

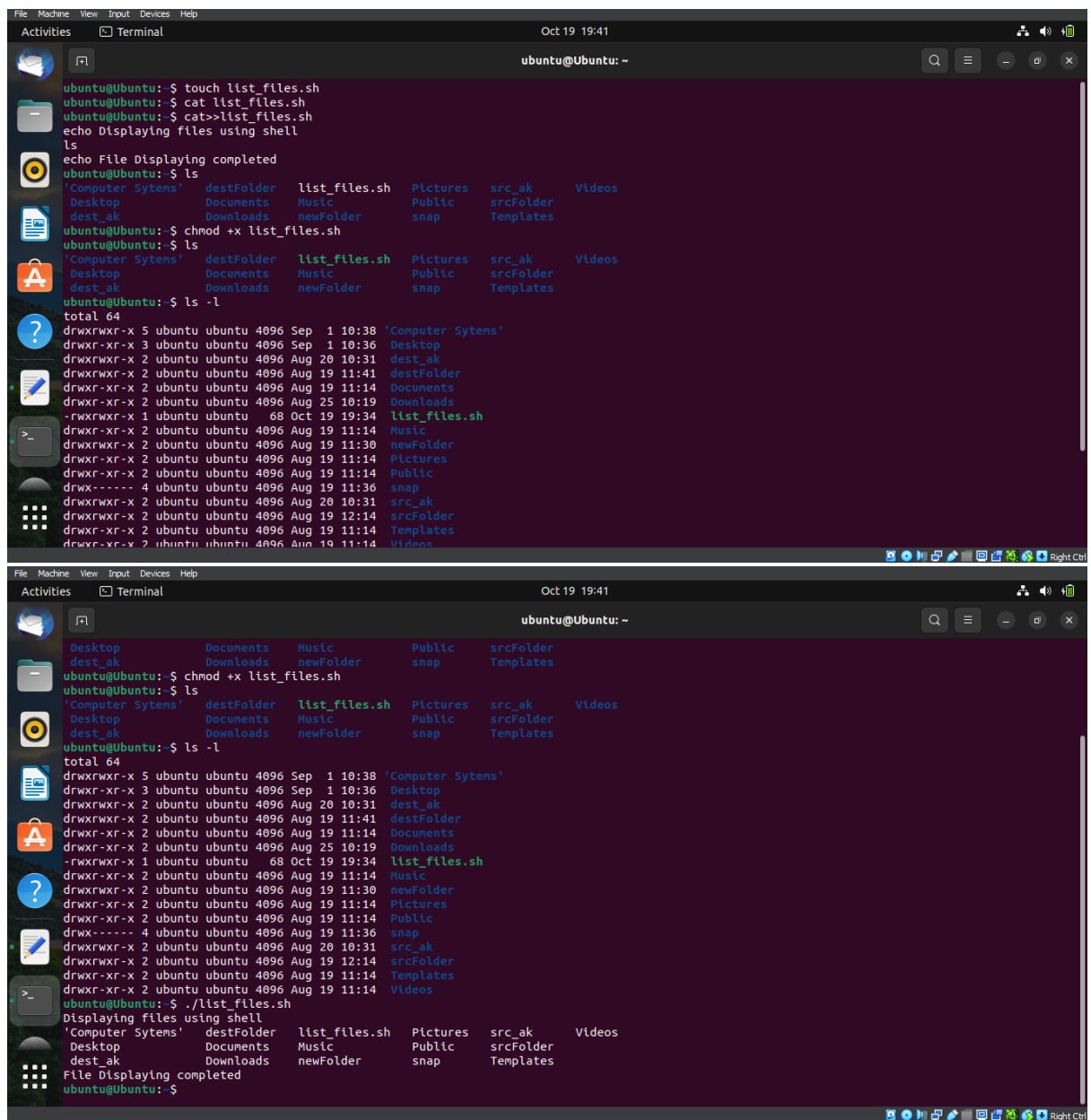
## Assignment 08

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### Q1) Basics on Shell Script

- Write a shell script to display all file information in detail within the working directory

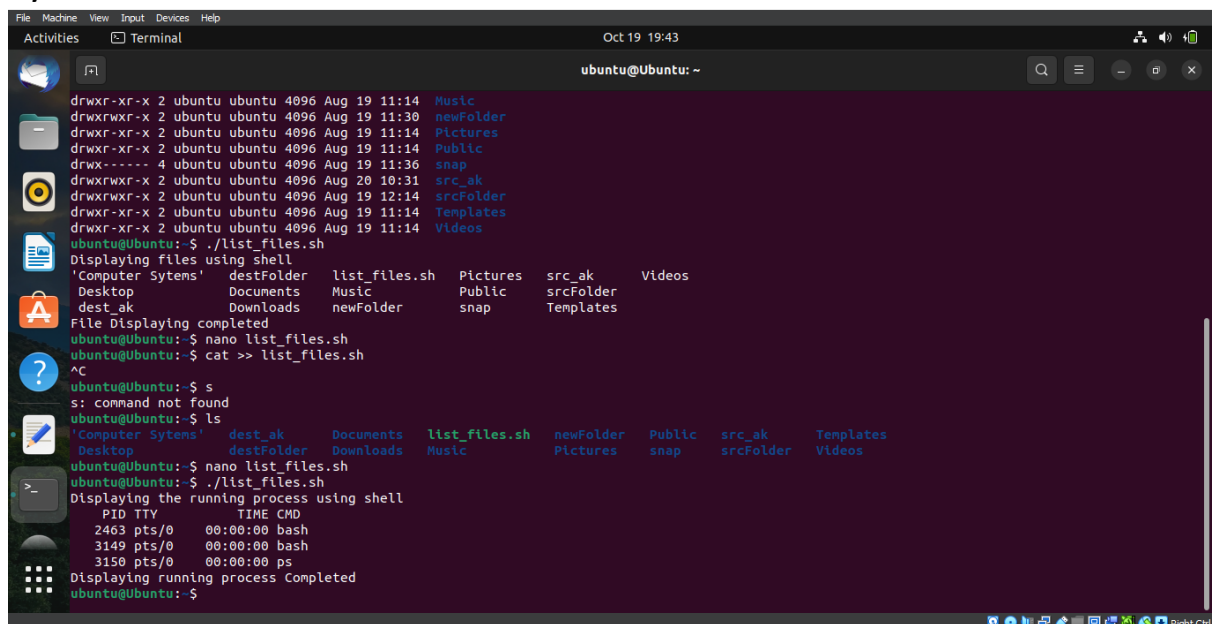


The image shows two screenshots of a terminal window on an Ubuntu system. The top screenshot shows the creation and initial execution of a shell script named `list_files.sh`. The bottom screenshot shows the script being made executable and then run, displaying detailed file information.

```
ubuntu@Ubuntu:~$ touch list_files.sh
ubuntu@Ubuntu:~$ cat list_files.sh
ubuntu@Ubuntu:~$ cat>>list_files.sh
echo Displaying files using shell
ls
echo File Displaying completed
ubuntu@Ubuntu:~$ ls
'Computer Sytems'  destFolder  list_files.sh  Pictures  src_ak  Videos
Desktop            Documents   Music          Public    srcFolder
dest_ak            Downloads  newFolder      snap      Templates
ubuntu@Ubuntu:~$ chmod +x list_files.sh
ubuntu@Ubuntu:~$ ls
'Computer Sytems'  destFolder  list_files.sh  Pictures  src_ak  Videos
Desktop            Documents   Music          Public    srcFolder
dest_ak            Downloads  newFolder      snap      Templates
ubuntu@Ubuntu:~$ ls -l
total 64
drwxrwxr-x 5 ubuntu ubuntu 4096 Sep 1 10:38 'Computer Sytems'
drwxr-xr-x 3 ubuntu ubuntu 4096 Sep 1 10:36 Desktop
drwxrwxr-x 2 ubuntu ubuntu 4096 Aug 20 10:31 dest_ak
drwxrwxr-x 2 ubuntu ubuntu 4096 Aug 19 11:41 destFolder
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Documents
