WINTER – SEMESTER
Course Code: MCSE505P
Course-Title: – Computer Network Lab Component
DIGITAL ASSIGNMENT - 1
(LAB)

Slot- L35+L36

Faculty: - SRIMATHI C (SCOPE)

Name: Nidhi Singh
Reg. No: 22MAI0015

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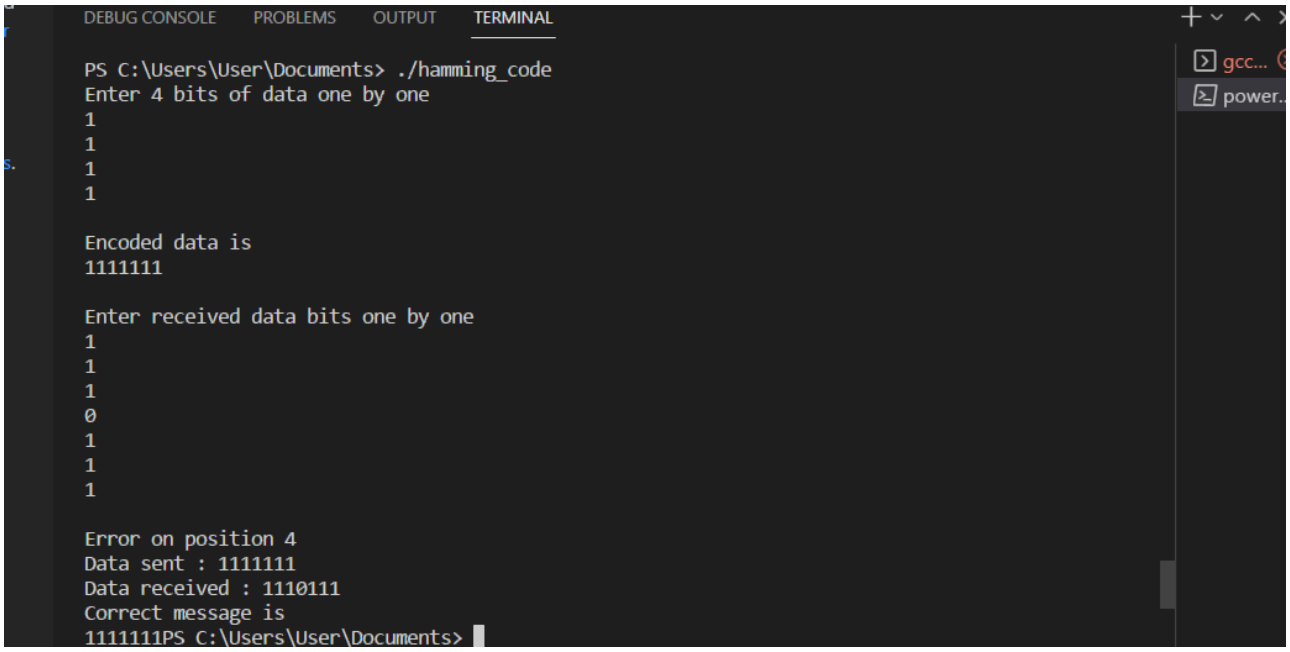
1. Implementation of Hamming code in c for 1 bit error detection.

Code :-

```
#include<stdio.h>

void main() {
    int data[10];
    int dataatrec[10],c,c1,c2,c3,i;

    printf("Enter 4 bits of data one by one\n");
    scanf("%d",&data[0]);
    scanf("%d",&data[1]);
    scanf("%d",&data[2]);
    scanf("%d",&data[4]);

    data[6]=data[0]^data[2]^data[4];
data[5]=data[0]^data[1]^data[4];
data[3]=data[0]^data[1]^data[2];

printf("\nEncoded data is\n");
for(i=0;i<7;i++)
        printf("%d",data[i]);

    printf("\n\nEnter received data bits one by one\n");
    for(i=0;i<7;i++)
        scanf("%d",&dataatrec[i]);

    c1=dataatrec[6]^dataatrec[4]^dataatrec[2]^dataatrec[0];
c2=dataatrec[5]^dataatrec[4]^dataatrec[1]^dataatrec[0];
c3=dataatrec[3]^dataatrec[2]^dataatrec[1]^dataatrec[0];
c=c3*4+c2*2+c1 ;

    if(c==0) {
printf("\nNo error while transmission of data\n");
    }
else {
printf("\nError on position %d",c);

printf("\nData sent : ");
```

```
        for(i=0;i<7;i++)
         printf("%d",data[i]);

printf("\nData received : ");
        for(i=0;i<7;i++)
         printf("%d",dataatrec[i]);
printf("\nCorrect message is\n");

if(dataatrec[7-c]==0)
dataatrec[7-c]=1;
        else
dataatrec[7-c]=0;
for (i=0;i<7;i++) {
printf("%d",dataatrec[i]);
}
}
}
```

