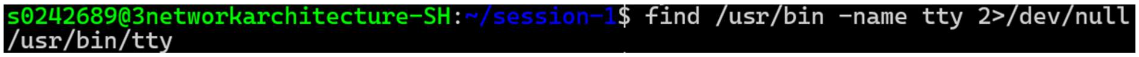
University of Antwerp
Faculty of Applied Engineering

Sten Hulsbergen
20242689

Session 2

2.1

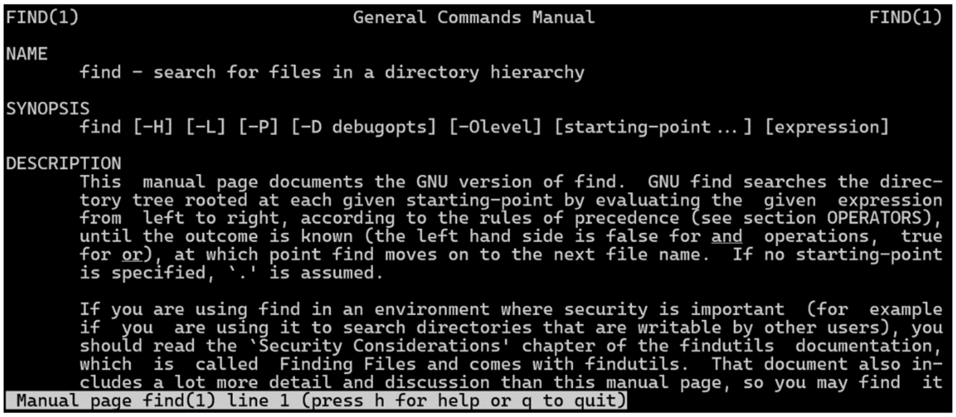
To find the tty-files use the following command: 'find /usr/bin -name tty 2>/dev/null', this will find all the files in "/usr/bin" that are named (-name) tty and redirect (2>) the error messages to "/dev/null".



```
s0242689@3networkarchitecture-SH:~/session-1$ find /usr/bin -name tty 2>/dev/null
/usr/bin/tty
```

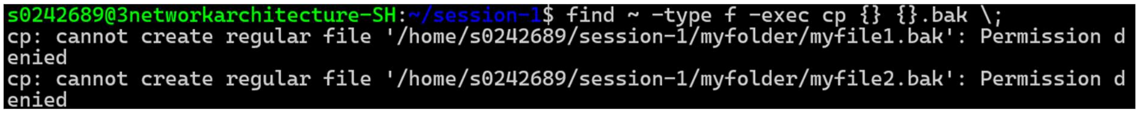
2.2

By using "man find" it is possible to see a 'manual' of the command that you want to use. The command that is used looks as follows: "find ~ -type f -exec cp {} {}.bak \;" where '~' means the home of the user, '-type f' means it is searching for files and '-exec cp {} {}.bak \;' means to copy each file that is found to a .bak-file.



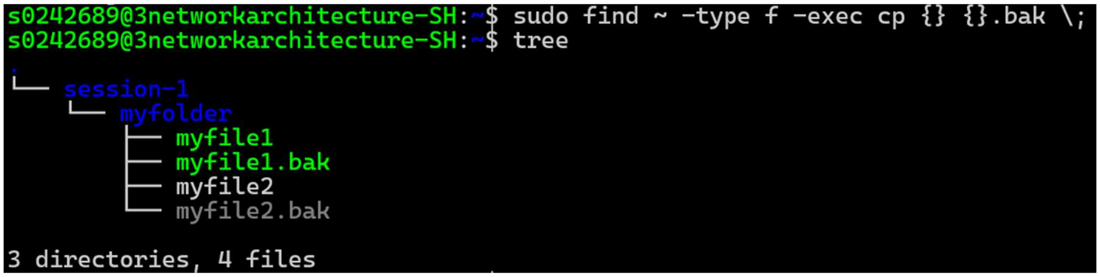
```
FIND(1)                      General Commands Manual                     FIND(1)

NAME
       find - search for files in a directory hierarchy

SYNOPSIS
       find [-H] [-L] [-P] [-D debugopts] [-Olevel] [starting-point...] [expression]

DESCRIPTION
       This  manual page documents the GNU version of find.  GNU find searches the direc-
       tory tree rooted at each given starting-point by evaluating the  given  expression
       from  left to right, according to the rules of precedence (see section OPERATORS),
       until the outcome is known (the left hand side is false for and  operations,  true
       for or), at which point find moves on to the next file name.  If no starting-point
       is specified, `.' is assumed.

       If you are using find in an environment where security is important  (for  example
       if  you  are using it to search directories that are writable by other users), you
       should read the `Security Considerations' chapter of the findutils  documentation,
       which  is  called  Finding Files and comes with findutils.  That document also in-
       cludes a lot more detail and discussion than this manual page, so you may find  it
 Manual page find(1) line 1 (press h for help or q to quit)
```

