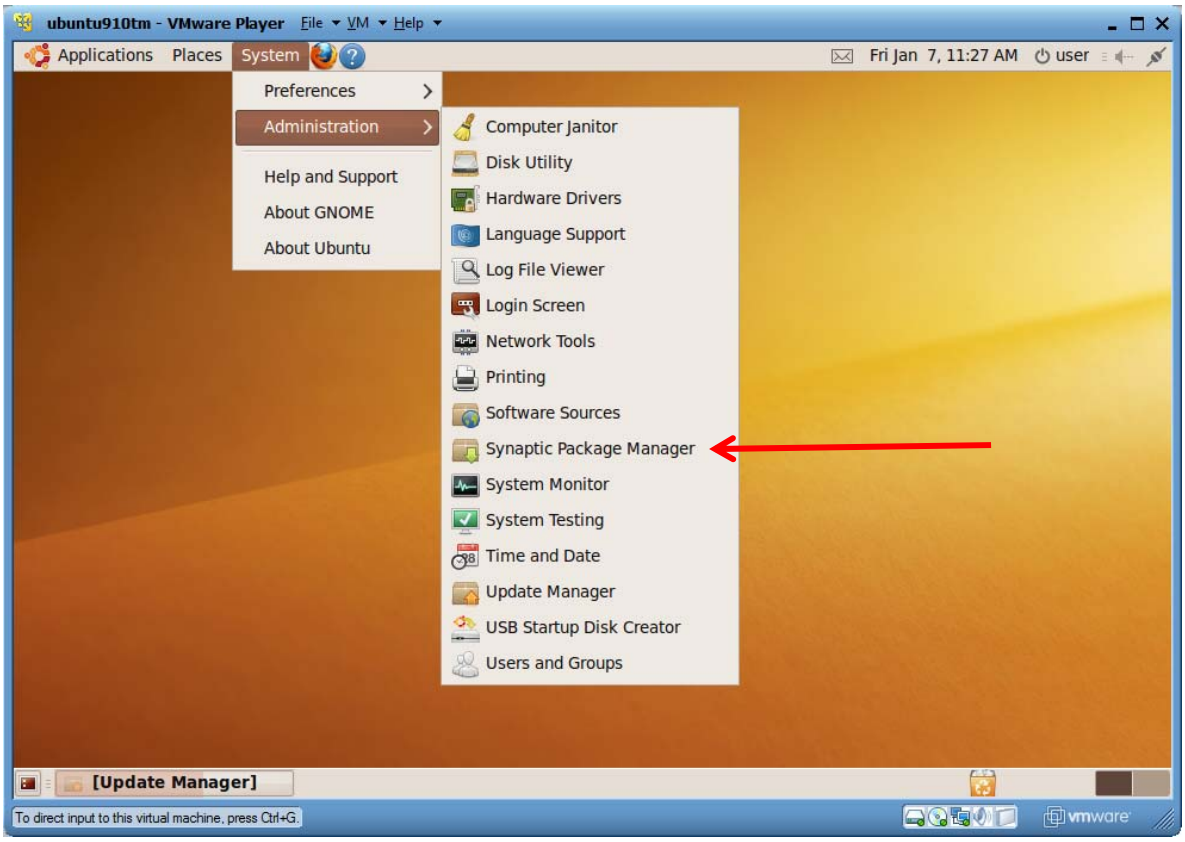


In the left "Places" pane, "user" is the current user *user*'s home folder "/home/user", which is also represented by symbol ~ in file/folder paths; and "File System" is the entire Linux file system "/". Folder "/home/user/Desktop" holds all items on your Ubuntu desktop. When you use Firefox web browser to download files, the downloaded files will be saved in folder "/home/user/Downloads".
You can use *Ubuntu* menu item "Applications|gedit text Editor" to launch a *gedit* text editor.



