**LINUX PROGRAMMING**
**WEEK 3**

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SLOT : B1 + TB1
COURSE CODE : SWE4009

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## 1. Process and memory management

a. AIM:

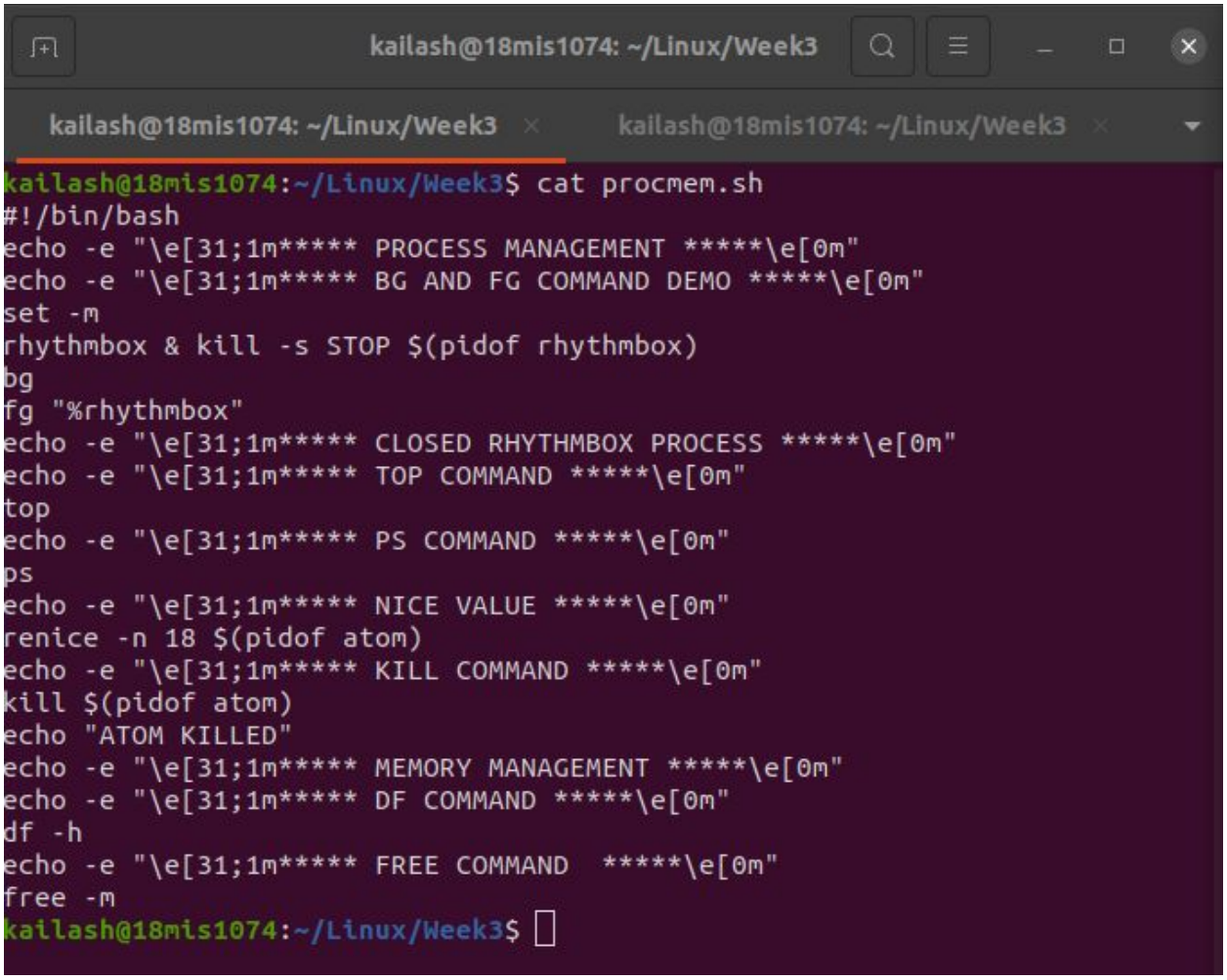
To demonstrate the process management and memory management commands in BASH shell.

b. ALGORITHM:

We will be executing following commands:

