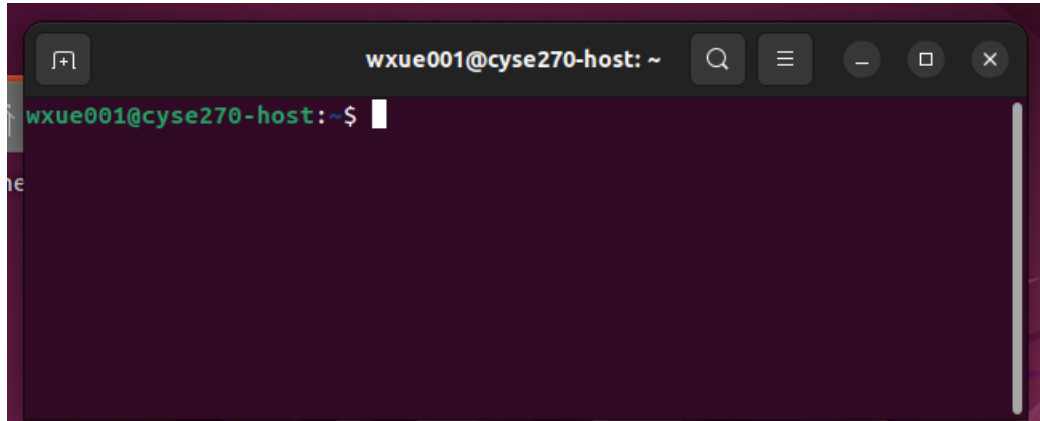


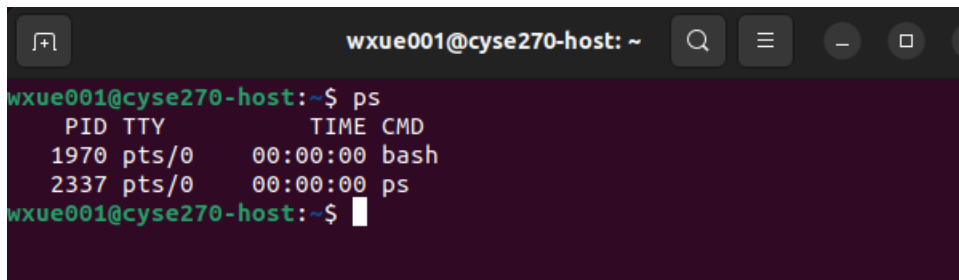
Lab 13 – System Admin

Task A: **Managing System Processes** (40 points)

Step 1. Open the terminal in your VM.



Step 2. List the processes that are running in the current shell.



Step 3. List all processes that are running on this system.

```
wxue001@cyse270-host:~$ ps -e
  PID TTY          TIME CMD
    1 ?            00:00:01 systemd
    2 ?            00:00:00 kthreadd
    3 ?            00:00:00 rcu_gp
    4 ?            00:00:00 rcu_par_gp
    5 ?            00:00:00 slub_flushwq
    6 ?            00:00:00 netns
    8 ?            00:00:00 kworker/0:0H-events_highpri
   10 ?            00:00:00 mm_percpu_wq
   11 ?            00:00:00 rcu_tasks_kthread
   12 ?            00:00:00 rcu_tasks_rude_kthread
   13 ?            00:00:00 rcu_tasks_trace_kthread
   14 ?            00:00:00 ksoftirqd/0
   15 ?            00:00:00 rcu_preempt
   16 ?            00:00:00 migration/0
   17 ?            00:00:00 idle_inject/0
   19 ?            00:00:00 cpuhp/0
   20 ?            00:00:00 cpuhp/1
   21 ?            00:00:00 idle_inject/1
   22 ?            00:00:00 migration/1
   23 ?            00:00:00 ksoftirqd/1
   25 ?            00:00:00 kworker/1:0H-events_highpri
   26 ?            00:00:00 kdevtmpfs
   27 ?            00:00:00 inet_frag_wq
   28 ?            00:00:00 kauditd
   29 ?            00:00:00 khungtaskd
   31 ?            00:00:00 oom_reaper
   33 ?            00:00:00 writeback
   34 ?            00:00:00 kcompactd0
   35 ?            00:00:00 ksm
   36 ?            00:00:00 khugepaged
```

