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# Operating Systems

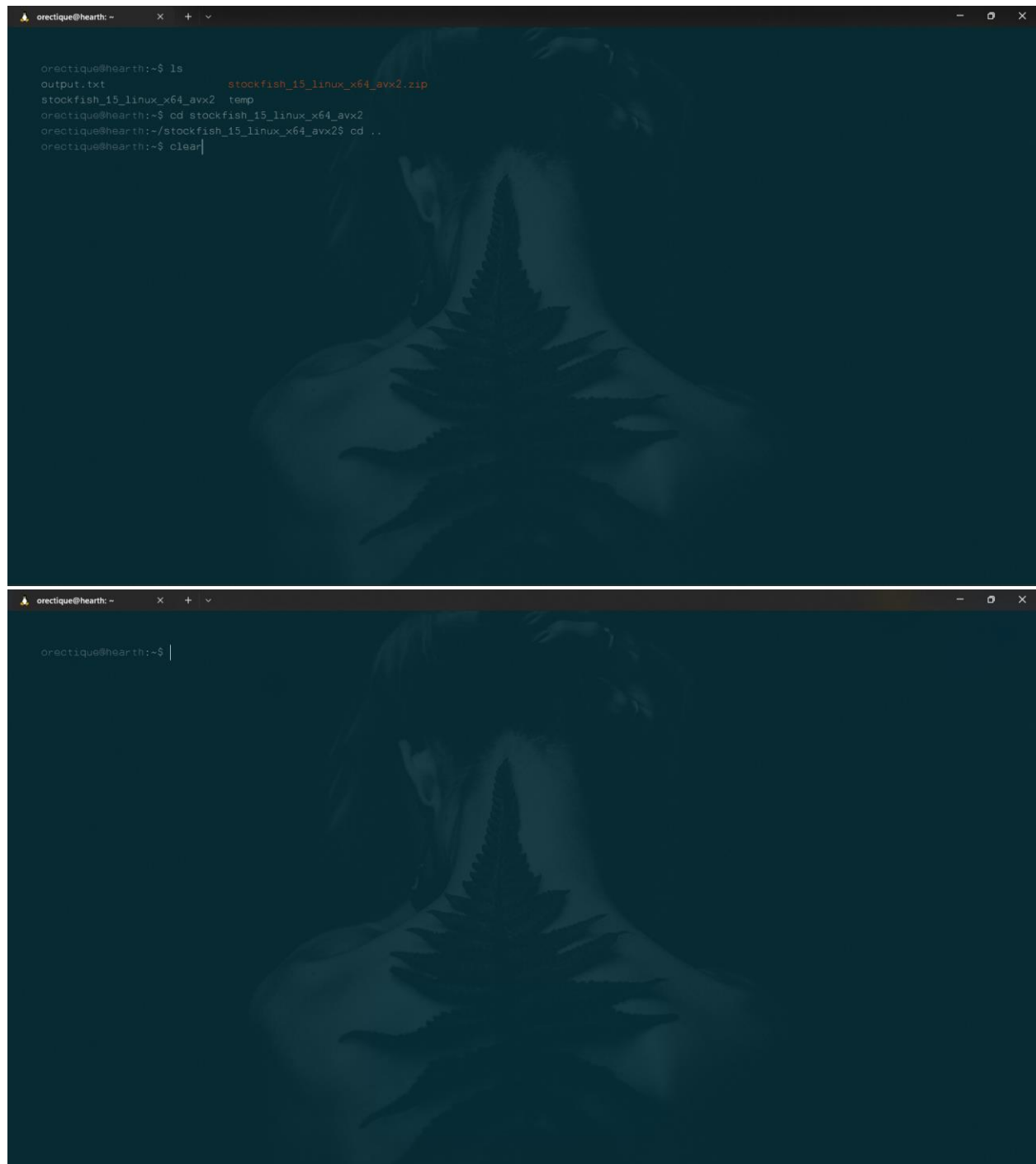
## 18CSC301

Assignment

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## Basic Linux Commands



The image displays two screenshots of a Linux terminal window. The top screenshot shows a series of commands being executed in a terminal with a dark background and a faint, artistic image of a person's face. The commands are: `ls`, which lists `output.txt` and `stockfish_15_linux_x64_avx2.zip`; `cd stockfish_15_linux_x64_avx2`, which changes the directory; `cd ..`, which returns to the previous directory; and `clear`, which clears the screen. The bottom screenshot shows the terminal after the `clear` command, with the prompt `orectique@hearth:~$` and a cursor.

