Course Name: Information and Communication Technologies Lab		
Lab # 8: Windows DOS and Ubuntu terminal basics		
Department	**Registration Number/Name**	**Semester/Section**
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Date	**Instructor's Name**	**Instructor's Signature**
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Objectives:

- How to access the command line from your own computer?
- How to perform some basic file manipulation?
- The best way to use administrator powers

Practical Task 1:

Try implementing all commands mentioned in the manual both on Command Prompt (Windows) and Terminal (Ubuntu)?

Ubuntu: **Windows:**

HELP COMMAND

```
muhammad@muhammad-VMware-Virtual-Platform:/home$ ls --help
Usage: ls [OPTION]... [FILE]...
List information about the FILEs (the current directory by default).
Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

Mandatory arguments to long options are mandatory for short options too.
  -a, --all                  do not ignore entries starting with .
  -A, --almost-all           do not list implied . and ..
      --author               with -l, print the author of each file
  -b, --escape               print C-style escapes for nongraphic characters
      --block-size=SIZE      with -l, scale sizes by SIZE when printing them;
                             e.g., '--block-size=M'; see SIZE format below

  -B, --ignore-backups       do not list implied entries ending with ~
  -c                         with -lt: sort by, and show, ctime (time of last
                             change of file status information);
                             with -l: show ctime and sort by name;
                             otherwise: sort by ctime, newest first

  -C                         list entries by columns
      --color[=WHEN]         color the output WHEN; more info below
  -d, --directory            list directories themselves, not their contents
  -D, --dired                generate output designed for Emacs' dired mode
  -f                         list all entries in directory order
  -F, --classify[=WHEN]      append indicator (one of */=>@|) to entries WHEN
      --file-type            likewise, except do not append '*'
      --format=WORD          across -x, commas -m, horizontal -x, long -l,
                             single-column -1, verbose -l, vertical -C
```

```
C:\Users\M.Hamzah Iqbal\Documents>help
For more information on a specific command, type HELP command-name
ASSOC          Displays or modifies file extension associations.
ATTRIB         Displays or changes file attributes.
BREAK          Sets or clears extended CTRL+C checking.
BCDEDIT        Sets properties in boot database to control boot loading.
CACLS          Displays or modifies access control lists (ACLs) of files.
CALL           Calls one batch program from another.
CD             Displays the name of or changes the current directory.
CHCP           Displays or sets the active code page number.
CHDIR          Displays the name of or changes the current directory.
CHKDSK         Checks a disk and displays a status report.
CHKNTFS        Displays or modifies the checking of disk at boot time.
CLS            Clears the screen.
CMD            Starts a new instance of the Windows command interpreter.
COLOR          Sets the default console foreground and background colors.
COMP           Compares the contents of two files or sets of files.
COMPACT        Displays or alters the compression of files on NTFS partitio
CONVERT        Converts FAT volumes to NTFS.  You cannot convert the
               current drive.
COPY           Copies one or more files to another location.
DATE           Displays or sets the date.
DEL            Deletes one or more files.
DIR            Displays a list of files and subdirectories in a directory.
DISKPART       Displays or configures Disk Partition properties.
DOSKEY         Edits command lines, recalls Windows commands, and
               creates macros.
```

CHANGE DIRECTORY:

```
muhammad@muhammad-VMware-Virtual-Platform:/home$ cd
muhammad@muhammad-VMware-Virtual-Platform:~$ cd ..
muhammad@muhammad-VMware-Virtual-Platform:/home$ cd /
muhammad@muhammad-VMware-Virtual-Platform:/$
```

```
C:\Users\M.Hamzah Iqbal>cd
C:\Users\M.Hamzah Iqbal

C:\Users\M.Hamzah Iqbal>cd ..

C:\Users>cd\

C:\>
```

Output current directory:

```
muhammad@muhammad-VMware-Virtual-Platform:/home$ pwd
/home
```

