

ERROR checking

```
sudo apt update && sudo apt upgrade -y
```

upgrades your machine with all tools completely

0 passes

any number other than 0 is a fail error

```
test -d /tmp/temp_dir
```

check to see if directory was created

```
test_rc=$?
```

check return codes

```
echo "mkdir resulted in ${mkdir_rc}, test resulted in ${test_rc}."
```

Check out how an exit status of 0 affects the logical operators:

```
true && echo "We get here because the first part is true!" true || echo "We never see this because the first part is true :(""
```

Check out how an exit status of 1 affects the logical operators:

```
false && echo "Since we only continue after && with an exit status of 0, this is never printed." false || echo "Because we only continue after || with a return code that is not 0, we see this!"
```

We need exactly three arguments, check how many have been passed to # the script.

ERROR checking (cont)

```
directory_name=$1 file_name=$2 file_content=$3
```

Save the arguments into variables.

```
absolute_file_path=${directory_name}/${file_name}
```

create absolute path

```
if [[ ! -d ${directory_name} ]]; then mkdir ${directory_name} || { echo "Cannot create directory, exiting script!"; exit 1; } fi
```

Check if the directory exists; otherwise, try to create it.

```
if [[ ! -f ${absolute_file_path} ]]; then touch ${absolute_file_path} || { echo "Cannot create file, exiting script!"; exit 1; } fi
```

Try to create the file, if it does not exist.

```
echo ${file_content} > ${absolute_file_path}
```

File has been created, echo the content to it.

```
cp /var/log/dpkg.log dpkg || { echo "Cannot copy dpkg.log to the new directory."; exit 1; }
```

Copy the log file to our new directory.

```
cd $(dirname $0)
```

Change directory to the script location.

```
cp /var/log/dpkg.log dpkg || { echo "Cannot copy dpkg.log to the new directory."; exit 1; }
```

Copy the log file to our new directory.

ERROR checking (cont)

```
if [[ $# -ne 1 ]]; then echo "Incorrect usage!" echo "Usage: $0 <file or directory path>" exit 1 fi
```

input validation

git keeper

```
git clone <url>
```

copies url to directory

```
git add <file>
```

keep track of git file

```
git commit -am "-done"
```

makes version of thing done

```
git push
```

pushes version to git server

for loop

```
for word in $(cat words.txt); do echo "The word is: $word" done
```

for loop example

```
" "
```

bash keep spaces together also prevents asterisk from being expanded

```
' '
```

no variables will be replaced in single quotes plus what double quotes do

Setting up Samba for file sharing

```
$ sudo yum install samba
```

install samba

```
$ sudo cp /etc/samba/smb.conf /etc/samba/smb.conf.backup
```

backup at each stage



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Setting up Samba for file sharing (cont)

\$ sudo mkdir /SharedFolder/	grant user permissions
\$ sudo chmod -R 755 /SharedFolder/	
\$ sudo firewall-cmd --add-service=samba \$ sudo firewall-cmd --reload	get past firewall
\$ sudo nano /etc/samba/smb.conf	configure samba file
\$ sudo smbpasswd -a <user>	create user
\$ sudo systemctl enable smb.service \$ sudo systemctl enable nmb.service \$ sudo systemctl start smb.service \$ sudo systemctl start nmb.service	start service
\$ testparm -v	listing of all the Samba configuration options and the values to which they are currently set
\$ sudo smbpasswd -a <user>	set up password for user

ARRAYS

ARRAY=(hi "how are you")	set values
echo \${ARRAY[*]}	list variables in array
for x in "\${ARRAY[@]}"; do echo \$x; done	list variables in new lines
unset ARRAY[variable]	remove variable

ARRAYS (cont)