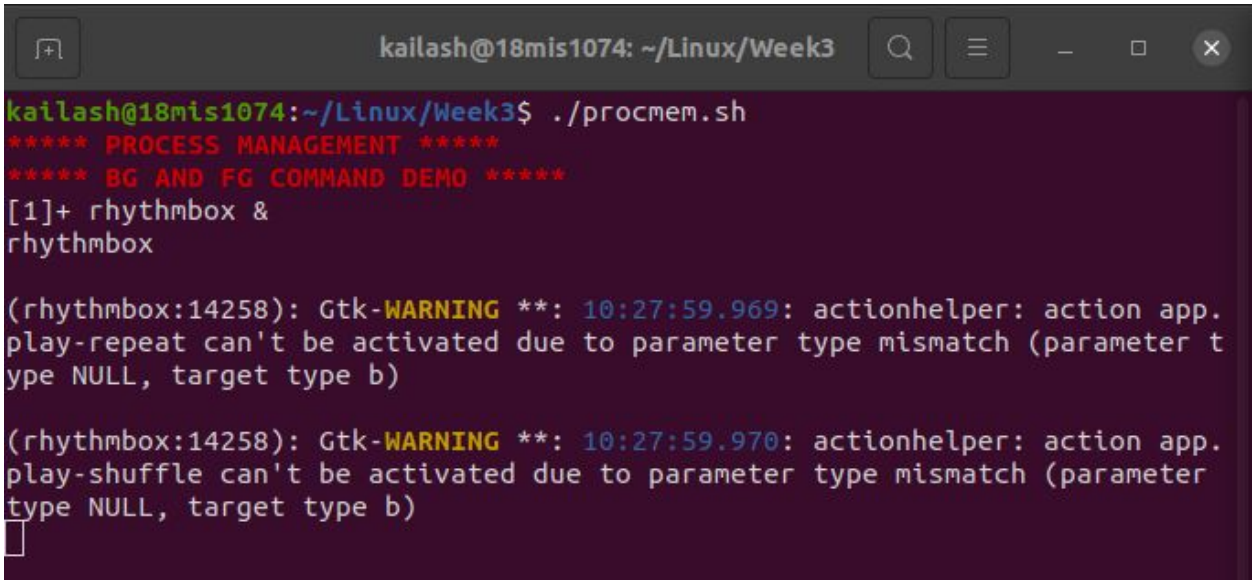
i. bg - used to send a process to background (using rhythmbox for demo)
ii. fg - used to bring a process to the foreground(using rhythmbox for demo)
iii. top - lists out the running processes
iv. ps - lists out the processes too, but in different manner
v. kill - used to kill running process (using atom text editor for demo)
vi. nice - like user defined priority; we can set it (using atom text editor for demo)
vii. DF - lists the free space on hard drive
viii. free - lists RAM and Swap availability

c. CODE:




d. OUTPUT: Atom was already opened previously, manually.

Rhythmbox opened :




After closing rhythmbox manually:

```
/usr/lib/python3/dist-packages/gi/overrides/GObject.py:502: Warning: ../..
/../gobject/gsignal.c:2735: instance '0x561404f85700' has no handler with
id '14310'
  return func(*args, **kwargs)
/usr/lib/python3/dist-packages/gi/overrides/GObject.py:502: Warning: ../..
/../gobject/gsignal.c:2735: instance '0x561404f85700' has no handler with
id '14309'
  return func(*args, **kwargs)

(rhythmbox:14258): Gtk-WARNING **: 10:28:25.980: Can't set a parent on wid
get which has a parent
***** CLOSED RHYTHMBOX PROCESS *****
***** TOP COMMAND *****
```

Top command :

```
***** CLOSED RHYTHMBOX PROCESS *****
***** TOP COMMAND *****
```

```
top - 10:29:08 up  1:29,  1 user,  load average: 1.35, 1.55, 1.41
Tasks: 247 total,   1 running, 246 sleeping,   0 stopped,   0 zombie
%Cpu(s): 17.8 us, 10.3 sy,  0.0 ni, 70.2 id,  1.6 wa,  0.0 hi,  0.2 si,  0
MiB Mem :   7424.5 total,   2516.2 free,   2287.4 used,   2620.9 buff/cach
MiB Swap:   2048.0 total,   2048.0 free,      0.0 used.   4800.2 avail Mem
```