CREATE DIRECTORY

```
muhammad@muhammad-VMware-Virtual-Platform:/home$ sudo mkdir Linux
muhammad@muhammad-VMware-Virtual-Platform:/home$ ls
Linux  muhammad
```

```
C:\Users\M.Hamzah Iqbal>cd Documents

C:\Users\M.Hamzah Iqbal\Documents>mkdir Hamzah_iqbal

C:\Users\M.Hamzah Iqbal\Documents>cd Hamzah_iqbal

C:\Users\M.Hamzah Iqbal\Documents\Hamzah_iqbal>
```

DELETE DIRECTORY

```
muhammad@muhammad-VMware-Virtual-Platform:/home$ sudo rm -rf Linux
muhammad@muhammad-VMware-Virtual-Platform:/home$ ls
muhammad
```

```
C:\Users\M.Hamzah Iqbal\Documents>rmdir /s Hamzah_iq
Hamzah_iq, Are you sure (Y/N)? Y

C:\Users\M.Hamzah Iqbal\Documents>cd Hamzah_iq
The system cannot find the path specified.
```

LIST DIRECTORY:

```
muhammad@muhammad-VMware-Virtual-Platform:~$ ls
Desktop  Documents  Downloads  Lab_8.txt  Linux  Music  Pictures  Public  snap
```

Command Prompt

```
C:\Users\M.Hamzah Iqbal>dir
 Volume in drive C is Windows-SSD
 Volume Serial Number is F6C3-A29A

 Directory of C:\Users\M.Hamzah Iqbal

11/13/2024  09:59 PM    <DIR>          .
11/17/2024  11:34 AM    <DIR>          ..
10/25/2024  09:28 AM    <DIR>          .arduinoIDE
09/20/2023  06:42 PM    <DIR>          .ms-ad
09/10/2023  12:15 PM    <DIR>          .swt
07/24/2023  04:59 PM    <DIR>          .vscode
05/13/2023  12:02 AM    <DIR>          Contacts
10/08/2023  04:19 PM    <DIR>          Documents
11/22/2024  09:36 PM    <DIR>          Downloads
04/23/2023  12:39 PM    <DIR>          Favorites
04/23/2023  12:39 PM    <DIR>          Links
04/23/2023  12:39 PM    <DIR>          Music
07/16/2024  01:20 PM    <DIR>          oinstall_tmp
02/01/2024  07:52 PM    <DIR>          OneDrive
04/23/2023  12:39 PM    <DIR>          Saved Games
04/23/2023  04:23 PM    <DIR>          Searches
05/09/2023  06:51 PM    <DIR>          source
07/19/2023  09:14 PM    <DIR>          Videos
               0 File(s)              0 bytes
              18 Dir(s)  732,143,566,848 bytes free
```

COPY

```
muhammad@muhammad-VMware-Virtual-Platform:~$ cp Lab_8.txt ~/Documents
muhammad@muhammad-VMware-Virtual-Platform:~$ cd Documents
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ ls
Desktop  Lab_8.txt
```

```
C:\Users\M.Hamzah Iqbal\Documents>copy lab_8.txt Desktop
        1 file(s) copied.
```

MOVE/RENAME

```
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ mv Lab_8.txt Lab_8.1.txt
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ ls
Desktop  Lab_8.1.txt
```

```
C:\Users\M.Hamzah Iqbal\Documents>rename lab_8.txt lab_8.1txt

C:\Users\M.Hamzah Iqbal\Documents>dir
 Volume in drive C is Windows-SSD
 Volume Serial Number is F6C3-A29A

 Directory of C:\Users\M.Hamzah Iqbal\Documents

11/23/2024  07:38 PM    <DIR>          .
11/13/2024  09:59 PM    <DIR>          ..
11/23/2024  07:03 PM                19 Desktop
11/23/2024  07:03 PM                19 lab_8.1txt
09/05/2023  11:23 AM    <DIR>          V380
10/08/2023  04:19 PM    <DIR>          Visual Studio 2022
               2 File(s)             38 bytes
               4 Dir(s)  729,921,650,688 bytes free
```