Step 4: Display all processes that are running by using the **top** command. (Keep this command running for the next few steps.)

```
top - 23:08:15 up 32 min, 1 user, load average: 0.20, 0.07, 0.02
Tasks: 190 total, 2 running, 188 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.5 us, 1.0 sy, 0.0 ni, 98.3 id, 0.0 wa, 0.0 hi, 0.2 si, 0.0 st
MiB Mem : 1975.2 total, 70.3 free, 765.6 used, 1139.3 buff/cache
MiB Swap: 2680.0 total, 2679.7 free, 0.3 used, 1023.8 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
1122	wxue001	20	0	4229724	329504	132612	R	1.7	16.3	0:33.76	gnome-s+
1936	wxue001	20	0	563928	54024	40632	S	1.0	2.7	0:04.89	gnome-t+
441	systemd+	20	0	14828	6168	5380	S	0.7	0.3	0:02.49	systemd+
46	root	20	0	0	0	0	I	0.3	0.0	0:00.34	kworker+
2314	root	20	0	0	0	0	I	0.3	0.0	0:01.60	kworker+
1	root	20	0	101248	12032	8288	S	0.0	0.6	0:01.10	systemd
2	root	20	0	0	0	0	S	0.0	0.0	0:00.01	kthreadd
3	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	rcu_gp
4	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	rcu_par+
5	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	slub_fl+
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	netns
8	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker+
10	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	mm_perc+
11	root	20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_tas+
12	root	20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_tas+
13	root	20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_tas+
14	root	20	0	0	0	0	S	0.0	0.0	0:00.14	ksoftir+
15	root	20	0	0	0	0	I	0.0	0.0	0:01.06	rcu_pre+
16	root	rt	0	0	0	0	S	0.0	0.0	0:00.01	migrati+
17	root	-51	0	0	0	0	S	0.0	0.0	0:00.00	idle_in+
19	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/0
20	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/1
21	root	-51	0	0	0	0	S	0.0	0.0	0:00.00	idle_in+
22	root	rt	0	0	0	0	S	0.0	0.0	0:00.22	migrati+
23	root	20	0	0	0	0	S	0.0	0.0	0:00.24	ksoftir+
25	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker+
26	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kdevtmp+
27	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	inet fr+

Step 5: While in the top command, display the help screen.

```
wxue001@cyse270-host: ~  
Help for Interactive Commands - procps-ng 3.3.17  
Window 1:Def: Cumulative mode Off. System: Delay 3.0 secs; Secure mode Off.  
  
Z,B,E,e Global: 'Z' colors; 'B' bold; 'E'/'e' summary/task memory scale  
l,t,m,I Toggle: 'l' load avg; 't' task/cpu; 'm' memory; 'I' Irix mode  
0,1,2,3,4 Toggle: '0' zeros; '1/2/3' cpu/numa views; '4' cpus two abreast  
f,F,X Fields: 'f'/'F' add/remove/order/sort; 'X' increase fixed-width  
  
L,&,<,> . Locate: 'L'/'&' find/again; Move sort column: '<'/'>' left/right  
R,H,J,C . Toggle: 'R' Sort; 'H' Threads; 'J' Num justify; 'C' Coordinates  
c,i,S,j . Toggle: 'c' Cmd name/line; 'i' Idle; 'S' Time; 'j' Str justify  
x,y . Toggle highlights: 'x' sort field; 'y' running tasks  
z,b . Toggle: 'z' color/mono; 'b' bold/reverse (only if 'x' or 'y')  
u,U,o,O . Filter by: 'u'/'U' effective/any user; 'o'/'O' other criteria  
n,#,^O . Set: 'n'/'#' max tasks displayed; Show: Ctrl+'O' other filter(s)  
V,v . Toggle: 'V' forest view; 'v' hide/show forest view children  
  
k,r Manipulate tasks: 'k' kill; 'r' renice  
d or s Set update interval  
W,Y,! Write config file 'W'; Inspect other output 'Y'; Combine Cpus '!'  
q Quit  
( commands shown with '.' require a visible task display window )  
Press 'h' or '?' for help with Windows,  
Type 'q' or <Esc> to continue
```

Step 6: Quit the top command.

Use q to quit the top command.

