

CSE7346 Cloud Computing

Laboratory 1

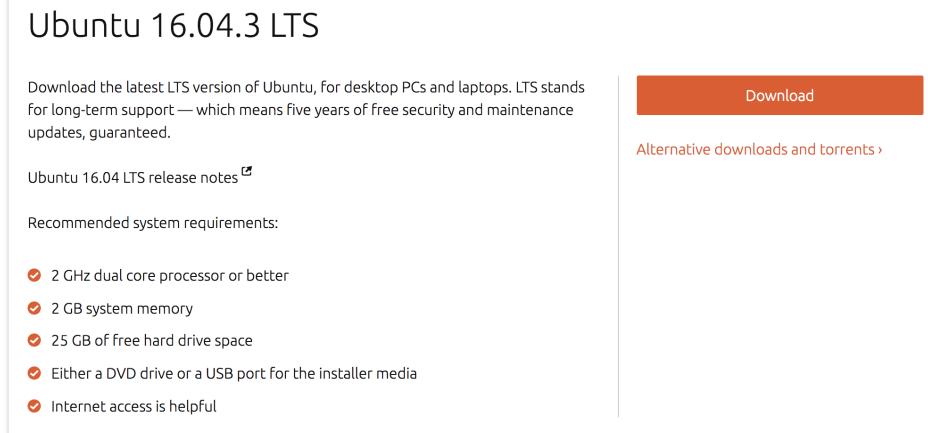
Nikhila Byreddy

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I have installed Ubuntu as a guest.

Initially I have downloaded ubuntu from the site <https://www.ubuntu.com/download/desktop>

Download Ubuntu Desktop



The image shows the Ubuntu 16.04.3 LTS download page. At the top, it says "Ubuntu 16.04.3 LTS". Below that, there's a brief description: "Download the latest LTS version of Ubuntu, for desktop PCs and laptops. LTS stands for long-term support — which means five years of free security and maintenance updates, guaranteed." To the right, there's a large orange "Download" button. Underneath the button, there's a link "Alternative downloads and torrents >". On the left side, there's a section for "Ubuntu 16.04 LTS release notes" and a list of "Recommended system requirements" which includes: 2 GHz dual core processor or better, 2 GB system memory, 25 GB of free hard drive space, Either a DVD drive or a USB port for the installer media, and Internet access is helpful.

Click on download and complete downloading Ubuntu.

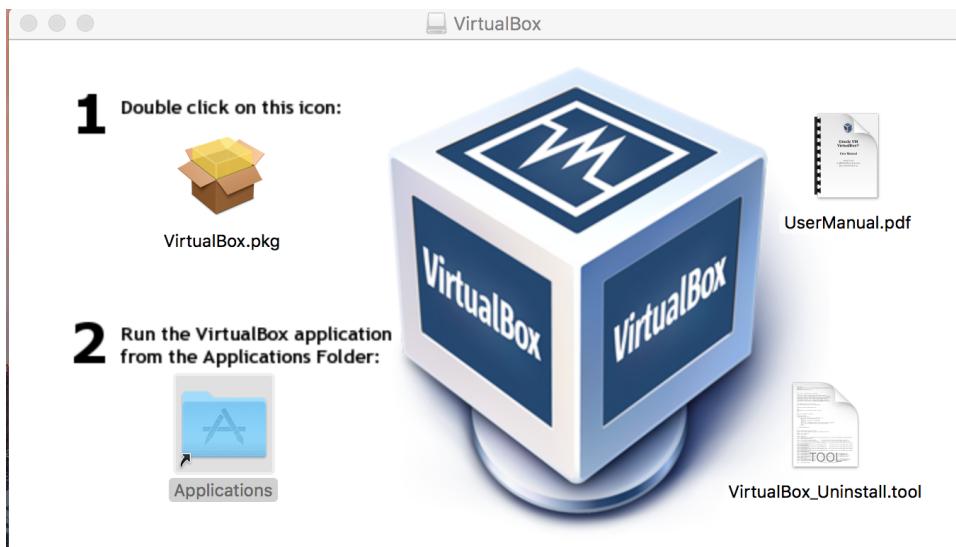
Now install Virtual box from the site <https://www.virtualbox.org/wiki/Downloads>



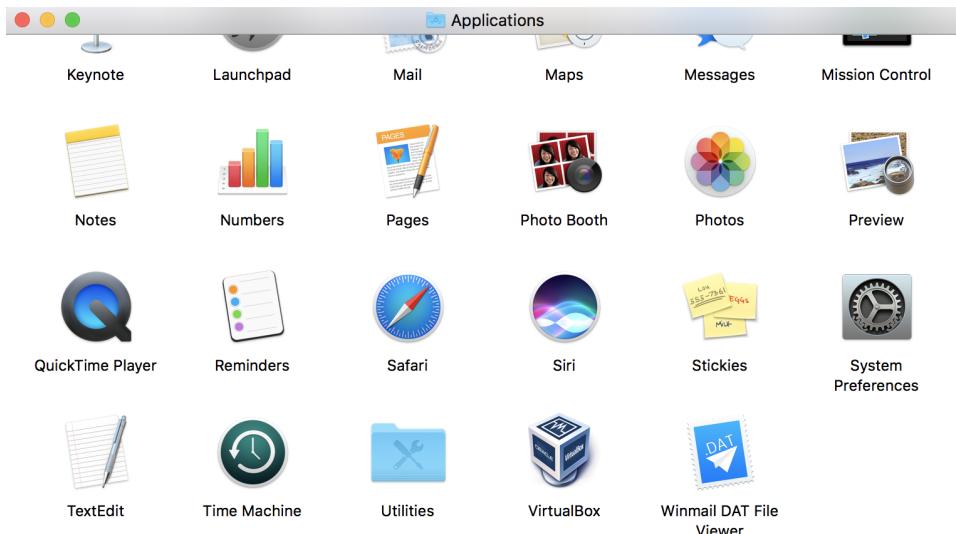
The image shows the VirtualBox download page. The title "VirtualBox" is prominently displayed in large blue letters. Below it, there's a "Download VirtualBox" button. A horizontal dotted line separates this from the "VirtualBox binaries" section. In this section, it says "Here, you will find links to VirtualBox binaries and its source code." Below that, there's a heading "VirtualBox binaries" and a note: "By downloading, you agree to the terms and conditions of the respective license." There's also a list of "VirtualBox 5.1.28 platform packages" which includes: Windows hosts, OS X hosts, Linux distributions, and Solaris hosts.

Now go to downloads and click on .dmg extension.

The following dialogue box shows up.



Now double click on the application folder.