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 25 10:19 Downloads
-rwxrwxr-x 1 ubuntu ubuntu 68 Oct 19 19:34 list_files.sh
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Music
drwxrwxr-x 2 ubuntu ubuntu 4096 Aug 19 11:30 newFolder
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Pictures
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Public
drwx----- 4 ubuntu ubuntu 4096 Aug 19 11:36 snap
drwxrwxr-x 2 ubuntu ubuntu 4096 Aug 20 10:31 src_ak
drwxrwxr-x 2 ubuntu ubuntu 4096 Aug 19 12:14 srcFolder
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Templates
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Videos
ubuntu@Ubuntu:~$
```

```
ubuntu@Ubuntu:~$ chmod +x list_files.sh
ubuntu@Ubuntu:~$ ls
'Computer Sytems'  destFolder  list_files.sh  Pictures  src_ak  Videos
Desktop            Documents   Music          Public    srcFolder
dest_ak            Downloads  newFolder      snap      Templates
ubuntu@Ubuntu:~$ ls -l
total 64
drwxrwxr-x 5 ubuntu ubuntu 4096 Sep 1 10:38 'Computer Sytems'
drwxr-xr-x 3 ubuntu ubuntu 4096 Sep 1 10:36 Desktop
drwxrwxr-x 2 ubuntu ubuntu 4096 Aug 20 10:31 dest_ak
drwxrwxr-x 2 ubuntu ubuntu 4096 Aug 19 11:41 destFolder
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Documents
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 25 10:19 Downloads
-rwxrwxr-x 1 ubuntu ubuntu 68 Oct 19 19:34 list_files.sh
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Music
drwxrwxr-x 2 ubuntu ubuntu 4096 Aug 19 11:30 newFolder
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Pictures