```
wxue001@cyse270-host: ~  
Tasks: 190 total, 1 running, 189 sleeping, 0 stopped, 0 zombie  
%Cpu(s): 0.3 us, 0.2 sy, 0.0 ni, 99.3 id, 0.0 wa, 0.0 hi, 0.2 si, 0.0 st  
MiB Mem : 1975.2 total, 70.3 free, 765.6 used, 1139.3 buff/cache  
MiB Swap: 2680.0 total, 2679.7 free, 0.3 used, 1023.8 avail Mem  
  
  PID USER      PR  NI    VIRT    RES    SHR  S  %CPU  %MEM    TIME+  COMMAND  
 1122 wxue001    20   0 4229728 329520 132612 S   1.0  16.3   0:34.82 gnome-s+  
  441 systemd+  20   0  14828   6168   5380 S   0.3   0.3   0:02.56 systemd+  
  814 root       20   0   6792   4828   3520 S   0.3   0.2   0:00.13 apache2  
 1936 wxue001    20   0 563928   54024 40632 S   0.3   2.7   0:05.07 gnome-t+  
 2314 root       20   0      0      0      0 I   0.3   0.0   0:01.97 kworker+  
 2363 wxue001    20   0  21748   4072   3356 R   0.3   0.2   0:00.09 top  
    1 root       20   0 101248  12032   8288 S   0.0   0.6   0:01.10 systemd  
    2 root       20   0      0      0      0 S   0.0   0.0   0:00.01 kthreadd  
    3 root       0 -20      0      0      0 I   0.0   0.0   0:00.00 rcu_gp  
    4 root       0 -20      0      0      0 I   0.0   0.0   0:00.00 rcu_par+  
    5 root       0 -20      0      0      0 I   0.0   0.0   0:00.00 slub_fl+  
    6 root       0 -20      0      0      0 I   0.0   0.0   0:00.00 netns  
    8 root       0 -20      0      0      0 I   0.0   0.0   0:00.00 kworker+  
   10 root       0 -20      0      0      0 I   0.0   0.0   0:00.00 mm_perc+  
   11 root       20   0      0      0      0 I   0.0   0.0   0:00.00 rcu_tas+  
   12 root       20   0      0      0      0 I   0.0   0.0   0:00.00 rcu_tas+  
   13 root       20   0      0      0      0 I   0.0   0.0   0:00.00 rcu_tas+  
