Practical 11
Network Applications and Configurations

A. TCP/IP and Network Commands
B. Email Overview
C. Managing Network Interfaces
D. Basic IP Routing and Gateways

A. TCP/IP and Network Commands

1. View the "/etc/services" file by typing: `cat /etc/services`
   What is the port number for the "smtp" service?

25

2. Show the result page by page by typing: `cat /etc/services | more`
   (**PIPE** the output of cat command to MORE, Jump the page one at a time by SPACEBAR)
3. search the result AUTOMATICALLY by typing `cat /etc/services | grep smtp`

```
jipx@ubuntu-jipx:~$ cat /etc/services | grep smtp
smtp            25/tcp          mail
urd             465/tcp         ssmtp smtps  # URL Rendesvous Directory for SSM
jipx@ubuntu-jipx:~$ _
```

4. Output the result to a text file "resultSmtp.txt"

```
jipx@ubuntu-jipx:~$ cat /etc/services | grep smtp >resultSmtp.txt
jipx@ubuntu-jipx:~$ ls
resultSmtp.txt
jipx@ubuntu-jipx:~$ cat resultSmtp.txt
smtp            25/tcp          mail
urd             465/tcp         ssmtp smtps  # URL Rendesvous Directory for SSM
```

5. How many services related to SMTP?
   `wc -l resultSmtp.txt`
   Write a single command to get the result.

```
jipx@ubuntu-jipx:~$ cat /etc/services | grep smtp  | wc -l
2
```

please delete the temporary file generated "resultSmtp.txt"

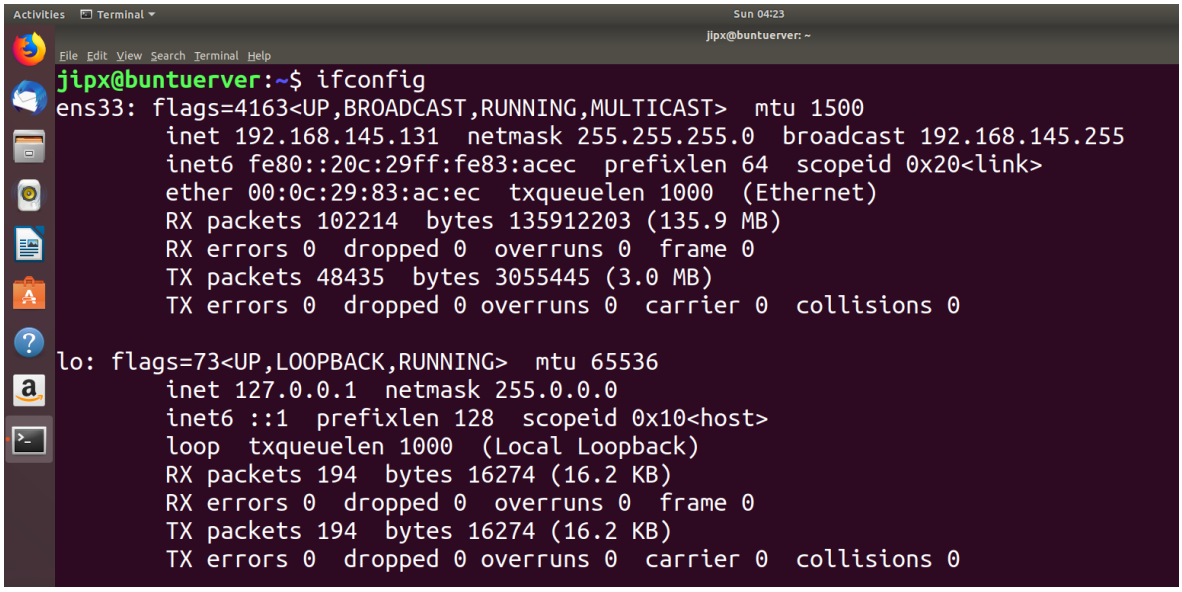
To remove (or delete) a file or directory in Linux from the command line, use the rm (remove) command. Be extra careful when removing files or directories with the rm command, because once the file is deleted it cannot be recovered.