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Public
drwx----- 4 ubuntu ubuntu 4096 Aug 19 11:36 snap
drwxrwxr-x 2 ubuntu ubuntu 4096 Aug 20 10:31 src_ak
drwxrwxr-x 2 ubuntu ubuntu 4096 Aug 19 12:14 srcFolder
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Templates
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Videos
ubuntu@Ubuntu:~$ ./list_files.sh
Displaying files using shell
'Computer Sytems'  destFolder  list_files.sh  Pictures  src_ak  Videos
Desktop            Documents   Music          Public    srcFolder
dest_ak            Downloads  newFolder      snap      Templates
File Displaying completed
ubuntu@Ubuntu:~$
```

- b. Write a shell script to display the running processes in the System

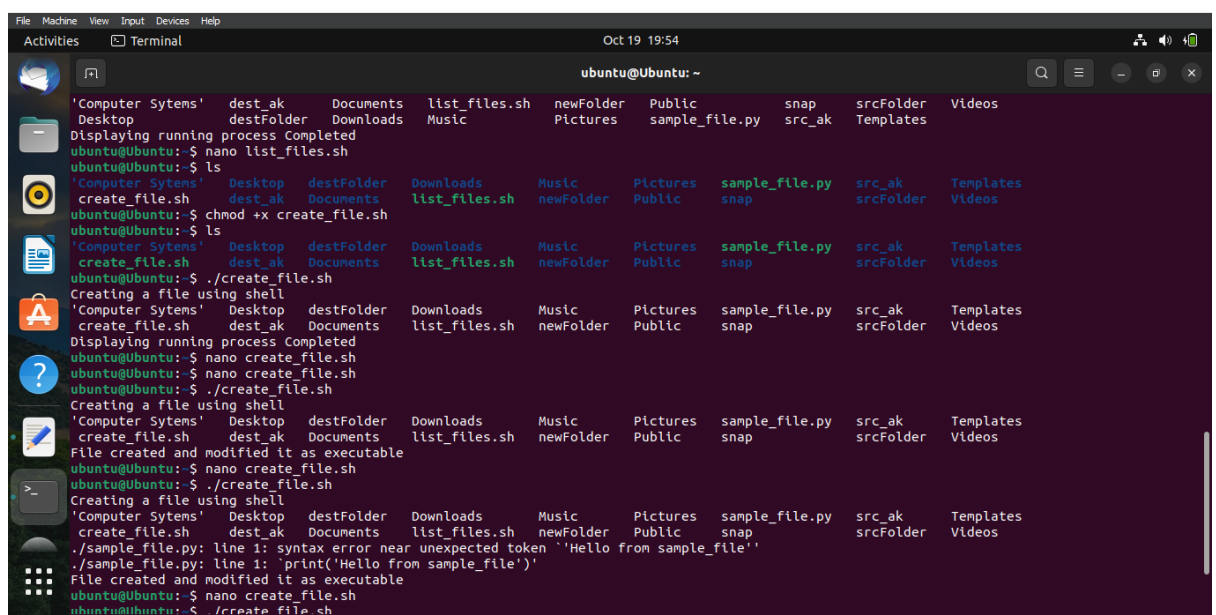


```
File Machine View Input Devices Help
Activities Terminal
Oct 19 19:43
ubuntu@Ubuntu: ~

drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Music
drwxrwxr-x 2 ubuntu ubuntu 4096 Aug 19 11:30 newFolder
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Pictures
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Public
drwx----- 4 ubuntu ubuntu 4096 Aug 19 11:36 snap
drwxrwxr-x 2 ubuntu ubuntu 4096 Aug 20 10:31 src_ak
drwxrwxr-x 2 ubuntu ubuntu 4096 Aug 19 12:14 srcFolder
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Templates
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 19 11:14 Videos

ubuntu@Ubuntu:~$ ./list_files.sh
Displaying files using shell
'Computer Sys'tems' destFolder list_files.sh Pictures src_ak Videos
Desktop Documents Music Public srcFolder
dest_ak Downloads newFolder snap Templates