```
orectique@hearth:~$ ls
output.txt          stockfish_15_linux_x64_avx2.zip
stockfish_15_linux_x64_avx2  temp
orectique@hearth:~$ cd stockfish_15_linux_x64_avx2
orectique@hearth:~/stockfish_15_linux_x64_avx2$ cd ..
orectique@hearth:~$ clear
```

```
orectique@hearth:~$ |
```

```
orectique@hearth:~$ help
GNU bash, version 5.1.16(1)-release (x86_64-pc-linux-gnu)
These shell commands are defined internally. Type 'help' to see this list.
Type 'help name' to find out more about the function 'name'.
Use 'info bash' to find out more about the shell in general.
Use 'man -k' or 'info' to find out more about commands not in this list.

A star (*) next to a name means that the command is disabled.

job_spec [ & ]
(( expression ))
. filename [arguments]
:
[ arg... ]
[[ expression ]]
alias [-p] [name=value] ... ]
bg [job_spec ...]
bind [-lpsvPSVK] [-m keymap] [-f filename] [-q name] [-u name] [-r key]
break [n]
builtin [shell-builtin [arg ...]]
caller [expr]
case WORD in [PATTERN] [PATTERN]...) COMMANDS ;;)... esac
cd [-L][-P [-e]] [-@] [dir]
command [-pVv] command [arg ...]
compgen [-abdefgjkuv] [-o option] [-A action] [-G globpat] [-W word]
complete [-abdefgjkuv] [-pr] [-DEI] [-o option] [-A action] [-G glob]
comptop [-o+o option] [-DEI] [name ...]
continue [n]
coproc [NAME] command [redirections]
declare [-aAffgillrtux] [-p] [name=value] ...]
dirs [-clpv] [+N] [-N]

history [-c] [-d offset] [n] or history -anrw [filename] or history ->
if COMMANDS; then COMMANDS; [ elif COMMANDS; then COMMANDS; ]... [ el>
jobs [-lnprs] [job_spec ...] or jobs -x command [args]
kill [-s sigspec | -n signum | -sigspec] pid | job_spec ... or kill -l>
let arg [arg ...]
local [option] name[=value] ...
logout [n]
mapfile [-d delim] [-n count] [-O origin] [-s count] [-t] [-u fd] [-C>
popd [-n] [+N] [-N]
printf [-v var] format [arguments]
pushd [-n] [+N] [-N] [dir]
pwd [-LP]
read [-ers] [-a array] [-d delim] [-i text] [-n nchars] [-N nchars] [>
readarray [-d delim] [-n count] [-O origin] [-s count] [-t] [-u fd] [>
readonly [-aAf] [name=value] ...] or readonly -p
return [n]
select NAME [in WORDS ... ;] do COMMANDS; done
set [-abefhkmnptuvxBCHP] [-o option-name] [--] [arg ...]
shift [n]
shopt [-pqsu] [-o] [optname ...]
source filename [arguments]
suspend [-f]
```

```
orectique@hearth:~$ fg [job_spec]
for NAME [in WORDS ... ] ; do COMMANDS; done
for (( exp1; exp2; exp3 )); do COMMANDS; done
function name { COMMANDS ; } or name () { COMMANDS ; }
getopts optstring name [arg ...]
hash [-lr] [-p pathname] [-dt] [name ...]
help [-dms] [pattern ...]
orectique@hearth:~$ history
1 poweroff
2 sudo apt-get scid
3 getent group sudo | cut -d: -f4
4 grep sudo /etc/group | cut -d: -f4
5 sudo apt-get scid
6 sudo apt-get install scid
7 sudo apt-get install stockfish
8 wget https://stockfishchess.org/files/stockfish_15_linux.zip
9 wget https://stockfishchess.org/files/stockfish_15_linux_x64_avx2.zip
10 unzip stockfish_15_linux_x64_avx2.zip
11 sudo apt install unzip
12 unzip stockfish_15_linux_x64_avx2.zip
13 cd stockfish_15_linux_x64_avx2
14 ls
15 chmod +x stockfish_15_x64_avx2
16 stockfish
17 cd stockfish_15_x64_avx2/src
18 cd stockfish_15_x64_avx2
19 cd stockfish_15_src
20 make build ARCH=x86-64
21 sudo apt install make
22 make build ARCH=x86-64
23 cd .