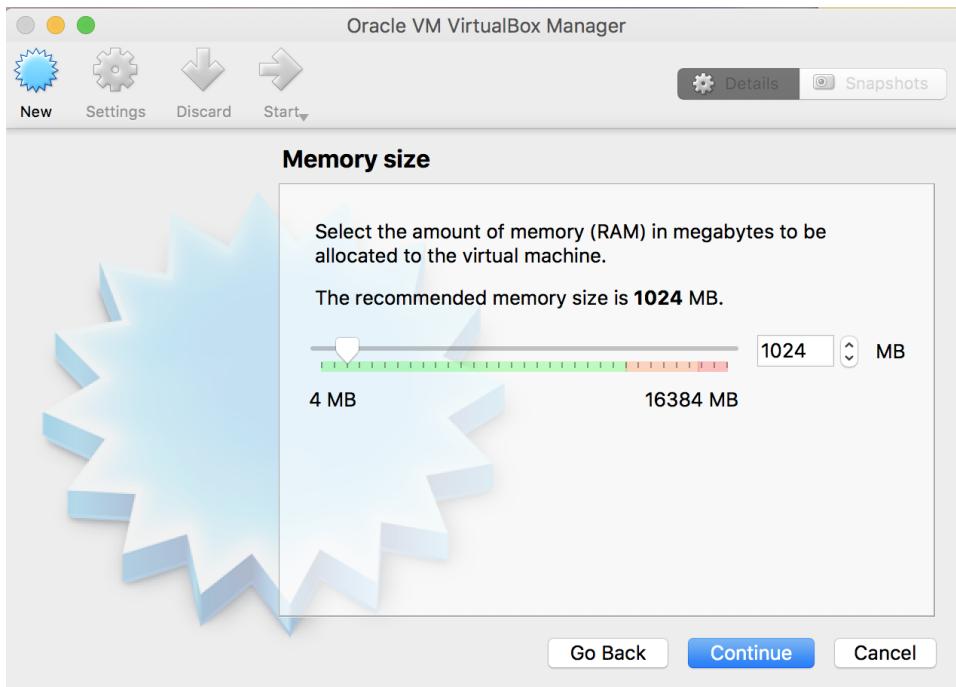
Now double click on the VirtualBox icon.

Click on New Icon.



Now Name the Operating System and select the type as Linux and Click continue.

You can now select the memory required for Ubuntu.



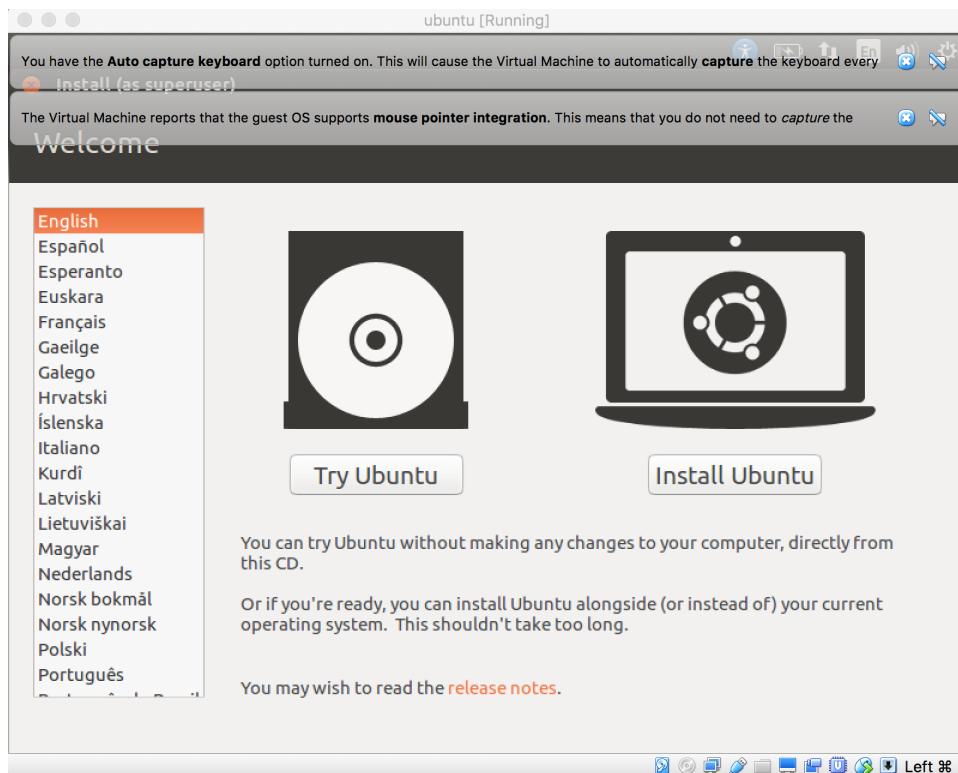
Then follow the default instructions given and click next for the next set of steps.

Then, it asks to choose for the file.

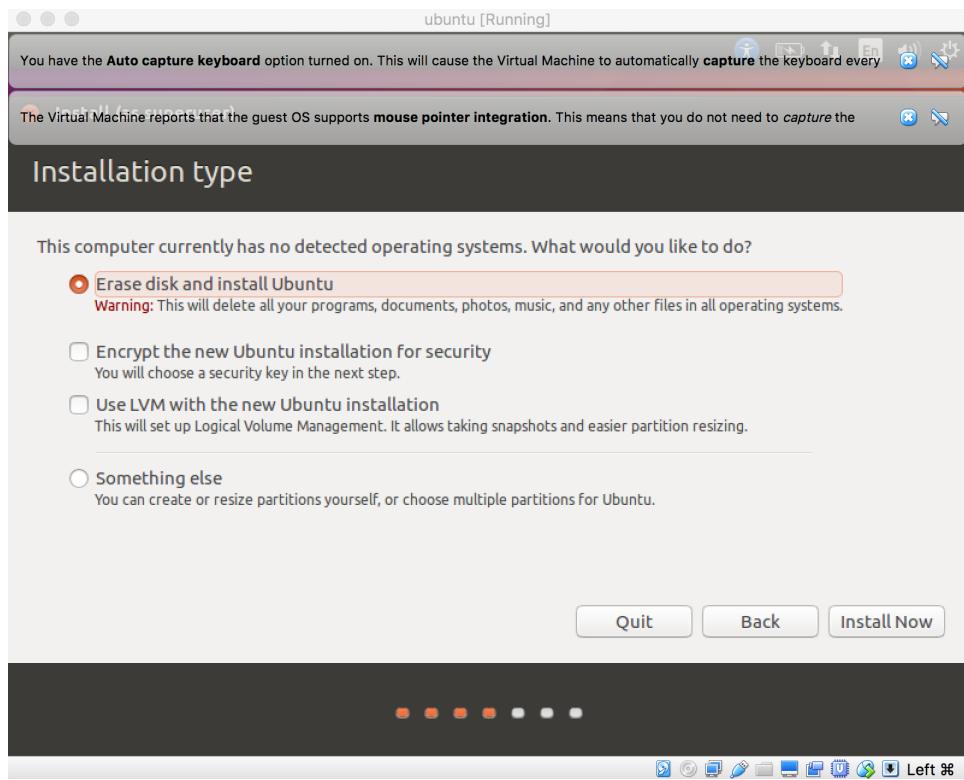
Choose the file from downloads where we have downloaded Ubuntu.

Click Start.

Click on Install Ubuntu.



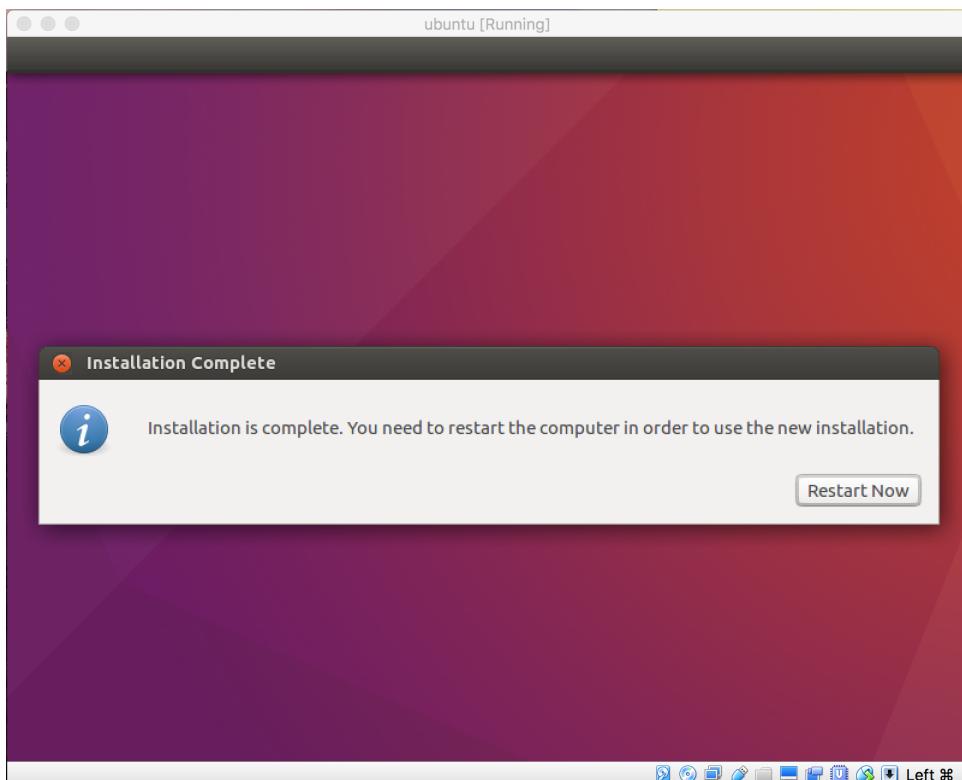
Now click on Erase disk and install Ubuntu