File Displaying completed
ubuntu@Ubuntu:~$ nano list_files.sh
ubuntu@Ubuntu:~$ cat >> list_files.sh
^C
ubuntu@Ubuntu:~$ s
s: command not found
ubuntu@Ubuntu:~$ ls
'Computer Sys'tems' dest_ak Documents list_files.sh newFolder Public src_ak Templates
Desktop destFolder Downloads Music Pictures snap srcFolder Videos
ubuntu@Ubuntu:~$ nano list_files.sh
ubuntu@Ubuntu:~$ ./list_files.sh
Displaying the running process using shell
PID TTY TIME CMD
2463 pts/0 00:00:00 bash
3149 pts/0 00:00:00 bash
3150 pts/0 00:00:00 ps
Displaying running process Completed
ubuntu@Ubuntu:~$
```

- c. Write a shell script to create a file, write something into the file, and make the file executable

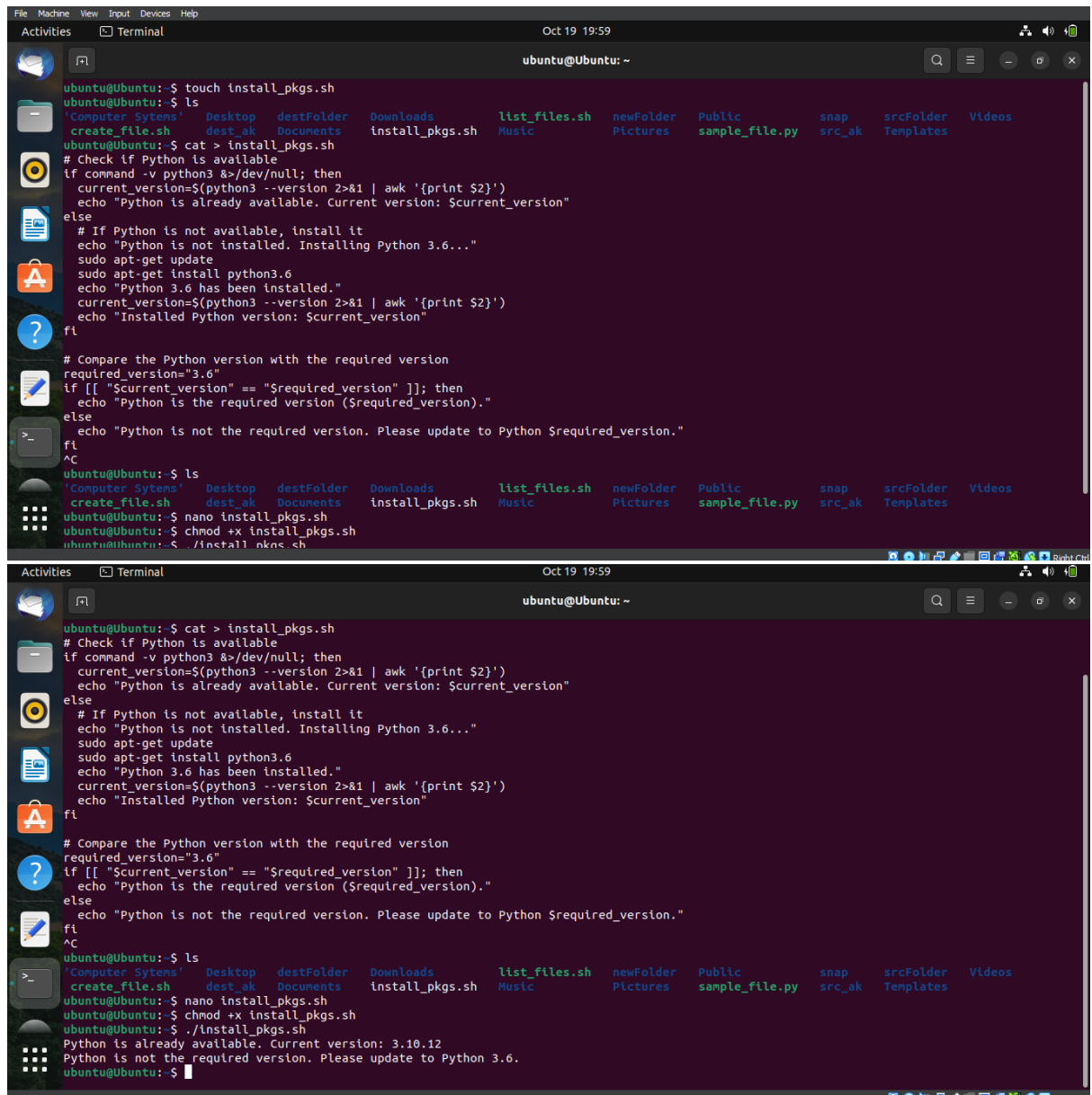


```
File Machine View Input Devices Help
Activities Terminal
Oct 19 19:54
ubuntu@Ubuntu: ~

'Computer Sys'tems' dest_ak Documents list_files.sh newFolder Public snap srcFolder Templates Videos
Desktop destFolder Downloads Music Pictures sample_file.py src_ak
Displaying running process Completed
ubuntu@Ubuntu:~$ nano list_files.sh
ubuntu@Ubuntu:~$ ls
'Computer Sys'tems' Desktop destFolder Downloads Music Pictures sample_file.py src_ak Templates
create_file.sh dest_ak Documents list_files.sh newFolder Public snap srcFolder Videos
ubuntu@Ubuntu:~$ chmod +x create_file.sh
ubuntu@Ubuntu:~$ ls
'Computer Sys'tems' Desktop destFolder Downloads Music Pictures sample_file.py src_ak Templates
create_file.sh dest_ak Documents list_files.sh newFolder Public snap srcFolder Videos
ubuntu@Ubuntu:~$ ./create_file.sh
Creating a file using shell
