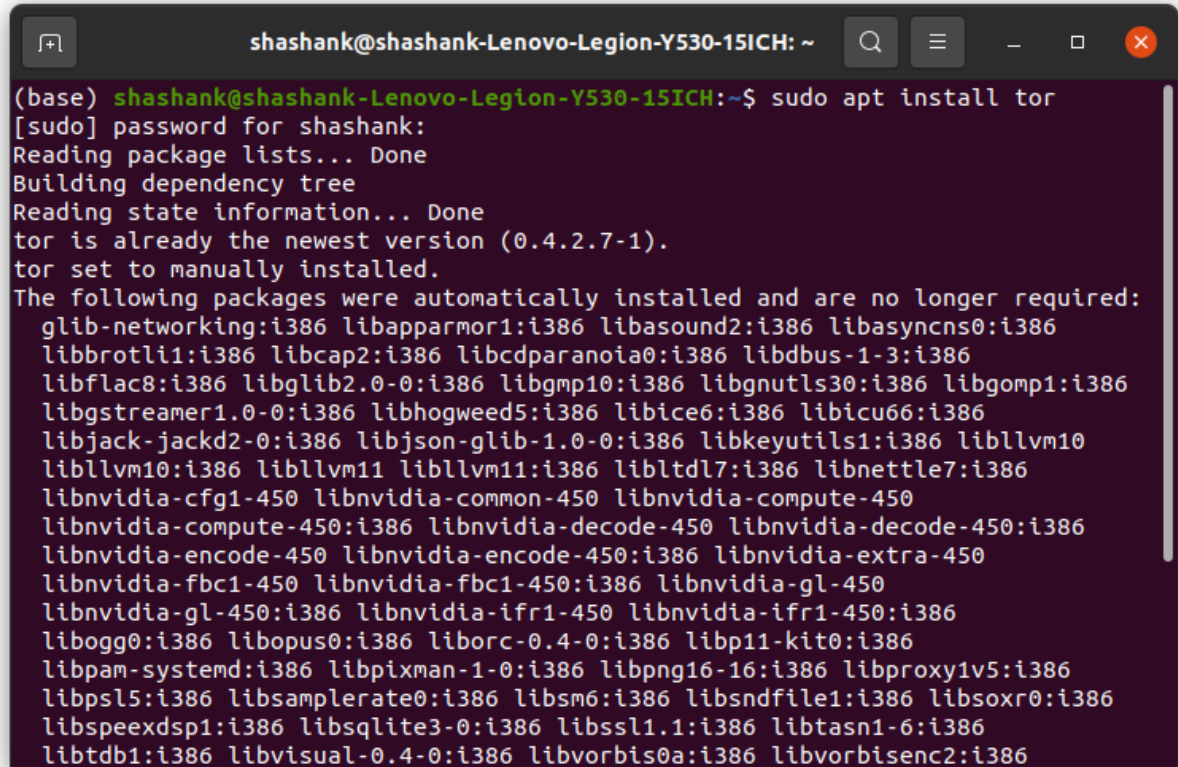


Q6

To install and configure TOR without TOR browser and configure it to any browser in the machine, the steps are as follows:

- 1) Install TOR, using terminal command, `sudo apt install tor`



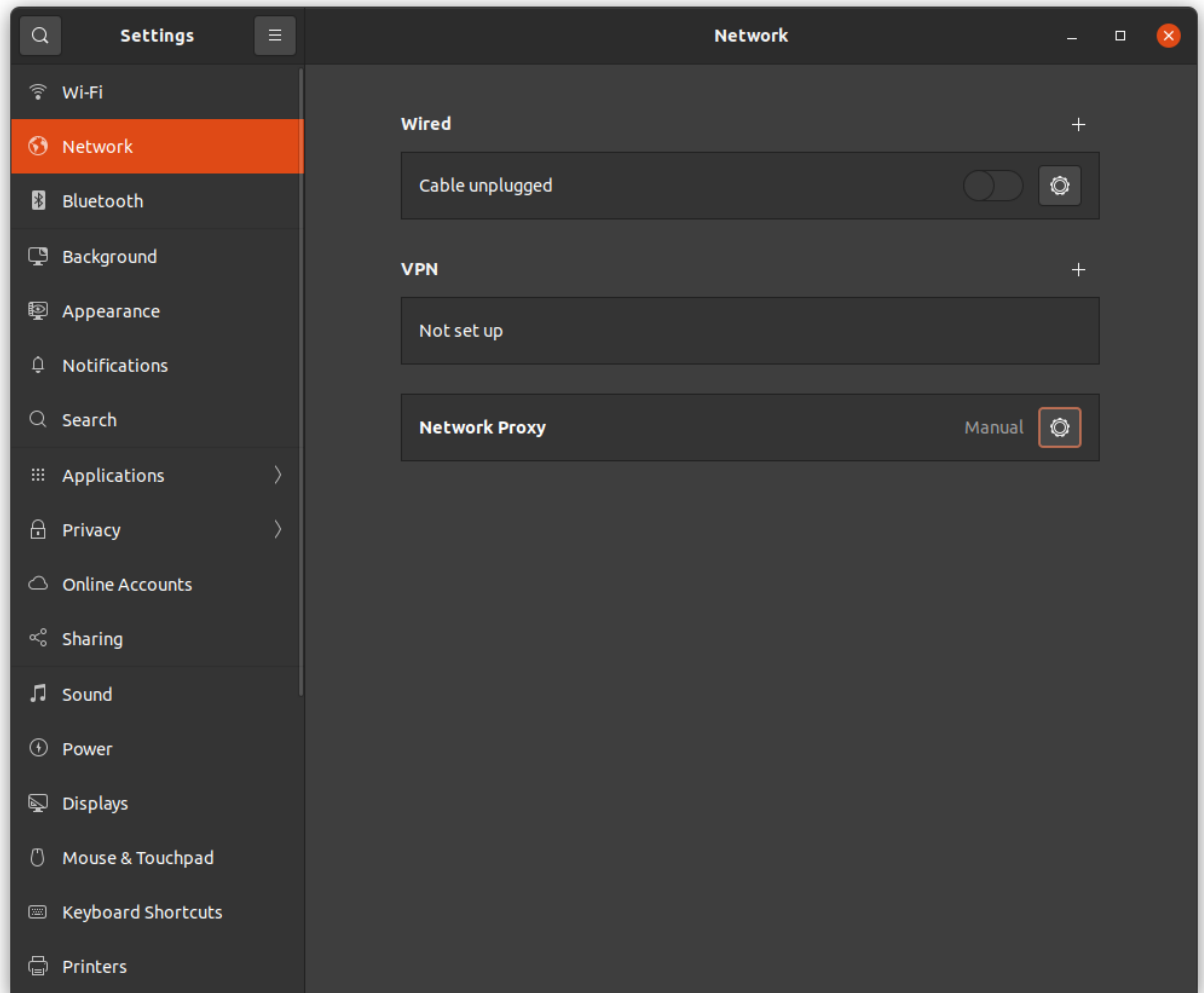
```
(base) shashank@shashank-Lenovo-Legion-Y530-15ICH:~$ sudo apt install tor
[sudo] password for shashank:
Reading package lists... Done
Building dependency tree
Reading state information... Done
tor is already the newest version (0.4.2.7-1).
tor set to manually installed.
The following packages were automatically installed and are no longer required:
glib-networking:i386 libapparmor1:i386 libasound2:i386 libasyncns0:i386
libbrotli1:i386 libcap2:i386 libcdparanoia0:i386 libdbus-1-3:i386
libflac8:i386 libglib2.0-0:i386 libgmp10:i386 libgnutls30:i386 libgomp1:i386
libgstreamer1.0-0:i386 libhogweed5:i386 libice6:i386 libicu66:i386
libjack-jackd2-0:i386 libjson-glib-1.0-0:i386 libkeyutils1:i386 libllvm10
libllvm10:i386 libllvm11 libllvm11:i386 libltdl7:i386 libnettle7:i386
libnvidia-cfg1-450 libnvidia-common-450 libnvidia-compute-450
libnvidia-compute-450:i386 libnvidia-decode-450 libnvidia-decode-450:i386
libnvidia-encode-450 libnvidia-encode-450:i386 libnvidia-extra-450
libnvidia-fbc1-450 libnvidia-fbc1-450:i386 libnvidia-gl-450
libnvidia-gl-450:i386 libnvidia-ifrt1-450 libnvidia-ifrt1-450:i386
libogg0:i386 libopus0:i386 liborc-0.4-0:i386 libp11-kit0:i386
libpam-systemd:i386 libpixmap-1-0:i386 libpng16-16:i386 libproxy1v5:i386
libpsl5:i386 libsamplerate0:i386 libsm6:i386 libsndfile1:i386 libsoxr0:i386
libspeexdsp1:i386 libsqlite3-0:i386 libssl1.1:i386 libtasn1-6:i386
libtcl1.8.8:i386 libvisual-0.4-0:i386 libvorbis0a:i386 libvorbisenc2:i386
```

