LAB MANNUAL

Of

OPERATING SYSTEMS

B. TECH. (COMPUTER SCIENCE) 5th SEMESTER

SUBJECT CODE : CSPC – 323

SUBMITTED BY :
Name : Komal Agarwal
Roll Number : 22103087
Group : G1(B)

SUBMITTED TO :
Name : Dr. D.K. Gupta
Designation : Associate Professor

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DR. B.R. AMBEDKAR NATIONAL INSTITUTE OF TECHNOLOGY

JALANDHAR

DR B R AMBEDKAR NATIONAL INSTITUTE OF TECHNOLOGY JALANDHAR

DEPARTMENT: COMPUTER SCIENCE AND ENGINEERING

COURSE CODE: CSPC-323

COURSE TITLE: OPERATING SYSTEMS LABORATORY

S. No.	Week No.	Name of Practical
1.	Week 1	• Installation of Linux OS (Ubuntu)/ Windows Subsystem for Linux (WSL). • Basic Linux commands.

<u>WEEK 1</u>

Objective :

- Installation of Linux OS (Ubuntu)/ Windows Subsystem for Linux (WSL).
- Basic Linux commands.

Procedure :

- **Installation of Windows Subsystem for Linux (WSL).**

```
Ubuntu is already installed.
Launching Ubuntu...
```
wsl --install -d ubuntu

- **Basic Linux commands**

1. ls (lists all the files and directories)
   mkdir (make directory) / cd (change directory)
   ls -F

```
ubuntu@ubuntu:~$ mkdir komal
ubuntu@ubuntu:~$ ls -F
Desktop/    Downloads/  Music/      Public/   Templates/
Documents/  komal/      Pictures/   snap/     Videos/
```

   ls -l

```
ubuntu@ubuntu:~$ ls -l
total 0
drwxr-xr-x 2 ubuntu ubuntu 60 Aug  4 19:55 Desktop
drwxr-xr-x 2 ubuntu ubuntu 40 Aug  4 19:55 Documents
drwxr-xr-x 2 ubuntu ubuntu 40 Aug  4 19:55 Downloads
drwxrwxr-x 2 ubuntu ubuntu 40 Aug  4 19:58 komal
drwxr-xr-x 2 ubuntu ubuntu 40 Aug  4 19:55 Music
drwxr-xr-x 2 ubuntu ubuntu 40 Aug  4 19:55 Pictures
drwxr-xr-x 2 ubuntu ubuntu 40 Aug  4 19:55 Public
drwx------ 4 ubuntu ubuntu 80 Aug  4 19:56 snap
drwxr-xr-x 2 ubuntu ubuntu 40 Aug  4 19:55 Templates
drwxr-xr-x 2 ubuntu ubuntu 40 Aug  4 19:55 Videos
```

   ls -F -R

```
ubuntu@ubuntu:~$ ls -F
Desktop/    Downloads/  Music/      Public/   Templates/
Documents/  komal/      Pictures/   snap/     Videos/
```

2. ps by default shows processes of current user that are running on current terminal

```
ubuntu@ubuntu:~$ ls -F -R
.:
Desktop/      Downloads/    Music/      Public/    Templates/
Documents/    komal/        Pictures/   snap/      Videos/

./Desktop:
ubuntu-desktop-bootstrap_ubuntu-desktop-bootstrap.desktop*

./Documents:

./Documents:

./Downloads:

./komal:

./Music:

./Pictures:

./Public:

./snap:
snapd-desktop-integration/  ubuntu-desktop-bootstrap/

./snap/snapd-desktop-integration:
157/   common/   current@

./snap/snapd-desktop-integration/157:

./snap/snapd-desktop-integration/common:

./snap/ubuntu-desktop-bootstrap:
171/   common/   current@

./snap/ubuntu-desktop-bootstrap/171:

./snap/ubuntu-desktop-bootstrap/common:

./Templates:

./Videos:
```