'Computer Sys'tems' Desktop destFolder Downloads Music Pictures sample_file.py src_ak Templates
create_file.sh dest_ak Documents list_files.sh newFolder Public snap srcFolder Videos
Displaying running process Completed
ubuntu@Ubuntu:~$ nano create_file.sh
ubuntu@Ubuntu:~$ ./create_file.sh
Creating a file using shell
'Computer Sys'tems' Desktop destFolder Downloads Music Pictures sample_file.py src_ak Templates
create_file.sh dest_ak Documents list_files.sh newFolder Public snap srcFolder Videos
File created and modified it as executable
ubuntu@Ubuntu:~$ nano create_file.sh
ubuntu@Ubuntu:~$ ./create_file.sh
Creating a file using shell
'Computer Sys'tems' Desktop destFolder Downloads Music Pictures sample_file.py src_ak Templates
create_file.sh dest_ak Documents list_files.sh newFolder Public snap srcFolder Videos
./sample_file.py: line 1: syntax error near unexpected token 'Hello from sample_file''
./sample_file.py: line 1: 'print('Hello from sample_file')'
File created and modified it as executable
ubuntu@Ubuntu:~$ nano create_file.sh
ubuntu@Ubuntu:~$ ./create_file.sh
```

Q2) Write a shell script to install packages

a. Python



The image shows two screenshots of a terminal window on an Ubuntu system. The top screenshot shows the creation of a shell script named `install_pkgs.sh` using the `nano` editor. The script checks if Python 3.6 is installed, and if not, it updates the system and installs Python 3.6. The bottom screenshot shows the execution of the script, which successfully installs Python 3.6 and prints the current version.