- 2) Once install tor, keeps running in the background

```
shashank@shashank-Lenovo-Legion-Y530-15ICH: ~  
linux-modules-extra-5.11.0-30-generic nvidia-compute-utils-450  
nvidia-dkms-450 nvidia-utils-450 shim xserver-xorg-video-nvidia-450  
Use 'sudo apt autoremove' to remove them.  
0 upgraded, 0 newly installed, 0 to remove and 30 not upgraded.  
(base) shashank@shashank-Lenovo-Legion-Y530-15ICH:~$ ps aux | grep tor  
debian-+ 1269 0.0 0.4 42704 38136 ? Ss 13:23 0:00 /usr/bin/tor  
--defaults-torrc /usr/share/tor/tor-service-defaults-torrc -f /etc/tor/torrc --R  
unAsDaemon 0  
shashank 2684 0.0 0.1 314108 9824 ? Ssl 13:24 0:00 /usr/libexec/  
gvfs-udisks2-volume-monitor  
shashank 2689 0.0 0.0 316724 7508 ? Ssl 13:24 0:00 /usr/libexec/  
gvfs-afc-volume-monitor  
shashank 2694 0.0 0.0 235700 6076 ? Ssl 13:24 0:00 /usr/libexec/  
gvfs-mtp-volume-monitor  
shashank 2698 0.0 0.0 237976 6604 ? Ssl 13:24 0:00 /usr/libexec/  
gvfs-gphoto2-volume-monitor  
shashank 2702 0.0 0.0 235876 6188 ? Ssl 13:24 0:00 /usr/libexec/  
gvfs-goa-volume-monitor  
shashank 2905 0.0 0.0 90064 4300 ? Ssl 13:25 0:00 /usr/libexec/  
gnome-session-ctl --monitor  
shashank 2983 0.0 0.0 235596 4652 ? Ssl 13:25 0:00 /usr/libexec/  
xdg-permission-store  
shashank 3072 0.0 0.1 312732 8432 ? Sl 13:25 0:00 /usr/lib/x86_  
64-linux-gnu/indicator-messages/indicator-messages-service  
shashank 3170 0.0 0.0 230728 30056 ? Ssl 13:25 0:00 /usr/libexec/
```

To configure Tor as default way to connect to internet for PC (regardless of browser) the steps are:

- 3) Open Settings (in ubuntu), Click on network



4) In Network Proxy, select Manual and fill the details as:

Network Proxy

☐ Automatic

☒ Manual

☐ Disabled

HTTP Proxy 8080 - +

HTTPS Proxy 0 - +

FTP Proxy 0 - +

Socks Host 9050 - +


Ignore Hosts

- a) Socks Host: 127.0.0.1 and port as 9050
 - b) Ignore Localhosts.
- 5) To check open <https://check.torproject.org/> on any browser.

