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RAS 598 Experimentation and Deployment of Robots

By Prof. Daniel Aukes

Assignment 02

Aim: To get used to the Terminal (Ubuntu 22.04)

Table of Commands Executed in Terminal for Assignment 2:

#	Command	What It Does
1	script -q -f -T log1.time log1.session	Starts recording a terminal session and saves output and timings to files.
2	cd	Changes the directory to the user's home directory.
3	pwd	Prints the current working directory.
4	ls -la	Lists all files and directories in the **current directory** with detailed information.
5	cd ~	Changes the directory to the **user's home directory**.
6	ls -la /	Lists all files and directories in the **root directory** with detailed information.
7	ls ap*	Matches and lists **files** and **directories** starting with "**ap**".
8	ls -d ap*	Lists **directories** matching "ap*" only, without displaying their contents.
9	echo "description"	**Prints** a string or message to the terminal.
10	find -iname "*.txt"	Searches for **files** with a .txt extension, **ignoring case**.
11	find -name "*.txt"	Searches for files with a .txt extension (**case-sensitive**).
12	find -name "*.TXT"	Searches for files with a .TXT extension (**case-sensitive**).
13	find -iname "b*"	**Searches** for **files or directories** starting with "b", ignoring case.
14	grep -lirl "broccoli"	Searches for the **string** "broccoli" in files, showing filenames (case-insensitive).
15	grep -lrin "broccoli"	Searches for "broccoli" in files, **displaying line numbers** (case-insensitive).
16	grep -lrn "broccoli"	Same as above, omitting case-insensitivity.
17	ls	Lists files and directories in the current directory.

18	mkdir temp	**Creates a directory** named "temp".
19	cd temp/	**Changes** directory to "temp".
20	mkdir folder-a	Creates a directory named "folder-a".
21	mkdir folder-b	Creates a directory named "folder-b".
22	cd folder-a	Changes directory to "folder-a".
23	touch file-a.txt	**Creates** an **empty file** named "file-a.txt".
24	touch file-b.txt	Creates an empty file named "file-b.txt".
25	cd ..	**Moves up one** directory level.
26	cd folder-b	**Changes** directory to "folder-b".
27	touch file-c.txt	**Creates** an empty file named "file-c.txt".
28	touch file-d.txt	**Creates** an **empty file** named "file-d.txt".
29	cd ../..	**Moves up two** directory levels.
30	echo "description"	Prints a message or string to the terminal.
31	cd temp/folder-b	Changes directory to "folder-b" inside "temp".
32	echo "text" > file-e.txt	**Writes** "text" to "file-e.txt", **overwriting** its contents.
33	cat file-e.txt	Displays the contents of "file-e.txt".
34	echo "text" >> file-e.txt	**Appends** "text" to "file-e.txt".
35	cp file-e.txt file-f.txt	Copies "file-e.txt" to "file-f.txt".
36	cat file-f.txt	**Displays** the contents of "file-f.txt".
37	cp file-e.txt file-g.md	**Copies** "file-e.txt" to "file-g.md".
38	cat file-g.md	**Displays** the **contents** of "file-g.md".
39	du -sh temp/	**Displays the size of the "temp" directory** in human-readable format.
40	df -h temp/	**Displays free disk space** for "temp" in human-readable format.
41	ps	**Displays a snapshot of current processes.**
42	kill <PID>	**Terminates a process by its process ID** (PID).

Table 1. Important command used in Assignment

Task 01: Instructions

1) Open Terminal (using shortcut- ctrl+t)
2) Log in to *en4114943l.tail8bc7c.ts.net, port 2200*, with your asurite as your username and the private key you created last week as your identity file. This will log you in to a temporary, logged, ssh session where you can complete the rest of this assignment.

Methodology:

1. On Terminal Run: ssh -i /home/anushkasatav/key-1233530170 -p 2200 1233530170@en4114943l.tail8bc7c.ts.net
    - ***Debugging the issue:*** *There might be few reasons why we couldn't connect to the remote device.*

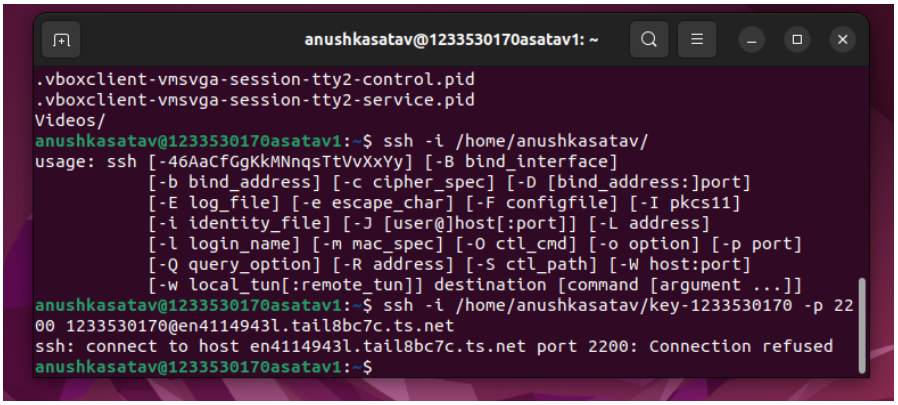


Figure 1. Starting temporary logged ssh session on remote desktop

- Since I faced the error shown in Figure 1., I tried to check the issue. For that I first checked if my ssh key is valid.

- On Terminal Run: `ssh-keygen -y -f /home/anushkasatav/key-1233530170`; if the key is valid, it returns output shown in Figure 1.

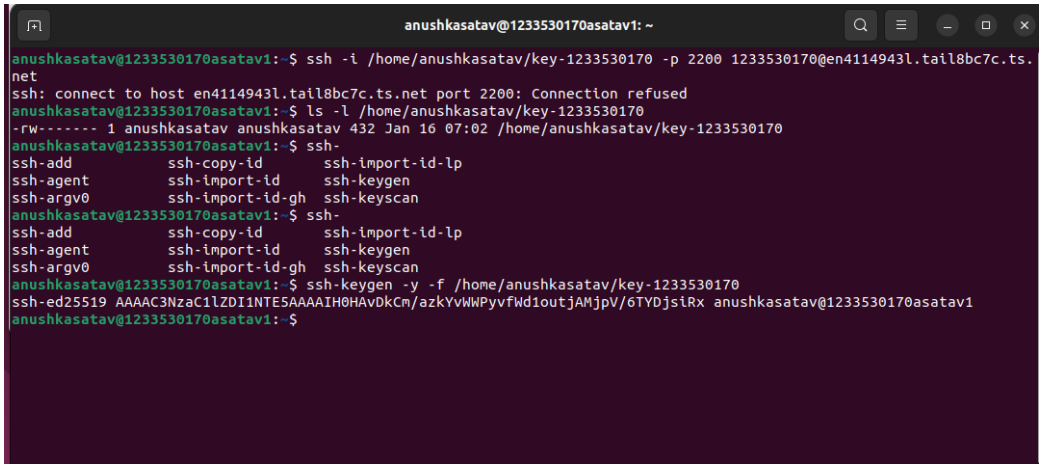


Figure 2. Validity of private key verified

- Other reason might be that server is offline and not accepting connections to port 2200. So, to test connectivity to the server,
  On Terminal Run: `telnet en4414943l.tail8bc7c.ts.net 2200`, it showed Figure 3. Hence, the server is not online. (Crosscheck status of remote device with professor; update: - timings will be up on dashboard)