   14 root       20   0      0      0      0 S   0.0   0.0   0:00.14 ksoftir+  
   15 root       20   0      0      0      0 I   0.0   0.0   0:01.07 rcu_pre+  
   16 root      rt   0      0      0      0 S   0.0   0.0   0:00.01 migrati+  
   17 root      -51  0      0      0      0 S   0.0   0.0   0:00.00 idle_in+  
   19 root       20   0      0      0      0 S   0.0   0.0   0:00.00 cpuhp/0  
   20 root       20   0      0      0      0 S   0.0   0.0   0:00.00 cpuhp/1  
   21 root      -51  0      0      0      0 S   0.0   0.0   0:00.00 idle_in+  
   22 root      rt   0      0      0      0 S   0.0   0.0   0:00.22 migrati+  
   23 root       20   0      0      0      0 S   0.0   0.0   0:00.24 ksoftir+  
   25 root       0 -20      0      0      0 I   0.0   0.0   0:00.00 kworker+  
   26 root       20   0      0      0      0 S   0.0   0.0   0:00.00 kdevtmp+  
wxue001@cyse270-host:~$
```

Step 7: Execute the **gnome-calculator** program in the background.

Step 8: In the current shell, list all running jobs.

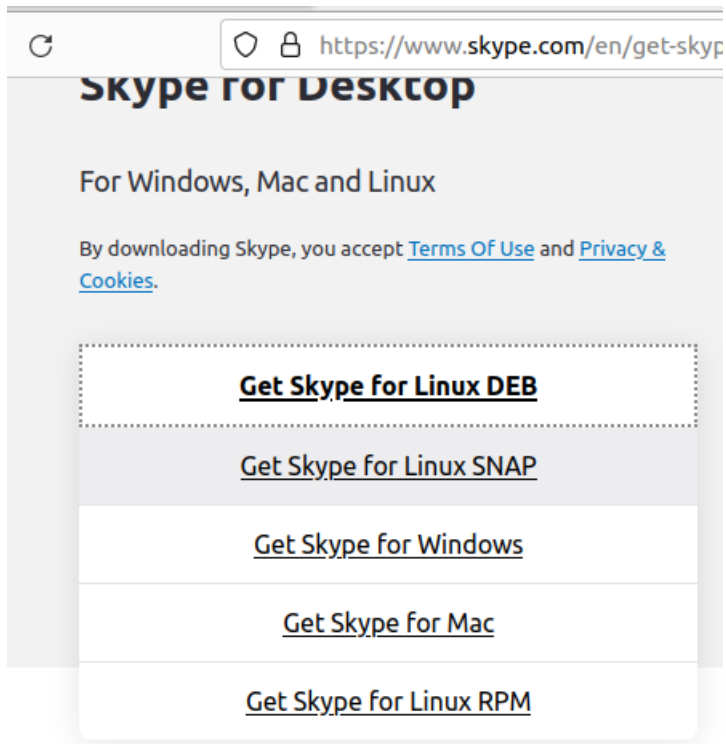
step-9: Use the **killall** command to stop (kill) all instances of the gnome-calculator program.

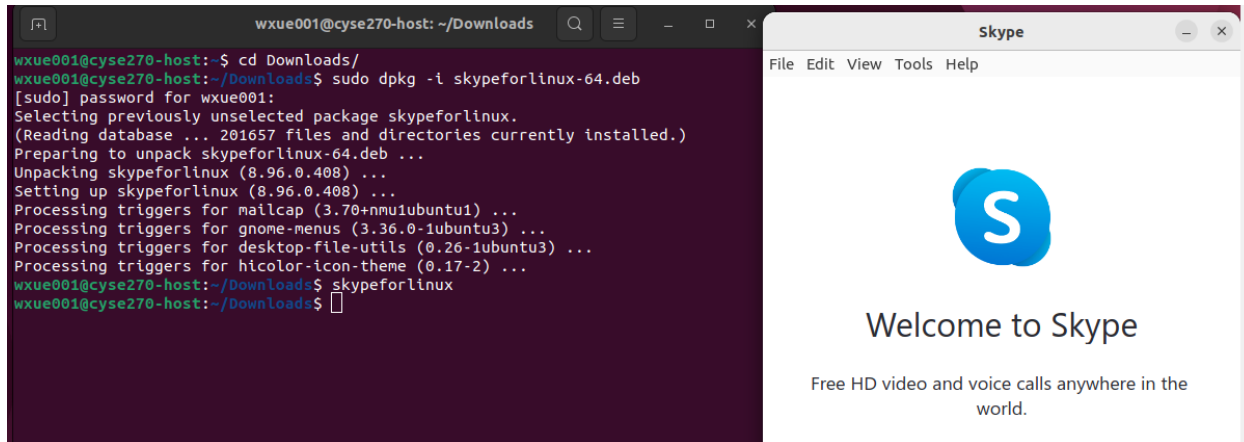
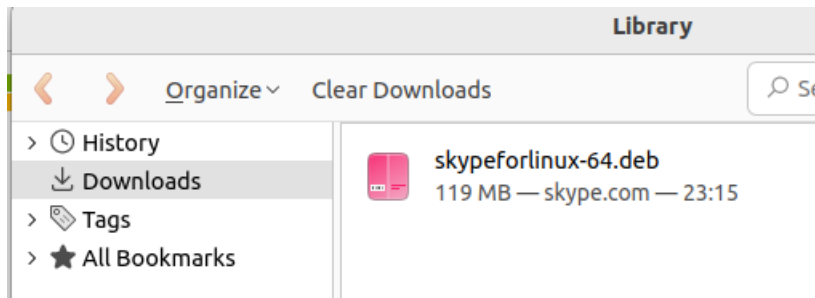
Step 10. In the current shell, use the **ps** command to list all running processes.

Task B – **Package installation** (60 points)

Step 1. Download the installation package (deb file) for skype in Linux and install it properly.

Note: you should not use APT GET to install Skype in this step.





Step 2. Create a backup file for the sources.list named source.list.bk in your Linux system.

Display the contents in both files, and **make sure they are identical**.