(1) MLr k Rea k Mul HW Ass Inb skle Mul Ho

check.torproject.org

English Go



Congratulations. This browser is configured to use Tor.

Your IP address appears to be: **45.66.35.35**

However, it does not appear to be Tor Browser.

[Click here to go to the download page](#)

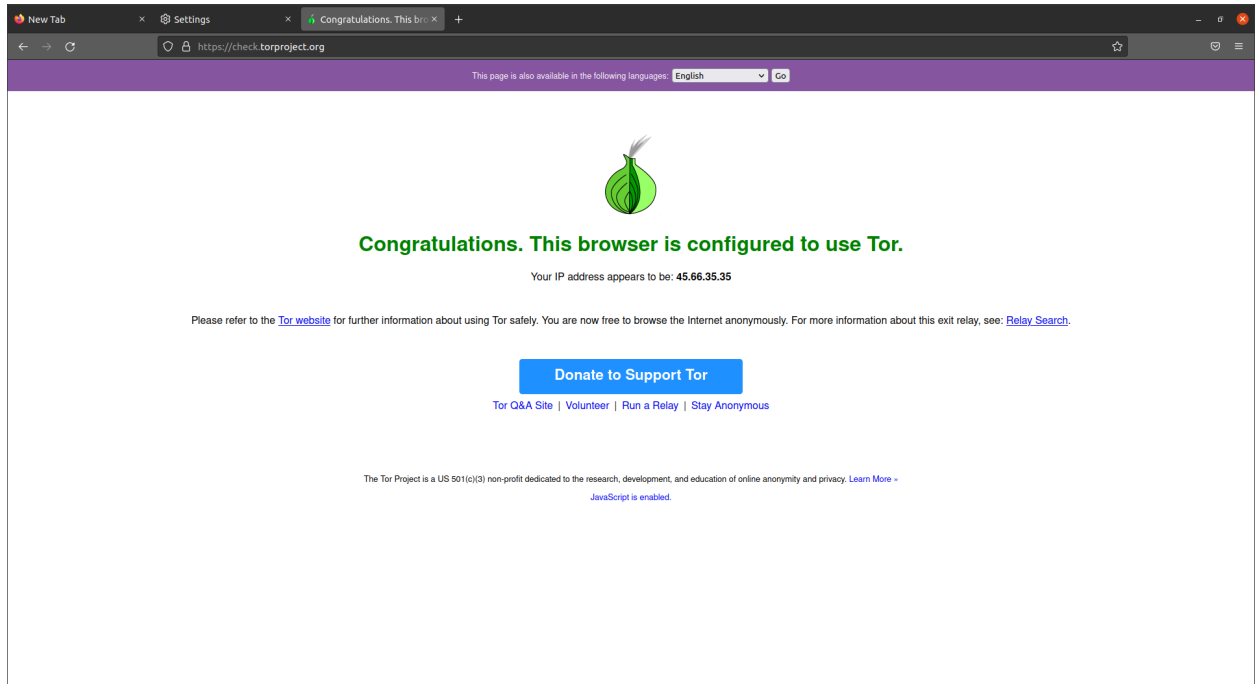
Please refer to the [Tor website](#) for further information about using Tor safely. You are now free to browse the Internet anonymously. For more information about this exit relay, see: [Relay Search](#).

Donate to Support Tor

[Tor Q&A Site](#) | [Volunteer](#) | [Run a Relay](#) | [Stay Anonymous](#)

The Tor Project is a US 501(c)(3) non-profit dedicated to the research, development, and education of online anonymity and privacy. [Learn More »](#)

JavaScript is enabled.



