# OPERATING SYSTEM

EXPERIMENT NO. 01

AIM – study of Unix/Linux general purpose utility commands list obtained form ( man, who, cat, cd, cp, ps, ls, mv, rm, rmdir, echo, more, date, time, kill, history, chmod, chown, finger, pwd, cal, logout, shutdown ) commands.

Theory –

*. What is shell programming?

→ The shell is later of programming that understands and executes the commands entered by the user.
A shell script is designed to be run by the Unix shell, a command line interpreter. The various dialects of the shell scripts are considered to be Scripting languages.

Basic Shell Commands are as →.

(1) Man → We can use this command after any command to get the official documentation written for that particular command.

(2) Who → To check the user we use the who command.

(3) ls → this command list downs all the files in a directory, further we can create modifications for the ls command like- ls -l, or ls -a.

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(4) ls -l ⟶ . Using this modification of the list command we can list down all the files with their permissions.

(5) ls -a ⟶ . This command is used to check the hidden files in the directory.

(6) MKdir ⟶ Using this account we can create new directries.

(7) RMdir → This command allows us to delete directories.

(8) pwd ⟶ : Using pwd command we can check the present working directory.

* There are some text editors that allows us to edit the files created in the terminal itself as.

(9) nano filename ⟶ Using this command we can use NANO as text editor.

(10) vim filename ⟶ Using this command, we can use Vim as text editor.

Conclusion ⟶

Thus, using different shell commands we successfully operated the unix based terminals to understand the core behind operating system.

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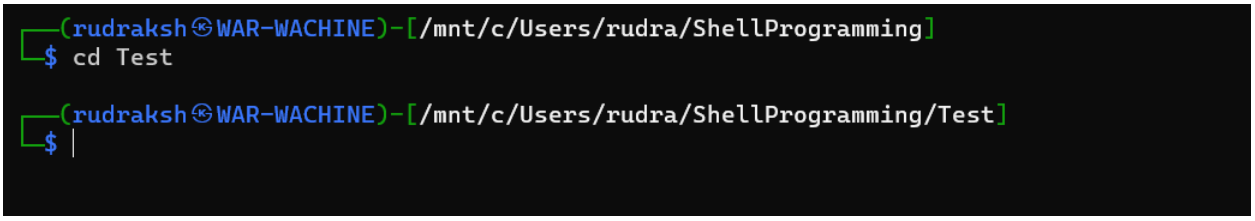
# Shell Commands

