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**Roll No: 14**

**Batch: S11**

### **Experiment No 3 : Linux- API**

**Aim:** Implement Basic Commands of Linux like ls, cp, mv using Kernel APIs.

#### **Theory:**

1) cp → cp - r → copies the file cp - backups → It copies the backups of the destination file in the source folder.

cp - i → It asks for confirmation of the user whether yes or no and gives warning to the user before overriding the destination file.

cp -ie.txt b.txt

cp - f → Unable to open destination file for writing because the user has not allowed the writing operation .By writing the command, the destination file is deleted and the content is copied from source to destination.

cp - v → it is used for which command is running in backup.

cp - p → It preserves the attributes of files such as last date modification time, time of last access owners and the file permissions.

*Syntax* : cp-p source file destination file.

cp - l → To create a hand link file

2) mv → (move or rename). mv.i → Ask the user for confirmation before moving the file.

`mv - f` → It provides the protection and overrides destination file forcefully and deletes the source file.







`mv - f a.txt b.txt mv - n` → It takes/prevents the existing file from being overridden.

`mv - n a.txt b.txt mv - b` → To take the backup of an existing file

## Output:

```
File Edit View Search Terminal Help
tsec10@ubuntu:~$ ps -aux
#167-18.04.1-Ubuntu SMP Wed May 24 00:51:42 UTC 2023
tsec10@ubuntu:~$ ps -aux
tsec10@ubuntu:~$ ps -aux
Linux ubuntu 5.4.0-150-generic #167-18.04.1-Ubuntu SMP Wed May 24 00:51:42 UTC 2023 x86_64 x86_64 GNU/Linux
tsec10 2214 1.0 3.6 1267372 144828 ? Sll 19:32 0:02 /usr/bin/gnome-software --application-service
root 2223 0.1 2.0 623192 80568 ? Ssl 19:32 0:00 /usr/lib/fwupd/fwupd
tsec10 2264 0.3 1.2 625444 51668 ? Sl 19:32 0:00 /usr/bin/nautilus --application-service
root 2282 0.0 0.0 0 0 ? I 19:32 0:00 [kworker/0:4-cgr]
root 2283 0.0 0.0 0 0 ? I 19:32 0:00 [kworker/0:5]
tsec10 2293 0.2 0.9 791688 36292 ? Ssl 19:33 0:00 /usr/lib/gnome-terminal/gnome-terminal-server
tsec10 2347 0.0 0.1 22452 4800 pts/0 Ss 19:33 0:00 bash
tsec10 2359 0.0 0.6 586872 25208 tty2 Sl+ 19:33 0:00 update-notifier
tsec10 2420 0.0 0.0 39672 3712 pts/0 R+ 19:35 0:00 ps -aux
tsec10 2421 0.0 0.0 7516 824 pts/0 S+ 19:35 0:00 tail
tsec10@ubuntu:~$ ps -aux|tail -n15
tsec10 2168 0.0 0.1 187908 5128 ? Sl 19:32 0:00 /usr/lib/dconf/dconf-service
tsec10 2168 0.1 1.5 1129008 62000 ? Sl 19:32 0:00 /usr/lib/evolution/evolution-calendar-factory-subprocess --factory all --bus-name org.gnome.evolution.dataserver.Subprocess.Backend.Calendar
arx2137x2 --own-path /org/gnome/evolution/dataserver/Subprocess/Backend/Calendar/2137/2
tsec10 2176 0.0 0.6 725716 24588 ? Ssl 19:32 0:00 /usr/lib/evolution/evolution-addressbook-factory
tsec10 2193 0.0 0.6 1075640 26204 ? Sl 19:32 0:00 /usr/lib/evolution/evolution-addressbook-factory-subprocess --factory all --bus-name org.gnome.evolution.dataserver.Subprocess.Backend.AddressBookX2178x2 --own-path /org/gnome/evolution/dataserver/Subprocess/Backend/AddressBook/2178/2
tsec10 2208 0.0 0.1 197368 5628 ? Ssl 19:32 0:00 /usr/lib/gvfs/gvfsd-metadata
tsec10 2214 0.9 3.6 1267372 144828 ? Ssl 19:32 0:02 /usr/bin/gnome-software --application-service
root 2223 0.1 2.0 623192 80568 ? Ssl 19:32 0:00 /usr/lib/fwupd/fwupd
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root 2282 0.0 0.0 0 0 ? I 19:32 0:00 [kworker/0:4-cgr]
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tsec10 2293 0.2 0.9 791688 36344 ? Ssl 19:33 0:00 /usr/lib/gnome-terminal/gnome-terminal-server
tsec10 2347 0.0 0.1 22452 4804 pts/0 Ss 19:33 0:00 bash
tsec10 2359 0.0 0.6 586872 25208 tty2 Sl+ 19:33 0:00 update-notifier
tsec10 2422 0.0 0.0 39672 3700 pts/0 R+ 19:36 0:00 ps -aux
tsec10 2423 0.0 0.0 7516 828 pts/0 S+ 19:36 0:00 tail -n15
