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Terminal Commands

Prerequisites to learn CLI

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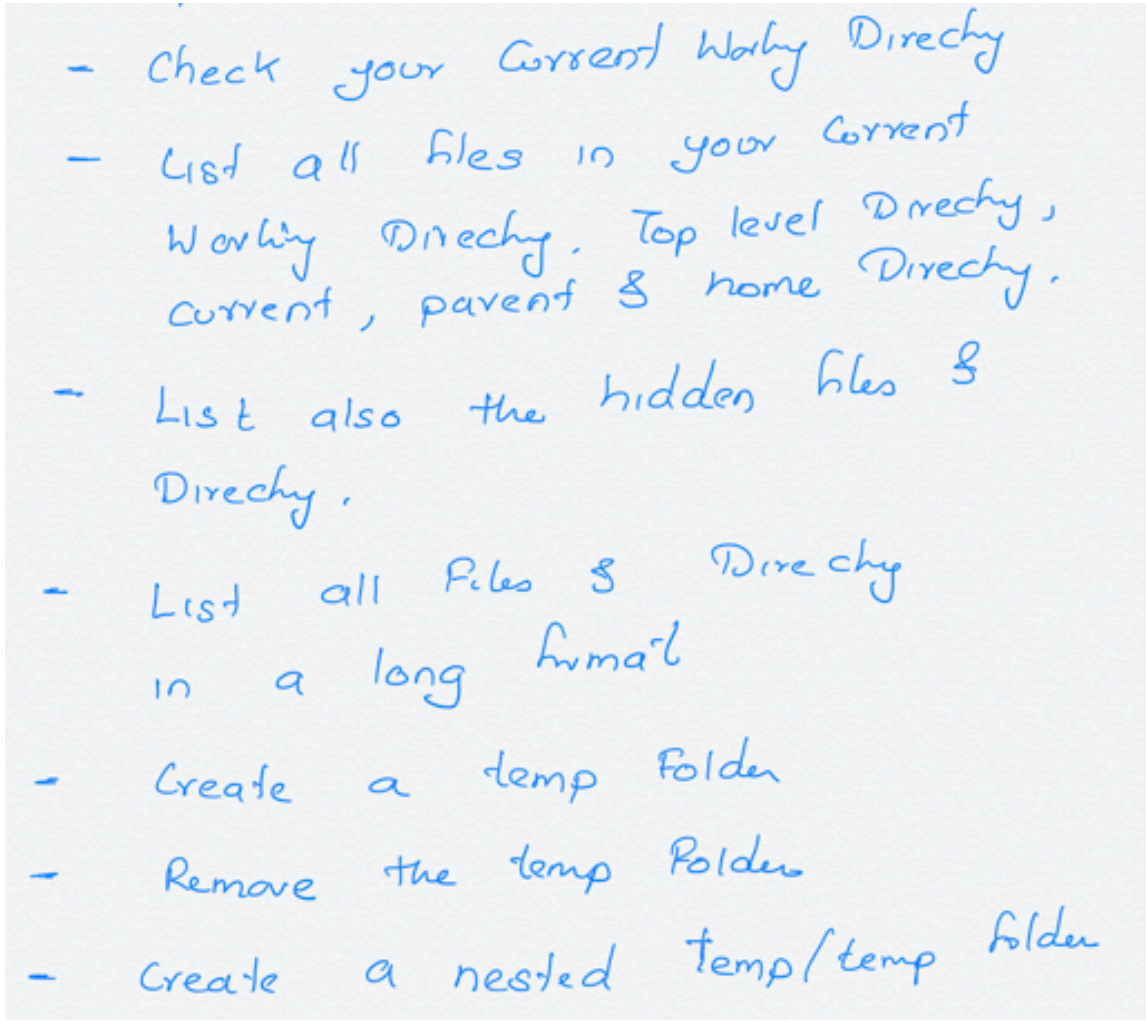
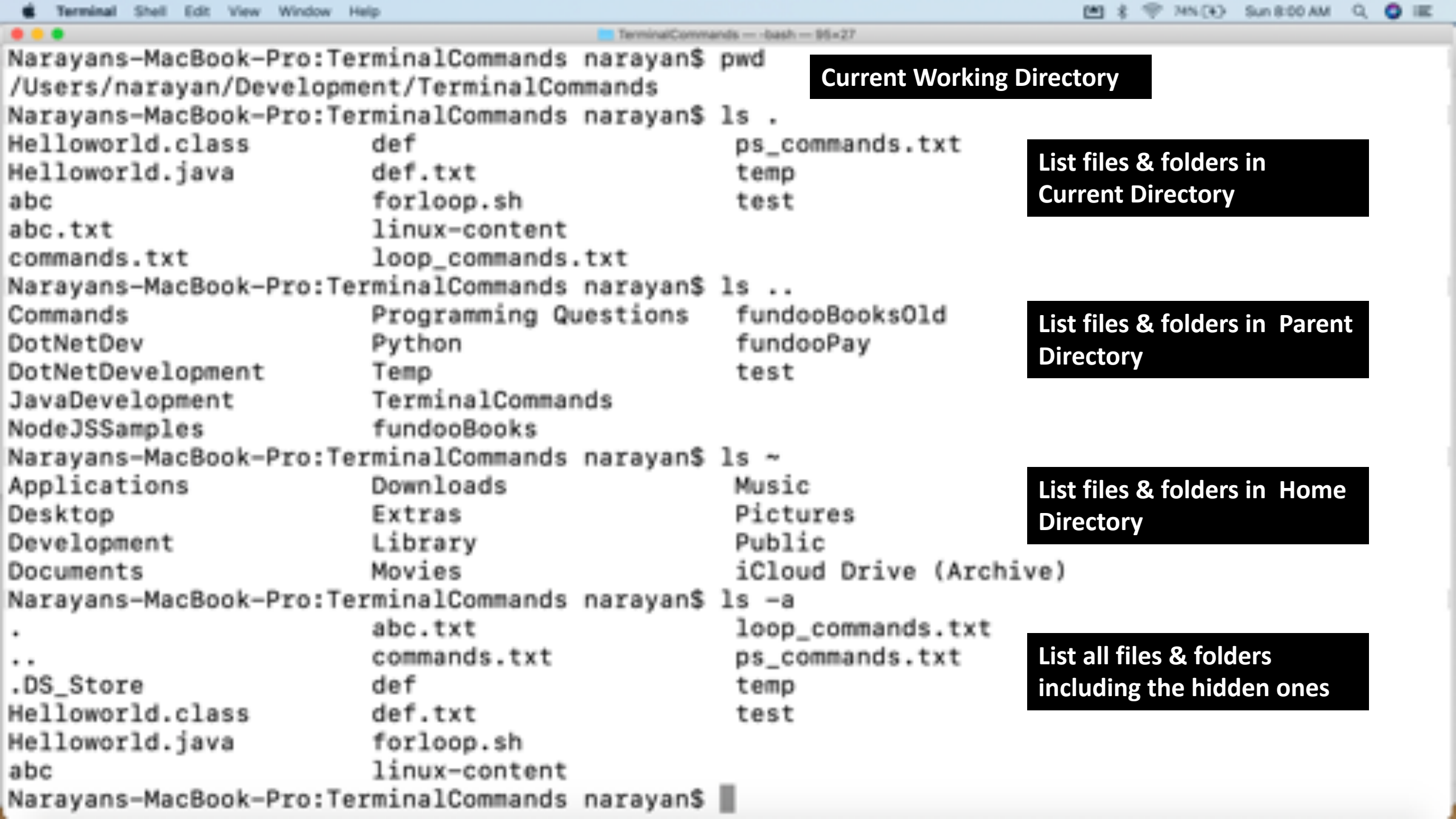
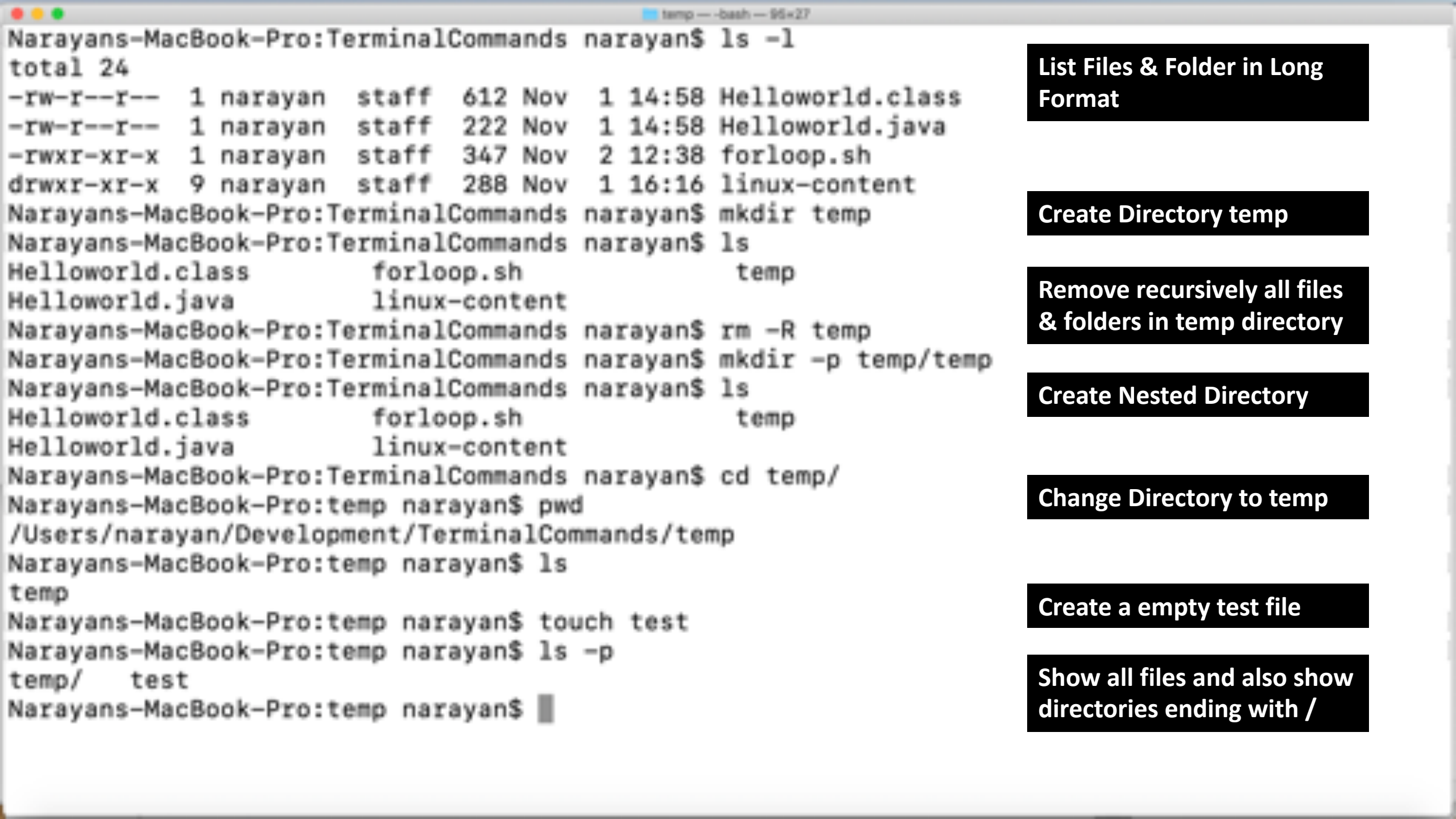
- CLI - Command Line Interface
- Check Java is installed ***java –version***
- Java Installation - https://exercism.io/tracks/java/installation#linux
- ***mkdir TerminalCommands***
- ***cd TerminalCommands/***
- Check git is installed - ***git --version***
- ***git clone https://github.com/edurekavivekh/linux-content.git***
- Change Dir to ***cd linux-content/*** and do ***ls***
- You will see linux_chit_sheet.pdf – for Linux Commands and linux_problem_sheet.pdf – to solve problems using linux commands