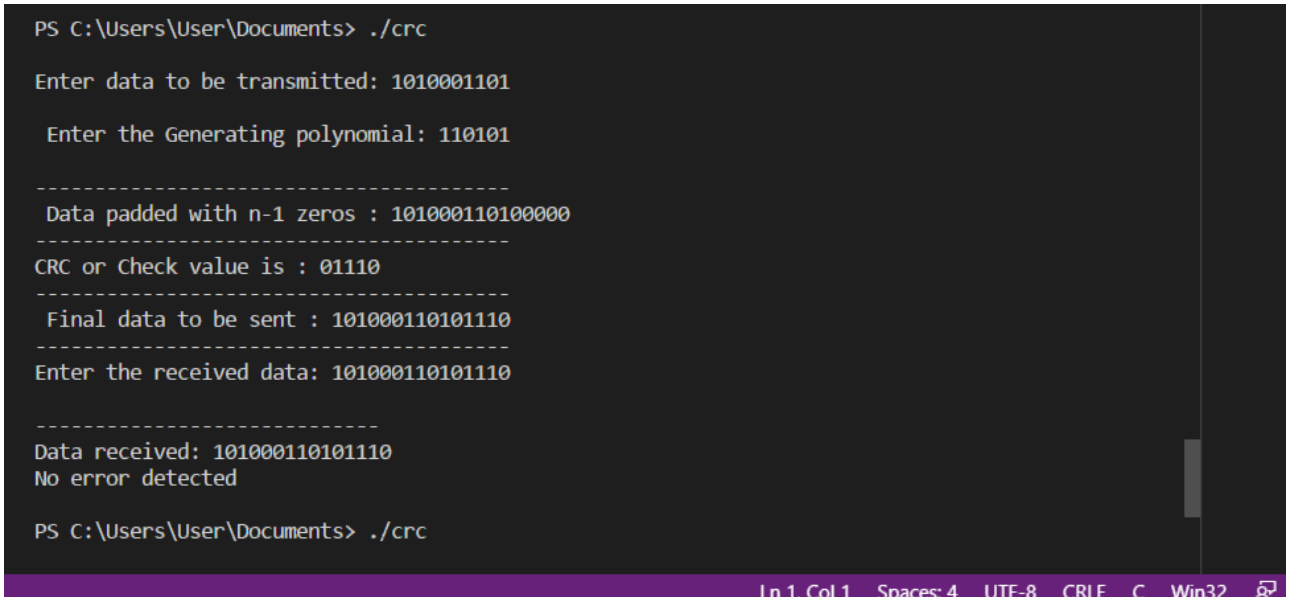
Output :-

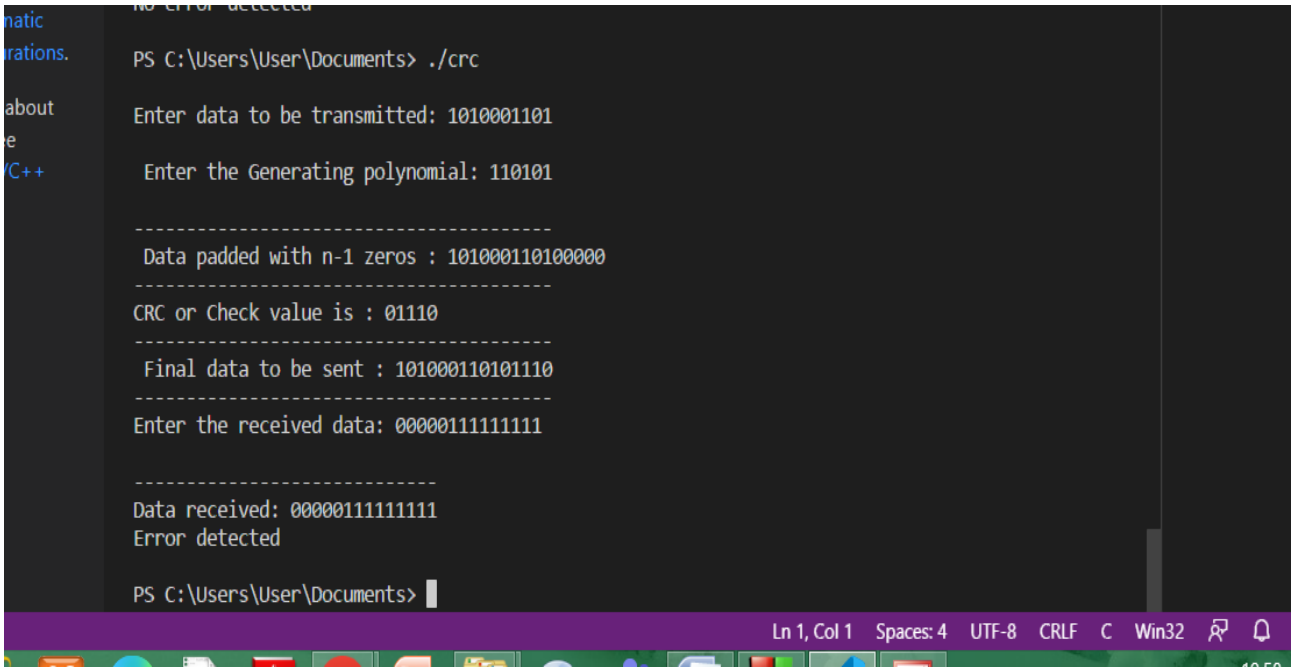


2. Implementation of checksum in c for error detection(one or more than one bit).

```c
#include<stdio.h>
#include<string.h>
#define N strlen(gen_poly)
char data[28];
char check_value[28];
char gen_poly[10];
int data_length,i,j;
void XOR(){
    for(j = 1;j < N; j++)
    check_value[j] = (( check_value[j] == gen_poly[j])?'0':'1');
}
 void receiver(){
    printf("Enter the received data: ");
    scanf("%s", data);
    printf("\n-----------------------------\n");
    printf("Data received: %s", data);
     crc();
     for(i=0;(i<N-1) && (check_value[i]!='1');i++);
        if(i<N-1)
            printf("\nError detected\n\n");
        else
            printf("\nNo error detected\n\n");
}
void crc(){
     for(i=0;i<N;i++)
        check_value[i]=data[i];
    do{
         if(check_value[0]=='1')
            XOR();
         for(j=0;j<N-1;j++)
            check_value[j]=check_value[j+1];
         check_value[j]=data[i++];
    }while(i<=data_length+N-1);
}
int main()
{
    printf("\nEnter data to be transmitted: ");
    scanf("%s",data);
    printf("\n Enter the Generating polynomial: ");
    scanf("%s",gen_poly);
    data_length=strlen(data);
    for(i=data_length;i<data_length+N-1;i++)
        data[i]='0';
    printf("\n----------------------------------------");
    printf("\n Data padded with n-1 zeros : %s",data);
    printf("\n----------------------------------------");
    crc();
    printf("\nCRC or Check value is : %s",check_value);
    for(i=data_length;i<data_length+N-1;i++)
        data[i]=check_value[i-data_length];
    printf("\n----------------------------------------");
    printf("\n Final data to be sent : %s",data);
    printf("\n----------------------------------------\n");
    receiver();
        return 0;
}
```