- To get the username

```
whoami
```

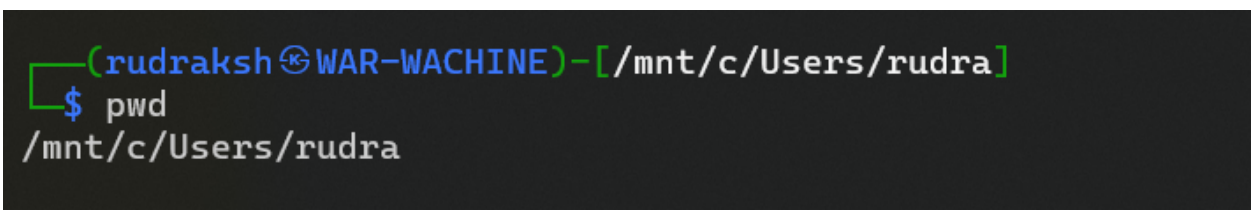

- To change the directory

```
cd
```



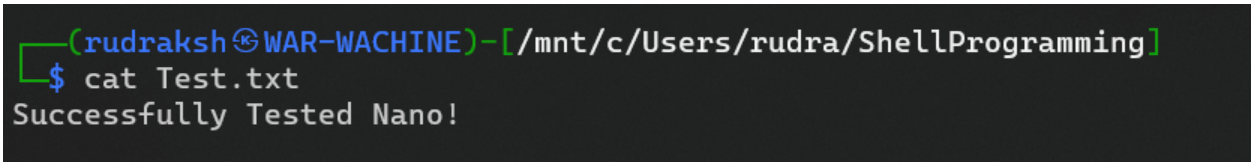

- To check the present working directory

```
pwd
```



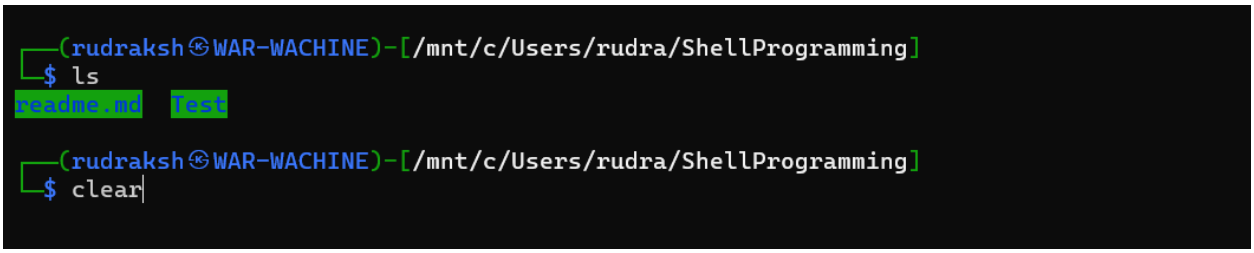
- To read the files

```
cat filename
```




- To clear the terminal

```
clear
```




- To list down previously used commands

```
history
```

```
337  cler
338  cls
339  cler
340  clear
341  ls
342  history
343  clear
344  ## implementing shell commands
345  ls
346  clear
347  pw
348  pwd
349  ls
350  clear
351  ls
352  ls -a
353  ll
354  mkdir ShellProgramming
355  cd ShellProgramming/
356  clear
357  ls
358  mkdir readme.md
359  clear
360  ls
361  ls -a
362  ll
363  ls -l
364  whoami
365  mkdir Test
366  cd Test
367  cd ..
368  ls
369  cd Test/
370  cd ..
371  clear
372  ls
373  history

┌──(rudraksh㉿WAR-WACHINE)-[/mnt/c/Users/rudra/ShellProgramming]
└─$ history
```

- To create files

```
touch
```

```
┌──(rudraksh㉿WAR-WACHINE)-[/mnt/c/Users/rudra/ShellProgramming]
└─$ touch Test.txt

┌──(rudraksh㉿WAR-WACHINE)-[/mnt/c/Users/rudra/ShellProgramming]
└─$ ls
readme.md  Test  Test.txt
```

- To list down all files in the working directory

```
ls
```

```
┌──(rudraksh㉿WAR-WACHINE)-[/mnt/c/Users/rudra]
└─$ ls
 06_linear_regression.ipynb                music-recommender.joblib
'3D Objects'                              'My Documents'
 AndroidStudioProjects                     NetHood
 ansel                                     NTUSER.DAT
 AppData                                   NTUSER.DAT{1c2b59c6-c5f5-11eb-bacb-000d3a96488e}.TM.blf
'Application Data'                         NTUSER.DAT{1c2b59c6-c5f5-11eb-bacb-000d3a96488e}.TMContainer00000000000000000001.regtrans-ms
'Assignment 04_Vaishnavi Nawghare.ipynb'   NTUSER.DAT{1c2b59c6-c5f5-11eb-bacb-000d3a96488e}.TMContainer00000000000000000002.regtrans-ms
'Assignment 15.ipynb'                      ntuser.dat.LOG1
'Assignment 17.ipynb'                      ntuser.dat.LOG2
'Assignment 18.ipynb'                      ntuser.ini
'Assignment 19.ipynb'                     'Numpy [PDS-Practical].ipynb'
'Assignment 20_Rudraksh Karpe.ipynb'       OneDrive
'Assignment 3_Group B.ipynb'               out.zip
'Assignment 3.ipynb'                      'Pandas [PDS-Practical].ipynb'
'Assignment 4.ipynb'                      'PDS Assignment_15.ipynb'
 Basics.ipynb                             'PDS Assignment 16.ipynb'
 battery-report.html                       Postman
 BullseyeCoverageError.txt                 PrintHood
'Clustering Algorithms.ipynb'             'Python Pending Assignments.ipynb'
 Contacts                                  Recent
 Cookies                                  'Saved Games'
 Desktop                                   Searches
 Documents                                 SendTo
 Downloads                                'Start Menu'
'Duplicate Data deletion.ipynb'            _.swp
 Favorites                                 Templates
'GROUP-B_ASSIGNMENT 04.ipynb'              Tracing
'HelloWord to ML.ipynb'                    Untitled1.ipynb
'Hello World to ML part-2.ipynb'           Untitled3.ipynb
 IdeaProjects                              Untitled4.ipynb
 IntelGraphicsProfiles                     Untitled5.ipynb
 keys                                      Untitled6.ipynb
 keys.pub                                  Untitled7.ipynb
 Links                                    'Untitled Folder'
'Local Settings'                          'Untitled Folder 1'
 main.cpp                                  vgsales.csv
```