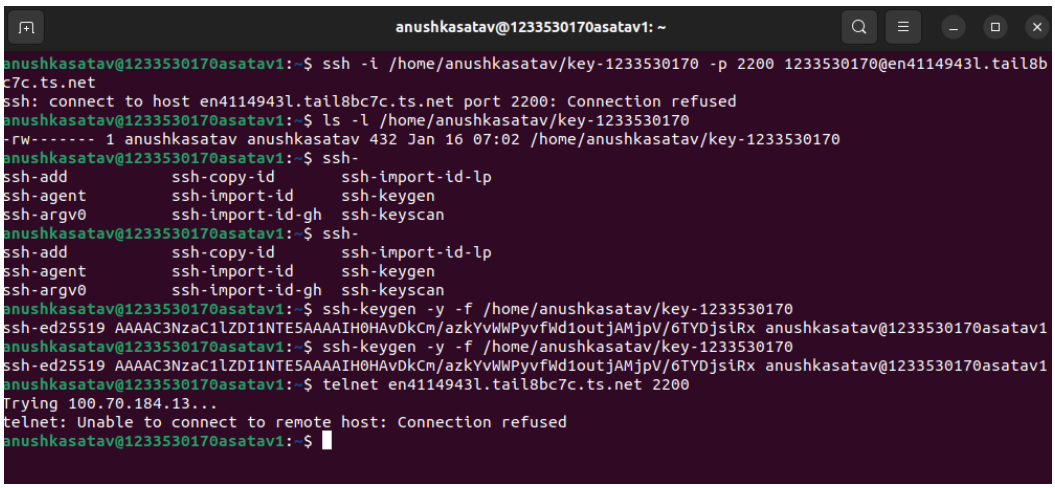


Figure 3. Not able to connect to remote host

<Timings were updated on dashboard>

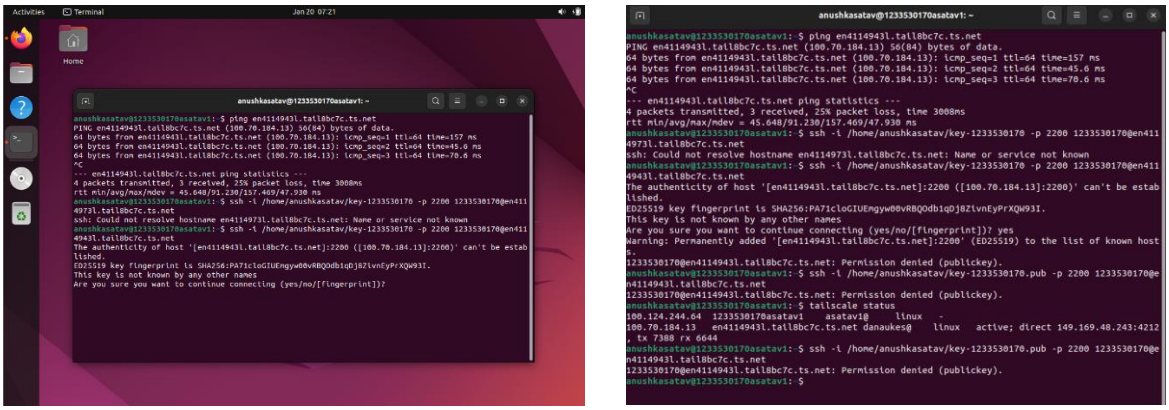


Figure 4. Access was denied

The issue was with Asurite ID. It was supposed to be “asatav1” and not “1233530170”!

Finally, on Terminal run: `ssh -v -I /home/anushkasatav/key-1233530170 -p 2200 asatav1@@en4114943l.tail8bc7c.ts.net`

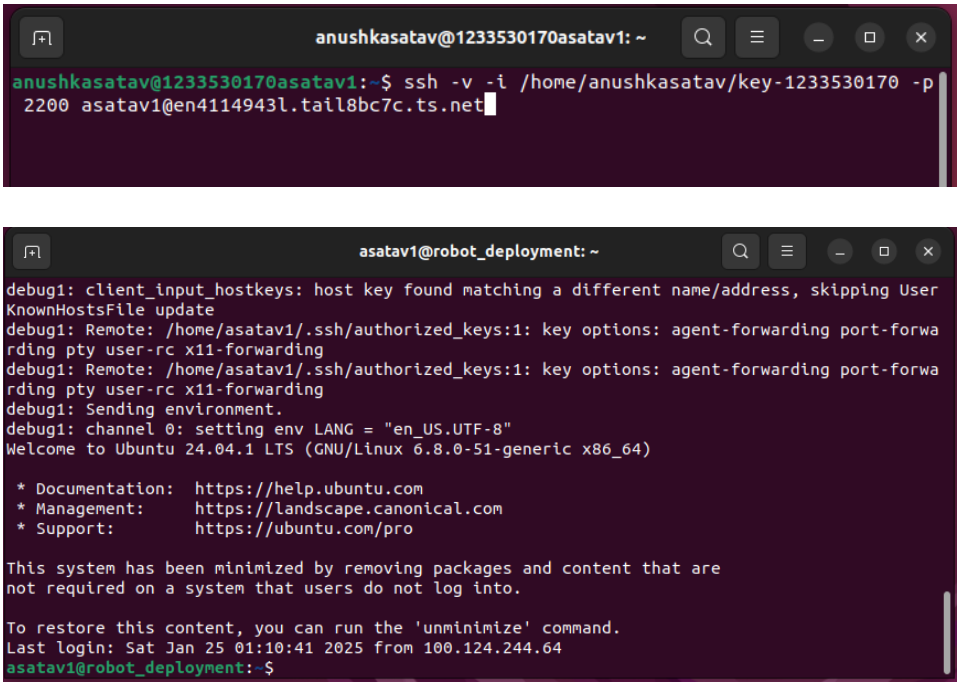


Figure 5. Successfully connected to the remote server

3) Once logged in, start by saving your session using the script command:

   On Terminal run: `script -q -f -T log1.time log1.session`

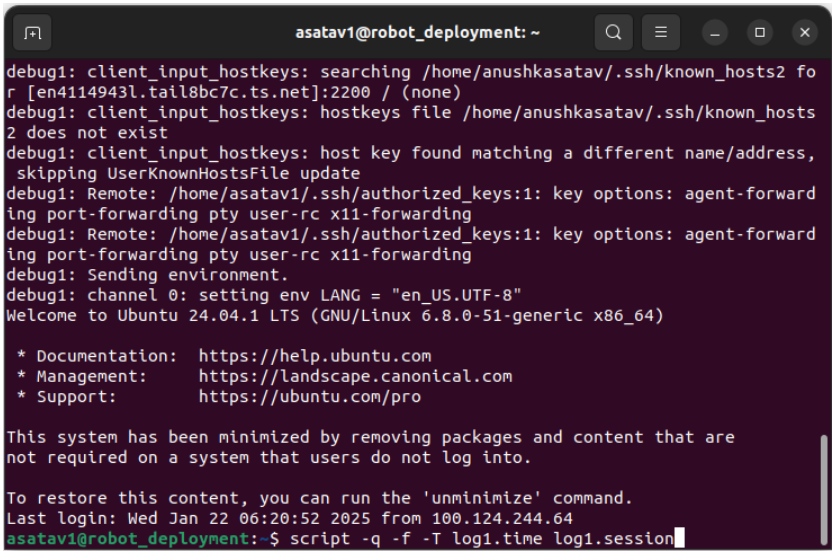


Figure 6. Save session in log

4) List files and folders

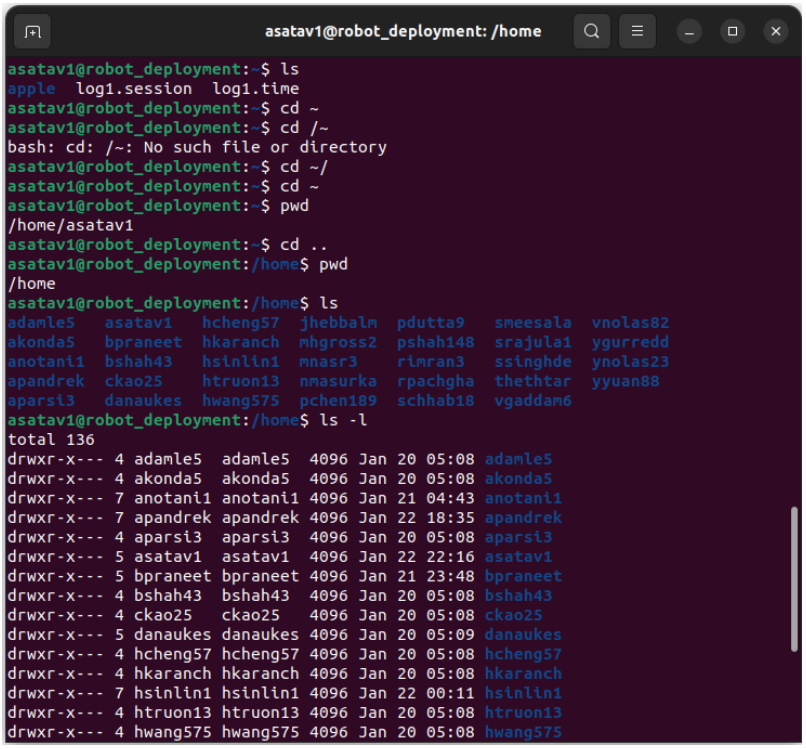
a. Navigate to the filesystem's root directory (using cd)

b. List all the files in root in list form using ls

c. Navigate to home (use the special character for home): "/"

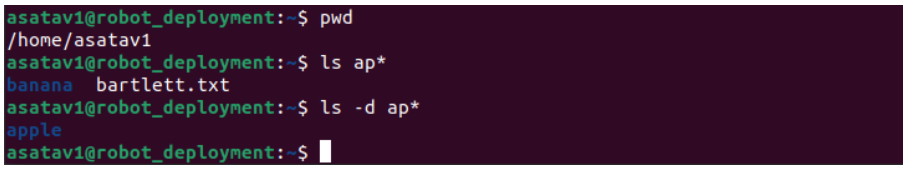
d. List all the files in your root directory from your home directory in list form

```
asatav1@robot_deployment:~$ script -q -f -T log1.time log1.session
asatav1@robot_deployment:~$ cd
asatav1@robot_deployment:~$ pwd
/home/asatav1
asatav1@robot_deployment:~$ ls -la
total 52
drwxr-x---  6 asatav1 asatav1 4096 Jan 22 22:38 .
drwxr-xr-x 36 root    root    4096 Jan 20 05:08 ..
-rw-------  1 asatav1 asatav1  551 Jan 22 22:35 .bash_history
-rw-r--r--  1 asatav1 asatav1  220 Mar 31  2024 .bash_logout
-rw-r--r--  1 asatav1 asatav1 4181 Jan 20 05:08 .bashrc
drwx------  2 asatav1 asatav1 4096 Jan 22 06:20 .cache
drwxrwxr-x  3 asatav1 asatav1 4096 Jan 22 22:37 .local
-rw-r--r--  1 asatav1 asatav1  807 Mar 31  2024 .profile
drwx------  2 asatav1 asatav1 4096 Jan 20 05:08 .ssh
drwxrwxr-x  3 asatav1 asatav1 4096 Jan 19 15:18 apple
-rw-rw-r--  1 asatav1 asatav1  456 Jan 22 22:38 log1.session
-rw-rw-r--  1 asatav1 asatav1  249 Jan 22 22:38 log1.time
```



e. List only the files in your directory that start with “ap”:

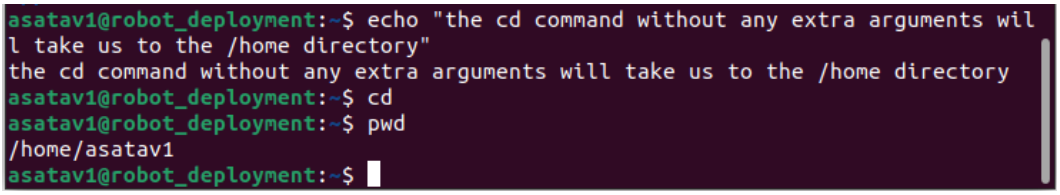
On terminal run: ls ap*(for searching files) && ls -d ap*(for searching directories)



f. Question: what does cd do without any extra arguments? Answer the question by printing a short response as a string in your ssh session using the echo command.

On Terminal run: echo “when there are no extra arguments with cd, it takes us to the home directory; in my case /home/asatav1”

```
asatav1@robot_deployment:~$ echo "when there are no extra arguments with
cd, it takes us to the home directory; in my case /home/asatav1"
when there are no extra arguments with cd, it takes us to the home
directory; in my case /home/asatav1
asatav1@robot_deployment:~$
```



5) Find and grep

a. Use find to locate all files in your user folder that end with ".txt", regardless of capitalization

```
asatav1@robot_deployment:~$ find -iname "*.txt"
./apple/bartlett.txt
./apple/banana/info.TXT
./apple/banana/cherry/durian/hello.txt
asatav1@robot_deployment:~$ find -name "*.txt"
./apple/bartlett.txt
./apple/banana/cherry/durian/hello.txt
asatav1@robot_deployment:~$ find -name "*.TXT"
./apple/banana/info.TXT
```

```
asatav1@robot_deployment:~$ pwd
/home/asatav1
asatav1@robot_deployment:~$ find -iname ".txt"
asatav1@robot_deployment:~$
```

b. Use find to list all files in your user folder that start with "b", regardless of capitalization

c. Use grep to list all the files in your user folder that contain "broccoli", regardless of capitalization.