6. Type `netstat -tuna` to list all Ports (tcp and udp) that are opened are listed as "LISTEN".

7. Write a single command to get the total number of ports opened.

netstat -an | wc -l

8. Type `ifconfig` to display your machine's IP address.
   You should get a display similar to that shown below. This command allows you to find out the IP address & MAC address of your various network interfaces on your server.

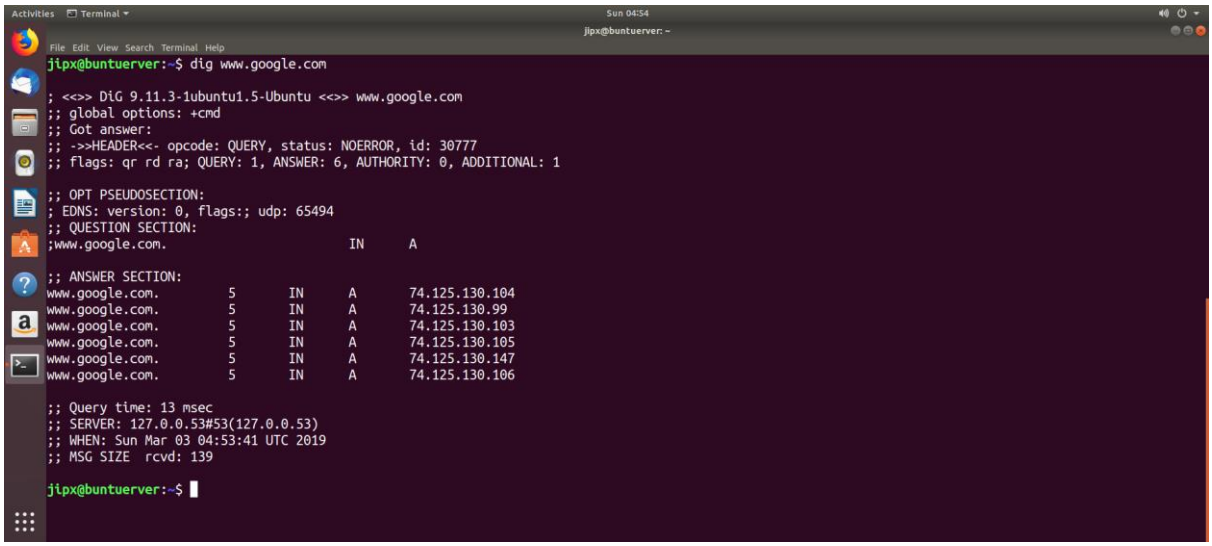


ens33 IP address:	192.168.106.131
lo IP address:	127.0.0.1

9. You can also type `ip addr` to display your machine's IP address.
10. Type `ping www.google.com`
    `What is the IP address of domain name wwww.google.com`

IP address(s) for www.google.com	74.125.24.147

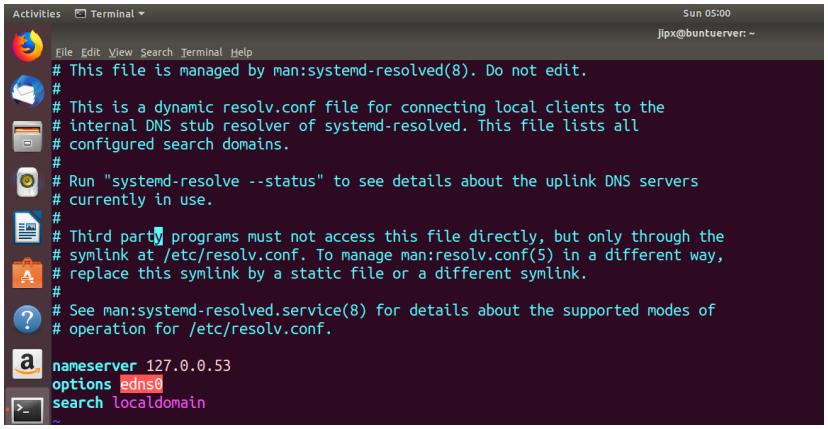
11. Try `nslookup wwww.google.com`, and `dig www.google.com`
    You should see response similar to the shown below.