# Some Modifications of the List command

- To check the hidden files in the directory

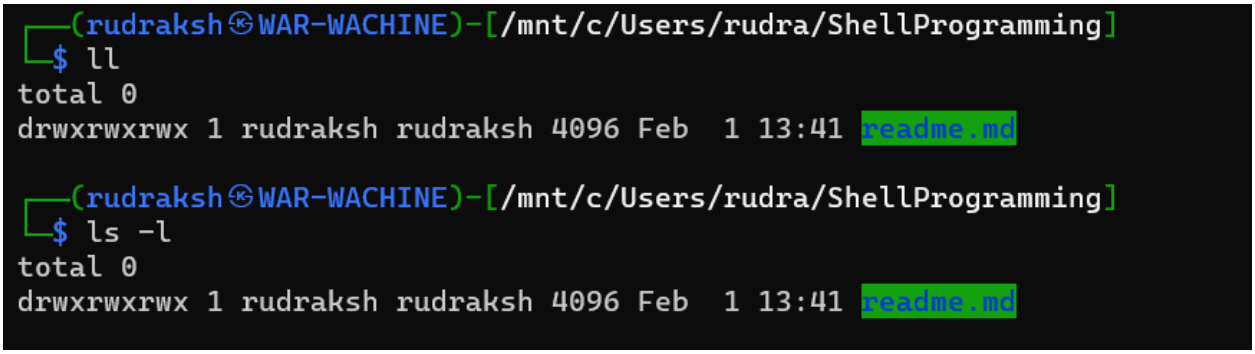
```
ls -a
```

```
┌──(rudraksh㉿WAR-WACHINE)-[/mnt/c/Users/rudra/ShellProgramming]
└─$ ls -a
.  ..  readme.md
```

- To check all the accesses for all the files in the directory

```
ls -l
```

```
ll
```




# Text Editors in the Linux or Unix Terminals

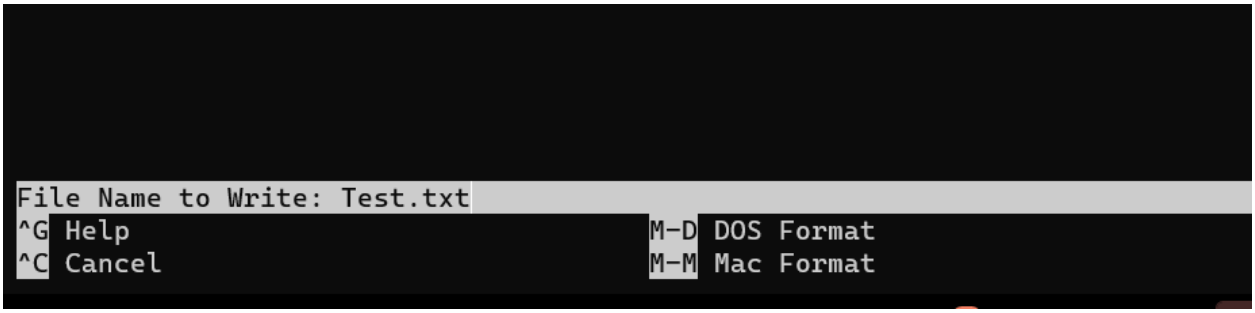
## Nano as a Text editor

- To open files using Nano

```
nano filename
```


# Nano Interface


- Use CTRL + O → To write down the changes




- CTRL + X is used to get out of the NANO interface.