| PID | USER | PR | NI | VIRT | RES | SHR | S | %CPU | %MEM | TIME+ |
|---|---|---|---|---|---|---|---|---|---|---|
| 1500 | kailash | 20 | 0 | 2055032 | 120056 | 57432 | S | 11.6 | 1.6 | 5:55.54 |
| 7257 | kailash | 20 | 0 | 8896460 | 205672 | 102384 | S | 11.0 | 2.7 | 3:14.37 |
| 940 | kailash | 9 | -11 | 4178304 | 21984 | 17268 | S | 9.3 | 0.3 | 4:34.00 |
| 1344 | kailash | 20 | 0 | 4197344 | 319908 | 121000 | S | 9.0 | 4.2 | 4:22.11 |
| 1864 | kailash | 20 | 0 | 369792 | 99892 | 66404 | S | 5.3 | 1.3 | 0:54.56 |
| 1014 | kailash | 20 | 0 | 860728 | 104880 | 57136 | S | 3.0 | 1.4 | 2:36.45 |
| 1823 | kailash | 20 | 0 | 771848 | 263444 | 148556 | S | 2.3 | 3.5 | 3:19.65 |
| 6073 | kailash | 20 | 0 | 828348 | 60448 | 49476 | S | 2.0 | 0.8 | 0:50.77 |
| 14117 | kailash | 20 | 0 | 1035356 | 219340 | 120688 | S | 1.0 | 2.9 | 0:03.06 |
| 1026 | mysql | 20 | 0 | 1740948 | 358736 | 35076 | S | 0.7 | 4.7 | 0:23.96 |
| 14337 | kailash | 20 | 0 | 4557568 | 88340 | 66932 | S | 0.7 | 1.2 | 0:00.19 |
| 163 | root | -51 | 0 | 0 | 0 | 0 | S | 0.3 | 0.0 | 0:04.74 |
| 169 | root | 20 | 0 | 0 | 0 | 0 | I | 0.3 | 0.0 | 0:04.69 |
| 6135 | kailash | 20 | 0 | 20.6g | 274532 | 98972 | S | 0.3 | 3.6 | 1:48.53 |
| 12192 | root | 20 | 0 | 0 | 0 | 0 | I | 0.3 | 0.0 | 0:03.33 |

After quitting top command,
PS command:

```
***** PS COMMAND *****
    PID TTY          TIME CMD
  14203 pts/0    00:00:00 bash
  14257 pts/0    00:00:00 procmem.sh
  14357 pts/0    00:00:00 ps
***** NICE VALUE *****
```

Nice / Renice command:

```
***** NICE VALUE *****
14179 (process ID) old priority 0, new priority 18
14149 (process ID) old priority 0, new priority 18
14123 (process ID) old priority 0, new priority 18
14121 (process ID) old priority 0, new priority 18
14117 (process ID) old priority 0, new priority 18
***** KILL COMMAND *****
```

Kill command:

```
***** KILL COMMAND *****
ATOM KILLED
***** MEMORY MANAGEMENT *****
***** DF COMMAND *****
```

DF command:

```
***** MEMORY MANAGEMENT *****
***** DF COMMAND *****
Filesystem      Size  Used Avail Use% Mounted on
udev            3.6G     0  3.6G   0% /dev
tmpfs           743M  2.1M  741M   1% /run
/dev/sda2       916G   89G  781G  11% /
tmpfs           3.7G   66M  3.6G   2% /dev/shm
tmpfs           5.0M  4.0K  5.0M   1% /run/lock
tmpfs           3.7G     0  3.7G   0% /sys/fs/cgroup
/dev/loop3       32M   32M     0 100% /snap/snapd/11036
/dev/loop6       56M   56M     0 100% /snap/core18/1988
/dev/loop2      926M  926M     0 100% /snap/android-studio/100
/dev/loop1      818M  818M     0 100% /snap/android-studio/99
/dev/loop0       50M   50M     0 100% /snap/snap-store/467
/dev/loop7       63M   63M     0 100% /snap/gtk-common-themes/1506
/dev/loop8       99M   99M     0 100% /snap/core/10823
/dev/loop10      56M   56M     0 100% /snap/core18/1944
/dev/loop11      52M   52M     0 100% /snap/snap-store/518
/dev/loop12     219M  219M     0 100% /snap/gnome-3-34-1804/66
/dev/loop9      216M  216M     0 100% /snap/atom/271
/dev/loop4      125M  125M     0 100% /snap/vscode/93
/dev/loop5      282M  282M     0 100% /snap/atom/273
/dev/loop14     256M  256M     0 100% /snap/gnome-3-34-1804/36
/dev/loop13      65M   65M     0 100% /snap/gtk-common-themes/1514
/dev/loop15      32M   32M     0 100% /snap/snapd/10707
/dev/loop16      62M   62M     0 100% /snap/core20/904
/dev/sda1       511M  7.9M  504M   2% /boot/efi
tmpfs           743M   52K  743M   1% /run/user/1000
***** FREE COMMAND  *****
```

Free command:

```
***** FREE COMMAND  *****
              total        used        free      shared  buff/cache   avai
lable
Mem:           7424        2188        2606          72        2629
 4890
Swap:          2047           0        2047
kailash@18mis1074:~/Linux/Week3$
```

e. RESULT:
   Therefore, we have successfully completed the process and memory management script.