Output :-


PS C:\Users\User\Documents> ./crc
Enter data to be transmitted: 1010001101
Enter the Generating polynomial: 110101
Data padded with n-1 zeros : 101000110100000
CRC or Check value is : 01110
Final data to be sent : 101000110101110
Enter the received data: 101000110101110
Data received: 101000110101110
No error detected
PS C:\Users\User\Documents> ./crc
Ln 1, Col 1 Spaces: 4 UTF-8 CRLF C Win32


PS C:\Users\User\Documents> ./crc
Enter data to be transmitted: 1010001101
Enter the Generating polynomial: 110101
Data padded with n-1 zeros : 101000110100000
CRC or Check value is : 01110
Final data to be sent : 101000110101110
Enter the received data: 00000111111111
Data received: 00000111111111
Error detected
PS C:\Users\User\Documents>
Ln 1, Col 1 Spaces: 4 UTF-8 CRLF C Win32

1. PING

• PING (Packet INternet Groper) command is the best way to test connectivity between two nodes. Whether it is Local Area Network (LAN) or Wide Area Network (WAN).

• Ping use ICMP (Internet Control Message Protocol) to communicate to other devices. You can ping host name or ip address using below command.

Syntax:

ping ipAddress or hostname

1. **ping www.vit.ac.in**

Output:

```
matlab@sjt517scope011:~$ ping www.vit.ac.in
PING vit.ac.in (10.10.7.35) 56(84) bytes of data.
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=1 ttl=252 time=0.800 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=2 ttl=252 time=0.651 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=3 ttl=252 time=0.549 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=4 ttl=252 time=0.431 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=5 ttl=252 time=0.637 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=6 ttl=252 time=0.536 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=7 ttl=252 time=0.490 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=8 ttl=252 time=0.391 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=9 ttl=252 time=0.524 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=10 ttl=252 time=0.528 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=11 ttl=252 time=0.457 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=12 ttl=252 time=0.417 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=13 ttl=252 time=0.378 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=14 ttl=252 time=0.474 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=15 ttl=252 time=0.472 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=16 ttl=252 time=0.677 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=17 ttl=252 time=0.429 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=18 ttl=252 time=0.768 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=19 ttl=252 time=0.510 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=20 ttl=252 time=0.634 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=21 ttl=252 time=0.626 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=22 ttl=252 time=0.633 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=23 ttl=252 time=0.554 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=24 ttl=252 time=0.450 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=25 ttl=252 time=0.447 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=26 ttl=252 time=0.622 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=27 ttl=252 time=0.631 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=28 ttl=252 time=0.516 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=29 ttl=252 time=0.400 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=31 ttl=252 time=0.463 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=32 ttl=252 time=0.508 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=33 ttl=252 time=0.455 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=34 ttl=252 time=0.492 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=35 ttl=252 time=0.484 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=36 ttl=252 time=0.630 ms
64 bytes from vit.ac.in (10.10.7.35): icmp_seq=37 ttl=252 time=0.412 ms
```

2. ping www.archive.org

```
matlab@sjt517scope011:~$ ping www.archive.org
PING www.archive.org (207.241.224.2) 56(84) bytes of data.
^C
--- www.archive.org ping statistics ---
553 packets transmitted, 0 received, 100% packet loss, time 565232ms

matlab@sjt517scope011:~$
```

3. ping www.tecmint.com

```
matlab@sjt517scope011:~$ ping www.tecmint.com
PING www.tecmint.com (104.26.2.23) 56(84) bytes of data.

^C
--- www.tecmint.com ping statistics ---
8 packets transmitted, 0 received, 100% packet loss, time 7165ms

matlab@sjt517scope011:~$
```

4.ping www.facebook.com

```
C:\Windows\system32>ping www.facebook.com

Pinging star-mini.c10r.facebook.com [157.240.192.35] with 32 bytes of data:
Reply from 157.240.192.35: bytes=32 time=5ms TTL=56
Reply from 157.240.192.35: bytes=32 time=6ms TTL=56
Reply from 157.240.192.35: bytes=32 time=5ms TTL=56
Reply from 157.240.192.35: bytes=32 time=5ms TTL=56

Ping statistics for 157.240.192.35:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 5ms, Maximum = 6ms, Average = 5ms

C:\Windows\system32>
```

5. ping www.academicearth.org

```
C:\Windows\system32>ping www.academicearth.org

Pinging www.academicearth.org [23.185.0.4] with 32 bytes of data:
Reply from 23.185.0.4: bytes=32 time=43ms TTL=58
Reply from 23.185.0.4: bytes=32 time=63ms TTL=58
Reply from 23.185.0.4: bytes=32 time=43ms TTL=58
Reply from 23.185.0.4: bytes=32 time=42ms TTL=58

Ping statistics for 23.185.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 42ms, Maximum = 63ms, Average = 47ms

C:\Windows\system32>
```

PING (**Packet INternet Groper**) command is the best way to test connectivity between **two nodes**. Whether it is **Local Area Network** (**LAN**) or **Wide Area Network** (**WAN**). Ping use**ICMP** (**Internet Control Message Protocol**) to communicate to other devices. You can ping host name of **ip address** using below command.

 # ping 4.2.2.2

```
matlab@sjt517scope011:~$ ping 4.2.2.2
PING 4.2.2.2 (4.2.2.2) 56(84) bytes of data.
^C
--- 4.2.2.2 ping statistics ---
16 packets transmitted, 0 received, 100% packet loss, time 15362ms

matlab@sjt517scope011:~$
```

2. NETSTAT

• Netstat (Network Statistic) command display connection info, routing table information etc. To displays routing table information use option as -r.
• It works with the LINUX Network Subsystem, it will tell us what the status of ports are ie. open, closed, waiting connections.