## vim interface


- To open files in vim editor

```
vim filename
```

## NOTE:

- Once you enter the vim editor,  you will not be able to edit directly like nano. You need to press  ‘i’ key to turn on the editor mode.

```
i
```


- To write changes and exit out of vim editor (Most of the people find this part tricky)
  - First get out of edit mode using ESC

```
ESC
```

  - writing changes and exiting

```
:wq
```


Testing vim!
:wq

# Shell Commands Practical 7/02/22

## Name - Rudraksh Karpe  Branch - Computer Engineering

## Roll No.  - SCOB86

## Aim -  Explore and study of TCP/IP untilities and network

## NETSTAT Command

- This command is used to get the networking stats of the computer on which the command is being used

```
netstat
```

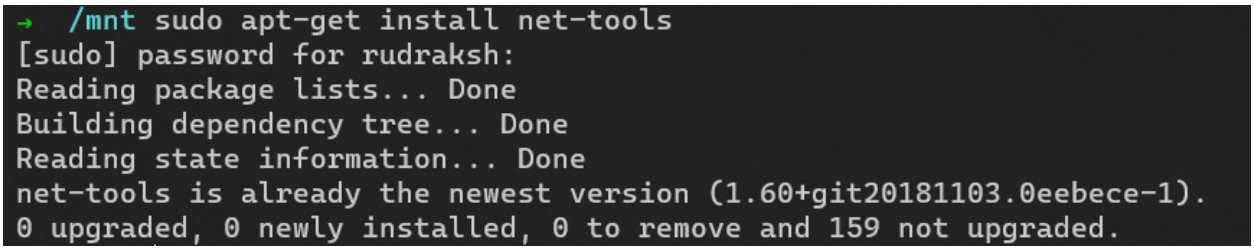
```
→  /mnt netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   Path
```

## Ifconfig command

- Using this command we can get the get the all the ip addresses connected to the computer

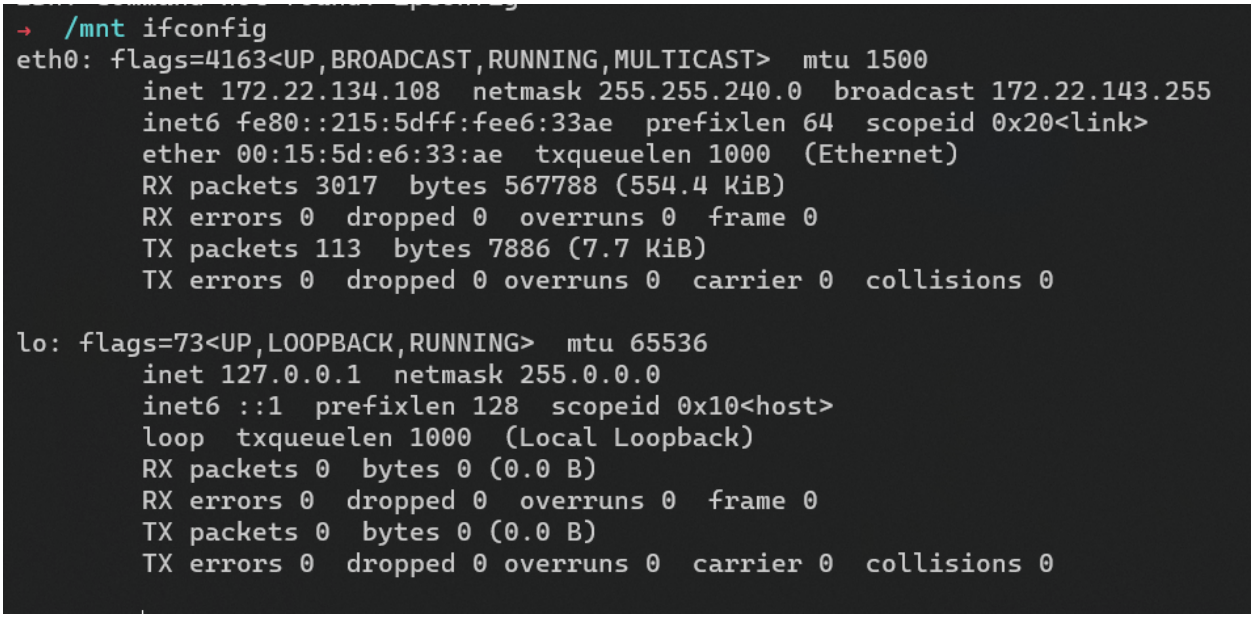
## Step 1 :

```
sudo apt-get install net-tools
```




