



National Textile University

Department of Computer Science

Subject: Operating System

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Reg. number: 23-NTU-CS-1170

Lab no.: lab2 (class task)

Semester: 5th

HOME TASK

Part 5: Text Processing and Utilities

5.1 Essential Text Commands

- Commands to demonstrate:

```
grep "pattern" file.txt      # Search for patterns
grep -i "pattern" file.txt   # Case-insensitive search
grep -n "pattern" file.txt   # Show line numbers
```

maha@DESKTOP-PDJCJQV: ~

```
maha@DESKTOP-PDJCJQV:~$ grep "pattern" hello.txt
maha@DESKTOP-PDJCJQV:~$ grep -i "pattern" hello.txt
maha@DESKTOP-PDJCJQV:~$ grep -n "pattern" hello.txt
maha@DESKTOP-PDJCJQV:~$
```

5.2 Pipes and Redirection

- Concepts and commands:

```
ls -l | grep ".txt"          # Pipe output
cat file1.txt file2.txt > combined.txt # Redirect output
echo "new line" >> file.txt   # Append to file
sort file.txt | uniq          # Chain commands
```

```
maha@DESKTOP-PDJCJQV: ~$ ls -l | grep ".txt"
-rw-r--r-- 1 maha maha 0 Sep 28 07:40 combined.txt
-rw-r--r-- 1 maha maha 9 Sep 28 07:41 file.txt
-rw-r--r-- 1 maha maha 0 Sep 28 07:17 file1.txt
-rw-r--r-- 1 maha maha 0 Sep 28 07:17 file2.txt
-rwxr-xr-x 1 maha maha 26 Sep 28 07:18 hello.txt
maha@DESKTOP-PDJCJQV:~$ cat file1.txt file2.txt > combined.txt
maha@DESKTOP-PDJCJQV:~$ echo "new line" >> hello.txt
maha@DESKTOP-PDJCJQV:~$ sort hello.txt | uniq

hi this is my test file
new line
maha@DESKTOP-PDJCJQV:~$
```

Part 6: Introduction to Processes

6.1 Understanding Processes

- **Concepts to Cover:**
 - What is a process?
 - Process ID (PID)
 - Parent-child relationships
 - Process states
- **Commands to demonstrate:**

```
ps                # Show current processes
ps aux            # Detailed process list
ps -ef            # Full format listing
pstree            # Process tree
top               # Real-time process viewer
htop              # Enhanced process viewer (if available)
kill PID          # Terminate process by PID
killall process_name # Kill processes by name
pkill pattern     # Kill processes matching pattern
```

Commands:

1. Ps:

maha@DESKTOP-PDJCJQV: ~

```
maha@DESKTOP-PDJCJQV:~$ ps
  PID TTY          TIME CMD
  313 pts/0        00:00:00 bash
  605 pts/0        00:00:00 less
  712 pts/0        00:00:00 ps
maha@DESKTOP-PDJCJQV:~$
```

2. Ps aux

maha@DESKTOP-PDJCJQV: ~

```
maha@DESKTOP-PDJCJQV:~$ ps aux
USER          PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root             1  0.0  0.3  21724 12340 ?        Ss   06:59   0:02 /sbin/init
root             2  0.0  0.0   3072  1920 ?        S1   06:59   0:00 /init
root             7  0.0  0.0   3072  1792 ?        S1   06:59   0:00 plan9 --control-socket
root            49  0.0  0.4  66752 18988 ?        S<s  06:59   0:00 /usr/lib/systemd/syste
root           104  0.0  0.1  25008  6144 ?        Ss   06:59   0:00 /usr/lib/systemd/syste
systemd+       120  0.0  0.3  21456 12416 ?        Ss   06:59   0:00 /usr/lib/systemd/syste
systemd+       121  0.0  0.1  91024  7552 ?        Ssl  06:59   0:00 /usr/lib/systemd/syste
root           168  0.0  0.0   4236  2432 ?        Ss   06:59   0:00 /usr/sbin/cron -f -P
message+       169  0.0  0.1   9528  4992 ?        Ss   06:59   0:00 @dbus-daemon --system
root           176  0.0  0.2  17960  8320 ?        Ss   06:59   0:00 /usr/lib/systemd/syste
root           178  0.0  0.3 1756096 12544 ?        Ssl  06:59   0:00 /usr/libexec/wsl-pro-s
root           181  0.0  0.0   3160  1792 hvc0     Ss+  06:59   0:00 /sbin/agetty -o -p --
syslog         183  0.0  0.1 222508  5504 ?        Ssl  06:59   0:00 /usr/sbin/rsyslogd -n
root           198  0.0  0.0   3116  1792 tty1     Ss+  06:59   0:00 /sbin/agetty -o -p --
root           209  0.0  0.5 107012 22272 ?        Ssl  06:59   0:00 /usr/bin/python3 /usr/
root           308  0.0  0.0   3080   768 ?        Ss   06:59   0:00 /init
root           310  0.0  0.0   3096   896 ?        S    06:59   0:00 /init
maha           313  0.0  0.1   6072  4864 pts/0    Ss   06:59   0:00 -bash
root           314  0.0  0.1   6824  4224 pts/1    Ss   06:59   0:00 /bin/login -f
maha           361  0.0  0.2  20312 11136 ?        Ss   06:59   0:00 /usr/lib/systemd/syste
maha           362  0.0  0.0  21148  3516 ?        S    06:59   0:00 (sd-pam)
maha           380  0.0  0.1   6072  5120 pts/1    S+   06:59   0:00 -bash
maha           605  0.0  0.0   3512  2304 pts/0    T    07:23   0:00 less hello.txt
maha           714  0.0  0.1   8280  4096 pts/0    R+   07:43   0:00 ps aux
maha@DESKTOP-PDJCJQV:~$
```

