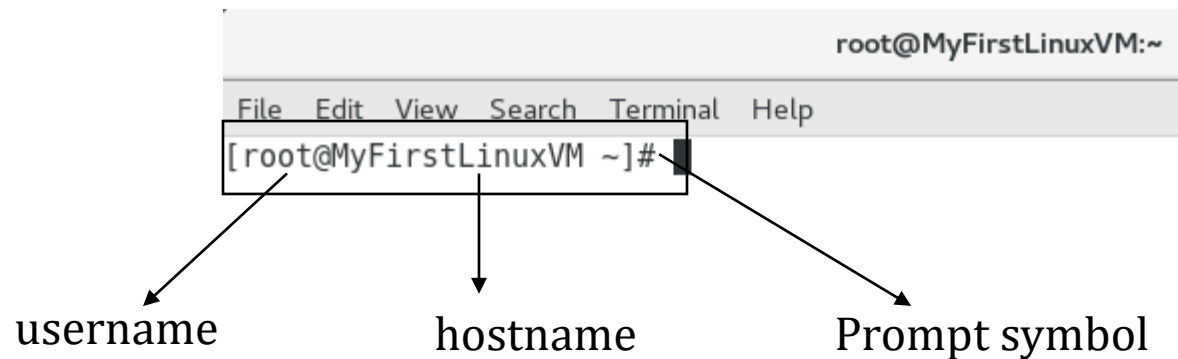


# **WELCOME TO: MODULE 3**

## **SYSTEM ACCESS AND FILE SYSTEM**

# Command Prompts and Getting Prompts Back

- What are command prompts?
  - A command prompt, also referred to simply as a prompt, is a short text at the start of the command line followed by prompt symbol on a command line interface



- To get your prompt back
  - **Ctrl + c**

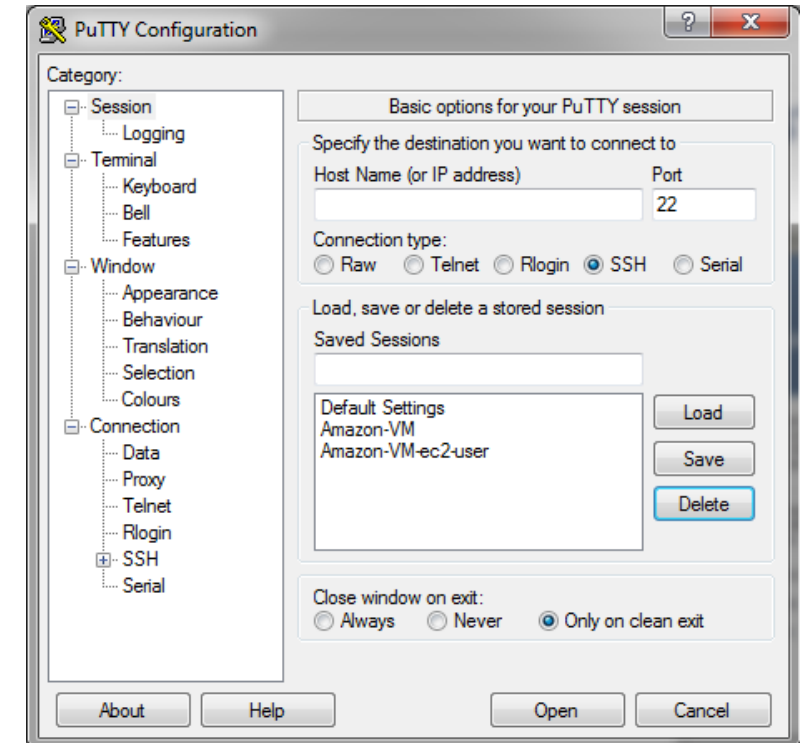
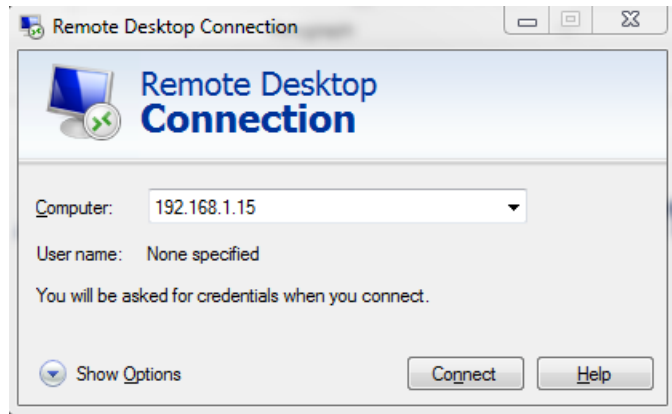
# ACCESS TO LINUX SYSTEM