## Step 2 :

```
ifconfig
```

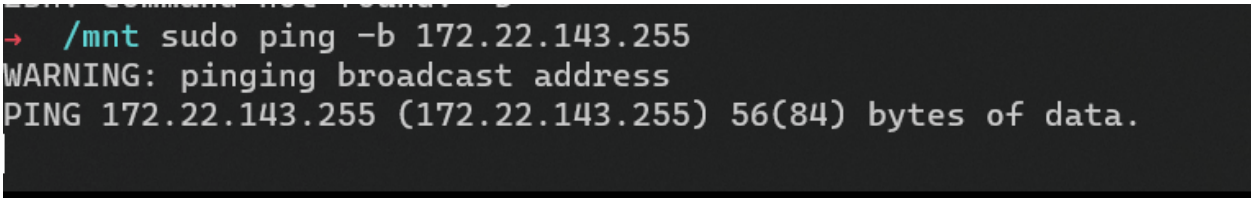


# Ping command

- Ping works by **sending an Internet Control Message Protocol (ICMP) Echo Request to a specified interface on the network and waiting for a reply** . When a ping command is issued, a ping signal is sent to a specified address. When the target host receives the echo request, it responds by sending an echo reply packet

- To run ping command pick any IP address from the ifconfig output and ping it

```
ping YOUR_IP_ADDRESS
```




# Whois command

- In Linux, the whois command line utility is a **WHOIS client** for communicating with the WHOIS server (or database host) which listen to requests on the well-known port number 43, which stores and delivers database content in a human-readable format.
- To run the whois command download the following requirements

# step 1:

```
sudo apt-get update -y
```

```
→  /mnt sudo apt-get update -y
Get:1 http://ftp.harukasan.org/kali kali-rolling InRelease [30.6 kB]
Get:2 http://ftp.harukasan.org/kali kali-rolling/main amd64 Packages [17.9 MB]
Fetched 17.9 MB in 1min 4s (279 kB/s)
Reading package lists... Done
```