```
1 #deb cdrom:[Ubuntu 22.04.1 LTS _Jammy Jellyfish_ - Release amd64 (20220809.1)]/
jammy main restricted
2
3 # See http://help.ubuntu.com/community/UpgradeNotes for how to upgrade to
4 # newer versions of the distribution.
5 deb http://us.archive.ubuntu.com/ubuntu/ jammy main restricted
6 # deb-src http://us.archive.ubuntu.com/ubuntu/ jammy main restricted
7
8 ## Major bug fix updates produced after the final release of the
9 ## distribution.
10 deb http://us.archive.ubuntu.com/ubuntu/ jammy-updates main restricted
11 # deb-src http://us.archive.ubuntu.com/ubuntu/ jammy-updates main restricted
12
13 ## N.B. software from this repository is ENTIRELY UNSUPPORTED by the Ubuntu
14 ## team. Also, please note that software in universe WILL NOT receive any
15 ## review or updates from the Ubuntu security team.
16 deb http://us.archive.ubuntu.com/ubuntu/ jammy universe
17 # deb-src http://us.archive.ubuntu.com/ubuntu/ jammy universe
18 deb http://us.archive.ubuntu.com/ubuntu/ jammy-updates universe
19 # deb-src http://us.archive.ubuntu.com/ubuntu/ jammy-updates universe
20
21 ## N.B. software from this repository is ENTIRELY UNSUPPORTED by the Ubuntu
22 ## team, and may not be under a free licence. Please satisfy yourself as to
23 ## your rights to use the software. Also, please note that software in
24 ## multiverse WILL NOT receive any review or updates from the Ubuntu
25 ## security team.
26 deb http://us.archive.ubuntu.com/ubuntu/ jammy multiverse
27 # deb-src http://us.archive.ubuntu.com/ubuntu/ jammy multiverse
28 deb http://us.archive.ubuntu.com/ubuntu/ jammy-updates multiverse
29 # deb-src http://us.archive.ubuntu.com/ubuntu/ jammy-updates multiverse
30
31 ## N.B. software from this repository may not have been tested as
32 ## extensively as that contained in the main release, although it includes
33 ## newer versions of some applications which may provide useful features.
```