With the changes made to myfile1 and myfile2 in session 1, there will be an error like shown below.



```
s0242689@3networkarchitecture-SH:~/session-1$ find ~ -type f -exec cp {} {}.bak \;
cp: cannot create regular file '/home/s0242689/session-1/myfolder/myfile1.bak': Permission d
enied
cp: cannot create regular file '/home/s0242689/session-1/myfolder/myfile2.bak': Permission d
enied
```

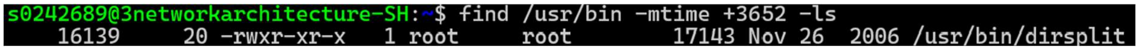
Running the command as super-user will work, this command is as follows: 'sudo find ~ -type f -exec cp {} {}.bak \;', like said before means, find every <u>file</u> in home and copy to (<u>file</u>).bak. After installing tree with 'sudo apt install tree' and using 'tree' in the home, shows all the files (except hidden files) in all the folders.



```
s0242689@3networkarchitecture-SH:~$ sudo find ~ -type f -exec cp {} {}.bak \;
s0242689@3networkarchitecture-SH:~$ tree
.
└── session-1
    └── myfolder
        ├── myfile1
        ├── myfile1.bak
        ├── myfile2
        └── myfile2.bak

3 directories, 4 files
```

2.3

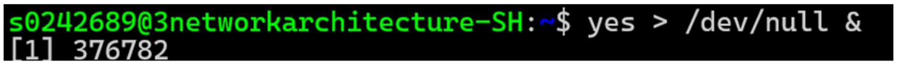
To find files in '/usr/bin' that have not been modified in a certain timerange, use this command: 'find /usr/bin -mtime +3652 -ls' where '-mtime' is for "File's data was last modified less than, more than or exactly n*24 hours ago" with n=3652(days), which means total time is 3652*24 = 10 years, and '-ls' is to give a list of the files that meet this criteria.



```
s0242689@3networkarchitecture-SH:~$ find /usr/bin -mtime +3652 -ls
    16139      20 -rwxr-xr-x   1 root      root          17143 Nov 26  2006 /usr/bin/dirsplit
```

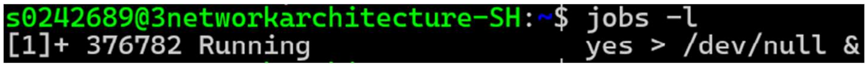
2.4

To run the task in the background it is mandatory to know to place '&' after the command like the following: 'yes > /dev/null **&**'. This will return an ID linked to the background job like shown in the image bellow.