```
ubuntu@Ubuntu:~$ touch install_pkgs.sh
ubuntu@Ubuntu:~$ ls
'Computer Systems' Desktop destFolder Downloads list_files.sh newFolder Public snap srcFolder Videos
create_file.sh dest_ak Documents install_pkgs.sh Music Pictures sample_file.py src_ak Templates
ubuntu@Ubuntu:~$ cat > install_pkgs.sh
# Check if Python is available
if command -v python3 &>/dev/null; then
    current_version=$(python3 --version 2>&1 | awk '{print $2}')
    echo "Python is already available. Current version: $current_version"
else
    # If Python is not available, install it
    echo "Python is not installed. Installing Python 3.6..."
    sudo apt-get update
    sudo apt-get install python3.6
    echo "Python 3.6 has been installed."
    current_version=$(python3 --version 2>&1 | awk '{print $2}')
    echo "Installed Python version: $current_version"
fi

# Compare the Python version with the required version
required_version="3.6"
if [[ "$current_version" == "$required_version" ]]; then
    echo "Python is the required version ($required_version)."
else
    echo "Python is not the required version. Please update to Python $required_version."
fi
ubuntu@Ubuntu:~$ ls
'Computer Systems' Desktop destFolder Downloads list_files.sh newFolder Public snap srcFolder Videos
create_file.sh dest_ak Documents install_pkgs.sh Music Pictures sample_file.py src_ak Templates
ubuntu@Ubuntu:~$ nano install_pkgs.sh
ubuntu@Ubuntu:~$ chmod +x install_pkgs.sh
ubuntu@Ubuntu:~$ ./install_pkgs.sh

ubuntu@Ubuntu:~$ cat > install_pkgs.sh
# Check if Python is available
if command -v python3 &>/dev/null; then
    current_version=$(python3 --version 2>&1 | awk '{print $2}')
    echo "Python is already available. Current version: $current_version"
else
    # If Python is not available, install it
    echo "Python is not installed. Installing Python 3.6..."
    sudo apt-get update
    sudo apt-get install python3.6
    echo "Python 3.6 has been installed."
    current_version=$(python3 --version 2>&1 | awk '{print $2}')
    echo "Installed Python version: $current_version"
fi

# Compare the Python version with the required version
required_version="3.6"
if [[ "$current_version" == "$required_version" ]]; then
    echo "Python is the required version ($required_version)."
else
    echo "Python is not the required version. Please update to Python $required_version."
fi
ubuntu@Ubuntu:~$ ls
'Computer Systems' Desktop destFolder Downloads list_files.sh newFolder Public snap srcFolder Videos
create_file.sh dest_ak Documents install_pkgs.sh Music Pictures sample_file.py src_ak Templates
ubuntu@Ubuntu:~$ nano install_pkgs.sh
ubuntu@Ubuntu:~$ chmod +x install_pkgs.sh
ubuntu@Ubuntu:~$ ./install_pkgs.sh
Python is already available. Current version: 3.10.12
Python is not the required version. Please update to Python 3.6.