Syntax : netstat

Eg : netstat

Output:

```
matlab@sjt517scope011:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 sjt517scope011:40138    e2a.google.com:https    ESTABLISHED
tcp        0      0 sjt517scope011:37448    bom07s37-in-f14.1:https TIME_WAIT
tcp        0      0 sjt517scope011:49722    VITCTS-BDC.VITUNIV:ldap FIN_WAIT2
tcp        0      0 sjt517scope011:38702    sf-in-f188.1e100.:https ESTABLISHED
tcp        0      0 sjt517scope011:48004    ADC-SCOPE.VITUNI:domain TIME_WAIT
tcp        0      0 sjt517scope011:47696    ADC-SCOPE.VITUNI:domain ESTABLISHED
tcp        0      0 sjt517scope011:55944    sf-in-f100.1e100.:https ESTABLISHED
tcp        0      0 sjt517scope011:34231    relay-3e92535d.net:http ESTABLISHED
tcp        0      0 sjt517scope011:53078    216.239.36.180:https    ESTABLISHED
tcp        0      0 sjt517scope011:59428    bom07s45-in-f5.1e:https ESTABLISHED
tcp        0      0 sjt517scope011:59176    bom07s32-in-f14.1:https ESTABLISHED
tcp        0      0 sjt517scope011:46902    bom12s07-in-f10.1:https ESTABLISHED
tcp        0      0 sjt517scope011:38632    10.110.2.11:ldap        FIN_WAIT2
tcp        0      0 sjt517scope011:39650    10.40.2.216:ldap        FIN_WAIT2
tcp        0      0 sjt517scope011:36658    bom12s14-in-f14.1:https ESTABLISHED
tcp        0      0 sjt517scope011:40378    bom07s30-in-f3.1e:https ESTABLISHED
tcp        0      0 sjt517scope011:56082    ADC-SCOPE.VITUNI:domain TIME_WAIT
tcp        0      0 sjt517scope011:39646    10.40.2.216:ldap        FIN_WAIT2
tcp        0      0 sjt517scope011:40932    smbs-adc.vituniver:ldap FIN_WAIT2
tcp        0      0 sjt517scope011:49076    10.40.2.216:ldap        FIN_WAIT2
tcp        0      0 sjt517scope011:36338    bom07s25-in-f3.1e:https ESTABLISHED
tcp       24      0 sjt517scope011:38268    47.241.90.34.bc.g:https ESTABLISHED
tcp        0      0 sjt517scope011:40326    10.50.2.218:ldap        FIN_WAIT2
tcp        0      0 sjt517scope011:35972    bom12s16-in-f14.1:https ESTABLISHED
tcp        0      0 sjt517scope011:44976    bom07s35-in-f2.1e:https ESTABLISHED
tcp        0      0 sjt517scope011:34198    bom07s36-in-f2.1e:https ESTABLISHED
tcp        0      0 sjt517scope011:46908    bom12s07-in-f10.1:https ESTABLISHED
tcp        0      0 sjt517scope011:45790    bom07s35-in-f3.1e:https ESTABLISHED
tcp        0      0 sjt517scope011:57634    bom12s17-in-f14.1:https ESTABLISHED
tcp        0      0 sjt517scope011:36572    216.239.34.117:https    ESTABLISHED
tcp        0      0 sjt517scope011:41278    bom07s29-in-f4.1e:https ESTABLISHED
tcp        0      0 sjt517scope011:56906    bom07s18-in-f3.1e:https ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  2      [ ]         DGRAM                    41520    /var/lib/samba/private/msg.sock/1862
unix  2      [ ]         DGRAM                    51923    /run/user/1001/systemd/notify
unix  4      [ ]         DGRAM                    27797    /run/systemd/notify
```

```
unix  3      [ ]         STREAM     CONNECTED     92771    @/tmp/.X11-unix/X0
unix  3      [ ]         STREAM     CONNECTED     99705
unix  3      [ ]         STREAM     CONNECTED     54829
unix  3      [ ]         STREAM     CONNECTED     45571    @/tmp/dbus-kCBpnnZtPM
unix  3      [ ]         STREAM     CONNECTED     52603    @/tmp/.ICE-unix/2786
unix  3      [ ]         STREAM     CONNECTED     42534
unix  3      [ ]         STREAM     CONNECTED     45813    /run/user/1001/bus
unix  3      [ ]         STREAM     CONNECTED     42779    /run/user/1001/bus
unix  3      [ ]         DGRAM                    52399
unix  3      [ ]         DGRAM                    51925
unix  3      [ ]         STREAM     CONNECTED     98881
unix  3      [ ]         STREAM     CONNECTED     93270    /run/user/1001/bus
unix  3      [ ]         STREAM     CONNECTED     60791
unix  3      [ ]         STREAM     CONNECTED     64543    /run/user/1001/bus
unix  3      [ ]         STREAM     CONNECTED     96297    /run/user/1001/pulse/native
unix  3      [ ]         STREAM     CONNECTED     41531
unix  3      [ ]         DGRAM                    16773
unix  3      [ ]         STREAM     CONNECTED     78804
unix  3      [ ]         STREAM     CONNECTED     50906
unix  3      [ ]         STREAM     CONNECTED     54876
unix  3      [ ]         STREAM     CONNECTED     64542
unix  3      [ ]         STREAM     CONNECTED     42690
unix  3      [ ]         STREAM     CONNECTED     44323    /run/systemd/journal/stdout
matlab@sjt517scope011:~$
```

For routing table:
Netstat (**Network Statistic**) command display connection info, routing table information etc. To displays routing table information use option as **-r**.