ARRAY+=("bland" "hello")	add variables
echo \${#ARRAY}	get length of array
\${VAR:-WORD}	substitute variable
"\$@"	shift variables
declare -A aa	
\${VAR/PATTERN/STRING}	replace parts of a variable
\${VAR:OFFSET:LENGTH}	remove substring

general

lists the contents of files to the terminal window	cat
give your own name to a command or sequence of commands	alias
information and files from Uniform Resource Locators (URLs) or internet addresses	curl
shows the size, used space, and available space on the mounted filesystems of your computer	df
compares two text files and shows the differences between them	diff
close a terminal window	exit
gives you a short dump of information about a user, including the time of the user's last login, the user's home directory, and the user account's full name	finger
summary of the memory usage with your computer.	free
tells you which groups a user is a member of	groups
compresses files	gzip

general (cont)

gives you a listing of the first 10 lines of a file	head
terminate a process from the command line	kill
view files without opening an editor	less
verify that you have network connectivity with another network device	ping
lists running processes	ps
shut down or reboot your Linux system	shutdown
listing of the last 10 lines of a file	tail
create an archive file	tar
real-time display of the data relating to your Linux machine.	top
obtain some system information regarding the Linux computer you're working on	uname
lists the currently logged in users.	w
find out who you are logged in as or who is logged into an unattended Linux terminal.	whoami

Add users

add user	sudo useradd <username>
add user password	sudo smbpasswd -a <username>
Add Admin	sudo useradd -g wheel <lastnamefirstletter>

Installing and setting up samba

check samba is not running	ps ax grep "samba-smbd nmbd winbindd"
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Installing and setting up samba (cont)

delete any samba files that are already on the system

```
smbd -b | grep "CONFIG-FILE" and smbd -b | egrep "LOCKDIR|STATEDIR|CACHEDIR|PRIVATE_DIR"; delete any files that these commands find
```

provision Samba AD. We'll want to do it interactively so our password can't be seen

```
samba-tool domain provision --use-rfc2307 --interactive
```

for the requests:

```
Realm: SAP.CSLAB.MORAVIAN.EDU Domain: SAP Server Role: dc DNS backend: SAMBA_INTERNAL
```

Set your hostname to our domain:

```
hostname sap.cslab.moravian.edu hostname -b sap.cslab.moravian.edu
```

Now enable samba and make it sure it will run at boot:

```
sudo systemctl start samba sudo systemctl enable samba
```

virtual environments

python3 -m venv /path/to/new/virtual/environment

-h, --help man pages for environments

--system-site-packages Give the virtual environment access to the system site-packages dir.

virtual environments (cont)

-- symlinks Try to use symlinks rather than copies, when symlinks are not the default for the platform.

--copies Try to use copies rather than symlinks, even when symlinks are the default for the platform.

--clear Delete the contents of the environment directory if it already exists, before environment creation.

-- upgrade Upgrade the environment directory to use this version of Python, assuming Python has been upgraded in-place.

--without-pip Skips installing or upgrading pip in the virtual environment (pip is bootstrapped by default)

--prompt PROMPT Provides an alternative prompt prefix for this environment.

<source> activate virtual env

<dir>/-bin/activate/

pip install <some project> install a project

pip install -r requirements.txt install required files

Files and Directories

ls to hide files

ls -a shows all files in current folder

ls .. look in directory

ls ../.. -a look in directory above

ls -a .. look in hidden directory

./ run program from current folder

pwd present working directory

tab completes command

> moves files somewhere else

rm ~/<filename> delete file

rm -r <dir> delete directories

mk dir create directories

wget <folder> download folder

tar -xzf <folder>.tar.gz unpack folder

cd <directory> change directory

cd \ go to home directory

mv move

History | grep <command> find commands with <command> in it

-f to follow code to the end

-f -u <unit> filter by the type of unit

!<number> repeat command on line

script everything that happened in a session

ports and firewalls

firewall-cmd --permanent --add-port=<port#>/tcp add port

firewall-cmd --reload reboot port

firewall-cmd --list-ports list ports

ports an firewalls (cont)

firewall-cmd --	use predefined
permanent --add--	service instead of
service=http	port #
sudo tcpdump -a -c	looks for the past
1000	1000 connections
	within server
ifconfig	show local ip

Network Diagnostic Tools

ping <we- baddress> or <IP>	tracks the time the round trip took to server
ping -s <number>	try a packet of <number>
/path/to/- tracert <webad- dress>	shows whether it can reach a host, but also the route it takes
dig	queries DNS servers and returns the information held about a particular domain.