tsec10@ubuntu:~$ ps -p55
PID TTY TIME CMD
2347 pts/0 00:00:00 bash
tsec10@ubuntu:~$ sudo apt install htop
[sudo] password for tsec10:
1
Sorry, try again.
[sudo] password for tsec10:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
 fonts-liberation2 fonts-opensymbol gir1.2-gst-plugins-base-1.0 gir1.2-gstreamer-1.0 gir1.2-gudev-1.0 gir1.2-udisks-2.0
 grilo-plugins-0.3-base gstreamer1.0-gtk3 libboost-date-time1.65.1 libboost-filesystem1.65.1 libboost-iostreams1.65.1
 libboost-locale1.65.1 libbcr-0.1-1 libclucene-contribs1v5 libclucene-core1v5 libcmis-0.5-5v5 libcolamd2 libdazzle-1.0-0
 libe-book-0.1-1 libedataserverui-1.2-2 libeot0 libepubgen-0.1-1 libetonyek-0.1-1 libevent-2.1-6 libexiv2-14
 libfreerdp-client2-2 libfreerdp2-2 libgc1c2 libgee-0.8-2 libgexiv2-2 libgom-1.0-0 libgpgmepp6 libgpgd-common libgpgd4
 liblangtag-common liblangtag1 liblirc-client0 liblua5.3-0 libmediaart-2.0-0 libmsspub-0.1-1 libodfgen-0.1-1 libqgwing2v5
 libraw16 librevenge-0.0-0 libsguttl5-2 libssh-4 libsuitesparseconfig5 libvncclient1 libwinpr2-2 libxapian30 libxmlsec1-nss
 linux-hwe-5.4-headers-5.4.0-137 linux-hwe-5.4-headers-5.4.0-84 lp-solve media-player-info python3-mako python3-markupsafe
 syslinux syslinux-common syslinux-legacy usb-creator-common
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
 htop
0 upgraded, 1 newly installed, 0 to remove and 53 not upgraded.
Need to get 80.0 kB of archives.
After this operation, 221 kB of additional disk space will be used.
Get:1 http://us.archive.ubuntu.com/ubuntu bionic/main amd64 htop amd64 2.1.0-3 [80.0 kB]
Fetched 80.0 kB in 1s (84.8 kB/s)
Selecting previously unselected package htop.
(Reading database ... 186880 files and directories currently installed.)
Preparing to unpack .../htop_2.1.0-3_amd64.deb ...
Unpacking htop (2.1.0-3) ...
Setting up htop (2.1.0-3) ...
Processing triggers for desktop-file-utils (0.23-1ubuntu3.18.04.2) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for gnome-menus (3.13.3-11ubuntu1.1) ...
Processing triggers for mime-support (3.60ubuntu1) ...
tsec10@ubuntu:~$ ps -eo pid,ppid,cmd,%mem,%cpu --sort=-%mem|head
PID PPID CMD %MEM %CPU
1901 1778 /usr/bin/gnome-shell 4.6 1.5
2214 1749 /usr/bin/gnome-software --g 3.6 0.3
1021 1015 /usr/bin/gnome-shell 3.5 0.2
2106 1778 nautilus-desktop 2.7 0.1
2223 1 /usr/lib/fwupd/fwupd 2.0 0.0
1769 1767 /usr/lib/xorg/Xorg vt2 -dis 1.9 0.6
2137 1749 /usr/lib/evolution/evolutio 1.6 0.0
1281 1 /usr/lib/packagekit/package 1.6 0.5
2168 2137 /usr/lib/evolution/evolutio 1.5 0.0
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 grilo-plugins-0.3-base gstreamer1.0-gtk3 libboost-date-time1.65.1 libboost-filesystem1.65.1 libboost-iostreams1.65.1
 libboost-locale1.65.1 libbcr-0.1-1 libclucene-contribs1v5 libclucene-core1v5 libcmis-0.5-5v5 libcolamd2 libdazzle-1.0-0
 libe-book-0.1-1 libedataserverui-1.2-2 libeot0 libepubgen-0.1-1 libetonyek-0.1-1 libevent-2.1-6 libexiv2-14
 libfreerdp-client2-2 libfreerdp2-2 libgc1c2 libgee-0.8-2 libgexiv2-2 libgom-1.0-0 libgpgmepp6 libgpgd-common libgpgd4
 liblangtag-common liblangtag1 liblirc-client0 liblua5.3-0 libmediaart-2.0-0 libmsspub-0.1-1 libodfgen-0.1-1 libqgwing2v5
 libraw16 librevenge-0.0-0 libsguttl5-2 libssh-4 libsuitesparseconfig5 libvncclient1 libwinpr2-2 libxapian30 libxmlsec1-nss
 linux-hwe-5.4-headers-5.4.0-137 linux-hwe-5.4-headers-5.4.0-84 lp-solve media-player-info python3-mako python3-markupsafe
 syslinux syslinux-common syslinux-legacy usb-creator-common
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2106 1778 nautilus-desktop 2.7 0.1
2223 1 /usr/lib/fwupd/fwupd 2.0 0.0
1769 1767 /usr/lib/xorg/Xorg vt2 -dis 1.9 0.6
2137 1749 /usr/lib/evolution/evolutio 1.6 0.0
1281 1 /usr/lib/packagekit/package 1.6 0.5
2168 2137 /usr/lib/evolution/evolutio 1.5 0.0
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```