Record down the DNS server IP address and port number

DNS server IP	74.125.24.106
DNS server viPORT	65494

12. Type `cat /etc/resolv.conf` to verify the DNS server name in the file: /etc/resolv.conf



13. Ping your physical Windows 10 machine
Type `ping your_physical_Windows10_IP_address`
Note: To find `your_physical_Windows10_IP_address`, run “ipconfig/all” in Windows and love for “IPv4 Address” under “VMWare Ethernet Adapter for VMnet8”

B. Change your host name

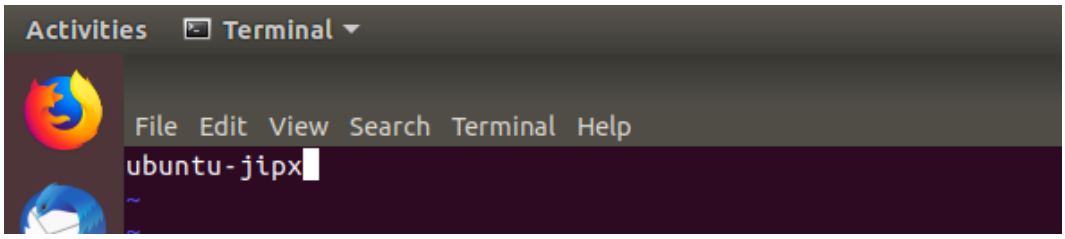
1. Press Ctrl+Alt+T on keyboard to open the terminal. When it opens, run the below command:

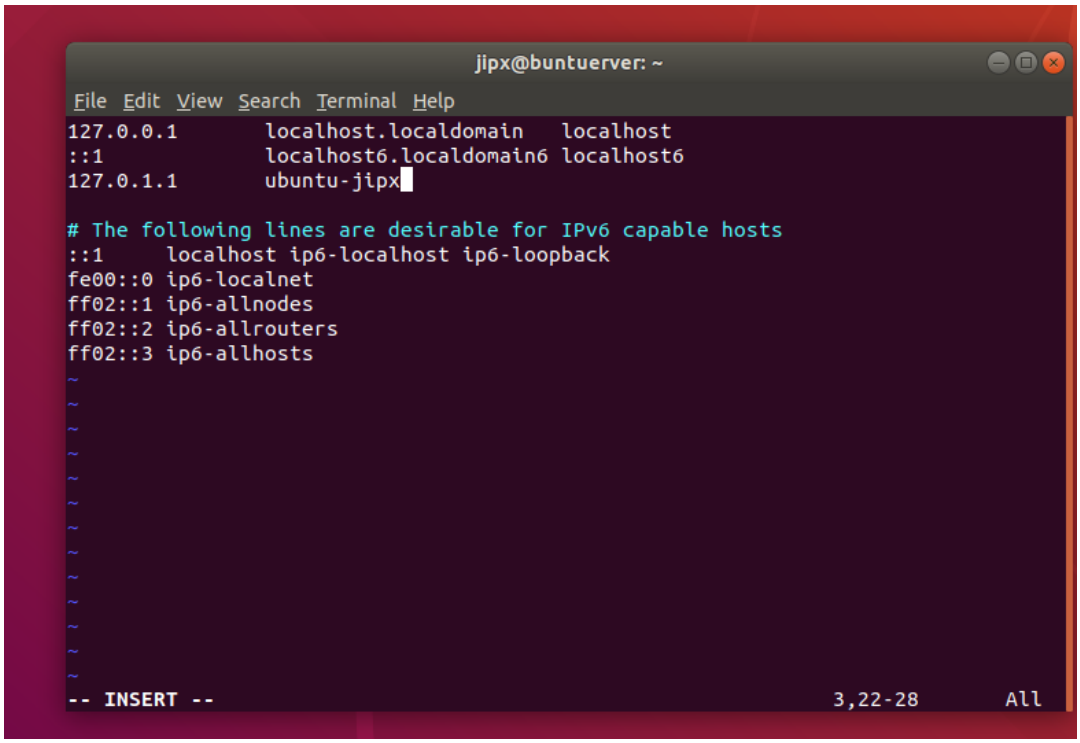
```
hostname
```

2. To change the name permanently, run command to edit the host files:

   Note:For Ubuntu server without a GUI, run `sudo vi /etc/hostname` and `sudo vi /etc/hosts` and edit them one by one.