Each operating system has a different protocol or client that is used to access the system

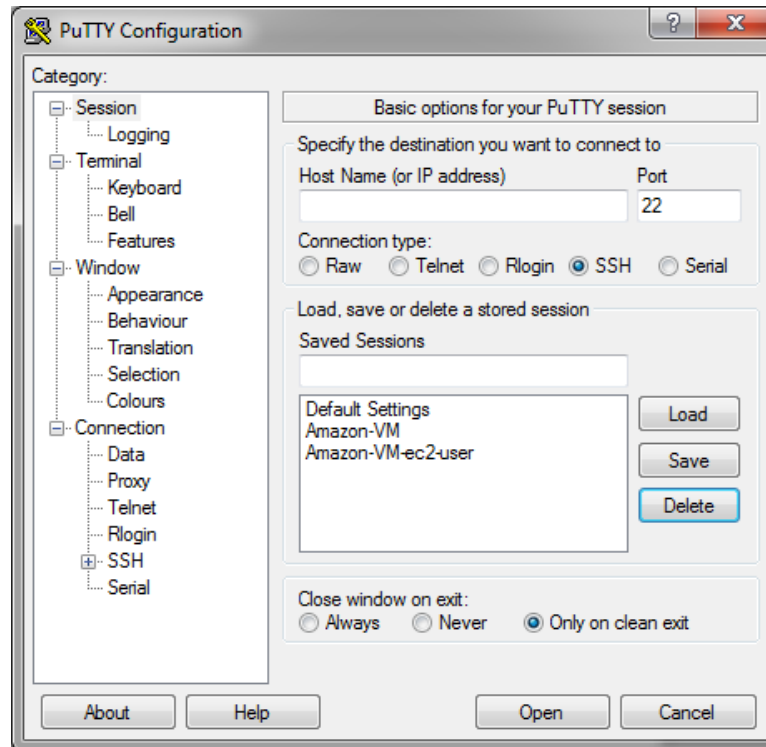
## Example:

Windows	=	Remote Desktop (RDP)
VMware ESX	=	vSphere client
Linux	=	Putty, SecureCRT SSH from Linux to Linux