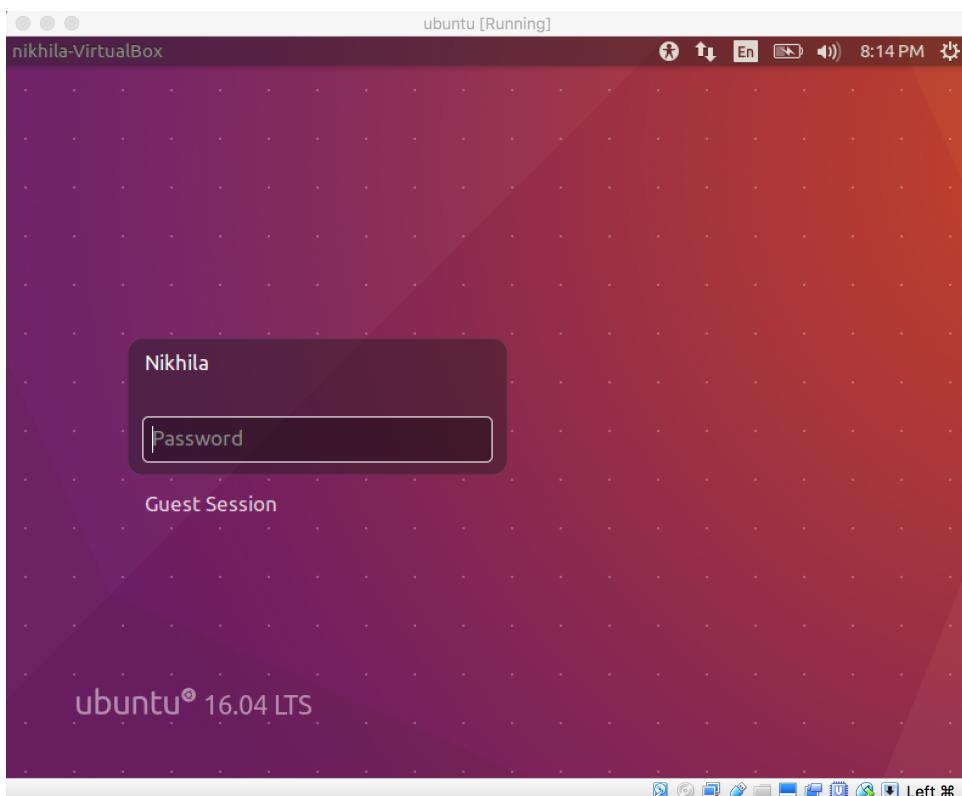
Select your time Zone when prompted.

Now set the username and password when prompted.

Now it asks to restart



After restarting it asks for password



You can enter the password and go to terminal in your Ubuntu VirtualBox.

Now, download the files from smucode in canvas to main pc.

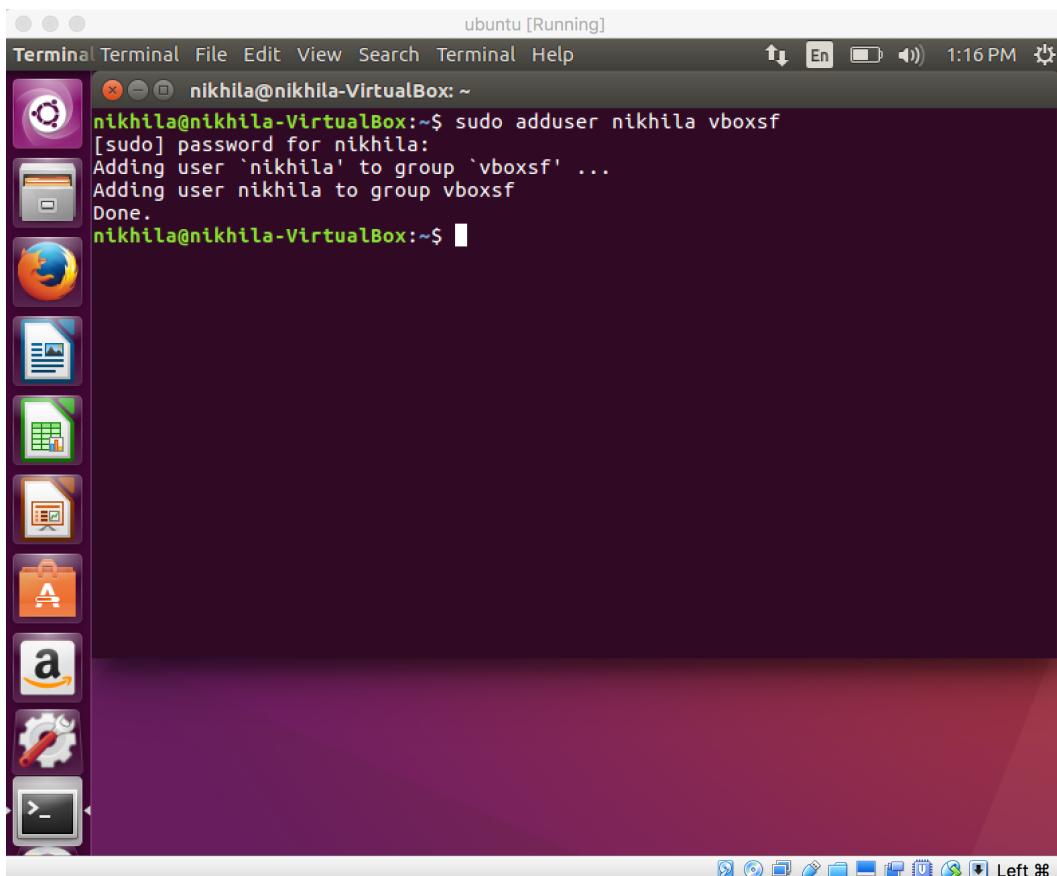
These files should be transferred to our virtualBox.

We can do this by making a separate folder and name it as sf in our pc.

Then go to virtualBox and click on settings and go to shared folders at the end.