File & Directory Commands


Terminal Shell Edit View Window Help
Sun 8:00 AM
TerminalCommands — -bash — 96×27
Narayans-MacBook-Pro:TerminalCommands narayan$ pwd
/Users/narayan/Development/TerminalCommands
Narayans-MacBook-Pro:TerminalCommands narayan$ ls .
Helloworld.class def ps_commands.txt
Helloworld.java def.txt temp
abc forloop.sh test
abc.txt linux-content
commands.txt loop_commands.txt
Narayans-MacBook-Pro:TerminalCommands narayan$ ls ..
Commands Programming Questions fundooBooksOld
DotNetDev Python fundooPay
DotNetDevelopment Temp test
JavaDevelopment TerminalCommands
NodeJSSamples fundooBooks
Narayans-MacBook-Pro:TerminalCommands narayan$ ls ~
Applications Downloads Music
Desktop Extras Pictures
Development Library Public
Documents Movies iCloud Drive (Archive)
Narayans-MacBook-Pro:TerminalCommands narayan$ ls -a
. abc.txt loop_commands.txt
.. commands.txt ps_commands.txt
.DS_Store def temp
Helloworld.class def.txt test
Helloworld.java forloop.sh
abc linux-content
Narayans-MacBook-Pro:TerminalCommands narayan$
Current Working Directory
List files & folders in Current Directory
List files & folders in Parent Directory
List files & folders in Home Directory
List all files & folders including the hidden ones


Narayans-MacBook-Pro:TerminalCommands narayan$ ls -l
total 24
-rw-r--r-- 1 narayan staff 612 Nov 1 14:58 Helloworld.class
-rw-r--r-- 1 narayan staff 222 Nov 1 14:58 Helloworld.java
-rwxr-xr-x 1 narayan staff 347 Nov 2 12:38 forloop.sh
drwxr-xr-x 9 narayan staff 288 Nov 1 16:16 linux-content
Narayans-MacBook-Pro:TerminalCommands narayan$ mkdir temp
Narayans-MacBook-Pro:TerminalCommands narayan$ ls
Helloworld.class forloop.sh temp
Helloworld.java linux-content
Narayans-MacBook-Pro:TerminalCommands narayan$ rm -R temp
Narayans-MacBook-Pro:TerminalCommands narayan$ mkdir -p temp/temp
Narayans-MacBook-Pro:TerminalCommands narayan$ ls
Helloworld.class forloop.sh temp
Helloworld.java linux-content
Narayans-MacBook-Pro:TerminalCommands narayan$ cd temp/
Narayans-MacBook-Pro:temp narayan$ pwd
/Users/narayan/Development/TerminalCommands/temp
Narayans-MacBook-Pro:temp narayan$ ls
temp
Narayans-MacBook-Pro:temp narayan$ touch test
Narayans-MacBook-Pro:temp narayan$ ls -p
temp/ test
Narayans-MacBook-Pro:temp narayan$
List Files & Folder in Long Format
Create Directory temp
Remove recursively all files & folders in temp directory
Create Nested Directory
Change Directory to temp
Create a empty test file
Show all files and also show directories ending with /

File Management

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- Change directry to temp
- Create a empty test file.
- Copy test file into another test1 file
- move test1 file to test2 file.
- Create a link to the test file in your home dire.
- Chaye dir to home & remove the temp folder.
- man ls ⇒ to list all options
- whereis ls ⇒ find the location of the command

```
Narayans-MacBook-Pro:temp narayan$ cp test test1
Narayans-MacBook-Pro:temp narayan$ ls -p
temp/   test    test1
Narayans-MacBook-Pro:temp narayan$ mv test1 test2
Narayans-MacBook-Pro:temp narayan$ ls -p
temp/   test    test2
Narayans-MacBook-Pro:temp narayan$ ln -s test temp/
Narayans-MacBook-Pro:temp narayan$ ls -p temp/
test
Narayans-MacBook-Pro:temp narayan$ ln -s ../linux-content/linux_chit_sheet.pdf ~/QuickLink/
Narayans-MacBook-Pro:temp narayan$ ls -l ~/QuickLink/
total 0
lrwxr-xr-x  1 narayan  staff  37 Nov  3 10:03 linux_chit_sheet.pdf -> ../linux-content/linux_ch
it_sheet.pdf
Narayans-MacBook-Pro:temp narayan$ whereis ls
/bin/ls
Narayans-MacBook-Pro:temp narayan$ ls /bin
[               dd              ksh             pax             stty
bash            df              launchctl       ps              sync
cat             echo            link            pwd             tcsh
chmod           ed              ln              rm              test
cp              expr            ls              rmdir           unlink
csh             hostname        mkdir           sh              wait4path
date            kill            mv              sleep           zsh
Narayans-MacBook-Pro:temp narayan$ man ls
```

Copy test file into test1

Move test1 file into test2

Link test file in temp dir

Link linux_chit_sheet pdf to QuickLink in home dir

Note on listing shows the location of actual file

Locate commands using whereis

Looking up bin folder in root dir

Lookup Command using man. Use q to quit

the **-P** option.

-1 (The lowercase letter ``ell''.) List in long format. (See below.) If the output is to a terminal, a total sum for all the file sizes is output on a line before the long listing.

-m Stream output format; list files across the page, separated by commas.

-n Display user and group IDs numerically, rather than converting to a user or group name in a long (**-l**) output. This option turns on the **-l** option.

-O Include the file flags in a long (**-l**) output.

-o List in long format, but omit the group id.

-P If argument is a symbolic link, list the link itself rather than the object the link references. This option cancels the **-H** and **-L** options.