```
1 #deb cdrom:[Ubuntu 22.04.1 LTS _Jammy Jellyfish_ - Release amd64 (20220809.1)]/
jammy main restricted
2
3 # See http://help.ubuntu.com/community/UpgradeNotes for how to upgrade to
4 # newer versions of the distribution.
5 deb http://us.archive.ubuntu.com/ubuntu/ jammy main restricted
6 # deb-src http://us.archive.ubuntu.com/ubuntu/ jammy main restricted
7
8 ## Major bug fix updates produced after the final release of the
9 ## distribution.
10 deb http://us.archive.ubuntu.com/ubuntu/ jammy-updates main restricted
11 # deb-src http://us.archive.ubuntu.com/ubuntu/ jammy-updates main restricted
12
13 ## N.B. software from this repository is ENTIRELY UNSUPPORTED by the Ubuntu
14 ## team. Also, please note that software in universe WILL NOT receive any
15 ## review or updates from the Ubuntu security team.
16 deb http://us.archive.ubuntu.com/ubuntu/ jammy universe
17 # deb-src http://us.archive.ubuntu.com/ubuntu/ jammy universe
18 deb http://us.archive.ubuntu.com/ubuntu/ jammy-updates universe
19 # deb-src http://us.archive.ubuntu.com/ubuntu/ jammy-updates universe
20
21 ## N.B. software from this repository is ENTIRELY UNSUPPORTED by the Ubuntu
22 ## team, and may not be under a free licence. Please satisfy yourself as to
23 ## your rights to use the software. Also, please note that software in
24 ## multiverse WILL NOT receive any review or updates from the Ubuntu
25 ## security team.
26 deb http://us.archive.ubuntu.com/ubuntu/ jammy multiverse
27 # deb-src http://us.archive.ubuntu.com/ubuntu/ jammy multiverse
28 deb http://us.archive.ubuntu.com/ubuntu/ jammy-updates multiverse
29 # deb-src http://us.archive.ubuntu.com/ubuntu/ jammy-updates multiverse
30
31 ## N.B. software from this repository may not have been tested as
32 ## extensively as that contained in the main release, although it includes
33 ## newer versions of some applications which may provide useful features.
```


Step 3. Delete everything in the source.list file. Now try to download the package “joe” by using apt get install command. What error do you see?

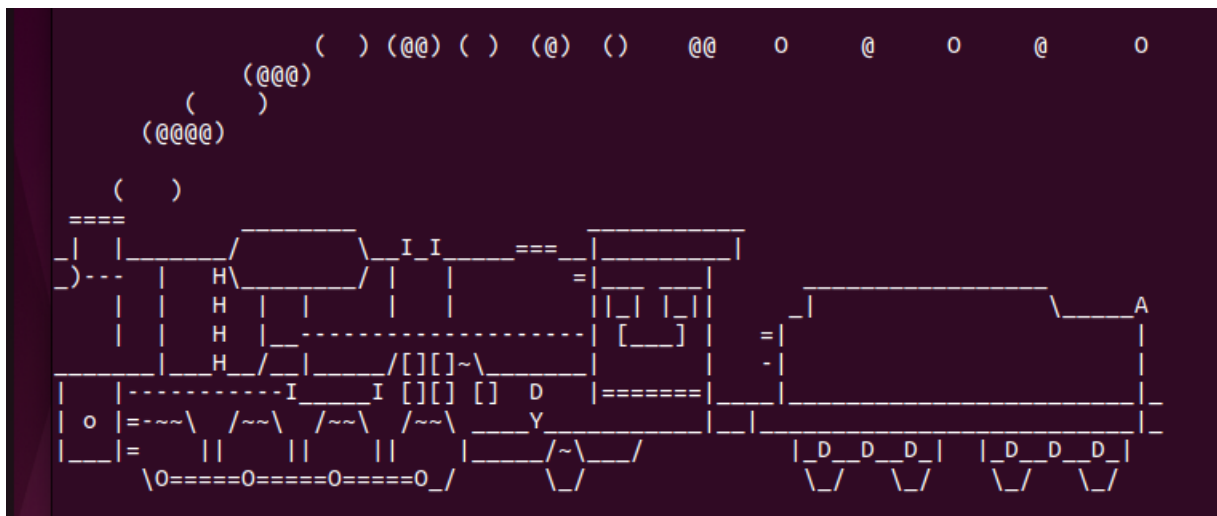
```
wxue001@cyse270-host: ~  
wxue001@cyse270-host:~$ sudo rm /etc/apt/sources.list  
wxue001@cyse270-host:~$ cat /etc/apt/sources.list  
cat: /etc/apt/sources.list: No such file or directory  
wxue001@cyse270-host:~$ sudo apt-get install joe  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
E: Unable to locate package joe  
wxue001@cyse270-host:~$
```

Step 4. Recover the sources.list from the backup file, then try to download the “joe” file again. You should be able to install joe this time.