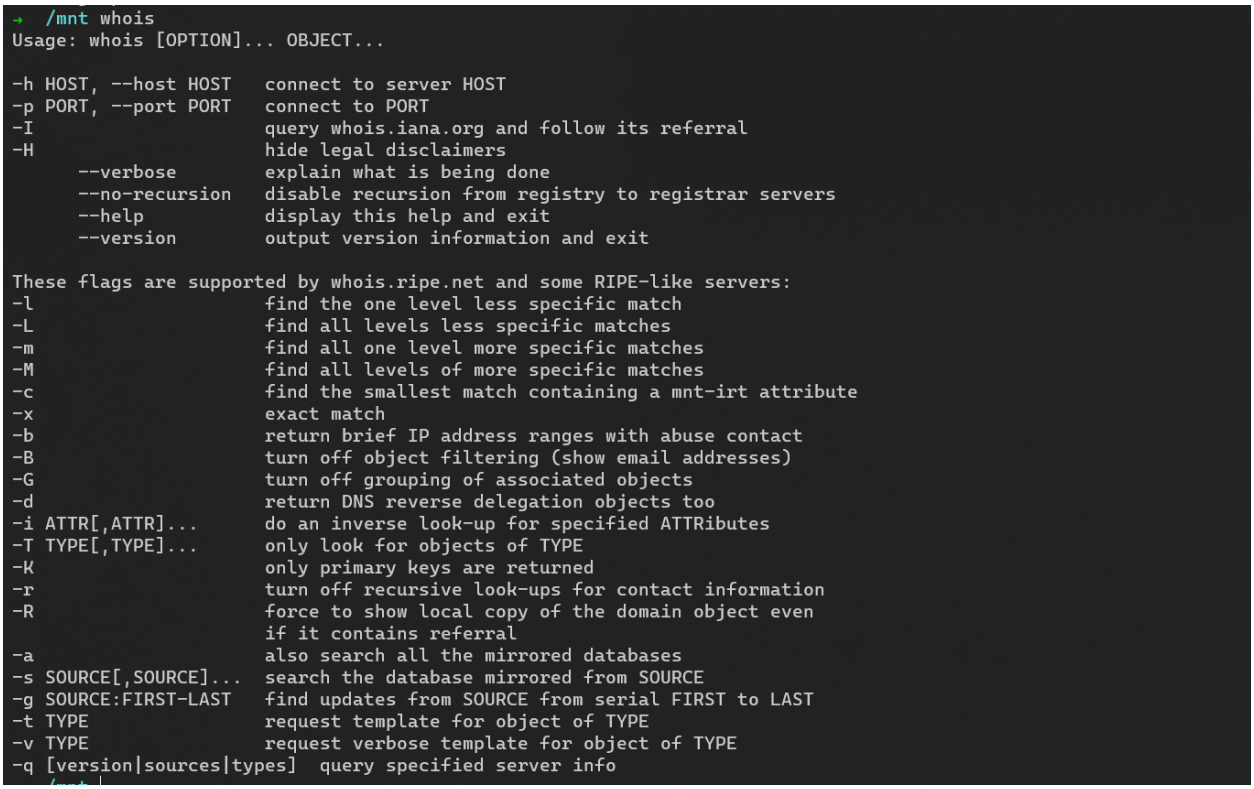
## step 2:

```
sudo apt-get install -y whois
```

```
→  /mnt sudo apt-get install -y whois
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages will be upgraded:
  whois
1 upgraded, 0 newly installed, 0 to remove and 158 not upgraded.
Need to get 81.1 kB of archives.
After this operation, 0 B of additional disk space will be used.
Get:1 http://ftp.harukasan.org/kali kali-rolling/main amd64 whois amd64 5.5.11 [81.1 kB]
Fetched 81.1 kB in 12s (6,782 B/s)
(Reading database ... 22702 files and directories currently installed.)
Preparing to unpack .../whois_5.5.11_amd64.deb ...
Unpacking whois (5.5.11) over (5.5.9) ...
Setting up whois (5.5.11) ...
```

- Now you can run whois command

```
whois
```



```
→  /mnt whois
Usage: whois [OPTION]... OBJECT...

-h HOST, --host HOST   connect to server HOST
-p PORT, --port PORT   connect to PORT
-I                     query whois.iana.org and follow its referral
-H                     hide legal disclaimers
      --verbose        explain what is being done
      --no-recursion   disable recursion from registry to registrar servers
      --help           display this help and exit
      --version        output version information and exit

These flags are supported by whois.ripe.net and some RIPE-like servers:
-l                     find the one level less specific match
-L                     find all levels less specific matches
-m                     find all one level more specific matches
-M                     find all levels of more specific matches
-c                     find the smallest match containing a mnt-irt attribute
-x                     exact match
-b                     return brief IP address ranges with abuse contact
-B                     turn off object filtering (show email addresses)
-G                     turn off grouping of associated objects
-d                     return DNS reverse delegation objects too
-i ATTR[,ATTR]...      do an inverse look-up for specified ATTRibutes
-T TYPE[,TYPE]...      only look for objects of TYPE
-K                     only primary keys are returned
-r                     turn off recursive look-ups for contact information
-R                     force to show local copy of the domain object even
                       if it contains referral
-a                     also search all the mirrored databases
-s SOURCE[,SOURCE]...  search the database mirrored from SOURCE
-g SOURCE:FIRST-LAST   find updates from SOURCE from serial FIRST to LAST
-t TYPE                request template for object of TYPE
-v TYPE                request verbose template for object of TYPE
-q [version|sources|types]  query specified server info
```

# Tracing command

- The tracert command is **a command that's used to show several details about the path that a packet takes from the computer or device you**
  're on to whatever destination you specify.