unalias [-a] name [name ...]
unset [-f] [-v] [-n] [name ...]
until COMMANDS; do COMMANDS; done
Variables - Names and meanings of some shell variables
wait [-fn] [-p var] [id ...]
while COMMANDS; do COMMANDS; done
{ COMMANDS ; }
```

## Directory Operations

```
orectique@hearth: ~/stockfish
orectique@hearth:~$ ls
output.txt  stockfish_15_linux_x64_avx2  stockfish_15_linux_x64_avx2.zip  temp
orectique@hearth:~/stockfish_15_linux_x64_avx2$ ls
AUTHORS  Copying.txt  info.txt  stockfish_15_src  stockfish_15_x64_avx2  subDir
orectique@hearth:~/stockfish_15_linux_x64_avx2$ cd subDir
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ mkdirhier ./layer1/layer2
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ ls
layer1
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ pwd
/home/orectique/stockfish_15_linux_x64_avx2/subDir
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ tree
Command 'tree' not found, but can be installed with:
sudo apt install tree
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ sudo apt install tree
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  tree
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 47.9 kB of archives.
After this operation, 116 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu jammy/universe amd64 tree amd64 2.0.2-1 [47.9 kB]
Fetched 47.9 kB in 2s (22.4 kB/s)
Selecting previously unselected package tree.
(Reading database ... 43894 files and directories currently installed.)
Preparing to unpack .../tree_2.0.2-1_amd64.deb ...
Unpacking tree (2.0.2-1) ...
Setting up tree (2.0.2-1) ...
Processing triggers for man-db (2.10.2-1) ...
Scanning processes...

orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ tree
.
├── layer1
│   └── layer2
└──

2 directories, 0 files
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$
```

## File Operations

```
orectique@hearth: ~/stockfish
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ ls
layer1  textFile1.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ echo "This is text content." > temp1
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ cat temp1 >> textFile1.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ cat textFile1.txt
This is text content.
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ echo "This is text content2." > temp2
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ cat temp2 > textFile2.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ diff textFile1.txt textFile2.txt
1c1
< This is text content.
---
> This is text content2.
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ basename textFile1.txt
textFile1.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ basename textFile1.txt .txt
textFile1
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ dirname textFile1.txt
.
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ mv textFile1.txt ./layer1
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ ls
layer1  temp1  temp2  textFile2.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ cd layer1
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir/layer1$ ls
layer2  textFile1.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir/layer1$ |

orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir/layer1$ ls
layer2  textFile1.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir/layer1$ shred textFile1.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir/layer1$ cd ..
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ ls
layer1  temp1  temp2  textFile2.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ stat textFile2.txt
  File: textFile2.txt
  Size: 23             Blocks: 8          IO Block: 4096   regular file
Device: 820h/2080d    Inode: 51462       Links: 1
Access: (0644/-rw-r--r--)  Uid: ( 1000/orectique)   Gid: ( 1000/orectique)
Access: 2022-11-06 21:50:06.259626511 +0530
Modify: 2022-11-06 21:49:33.519626452 +0530
Change: 2022-11-06 21:49:33.519626452 +0530
 Birth: 2022-11-06 21:49:33.519626452 +0530
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ cat temp2 >> textFile2.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ cat temp2 >> textFile2.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ cat temp2 >> textFile2.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ cat textFile2.txt
This is text content2.
This is text content2.
This is text content2.
This is text content2.
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ cat temp1 >> textFile2.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ cat temp1 >> textFile2.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ sort textFile2.txt | uniq
This is text content.
This is text content2.
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$
```

```
orectique@hearth: ~/stockfish x + v
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ cat temp1 >> textFile3.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ ls
layer1 temp1 temp2 textFile2.txt textFile3.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$ comm textFile2.txt textFile3.txt
This is text content.
This is text content2.
This is text content2.
This is text content2.
This is text content2.
comm: file 1 is not in sorted order
This is text content.
This is text content.