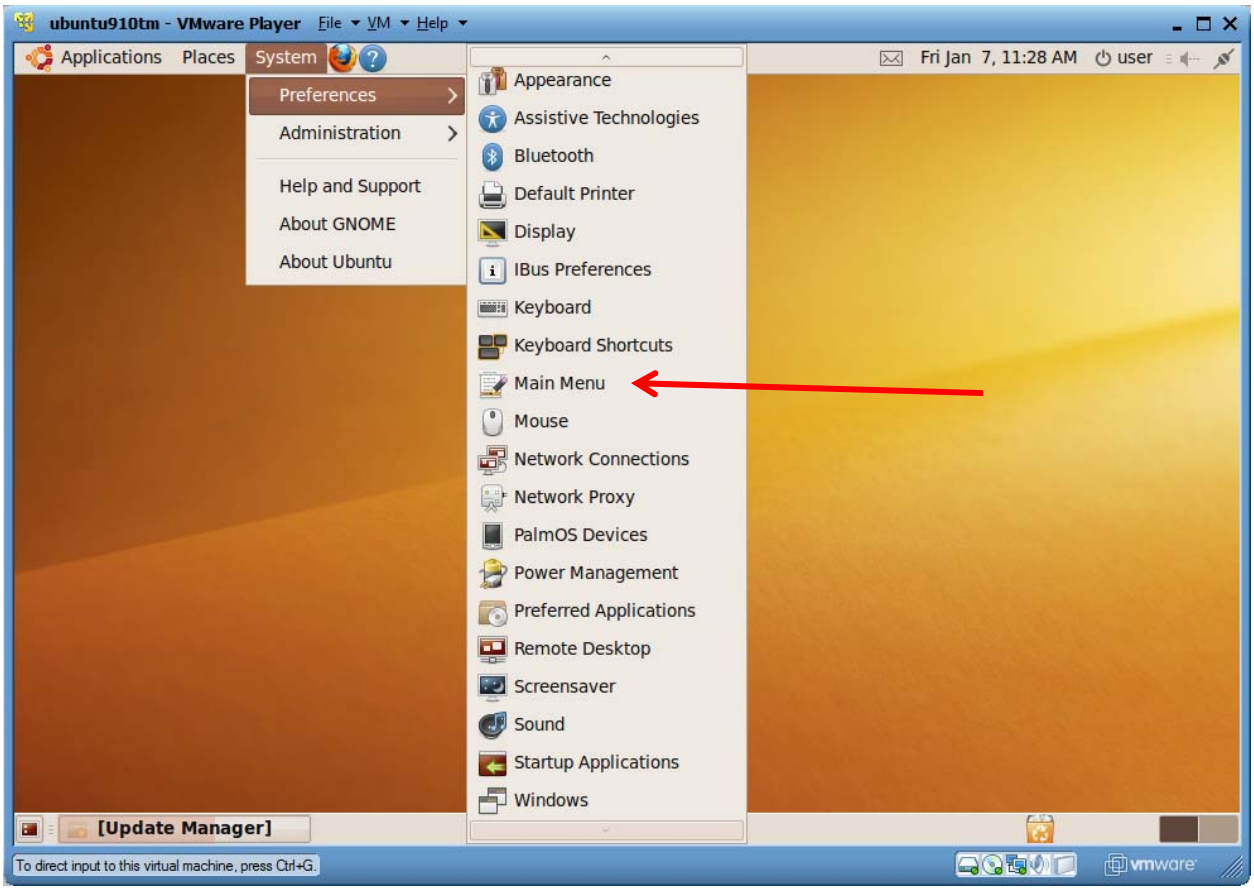
- *Using Synaptic Package Manager*

Ubuntu menu "System" contains important administrator tools for managing the system. Menu item "**System|Administration|Synaptic Package Manager**" allows you to use a GUI to install, update or remove software packages (in this document we will use a lower-level command tool "aptitude" for performing the same functions).