# ACCESS TO LINUX SYSTEM



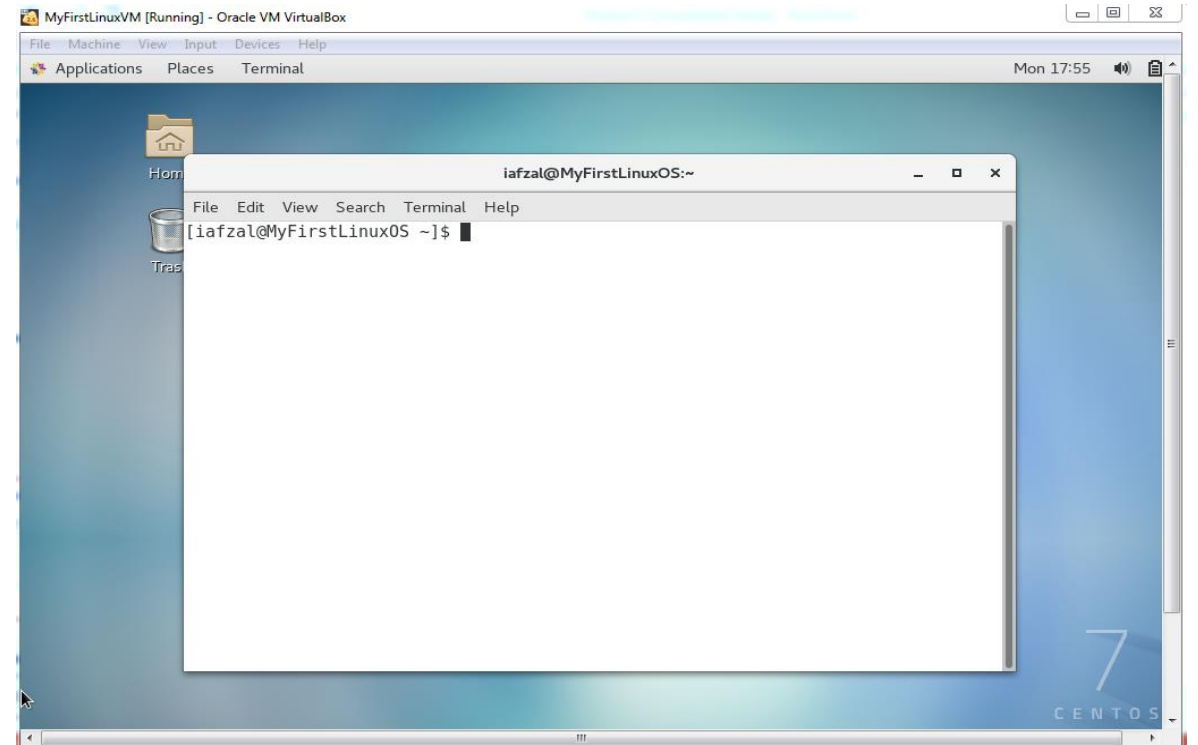
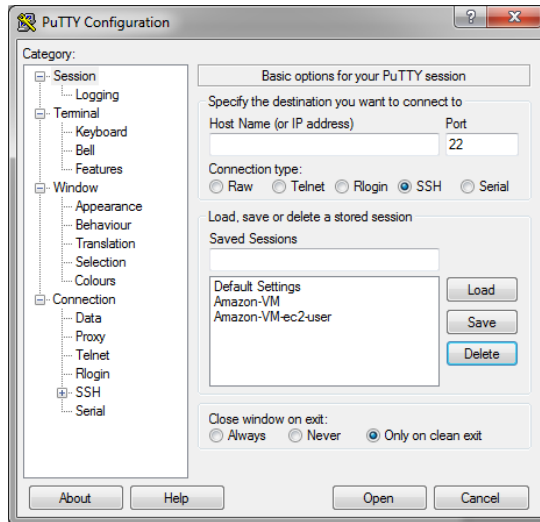
# DOWNLOAD AND INSTALL PUTTY



# ACCESS TO LINUX FROM MAC

- Openup a terminal on your MAC
- Run the following command
  - **# ssh -l iafzal 192.168.56.101**

# ACCESS TO LINUX VIA PUTTY



# NEW NETWORK COMMAND (IP)

- CentOS/RHEL 5 or 6 = **ifconfig**
- CentOS/RHEL 7 = **ip**
- CentOS/RHEL 7.5 and up = **ifconfig**  
command has been deprecated
- To use ifconfig in 7.5 = “**yum install net-tools**”



# IMPORTANT THINGS TO REMEMBER

- Linux has a super administrator account “root”
- “root” is the most powerful account that can create, modify, delete accounts and make changes to system configuration files
- Linux is a case-sensitive system
- Avoid using file names with spaces.