d. Use grep to list all the files in your user folder that contain "broccoli", regardless of capitalization, printing the associated lines and line numbers.

```
asatav1@robot_deployment:~$ find -iname "*.txt"
./apple/bartlett.txt
./apple/banana/info.TXT
./apple/banana/cherry/durian/hello.txt
asatav1@robot_deployment:~$ find -name "*.txt"
./apple/bartlett.txt
./apple/banana/cherry/durian/hello.txt
asatav1@robot_deployment:~$ find -name "*.TXT"
./apple/banana/info.TXT
asatav1@robot_deployment:~$ find -iname "b*"
./apple/bartlett.txt
./apple/banana
asatav1@robot_deployment:~$ grep -Iirl "broccoli"
log1.session
.bash_history
apple/banana/cauliflower/abc
apple/banana/cherry/durian/hello.txt
asatav1@robot_deployment:~$ grep -Irin "broccoli"
asatav1@robot_deployment:~$ ls -d ap*
log1.session:76:asatav1@robot_deployment:~$ grep -Irin "broccoli"
.bash_history:40:grep -iIrl "broccoli"
.bash_history:41:grep -Iirn "broccoli
apple/banana/cauliflower/abc:1:Also known as broccoli blanco
apple/banana/cherry/durian/hello.txt:2:**Not** known as "Broccoli Blanco"
asatav1@robot_deployment:~$
```

```
asatav1@robot_deployment:~$ find -iname "b*"
./apple/bartlett.txt
./apple/banana
asatav1@robot_deployment:~$ grep -Iirl "broccoli"
log1.session
.bash_history
apple/banana/cauliflower/abc
apple/banana/cherry/durian/hello.txt
asatav1@robot_deployment:~$ grep -Irin "broccoli"
asatav1@robot_deployment:~$ ls -d ap*
log1.session:76:asatav1@robot_deployment:~$ grep -Irin "broccoli"
.bash_history:40:grep -iIrl "broccoli"
.bash_history:41:grep -Iirn "broccoli
apple/banana/cauliflower/abc:1:Also known as broccoli blanco
apple/banana/cherry/durian/hello.txt:2:**Not** known as "Broccoli Blanco"
asatav1@robot_deployment:~$ grep -Irn "broccoli"
asatav1@robot_deployment:~$ ls -d ap*
log1.session:76:asatav1@robot_deployment:~$ grep -Irin "broccoli"
asatav1@robot_deployment:~$ ls -d ap*
log1.session:78:log1.session:76:asatav1@robot_deployment:~$ grep -Irin
"broccoli"
log1.session:79:.bash_history:40:grep -iIrl "broccoli"
log1.session:80:.bash_history:41:grep -Iirn "broccoli
log1.session:81:apple/banana/cauliflower/abc:1:Also known as broccoli
blanco
log1.session:83:asatav1@robot_deployment:~$ grep -Irn "broccoli"
asatav1@robot_deployment:~$ ls -d ap*
log1.session:85:log1.session:76:asatav1@robot_deployment:~$ grep -Irin
"broccoli"
asatav1@robot_deployment:~$ ls -d ap*
log1.session:87:log1.session:78:log1.session:76:asatav1@robot_deployment:
~$ grep -Irin "broccoli"
.bash_history:40:grep -iIrl "broccoli"
.bash_history:41:grep -Iirn "broccoli
apple/banana/cauliflower/abc:1:Also known as broccoli blanco
asatav1@robot_deployment:~$
```

6) Using touch and mkdir, create the following nested directory structure in your home directory (/home/yourusername)

```
temp/
├── folder-a
│   ├── file-a.txt
│   └── file-b.txt
└── folder-b
├── file-c.txt
└── file-d.txt
```

Question 1. Which flag of the mkdir command helps reduce the number of commands you have to
type out to make a nested folder structure?

Answer. On Terminal run: echo “the -p flag of mkdir command allows us to directly make a nested folder structure.”” for answer.

```
asatav1@robot_deployment:~$ pwd
/home/asatav1
asatav1@robot_deployment:~$ mkdir temp
asatav1@robot_deployment:~$ cd temp/
asatav1@robot_deployment:~/temp$ mkdir folder-a
asatav1@robot_deployment:~/temp$ mkdir folder-b
asatav1@robot_deployment:~/temp$ cd folder-a
asatav1@robot_deployment:~/temp/folder-a$ touch file-a.txt
asatav1@robot_deployment:~/temp/folder-a$ touch file-b.txt
asatav1@robot_deployment:~/temp/folder-a$ ls
file-a.txt  file-b.txt
asatav1@robot_deployment:~/temp/folder-a$ cd ..
asatav1@robot_deployment:~/temp$ cd folder-b
asatav1@robot_deployment:~/temp/folder-b$ ls
asatav1@robot_deployment:~/temp/folder-b$ touch file-c.txt
asatav1@robot_deployment:~/temp/folder-b$ touch file-d.txt
asatav1@robot_deployment:~/temp/folder-b$ ls
file-c.txt  file-d.txt
asatav1@robot_deployment:~/temp/folder-b$ cd ../..
asatav1@robot_deployment:~$ ls
apple  log1.session  log1.time  temp
asatav1@robot_deployment:~$ echo "the -p flag of mkdir command allows us
to directly make a nested folder structure."
the -p flag of mkdir command allows us to directly make a nested folder
structure.
```

```
asatav1@robot_deployment:~$ ls
apple  log1.session  log1.time
asatav1@robot_deployment:~$ pwd
/home/asatav1
asatav1@robot_deployment:~$ mkdir temp
asatav1@robot_deployment:~$ cd temp/
asatav1@robot_deployment:~/temp$ mkdir folder-a
asatav1@robot_deployment:~/temp$ mkdir folder-b
asatav1@robot_deployment:~/temp$ cd folder-a
asatav1@robot_deployment:~/temp/folder-a$ touch file-a.txt
asatav1@robot_deployment:~/temp/folder-a$ touch file-b.txt
asatav1@robot_deployment:~/temp/folder-a$ ls
file-a.txt  file-b.txt
asatav1@robot_deployment:~/temp/folder-a$ cd ..
asatav1@robot_deployment:~/temp$ cd folder-b
asatav1@robot_deployment:~/temp/folder-b$ ls
asatav1@robot_deployment:~/temp/folder-b$ touch file-c.txt
asatav1@robot_deployment:~/temp/folder-b$ touch file-d.txt
asatav1@robot_deployment:~/temp/folder-b$ ls
file-c.txt  file-d.txt
asatav1@robot_deployment:~/temp/folder-b$ cd ../..
asatav1@robot_deployment:~$ ls
apple  log1.session  log1.time  temp
asatav1@robot_deployment:~$ echo "the -p flag of mkdir command allows us to dire
ctly make a nested folder structure."
the -p flag of mkdir command allows us to directly make a nested folder structur
e.
asatav1@robot_deployment:~$
```