```
Open ▾  copy.c  Save    
```

```
#include<stdlib.h>
int main()
{
FILE *fptr1, *fptr2;
char filename [100], c;
printf("Enter the filename to open for reading \n");
scanf("%s", filename); // Open one file for reading

fptr1 = fopen(filename, "r");

if(fptr1 ==NULL)
{printf("Cannot open file %s in", filename); exit(0);}
printf("Enter the filename to open for writing \n");
scanf("%s", filename);
// Open another file for writing

fptr2= fopen(filename, "w"); if (fptr2 == NULL)
{printf("Cannot open file %s\n", filename); exit(0);} // Read contents from file
c = fgetc(fptr1); while (c != EOF) {fputc(c, fptr2);
c = fgetc(fptr1);}printf("\nContents copied to %s", filename);
fclose(fptr1); fclose(fptr2); return 0;
}
```

```
tsec@ubuntu:~$ gcc -o copy.out copy.c
tsec@ubuntu:~$ ./copy.out
Enter the filename to open for reading
example.txt
Enter the filename to open for writing
example1.txt
Contents copied to example1.txt
```

```
tsec@ubuntu:~$ cat example1.txt
Hello!!!
```

**Conclusion:** Thus we have successfully studied and implemented various basic commands of Linux like ls, cp and mv using kernel APIs