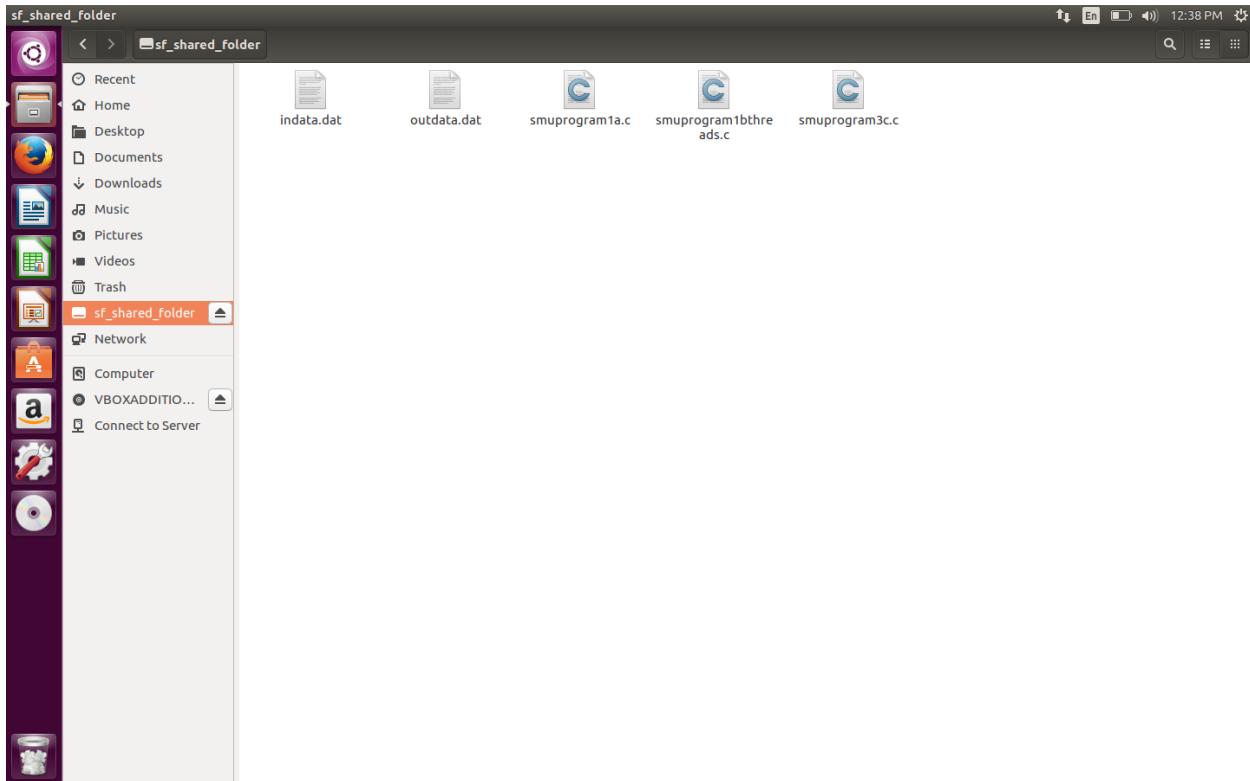
Now enter the path of the folder present in pc in our virtualBox and click on automount.

Then go to terminal in our VirtualBox and follow the below steps as shown.



And then restart.

After restarting we can find the shared folders in our virtualBox.