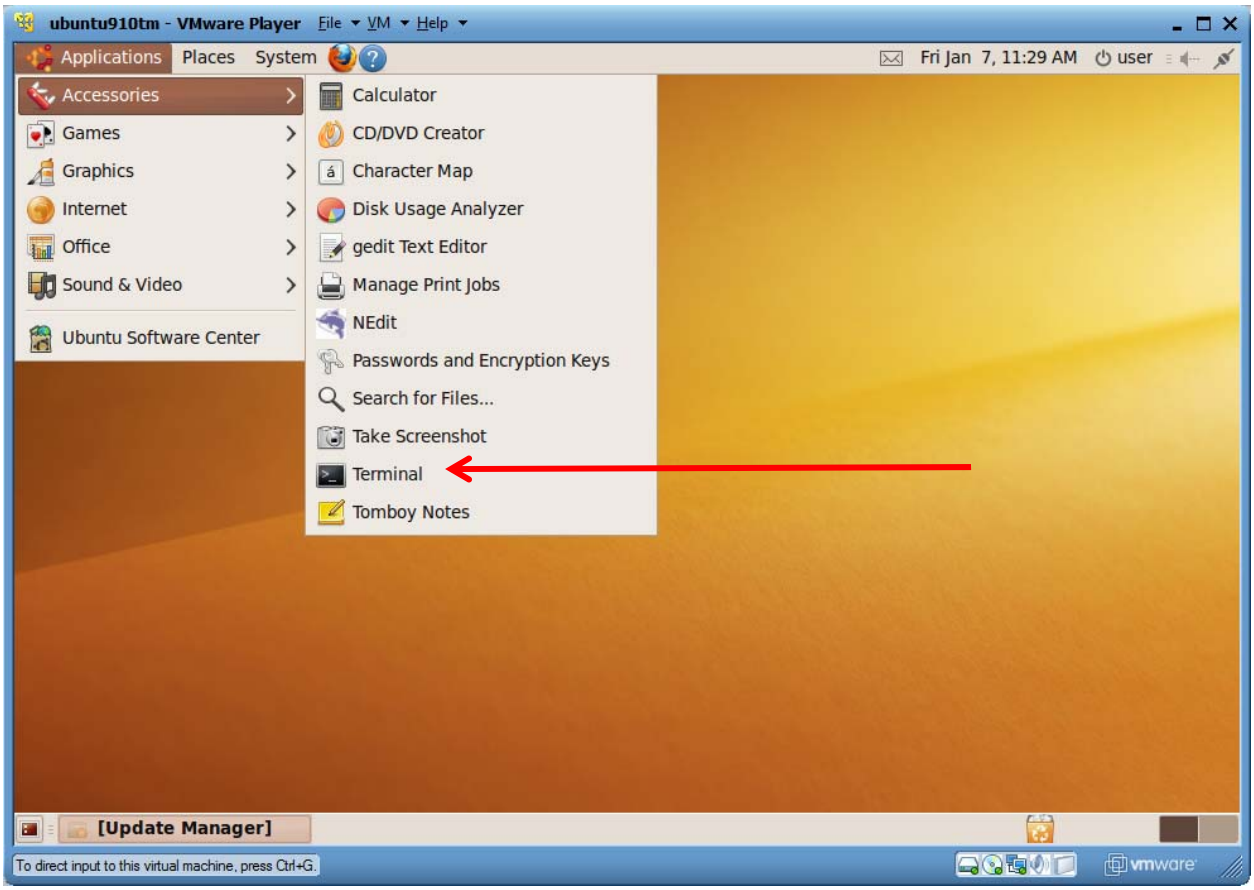


Customizing Ubuntu Application Menu

Menu item "**Preferences|Main Menu**" lets you customize the top-left *Applications* menu.



For security reason, by default *Ubuntu* doesn't create password for super user *root*. We'd like to create a password for *root*. Click on menu item "**Applications|Accessories|Terminal**" to launch a terminal window.



In the terminal window, run "**sudo passwd root**". When asked for your password, enter 12345678. Then type 12345678 twice as *root*'s password.

In *Ubuntu* there are three popular utilities for installing applications: *apt-get*, *aptitude*, and *Synaptic*. Utilities *apt-get* and *aptitude* are both terminal commands and very concise and flexible, while *Synaptic* has a graphic user interface (GUI) but is less flexible. In this guide we mainly use *aptitude* to install applications, which is a wrapper of *apt-get* but with some enhancement. Utility *aptitude* also performs functions that traditionally were handled by many "apt" family utilities. Run "man aptitude" and "man apt-get" to learn more about *aptitude* and *apt-get*.