```
wxue001@cyse270-host: ~  
wxue001@cyse270-host:~$ cd Downloads/  
wxue001@cyse270-host:~/Downloads$ sudo cp source.list.bk /etc/apt/sources.list  
wxue001@cyse270-host:~/Downloads$ CD  
CD: command not found  
wxue001@cyse270-host:~/Downloads$ cd  
wxue001@cyse270-host:~$ sudo apt-get install joe  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
The following packages were automatically installed and are no longer required:  
  libflashrom1 libftdi1-2 libllvm13  
Use 'sudo apt autoremove' to remove them.  
The following NEW packages will be installed:  
  joe  
0 upgraded, 1 newly installed, 0 to remove and 2 not upgraded.  
Need to get 509 kB of archives.  
After this operation, 2,150 kB of additional disk space will be used.  
Get:1 http://us.archive.ubuntu.com/ubuntu jammy/universe amd64 joe amd64 4.6-1build2 [509 kB]  
Fetched 509 kB in 0s (1,279 kB/s)  
Selecting previously unselected package joe.  
(Reading database ... 201807 files and directories currently installed.)  
Preparing to unpack .../joe_4.6-1build2_amd64.deb ...  
Unpacking joe (4.6-1build2) ...  
Setting up joe (4.6-1build2) ...  
update-alternatives: using /usr/bin/joe to provide /usr/bin/editor (editor) in auto mode  
Processing triggers for man-db (2.10.2-1) ...  
Processing triggers for mailcap (3.70+nmu1ubuntu1) ...  
Processing triggers for desktop-file-utils (0.26-1ubuntu3) ...  
Processing triggers for gnome-menus (3.36.0-1ubuntu3) ...  
wxue001@cyse270-host:~$
```

Step 5. Install and play the “sl” command.

```
wxue001@cyse270-host:~$ sudo apt-get install sl
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libflashrom1 libftdi1-2 libllvm13
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  sl
0 upgraded, 1 newly installed, 0 to remove and 2 not upgraded.
Need to get 12.7 kB of archives.
After this operation, 60.4 kB of additional disk space will be used.
Get:1 http://us.archive.ubuntu.com/ubuntu jammy/universe amd64 sl amd64 5.02-1 [12.7 kB]
Fetched 12.7 kB in 0s (132 kB/s)
Selecting previously unselected package sl.
(Reading database ... 201946 files and directories currently installed.)
Preparing to unpack .../archives/sl_5.02-1_amd64.deb ...
Unpacking sl (5.02-1) ...
Setting up sl (5.02-1) ...
Processing triggers for man-db (2.10.2-1) ...
wxue001@cyse270-host:~$ sl
```



Step 6. Install and play the “cowsay” command.


```

wxue001@cyse270-host:~$ sudo apt-get install cowsay
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libflashrom1 libftdi1-2 libllvm13
Use 'sudo apt autoremove' to remove them.
Suggested packages:
  filters cowsay-off
The following NEW packages will be installed:
  cowsay
0 upgraded, 1 newly installed, 0 to remove and 2 not upgraded.
Need to get 18.6 kB of archives.
After this operation, 93.2 kB of additional disk space will be used.
Get:1 http://us.archive.ubuntu.com/ubuntu jammy/universe amd64 cowsay all 3.03+dfsg2-8 [18.6 k
B]
Fetched 18.6 kB in 0s (147 kB/s)
Selecting previously unselected package cowsay.
(Reading database ... 201969 files and directories currently installed.)
Preparing to unpack .../cowsay_3.03+dfsg2-8_all.deb ...
Unpacking cowsay (3.03+dfsg2-8) ...
Setting up cowsay (3.03+dfsg2-8) ...
Processing triggers for man-db (2.10.2-1) ...
wxue001@cyse270-host:~$

```

```

Processing triggers for man-db (2.10.2-1) ...
wxue001@cyse270-host:~$ cowsay "This is William"

  _____
< This is William >
  -----
      \   ^__^
       \  (oo)\_______
          (__)\       )\/\
              ||----w |
              ||     ||

wxue001@cyse270-host:~$

```

Step 7. Install and play the “cmatrix” command.