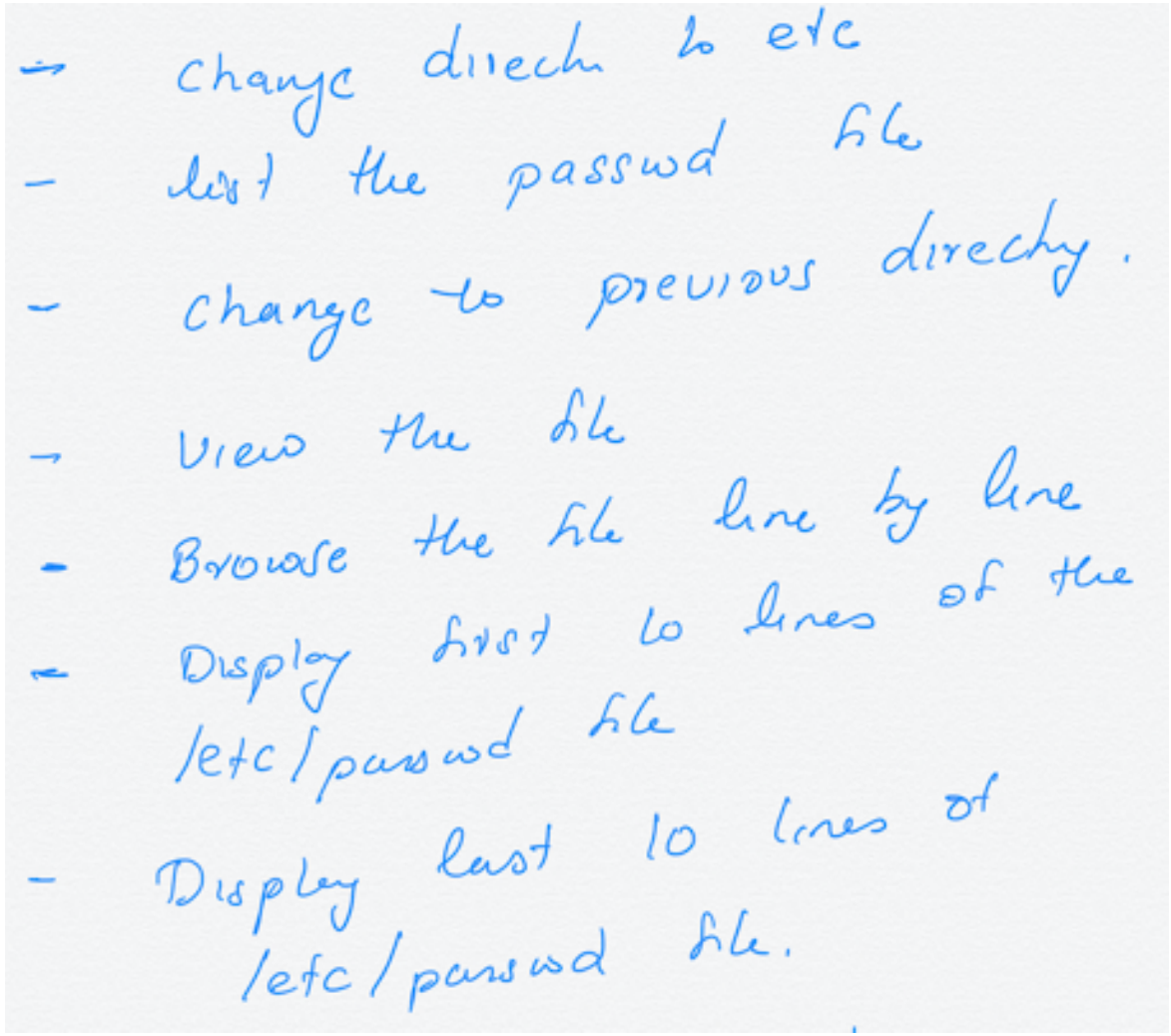
-p Write a slash (`/') after each filename if that file is a directory.

-q Force printing of non-graphic characters in file names as the character `?'; this is the default when output is to a terminal.

-R Recursively list subdirectories encountered.

/-p

Searching for –p string in the man ls. Also use n and p to look for next & previous –p string



View & Browse Files

```
Narayans-MacBook-Pro:temp narayan$ ls -l /etc/passwd
-rw-r--r--  1 root  wheel  6804 Feb 26  2019 /etc/passwd
Narayans-MacBook-Pro:temp narayan$ less /etc/passwd
Narayans-MacBook-Pro:temp narayan$ head /etc/passwd
##
# User Database
#
# Note that this file is consulted directly only when the system is running
# in single-user mode.  At other times this information is provided by
# Open Directory.
#
# See the opendirectoryd(8) man page for additional information about
# Open Directory.
##
Narayans-MacBook-Pro:temp narayan$ tail -2 /etc/passwd
_timed:*:266:266:Time Sync Daemon:/var/db/timed:/usr/bin/false
_reportmemoryexception:*:269:269:ReportMemoryException:/var/db/reportmemoryexception:/usr/bin/f
alse
Narayans-MacBook-Pro:temp narayan$ cat /etc/passwd
```

List in Long Format /etc/passwd file

Browsing the passwd file using less

Display first 10 lines from top

Display last 2 lines from bottom

Browsing the complete file

Pipe & Grep Commands

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- cmd1 | cmd2
  stdout of cmd1 to cmd2
- find all directories in the current working directy.
- find passwd file in /etc/
- find all files in the /etc/ directy

```
TerminalCommands $ find . -size +5M
./linux-content/linux_chit_sheet.pdf
./linux-content/.git/objects/b6/04c4fde493cb44468855d37d0ae0973164cc67
./linux-content/.git/objects/2b/b9e2d5d41336c901d25a51b89a6adaa578c946
./linux-content/linux_problem_sheet.pdf
TerminalCommands $ find . -name *.pdf -size +5M
./linux-content/linux_chit_sheet.pdf
./linux-content/linux_problem_sheet.pdf
TerminalCommands $ find . -size +5M | grep pdf
./linux-content/linux_chit_sheet.pdf
./linux-content/linux_problem_sheet.pdf
TerminalCommands $ find . -name data*
./linux-content/data.csv
TerminalCommands $ grep CAPTAIN linux-content/data.csv
2  GARY         CAPTAIN         155966  245131      137811   538909   538909
3  ALBERT       CAPTAIN         212739  106088      16452    335279   335279
12 PATRICIA     CAPTAIN         99722   87082       110804   297608   297608
TerminalCommands $ grep -r CAPTAIN .
./linux-content/data.csv:2  GARY         CAPTAIN         155966  245131      137811   538
909   538909
./linux-content/data.csv:3  ALBERT       CAPTAIN         212739  106088      16452    335
279   335279
./linux-content/data.csv:12 PATRICIA     CAPTAIN         99722   87082       110804   297
608   297608
TerminalCommands $
```