# CHANGING PASSWORD

- You should change your initial password as soon as you login

Command = `passwd userid`

`Old password:` - enter your current password

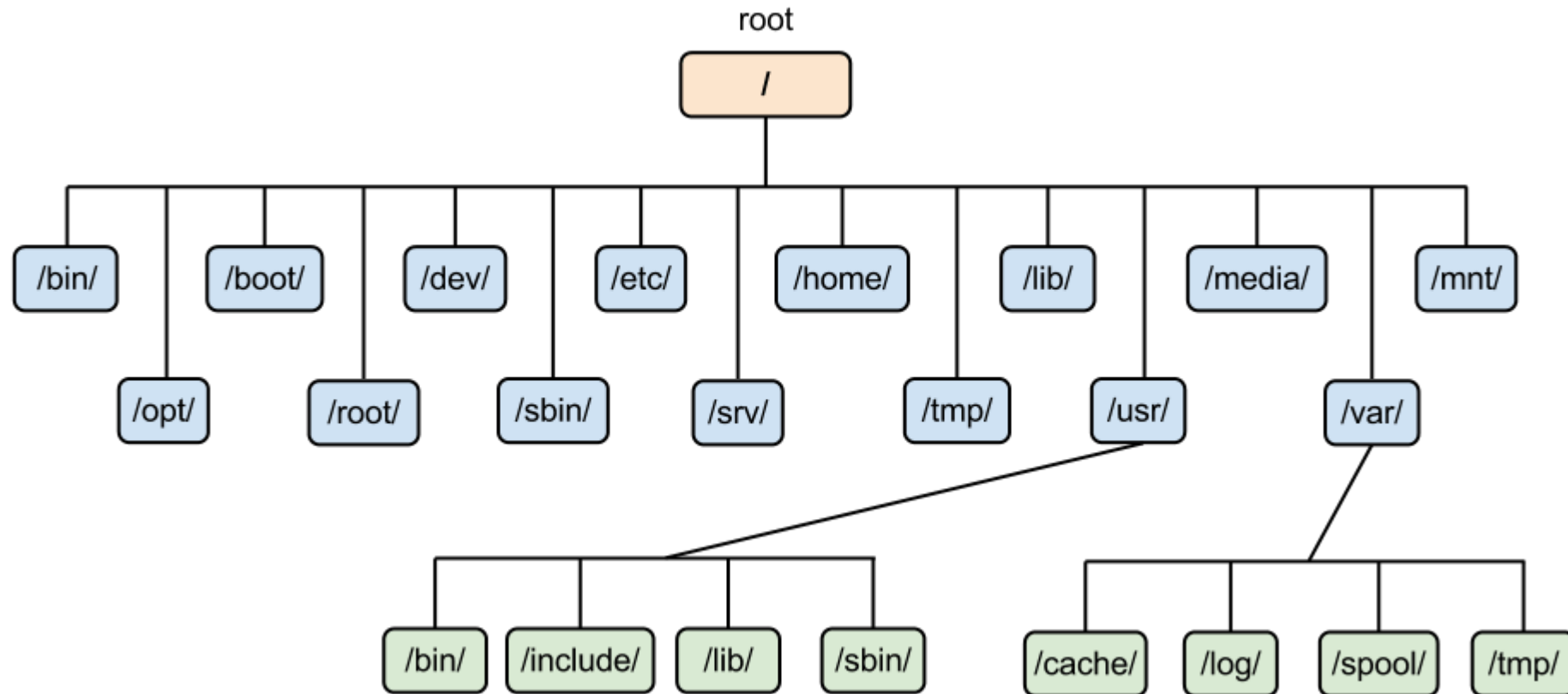
`New password:` - enter your new password

`Retype new password:` - re-enter your new password

# LINUX FILE SYSTEM

- OS store data on disk drives using a structure called a filesystem, consisting of files, directories, and the information needed to access and locate them.
- There are many different types of filesystems. In general, improvements have been made to filesystems with new releases of operating systems, and each new filesystem has been given a different name:  
E.g. ext3, ext4, XFS, NTFS, FAT etc.
- Linux filesystems store information in a hierarchy of directories and files

# FILE SYSTEM STRUCTURE



# File System Structure and its Description

/boot	Contains file that is used by the boot loader (grub.cfg)
/root	root user home directory. It is not same as /
/dev etc.)	System devices (e.g. disk, cdrom, speakers, flashdrive, keyboard
/etc	Configuration files
/bin → /usr/bin	Everyday user commands
/sbin → /usr/sbin	System/filesystem commands
/opt	Optional add-on applications (Not part of OS apps)
/proc	Running processes (Only exist in Memory)
/lib → usr/lib	C programming library files needed by commands and apps
	<b>strace -e open pwd</b>
/tmp	Directory for temporary files
/home	Directory for user
/var	System logs
/run	System daemons that start very early (e.g. systemd and udev) to
store	temporary runtime files like PID files
/mnt	To mount external filesystem. (e.g. NFS)
/media	For cdrom mounts.