7) Navigate to temp/folder-b/
    a. 1. Write the following string to a new file (file-e.txt) using >
    The quick brown fox jumped over the lazy dog

```
asatav1@robot_deployment:~/temp/folder-b$ ls
file-c.txt  file-d.txt
asatav1@robot_deployment:~/temp/folder-b$ cd ../..
asatav1@robot_deployment:~$ ls
apple  log1.session  log1.time  temp
asatav1@robot_deployment:~$ echo "the -p flag of mkdir command allows us to dire
ctly make a nested folder structure."
the -p flag of mkdir command allows us to directly make a nested folder structur
e.
asatav1@robot_deployment:~$ cd temp/folder-b
asatav1@robot_deployment:~/temp/folder-b$ pwd
/home/asatav1/temp/folder-b
asatav1@robot_deployment:~/temp/folder-b$ echo "The quick brown fox jumped over
the lazy dog" > file-e.txt
asatav1@robot_deployment:~/temp/folder-b$ ls
file-c.txt  file-d.txt  file-e.txt
asatav1@robot_deployment:~/temp/folder-b$ cat file-e.txt
The quick brown fox jumped over the lazy dog
asatav1@robot_deployment:~/temp/folder-b$
```

b. Display the contents of the file in the terminal (use `cat`)

```
asatav1@robot_deployment:~/temp/folder-b$ ls
file-c.txt  file-d.txt  file-e.txt
asatav1@robot_deployment:~/temp/folder-b$ cat file-e.txt
The quick brown fox jumped over the lazy dog
asatav1@robot_deployment:~/temp/folder-b$ echo "Hi, I am Anushka. Nice to meet o
you." >> file-e.txt
asatav1@robot_deployment:~/temp/folder-b$ cat file-e.txt
The quick brown fox jumped over the lazy dog
Hi, I am Anushka. Nice to meet oyou.
asatav1@robot_deployment:~/temp/folder-b$
```

c. Append a second string to the file and re-display the contents

d. Use a different command to append (not replace) to the contents of the file. Re-display the contents- On Terminal run: `echo "Hi, I am Anushka. Nice to meet you." >> file-e.txt`

```
asatav1@robot_deployment:~/temp/folder-b$ echo "The quick brown fox
jumped over the lazy dog" > file-e.txt
asatav1@robot_deployment:~/temp/folder-b$ ls
file-c.txt  file-d.txt  file-e.txt
asatav1@robot_deployment:~/temp/folder-b$ cat file-e.txt
The quick brown fox jumped over the lazy dog
asatav1@robot_deployment:~/temp/folder-b$ echo "Hi, I am Anushka. Nice to
meet oyou." >> file-e.txt
asatav1@robot_deployment:~/temp/folder-b$ cat file-e.txt
The quick brown fox jumped over the lazy dog
Hi, I am Anushka. Nice to meet oyou.
asatav1@robot_deployment:~/temp/folder-b$ echo "Hi, I am adding third
line to file-e.txt!" | tee -a file-e.txt
Hi, I am adding third line to file-e.txt!
asatav1@robot_deployment:~/temp/folder-b$ cat file-e.txt
The quick brown fox jumped over the lazy dog
Hi, I am Anushka. Nice to meet oyou.
Hi, I am adding third line to file-e.txt!
```

```
asatav1@robot_deployment:~/temp/folder-b$ cat file-e.txt
The quick brown fox jumped over the lazy dog
asatav1@robot_deployment:~/temp/folder-b$ echo "Hi, I am Anushka. Nice to meet o
you." >> file-e.txt
asatav1@robot_deployment:~/temp/folder-b$ cat file-e.txt
The quick brown fox jumped over the lazy dog
Hi, I am Anushka. Nice to meet oyou.
asatav1@robot_deployment:~/temp/folder-b$ echo "Hi, I am adding third line to fi
le-e.txt!" | tee -a file-e.txt
Hi, I am adding third line to file-e.txt!
asatav1@robot_deployment:~/temp/folder-b$
```

e. Copy file-e.txt to file-f.txt and then file-g.md. (note the extension difference)
f. Use > to input a string to (file-f.txt), then display its contents

```
asatav1@robot_deployment:~/temp/folder-b$ cp file-e.txt file-f.txt
asatav1@robot_deployment:~/temp/folder-b$ ls
file-c.txt  file-d.txt  file-e.txt  file-f.txt
asatav1@robot_deployment:~/temp/folder-b$ cat file-f.txt
The quick brown fox jumped over the lazy dog
Hi, I am Anushka. Nice to meet oyou.
Hi, I am adding third line to file-e.txt!
asatav1@robot_deployment:~/temp/folder-b$ cp file-e.txt file-g.md
asatav1@robot_deployment:~/temp/folder-b$ ls
file-c.txt  file-d.txt  file-e.txt  file-f.txt  file-g.md
asatav1@robot_deployment:~/temp/folder-b$ cat file-g.md
The quick brown fox jumped over the lazy dog
Hi, I am Anushka. Nice to meet oyou.
Hi, I am adding third line to file-e.txt!
asatav1@robot_deployment:~/temp/folder-b$
```

g. What happened to the original contents of file-f.txt? Explain with a short sentence directly in the terminal using echo.
Answer. On Terminal run: echo “since we used '>' to input string to file-f, all of its contents got overwritten by the new string." for answer.

```
asatav1@robot_deployment:~/temp/folder-b$ cp file-e.txt file-g.md
asatav1@robot_deployment:~/temp/folder-b$ ls
file-c.txt  file-d.txt  file-e.txt  file-f.txt  file-g.md
asatav1@robot_deployment:~/temp/folder-b$ cat file-g.md
The quick brown fox jumped over the lazy dog
Hi, I am Anushka. Nice to meet oyou.
Hi, I am adding third line to file-e.txt!
asatav1@robot_deployment:~/temp/folder-b$ echo "New string to add to file-f.txt"
> file-f.txt
asatav1@robot_deployment:~/temp/folder-b$ cat file-f.txt
New string to add to file-f.txt
asatav1@robot_deployment:~/temp/folder-b$ echo "since we used '>' to input strin
g to file-f, all of its contents got overwritten by the new string."
since we used '>' to input string to file-f, all of its contents got overwritten
 by the new string.
asatav1@robot_deployment:~/temp/folder-b$
```


```
asatav1@robot_deployment:~/temp/folder-b$ cp file-e.txt file-f.txt
asatav1@robot_deployment:~/temp/folder-b$ ls
file-c.txt  file-d.txt  file-e.txt  file-f.txt
asatav1@robot_deployment:~/temp/folder-b$ cat file-f.txt
The quick brown fox jumped over the lazy dog
Hi, I am Anushka. Nice to meet oyou.
Hi, I am adding third line to file-e.txt!
asatav1@robot_deployment:~/temp/folder-b$ cp file-e.txt file-g.md
asatav1@robot_deployment:~/temp/folder-b$ ls
file-c.txt  file-d.txt  file-e.txt  file-f.txt  file-g.md
asatav1@robot_deployment:~/temp/folder-b$ cat file-g.md
The quick brown fox jumped over the lazy dog
Hi, I am Anushka. Nice to meet oyou.
Hi, I am adding third line to file-e.txt!
asatav1@robot_deployment:~/temp/folder-b$ echo "New string to add to
file-f.txt"> file-f.txt
asatav1@robot_deployment:~/temp/folder-b$ cat file-f.txt
New string to add to file-f.txt
asatav1@robot_deployment:~/temp/folder-b$ echo "since we used '>' to
input string to file-f, all of its contents got overwritten by the new
string."
since we used '>' to input string to file-f, all of its contents got
overwritten by the new string.
asatav1@robot_deployment:~/temp/folder-b$
```

8) Advanced functions

a. Show the **total** disk usage of temp/ in human readable format
b. Replace any instances of stew with pot in files inside the user folder using a terminal command.