Open the terminal and then compile program 1a

```
nikhila@nikhila-VirtualBox: ~/smucode$ gcc smuprogramia.c -o smuprogramia.out
nikhila@nikhila-VirtualBox:~/smucode$ ./smuprogramia.out
1924145348608 17179869184 112 40171497
1889785610240 17179869184 110 10582481
377957122048 17179869184 22 24417189
1391569403904 17179869184 81 4062121
1254130450432 17179869184 73 5487515
773094113280 17179869184 45 8985853
1030792151040 17179869184 60 42173417
721554505728 17179869184 42 41792379
1511828488192 17179869184 88 16803540
1236950581248 17179869184 72 29179344
1065151889408 17179869184 62 63624324
1460288880640 17179869184 85 15405611
1889785610240 17179869184 110 20364589
2095944040448 17179869184 122 48691586
584115552256 17179869184 34 20964349
773094113280 17179869184 45 23471030
240518168576 17179869184 14 14933359
1511828488192 17179869184 88 29054171
1803886264320 17179869184 105 92207532
171798691840 17179869184 18 16478574
824633720832 17179869184 48 6298948
1168231104512 17179869184 68 23504953
481036337152 17179869184 28 4263897
962072674304 17179869184 56 16304010
687194767360 17179869184 46 31726581
962072674304 17179869184 56 9730442
755914244096 17179869184 44 12214446
1236950581248 17179869184 72 3455334
876173328384 17179869184 51 65125921
1803886264320 17179869184 105 4957346
1958505086976 17179869184 114 8013466
1906965479424 17179869184 111 30931992
2113123909632 17179869184 123 5817398
601295421440 17179869184 35 411378
841813590016 17179869184 49 59328332
21474836488000 17179869184 125 8788259
2113123909632 17179869184 123 10256678
1546188226560 17179869184 90 27770810
1752346656768 17179869184 182 28344107
755914244096 17179869184 44 19873003
463856467968 17179869184 27 1427171
1340029796352 17179869184 78 51349624
223338299392 17179869184 13 19590749
584115552256 17179869184 34 16746331
412316860416 17179869184 24 38663941
618475290624 17179869184 36 27123984
```

```

nikhila@nikhila-VirtualBox: ~/smucode
[1] 1672 S nikhila 0.0 0.8 366708 8768 ? Ssl 20:56 0:00 /usr/lib/x86_64-linux-gnu/indicator-power/indicator-power-service
nikhila 1683 0.0 1.3 788892 13312 ? Ssl 20:56 0:00 /usr/lib/x86_64-linux-gnu/indicator-datetime/indicator-datetime-service
nikhila 1684 0.0 2.5 658388 26328 ? Ssl 20:56 0:00 /usr/lib/x86_64-linux-gnu/indicator-keyboard/indicator-keyboard-service --use-gtk
nikhila 1685 0.0 1.0 682896 10248 ? Ssl 20:56 0:00 /usr/lib/x86_64-linux-gnu/indicator-sound/indicator-sound-service
nikhila 1691 0.0 2.1 556832 21908 ? Ssl 20:56 0:00 /usr/lib/x86_64-linux-gnu/indicator-printers/indicator-printers-service
nikhila 1694 0.0 0.8 512316 8168 ? Ssl 20:56 0:00 /usr/lib/x86_64-linux-gnu/indicator-session/indicator-session-service
nikhila 1700 0.0 1.2 403148 12876 ? Ssl 20:56 0:00 /usr/lib/x86_64-linux-gnu/indicator-application/indicator-application-service
nikhila 1726 0.0 1.8 924504 18876 ? Ssl 20:56 0:00 /usr/lib/evolution/evolution-source-registry
nikhila 1739 0.0 0.7 442012 7444 ? Ssl 20:56 0:00 /usr/bin/pulseaudio --start --log-target=syslog
nikhila 1884 0.0 5.2 876856 53156 ? Sl 20:56 0:00 /usr/lib/evolution/evolution-calendar-factory
nikhila 1915 0.1 5.4 1041120 55668 ? Sl 20:56 0:05 nautilus -n
nikhila 1917 0.0 7.3 750424 74672 ? Sl 20:56 0:00 nm-applet
nikhila 1918 0.0 3.1 672332 31928 ? Sl 20:56 0:00 /usr/lib/evolution/evolution-calendar-factory-subprocess --factory contacts --bus-name
nikhila 1922 0.0 4.5 829884 46626 ? Sl 20:56 0:00 /usr/lib/polkit-gnome/polkit-gnome-authentication-agent-1
nikhila 1923 0.0 2.1 438644 21740 ? Sl 20:56 0:00 /usr/lib/unity-settings-daemon/unity-fallback-mount-helper
nikhila 1926 0.0 1.9 583988 19944 ? Sl 20:56 0:00 /usr/lib/unity-settings-daemon/unity-fallback-mount-helper
nikhila 1930 0.0 0.8 377124 8964 ? Sl 20:56 0:00 /usr/lib/gvfs/gvfs-udisks2-volume-monitor
root 1940 0.1 1.1 382320 11372 ? Ssl 20:56 0:00 /usr/lib/udisks2/udisksd --no-debug
nikhila 1953 0.0 4.4 814136 45596 ? Sl 20:56 0:00 /usr/lib/evolution/evolution-calendar-factory-subprocess --factory local --bus-name or
nikhila 1958 0.0 1.2 704360 12916 ? Sl 20:56 0:00 /usr/lib/evolution/evolution-addressbook-factory
nikhila 1983 0.0 0.4 264600 4840 ? Sl 20:56 0:00 /usr/lib/gvfs/gvfs-goa-volume-monitor
nikhila 1990 0.0 0.8 410684 8120 ? Sl 20:56 0:00 /usr/lib/gvfs/gvfs-afc-volume-monitor
nikhila 1997 0.0 1.2 788872 12752 ? Sl 20:56 0:00 /usr/lib/evolution/evolution-addressbook-factory-subprocess --factory local --bus-name
nikhila 2004 0.0 0.4 278788 4672 ? Sl 20:56 0:00 /usr/lib/gvfs/gvfs-ghostot2-volume-monitor
root 2018 0.0 3.1 635312 32360 ? Sl 20:56 0:00 /usr/lib/x86_64-linux-gnu/fwupd/fwupd
nikhila 2032 0.0 0.4 266592 4584 ? Sl 20:56 0:00 /usr/lib/gvfs/gvfs-mtp-volume-monitor
nikhila 2064 0.0 0.8 370716 8172 ? Sl 20:56 0:00 /usr/lib/gvfs/gvfsd-trash --spawner :1.5 /org/gtk/gvfs/exec_spaw/0
nikhila 2098 0.0 1.4 497944 15888 ? Sl 20:56 0:00 zeitgeist-databus
nikhila 2105 0.0 0.0 4508 696 ? Sl 20:56 0:00 /bin/sh -c /usr/lib/x86_64-linux-gnu/zeitgeist/zeitgeist-maybe-vacuum; /usr/bin/zeitge
nikhila 2109 0.0 0.8 358008 8984 ? Sl 20:56 0:00 /usr/bin/zeitgeist-daemon
nikhila 2117 0.0 1.4 321436 14492 ? Sl 20:56 0:00 /usr/lib/x86_64-linux-gnu/zeitgeist-fts
nikhila 2138 0.0 0.7 371136 7648 ? Sl 20:56 0:00 /usr/lib/gvfs/gvfsd-network --spawner :1.5 /org/gtk/gvfs/exec_spaw/1
nikhila 2164 0.0 0.5 376984 6072 ? Sl 20:56 0:00 /usr/lib/gvfs/gvfsd-dnssd --spawner :1.5 /org/gtk/gvfs/exec_spaw/4
nikhila 2198 0.0 2.5 607032 25872 ? Sl 20:57 0:00 update-notifier
nikhila 2225 0.0 0.5 193120 5528 ? Sl 20:57 0:00 /usr/lib/gvfs/gvfsd-metadata
nikhila 2238 0.0 0.8 530296 8784 ? Sl 20:58 0:00 /usr/lib/x86_64-linux-gnu/deja-dup/deja-dup-monitor
nikhila 2283 0.0 1.5 654048 15896 ? Sl 21:02 0:00 /usr/lib/x86_64-linux-gnu/unity-scope-home/unity-scope-home
nikhila 2295 0.0 2.0 656852 21156 ? Sl 21:02 0:00 /usr/bin/unity-scope-loader applications/applications.scope applications/scopes.scope
nikhila 2296 0.0 1.2 563912 12496 ? Sl 21:02 0:00 /usr/lib/x86_64-linux-gnu/unity-lens-files/unity-files-daemon
nikhila 2328 0.1 3.7 674124 37516 ? Sl 21:02 0:05 /usr/lib/gnome-terminal/gnome-terminal-server
nikhila 2335 0.0 0.4 29448 4976 pts/4 Ss 21:02 0:00 bash
root 2444 0.0 0.0 0 0 ? S 21:11 0:01 [kworker/0:0]
root 2485 0.0 0.0 0 0 ? S 21:24 0:00 [kworker/u2:1]
root 2531 0.0 0.0 0 0 ? S 21:46 0:00 [kworker/u2:2]
root 2607 0.0 0.0 0 0 ? S 22:02 0:00 [kworker/u2:2]
root 2670 0.0 0.0 0 0 ? S 22:16 0:00 [kworker/u2:0]
nikhila 2722 85.5 0.0 4356 688 pts/4 S+ 22:26 0:45 ./smuprogram1b.out
nikhila 2726 0.0 0.0 4508 756 pts/4 S+ 22:27 0:00 sh -c ps aux
nikhila 2727 0.0 0.3 44432 3264 pts/4 R+ 22:27 0:00 ps aux
process id 2722
nikhila@nikhila-VirtualBox:~/smucode$ 

```

Now compile and run 1b

```

nikhila@nikhila-VirtualBox: ~/smucode
nikhila@nikhila-VirtualBox:~/smucode$ gcc -pthread smuprogram1bthreads.c -o smuprogram1bthreads.out
nikhila@nikhila-VirtualBox:~/smucode$ ./smuprogram1bthreads.out
In Main: creating thread 0
In main: creating thread 1
1024 17179869184 0 38402082 1
1024 17179869184 0 10276730 2
1024 17179869184 0 24039879 3
1024 17179869184 0 4062121 4
1024 17179869184 0 5046625 5
1024 17179869184 0 8815870 6
1024 17179869184 0 41496236 7
1024 17179869184 0 41060153 8
1024 17179869184 0 15121439 9
1024 17179869184 0 28824057 10
1024 17179869184 0 62663765 11
1024 17179869184 0 15363952 12
1024 17179869184 0 18900663 13
1024 17179869184 0 47993092 14
1024 17179869184 0 20964349 15
1024 17179869184 0 22680930 16
1024 17179869184 0 13921968 17
1024 17179869184 0 27952392 18
1024 17179869184 0 90922622 19
1024 17179869184 0 15640929 20
1024 17179869184 0 6073336 21
1024 17179869184 0 23022748 22
1024 17179869184 0 3722440 23
1024 17179869184 0 16304010 24
1024 17179869184 0 31497544 25
1024 17179869184 0 9311848 26
1024 17179869184 0 12006727 27
1024 17179869184 0 3162512 28
1024 17179869184 0 64374083 29
1024 17179869184 0 4566618 30
1024 17179869184 0 7725897 31
1024 17179869184 0 30062215 32
1024 17179869184 0 5817398 33
1024 17179869184 0 411378 34
1024 17179869184 0 57406146 35
1024 17179869184 0 8141651 36
1024 17179869184 0 10256678 37
1024 17179869184 0 27110067 38
1024 17179869184 0 27098961 39
1024 17179869184 0 19494173 40
1024 17179869184 0 1427171 41
1024 17179869184 0 50926845 42
1024 17179869184 0 19053468 43
1024 17179869184 0 16205640 44
1024 17179869184 0 36933851 45
1024 17179869184 0 26945829 46
1024 17179869184 0 30409861 47