Syntax : netstat -r
Eg : netstat -r
Output:

```
matlab@sjt517scope011:~$ netstat -r
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window  irtt Iface
default         _gateway        0.0.0.0         UG        0 0          0 eno1
10.30.162.0     0.0.0.0         255.255.255.0   U         0 0          0 eno1
link-local      0.0.0.0         255.255.0.0     U         0 0          0 eno1
172.17.0.0      0.0.0.0         255.255.0.0     U         0 0          0 docker0
matlab@sjt517scope011:~$
```

3. Hostname

Tells the user the host name of the computer they are logged into.
Syntax : hostname
E.g : hostname

Output:-

```
matlab@sjt517scope011:~$ hostname
sjt517scope011
matlab@sjt517scope011:~$
```

4. Traceroute

Network troubleshooting utility which shows number of hops taken to reach destination also determine packets travelling path.

syntax: traceroute machineName
e.g. traceroute www.vit.ac.in

Each host will be displayed, along with the response times at each host.
1. traceroute www.vit.ac.in

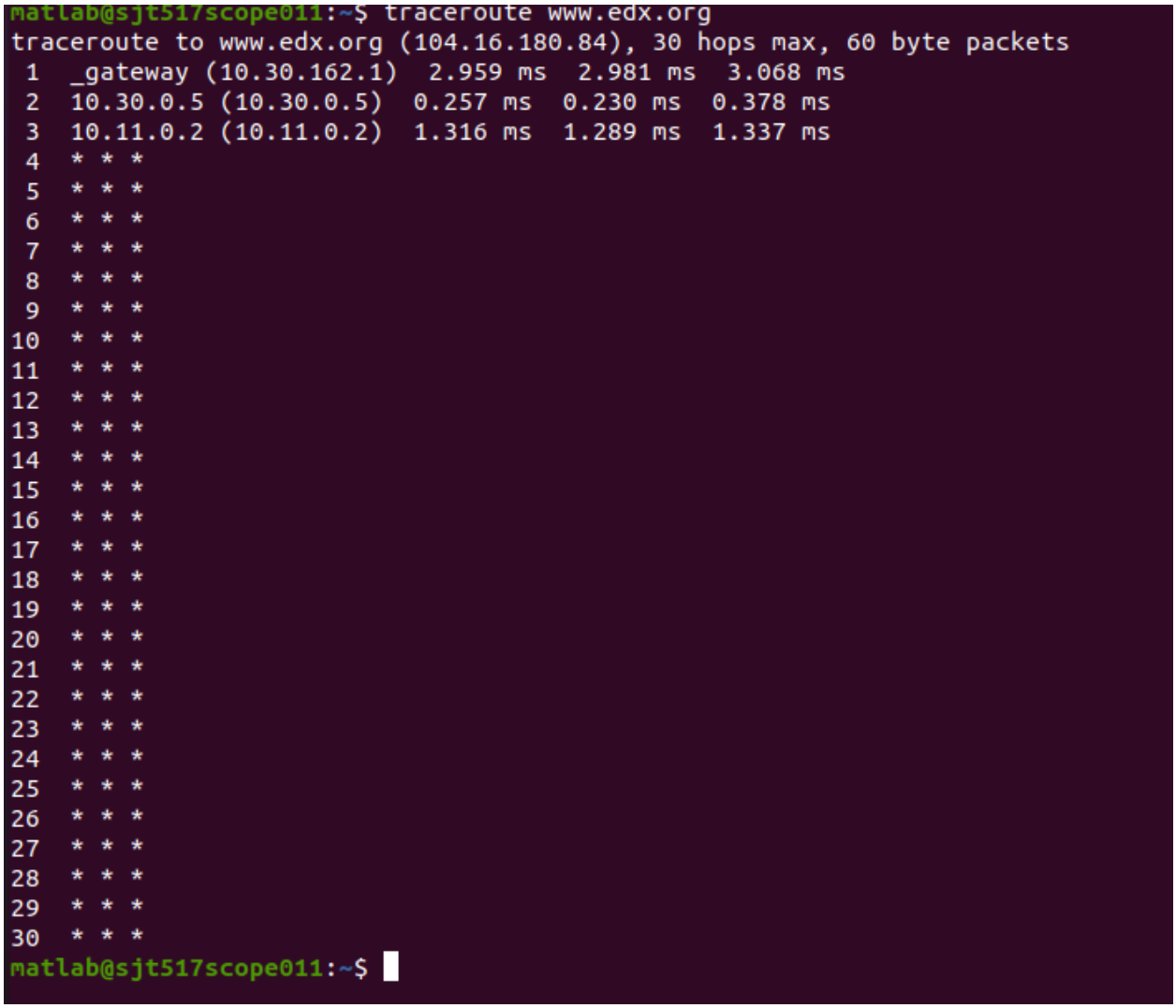
Output :

```
matlab@sjt517scope011:~$ traceroute www.vit.ac.in
traceroute to www.vit.ac.in (10.10.7.35), 30 hops max, 60 byte packets
 1  _gateway (10.30.162.1)  1.502 ms  1.574 ms  1.728 ms
 2  10.30.0.5 (10.30.0.5)  0.312 ms  0.305 ms  0.397 ms
 3  10.11.0.2 (10.11.0.2)  1.623 ms  1.532 ms  1.686 ms
 4  10.10.7.201 (10.10.7.201)  1.262 ms  1.010 ms  1.005 ms
 5  10.10.7.201 (10.10.7.201)  0.999 ms  1.081 ms  1.237 ms
matlab@sjt517scope011:~$
```