During tor connection, See IP and Hostname are endnodes of tor network
Hostname as visible on whatsmyip.com, vps1925723.dedi.server-hosting.expert

```
(base) shashank@shashank-Lenovo-Legion-Y530-15ICH:~$ nslookup 217.79.178.53
53.178.79.217.in-addr.arpa      name = vps1925723.dedi.server-hosting.expert.

Authoritative answers can be found from:

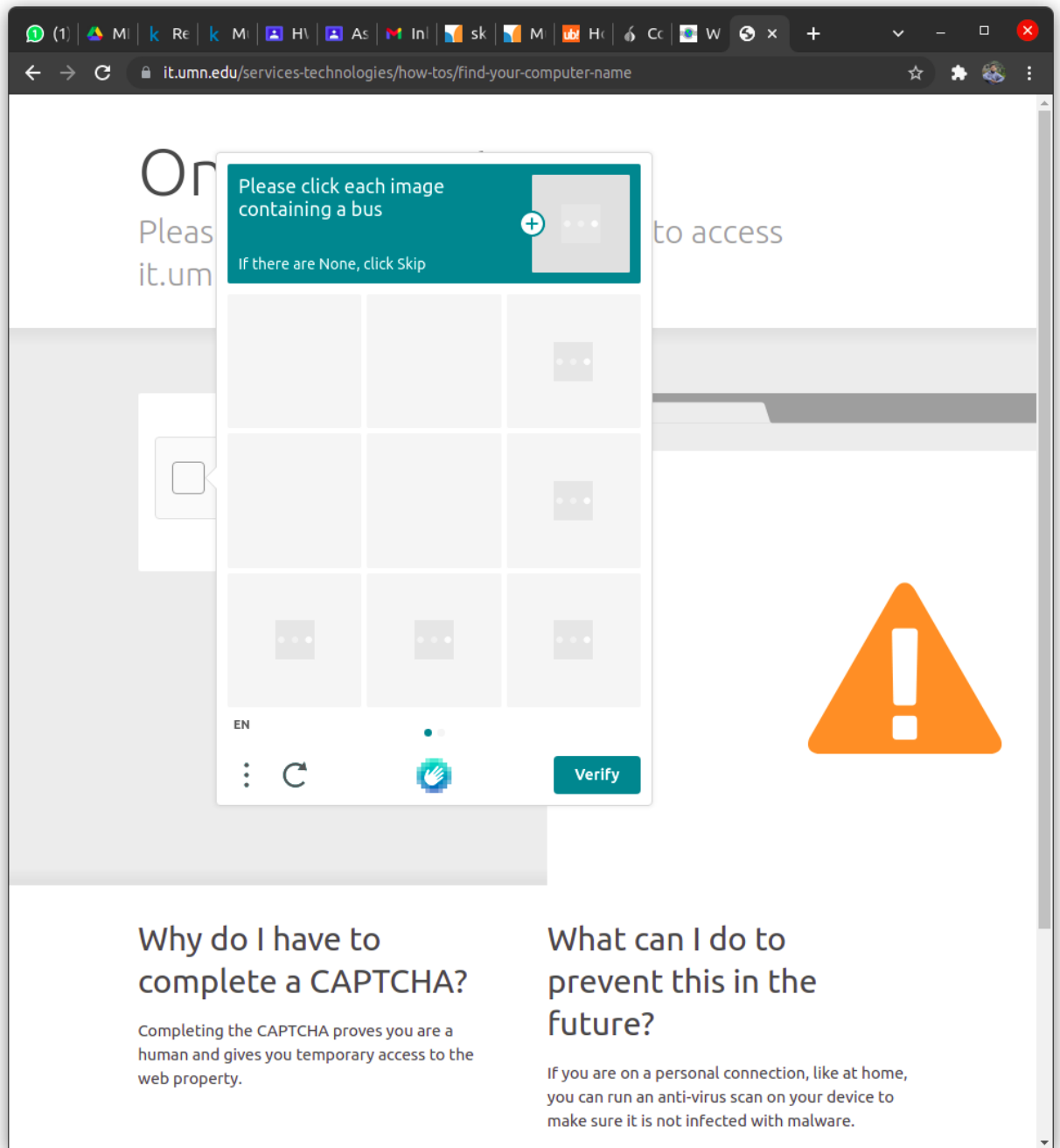
(base) shashank@shashank-Lenovo-Legion-Y530-15ICH:~$
```