ubuntu@Ubuntu:~$
```

## b. Numpy

```
File Machine View Input Devices Help
Activities Terminal Oct 19 20:03 root@Ubuntu: /home/ubuntu

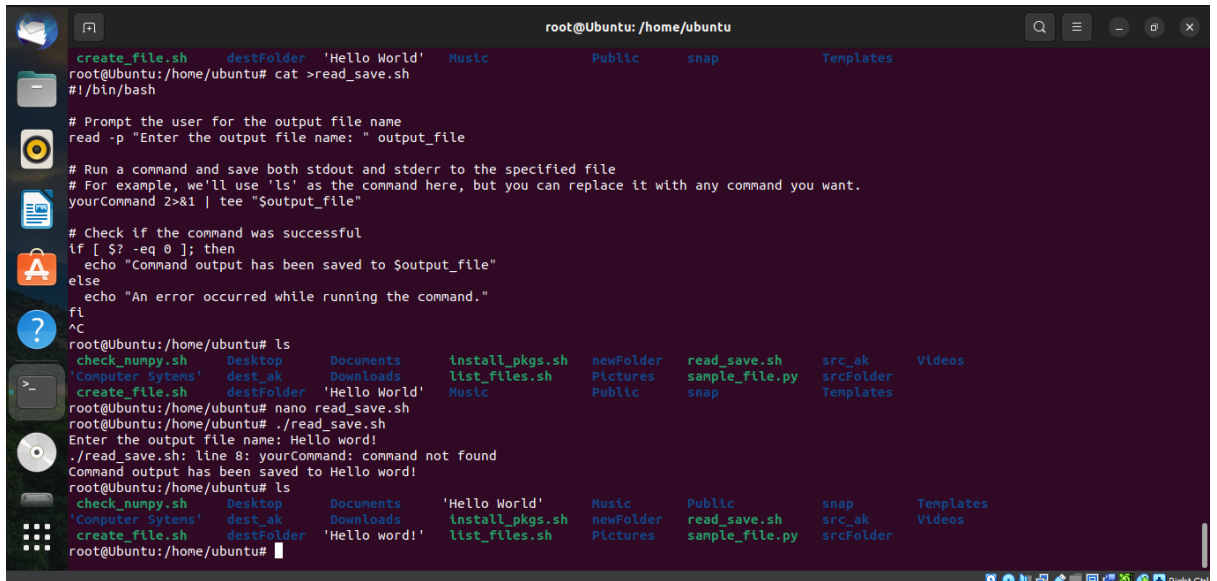
root@Ubuntu:/home/ubuntu# touch check_numpy.sh
root@Ubuntu:/home/ubuntu# cat >check_numpy.sh
#!/bin/bash

required_version="1.20.0"

# Check if NumPy is installed and retrieve its version
if python3 -c "import numpy" &>/dev/null; then
    current_version=$(python3 -c "import numpy; print(numpy.__version__)")
    echo "NumPy is already installed. Current version: $current_version"
else
    echo "NumPy is not installed. Installing NumPy..."
    sudo apt-get update
    sudo apt-get install python3-numpy
    current_version=$(python3 -c "import numpy; print(numpy.__version__)")
    echo "NumPy has been installed. Current version: $current_version"
fi

# Compare the NumPy version with the required version
if [[ "$current_version" == "$required_version" ]]; then
    echo "NumPy is the required version ($required_version)."
else
    echo "NumPy is not the required version. Please update to NumPy $required_version."
fi
^C
root@Ubuntu:/home/ubuntu# ls
check_numpy.sh  create_file.sh  dest_ak  destFolder  Documents  install_pkgs.sh  Music  Pictures  sample_file.py  src_ak  Templates
root@Ubuntu:/home/ubuntu# chmod +x check_numpy.sh
root@Ubuntu:/home/ubuntu# ./check_numpy.sh
NumPy is not installed. Installing NumPy...
Get:1 http://packages.microsoft.com/repos/code stable InRelease [3,569 B]
Get:2 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Hit:3 http://in.archive.ubuntu.com/ubuntu jammy InRelease
Get:4 http://in.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:5 http://packages.microsoft.com/repos/code stable/main arm64 Packages [82.7 kB]
Get:6 http://packages.microsoft.com/repos/code stable/main amd64 Packages [82.2 kB]
Get:7 http://packages.microsoft.com/repos/code stable/main armhf Packages [83.2 kB]
Get:8 http://security.ubuntu.com/ubuntu jammy-security/main i386 Packages [346 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu jammy-backports InRelease [109 kB]
Get:10 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [859 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [1,101 kB]
Get:12 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [176 kB]
Get:13 http://security.ubuntu.com/ubuntu jammy-security/main amd64 DEP-11 Metadata [43.0 kB]
Get:14 http://security.ubuntu.com/ubuntu jammy-security/main DEP-11 48x48 Icons [16.9 kB]
Get:15 http://security.ubuntu.com/ubuntu jammy-security/main DEP-11 64x64 Icons [26.5 kB]
Get:16 http://security.ubuntu.com/ubuntu jammy-security/main amd64 c-n-f Metadata [11.4 kB]
Get:17 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [955 kB]
Get:18 http://security.ubuntu.com/ubuntu jammy-security/restricted i386 Packages [32.0 kB]
Get:19 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [154 kB]
Get:20 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 c-n-f Metadata [532 B]
Get:21 http://in.archive.ubuntu.com/ubuntu jammy-updates/main i386 Packages [515 kB]
Get:22 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [791 kB]
Get:23 http://in.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [239 kB]
Get:24 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 DEP-11 Metadata [101 kB]
Get:25 http://in.archive.ubuntu.com/ubuntu jammy-updates/main DEP-11 48x48 Icons [36.1 kB]
Get:26 http://in.archive.ubuntu.com/ubuntu jammy-updates/main DEP-11 64x64 Icons [55.1 kB]
Get:27 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [16.0 kB]