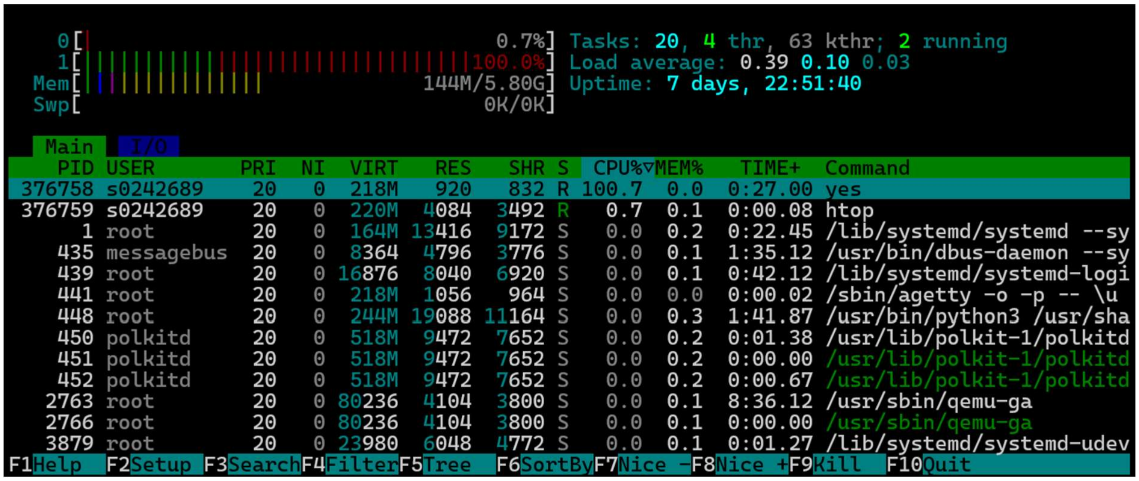
```
s0242689@3networkarchitecture-SH:~$ yes > /dev/null &
[1] 376782
```

By using the command 'jobs -l' a list of active processes is shown to verify that the process is running, '-l' is used to see the process ID as additional information.



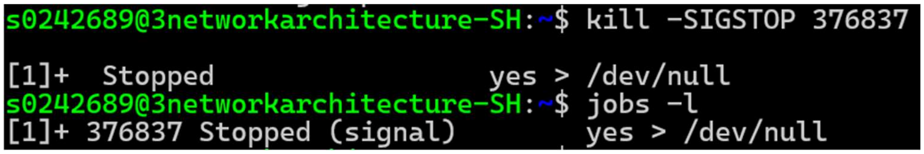
```
s0242689@3networkarchitecture-SH:~$ jobs -l
[1]+ 376782 Running                 yes > /dev/null &
```

After installing htop with 'sudo apt install htop' and then using 'htop' it is noticeable that core 1 is used 100% by this task.



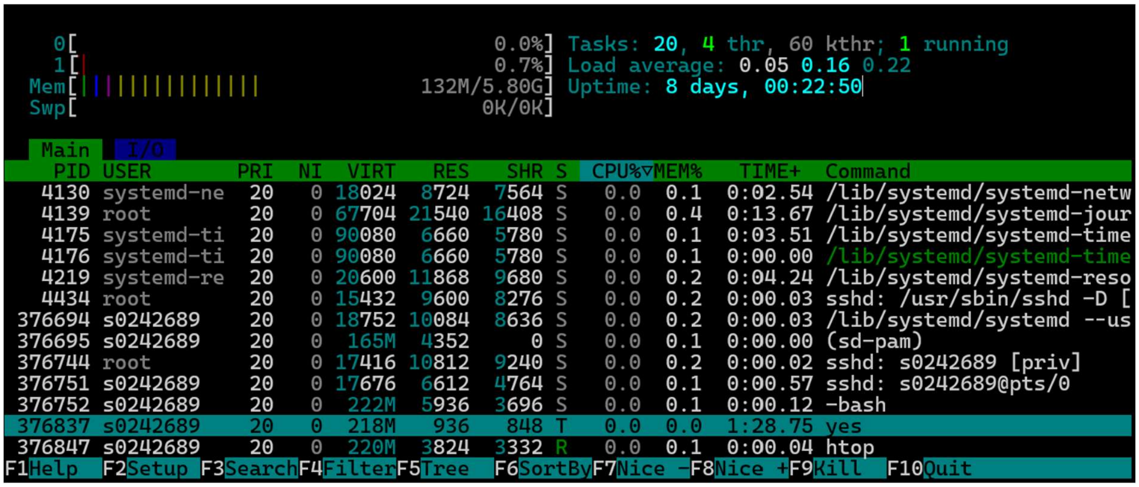
```
    0[|                                0.7%] Tasks: 20, 4 thr, 63 kthr; 2 running
    1[||||||||||||||||||||||||||||||100.0%] Load average: 0.39 0.10 0.03
  Mem[||||||||||||||              144M/5.80G] Uptime: 7 days, 22:51:40
  Swp[                                 0K/0K]

  Main  I/O
    PID USER       PRI  NI  VIRT   RES   SHR S  CPU%▽MEM%   TIME+  Command
 376758 s0242689    20   0  218M   920   832 R 100.7  0.0  0:27.00 yes
 376759 s0242689    20   0  220M  4084  3492 R   0.7  0.1  0:00.08 htop
      1 root        20   0  164M 13416  9172 S   0.0  0.2  0:22.45 /lib/systemd/systemd --sy
    435 messagebus  20   0  8364  4796  3776 S   0.0  0.1  1:35.12 /usr/bin/dbus-daemon --sy
    439 root        20   0 16876  8040  6920 S   0.0  0.1  0:42.12 /lib/systemd/systemd-logi
    441 root        20   0  218M  1056   964 S   0.0  0.0  0:00.02 /sbin/agetty -o -p -- \u
    448 root        20   0  244M 19088 11164 S   0.0  0.3  1:41.87 /usr/bin/python3 /usr/sha
    450 polkitd     20   0  518M  9472  7652 S   0.0  0.2  0:01.38 /usr/lib/polkit-1/polkitd
    451 polkitd     20   0  518M  9472  7652 S   0.0  0.2  0:00.00 /usr/lib/polkit-1/polkitd
    452 polkitd     20   0  518M  9472  7652 S   0.0  0.2  0:00.67 /usr/lib/polkit-1/polkitd
   2763 root        20   0 80236  4104  3800 S   0.0  0.1  8:36.12 /usr/sbin/qemu-ga
   2766 root        20   0 80236  4104  3800 S   0.0  0.1  0:00.00 /usr/sbin/qemu-ga
   3879 root        20   0 23980  6048  4772 S   0.0  0.1  0:01.27 /lib/systemd/systemd-udev
F1Help  F2Setup F3SearchF4FilterF5Tree  F6SortByF7Nice -F8Nice +F9Kill  F10Quit
```