# NAVIGATING FILE SYSTEM

- When navigating a UNIX filesystem, there are a few important commands:

"cd"

"pwd"

"ls"

- "cd" stands for change directory. It is the primary command for moving you around the filesystem.
- "pwd" stands for print working directory. It tells you where you current location is.
- "ls" stands for list. It lists all the directories/files within a current working directory
- Using of TAB key to auto-complete

# WHAT IS ROOT?

- There are 3 types of root on Linux system
  1. Root account: root is an account or a username on Linux machine and it is the most powerful account which has access to all commands and files
  2. Root as /: the very first directory in Linux is also referred as root directory
  3. Root home directory: the root user account also has a directory located in /root which is called root home directory

# FILE SYSTEM PATHS

- There are two paths to navigate to a filesystem
  - ✓ Absolute Path
  - ✓ Relative Path
- An absolute path always begins with a "/". This indicates that the path starts at the root directory. An example of an absolute path is

**cd /var/log/httpd**

- A relative path does not begin with a "/". It identifies a location relative to your current position. An example of a relative path is:

**cd /var**

**cd log**

**cd httpd**



# DIRECTORY LISTING ATTRIBUTES

Total columns = 9

Type	# of Links	Owner	Group	Size	Month	Day	Time	Name
<code>drwxr-xr-x.</code>	21	root	root	4096	Feb	27	13:33	var
<code>lrwxrwxrwx.</code>	1	root	root	7	Feb	27	13:15	bin
<code>-rw-r-r--</code>	1	root	root	0	Mar	2	11:15	testfile



The second column is the number of hard links to the file. For a directory, the number of hard links is the number of immediate subdirectories it has plus its parent directory and itself

# LINUX FILE TYPES

File Symbol	Meaning
-	Regular file
d	Directory
l	link
c	Special file or device file
s	socket
p	Named pipe
b	Block device

# CREATING FILES AND DIRECTORIES

- Creating Files
  - ✓ touch
  - ✓ cp
  - ✓ vi
- Creating Directories
  - ✓ mkdir

# The “echo” command

- “echo” is one of the most commonly and widely used built-in command for Linux
- Just like the word echo, the command echo does the same thing
- “echo” command outputs the strings it is being passed as arguments
  - E.g. `echo hello world`
- It is also used to create add contents in a file using file redirects
  - E.g. `echo hello world > filename1.`

# FIND FILES AND DIRECTORIES

- Two main commands are used to find files/directories
  - `find`
  - `locate`

# Difference Between find and locate

- **locate** uses a prebuilt database, which should be regularly updated, while **find** iterates over a filesystem to locate files. Thus, locate is much faster than find , but can be inaccurate if the database (can be seen as a cache) is not updated
- To update locate database run **updatedb**