```

wxue001@cyse270-host:~$ sudo apt-get install cmatrix
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libflashrom1 libftdi1-2 libllvm13
Use 'sudo apt autoremove' to remove them.
Suggested packages:
  cmatrix-xfont
The following NEW packages will be installed:
  cmatrix
0 upgraded, 1 newly installed, 0 to remove and 2 not upgraded.
Need to get 17.1 kB of archives.
After this operation, 57.3 kB of additional disk space will be used.
Get:1 http://us.archive.ubuntu.com/ubuntu jammy/universe amd64 cmatrix amd64 2.0-3 [17.1 kB]
Fetched 17.1 kB in 0s (123 kB/s)
Selecting previously unselected package cmatrix.
(Reading database ... 202029 files and directories currently installed.)
Preparing to unpack .../cmatrix_2.0-3_amd64.deb ...
Unpacking cmatrix (2.0-3) ...
Setting up cmatrix (2.0-3) ...
Processing triggers for mailcap (3.70+nmu1ubuntu1) ...
Processing triggers for desktop-file-utils (0.26-1ubuntu3) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu3) ...
Processing triggers for man-db (2.10.2-1) ...
wxue001@cyse270-host:~$

```

```

T Y @ Z H ;      r ) w T `   f   n      L l R      . W $ d 9      : N O      0 = G A x
5 j / = B Z      _ / x Q #   &   a      m >      K   k a ^ W M   N > D   V C - )
V P ] c s E      _ 7 b A J O   /   :   B d   r I      Z   P u x F 3   A z )   r _ j c
N Q C + 3      o 6 " \ . s   '   \   i 9   n _      B   k 2 / K B   ] , &   l # m m
<   T o D      X h % _ D C   N   p   S ]   y +      L l F a J   y p J   S t T > q
P   $   - ;      Q v ?   u   ^   < ! q +   f 3 w   6 ,   * s i c > T   E ]   _ R z
z      ^ *   _ 6   [   5 9   )   w , f K   U e :   d ^   V V X u M g   ;   & V
      \ . 6      W   ,   e   V d u V   K f K   Q (   / m . u   '   ;   )
      C   c N      8   ^   3   G G p x   b ) A      :   ] E x d   q   '   l
      (   o n   :   7   >   o l V D   $ d -   3   X f < F   '   )
      l   ^ ;   S   t   7   B K 8 S   $ . ?   &   p $ B =   4   & >
      W   b \      o   Y   _ 8 ( W   Z = g   &   ) t v o   y   %   j 5
      c   u Y   _ K   8 6   o [ h I   a d C   8 x   B O " E   a %   3 X
      s   0 )   r P   N D   q T ! E   ; ] 7   T q   N - h E   e @   d B
      (   K o   P   s G   / c n p   * U f 7   2 '   h h * #   # 9   l p
      5 o x u      n Y   2 s f   z ] S ?   5 / Z   : y m   b 3   x k
Y      _ + 4 9      + T   H S K   U / y F   A & 6   ` X      ; .   N F
(      c   y $ J b      t P   j 2 e   ] ^   >   \ d (   + ;   < p   e *
U      - ' \ m H      '   5 % X   C #   r & m v "   w   2 _   > 5   ) U
*      ) 9 g t q      R   B   0 K   7 i   k I 5 k $ *   b g   M j   X s
A      u j W l      5   U   S V   w   3 6 k Y & q   m W >   ,   \   Q R
@      + m - +      *   E   n   9   ' ) U 4 b a   D * <   ,   W V
J v   b Z a H      W   -   d   F   - S ] J % o   D a 1   Q   K = d
l 8   ] 1 9 ^      Q   G   $ y   $   & N i m s +   R & @   w   W 6 Z
Y G   * ; I '      4   f   *   n U      ^   ' N s L & 5   '   K   y e
L r   7 S l \      l   [   +   F $   W F r F 1 w   k   $   $   : n
l H   E N b v      P   C   v (   Z m 5 r 0 n   0   6   $ a
M 3   g @ 8 j      e _ I   8   Q Y * q      d   M L ' E   4   s   ?   k
9 /   Q ' a *      u x   ?   ? c * :      &   [ U Y   1   w   .   2   7
-   x   ! " J m      f   <   _ O M ?      &   ) Q V   ^   >   7   '   B
<   3 X l &      y i   D M b h   P   #   d & n   '   [   ;   .   K   m
J   K u G 8      d c   < v 5   (   ?   D a y   N   Z   *   o   D   G

```