Project 1-3

This project shows you how to use the date command. You should already be at the command line or have a terminal window open for the project.

To display your system date:

1. Type **date** in the command line, and press **Enter**. What do you see? _____
   You might see the abbreviation EDT (Eastern Daylight Time) instead of EST (Eastern Standard Time), or another time zone abbreviation, such as PDT (Pacific Daylight Time) or CST (Central Standard Time). Notice also that UNIX/Linux use a 24-hour clock.
2. Type **Date** in the command line, and press **Enter**. What error do you see? _____
   The system error message appears because you much enter the date command, like most Linux commands, in lower case letters.

To display your system date in UTC:

1. Type **date –u** in the command line, and press **Enter**. What do you see? _____
   _____

Project 1-4

In this project, you use the cal command to display the current calendar, a Julian date calendar, and the historical calendar for July 1776.

To use the *cal* command:

1. Type **cal** in the command line, and press **Enter**. What calendar do you see? _____
   _____
2. Type **cal –j 2011** in the command line, and press **Enter**. What type of calendar appears? _____
   _____
3. To determine the day of the week when the Declarations of Independence was signed, type **cal 7 1776** in the command line, and press **Enter**. Record the calendar you see: _____
   _____ in this case, the month and year are the command arguments.
4. If you type **cal july 1776**, what error message do you see? _____

Project 1-5

The *who* command is valuable for determining who is currently logged in to a system. In this project, you try out the *who* command using several options.

To use the *who* command to determine who is logged in to the system:

1. Type **who** in the command line, and press **Enter**.
2. You see a list showing user names, the terminals they are using, and the dates and the times they logged in. Record your observation: _____
3. To display a line of column headings with the who command's output, type **who –H** and press **Enter**.
   In any current users are logged in from a remote host, the COMMENT column shows the name of the host.
4. Idle time is the amount of time that has elapsed with no activity in a user's session. Type **who –u** and press **Enter** to see each user's idle time. Record your output: _____
   _____
5. If you want to use multiple options on the same command line, type them all after a single hyphen. For example, type **who –uH** and press **Enter** to see a list of users with idle times and column headings.
6. Type **who –q** and press **Enter** to see a quick list of current users. Do you see only login names and the total number of users on the system? _____
7. To determine which terminal you are using or what time you logged in, type **who am i** in the command line, and press **Enter**. What do you see? (Another option is to type **whoami** as one word, which only displays your account name or user ID, in case you are not certain which account your are currently using; this option is often used by system administrator. Also try entering who mom likes to see what you find out.) _____
   _____

Project 1-6

At this point, you screen might seem filled with commands and their results. Use the clear command anytime you want a clean slate. This project enables you to clear the screen now.

To clear the screen:

1. Type **clear** on the command line, and press **Enter**. The command prompt is now in the upper-left corner of your screen.

Project 1-7

You can use the manual pages to learn more about a command or program (if the program is documented in the manual pages). In addition, the *whatis* command provides a quick summary of specific command and programs. You use both the man and what is command in this project. The database for the *whatis* command should already be created prior to using the command.

To display online help using man:

1. Type **man who** in the command line, and press **Enter**. Do you see the explanation f the *who* command? _____
2. Press **Enter** one or more times to view additional lines of text. Next press the **spacebar** to view additional pages of documentation.
3. Type **q** to exit the man program.
4. Type **man man** and press **Enter**. You see the man page describing the man command. What is the purpose of the –M option?
5. Type **q** to exit the man program.

To display a brief description of a command with the whatis command:

1. Type **whatis who** and press **Enter**.
2. Do you see a summary of the *who* command? Record here: _____

Project 1-8

When you type a command and make a spelling or other mistake, you do not need to retype the entire command. You can use the command-line edit functions instead. In this project, you practice using the edit functions.