ps -A(show all processes)

```
ubuntu@ubuntu:~$ ps -A
    PID TTY          TIME CMD
      1 ?        00:00:05 systemd
      2 ?        00:00:00 kthreadd
      3 ?        00:00:00 pool_workqueue_release
      4 ?        00:00:00 kworker/R-rcu_g
      5 ?        00:00:00 kworker/R-rcu_p
      6 ?        00:00:00 kworker/R-slub_
      7 ?        00:00:00 kworker/R-netns
      8 ?        00:00:00 kworker/0:0-events
      9 ?        00:00:00 kworker/0:1-ata_sff
     10 ?        00:00:00 kworker/0:0H-events_highpri
     11 ?        00:00:00 kworker/u8:0-netns
     12 ?        00:00:00 kworker/R-mm_pe
     13 ?        00:00:00 rcu_tasks_kthread
     14 ?        00:00:00 rcu_tasks_rude_kthread
     15 ?        00:00:00 rcu_tasks_trace_kthread
     16 ?        00:00:00 ksoftirqd/0
     17 ?        00:00:01 rcu_preempt
     18 ?        00:00:00 migration/0
     19 ?        00:00:00 idle_inject/0
     20 ?        00:00:00 cpuhp/0
     21 ?        00:00:00 cpuhp/1
     22 ?        00:00:00 idle_inject/1
     23 ?        00:00:00 migration/1
     24 ?        00:00:00 ksoftirqd/1
     25 ?        00:00:00 kworker/1:0-events
     26 ?        00:00:00 kworker/1:0H-events_highpri
     27 ?        00:00:00 cpuhp/2
     28 ?        00:00:00 idle_inject/2
     29 ?        00:00:00 migration/2
     30 ?        00:00:00 ksoftirqd/2
     31 ?        00:00:00 kworker/2:0-cgroup_destroy
```

```
3288 ?        00:00:00 xdg-desktop-por
3323 ?        00:00:00 snapd-desktop-i
3522 ?        00:00:00 snapd-desktop-i
3691 ?        00:00:00 psimon
3693 ?        00:00:00 subiquity-serve
3716 ?        00:00:07 python3.10
3740 ?        00:00:02 kworker/0:2H-kblockd
3764 ?        00:00:05 kworker/2:2H-kblockd
3778 ?        00:00:00 kworker/R-cfg80
3802 ?        00:00:00 kworker/u10:9-loop0
3803 ?        00:00:00 kworker/u10:10-loop13
3804 ?        00:00:00 kworker/u10:11
3805 ?        00:00:00 kworker/u10:12
3921 ?        00:00:00 kworker/u11:4-events_power_efficient
3925 ?        00:00:00 kworker/R-xfsal
3926 ?        00:00:00 kworker/R-xfs_m
3930 ?        00:00:00 jfsIO
3931 ?        00:00:00 jfsCommit
3932 ?        00:00:00 jfsCommit
3933 ?        00:00:00 jfsCommit
3934 ?        00:00:00 jfsCommit
3935 ?        00:00:00 jfsSync
4005 ?        00:00:01 update-notifier
4094 ?        00:00:00 kworker/u11:5-events_unbound
4097 ?        00:00:00 kworker/u9:6
4277 ?        00:00:01 gjs
4351 ?        00:00:01 gnome-terminal-
4367 pts/0    00:00:00 bash
4392 ?        00:00:00 deja-dup-monito
4408 pts/0    00:00:00 ps
```