```

```

nikhila@nikhila-VirtualBox: ~/smucode
[1] 1915 S nikhila 1683 0.0 1.3 788892 13312 ? Ssl 20:56 0:00 /usr/lib/x86_6
nikhila 1684 0.0 2.5 658388 26328 ? Ssl 20:56 0:00 /usr/lib/x86_6
nikhila 1685 0.0 1.0 682896 10248 ? Ssl 20:56 0:00 /usr/lib/x86_6
nikhila 1691 0.0 2.1 556832 21908 ? Ssl 20:56 0:00 /usr/lib/x86_6
nikhila 1694 0.0 0.8 512316 8168 ? Ssl 20:56 0:00 /usr/lib/x86_6
nikhila 1700 0.0 1.2 403148 12876 ? Ssl 20:56 0:00 /usr/lib/x86_6
nikhila 1726 0.0 1.8 924504 18876 ? Sl 20:56 0:00 /usr/lib/evolu
nikhila 1739 0.0 0.7 442012 7444 ? S<l 20:56 0:00 /usr/bin/pulse
nikhila 1884 0.0 5.2 876856 53156 ? Sl 20:56 0:00 /usr/lib/evolu
nikhila 1915 0.0 5.4 1041120 55668 ? Sl 20:56 0:05 nautilus -n
nikhila 1917 0.0 7.3 750424 74672 ? Sl 20:56 0:00 /usr/bin/gnome
nikhila 1918 0.0 3.1 672332 31928 ? Sl 20:56 0:00 nm-applet
nikhila 1922 0.0 4.5 829884 46620 ? Sl 20:56 0:00 /usr/lib/evolu
nikhila 1923 0.0 2.1 438644 21740 ? Sl 20:56 0:00 /usr/lib/polic
nikhila 1926 0.0 1.9 583988 19944 ? Sl 20:56 0:00 /usr/lib/unity
nikhila 1930 0.0 0.8 377124 8964 ? Sl 20:56 0:00 /usr/lib/gvfs/
root 1940 0.0 1.1 382320 11372 ? Ssl 20:56 0:00 /usr/lib/udisks
nikhila 1953 0.0 4.4 814136 45596 ? Sl 20:56 0:00 /usr/lib/evolu
nikhila 1958 0.0 1.2 704360 12916 ? Sl 20:56 0:00 /usr/lib/evolu
nikhila 1983 0.0 0.4 264600 4840 ? Sl 20:56 0:00 /usr/lib/gvfs/
nikhila 1990 0.0 0.8 418684 8128 ? Sl 20:56 0:00 /usr/lib/gvfs/
nikhila 1997 0.0 1.2 788872 12752 ? Sl 20:56 0:00 /usr/lib/evolu
nikhila 2064 0.0 0.4 278788 4672 ? Sl 20:56 0:00 /usr/lib/gvfs/
root 2018 0.0 3.1 635112 32160 ? Sl 20:56 0:00 /usr/lib/x86_6
nikhila 2033 0.0 0.4 266500 4884 ? Sl 20:56 0:00 /usr/lib/gvfs/
nikhila 2098 0.0 0.8 39716 8172 ? Sl 20:56 0:00 /usr/lib/gvfs/
nikhila 2105 0.0 0.0 4508 696 ? Sl 20:56 0:00 /usr/bin/sh
nikhila 2109 0.0 0.8 358008 8984 ? Sl 20:56 0:00 /usr/bin/zetlg
nikhila 2117 0.0 1.4 321436 14492 ? Sl 20:56 0:00 /usr/lib/x86_6
nikhila 2138 0.0 0.7 371136 7648 ? Sl 20:56 0:00 /usr/lib/gvfs/
nikhila 2164 0.0 0.5 376984 6972 ? Sl 20:56 0:00 /usr/lib/gvfs/
nikhila 2198 0.0 2.5 607032 25888 ? Sl 20:57 0:00 update-notifie
nikhila 2225 0.0 0.5 193128 5528 ? Sl 20:57 0:00 /usr/lib/gvfs/
nikhila 2238 0.0 0.8 538296 8784 ? Sl 20:58 0:00 /usr/lib/x86_6
nikhila 2283 0.0 1.5 654048 15896 ? Sl 21:02 0:00 /usr/lib/x86_6
nikhila 2295 0.0 2.0 656852 21156 ? Sl 21:02 0:00 /usr/bin/unity
nikhila 2296 0.0 1.2 563912 12496 ? Sl 21:02 0:00 /usr/lib/x86_6
nikhila 2328 0.1 3.6 673740 37388 ? Sl 21:02 0:00 /usr/lib/gnome
nikhila 2335 0.0 0.4 29448 4976 pts/4 Ss 21:02 0:00 bash
root 2444 0.0 0.0 0 0 ? S 21:11 0:01 [kworker/0:0]
root 2485 0.0 0.0 0 0 ? S 21:24 0:00 [kworker/u2:1]
root 2531 0.0 0.0 0 0 ? S 21:46 0:00 [kworker/0:2]
root 2607 0.0 0.0 0 0 ? S 22:02 0:00 [kworker/u2:2]
root 2670 0.0 0.0 0 0 ? S 22:16 0:00 [kworker/u2:0]
nikhila 2760 93.1 0.0 90584 956 pts/4 S+ 22:34 0:39 ./smuprogram1b
nikhila 2765 0.0 0.0 4508 796 pts/4 S+ 22:34 0:00 sh -c ps aux
nikhila 2766 0.0 0.3 44432 3284 pts/4 R+ 22:34 0:00 ps aux
process id 2766
nikhila@nikhila-VirtualBox:~/smucode$ #
nikhila@nikhila-VirtualBox:~/smucode$ 
```