To edit a command typed on the command line:

1. Begin by determining the shell you are using. To determine the shell, type **echo $SHELL** and press **Enter**. If you are using the Bash shell, you see the following output: /bin/bash. If you are not using the Bash shell, type **bash** and press **Enter**.
2. Type **who am i**, but do not press Enter.
3. Press the **left arrow** key to move the cursor to the letter **a** in the word "am."
4. Press **Alt+d** to delete the word "am."
5. Press **Ctrl+k** to delete the command line from the current cursor position.
6. Press **Ctrl+a** to move the cursor to the beginning of the command line.
7. Press **Ctrl+k** again to delete the command line.
8. Retype the command who am I but do not press Enter.
9. Press **Alt+b** three times. Watch the cursor move back character by character each time you press the key combination. The cursor should be positioned at the beginning of the line.
10. Press **Alt+f** three times. Each time you press the key combination, the cursor moves forward character by character.
11. Press **Ctrl+a**, and then press **Ctrl+k** to clear the command line.

Project 1-9

You can execute multiple commands on one command line by using a semicolon between commands. You practice running multiple commands in this project.

To enter multiple commands on the command line:

1. Type **date; cal** and press **Enter** to view the current date and this month's calendar.
2. Type **date; who –uH** and press **Enter**. The date command produces the first line of the output; the remainder of the output is the results of the who command. Record your screen: _____

Project 1-10

In this project, you use the command history capability of the Bash shell to recall commands you have used earlier. As you'll discover the more you use Linux, this command save a lot of time otherwise spent on repeated typing.

To use the command-line history:

1. Type **date** and press **Enter**.
2. Type **who** and press **Enter**.
3. Type **who –uH** and press **Enter**.
4. Type **clear** and press **Enter**.
5. Press the **up arrow** key four times, the date command is recalled to the command line. Do not press Enter.
6. Press the **down arrow** key twice. What command do you see? _____ Press **Enter** to execute the command.

Project 1-11

Your password is your means to protect your user account from others who might attempt to access it without your authorization. Plan to change your password often to keep your account secure. In this project, you learn how to change your password.

To change your password:

1. Type **passwd** after the command prompt, and press **Enter**.
2. Type your current password and press **Enter**. (if you are logged into the root or super user (su) account you skip this step and go directly to step 3.)
3. Type your new password and press **Enter**. You new password does not appear on the screen as you type.
4. Retype you new password and press Enter to confirm. You can cancel the change of password if you want to keep your old password.

Project 1-12

The cat command has several purposes, but one of the most commonly used is to view the contents of a file. For example, in this project, you use the cat command to view a file called shells that resides in the /etc directory. This file contains a list of valid shell programs available through Linux.

To use cat to view the shells file:

1. Type **cat /etc/shells** after the command prompt, and press **Enter** (the forward slash (/) is used to indicate a directory or folder change.) What shells do you see on your system? _____

_____

2. Sometimes, it is helpful to see a file's contents displayed with line numbers. The –n option causes the cat command to display a number of at the beginning of each line of output. Type **cat –n /etc/shells** and press **Enter**. You see the same list of shells as before, but his time a number of precedes each line.

Project 1-13

You can view another file in the **/etc** directory called **wgetrc**, or any other long files. This multiple page file contains initialization file for wget. *wget* is a non-interactive downloader. The cat command is not a practical way to view this file, which is longer than one screen. However, as you learn in this project, you can use the *more* and *less* commands to read a large file, screen by screen.

To view the contents of large file on the screen with the more command:

1. Type **more /etc/wgetrc** after the command prompt, and press Enter. Record your screen: _____

_____

2. Press the **spacebar** to scroll to the next screen.
3. Terminate the display by typing **q** (for quit).

To view the contents of large files on the screen with the less command:

1. Type **less /etc/wgetrc** after the command prompt, and press **Enter**. What do you see? _____

_____

2. Press the **down arrow** key several times to scroll forward in the file one line at a time.
3. Press the **up arrow** key several times to scroll backward in the file one line at a time.
4. Press **Pg Dn** (or Page Down), spacebar, z, or f to scroll forward one screen.
5. Press **Pg Up** (or Page Up) or b to return to a previous screen.
6. Terminate the display by typing **q** (for quit) when you see a colon (:) at the bottom of a screen.