After using 'kill -SIGSTOP 376837(=process ID)' to pause the process and verifying with 'jobs -l', it says "Stopped (signal)" like shown in the image bellow.



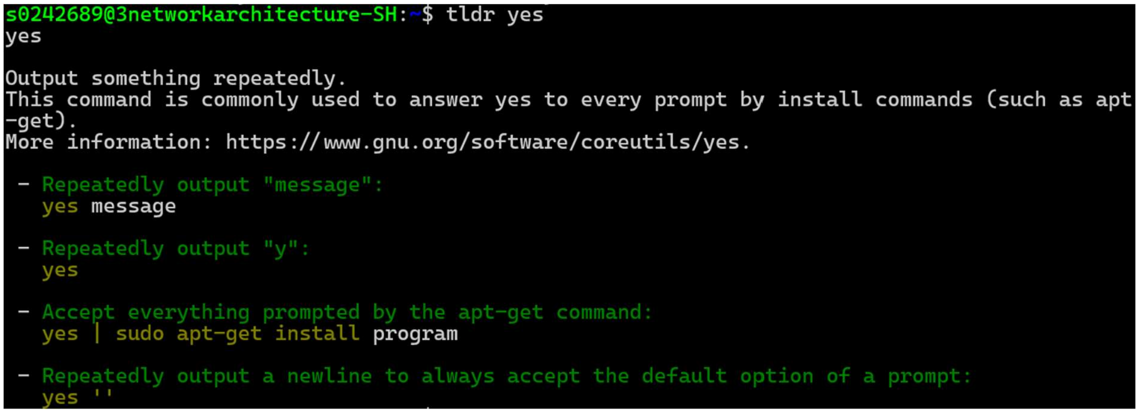
```
s0242689@3networkarchitecture-SH:~$ kill -SIGSTOP 376837

[1]+  Stopped                 yes > /dev/null
s0242689@3networkarchitecture-SH:~$ jobs -l
[1]+ 376837 Stopped (signal)        yes > /dev/null
```