   In both files, change the name to what you want and save them.

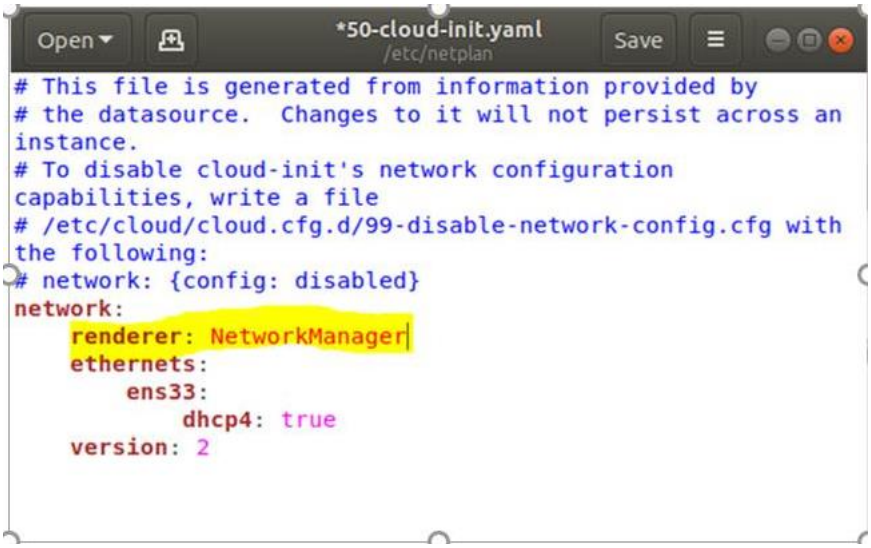




3. Edit the file /etc/netplan/50-cloud-init.yaml and add in the following line:

```
renderer: NetworkManager
```

Type `sudo gedit /etc/netplan/50-cloud-init.yaml`



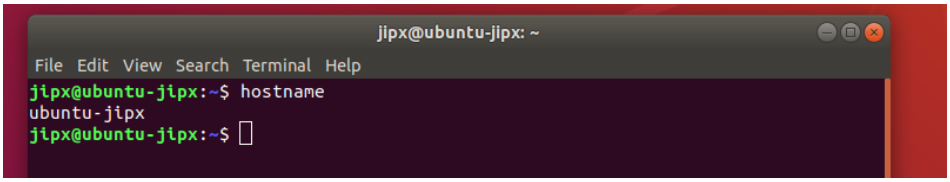
4. Run sudo netplan to apply, to effect the change

Type `sudo netplan apply`

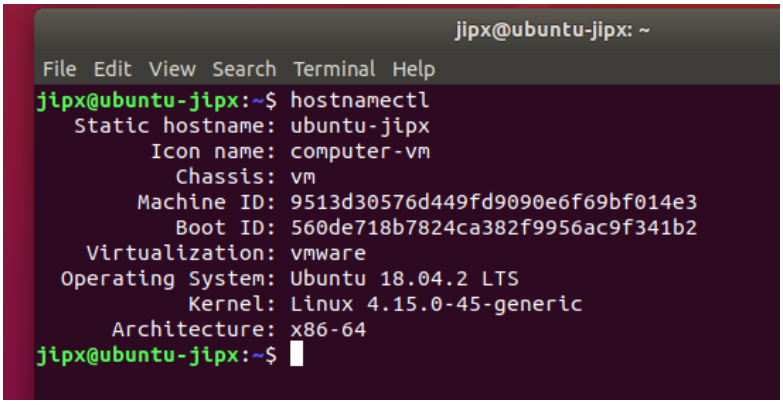
5. Restart your Ubuntu VM.