The screenshot shows the homepage of the WhatsMyIP website. The browser's address bar displays 'whatsmyip.org'. The main header area shows 'Your IP Address is 217.79.178.53'. Below this, there is a banner for 'Auth0® Get Auth0® Free Up to 7k Users' with a 'SIGN UP' button. The left sidebar contains a list of tools categorized into 'Networking Tools', 'Text Related Tools', and 'Other Tools'. The main content area is divided into several sections: 'Home' with a 'Science to the Rescue - You Can Help' message, 'Hostname & User Agent' showing details like 'vps1925723 dedi.server-hosting.expert', 'Site News & Updates' with a list of recent updates, 'Mobile App' with a download link, 'Social Links' with Facebook and Twitter icons, and 'PixelAds' with a 'BUY PIXELADS' button.

After termination, See IP and Hostname are my own ISP

The screenshot shows the homepage of the WhatsMyIP website after a termination. The browser's address bar displays 'whatsmyip.org'. The main header area shows 'Your IP Address is 182.64.145.68'. Below this, there is a banner for 'Attention, Startups! 50% OFF all JetBrains products' with an 'Apply now!' button. The left sidebar contains a list of tools categorized into 'Networking Tools', 'Text Related Tools', and 'Other Tools'. The main content area is divided into several sections: 'Home' with a 'Science to the Rescue - You Can Help' message, 'Hostname & User Agent' showing details like 'abts-north-dynamic-068.145.64.182.airtelbroadband.in', 'Site News & Updates' with a list of recent updates, 'Mobile App' with a download link, 'Social Links' with Facebook and Twitter icons, and 'PixelAds' with a 'BUY PIXELADS' button.

While using tor,



Q7

Task 1: Using the ssl library to create a public key for my system and use it to access the assigned VM. The steps followed for the same are:

- Firstly we will check if we already have a generated key-pair or not.
Command: **ls -al ~/.ssh/id_*.pub**
- Then, if we don't have a key-pair we will generate one using the ssh-keygen command, we can add our authentication credentials as comments.

Command: **ssh-keygen -t rsa -b 4096 -C "shashank19107@iiitd.ac.in"**

This command generates an rsa 4096 bit key pair with a given string as comment.

```
(base) shashank@shashank-Lenovo-Legion-Y530-15ICH:~$ ls -al ~/.ssh/id_*.pub
ls: cannot access '/home/shashank/.ssh/id_*.pub': No such file or directory
(base) shashank@shashank-Lenovo-Legion-Y530-15ICH:~$ ssh-keygen -t rsa -b 4096 -
C "shashank19107@iiitd.ac.in"
Generating public/private rsa key pair.
Enter file in which to save the key (/home/shashank/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/shashank/.ssh/id_rsa
Your public key has been saved in /home/shashank/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:G/m2bWvvjK+frf73gVXcmC0oq13s0Jv6qJxhyIqobJo shashank19107@iiitd.ac.in
The key's randomart image is:
+---[RSA 4096]---+
|
|          . =.
|         . . + =
|        . = ..
|       S o + .
|      . . * + oo
|     o = + +. .
|+.+ . . o + =oo oo|
|E.. . . +.++*OXo*|
+-----[SHA256]-----+
(base) shashank@shashank-Lenovo-Legion-Y530-15ICH:~$ ls ~/.ssh/id_*
/home/shashank/.ssh/id_rsa  /home/shashank/.ssh/id_rsa.pub
(base) shashank@shashank-Lenovo-Legion-Y530-15ICH:~$ ssh-copy-id iiitd@192.168.2
```

- c) Now we will copy our obtained key in the assigned VM, we will use the command `ssh-copy-id` followed by `user@IP` and enter password when prompted.