Similarly compile and run 3c

```

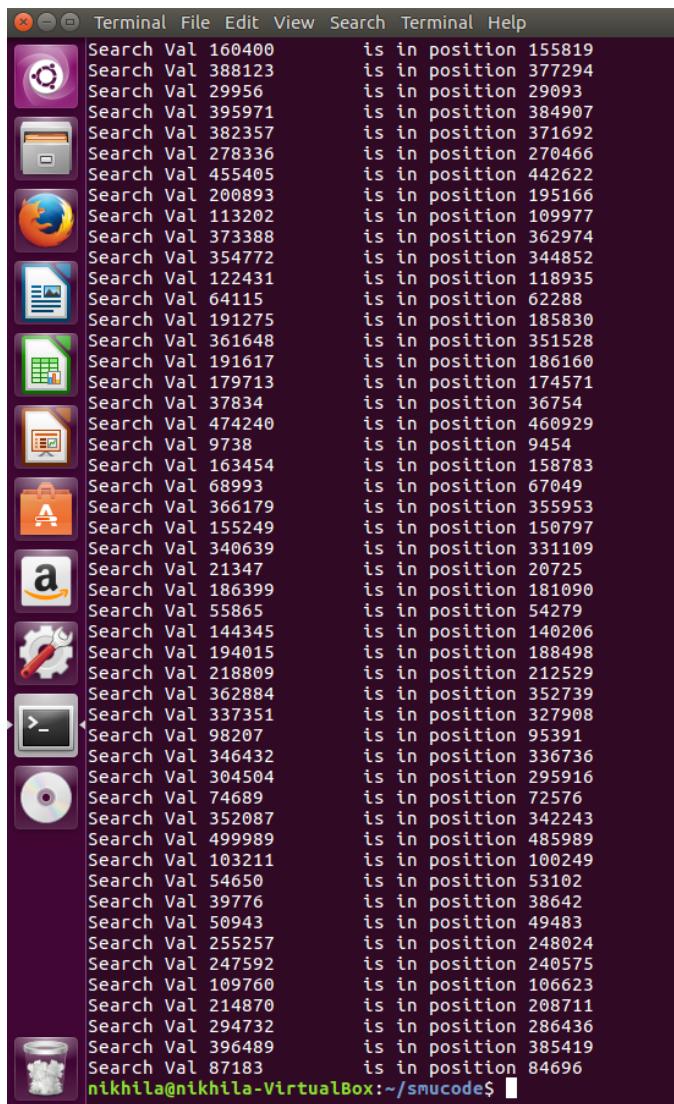
nikhila@nikhila-VirtualBox: ~/smucode
nikhila@nikhila-VirtualBox:~/smucode$ gcc -pthread smuprogram3c.c -o smuprogram3c.out
nikhila@nikhila-VirtualBox:~/smucode$ ./smuprogram3c.out
100000 iterations
200000 iterations
300000 iterations
400000 iterations
USER PID %CPU XMEM VSZ RSS TTY STAT START TIME COMMAND
root 1 0.0 0.4 119792 4292 ? Ss 20:55 0:00 /sbin/init splash
root 2 0.0 0.0 0 0 ? S 20:55 0:00 [kthreadd]
root 4 0.0 0.0 0 0 ? S< 20:55 0:00 [kworker/0:0H]
root 6 0.0 0.0 0 0 ? S 20:55 0:00 [ksoftirqd/0]
root 7 0.0 0.0 0 0 ? S 20:55 0:00 [rcu_sched]
root 8 0.0 0.0 0 0 ? S 20:55 0:00 [rcu_bh]
root 9 0.0 0.0 0 0 ? S 20:55 0:00 [migration/0]
root 10 0.0 0.0 0 0 ? S< 20:55 0:00 [lru-add-drain]
root 11 0.0 0.0 0 0 ? S 20:55 0:00 [watchdog/0]
root 12 0.0 0.0 0 0 ? S 20:55 0:00 [cpuhp/0]
root 13 0.0 0.0 0 0 ? S 20:55 0:00 [kdevtmpfs]
root 14 0.0 0.0 0 0 ? S< 20:55 0:00 [netns]
root 15 0.0 0.0 0 0 ? S 20:55 0:00 [khungtaskd]
root 16 0.0 0.0 0 0 ? S 20:55 0:00 [oom_reaper]
root 17 0.0 0.0 0 0 ? S< 20:55 0:00 [writeback]
root 18 0.0 0.0 0 0 ? S 20:55 0:00 [kcompactd0]
root 19 0.0 0.0 0 0 ? SN 20:55 0:00 [ksmd]
root 20 0.0 0.0 0 0 ? SN 20:55 0:00 [khugepaged]
root 21 0.0 0.0 0 0 ? S< 20:55 0:00 [crypto]
root 22 0.0 0.0 0 0 ? S< 20:55 0:00 [kintegrityd]
root 23 0.0 0.0 0 0 ? S< 20:55 0:00 [bioset]
root 24 0.0 0.0 0 0 ? S< 20:55 0:00 [blklockd]
root 25 0.0 0.0 0 0 ? S< 20:55 0:00 [ata_sff]
root 26 0.0 0.0 0 0 ? S< 20:55 0:00 [md]
root 27 0.0 0.0 0 0 ? S< 20:55 0:00 [devfreq_wq]
root 28 0.0 0.0 0 0 ? S< 20:55 0:00 [watchdogd]
root 32 0.0 0.0 0 0 ? S 20:55 0:00 [kauditd]
root 33 0.0 0.0 0 0 ? S 20:55 0:00 [kswapd]
root 34 0.0 0.0 0 0 ? S< 20:55 0:00 [vmstat]
root 35 0.0 0.0 0 0 ? S< 20:55 0:00 [bioset]
root 36 0.0 0.0 0 0 ? S 20:55 0:00 [cryptfs-kthrea]
root 76 0.0 0.0 0 0 ? S< 20:55 0:00 [kthrotld]
root 77 0.0 0.0 0 0 ? S 20:55 0:00 [acpi_thermal_pm]
root 78 0.0 0.0 0 0 ? S< 20:55 0:00 [bioset]
root 79 0.0 0.0 0 0 ? S 20:55 0:00 [bioset]
root 80 0.0 0.0 0 0 ? S< 20:55 0:00 [bioset]
root 81 0.0 0.0 0 0 ? S< 20:55 0:00 [bioset]
root 82 0.0 0.0 0 0 ? S< 20:55 0:00 [bioset]
root 83 0.0 0.0 0 0 ? S< 20:55 0:00 [bioset]
root 84 0.0 0.0 0 0 ? S< 20:55 0:00 [bioset]
root 85 0.0 0.0 0 0 ? S< 20:55 0:00 [bioset]
root 86 0.0 0.0 0 0 ? S 20:55 0:00 [scsi_eh_0]
root 87 0.0 0.0 0 0 ? S< 20:55 0:00 [scsi_tmf_0]
root 88 0.0 0.0 0 0 ? S 20:55 0:00 [scsi_eh_1]
```

```
nikhila@nikhila-VirtualBox: ~/smucode

nikhila 1683 0.0 1.3 788892 13312 ? Ssl 20:56 0:00 /usr/lib/x86_64-linux-gnu/indicator-datetime/indicator-datetime-service
nikhila 1684 0.0 2.5 658388 26328 ? Ssl 20:56 0:00 /usr/lib/x86_64-linux-gnu/indicator-keyboard/indicator-keyboard-service --use-gtk
nikhila 1685 0.0 1.0 682896 10248 ? Ssl 20:56 0:00 /usr/lib/x86_64-linux-gnu/indicator-sound/indicator-sound-service
nikhila 1691 0.0 2.1 556832 21908 ? Ssl 20:56 0:00 /usr/lib/x86_64-linux-gnu/indicator-printers/indicator-printers-service
nikhila 1694 0.0 0.8 512316 8168 ? Ssl 20:56 0:00 /usr/lib/x86_64-linux-gnu/indicator-session/indicator-session-service
nikhila 1700 0.0 1.2 403148 12876 ? Ssl 20:56 0:00 /usr/lib/x86_64-linux-gnu/indicator-application/indicator-application-service
nikhila 1726 0.0 1.8 924504 18876 ? Sl 20:56 0:00 /usr/lib/evolution/evolution-source-registry
nikhila 1739 0.0 0.7 442012 7444 ? Sl 20:56 0:00 /usr/bin/pulseaudio --start --log-target=syslog
nikhila 1884 0.0 5.2 876856 53156 ? Sl 20:56 0:00 /usr/lib/evolution/evolution-calendar-factory
nikhila 1915 0.1 5.4 1041120 55668 ? Sl 20:56 0:05 nautilus -n
nikhila 1917 0.0 7.3 750424 74672 ? Sl 20:56 0:00 /usr/bin/gnome-software --application-service
nikhila 1918 0.0 3.1 672332 31928 ? Sl 20:56 0:00 nm-applet
nikhila 1922 0.0 4.5 829884 46820 ? Sl 20:56 0:00 /usr/lib/evolution/evolution-calendar-factory-subprocess --factory contacts --bus-name
nikhila 1923 0.0 2.1 438644 21740 ? Sl 20:56 0:00 /usr/lib/polkit-gnome/polkit-gnome-authentication-agent-1
nikhila 1926 0.0 1.9 583988 19944 ? Sl 20:56 0:00 /usr/lib/unity-settings-daemon/unity-fallback-mount-helper
nikhila 1930 0.0 0.8 377124 8964 ? Sl 20:56 0:00 /usr/lib/gvfs/gvfs-udisks2-volume-monitor
root 1940 0.0 1.1 382320 11372 ? Ssl 20:56 0:00 /usr/lib/udisks2/udisks2 --no-debug
nikhila 1953 0.4 4.4 814136 45596 ? Sl 20:56 0:00 /usr/lib/evolution/evolution-calendar-factory-subprocess --factory local --bus-name or
nikhila 1958 0.0 1.2 704360 12916 ? Sl 20:56 0:00 /usr/lib/evolution/evolution-addressbook-factory
nikhila 1983 0.0 0.4 264600 4840 ? Sl 20:56 0:00 /usr/lib/gvfs/gvfs-goa-volume-monitor
nikhila 1990 0.0 0.8 416864 8120 ? Sl 20:56 0:00 /usr/lib/gvfs/gvfs-afc-volume-monitor
nikhila 1997 0.0 1.2 788072 12752 ? Sl 20:56 0:00 /usr/lib/evolution/evolution-addressbook-factory-subprocess --factory local --bus-name
nikhila 2004 0.0 0.4 278788 4672 ? Sl 20:56 0:00 /usr/lib/gvfs/gvfs-photot-volume-monitor
root 2018 0.0 3.1 635312 32360 ? Sl 20:56 0:00 /usr/lib/x86_64-linux-gnu/fwupd/fwupd
nikhila 2032 0.0 0.4 266592 4584 ? Sl 20:56 0:00 /usr/lib/gvfs/gvfs-ntp-volume-monitor
nikhila 2064 0.0 0.8 370716 8172 ? Sl 20:56 0:00 /usr/lib/gvfs/gvfsd-trash --spawner :1.5 /org/gtk/gvfs/exec_spaw/0
nikhila 2098 0.0 1.4 497944 15088 ? Sl 20:56 0:00 zeitgeist-databus
nikhila 2185 0.0 0.0 4588 696 ? S 20:56 0:00 /bin/sh -c /usr/lib/x86_64-linux-gnu/zeitgeist/zeitgeist-maybe-vacuum; /usr/bin/zeitge
nikhila 2109 0.0 0.8 358088 8984 ? Sl 20:56 0:00 /usr/bin/zeitgeist-daemon
nikhila 2117 0.0 1.4 321436 14492 ? Sl 20:56 0:00 /usr/lib/x86_64-linux-gnu/zeitgeist-fts
nikhila 2138 0.0 0.7 371136 7648 ? Sl 20:56 0:00 /usr/lib/gvfs/gvfsd-network --spawner :1.5 /org/gtk/gvfs/exec_spaw/1
nikhila 2164 0.0 0.5 376984 6072 ? Sl 20:56 0:00 /usr/lib/gvfs/gvfsd-dnsdd --spawner :1.5 /org/gtk/gvfs/exec_spaw/4
nikhila 2198 0.0 2.5 607032 25872 ? Sl 20:57 0:00 update-notifier
nikhila 2225 0.0 0.5 193120 5528 ? Sl 20:57 0:00 /usr/lib/gvfs/gvfsd-metadata
nikhila 2238 0.0 0.8 530296 8784 ? Sl 20:58 0:00 /usr/lib/x86_64-linux-gnu/deja-dup/deja-dup-monitor
nikhila 2283 0.0 1.5 654048 15896 ? Sl 21:02 0:00 /usr/lib/x86_64-linux-gnu/unity-scope-home/unity-scope-home
nikhila 2295 0.0 2.0 656852 21156 ? Sl 21:02 0:00 /usr/bin/unity-scope-loader applications/applications.scope applications/scopes.scope
nikhila 2296 0.0 1.2 563912 12496 ? Sl 21:02 0:00 /usr/lib/x86_64-linux-gnu/unity-lens-files/unity-files-daemon
nikhila 2328 0.1 3.6 673868 37456 ? Sl 21:02 0:04 /usr/lib/gnome-terminal/gnome-terminal-server
nikhila 2335 0.0 0.4 29448 4976 pts/4 Ss 21:02 0:00 bash
root 2444 0.0 0.0 0 0 ? S 21:11 0:01 [kworker/0:0]
root 2485 0.0 0.0 0 0 ? S 21:24 0:00 [kworker/u2:1]
root 2531 0.0 0.0 0 0 ? S 21:46 0:00 [kworker/u2:2]
root 2607 0.0 0.0 0 0 ? S 22:02 0:00 [kworker/u2:2]
root 2670 0.0 0.0 0 0 ? S 22:16 0:00 [kworker/u2:0]
nikhila 2694 35.0 0.6 307144 7064 pts/4 S+ 22:20 0:00 ./smuprogram3c.out
nikhila 2699 0.0 0.0 4588 796 pts/4 S+ 22:20 0:00 sh -c ps aux
nikhila 2701 0.0 0.3 44432 3308 pts/4 R+ 22:20 0:00 ps aux
process id 2694
nikhila@nikhila-VirtualBox:~/smucode$ #
nikhila@nikhila-VirtualBox:~/smucode$ #
```