comm: input is not in sorted order
orectique@hearth:~/stockfish_15_linux_x64_avx2/subDir$
```

## Search Options

```
orectique@hearth: ~/stockfish x + v
orectique@hearth:~/stockfish_15_linux_x64_avx2$ grep -l "content" *
Copying.txt
grep: stockfish_15_src: Is a directory
grep: subDir: Is a directory
orectique@hearth:~/stockfish_15_linux_x64_avx2$ grep -l "text" *
Copying.txt
grep: stockfish_15_src: Is a directory
stockfish_15_x64_avx2
grep: subDir: Is a directory
orectique@hearth:~/stockfish_15_linux_x64_avx2$ ls
AUTHORS Copying.txt info.txt stockfish_15_src stockfish_15_x64_avx2 subDir
orectique@hearth:~/stockfish_15_linux_x64_avx2$ find /subDir -name "*.txt"
find: '/subDir': No such file or directory
orectique@hearth:~/stockfish_15_linux_x64_avx2$ find ./subDir -name "*.txt"
./subDir/textFile2.txt
./subDir/textFile3.txt
./subDir/layer1/textFile1.txt
orectique@hearth:~/stockfish_15_linux_x64_avx2$
```

```
orectique@hearth: ~$ locate "*.zip"
/home/orectique/stockfish_15_linux_x64_avx2.zip
/mnt/c/Drivers/video/RRDQ2/0/Drivers/win64/Graphics/AGSOOfflinePackage.zip
/mnt/c/Program Files/Eclipse Adoptium/jdk-17.0.4.8-hotspot/lib/src.zip
/mnt/c/Program Files/Inkscape/share/inkscape/extensions/docs/tutorial/resources/make_red_extension.zip
/mnt/c/Program Files/Inkscape/share/inkscape/extensions/docs/tutorial/resources/stroke_parity_extension.zip
/mnt/c/Program Files/Inkscape/share/inkscape/extensions/docs/tutorial/resources/template_effect.zip
/mnt/c/Users/orect/.jdk8/openjdk-18.0.2/lib/src.zip
/mnt/c/Users/orect/AppData/Local/BraveSoftware/Brave-Browser/User Data/oofiananboodjbbmdalgdommihjbkfag/1.0.119/6.0/httpse.leveldb.zip
/mnt/c/Users/orect/AppData/Local/Microsoft/Office/16.0/PowerQuery/User.zip
/mnt/c/Users/orect/AppData/Local/Programs/GIMP 2/lib/python2.7/test/zipdir.zip
/mnt/c/Users/orect/AppData/Local/R/win-library/4.2/readr/extdata/mtcars.csv.zip
/mnt/c/Users/orect/AppData/Local/R/win-library/4.2/vroom/extdata/mtcars.csv.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/chunkers/maxent_ne_chunker.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/abc.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/alpino.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/bicreative_ppi.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/brown.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/brown_tei.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/cess_cat.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/cess_esp.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/chat80.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/city_database.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/cmudict.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/comparative_sentences.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/comtrans.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/conll2000.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/conll2002.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/conll2007.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/crubadan.zip
/mnt/c/Users/orect/AppData/Roaming/nltk_data/corpora/dependency_treebank.zip
```

```
orectique@hearth: ~/stockfish$
usb-modeswitch-data/jammy.now 20191128-4 all [installed,automatic]
usb-modeswitch/jammy.now 2.6.1-3ubuntu2 amd64 [installed,automatic]
usb.ids/jammy.now 2022.04.02-1 all [installed,automatic]
usbutils/jammy.now 1:014-1build1 amd64 [installed,automatic]
usrmerge/jammy.now 25ubuntu2 all [installed,automatic]
util-linux/jammy.now 2.37.2-4ubuntu3 amd64 [installed,automatic]
uuid-runtime/jammy.now 2.37.2-4ubuntu3 amd64 [installed,automatic]
vim-common/jammy-updates,jammy-security.now 2:8.2.3995-1ubuntu2.1 all [installed,automatic]
vim-runtime/jammy-updates,jammy-security.now 2:8.2.3995-1ubuntu2.1 all [installed,automatic]
vim-tiny/jammy-updates,jammy-security.now 2:8.2.3995-1ubuntu2.1 amd64 [installed,automatic]
vim/jammy-updates,jammy-security.now 2:8.2.3995-1ubuntu2.1 amd64 [installed,automatic]
wget/jammy.now 1.21.2-2ubuntu1 amd64 [installed,automatic]
whiptail/jammy.now 0.52.21-5ubuntu2 amd64 [installed,automatic]
wsl-setup/jammy.now 0.2 amd64 [installed]
xauth/jammy.now 1:1.1-1build2 amd64 [installed,automatic]
xdg-user-dirs/jammy.now 0.17-2ubuntu4 amd64 [installed,automatic]
xfsprogs/jammy.now 5.13.0-1ubuntu2 amd64 [installed,automatic]
xkb-data/jammy.now 2.33-1 all [installed,automatic]
xutils-dev/jammy.now 1:7.7+6ubuntu1 amd64 [installed]
xxd/jammy-updates,jammy-security.now 2:8.2.3995-1ubuntu2.1 amd64 [installed,automatic]
xz-utils/jammy.now 5.2.5-2ubuntu1 amd64 [installed,automatic]
zerofree/jammy.now 1.1.1-1build3 amd64 [installed,automatic]
zip/jammy.now 3.0-12build2 amd64 [installed,automatic]
zlib1g-dev/jammy-updates.now 1:1.2.11.dfsg-2ubuntu9.1 amd64 [installed,automatic]
zlib1g/jammy-updates.now 1:1.2.11.dfsg-2ubuntu9.1 amd64 [installed,automatic]
zstd/jammy.now 1.4.8+dfsg-3build1 amd64 [installed,automatic]
orectique@hearth:~/stockfish_15_linux_x64_avx2$ whereis vim
vim: /usr/bin/vim /etc/vim /usr/share/vim /usr/share/man/man1/vim.1.gz
orectique@hearth:~/stockfish_15_linux_x64_avx2$ which vim
/usr/bin/vim
orectique@hearth:~/stockfish_15_linux_x64_avx2$
```



## User Information

```
orectique@hearth: ~  
orectique@hearth:~$ finger orectique  
Login: orectique                Name: Sreehari P Sreedhar  
Directory: /home/orectique      Shell: /bin/bash  
Never logged in.  