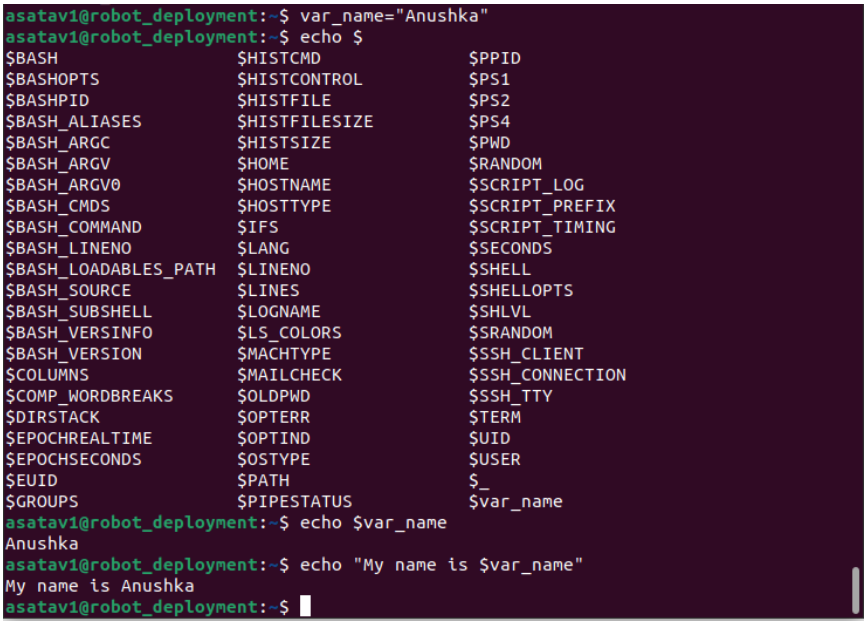
```
asatav1@robot_deployment:~$ du -sh temp/
24K   temp/
asatav1@robot_deployment:~$ df -h temp/
Filesystem                         Size  Used Avail Use% Mounted on
/dev/mapper/ubuntu--vg-ubuntu--lv  913G   14G  853G   2% /home
asatav1@robot_deployment:~$ echo "df (disk free) shows disk space in
Linux"
df (disk free) shows disk space in Linux
asatav1@robot_deployment:~$ df -h temp/
Filesystem                         Size  Used Avail Use% Mounted on
/dev/mapper/ubuntu--vg-ubuntu--lv  913G   14G  853G   2% /home
asatav1@robot_deployment:~$ ls
apple  log1.session  log1.time  temp
asatav1@robot_deployment:~$ cd apple/ba
banana/       bartlett.txt
asatav1@robot_deployment:~$ grep -irl "stew" /
.dockerenv          lib64/              sessions/
bin/                media/              srv/
bin.usr-is-merged/  mnt/                sys/
boot/               opt/                tmp/
dev/                proc/               usr/
etc/                root/               var/
home/               run/                work/
lib/                sbin/
lib.usr-is-merged/  sbin.usr-is-merged/
asatav1@robot_deployment:~$ grep -irl "stew" /
.dockerenv          lib64/              sessions/
bin/                media/              srv/
bin.usr-is-merged/  mnt/                sys/
boot/               opt/                tmp/
dev/                proc/               usr/
etc/                root/               var/
home/               run/                work/
lib/                sbin/
lib.usr-is-merged/  sbin.usr-is-merged/
asatav1@robot_deployment:~$ grep -irl "stew"
log1.session
apple/banana/cherry/durian/taters.md
asatav1@robot_deployment:~$ cat apple/banana/c
cauliflower/ cherry/
asatav1@robot_deployment:~$ cat apple/banana/cherry/durian/taters.md
boil 'em, smash 'em, stick 'em in a stewasatav1@robot_deployment:~$
asatav1@robot_deployment:~$ find ~ -exec sed -i 's/stew/pot/g' {} +
sed: couldn't edit /home/asatav1: not a regular file
asatav1@robot_deployment:~$ ls
apple  log1.session  log1.time  temp
asatav1@robot_deployment:~$ find -exec sed -i 's/stew/pot/g' {} +
sed: couldn't edit .: not a regular file
asatav1@robot_deployment:~$ find "*.md" -exec sed -i 's/stew/pot/g' {} +
find: `*.md': No such file or directory
asatav1@robot_deployment:~$ find -iname "*.md" -exec sed -i
's/stew/pot/g' {} +
asatav1@robot_deployment:~$ cat apple/banana/cherry/durian/taters.md
boil 'em, smash 'em, stick 'em in a potasatav1@robot_deployment:~$
asatav1@robot_deployment:~$
```

```
asatav1@robot_deployment:~/temp/folder-b$ cd
asatav1@robot_deployment:~$ du -sh temp/
24K     temp/
asatav1@robot_deployment:~$ df -h temp/
Filesystem                         Size  Used Avail Use% Mounted on
/dev/mapper/ubuntu--vg-ubuntu--lv  913G   14G  853G   2% /home
asatav1@robot_deployment:~$ echo "df (disk free) shows disk space in Linux"
df (disk free) shows disk space in Linux
asatav1@robot_deployment:~$ df -h temp/
Filesystem                         Size  Used Avail Use% Mounted on
/dev/mapper/ubuntu--vg-ubuntu--lv  913G   14G  853G   2% /home
asatav1@robot_deployment:~$
```

```
asatav1@robot_deployment: ~
df (disk free) shows disk space in Linux
asatav1@robot_deployment:~$ df -h temp/
Filesystem                         Size  Used Avail Use% Mounted on
/dev/mapper/ubuntu--vg-ubuntu--lv  913G   14G  853G   2% /home
asatav1@robot_deployment:~$ ls
apple  log1.session  log1.time  temp
asatav1@robot_deployment:~$ cd apple/ba
banana/       bartlett.txt
asatav1@robot_deployment:~$ grep -irl "stew" /
.dockerenv          lib64/              sessions/
bin/                media/              srv/
bin.usr-is-merged/  mnt/                sys/
boot/               opt/                tmp/
dev/                proc/               usr/
etc/                root/               var/
home/               run/                work/
lib/                sbin/
lib.usr-is-merged/  sbin.usr-is-merged/
asatav1@robot_deployment:~$ grep -irl "stew" /
.dockerenv          lib64/              sessions/
bin/                media/              srv/
bin.usr-is-merged/  mnt/                sys/
boot/               opt/                tmp/
dev/                proc/               usr/
etc/                root/               var/
home/               run/                work/
lib/                sbin/
lib.usr-is-merged/  sbin.usr-is-merged/
asatav1@robot_deployment:~$ grep -irl "stew"
log1.session
apple/banana/cherry/durian/taters.md
asatav1@robot_deployment:~$ cat apple/banana/c
cauliflower/ cherry/
asatav1@robot_deployment:~$ cat apple/banana/cherry/durian/taters.md
boil 'em, smash 'em, stick 'em in a stewasatav1@robot_deployment:~$
asatav1@robot_deployment:~$ find ~ -exec sed -i 's/stew/pot/g' {} +
sed: couldn't edit /home/asatav1: not a regular file
asatav1@robot_deployment:~$ ls
apple  log1.session  log1.time  temp
asatav1@robot_deployment:~$ find -exec sed -i 's/stew/pot/g' {} +
sed: couldn't edit .: not a regular file
asatav1@robot_deployment:~$ find "*.md" -exec sed -i 's/stew/pot/g' {} +
find: ‘*.md’: No such file or directory
asatav1@robot_deployment:~$ find -iname "*.md" -exec sed -i 's/stew/pot/g' {} +
asatav1@robot_deployment:~$ cat apple/banana/cherry/durian/taters.md
boil 'em, smash 'em, stick 'em in a potasatav1@robot_deployment:~$
asatav1@robot_deployment:~$
```