Find file size greater the 5M

Find pdf files greater than 5M

Find pdf files greater than 5M using pipe and grep command

Find files starting with data
grep CAPTAIN in data.csv file

Recursively grep CAPTAIN in the Current Directory

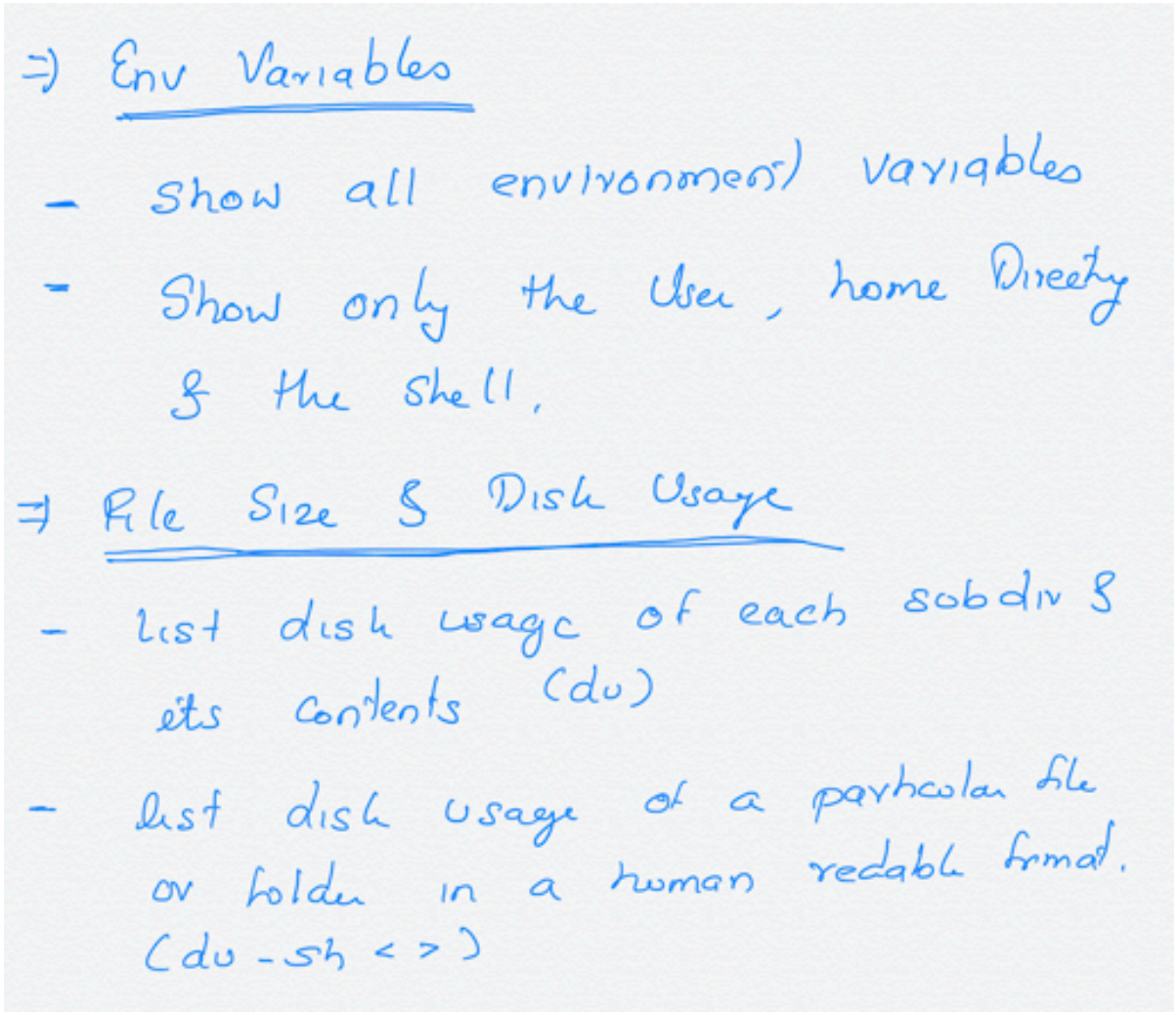
```
Narayans-MacBook-Pro:temp narayan$ ls -p | grep /
temp/
Narayans-MacBook-Pro:temp narayan$ ls -p | grep -v /
test
test2
Narayans-MacBook-Pro:temp narayan$ env
TERM_PROGRAM=Apple_Terminal
SHELL=/bin/bash
TERM=xterm-256color
TMPDIR=/var/folders/sz/zlcpnpd10qlcr6xf3frycq3h0000gn/T/
Apple_PubSub_Socket_Render=/private/tmp/com.apple.launchd.kO4qruzk78/Render
TERM_PROGRAM_VERSION=421.2
OLDPWD=/Users/narayan/Development/TerminalCommands
TERM_SESSION_ID=FE80A322-0260-4F1F-9A39-A283CE5D10E9
USER=narayan
SSH_AUTH_SOCK=/private/tmp/com.apple.launchd.kfSZSOYnZs/Listeners
PATH=/usr/local/bin:/usr/bin:/bin:/usr/sbin:/sbin
PWD=/Users/narayan/Development/TerminalCommands/temp
XPC_FLAGS=0x0
XPC_SERVICE_NAME=0
SHLVL=1
HOME=/Users/narayan
LOGNAME=narayan
LC_CTYPE=UTF-8
_=/usr/bin/env
Narayans-MacBook-Pro:temp narayan$ env | grep USER
USER=narayan
```

Using Pipe i.e. | to show all Folders

Using Pipe to show all Files

Displaying Environment Variables

Using pipe to Grep USER Variable



Env Variables & Disk Usage

```
Narayans-MacBook-Pro:TerminalCommands narayan$ echo $USER
narayan
Narayans-MacBook-Pro:TerminalCommands narayan$ echo $SHELL
/bin/bash
Narayans-MacBook-Pro:TerminalCommands narayan$ echo $HOME
/Users/narayan
Narayans-MacBook-Pro:TerminalCommands narayan$ du -sh linux-content/
 27M    linux-content/
Narayans-MacBook-Pro:TerminalCommands narayan$ du -sm * | sort -nr
27      linux-content
1       forloop.sh
1       Helloworld.java
1       Helloworld.class
0       temp
Narayans-MacBook-Pro:TerminalCommands narayan$ du -sk * | sort -n
0       temp
4       Helloworld.class
4       Helloworld.java
4       forloop.sh
27456   linux-content
Narayans-MacBook-Pro:TerminalCommands narayan$ find ~/Development -name commands.txt
/Users/narayan/Development/Commands/commands.txt
Narayans-MacBook-Pro:TerminalCommands narayan$ find . -type f -empty
./temp/test
./temp/test2
./linux-content/sample
Narayans-MacBook-Pro:TerminalCommands narayan$
```