No mail.  
No Plan.  
orectique@hearth:~$ groups orectique  
orectique : orectique sudo  
orectique@hearth:~$ id orectique  
uid=1000(orectique) gid=1000(orectique) groups=1000(orectique),27(sudo)  
orectique@hearth:~$ last orectique  
  
wtmp begins Tue Sep 20 13:57:36 2022  
orectique@hearth:~$ w orectique  
23:33:32 up 12:12, 0 users, load average: 0.00, 0.00, 0.00  
USER      TTY      FROM          LOGIN@   IDLE   JCPU   PCPU WHAT  
orectique@hearth:~$ whoami  
orectique  
orectique@hearth:~$ |
```

## System Commands

```
orectique@hearth: ~  
orectique@hearth:~$ logger "This is a test log message."  
orectique@hearth:~$ |
```

reboot, shutdown, and rtcwake cannot be effectively presented.



## System Information

```
orectique@hearth: ~$ date
Mon Nov  7 00:00:31 IST 2022
orectique@hearth: ~$ df
Filesystem      1K-blocks    Used Available Use% Mounted on
/dev/sdc        263174212  2081176 247654880  1% /
none            4008188      32    4008156  1% /mnt/wslg
none            4008188       4    4008184  1% /mnt/wsl
tools          224744444 165709924 59034520  74% /init
none            4008188       4    4008184  1% /run
none            4008188       0    4008188  0% /run/lock
none            4008188       0    4008188  0% /run/shm
none            4008188       0    4008188  0% /run/user
tmpfs           4008188       0    4008188  0% /sys/fs/cgroup
drivers         224744444 165709924 59034520  74% /usr/lib/wsl/drivers
lib             224744444 165709924 59034520  74% /usr/lib/wsl/lib
none            4008188      76    4008112  1% /mnt/wslg/versions.txt
none            4008188      76    4008112  1% /mnt/wslg/doc
drvfs           224744444 165709924 59034520  74% /mnt/c
drvfs           255998972 37847532 218151440  15% /mnt/d
drvfs           17908732  1296992 16611740  8% /mnt/e
orectique@hearth: ~$ dmesg | less
orectique@hearth: ~$
```

```
orectique@hearth: ~$
[ 0.000000] Linux version 5.10.16.3-microsoft-standard-WSL2 (oe-user@oe-host) (x86_64-msft-linux-gcc (GCC) 9.3.0, GNU ld (GNU Binutils) 2.34.0.2
0200220) #1 SMP Fri Apr 2 22:23:49 UTC 2021
[ 0.000000] Command line: initrd=initrd.img panic=-1 nr_cpus=8 swiotlb=force earlycon=uart8250,io,0x3f8,115200 console=hvc0 debug ptv.legacy_co
unt=0
[ 0.000000] KERNEL supported cpus:
[ 0.000000] Intel GenuineIntel
[ 0.000000] AMD AuthenticAMD
[ 0.000000] Centaur CentaurHauls
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x001: 'x87 floating point registers'
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x002: 'SSE registers'
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x004: 'AVX registers'
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x020: 'AVX-512 opmask'
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x040: 'AVX-512 Hi256'
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x080: 'AVX-512 ZMM_Hi256'
[ 0.000000] x86/fpu: xstate_offset[2]: 576, xstate_sizes[2]: 256
[ 0.000000] x86/fpu: xstate_offset[5]: 832, xstate_sizes[5]: 64
[ 0.000000] x86/fpu: xstate_offset[6]: 896, xstate_sizes[6]: 512
[ 0.000000] x86/fpu: xstate_offset[7]: 1408, xstate_sizes[7]: 1024
[ 0.000000] x86/fpu: Enabled xstate features 0xe7, context size is 2432 bytes, using 'compact' format.