9) Variables

a. Use the equals sign to assign a string
b. Print the variable's value in terminal
c. Embed the contents of the variable within another string and echo to the terminal



d. Export your variable as an environment variable
e. Identify all environment variables using a function in bash

```
asatav1@robot_deployment:~$ var_name="Anushka"
asatav1@robot_deployment:~$ echo $
$BASH                   $HISTCMD              $PPID
$BASHOPTS               $HISTCONTROL          $PS1
$BASHPID                $HISTFILE             $PS2
$BASH_ALIASES           $HISTFILESIZE         $PS4
$BASH_ARGC              $HISTSIZE             $PWD
$BASH_ARGV              $HOME                 $RANDOM
$BASH_ARGV0             $HOSTNAME             $SCRIPT_LOG
$BASH_CMDS              $HOSTTYPE             $SCRIPT_PREFIX
$BASH_COMMAND           $IFS                  $SCRIPT_TIMING
$BASH_LINENO            $LANG                 $SECONDS
$BASH_LOADABLES_PATH    $LINENO               $SHELL
$BASH_SOURCE            $LINES                $SHELLOPTS
$BASH_SUBSHELL          $LOGNAME              $SHLVL
$BASH_VERSINFO          $LS_COLORS            $SRANDOM
$BASH_VERSION           $MACHTYPE             $SSH_CLIENT
$COLUMNS                $MAILCHECK            $SSH_CONNECTION
$COMP_WORDBREAKS        $OLDPWD               $SSH_TTY
$DIRSTACK               $OPTERR               $TERM
$EPOCHREALTIME          $OPTIND               $UID
$EPOCHSECONDS           $OSTYPE               $USER
$EUID                   $PATH                 $_
$GROUPS                 $PIPESTATUS           $var_name
asatav1@robot_deployment:~$ echo $var_name
Anushka
asatav1@robot_deployment:~$ echo "My name is $var_name"
My name is Anushka
asatav1@robot_deployment:~$ export var_name
asatav1@robot_deployment:~$ printenv
SHELL=/bin/bash
var_name=Anushka
PWD=/home/asatav1
LOGNAME=asatav1
HOME=/home/asatav1
```

```
asatav1@robot_deployment:~$ export var_name
asatav1@robot_deployment:~$ printenv
SHELL=/bin/bash
var_name=Anushka
PWD=/home/asatav1
LOGNAME=asatav1
HOME=/home/asatav1
LANG=C.UTF-8
LS_COLORS=rs=0:di=01;34:ln=01;36:mh=00:pi=40;33:so=01;35:do=01;35:bd=40;33;01:cd
=40;33;01:or=40;31;01:mi=00:su=37;41:sg=30;43:ca=00:tw=30;42:ow=34;42:st=37;44:e
x=01;32:*.tar=01;31:*.tgz=01;31:*.arc=01;31:*.arj=01;31:*.taz=01;31:*.lha=01;31:
*.lz4=01;31:*.lzh=01;31:*.lzma=01;31:*.tlz=01;31:*.txz=01;31:*.tzo=01;31:*.t7z=0
1;31:*.zip=01;31:*.z=01;31:*.dz=01;31:*.gz=01;31:*.lrz=01;31:*.lz=01;31:*.lzo=01
;31:*.xz=01;31:*.zst=01;31:*.tzst=01;31:*.bz2=01;31:*.bz=01;31:*.tbz=01;31:*.tbz
2=01;31:*.tz=01;31:*.deb=01;31:*.rpm=01;31:*.jar=01;31:*.war=01;31:*.ear=01;31:*
.sar=01;31:*.rar=01;31:*.alz=01;31:*.ace=01;31:*.zoo=01;31:*.cpio=01;31:*.7z=01;
31:*.rz=01;31:*.cab=01;31:*.wim=01;31:*.swm=01;31:*.dwm=01;31:*.esd=01;31:*.avif
=01;35:*.jpg=01;35:*.jpeg=01;35:*.mjpg=01;35:*.mjpeg=01;35:*.gif=01;35:*.bmp=01;
35:*.pbm=01;35:*.pgm=01;35:*.ppm=01;35:*.tga=01;35:*.xbm=01;35:*.xpm=01;35:*.tif
=01;35:*.tiff=01;35:*.png=01;35:*.svg=01;35:*.svgz=01;35:*.mng=01;35:*.pcx=01;35
:*.mov=01;35:*.mpg=01;35:*.mpeg=01;35:*.m2v=01;35:*.mkv=01;35:*.webm=01;35:*.web
p=01;35:*.ogm=01;35:*.mp4=01;35:*.m4v=01;35:*.mp4v=01;35:*.vob=01;35:*.qt=01;35:
*.nuv=01;35:*.wmv=01;35:*.asf=01;35:*.rm=01;35:*.rmvb=01;35:*.flc=01;35:*.avi=01
;35:*.fli=01;35:*.flv=01;35:*.gl=01;35:*.dl=01;35:*.xcf=01;35:*.xwd=01;35:*.yuv=
01;35:*.cgm=01;35:*.emf=01;35:*.ogv=01;35:*.ogx=01;35:*.aac=00;36:*.au=00;36:*.f
lac=00;36:*.m4a=00;36:*.mid=00;36:*.midi=00;36:*.mka=00;36:*.mp3=00;36:*.mpc=00;
36:*.ogg=00;36:*.ra=00;36:*.wav=00;36:*.oga=00;36:*.opus=00;36:*.spx=00;36:*.xsp
f=00;36:*~=00;90:*#=00;90:*.bak=00;90:*.crdownload=00;90:*.dpkg-dist=00;90:*.dpk
g-new=00;90:*.dpkg-old=00;90:*.dpkg-tmp=00;90:*.old=00;90:*.orig=00;90:*.part=00
;90:*.rej=00;90:*.rpmnew=00;90:*.rpmorig=00;90:*.rpmsave=00;90:*.swp=00;90:*.tmp
=00;90:*.ucf-dist=00;90:*.ucf-new=00;90:*.ucf-old=00;90:
SCRIPT_LOG=/sessions/session-asatav1-2025-01-22-22-35-58.log
SSH_CONNECTION=100.124.244.64 47020 172.18.0.2 22
TERM=xterm-256color
USER=asatav1
SHLVL=4
SSH_CLIENT=100.124.244.64 47020 22
SCRIPT_PREFIX=/sessions/session-asatav1-2025-01-22-22-35-58
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/us
r/local/games:/snap/bin
SSH_TTY=/dev/pts/37
OLDPWD=/home/asatav1/temp/folder-b
SCRIPT_TIMING=/sessions/session-asatav1-2025-01-22-22-35-58.time
_=/usr/bin/printenv
asatav1@robot_deployment:~$
```