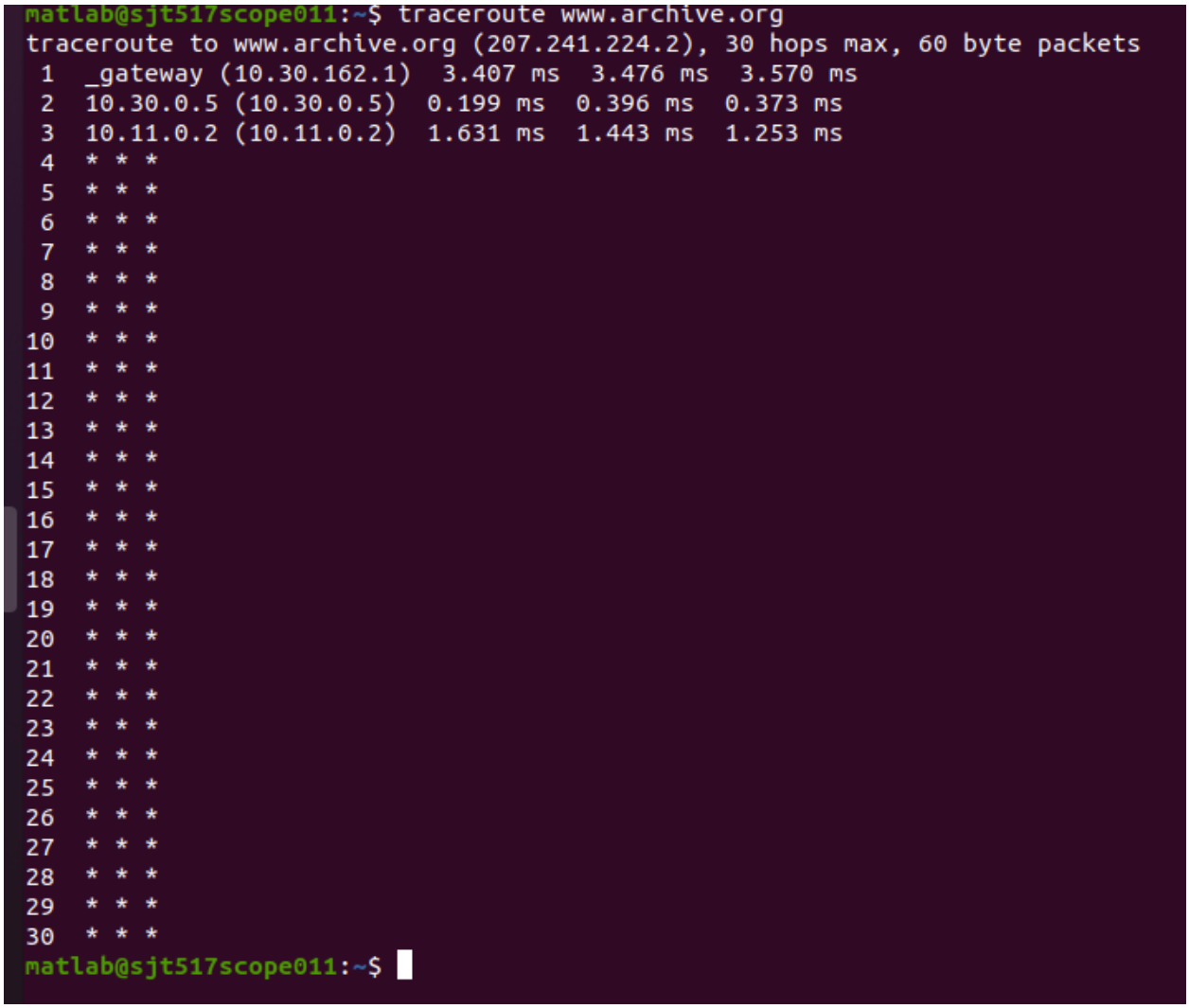
2. traceroute www.bigthink.com

```
matlab@sjt517scope011:~$ traceroute www.bigthink.com
traceroute to www.bigthink.com (104.22.58.144), 30 hops max, 60 byte packets
 1  _gateway (10.30.162.1)  8.274 ms  8.223 ms  8.281 ms
 2  10.30.0.5 (10.30.0.5)  0.971 ms  0.949 ms  0.928 ms
 3  10.11.0.2 (10.11.0.2)  1.192 ms  2.642 ms  1.151 ms
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
matlab@sjt517scope011:~$
```