6. Type `cat /etc/hosts`
   `cat /etc/hostname`
   You will notice that the settings have been changed.

7. Type `hostname` to reconfirm that the computer name has indeed changed.

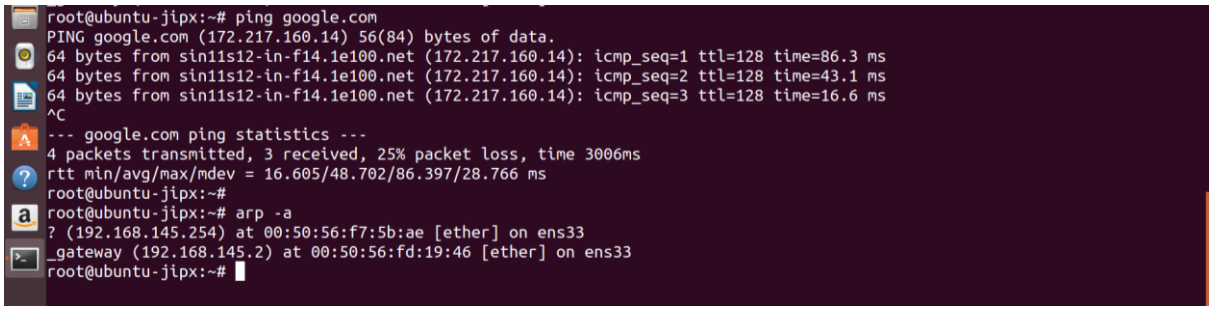


8. Type `hostnamectl` to reconfirm that the computer name has indeed changed.



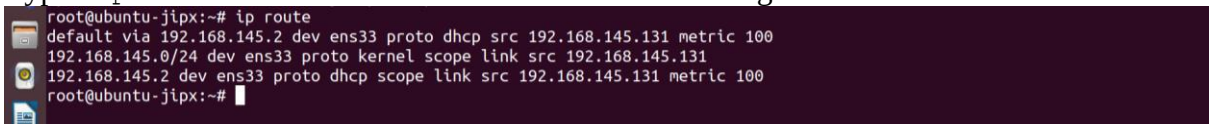
C. Basic IP Routing and Gateways (make sure firewall is open)

1. Ping to another machine e.g. `ping www.google.com`
2. Type `arp -a` to view the ARP cache. Can you find the MAC address of gateway?



MAC address of your gateway	00:50:56:e2:74:b8

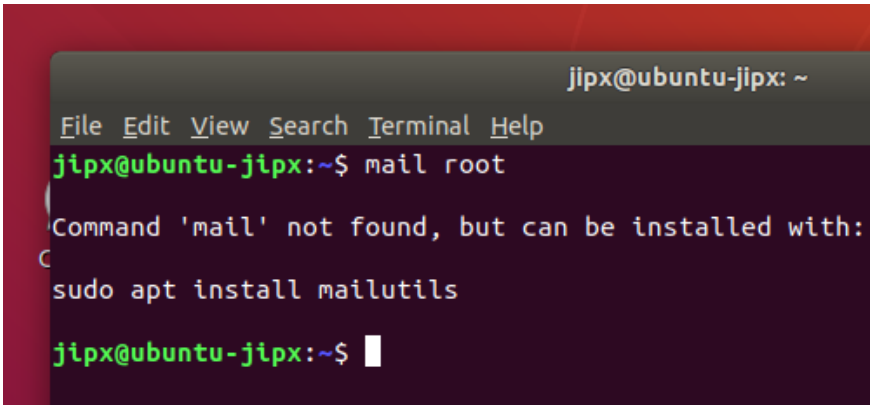
3. Type `ip route` to view the current routing table.