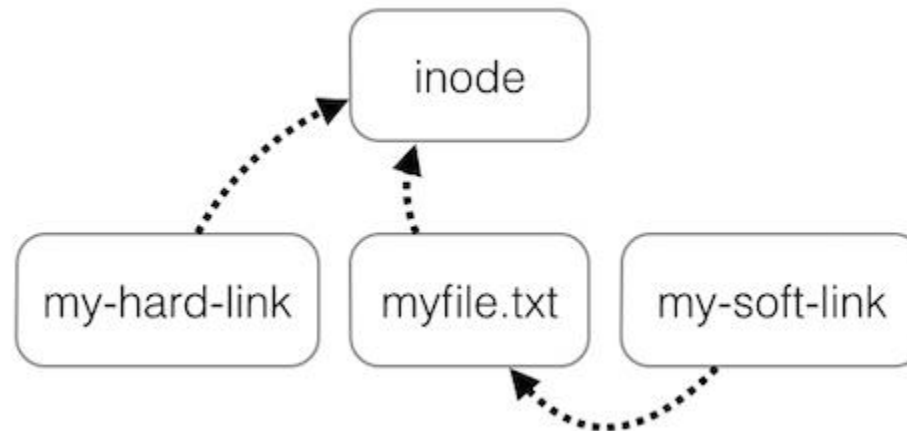
# WILDCARDS

- A wildcard is a character that can be used as a substitute for any of a class of characters in a search
  - \* - represents zero or more characters
  - ? - represents a single character
  - [] - represents a range of characters

# SOFT AND HARD LINKS

- inode = Pointer or number of a file on the hard disk
- Soft Link = Link will be removed if file is removed or renamed
- Hard Link = Deleting renaming or moving the original file will not affect the hard link

- `ln`
- `ln -s`





# Filesystem Color Definition

```
iafzal@myfirstlinuxvm:~  
crw----- 1 root root 10, 137 Apr 2 15:23 vhci  
crw----- 1 root root 10, 238 Apr 2 15:23 vhost-net  
crw-rw-rw- 1 root root 1, 5 Apr 2 15:23 zero  
[iafzal@myfirstlinuxvm ~]$ ls -ltr  
total 296  
drwxr-xr-x. 2 iafzal iafzal 6 Jan 8 21:44 Templates  
drwxr-xr-x. 2 iafzal iafzal 6 Jan 8 21:44 Public  
drwxr-xr-x. 2 iafzal iafzal 6 Jan 8 21:44 Downloads  
drwxr-xr-x. 2 iafzal iafzal 6 Jan 8 21:44 Documents  
drwxr-xr-x. 2 iafzal iafzal 6 Jan 8 21:44 Desktop  
drwxr-xr-x. 2 iafzal iafzal 6 Jan 8 21:44 Videos  
drwxr-xr-x. 2 iafzal iafzal 6 Jan 8 21:44 Pictures  
drwxr-xr-x. 2 iafzal iafzal 6 Jan 8 21:44 Music  
-rwxrwxr-x. 1 iafzal iafzal 47 Feb 11 19:10 homer  
-rw----r--. 1 iafzal iafzal 247944 Feb 14 18:08 messages  
drwxrwxr-x. 2 root root 6 Feb 14 18:43 rootdir1  
-rw-rw-r-- 1 iafzal iafzal 30 Feb 25 15:50 clients  
-rwxrwxr-x 1 iafzal iafzal 164 Feb 25 16:00 checkclients  
-rw-rw-r-- 1 iafzal iafzal 4 Feb 26 17:58 james  
-rw-rw-r-- 1 iafzal iafzal 1608 Feb 26 19:16 peter  
-rw-rw-r-- 1 iafzal iafzal 8649 Feb 26 19:19 ifconfig.txt  
-rw-rw-r-- 1 iafzal iafzal 8719 Feb 26 19:23 ifconfig.file  
-rw-rw-r-- 1 iafzal iafzal 186 Feb 27 19:42 seinfeld.bak  
-rw-rw-r-- 1 iafzal iafzal 180 Feb 27 20:06 seinfeld  
[iafzal@myfirstlinuxvm ~]$
```



# Filesystem Color Definition

- **Blue** = Directory
- **Green** = Executable or recognized data file
- **Sky Blue** = Symbolic link file

e.g. `cd /home/iafzal`  
`touch ca`  
`cd /tmp`  
`ln -s /home/iafzal/ca`



- **Yellow with black background** = Device

- **Pink** = Graphic image file
- **Red** = Archive file (tar)

- **Red with black background** = Broken Link

e.g. `cd /home/iafzal`  
`touch ihulk`  
`ln -s ihulk /tmp/ihulk`  
*Absolute path for source file is missing*