When looking at 'htop', it is clear the process has been paused and the CPU usage is back to idle. The process is still in the memory like highlighted bellow.



```
    0[                                    0.0%] Tasks: 20, 4 thr, 60 kthr; 1 running
    1[|                                   0.7%] Load average: 0.05 0.16 0.22
  Mem[||||||||||||||||              132M/5.80G] Uptime: 8 days, 00:22:50
  Swp[                                   0K/0K]

   Main  I/O
    PID USER       PRI  NI  VIRT   RES   SHR S  CPU%▽MEM%   TIME+  Command
   4130 systemd-ne  20   0 18024  8724  7564 S   0.0  0.1  0:02.54 /lib/systemd/systemd-netw
   4139 root        20   0 67704 21540 16408 S   0.0  0.4  0:13.67 /lib/systemd/systemd-jour
   4175 systemd-ti  20   0 90080  6660  5780 S   0.0  0.1  0:03.51 /lib/systemd/systemd-time
   4176 systemd-ti  20   0 90080  6660  5780 S   0.0  0.1  0:00.00 /lib/systemd/systemd-time
   4219 systemd-re  20   0 20600 11868  9680 S   0.0  0.2  0:04.24 /lib/systemd/systemd-reso
   4434 root        20   0 15432  9600  8276 S   0.0  0.2  0:00.03 sshd: /usr/sbin/sshd -D [
 376694 s0242689    20   0 18752 10084  8636 S   0.0  0.2  0:00.03 /lib/systemd/systemd --us
 376695 s0242689    20   0  165M  4352     0 S   0.0  0.1  0:00.00 (sd-pam)
 376744 root        20   0 17416 10812  9240 S   0.0  0.2  0:00.02 sshd: s0242689 [priv]
 376751 s0242689    20   0 17676  6612  4764 S   0.0  0.1  0:00.57 sshd: s0242689@pts/0
 376752 s0242689    20   0  222M  5936  3696 S   0.0  0.1  0:00.12 -bash
 376837 s0242689    20   0  218M   936   848 T   0.0  0.0  1:28.75 yes
 376847 s0242689    20   0  220M  3824  3332 R   0.0  0.1  0:00.04 htop
F1Help  F2Setup F3SearchF4FilterF5Tree  F6SortByF7Nice -F8Nice +F9Kill  F10Quit
```

To get a quick understanding what the command 'yes' does, install tldr with 'sudo apt install tldr' followed by 'tldr yes' to get a quick overview of what the command does, as shown in the image bellow.

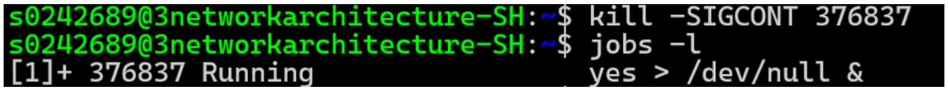


```
s0242689@3networkarchitecture-SH:~$ tldr yes
yes

Output something repeatedly.
This command is commonly used to answer yes to every prompt by install commands (such as apt
-get).
More information: https://www.gnu.org/software/coreutils/yes.

 - Repeatedly output "message":
   yes message

 - Repeatedly output "y":
   yes

 - Accept everything prompted by the apt-get command:
   yes | sudo apt-get install program

 - Repeatedly output a newline to always accept the default option of a prompt:
   yes ''
```

With this information it is clear what 'yes > /dev/null' does. This command appears to output "y" repeatedly in the "/dev/null" without any delay so the process will take a lot of resources to run.