D. Email Overview

1. As user student, send an email to root.

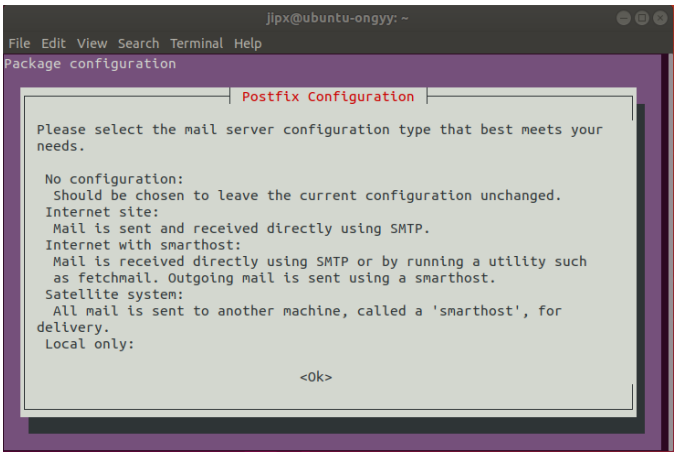
```
mail root
```



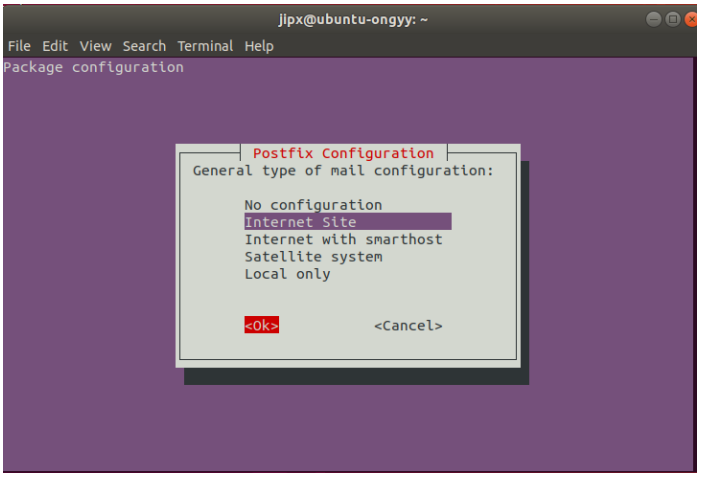
If mailutils not installed, you will see the above error.

Type: sudo apt install mailutils

Press **<tab>** key (cursor will be moved to "Ok"). Press the **<enter>** key.



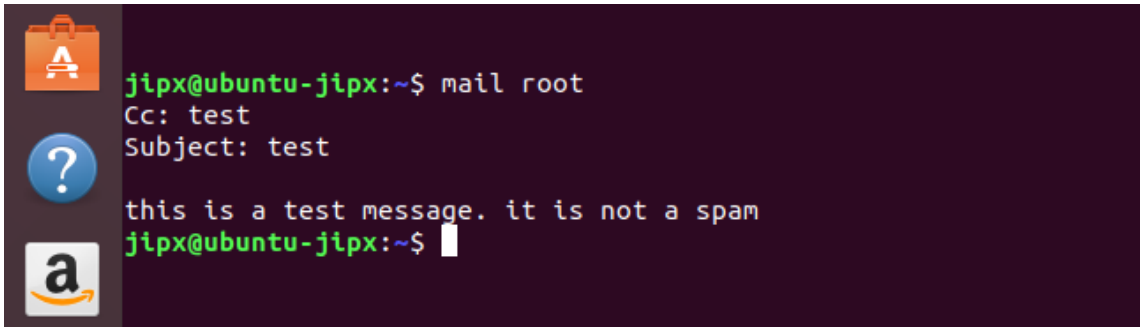
Select Internet Site & Ok (use <tab> key). Press the **<enter>** key.



After installation, type `mail root` again.