ps -ef

```
ubuntu@ubuntu:~$ ps -ef
UID        PID    PPID  C STIME TTY          TIME CMD
root         1       0  2 19:55 ?        00:00:05 /sbin/init splash noprompt n
root         2       0  0 19:55 ?        00:00:00 [kthreadd]
root         3       2  0 19:55 ?        00:00:00 [pool_workqueue_release]
root         4       2  0 19:55 ?        00:00:00 [kworker/R-rcu_g]
root         5       2  0 19:55 ?        00:00:00 [kworker/R-rcu_p]
root         6       2  0 19:55 ?        00:00:00 [kworker/R-slub_]
root         7       2  0 19:55 ?        00:00:00 [kworker/R-netns]
root         8       2  0 19:55 ?        00:00:00 [kworker/0:0-events]
root         9       2  0 19:55 ?        00:00:00 [kworker/0:1-events]
root        10       2  0 19:55 ?        00:00:00 [kworker/0:0H-events_highpri]
root        11       2  0 19:55 ?        00:00:00 [kworker/u8:0-netns]
root        12       2  0 19:55 ?        00:00:00 [kworker/R-mm_pe]
root        13       2  0 19:55 ?        00:00:00 [rcu_tasks_kthread]
root        14       2  0 19:55 ?        00:00:00 [rcu_tasks_rude_kthread]
root        15       2  0 19:55 ?        00:00:00 [rcu_tasks_trace_kthread]
root        16       2  0 19:55 ?        00:00:00 [ksoftirqd/0]
root        17       2  0 19:55 ?        00:00:01 [rcu_preempt]
root        18       2  0 19:55 ?        00:00:00 [migration/0]
root        19       2  0 19:55 ?        00:00:00 [idle_inject/0]
root        20       2  0 19:55 ?        00:00:00 [cpuhp/0]
root        21       2  0 19:55 ?        00:00:00 [cpuhp/1]
root        22       2  0 19:55 ?        00:00:00 [idle_inject/1]
root        23       2  0 19:55 ?        00:00:00 [migration/1]
root        24       2  0 19:55 ?        00:00:00 [ksoftirqd/1]
root        25       2  0 19:55 ?        00:00:00 [kworker/1:0-events]
root        26       2  0 19:55 ?        00:00:00 [kworker/1:0H-events_highpri]
root        27       2  0 19:55 ?        00:00:00 [cpuhp/2]
root        28       2  0 19:55 ?        00:00:00 [idle_inject/2]
```

```
ubuntu      3288    2001  0 19:56 ?        00:00:00 /usr/libexec/xdg-desktop-por
ubuntu      3323    2001  0 19:56 ?        00:00:00 /snap/snapd-desktop-integrat
ubuntu      3522    3323  0 19:56 ?        00:00:00 /snap/snapd-desktop-integrat
root        3691       2  0 19:56 ?        00:00:00 [psimon]
root        3693       1  0 19:56 ?        00:00:00 /bin/bash /snap/ubuntu-deskt
root        3716    3693  5 19:56 ?        00:00:07 /snap/ubuntu-desktop-bootstr
root        3740       2  1 19:56 ?        00:00:02 [kworker/0:2H-kblockd]
root        3764       2  3 19:56 ?        00:00:05 [kworker/2:2H-kblockd]
root        3778       2  0 19:56 ?        00:00:00 [kworker/R-cfg80]
root        3802       2  0 19:57 ?        00:00:00 [kworker/u10:9-loop0]
root        3803       2  0 19:57 ?        00:00:00 [kworker/u10:10-loop13]
root        3804       2  0 19:57 ?        00:00:00 [kworker/u10:11]
root        3805       2  0 19:57 ?        00:00:00 [kworker/u10:12]
root        3921       2  0 19:57 ?        00:00:00 [kworker/u11:4-events_power_
root        3925       2  0 19:57 ?        00:00:00 [kworker/R-xfsal]
root        3926       2  0 19:57 ?        00:00:00 [kworker/R-xfs_m]
root        3930       2  0 19:57 ?        00:00:00 [jfsIO]
root        3931       2  0 19:57 ?        00:00:00 [jfsCommit]
root        3932       2  0 19:57 ?        00:00:00 [jfsCommit]
root        3933       2  0 19:57 ?        00:00:00 [jfsCommit]
root        3934       2  0 19:57 ?        00:00:00 [jfsCommit]
root        3935       2  0 19:57 ?        00:00:00 [jfsSync]
ubuntu      4005    2541  0 19:57 ?        00:00:01 /usr/bin/update-notifier
root        4094       2  0 19:57 ?        00:00:00 [kworker/u11:5-events_unboun
root        4097       2  0 19:57 ?        00:00:00 [kworker/u9:6]
ubuntu      4277    2568  1 19:57 ?        00:00:01 gjs /usr/share/gnome-shell/e
ubuntu      4351    2001  2 19:57 ?        00:00:02 /usr/libexec/gnome-terminal-
ubuntu      4367    4351  0 19:57 pts/0    00:00:00 bash
ubuntu      4392    2541  0 19:58 ?        00:00:00 /usr/libexec/deja-dup/deja-d
ubuntu      4409    4367 99 19:59 pts/0    00:00:00 ps -ef
```