10) Processes

a. Launch sleep infinity in a subprocess
b. Show all processes running (not just for the current user, not just in the tty session)
c. Find the sleep PID using pipes, and grep
d. Kill sleep infinity with the PID you just found.

```
asatav1@robot_deployment:~$ tmux
bash: tmux: command not found
asatav1@robot_deployment:~$ sleep infinity &
[1] 18217
asatav1@robot_deployment:~$ ps
    PID TTY          TIME CMD
  18128 pts/48   00:00:00 bash
  18217 pts/48   00:00:00 sleep
  18218 pts/48   00:00:00 ps
asatav1@robot_deployment:~$ ps -e
    PID TTY          TIME CMD
      1 ?        00:00:00 sleep
     15 ?        00:00:00 sshd
   1298 ?        00:00:00 sshd
   1322 ?        00:00:00 sshd
   1324 ?        00:00:00 sshd
   1326 ?        00:00:00 sshd
   1328 ?        00:00:00 sshd
   1330 ?        00:00:00 sshd
   1332 ?        00:00:00 sshd
   1334 ?        00:00:00 sshd
   1336 ?        00:00:00 sshd
```

```
asatav1@robot_deployment:~$ tmux
bash: tmux: command not found
asatav1@robot_deployment:~$ sleep infinity &
[1] 18217
asatav1@robot_deployment:~$ ps
    PID TTY          TIME CMD
  18128 pts/48   00:00:00 bash
  18217 pts/48   00:00:00 sleep
  18218 pts/48   00:00:00 ps
asatav1@robot_deployment:~$ ps -e
    PID TTY          TIME CMD
      1 ?        00:00:00 sleep
     15 ?        00:00:00 sshd
   1298 ?        00:00:00 sshd
   1322 ?        00:00:00 sshd
   1324 ?        00:00:00 sshd
   1326 ?        00:00:00 sshd
   1328 ?        00:00:00 sshd
   1330 ?        00:00:00 sshd
   1332 ?        00:00:00 sshd
   1334 ?        00:00:00 sshd
   1336 ?        00:00:00 sshd
   1337 pts/0    00:00:00 bash
   1361 ?        00:00:00 sshd
   1378 ?        00:00:00 sshd
   1380 ?        00:00:00 sshd
   1382 ?        00:00:00 sshd
   1384 ?        00:00:00 sshd
   1386 ?        00:00:00 sshd
   1388 ?        00:00:00 sshd
   1390 ?        00:00:00 sshd
   1402 ?        00:00:00 sshd
```

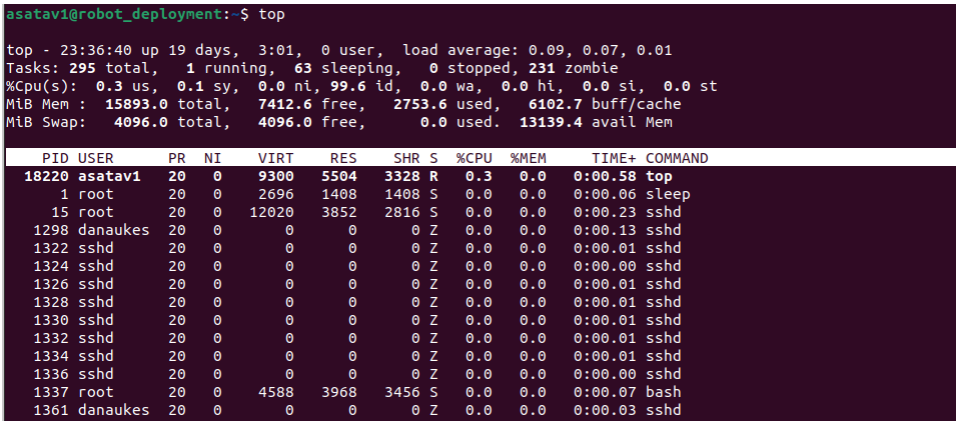
- tmux: A terminal multiplexer that allows you to create, manage, and switch between multiple terminal sessions within a single window.

```
asatav1@robot_deployment:~$ top

top - 23:36:55 up 19 days,  3:01,  0 user,  load average: 0.07, 0.07,
0.01
Tasks: 295 total,   1 running,  63 sleeping,   0 stopped, 231 zombie
%Cpu(s):  0.2 us,  0.2 sy,  0.0 ni, 99.5 id,  0.1 wa,  0.0 hi,  0.0 si,
0.0 st
MiB Mem :  15893.0 total,   7412.6 free,   2753.6 used,   6102.7
buff/cache
MiB Swap:   4096.0 total,   4096.0 free,      0.0 used.  13139.4 avail
Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+
COMMAND
  18220 asatav1   20   0    9300   5504   3328 R   0.3   0.0   0:00.64
top
      1 root      20   0    2696   1408   1408 S   0.0   0.0   0:00.06
sleep
     15 root      20   0   12020   3852   2816 S   0.0   0.0   0:00.23
sshd
   1298 danaukes  20   0       0      0      0 Z   0.0   0.0   0:00.13
sshd
   1322 sshd      20   0       0      0      0 Z   0.0   0.0   0:00.01
sshd
   1324 sshd      20   0       0      0      0 Z   0.0   0.0   0:00.00
sshd
   1326 sshd      20   0       0      0      0 Z   0.0   0.0   0:00.01
sshd
   1328 sshd      20   0       0      0      0 Z   0.0   0.0   0:00.01
sshd
   1330 sshd      20   0       0      0      0 Z   0.0   0.0   0:00.01
sshd
   1332 sshd      20   0       0      0      0 Z   0.0   0.0   0:00.01
sshd
   1334 sshd      20   0       0      0      0 Z   0.0   0.0   0:00.01
sshd
```

```
asatav1@robot_deployment:~$ ps -e | grep "sleep"
      1 ?        00:00:00 sleep
  18217 pts/48   00:00:00 sleep
asatav1@robot_deployment:~$ kill 18217
asatav1@robot_deployment:~$ ps -e | grep "sleep"
      1 ?        00:00:00 sleep
[1]+  Terminated              sleep infinity
asatav1@robot_deployment:~$
asatav1@robot_deployment:~$ exit
```



- top: Displays a real-time view of system processes, including CPU, memory usage, and other performance metrics.

```
asatav1@robot_deployment:~$
asatav1@robot_deployment:~$ htop
bash: htop: command not found
asatav1@robot_deployment:~$ ps -e | grep "sleep"
      1 ?        00:00:00 sleep
  18217 pts/48   00:00:00 sleep
asatav1@robot_deployment:~$
```

- htop: An interactive process viewer, like top, but with a user-friendly interface and more features for managing processes.
- ps -e | grep “sleep”: Lists all currently running processes (ps -e) and filters the output to show only processes containing "sleep" in their name using grep.

```
asatav1@robot_deployment:~$ ps -e | grep "sleep"
      1 ?        00:00:00 sleep
  18217 pts/48   00:00:00 sleep
asatav1@robot_deployment:~$ kill 18217
asatav1@robot_deployment:~$ ps -e | grep "sleep"
      1 ?        00:00:00 sleep
[1]+  Terminated              sleep infinity
asatav1@robot_deployment:~$ exit
```

- kill 18217: Terminates the "sleep infinity" process using its Process ID (18217) found in the previous step.

11) Copy and paste the contents of your entire bash session, (warts and all) to a new text editor and submit to Canvas. Type exit until your terminal closes.
(***File submitted on canvas***)