3. Ps -ef

```
maha@DESKTOP-PDJCJQV: ~$ ps -ef
UID          PID    PPID  C STIME TTY          TIME CMD
root           1        0  0 06:59 ?           00:00:02 /sbin/init
root           2        1  0 06:59 ?           00:00:00 /init
root           7        2  0 06:59 ?           00:00:00 plan9 --control-socket 7 --log-level
root          49        1  0 06:59 ?           00:00:00 /usr/lib/systemd/systemd-journald
root         104        1  0 06:59 ?           00:00:00 /usr/lib/systemd/systemd-udevd
systemd+     120        1  0 06:59 ?           00:00:00 /usr/lib/systemd/systemd-resolved
systemd+     121        1  0 06:59 ?           00:00:00 /usr/lib/systemd/systemd-timesyncd
root         168        1  0 06:59 ?           00:00:00 /usr/sbin/cron -f -P
message+    169        1  0 06:59 ?           00:00:00 @dbus-daemon --system --address=syste
root         176        1  0 06:59 ?           00:00:00 /usr/lib/systemd/systemd-logind
root         178        1  0 06:59 ?           00:00:00 /usr/libexec/wsl-pro-service -vv
root         181        1  0 06:59 hvc0       00:00:00 /sbin/agetty -o -p -- \u --noclear --
syslog      183        1  0 06:59 ?           00:00:00 /usr/sbin/rsyslogd -n -iNONE
root         198        1  0 06:59 tty1       00:00:00 /sbin/agetty -o -p -- \u --noclear -
root         209        1  0 06:59 ?           00:00:00 /usr/bin/python3 /usr/share/unattende
root         308        2  0 06:59 ?           00:00:00 /init
root         310       308  0 06:59 ?           00:00:00 /init
maha        313       310  0 06:59 pts/0     00:00:00 -bash
root        314        2  0 06:59 pts/1     00:00:00 /bin/login -f
maha        361        1  0 06:59 ?           00:00:00 /usr/lib/systemd/systemd --user
maha        362       361  0 06:59 ?           00:00:00 (sd-pam)
maha        380       314  0 06:59 pts/1     00:00:00 -bash
maha        605       313  0 07:23 pts/0     00:00:00 less hello.txt
maha        720       313  0 07:43 pts/0     00:00:00 ps -ef
maha@DESKTOP-PDJCJQV:~$
```

4. Pstree

```
maha@DESKTOP-PDJCJQV: ~$ pstree
systemd--2*[agetty]
├── cron
├── dbus-daemon
├── init-systemd(Ub
│   ├── SessionLeader──Relay(313)──bash──less
│   │                               └──pstree
│   ├── init──{init}
│   ├── login──bash
│   └── {init-systemd(Ub)
├── rsyslogd──3*[{rsyslogd}]
├── systemd──(sd-pam)
├── systemd-journal
├── systemd-logind
├── systemd-resolve
├── systemd-timesyn──{systemd-timesyn}
├── systemd-udevd
├── unattended-upgr──{unattended-upgr}
└── wsl-pro-service──7*[{wsl-pro-service}]
maha@DESKTOP-PDJCJQV:~$
```