[ 0.000000] BIOS-provided physical RAM map:
[ 0.000000] BIOS-e820: [mem 0x0000000000000000-0x0000000000009ffff] usable
[ 0.000000] BIOS-e820: [mem 0x000000000000e000-0x000000000000e0fff] reserved
[ 0.000000] BIOS-e820: [mem 0x0000000000010000-0x000000000001ffff] ACPI data
[ 0.000000] BIOS-e820: [mem 0x0000000000020000-0x000000000007ffff] usable
[ 0.000000] BIOS-e820: [mem 0x0000000010000000-0x000000001ffffffffff] usable
[ 0.000000] earlycon: uart8250 at I/O port 0x3f8 (options '115200')
[ 0.000000] printk: bootconsole [uart8250] enabled
[ 0.000000] NX (Execute Disable) protection: active
[ 0.000000] DMI not present or invalid.
[ 0.000000] Hypervisor detected: Microsoft Hyper-V
:]
```

```
orectique@hearth:~$ du
4      ./temp
4      ./landscape
16660  ./cache/pip/http/9/d/a/4/3
16664  ./cache/pip/http/9/d/a/4
16668  ./cache/pip/http/9/d/a
16672  ./cache/pip/http/9/d
16676  ./cache/pip/http/9
12     ./cache/pip/http/e/1/a/1/0
16     ./cache/pip/http/e/1/a/1
20     ./cache/pip/http/e/1/a
24     ./cache/pip/http/e/1
28     ./cache/pip/http/e
248    ./cache/pip/http/1/5/8/5/6
252    ./cache/pip/http/1/5/8/5
256    ./cache/pip/http/1/5/8
260    ./cache/pip/http/1/5
264    ./cache/pip/http/1
11788  ./cache/pip/http/d/9/3/4/f
11792  ./cache/pip/http/d/9/3/4
11796  ./cache/pip/http/d/9/3
11800  ./cache/pip/http/d/9
11804  ./cache/pip/http/d
132    ./cache/pip/http/6/6/e/c/7
136    ./cache/pip/http/6/6/e/c
140    ./cache/pip/http/6/6/e
144    ./cache/pip/http/6/6
148    ./cache/pip/http/6
212    ./cache/pip/http/c/c/1/3/3
216    ./cache/pip/http/c/c/1/3
220    ./cache/pip/http/c/c/1
```

```
orectique@hearth:~$ du
80     ./local/lib/python3.10/site-packages/pandas/api
62008  ./local/lib/python3.10/site-packages/pandas
88     ./local/lib/python3.10/site-packages/dateutil/__pycache__
80     ./local/lib/python3.10/site-packages/dateutil/tz/__pycache__
188    ./local/lib/python3.10/site-packages/dateutil/tz
60     ./local/lib/python3.10/site-packages/dateutil/parser/__pycache__
144    ./local/lib/python3.10/site-packages/dateutil/parser
16     ./local/lib/python3.10/site-packages/dateutil/zoneinfo/__pycache__
204    ./local/lib/python3.10/site-packages/dateutil/zoneinfo
748    ./local/lib/python3.10/site-packages/dateutil
132368 ./local/lib/python3.10/site-packages
132372 ./local/lib/python3.10
132376 ./local/lib
16     ./local/bin
132396 ./local
235912 .