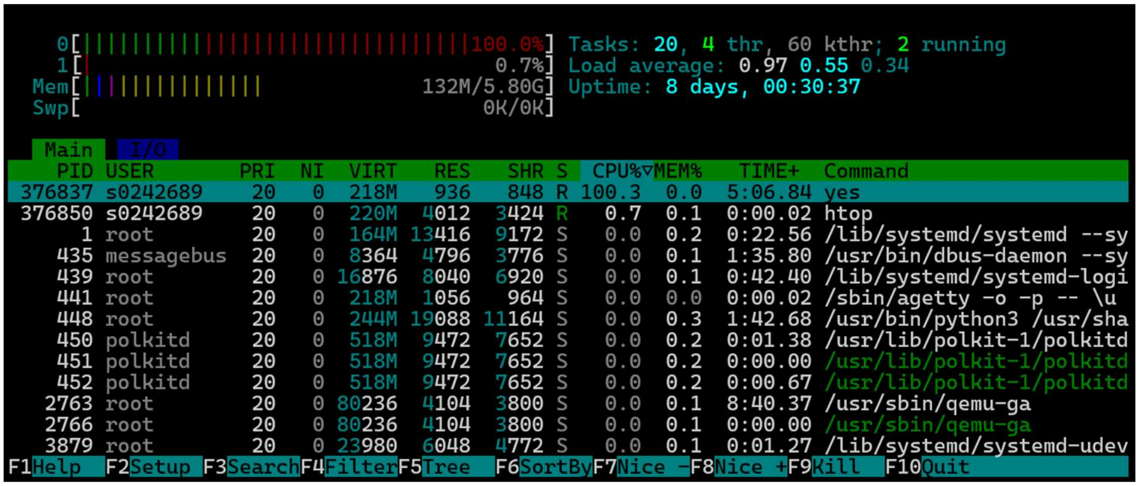
2.5

After using ‘kill -SIGCONT 376837(=process ID)’ to let the process continue and verifying with ‘jobs -l’, it says “running” like shown in the image bellow.



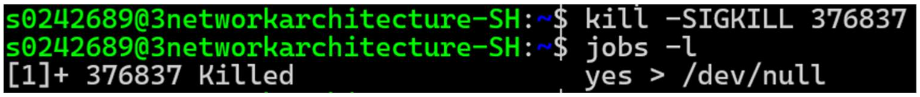
```
s0242689@3networkarchitecture-SH:~$ kill -SIGCONT 376837
s0242689@3networkarchitecture-SH:~$ jobs -l
[1]+ 376837 Running                 yes > /dev/null &
```

Continuing this process is also noticeable in ‘htop’, this time core 0 is used for 100%.



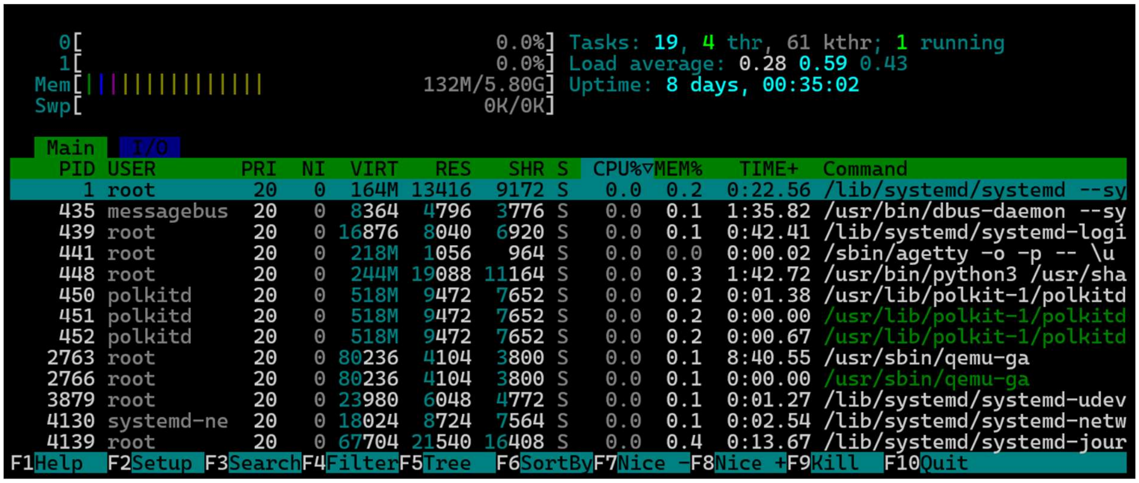
```
    0[||||||||||||||||||||||||||||||||100.0%] Tasks: 20, 4 thr, 60 kthr; 2 running
    1[|                                 0.7%] Load average: 0.97 0.55 0.34
  Mem[|||||||||||||||            132M/5.80G] Uptime: 8 days, 00:30:37
  Swp[                                0K/0K]

  Main  I/O
    PID USER      PRI  NI  VIRT   RES   SHR S  CPU%▽MEM%   TIME+  Command
 376837 s0242689   20   0  218M   936   848 R 100.3  0.0  5:06.84 yes
 376850 s0242689   20   0  220M  4012  3424 R   0.7  0.1  0:00.02 htop
      1 root       20   0  164M 13416  9172 S   0.0  0.2  0:22.56 /lib/systemd/systemd --sy
    435 messagebus 20   0  8364  4796  3776 S   0.0  0.1  1:35.80 /usr/bin/dbus-daemon --sy
    439 root       20   0 16876  8040  6920 S   0.0  0.1  0:42.40 /lib/systemd/systemd-logi
    441 root       20   0  218M  1056   964 S   0.0  0.0  0:00.02 /sbin/agetty -o -p -- \u
    448 root       20   0  244M 19088 11164 S   0.0  0.3  1:42.68 /usr/bin/python3 /usr/sha
    450 polkitd    20   0  518M  9472  7652 S   0.0  0.2  0:01.38 /usr/lib/polkit-1/polkitd
    451 polkitd    20   0  518M  9472  7652 S   0.0  0.2  0:00.00 /usr/lib/polkit-1/polkitd
    452 polkitd    20   0  518M  9472  7652 S   0.0  0.2  0:00.67 /usr/lib/polkit-1/polkitd
   2763 root       20   0 80236  4104  3800 S   0.0  0.1  8:40.37 /usr/sbin/qemu-ga
   2766 root       20   0 80236  4104  3800 S   0.0  0.1  0:00.00 /usr/sbin/qemu-ga
   3879 root       20   0 23980  6048  4772 S   0.0  0.1  0:01.27 /lib/systemd/systemd-udev
F1Help  F2Setup F3SearchF4FilterF5Tree  F6SortByF7Nice -F8Nice +F9Kill  F10Quit
```