5. top

```
maha@DESKTOP-PDJCJQV: ~$ top
top - 07:44:44 up 45 min, 1 user, load average: 0.01, 0.05, 0.02
Tasks: 24 total, 1 running, 22 sleeping, 1 stopped, 0 zombie
%Cpu(s):  0.0 us,  0.2 sy,  0.0 ni, 99.8 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem : 3865.2 total, 3416.5 free, 447.5 used, 134.3 buff/cache
MiB Swap: 1024.0 total, 1024.0 free,  0.0 used. 3417.7 avail Mem

  PID USER      PR  NI  VIRT  RES  SHR S %CPU  %MEM    TIME+  COMMAND
    1 root        20   0 21724 12340 9140 S   0.0   0.3   0:02.34 systemd
    2 root        20   0 3072  1920 1792 S   0.0   0.0   0:00.02 init-systemd(Ub
    7 root        20   0 3072  1792 1792 S   0.0   0.0   0:00.00 init
   49 root        19  -1 66752 18988 18092 S   0.0   0.5   0:00.96 systemd-journal
  104 root        20   0 25008 6144 4864 S   0.0   0.2   0:00.59 systemd-udev
  120 systemd+    20   0 21456 12416 10368 S   0.0   0.3   0:00.32 systemd-resolve
  121 systemd+    20   0 91024 7552 6784 S   0.0   0.2   0:00.35 systemd-timesyn
  168 root        20   0 4236  2432 2304 S   0.0   0.1   0:00.02 cron
  169 message+    20   0 9528  4992 4480 S   0.0   0.1   0:00.45 dbus-daemon
  176 root        20   0 17960 8320 7424 S   0.0   0.2   0:00.28 systemd-logind
  178 root        20   0 1756096 12544 10368 S   0.0   0.3   0:00.38 wsl-pro-service
  181 root        20   0 3160  1792 1792 S   0.0   0.0   0:00.02agetty
  183 syslog      20   0 222508 5504 4352 S   0.0   0.1   0:00.21 rsyslogd
  198 root        20   0 3116  1792 1664 S   0.0   0.0   0:00.01agetty
  209 root        20   0 107012 22272 13056 S   0.0   0.6   0:00.27unattended-upgr
```

6. htop

```
maha@DESKTOP-PDJCJQV: ~$ htop
0[          0.0%] Tasks: 26, 20 thr, 0 kthr; 1 running
1[          0.0%] Load average: 0.16 0.08 0.03
2[          0.0%] Uptime: 00:47:03
3[          2.6%]
Mem[|||||] 328M/3.77G
Swp[          0K/1.00G]

Main  I/O
PID USER      PRI  NI  VIRT  RES  SHR S CPU% MEM%   TIME+  Command
1185 maha        20   0 5500  3968 3328 R  1.3  0.1   0:00.08 htop
    1 root        20   0 21856 12340 9140 S   0.0   0.3   0:02.43 /sbin/init
    2 root        20   0 3072  1920 1792 S   0.0   0.0   0:00.01 /init
    7 root        20   0 3072  1792 1792 S   0.0   0.0   0:00.00 plan9 --control-socket
    8 root        20   0 3072  1792 1792 S   0.0   0.0   0:00.00 plan9 --control-socket
    9 root        20   0 3072  1920 1792 S   0.0   0.0   0:00.00 /init
   49 root        19  -1 66752 18988 18092 S   0.0   0.5   0:00.92 /usr/lib/systemd/syste
  104 root        20   0 25008 6144 4864 S   0.0   0.2   0:00.60 /usr/lib/systemd/syste
  120 systemd-re  20   0 21456 12416 10368 S   0.0   0.3   0:00.32 /usr/lib/systemd/syste
  121 systemd-ti  20   0 91024 7552 6784 S   0.0   0.2   0:00.36 /usr/lib/systemd/syste
  153 systemd-ti  20   0 91024 7552 6784 S   0.0   0.2   0:00.00 /usr/lib/systemd/syste

F1Help F2Setup F3Search F4Filter F5Tree F6SortBy F7Nice -F8Nice +F9Kill F10Quit
```

7. Kill PID

maha@DESKTOP-PDJCJQV: ~

```
maha@DESKTOP-PDJCJQV:~$ kill 2345
-bash: kill: (2345) - No such process
maha@DESKTOP-PDJCJQV:~$ kill PID
-bash: kill: PID: arguments must be process or job IDs
maha@DESKTOP-PDJCJQV:~$
```

8. Killall process_name:

maha@DESKTOP-PDJCJQV: ~

```
maha@DESKTOP-PDJCJQV:~$ killall process_name
process_name: no process found
maha@DESKTOP-PDJCJQV:~$ killall gedit
gedit: no process found
maha@DESKTOP-PDJCJQV:~$ killall firefox
firefox: no process found
maha@DESKTOP-PDJCJQV:~$
```

9. Pkill pattern

maha@DESKTOP-PDJCJQV: ~

```
maha@DESKTOP-PDJCJQV:~$ pkill pattern
maha@DESKTOP-PDJCJQV:~$
```