Command: `ssh-copy-id iiitd@192.168.2.234`

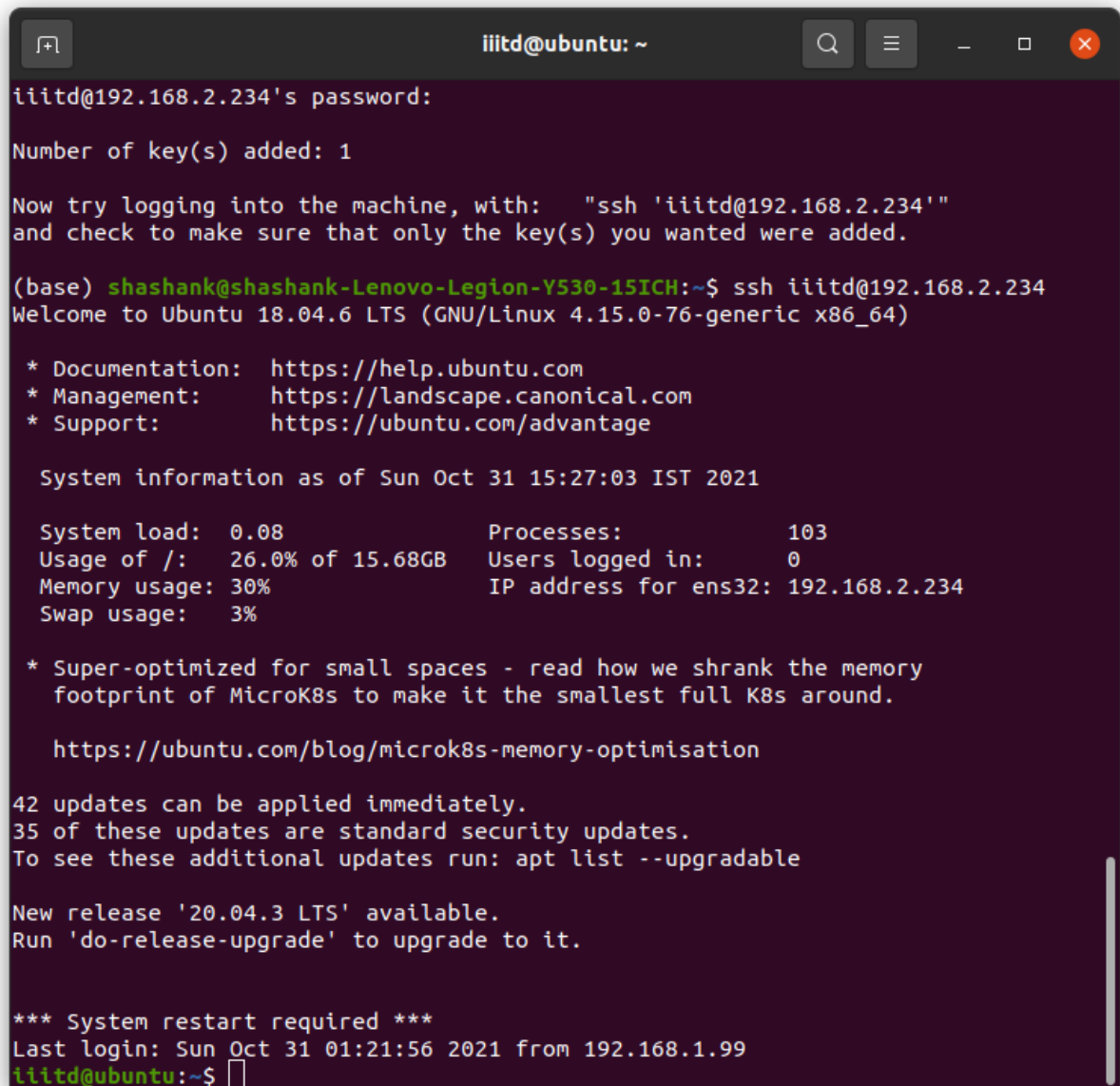
```
(base) shashank@shashank-Lenovo-Legion-Y530-15ICH:~$ ls ~/.ssh/id_*
/home/shashank/.ssh/id_rsa  /home/shashank/.ssh/id_rsa.pub
(base) shashank@shashank-Lenovo-Legion-Y530-15ICH:~$ ssh-copy-id iiitd@192.168.2
.234
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter
out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompt
ed now it is to install the new keys
iiitd@192.168.2.234's password:

Number of key(s) added: 1

Now try logging into the machine, with:  "ssh 'iiitd@192.168.2.234'"
and check to make sure that only the key(s) you wanted were added.

(base) shashank@shashank-Lenovo-Legion-Y530-15ICH:~$ ssh iiitd@192.168.2.234
```