## Step 1:

```
sudo apt install pvm-dev
```

```
→  /mnt sudo apt install pvm-dev
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  fontconfig-config fonts-dejavu-core libc-dev-bin libc-devtools libc6-dev libcrypt-dev libcrypt1 libdeflate0 libfontconfig1 libfreetype6 libgd3 libjbig0
  libjpeg62-turbo libncurses-dev libncurses6 libncursesw6 libnsl-dev libpam0g libpng16-16 libpvm3 libreadline-dev libreadline8 libtiff5 libtinfo6
  libtirpc-common libtirpc-dev libtirpc3 libwebp6 libxpm4 linux-libc-dev manpages manpages-dev ncurses-bin pvm rpcsvc-proto ucf
Suggested packages:
  glibc-doc libgd-tools ncurses-doc libpam-doc readline-doc man-browser
Recommended packages:
  libgpm2
The following NEW packages will be installed:
  fontconfig-config fonts-dejavu-core libc-dev-bin libc-devtools libc6-dev libcrypt-dev libdeflate0 libfontconfig1 libfreetype6 libgd3 libjbig0
  libjpeg62-turbo libncurses-dev libnsl-dev libpng16-16 libpvm3 libreadline-dev libtiff5 libtirpc-dev libwebp6 libxpm4 linux-libc-dev manpages
  manpages-dev pvm pvm-dev rpcsvc-proto ucf
The following packages will be upgraded:
  libcrypt1 libncurses6 libncursesw6 libpam0g libreadline8 libtinfo6 libtirpc-common libtirpc3 ncurses-bin
9 upgraded, 28 newly installed, 0 to remove and 149 not upgraded.
Need to get 15.1 MB of archives.
After this operation, 42.5 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

- Press Y to say Yes