ps -L (show process threads)

```
ubuntu@ubuntu:~$ ps -L
   PID    LWP TTY          TIME CMD
  4367   4367 pts/0    00:00:00 bash
  4411   4411 pts/0    00:00:00 ps
```

ps -H(displays processes in hierarchial format)

```
ubuntu@ubuntu:~$ ps -H
   PID TTY          TIME CMD
  4367 pts/0    00:00:00 bash
  4412 pts/0    00:00:00   ps
```

3. nice and renice
    nice(run nice to determine current niceness)

```
ubuntu@ubuntu:~$ nice
0
ubuntu@ubuntu:~$ top -d 5
```

4. top (displays process information similar to ps but in real-time mode)
    top -d 5 (change update delay to 5 seconds)

```
ubuntu@ubuntu:~$ top -d 5

top - 19:59:32 up 4 min,  1 user,  load average: 1.36, 2.16, 1.06
Tasks: 265 total,   1 running, 264 sleeping,   0 stopped,   0 zombie
%Cpu(s):  1.6 us,  4.8 sy,  0.0 ni, 87.1 id,  1.6 wa,  0.0 hi,  4.8 si,  0.0 st
MiB Mem :   1967.2 total,     90.2 free,   1104.3 used,    994.5 buff/cache
MiB Swap:      0.0 total,      0.0 free,      0.0 used.    862.9 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
   4414 ubuntu    20   0   23204   5504   3456 R   5.3   0.3   0:00.14 top
      1 root      20   0   23404  14296   9432 S   0.0   0.7   0:05.08 systemd
      2 root      20   0       0      0      0 S   0.0   0.0   0:00.03 kthreadd
      3 root      20   0       0      0      0 S   0.0   0.0   0:00.00 pool_wo+
      4 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker+
      5 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker+
      6 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker+
      7 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker+
      8 root      20   0       0      0      0 I   0.0   0.0   0:00.00 kworker+
      9 root      20   0       0      0      0 I   0.0   0.0   0:00.54 kworker+
     10 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker+
     11 root      20   0       0      0      0 I   0.0   0.0   0:00.00 kworker+
     12 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker+
     13 root      20   0       0      0      0 I   0.0   0.0   0:00.00 rcu tas+
```

top -p 140,220 (only display processes 190,2690)

```
ubuntu@ubuntu:~$ top -p 140,220

top - 19:59:49 up 4 min,  1 user,  load average: 0.97, 2.02, 1.03
Tasks:   0 total,   0 running,   0 sleeping,   0 stopped,   0 zombie
%Cpu(s):  1.1 us,  2.2 sy,  0.0 ni, 96.7 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem :   1967.2 total,     89.5 free,   1105.1 used,    994.5 buff/cache
MiB Swap:      0.0 total,      0.0 free,      0.0 used.    862.1 avail Mem


    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
```

5. uname -a

```
ubuntu@ubuntu:~$ uname -a
Linux ubuntu 6.8.0-31-generic #31-Ubuntu SMP PREEMPT_DYNAMIC Sat Apr 20 00:40:06 UTC 2024 x86_64 x86_64 x86_64 GNU/Linux
ubuntu@ubuntu:~$ lsb_release -a
```

6. lsb_release -a

```
ubuntu@ubuntu:~$ lsb_release -a
No LSB modules are available.
Distributor ID: Ubuntu
Description:    Ubuntu 24.04 LTS
Release:        24.04
Codename:       noble
```

7. ifconfig

```
ubuntu@ubuntu:~$ ifconfig
Command 'ifconfig' not found, but can be installed with:
sudo apt install net-tools
ubuntu@ubuntu:~$ iwconfig
```

8. iwconfig

```
ubuntu@ubuntu:~$ iwconfig
lo        no wireless extensions.

enp0s3    no wireless extensions.
```