- d) We will receive a success acknowledgment, we can check if our keys were added successfully by doing `ssh user@IP`, we should be logged in without password.
Command: `ssh iiitd@192.168.2.234`



```
iiitd@ubuntu: ~  
iiitd@192.168.2.234's password:  
Number of key(s) added: 1  
  
Now try logging into the machine, with: "ssh 'iiitd@192.168.2.234'"  
and check to make sure that only the key(s) you wanted were added.  
  
(base) shashank@shashank-Lenovo-Legion-Y530-15ICH:~$ ssh iiitd@192.168.2.234  
Welcome to Ubuntu 18.04.6 LTS (GNU/Linux 4.15.0-76-generic x86_64)  
  
* Documentation:  https://help.ubuntu.com  
* Management:    https://landscape.canonical.com  
* Support:       https://ubuntu.com/advantage  
  
System information as of Sun Oct 31 15:27:03 IST 2021  
  
System load:  0.08      Processes:            103  
Usage of /:   26.0% of 15.68GB  Users logged in:     0  
Memory usage: 30%      IP address for ens32: 192.168.2.234  
Swap usage:   3%  
  
* Super-optimized for small spaces - read how we shrank the memory  
  footprint of MicroK8s to make it the smallest full K8s around.  
  
https://ubuntu.com/blog/microk8s-memory-optimisation  
  
42 updates can be applied immediately.  
35 of these updates are standard security updates.  
To see these additional updates run: apt list --upgradable  
  
New release '20.04.3 LTS' available.  
Run 'do-release-upgrade' to upgrade to it.  
  
*** System restart required ***  
Last login: Sun Oct 31 01:21:56 2021 from 192.168.1.99  
iiitd@ubuntu:~$
```

Q7 Task 2:

Having a public key is a much safer method especially when we are required to log in any system very frequently because managing different passwords is often very complicated and time consuming, multiple users can use this method to access a system without going through the hassle of remaining a common password, in case of any breach, the user can be individually obtained, it can be pinpointed just by looking at the login logs.

Public key cryptography also eliminates the possibility of unauthorised access due to password breach, having a public key adds a layer of security without compromising on the user experience or by prompting for annoying authorisations.

Q4.

```
shashank@shashank-Lenovo-Legion-Y530-15ICH: ~/Desktop/...  
GPS Latitude      : 36 deg 50' 30.18" S  
GPS Longitude     : 174 deg 46' 32.89" E  
GPS Position      : 36 deg 50' 30.18" S, 174 deg 46' 32.89" E  
(base) shashank@shashank-Lenovo-Legion-Y530-15ICH:~/Desktop/FCS/HW 2/Q4/exiftool  
$ md5sum 4_img.jpg  
50bb962c9c4dbd36efcc06a5c9c6462d 4_img.jpg  
(base) shashank@shashank-Lenovo-Legion-Y530-15ICH:~/Desktop/FCS/HW 2/Q4/exiftool  
$
```

```
1 image files updated  
(base) shashank@shashank-Lenovo-Legion-Y530-15ICH:~/Desktop/FCS/HW 2/Q4/exiftool  
$ md5sum 4_img.jpg  
013e126ec6db4013b8b2b15bafd1e334 4_img.jpg  
(base) shashank@shashank-Lenovo-Legion-Y530-15ICH:~/Desktop/FCS/HW 2/Q4/exiftool
```