Writing USER, SHELL and HOME variable to standard output using echo
NOTE: Variable is referred using $

Displaying Disk Usage in Human Readable Form

Piping Disk Usage of current folder to Sort in Descending Order

Piping Disk Usage in Ascending Order
NOTE – Option n is used to Sort Numeric Value

1: Finding commands.txt file in Development folder
2: Finding empty file in current folder

Process Management

- Use nano editor to create a Helloworld java program.
- The Helloworld java program would print hello world every minute in an infinite loop
- Display the current running processes
- Display realtime the top processes.
- Identify the java process & kill it.
- Start the Helloworld program in the Background
- Display the Background jobs
- Bring the most recent background job to foreground

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```
Narayans-MacBook-Pro:TerminalCommands narayan$ nano -T 3 Helloworld.java
Narayans-MacBook-Pro:TerminalCommands narayan$ javac Helloworld.java
Narayans-MacBook-Pro:TerminalCommands narayan$ ls -l
total 24
-rw-r--r--  1 narayan  staff  612 Nov  3 15:06 Helloworld.class
-rw-r--r--  1 narayan  staff  224 Nov  3 15:06 Helloworld.java
-rwxr-xr-x  1 narayan  staff  347 Nov  2 12:38 forloop.sh
drwxr-xr-x  9 narayan  staff  288 Nov  1 16:16 linux-content
drwxr-xr-x  5 narayan  staff  160 Nov  3 10:02 temp
Narayans-MacBook-Pro:TerminalCommands narayan$ java Helloworld  &
[1] 68193
Narayans-MacBook-Pro:TerminalCommands narayan$ Hello world

Narayans-MacBook-Pro:TerminalCommands narayan$ ps -elf | grep java | grep -v grep
  501 68193 57392     4006   0  31  0  8030176  30076 -                      0
:00.16 /usr/bin/java He  3:06PM
Narayans-MacBook-Pro:TerminalCommands narayan$ jobs
[1]+  Running                 java Helloworld &
Narayans-MacBook-Pro:TerminalCommands narayan$ fg %1
java Helloworld
^Z
[1]+  Stopped                 java Helloworld
Narayans-MacBook-Pro:TerminalCommands narayan$ bg %1
[1]+ java Helloworld &
Narayans-MacBook-Pro:TerminalCommands narayan$ jobs
[1]+  Running                 java Helloworld &
Narayans-MacBook-Pro:TerminalCommands narayan$ killall java
```

1: Using nano editor to create Helloworld.java
2: NOTE: option T 3 for tabspace of 3
3: Compiling Java Program

Running the java program in Background using &

Grepping the Java Process

Viewing the Jobs running in Background

Bringing the Job to the Foreground

Stopping the Job using ^Z

Starting the Job to the Foreground

Killing the Job

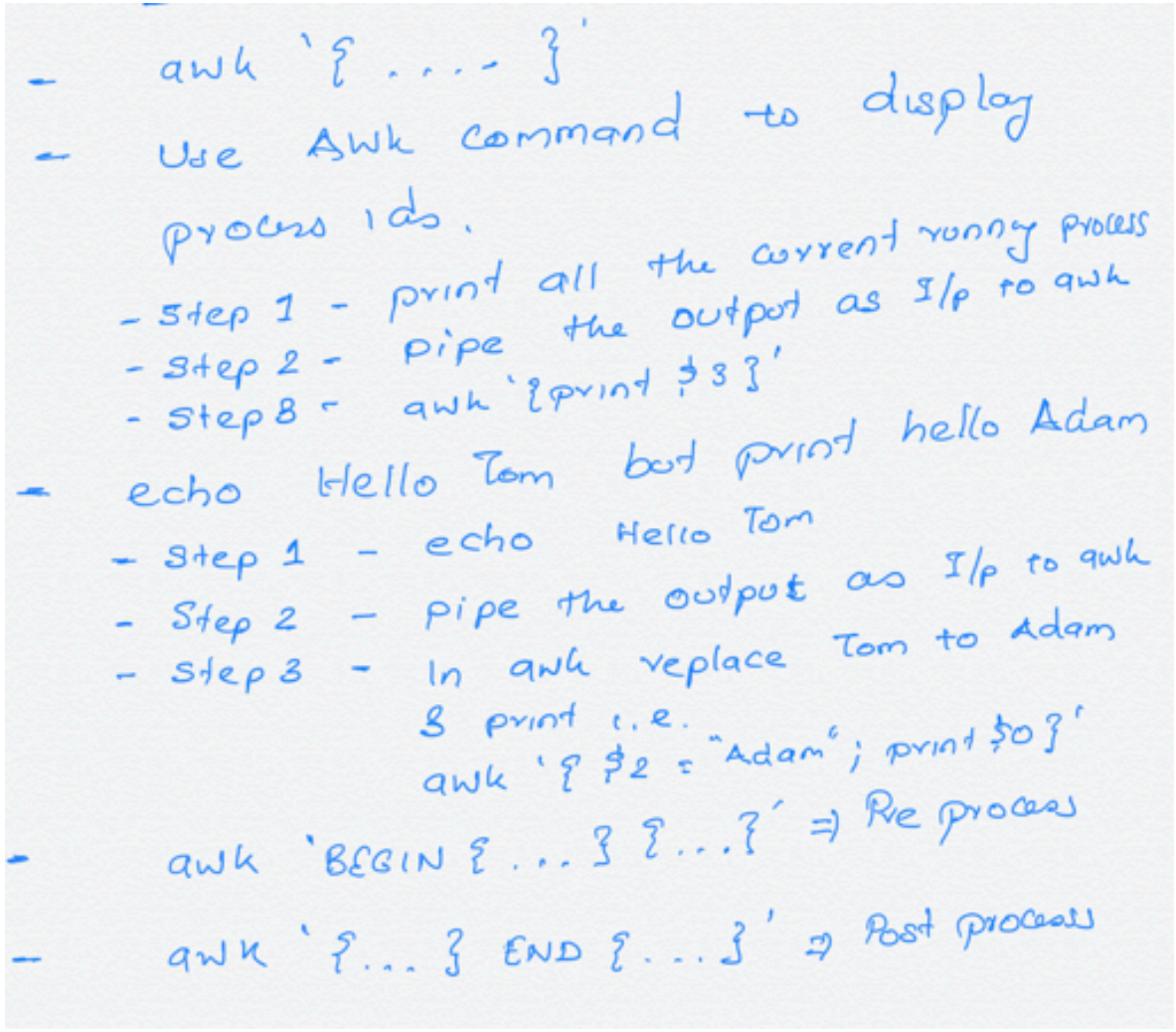
```
public class Helloworld {

   public static void main(String args[]){
      while(true){
         System.out.println("Hello world");
         try{
            Thread.sleep(60000);
         }catch(Exception ex){
            System.out.println(ex);
         }