After using ‘kill -SIGKILL 376837(=process ID)’ to kill the process and verifying with ‘jobs -l’, it says “killed” like shown in the image bellow.



```
s0242689@3networkarchitecture-SH:~$ kill -SIGKILL 376837
s0242689@3networkarchitecture-SH:~$ jobs -l
[1]+ 376837 Killed                  yes > /dev/null
```

When opening ‘htop’ it is also clear that the process has been killed since both core 0 and core 1 are not used by any heavy processes, and the process is also nowhere to be found in the list.



```
    0[                                  0.0%] Tasks: 19, 4 thr, 61 kthr; 1 running
    1[                                  0.0%] Load average: 0.28 0.59 0.43
  Mem[|||||||||||||||            132M/5.80G] Uptime: 8 days, 00:35:02
  Swp[                                0K/0K]

  Main  I/O
    PID USER      PRI  NI  VIRT   RES   SHR S  CPU%▽MEM%   TIME+  Command
      1 root       20   0  164M 13416  9172 S   0.0  0.2  0:22.56 /lib/systemd/systemd --sy
    435 messagebus 20   0  8364  4796  3776 S   0.0  0.1  1:35.82 /usr/bin/dbus-daemon --sy
    439 root       20   0 16876  8040  6920 S   0.0  0.1  0:42.41 /lib/systemd/systemd-logi
    441 root       20   0  218M  1056   964 S   0.0  0.0  0:00.02 /sbin/agetty -o -p -- \u
    448 root       20   0  244M 19088 11164 S   0.0  0.3  1:42.72 /usr/bin/python3 /usr/sha
    450 polkitd    20   0  518M  9472  7652 S   0.0  0.2  0:01.38 /usr/lib/polkit-1/polkitd
    451 polkitd    20   0  518M  9472  7652 S   0.0  0.2  0:00.00 /usr/lib/polkit-1/polkitd
    452 polkitd    20   0  518M  9472  7652 S   0.0  0.2  0:00.67 /usr/lib/polkit-1/polkitd
   2763 root       20   0 80236  4104  3800 S   0.0  0.1  8:40.55 /usr/sbin/qemu-ga
   2766 root       20   0 80236  4104  3800 S   0.0  0.1  0:00.00 /usr/sbin/qemu-ga
   3879 root       20   0 23980  6048  4772 S   0.0  0.1  0:01.27 /lib/systemd/systemd-udev
   4130 systemd-ne 20   0 18024  8724  7564 S   0.0  0.1  0:02.54 /lib/systemd/systemd-netw
   4139 root       20   0 67704 21540 16408 S   0.0  0.4  0:13.67 /lib/systemd/systemd-jour
F1Help  F2Setup F3SearchF4FilterF5Tree  F6SortByF7Nice -F8Nice +F9Kill  F10Quit
```