Set up SMB

go to file	sudo nano /etc/samba/smb.conf
input values	[homes] comment = Home Direct- ories browsable = no writeable = yes valid users = sap.cslab.morav- ian.edu\%S [printers] comment = All Printers path = /var/spoo- l/samba browsable = no guest ok = no writeable = no printable = yes
run	sudo setsebool -P samba_enable- _home_dirs on

Set up DHCP

Setting up	ip addr add 192.168.114.1 dev br0;
Static IP on Server (For DHCP)	
Setting up	sudo dnf install bridge-utils sudo brctl addbr br0 sudo brctl addif
Bridging	enp1s0 sudo brctl addif eno1 sudo ifconfig br0 up
DHCP Config	subnet 192.168.114.0 netmask 255.255.255.0 { range 192.16- 8.114.1 192.168.114.255; option subnet-mask 255.255.255.0; option routers 192.168.114.1; option broadcast-address 192.168.114.255; default-lease- time 600; max-lease-time 7200; host interface0 { hardware ethernet 54:04:a6:3f:85:35; fixed-address 192.168.114.1; } }
DHCP Config pt.2	/etc/sysconfig/network-scripts/if- cfg-eno1:
DHCP Config pt.3	DEVICE=eno1 BOOTPR- OTO:dhcp TYPE: ethernet ipaddr=192.168.114.1 ONBOOT=yes

Permissions and Owners

ls -l	view permissions of files and directories
./<filename>	execute file
chmod +x <filename>	
ls -l	added permission to execute file
chown bin	changes ownership of file(can only be used by root)
chgrp bin	changes group
chmod -x <filename>	removed permission to execute file
chmod u+x <filename>	assign execute permission to yourself only
chmod ug+rwX <fi- lename>	assign read, write, execute permission to user and group
etc /shadow	can only be run by root
chmod -R	recursive
history	show all command history
adduser	adds user

Cups printer

set up cups	lpadmin -p laserjet -L "- Printer" -v usb://HP/Las- erJet%202200?serial=0- 0USBGJ02797
list the available backends and printers	lpinfo -v
The Bonjour (DNS-SD) protocol.	dnssd
The Internet Printing Protocol (IPP) with optional encryp- tion.	ipp
The Internet Printing Protocol with mandatory encryption.	ipps

Cups printer (cont)

The Line Printer Daemon protocol	lpd:
The AppSocket (JetDirect) protocol.	socket
Set printer	lpadmin -p printername -v device-uri
aborts jobs. on printer	abort-job
Enables/disables per-printer sharing	-o printer-is-shared=true/false
Enables sharing of printers with other computers and mobile devices on your local network.	--share-printers
Expands printer sharing to any network that can reach your server.	--remote-any
create, modify, or delete a class	lpadmin -p printername -c classname
printer is removed from the class	lpadmin -p printername -r classname
deletes the named class	lpadmin -x classname
enable debug logging	cupscctl --debug-logging
disable debug logging	cupscctl --no-debug-logging
creates a destination for a printer at IP address 11.22.33.44	lpadmin -p printername -E -v ipp://11.22.33.44/ipp/print -m everywhere

Cups printer (cont)

creates a destination for a HP LaserJet printer at IP address 11.22.33.44	lpadmin -p printername -E -v socket://11.22.33.44 -m drv:///sample.drv/laserjet.ppd
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SSH

\$ ssh -l <account name> <remote system>	log in
\$ ssh <account name>@<remote system>	log in
\$ ssh <remote system>	log in if on same local and remote system
\$ ssh -l <account name> <remote system> rm <absolute path name>	run a single command
\$ scp <file name> <account name>@<remote server>:	copy files from local to remote
\$ scp <account name>@<remote system>:<file name> .	copy files from remote to local
\$ scp -r <account name>@<remote system>:<directory> .	copy directory



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