```
  glibc-doc libgd-tools ncurses-doc libpam-doc readline-doc man-browser
Recommended packages:
  libgpm2
The following NEW packages will be installed:
  fontconfig-config fonts-dejavu-core libc-dev-bin libc-devtools libc6-dev libcrypt-dev libdeflate0 libfontconfig1 libfreetype6 libgd3 libjbig0
  libjpeg62-turbo libncurses-dev libnsl-dev libpng16-16 libpvm3 libreadline-dev libtiff5 libtirpc-dev libwebp6 libxpm4 linux-libc-dev manpages
  manpages-dev pvm pvm-dev rpcsvc-proto ucf
The following packages will be upgraded:
  libcrypt1 libncurses6 libncursesw6 libpam0g libreadline8 libtinfo6 libtirpc-common libtirpc3 ncurses-bin
9 upgraded, 28 newly installed, 0 to remove and 149 not upgraded.
Need to get 15.1 MB of archives.
After this operation, 42.5 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://ftp.harukasan.org/kali kali-rolling/main amd64 libncurses6 amd64 6.3-2 [102 kB]
Get:2 http://ftp.harukasan.org/kali kali-rolling/main amd64 libncursesw6 amd64 6.3-2 [133 kB]
Get:3 http://ftp.harukasan.org/kali kali-rolling/main amd64 libtinfo6 amd64 6.3-2 [349 kB]
Get:4 http://ftp.harukasan.org/kali kali-rolling/main amd64 ncurses-bin amd64 6.3-2 [439 kB]
Get:5 http://ftp.harukasan.org/kali kali-rolling/main amd64 libpam0g amd64 1.4.0-11 [130 kB]
Get:6 http://ftp.harukasan.org/kali kali-rolling/main amd64 libcrypt1 amd64 1:4.4.27-1.1 [89.0 kB]
Get:7 http://ftp.harukasan.org/kali kali-rolling/main amd64 libtirpc-common all 1.3.2-2 [13.8 kB]
Get:8 http://ftp.harukasan.org/kali kali-rolling/main amd64 libtirpc3 amd64 1.3.2-2 [83.9 kB]
Get:9 http://ftp.harukasan.org/kali kali-rolling/main amd64 libreadline8 amd64 8.1.2-1 [168 kB]
Get:10 http://ftp.harukasan.org/kali kali-rolling/main amd64 manpages all 5.10-1 [1,412 kB]
Get:11 http://ftp.harukasan.org/kali kali-rolling/main amd64 ucf all 3.0043 [74.0 kB]
Get:12 http://ftp.harukasan.org/kali kali-rolling/main amd64 fonts-dejavu-core all 2.37-2 [1,069 kB]
Get:13 http://ftp.harukasan.org/kali kali-rolling/main amd64 fontconfig-config all 2.13.1-4.3 [281 kB]
Get:14 http://ftp.harukasan.org/kali kali-rolling/main amd64 libc-dev-bin amd64 2.33-1 [242 kB]
Get:15 http://ftp.harukasan.org/kali kali-rolling/main amd64 libpng16-16 amd64 1.6.37-3 [294 kB]
Get:16 http://ftp.harukasan.org/kali kali-rolling/main amd64 libfreetype6 amd64 2.11.1+dfsg-1 [400 kB]
Get:17 http://ftp.harukasan.org/kali kali-rolling/main amd64 libfontconfig1 amd64 2.13.1-4.3 [350 kB]
Get:18 http://ftp.harukasan.org/kali kali-rolling/main amd64 libjpeg62-turbo amd64 1:2.1.2-1 [164 kB]
Get:19 http://ftp.harukasan.org/kali kali-rolling/main amd64 libdeflate0 amd64 1.8-1 [53.1 kB]
Get:20 http://ftp.harukasan.org/kali kali-rolling/main amd64 libjbig0 amd64 2.1-3.1+b2 [31.0 kB]
Get:21 http://ftp.harukasan.org/kali kali-rolling/main amd64 libwebp6 amd64 0.6.1-2.1 [258 kB]
Get:22 http://ftp.harukasan.org/kali kali-rolling/main amd64 libtiff5 amd64 4.3.0-3 [295 kB]
Get:23 http://ftp.harukasan.org/kali kali-rolling/main amd64 libxpm4 amd64 1:3.5.12-1 [49.1 kB]
Get:24 http://ftp.harukasan.org/kali kali-rolling/main amd64 libgd3 amd64 2.3.0-2 [137 kB]
Get:25 http://ftp.harukasan.org/kali kali-rolling/main amd64 libc-devtools amd64 2.33-1 [250 kB]
Get:26 http://ftp.harukasan.org/kali kali-rolling/main amd64 linux-libc-dev amd64 5.15.15-2kali1 [2,202 kB]
53% [26 linux-libc-dev 592 kB/2,202 kB 27%]                                                                    361 kB/s 21s
```

## Step 2:

```
tracer
```

- Now you can run trace command acordingly

```
→  /mnt tracer
libpvm [pid1058] /tmp/pvmd.1000: No such file or directory
libpvm [pid1058] /tmp/pvmd.1000: No such file or directory
libpvm [pid1058] /tmp/pvmd.1000: No such file or directory
libpvm [pid1058]: pvm_mytid(): Can't contact local daemon
libpvm [pid1058]: Error Joining PVM: Can't contact local daemon
```

# ARP Command

- arp command manipulates the System's ARP cache. It also allows a complete dump of the ARP cache. ARP stands for **Address Resolution Protocol** . The primary function of this protocol is to resolve the IP address of a system to its mac address, and hence it works between level 2(Data link layer) and level 3(Network layer).

```
arp
```

```
→  /mnt arp
Address                  HWtype  HWaddress           Flags Mask            Iface
WAR-WACHINE.mshome.net   ether   00:15:5d:e6:3c:08   C                     eth0
```