Get:28 http://in.archive.ubuntu.com/ubuntu jammy-updates/restricted i386 Packages [32.3 kB]
Get:29 http://in.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [1,036 kB]
Get:30 http://in.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [167 kB]
Get:31 http://in.archive.ubuntu.com/ubuntu jammy-updates/main i386 Packages [515 kB]
Get:32 http://security.ubuntu.com/ubuntu jammy-security/universe i386 Packages [561 kB]
Get:33 http://in.archive.ubuntu.com/ubuntu jammy-backports/universe DEP-11 64x64 Icons [25.6 kB]
Get:34 http://in.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [644 B]
Get:35 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [145 kB]
Get:36 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 DEP-11 Metadata [55.1 kB]
Get:37 http://security.ubuntu.com/ubuntu jammy-security/universe DEP-11 48x48 Icons [22.0 kB]
Get:38 http://security.ubuntu.com/ubuntu jammy-security/universe DEP-11 64x64 Icons [34.6 kB]
Get:39 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [16.8 kB]
Get:40 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [36.5 kB]
Get:41 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [260 B]
Fetched 11.2 MB in 6s (1,999 kB/s)
Reading package lists... Done
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libblas3 libgfortran5 liblapack3
Suggested packages:
  gfortran python-numpy-doc python3-pytest
The following NEW packages will be installed:
  libblas3 libgfortran5 liblapack3 python3-numpy
0 upgraded, 4 newly installed, 0 to remove and 102 not upgraded.
Need to get 7,079 kB of archives.
After this operation, 30.3 MB of additional disk space will be used.
Do you want to continue? [Y/n] n
Abort.
Traceback (most recent call last):
  File "<string>", line 1, in <module>
ModuleNotFoundError: No module named 'numpy'
NumPy has been installed. Current version:
NumPy is not the required version. Please update to NumPy 1.20.0.
root@Ubuntu:/home/ubuntu#
```

Q3) Write a Shell script for reading and saving terminal output into a file



```
root@Ubuntu: /home/ubuntu
create_file.sh destFolder 'Hello World' Music Public snap Templates
root@Ubuntu:/home/ubuntu# cat >read_save.sh
#!/bin/bash

# Prompt the user for the output file name
read -p "Enter the output file name: " output_file

# Run a command and save both stdout and stderr to the specified file
# For example, we'll use 'ls' as the command here, but you can replace it with any command you want.
yourCommand 2>&1 | tee "$output_file"

# Check if the command was successful
if [ $? -eq 0 ]; then
    echo "Command output has been saved to $output_file"
else
    echo "An error occurred while running the command."
fi
^C
root@Ubuntu:/home/ubuntu# ls
check_numpy.sh Desktop Documents install_pkgs.sh newFolder read_save.sh src_ak Videos
'Computer Sytems' dest_ak Downloads list_files.sh Pictures sample_file.py srcFolder Templates
create_file.sh destFolder 'Hello World' Music Public snap Templates
root@Ubuntu:/home/ubuntu# nano read_save.sh
root@Ubuntu:/home/ubuntu# ./read_save.sh
Enter the output file name: Hello word!
./read_save.sh: line 8: yourCommand: command not found
Command output has been saved to Hello word!
root@Ubuntu:/home/ubuntu# ls
check_numpy.sh Desktop Documents 'Hello World' Music Public snap Templates
'Computer Sytems' dest_ak Downloads install_pkgs.sh newFolder read_save.sh src_ak Videos
create_file.sh destFolder 'Hello word!' list_files.sh Pictures sample_file.py srcFolder
root@Ubuntu:/home/ubuntu#
```