## 2. Program to use curses

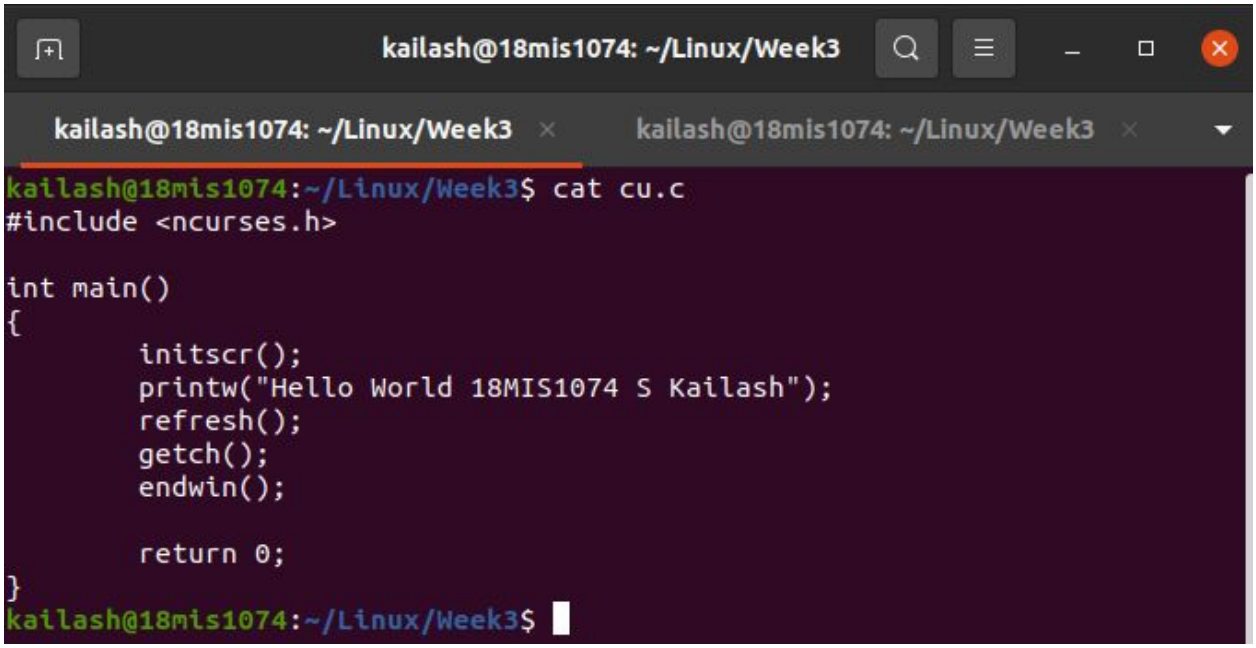
a. AIM:
   To demonstrate simple use of ncurses library using hello world program.

b. ALGORITHM:

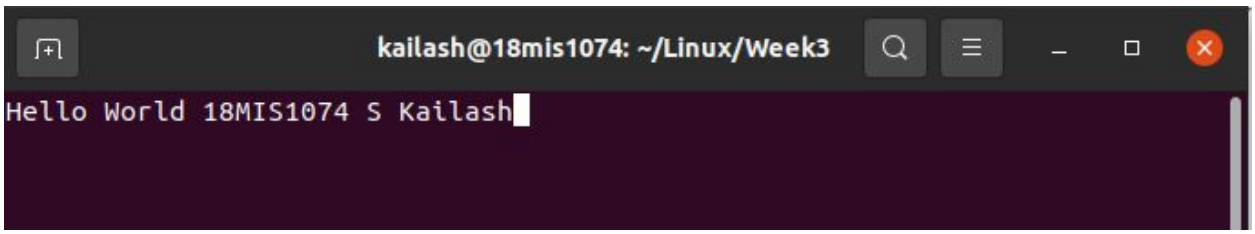
The program is written in C language, with the lncurses flag enabled for gcc during compilation; we also import ncurses header file.

1. Initialise screen using initscr() method
2. Print “Hello World 18MIS1074 S Kailash”
3. refresh () method is called to print to real screen
4. getch() is used to wait for user i/p and endwin() is called to terminate the window’s curses mode.

c. CODE:



d. OUTPUT:
Compilation : gcc cu.c -lncurses -o cu
On running ./cu




e. RESULT:

Hence, we have demonstrated use of ncurses library using hello world function.

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