Project 1-14

Sometimes, you only need to glimpse part of a file's contents to determine what is stored in the file. In this project, you use the head command to view the beginning 10 lines in file, and then you use the tail command to view the final 10 lines in the file.

To view the first and final few lines of a file:

1. Type **head /etc/wgetrc** and press **Enter** to see the first 10 lines of the /etc/wgetrc file.
2. The –n option specifies the number of lines the head command displays.
   Type head –n 5 /etc/ wgetrc and press **Enter**. You see the first five lines of the /ect/wgetrc file.
3. The tail command shows you the final few lines of a file. Like the head command, tail displays 10 lines by default. Type **tail /etc/wgetrc** and press **Enter** to see the final 10 lines of the /etc/wgetrc file.

4. The –n option specifies the number of lines the tail command displays.
   Type **tail –n 5 /etc/wgetrc** and press **Enter**. You see the final five lines of the /etc/wgetrc file.

Project 1-15

You already use the *who* command to find out who is logged in to a computer. In this project, you use the same command with the > redirection symbol to save this information in a text file.

To save a file that lists persons logged in to the system:

1. Make sure you are under the directory of /home/usr, or type **cd** to move to /home/usr directory.
2. Type **who > current_users** after the command prompt, and press **Enter**. The *who* command output does not appear on the screen, but is redirected to a new disk file called current_users. Linux places this text file in the active directory (the directory on the disk where you are currently using the system.)
3. Type **cat current_users** after the command prompt, and press **Enter** to see a list of users currently using the system. Record your output: _____

Project 1-16

You can also use the redirection symbol with the cal command to save a calendar in a text file. For example, assume that you are involved in a development project with a projected deadline in the year 2011. You can save the calendar in a text file.

To save the year 2011 calendar in a file.

1. Type **cal 2011 > year_2011** after the command prompt, and press **Enter**. This creates a text file called year_2011.
2. Type **less year_2011** and press **Enter** to see the calendar created by the previous command. Use the arrow keys, Pg Dn (or Page Down), Pg Up (or Page Up), and other keys to scroll through the file.
3. Terminate the display by typing **q** (for quit).

Project 1-17

As you work with Linux, you remember that your supervisor asked you to complete a few tasks by the end of the week. In this project, you decide to create a notes files of task reminder y using the cat command with the > redirection symbol.

To create a new file:

1. Type **cat > notes** after the command prompt, and press **Enter**.
2. Type the following: **Remember to order a new CD-ROM, and send the report by Thursday**, and press **Enter**.
3. Press **Ctrl+d**.

4. To review the file you just created, type **cat notes** after the command prompt, and press **Enter**. The sentence you typed in step 2 appears on the screen. Record your screen: _____

_____

After you create the notes file, you remember that your supervisor asked you to complete another task. You can append the reminder to the existing notes file. You also want to include the appropriate monthly calendar in the file for reference.

To add information to an existing file:

1. Type **cat >> notes** after the command prompt, and press **Enter**.
2. Type the following: **Also remember to make reservations for Sept. conference**, and press **Enter**.
3. Press **Ctrl+d**.
4. To add the September calendar to your notes, type **cal 9 2011 >> notes** and press **Enter**.
5. Type **less notes** and then press **Enter** to review the file. Record your observation: _____

_____
6. Type **q** to exit the file.

****

Include your experiences and answers to all the underlying parts in your report. Include the following at the beginning of your report.

- Name: _____
- UTC ID: _____
- Course Number and Name: _____
- Semester: _____
- Lab Name and Number: _____
- I spent _____hours and _____minutes to finish this hands-on lab.
- I have _____ (percent) finish this lab.
- I expect _____ (A, B, C, or F) of this lab.
- This lab helps me to master Linux Operating System, environment, and commands. Choose a number to indicate how much the lab is helpful.

  1 2 3 4 5

  (less helpful) (more helpful)