Now for the outdata.dat

cat outdata.dat gives



```
Terminal File Edit View Search Terminal Help
Search Val 160400      is in position 155819
Search Val 388123      is in position 377294
Search Val 29956       is in position 29093
Search Val 395971      is in position 384907
Search Val 382357      is in position 371692
Search Val 278336      is in position 270466
Search Val 455405      is in position 442622
Search Val 200893      is in position 195166
Search Val 113202      is in position 109977
Search Val 373388      is in position 362974
Search Val 354772      is in position 344852
Search Val 122431      is in position 118935
Search Val 64115       is in position 62288
Search Val 191275      is in position 185830
Search Val 361648      is in position 351528
Search Val 191617      is in position 186160
Search Val 179713      is in position 174571
Search Val 37834       is in position 36754
Search Val 474240      is in position 460929
Search Val 9738        is in position 9454
Search Val 163454      is in position 158783
Search Val 68993       is in position 67049
Search Val 366179      is in position 355953
Search Val 155249      is in position 150797
Search Val 340639      is in position 331109
Search Val 21347       is in position 20725
Search Val 186399      is in position 181090
Search Val 55865       is in position 54279
Search Val 144345      is in position 140206
Search Val 194015      is in position 188498
Search Val 218809      is in position 212529
Search Val 362884      is in position 352739
Search Val 337351      is in position 327908
Search Val 98207       is in position 95391
Search Val 346432      is in position 336736
Search Val 304504      is in position 295916
Search Val 74689       is in position 72576
Search Val 352087      is in position 342243
Search Val 499989      is in position 485989
Search Val 103211      is in position 100249
Search Val 54650       is in position 53102
Search Val 39776       is in position 38642
Search Val 50943       is in position 49483
Search Val 255257      is in position 248024
Search Val 247592      is in position 240575
Search Val 109760      is in position 106623
Search Val 214870      is in position 208711
Search Val 294732      is in position 286436
Search Val 396489      is in position 385419
Search Val 87183       is in position 84696
nikhila@nikhila-VirtualBox:~/smucode$
```

Now for indata.dat

Cat in data.dat

```
nikhila@nikhila-VirtualBox:~/smucode$ cat indata.dat
153685,499950
160400,499951
388123,499952
29956,499953
395971,499954
382357,499955
278336,499956
455405,499957
200893,499958
113202,499959
373388,499960
354772,499961
122431,499962
64115,499963
191275,499964
361648,499965
191617,499966
179713,499967
37834,499968
474240,499969
9738,499970
163454,499971
68993,499972
366179,499973
155249,499974
340639,499975
21347,499976
186399,499977
55865,499978
144345,499979
194015,499980
218809,499981
362884,499982
337351,499983
98207,499984
346432,499985
304504,499986
74689,499987
352087,499988
499989,499989
103211,499990
54650,499991
39776,499992
50943,499993
255257,499994
247592,499995
109760,499996
214870,499997
294732,499998
396489,499999
87183,500000nikhila@nikhila-VirtualBox:~/smucode$
```