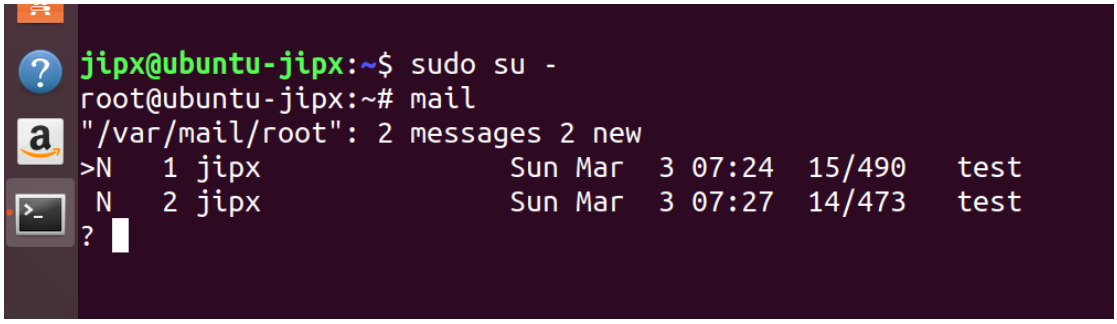
2. Type in a subject and press <enter>

3. Type in the mail message. When you have completed typing the mail message, press `<Control-D>` to end the message.



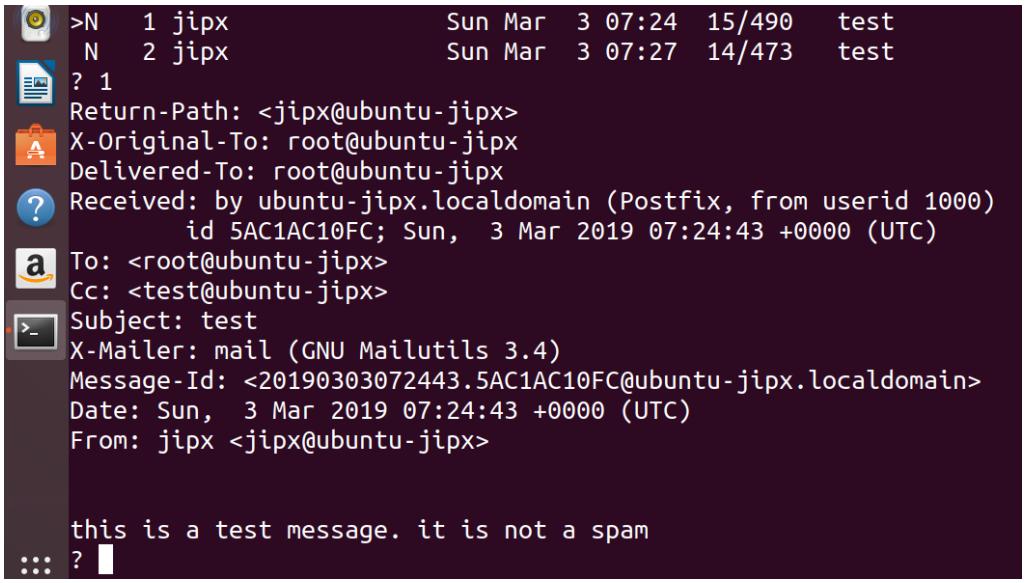
if you see error: "*mail: cannot send message: process exited with a non-zero status*": please refer to troubleshooting

4. As user root, type `mail`



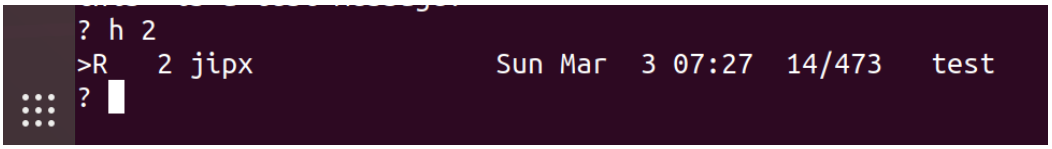
A list of mail will be displayed. (Note: N means new mail received)

5. Type `<number>` to read mail, where `<number>` is the number of the mail you wish to read.



6. Type s to save the read mail to mbox.

7. Type h to view the mail headers.



(Note: R means mail read)

8. To delete mails, type d <number> , where <number> is the number of the mail to be deleted.

9. Type q to quit the "mail" program.

TroubleShooting

mail: cannot send message: process exited with a non-zero status

(1) Check the mail log

```
sudo cat /var/log/mail.log
```

which said:
```
postfix/sendmail[27115]: fatal: open /etc/postfix/main.cf: No such file or directory
```

(2)

```
sudo dpkg-reconfigure postfix
```

source: https://unix.stackexchange.com/questions/185365/mail-cannot-send-message-process-exited-with-a-non-zero-status

End of Practical