      }

   }
}
```

[Read 15 lines]



AWK Commands

```
Narayans-MacBook-Pro:TerminalCommands narayan$ ps -elf | grep java | grep -v grep
  501 68416 57392     4006   0  31  0  8019936  30160 -                0
:00.19 /usr/bin/java He  3:53PM
Narayans-MacBook-Pro:TerminalCommands narayan$ ps -elf | grep java | grep -v grep | awk '{ prin
t $2 }'
68416
Narayans-MacBook-Pro:TerminalCommands narayan$ kill -9 `ps -elf | grep java | grep -v grep | aw
k '{ print $2 }'`
Narayans-MacBook-Pro:TerminalCommands narayan$ mypid=`ps -elf | grep java | grep -v grep | awk
'{ print $2 }'`
Narayans-MacBook-Pro:TerminalCommands narayan$ echo $mypid
68432
Narayans-MacBook-Pro:TerminalCommands narayan$ kill -9 $mypid
Narayans-MacBook-Pro:linux-content narayan$ echo Hello Tom
Hello Tom
Narayans-MacBook-Pro:linux-content narayan$ echo Hello Tom | awk '{ print $0 }'
Hello Tom
Narayans-MacBook-Pro:linux-content narayan$ echo Hello Tom | awk '{ print $2 }'
Tom
Narayans-MacBook-Pro:linux-content narayan$ echo Hello Tom | awk '{ $2 = "Adam"} { print $0 }'
Hello Adam
Narayans-MacBook-Pro:linux-content narayan$
```

Grepping the Java Process

Using awk to grep the Java Process Id

Using awk with Backquotes `...` to kill java process

1: Assigning java process id to variable mypid
2: Printing to terminal $mypid
3: Killing the Java process

1: echo to stdout Hello Tom
2: Using awk print $0 which prints Hello Tom
3: Using awk replace Tom with Adam and Print the complete String

```
Narayans-MacBook-Pro:linux-content narayan$ cat data.csv
Id EmployeeName JobTitle        BasePay OvertimePay OtherPay TotalPay TotalPayBenefits
1  NATHANIEL    GM              167411  0           400184   567595   567595
2  GARY         CAPTAIN         155966  245131      137811   538909   538909
3  ALBERT       CAPTAIN         212739  106088      16452    335279   335279
4  CHRISTOPHER  MECHANIC        77916   56120       198306   332343   332343
5  PATRICK      DEPUTYCHIEF     134401  9737        182234   326373   326373
6  DAVID        ASSTDEPUTY      118602  8601        189082   316285   316285
7  ALSON        BATTALIONCHIEF  92492   89062       134426   315981   315981
8  DAVID        DEPUTYDIRECTOR  256576  0           51322    307899   307899
10 JOANNE       CHIEF           285262  0           17115    302377   302377
12 PATRICIA     CAPTAIN         99722   87082       110804   297608   297608
13 EDWARD       EXECUTIVE       294580  0           0        294580   294580
Narayans-MacBook-Pro:linux-content narayan$ cat data.csv | grep CAPTAIN | awk '{ print $2 " " $
4}'
GARY 155966
ALBERT 212739
PATRICIA 99722
Narayans-MacBook-Pro:linux-content narayan$ cat data.csv | grep CAPTAIN | awk '{ sum+=$4 }END{
print sum }'
468427
Narayans-MacBook-Pro:linux-content narayan$ cat data.csv | grep CAPTAIN | awk '{ sum+=$4 }END{
print sum/NR }'
156142
Narayans-MacBook-Pro:linux-content narayan$
```

Displaying Data in data.csv file

Displaying the Employee Name and Base Salary whose Job Title is Captain

Displaying the total salary received by Captains

Displaying the average salary received by Captains
NOTE: END is used to indicate post process and NR is an inbuilt variable indicating Number of Records

Conditions & Loops

- for loop

```
for arg in `.....`;
do
    .....;
    .....;
done
```

- eg: Move files from One folder to their respective folders.

Step1: Create two empty files abc.txt & def.txt

Step2: print the list of .txt files.

Step3: pipe it to awk & print the file name.

Step4: Do it in for loop for each file & print the file name