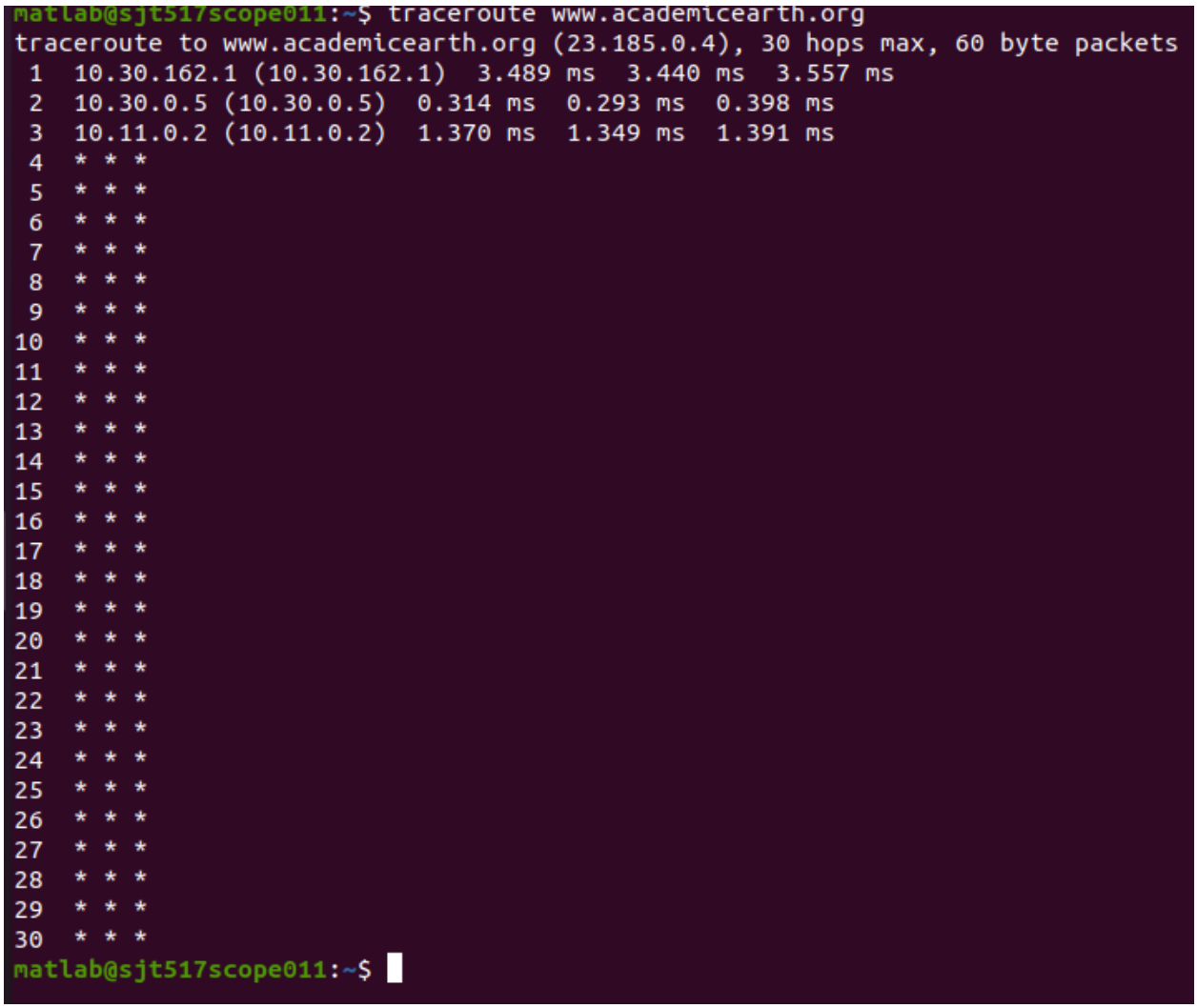
3. traceroute www.edx.org



4. traceroute www.archive.org

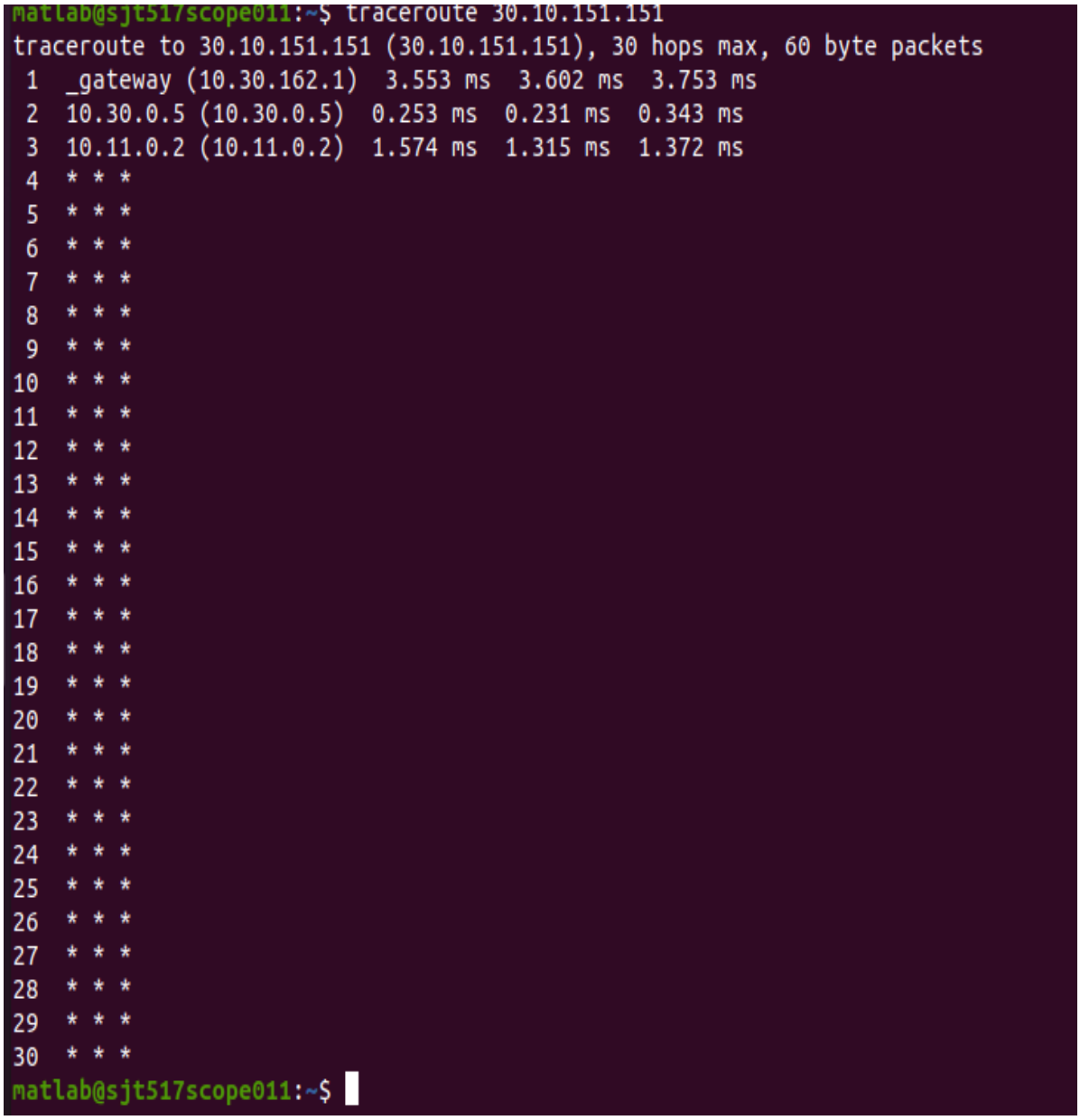


5. traceroute www.academicearth.org



traceroute is a network troubleshooting utility which shows number of hops taken to reach destination also determine packets traveling path. Below we are tracing route to global **DNS server IP Address** and able to reach destination also shows path of that packet is traveling.