orectique@hearth:~$ free
              total    used         free       shared  buff/cache   available
Mem:        8016376  323888      7319024         292      373464      7454660
Swap:      2097152          0      2097152

orectique@hearth:~$ hostname
hearth
orectique@hearth:~$ uname
Linux
orectique@hearth:~$ uptime
00:03:43 up 12:42,  0 users,  load average: 0.01, 0.01, 0.00
orectique@hearth:~$ vmstat
procs -----memory----- ---swap-- -----io-----system-- -----cpu-----
 r  b  swpd   free   buff  cache   si   so    bi   bo    in   cs us sy id wa st
  2   0      0 7319276 43384 330152    0    0     1    12    4    9  0  0 100  0  0
orectique@hearth:~$
```

## Process Management

```
orectique@hearth: ~  
orectique@hearth:~$ top  
top - 00:15:25 up 12:54, 0 users, load average: 0.00, 0.00, 0.00  
Tasks: 10 total, 1 running, 9 sleeping, 0 stopped, 0 zombie  
%Cpu(s): 0.0 us, 0.0 sy, 0.0 ni,100.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st  
MiB Mem : 7828.5 total, 7148.9 free, 314.2 used, 365.4 buff/cache  
MiB Swap: 2048.0 total, 2048.0 free, 0.0 used, 7282.0 avail Mem  


| PID  | USER     | PR | NI | VIRT  | RES  | SHR  | S | %CPU | %MEM | TIME+   | COMMAND |
|------|----------|----|----|-------|------|------|---|------|------|---------|---------|
| 1553 | orectiq+ | 20 | 0  | 10768 | 3848 | 3252 | R | 0.3  | 0.0  | 0:00.01 | top     |
| 1    | root     | 20 | 0  | 1952  | 1248 | 1108 | S | 0.0  | 0.0  | 0:00.26 | init    |
| 57   | root     | 20 | 0  | 2164  | 364  | 0    | S | 0.0  | 0.0  | 0:00.00 | init    |
| 58   | root     | 20 | 0  | 2172  | 364  | 0    | S | 0.0  | 0.0  | 0:00.00 | init    |
| 59   | orectiq+ | 20 | 0  | 9096  | 5184 | 3420 | S | 0.0  | 0.1  | 0:00.01 | bash    |
| 603  | root     | 20 | 0  | 2300  | 500  | 0    | S | 0.0  | 0.0  | 0:00.00 | init    |
| 604  | root     | 20 | 0  | 2300  | 500  | 0    | S | 0.0  | 0.0  | 0:03.60 | init    |
| 605  | orectiq+ | 20 | 0  | 9772  | 5928 | 3896 | S | 0.0  | 0.1  | 0:01.08 | bash    |
| 1500 | root     | 20 | 0  | 10976 | 4784 | 3968 | S | 0.0  | 0.1  | 0:00.02 | su      |
| 1501 | orectiq+ | 20 | 0  | 9188  | 5456 | 3704 | S | 0.0  | 0.1  | 0:00.14 | bash    |


```

```
orectique@hearth: ~  
orectique@hearth:~$ sleep 10s  
orectique@hearth:~$ pstree  
init--init--init--bash  
    |--init--init--bash--su--bash--pstree  
    |--init--init--bash--cmatrix  
    --2*[init]  
orectique@hearth:~$ ps  
PID TTY          TIME CMD  
605 pts/2        00:00:01 bash  
1501 pts/2        00:00:00 bash  
1655 pts/2        00:00:00 ps  
orectique@hearth:~$ renice 1 -p 1501  
1501 (process ID) old priority 1, new priority 1  
orectique@hearth:~$ pkill -P 1655  
orectique@hearth:~$ pgrep text  
orectique@hearth:~$ pgrep linux  
orectique@hearth:~$ pgrep sudo  
orectique@hearth:~$ pgrep echo  
orectique@hearth:~$ nohup echo "Hello World!"  
nohup: ignoring input and appending output to 'nohup.out'  
orectique@hearth:~$ nice -n 9 vim  
orectique@hearth:~$ killall  
Usage: killall [OPTION]... [--] NAME...  
       killall -l, --list  
       killall -V, --version  
  
-e,--exact      require exact match for very long names  
-I,--ignore-case case insensitive process name match  
-g,--process-group kill process group instead of process  
-y,--younger-than kill processes younger than TIME  
-o,--older-than  kill processes older than TIME
```

```
orectique@hearth: ~$ ps
  PID TTY          TIME CMD
 1627 pts/0    00:00:00 bash
 1667 pts/0    00:00:00 ps
orectique@hearth:~$ chrt -p 1667
chrt: failed to get pid 1667's policy: No such process
orectique@hearth:~$ chrt -p 1627
pid 1627's current scheduling policy: SCHED_OTHER
pid 1627's current scheduling priority: 0
orectique@hearth:~$ ionice -p 1627
none: prio 4
orectique@hearth:~$
```

```
R n .      ] 4V<  L1  v  g J n m  ?  F      C<U$  N      ( . 5 A  : k  j  >      ' T 6 e a  ^ u r q
! x V      W a T k  7 (  B  /  9 E  i  1      ^  w j _ U $  m      p . P  b 9  T  .      * 9 Z  H ) b f
; 4 )      B @ R e  ! #  m o  : 3  <      ?  1 < : ? t  E ?      g J P  A I  '      '      k 1 X  / x  q
< V 9      /  0 C "  B !  7  j  " 4  1      4  V b " b H  ^ s      w      . h  D  k      H  Y      ? z  ?