```
for files in `ls *.txt`;
do echo $files | awk -F. '{print $1}';
done
```

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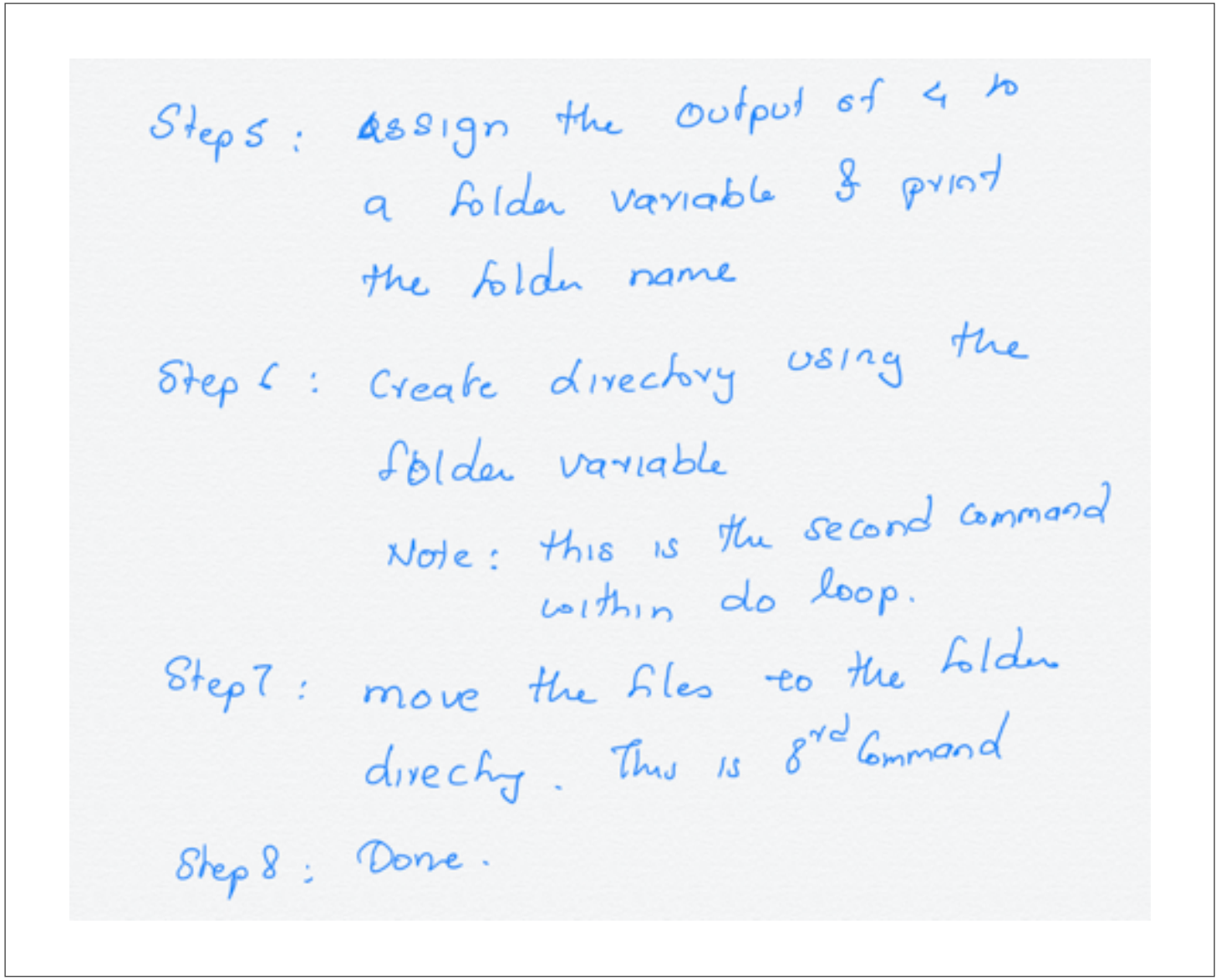
```
Narayans-MacBook-Pro:temp narayan$ ls *.txt
abc.txt def.txt
Narayans-MacBook-Pro:temp narayan$ for files in `ls *.txt`; do echo $files; done
abc.txt
def.txt
Narayans-MacBook-Pro:temp narayan$ for file in `ls *.txt`; do folderName=`echo $file | awk -F.
'{print $1}'`; echo $folderName; done
abc
def
Narayans-MacBook-Pro:temp narayan$ for file in `ls *.txt`;
> do
> folderName=`echo $file | awk -F. '{print $1}'`;
> mkdir $folderName;
> cp $file $folderName;
> echo Copied $file to $folderName/;
> done
Copied abc.txt to abc/
Copied def.txt to def/
Narayans-MacBook-Pro:temp narayan$ ls -p
abc/            def/            folderName/     test
abc.txt         def.txt         temp/           test2
Narayans-MacBook-Pro:temp narayan$ ls -p abc/
abc.txt
Narayans-MacBook-Pro:temp narayan$ ls -p def/
def.txt
Narayans-MacBook-Pro:temp narayan$
```

Using for loop to display files with ext .txt

Using for loop and awk to display file names

1: Using for loop to read in each file with ext .txt
2: Staring the loop with do
3: Using awk to read the file name into folderName
4: Making Directory with the file name
5: Coping the file into the folder using $folderName
6: Displaying the result to stdout
7: indicating done to close for loop

Displaying the files in current folder and the new folders created by the for loop



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Conditions & Loops

Conditions & Loops

- Conditional Loop

```
while [ condition ];
do
    commands...
done
```

- Conditional if ... then ... else

```
if [Condition]:
  then
      command;
  else
      command;
fi
```

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```
  GNU nano 2.0.6                File: forloop.sh                      Modified

#!/bin/bash -x

for file in `ls *.txt`;
do
    folderName=`echo $file | awk -F. '{print $1}'`;
    #echo "checking for already existing directory started";
    if [ -d $folderName ];
    then
       rm -R $folderName;
    fi
    #echo creating foler ${folderName};
    mkdir $folderName;
    #echo copying ${file} to ${folderName};
    cp $file $folderName;

done
```

1: Creating forloop.sh script file to copy txt files to resp dir
2: Specifying bash shell and setting debug option with -x
3: Using for loop to read each file

1: Using if condition to check folder exists
2: then removing the folder along with the files
3: Closing the if loop with fi

Creating the directory with the file name and then copying the files into the corresponding directory

```
[ Read 16 lines ]
^G Get Help  ^O WriteOut  ^R Read File ^Y Prev Page ^K Cut Text  ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is  ^V Next Page ^U UnCut Text ^T To Spell
```

```
Narayans-MacBook-Pro:TerminalCommands narayan$ nano -T 3 forloop.sh
Narayans-MacBook-Pro:TerminalCommands narayan$ ./forloop.sh
++ ls abc.txt def.txt
+ for file in ``ls *.txt``
++ echo abc.txt
++ awk -F. '{print $1}'
+ folderName=abc
+ '[' -d abc ']'
+ rm -R abc
+ mkdir abc
+ cp abc.txt abc
+ for file in ``ls *.txt``
++ echo def.txt
++ awk -F. '{print $1}'
+ folderName=def
+ '[' -d def ']'
+ rm -R def
+ mkdir def
+ cp def.txt def
Narayans-MacBook-Pro:TerminalCommands narayan$ ls -p
Helloworld.class        abc.txt                 forloop.sh
Helloworld.java         def/                    linux-content/
abc/                    def.txt                 temp/
Narayans-MacBook-Pro:TerminalCommands narayan$
```

Running the script using ./forloop.sh

1: Script is run with debug statements
2: Indicates first abc.txt is being processed
3: Setting the folderName variable with abc
4: Checks if folder abc exisits
5: Folder exists hence removing the folder and its contents
6: Creating abc directory
7: Copying abc.txt file to abc folder
8: Similarly working with the def.txt file

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Thank you