 # traceroute 4.2.2.2



5. ifconfig (In Windows use ipconfig)

ifconfig (interface configurator) command is use to initialize an interface, assign IP Address to interface and enable or disable interface on demand.

Syntax : ifconfig
Eg. Ifconfig

Output :

```
matlab@sjt517scope011:~$ ifconfig
docker0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 172.17.0.1  netmask 255.255.0.0  broadcast 172.17.255.255
        ether 02:42:30:24:92:d0  txqueuelen 0  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

eno1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.30.162.21  netmask 255.255.255.0  broadcast 10.30.162.255
        inet6 fe80::208b:663f:c5ce:b296  prefixlen 64  scopeid 0x20<link>
        inet6 fe80::d4e7:c878:b01e:1119  prefixlen 64  scopeid 0x20<link>
        inet6 fe80::c3fc:5475:757c:f2e5  prefixlen 64  scopeid 0x20<link>
        ether c8:d9:d2:32:df:3d  txqueuelen 1000  (Ethernet)
        RX packets 136800  bytes 76305234 (76.3 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 78241  bytes 12842980 (12.8 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
        device interrupt 16  memory 0xe3100000-e3120000

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 37549  bytes 3261457 (3.2 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 37549  bytes 3261457 (3.2 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

matlab@sjt517scope011:~$
```

ifconfig with interface (**eth0**) command only shows specific interface details like **IP Address**, **MAC Address** etc. with **-a** options will display all available interface details if it is disable also.

```
# ifconfig eth0
```

```
        TX packets 26893  bytes 2320095 (2.3 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

matlab@sjt517scope027:~$ ifconfig eth0
eth0: error fetching interface information: Device not found
matlab@sjt517scope027:~$
```

6. dig

The "domain information groper" tool. If a hostname is given as an argument, it outputs information about that host, including it's IP address, hostname and various other information.

Syntax : dig

e.g : dig vitlinux

Output :

```
matlab@sjt517scope011:~$ dig

; <<>> DiG 9.16.1-Ubuntu <<>>
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 56506
;; flags: qr rd ra; QUERY: 1, ANSWER: 13, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;.                              IN      NS

;; ANSWER SECTION:
.                       86400   IN      NS      a.root-servers.net.
.                       86400   IN      NS      b.root-servers.net.
.                       86400   IN      NS      c.root-servers.net.
.                       86400   IN      NS      d.root-servers.net.
.                       86400   IN      NS      e.root-servers.net.
.                       86400   IN      NS      f.root-servers.net.
.                       86400   IN      NS      g.root-servers.net.
.                       86400   IN      NS      h.root-servers.net.
.                       86400   IN      NS      i.root-servers.net.
.                       86400   IN      NS      j.root-servers.net.
.                       86400   IN      NS      k.root-servers.net.
.                       86400   IN      NS      l.root-servers.net.
.                       86400   IN      NS      m.root-servers.net.

;; Query time: 27 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Mon Mar 06 09:03:09 IST 2023
;; MSG SIZE  rcvd: 239
```

7. NSLOOKUP

nslookup nslookup returns the ipaddress of the given hostname and vice versa.

Syntax : nslookup domainname or ipaddress
e.g nslookup www.vit.ac.in

Output:-

```
matlab@sjt517scope011:~$ nslookup www.vit.ac.in
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
www.vit.ac.in   canonical name = vit.ac.in.
Name:   vit.ac.in
Address: 10.10.7.35

matlab@sjt517scope011:~$
```

```
matlab@sjt517scope011:~$ nslookup www.twitter.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
www.twitter.com canonical name = twitter.com.
Name:   twitter.com
Address: 104.244.42.193

matlab@sjt517scope011:~$
```

```
matlab@sjt517scope011:~$ nslookup www.edx.org
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
www.edx.org     canonical name = www.edx.org.cdn.cloudflare.net.
Name:   www.edx.org.cdn.cloudflare.net
Address: 104.16.181.84
Name:   www.edx.org.cdn.cloudflare.net
Address: 104.16.180.84
Name:   www.edx.org.cdn.cloudflare.net
Address: 104.16.179.84
Name:   www.edx.org.cdn.cloudflare.net
Address: 104.16.178.84
Name:   www.edx.org.cdn.cloudflare.net
Address: 104.16.177.84
Name:   www.edx.org.cdn.cloudflare.net
Address: 2606:4700::6810:b354
Name:   www.edx.org.cdn.cloudflare.net
Address: 2606:4700::6810:b454
Name:   www.edx.org.cdn.cloudflare.net
Address: 2606:4700::6810:b554
Name:   www.edx.org.cdn.cloudflare.net
Address: 2606:4700::6810:b154
Name:   www.edx.org.cdn.cloudflare.net
Address: 2606:4700::6810:b254
```

```
matlab@sjt517scope011:~$ nslookup www.academicearth.org
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   www.academicearth.org
Address: 23.185.0.4
Name:   www.academicearth.org
Address: 2620:12a:8000::4
Name:   www.academicearth.org
Address: 2620:12a:8001::4
```

```
matlab@sjt517scope011:~$ nslookup www.facebook.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
www.facebook.com        canonical name = star-mini.c10r.facebook.com.
Name:   star-mini.c10r.facebook.com
Address: 157.240.242.35
Name:   star-mini.c10r.facebook.com
Address: 2a03:2880:f16e:81:face:b00c:0:25de
```

nslookup command also use to find out DNS related query. The following examples shows A Record (IP Address) of tecmint.com.

 # nslookup www.tecmint.com

```
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Windows\system32>nslookup www.tecmint.com
Server:  UnKnown
Address:  172.16.128.1

Non-authoritative answer:
Name:    www.tecmint.com
Addresses:  2606:4700:9768:ee82:bbc5:0:4878:10f9
          104.26.3.23
          172.67.72.207
          104.26.2.23
```