2 ) ?      h h F T  E h  r  ]  S -      r      +  s g 4 = S  y g  3      s D  E C  ,      U  Y      q #  7
1 q a      A . b N + n  \  5 8  O  W      @  m ? ( I "  4 '      M  T  N G  6 p  %      2  G  ^  V
! E t      w  7 6 p  C 5 ?      b  C  %  X      \ 9 1  " r ' 7 f u  2 [ R  E  y  o  7 1  >  ^      X  W  0      U  t
S S B      %  n Y f  1 ' I  E      u  D      ^ ^ k ? x 5 m < k  % U  y  k  0  m p  V  _      ? Q Q  ]      )
' ( . *  3      q d 3      q      @  p      x V b ? ] z  n P  0 B  3  w  y  3  U  W  f      p 4 M  \      p
/  o  D r  %  O w '      &      A  Z      P T W X ) @  e X  ^ H  A  h  U  W  W      Q  A + b  3      &
X  T y  h      c k )      >  b      a C @ g  Y  i $  3 u  K      7  a  M      "  Y r '      "      W
N > P  Q      ) 7      k      R      5 " M D  G  < "      2 N  '      B      -      V [      & 2 V  d      ,
:  : 2  Z      4 x      +      f      ( S 2 d  "  7 /  + %      I      <      9      S 3 "      ; b ,      &      #      2
# 1 9      S      0 f      8      M      G      . 5 % 3  @  w 4  f <      ]      ,      r E ] A c c ;      !      (      #
[ m D 4      ^ X  ? P      x      x      .  ? . 2  "  I  , z      8 4      >      ]      6  ' f , t N      K      z
U d # M =      h )  K w      Q      z  t /  z v * f      ! (      m z F      * g  2 T 4 q v @      #
5 G f ' v      * A , h =      q      >  @  q a n      + -      ( 5 ?      @ T  2 ! : c 3 =      $
y 8 _ r )      '      ( L P U K  D  W      +      ^ 2 D      m X B  y 9 <      ^  u N Q  r S - M k i      z ?
( K 4 r  0      e      2 7 P : 7  F  R      M  / t 5      R x e  2 D A      L      ' h p  S / _      ?      [ ?      \
3 P      '      >      M [ y  j W  V      S      ^  D / +      s c K  ] R % s      U  V P W  m 4 $      n      4
r .      z      4 X  T L J  7 @  4      w O p z .      H  s t /  ! 3 I -      h  g 2 +  b s N      >      &
F #      g      I u  t U =  B n  z  c * =  Q U  Q  . e -  ! % ' u      X  Q # 6  V  f      s  <      A
W M      W R      R L  E K / I : :  c  & ' '  < 0      R 9 b D a  j y a b      "  > r 6  U  j      ( =  F  %  ,
% k      *  x      M  p f  D 4 # b X w  l  u F ?  / U  G * n z K  \ ?  Y      f  E , 9  1  I      + m  v  0  M
X 4      !  #      T  I B  j H P e y P      b      *      w 4      = z d k z  h G  n      N  Y  G  \      G '  Z  # '  9
: 9 "      ,      >      [  u U  $ r & S J u      j ?      W '      z D - j  ( V  $ V      p  i  p  4      1 #  \  : <  5
5 1 q  & z )      J  I H  R j s S * 9      k +      x E      ' < G -      > h  P b N      -  0  A I ]      5 <  H  5 '  '
K V T  p  P  L      ^  w E      " B  % M 0      j >      / c      y N Y n      "  0 0 @  (      K  m  L U A      K z  V  H z  A
s , J  ]  j :      I  p ^  4 Y  H G g      = V      z T      " 7 ? $      1  F = D  1      V  T  ? I z      ] <  ^  0 +  0
G ?  O  x  R      8  m '  f "  ^ h =      T      o e  ^      u ' E      U  @ G @  [      "  b  T z 4      U n  @  & f  8
n c  M  K s 1 1  1  F , < Z F  r E '      H      i +  t      # c      >  ) F W a 7      M      f \ ?  w      * '      t e j (  0
```