PRINT FILE

```
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ echo This is Lab 8 hello >Lab_8.1.txt
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ cat Lab_8.1.txt
This is Lab 8 hello
```

```
C:\Users\M.Hamzah Iqbal\Documents>echo This is my Lab_8 >lab_8.txt

C:\Users\M.Hamzah Iqbal\Documents>type lab_8.txt
This is my Lab_8
```

VIEW FILE

```
This is Lab 8 hello
~
~
~
~
~
~
~
~
~
~
```

```
C:\Users\M.Hamzah Iqbal\Documents>more lab_8.1txt
This is my Lab_8
```

AND/OR

```
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ mkdir Data && cd Data
muhammad@muhammad-VMware-Virtual-Platform:~/Documents/Data$
```

```
C:\Users\M.Hamzah Iqbal\Documents>echo Deleting newlab_8.txt && del /p  newlab_8.txt
Deleting newlab_8.txt
C:\Users\M.Hamzah Iqbal\Documents\newlab_8.txt, Delete (Y/N)? Y
```

```
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ mkdir Hello || echo Directory is new
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ ls
Data  Desktop  Hello  Lab_8.1.txt
```

```
C:\Users\M.Hamzah Iqbal\Documents>echo Creating newlab_8.txt || echo Hello World  <newlab_8.txt
Creating newlab_8.txt
```

PIPING

```
Data  Desktop  Hello  Lab_8.1.txt
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ ls | grep lab_8.1.txt
```

```
C:\Users\M.Hamzah Iqbal\Documents>dir | find "txt"
11/23/2024  07:03 PM                19 lab_8.1txt
```

ECHO

```
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ echo Hello World
Hello World
```

```
C:\Users\M.Hamzah Iqbal>echo "My name is Hamzah"
"My name is Hamzah"
```

FIND

```
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ find Lab_8.1.txt
Lab_8.1.txt
```

```
C:\Users\M.Hamzah Iqbal>dir *lab_8.txt*.* /s /p
 Volume in drive C is Windows-SSD
 Volume Serial Number is F6C3-A29A

 Directory of C:\Users\M.Hamzah Iqbal

11/24/2024  11:09 AM                19 lab_8.txt
               1 File(s)             19 bytes
```

KILL PROCESS

```
C:\Users\M.Hamzah Iqbal\Documents>taskkill/IM SnippingTool.exe /F
SUCCESS: The process "SnippingTool.exe" with PID 22776 has been terminated.
```

COMPARE FILES:

```
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ diff Lab_8.1.txt Lab_8.2.txt
1d0
< This is Lab 8 hello
```

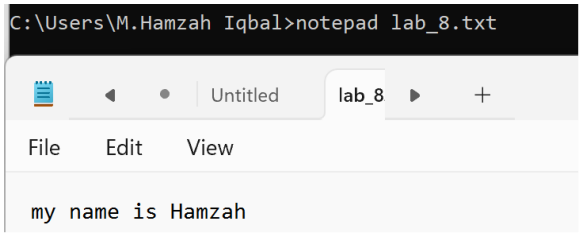
```
C:\Users\M.Hamzah Iqbal>echo this is lab 8>lab_8.1.txt
this is lab

C:\Users\M.Hamzah Iqbal>fc lab_8.1.txt lab_8.txt
Comparing files lab_8.1.txt and LAB_8.TXT
***** lab_8.1.txt
***** LAB_8.TXT
my name is Hamzah
*****
```

EDIT FILE:

```
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ pico Lab_8.1.txt
```

```
  GNU nano 7.2
This is Lab 8 hello
..
```

```
C:\Users\M.Hamzah Iqbal>notepad lab_8.txt
```



Since my OS is Window 11 edit command can no longer be used

OS VERSION:

```
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ uname -a
Linux muhammad-VMware-Virtual-Platform 6.8.0-49-generic #49-Ubuntu S
4 GNU/Linux
```

```
C:\Users\M.Hamzah Iqbal>ver

Microsoft Windows [Version 10.0.22000.2538]
```

ENVIRONMENT VARIABLES:

```
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ export b=80
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ echo $b
80
```

```
C:\Users\M.Hamzah Iqbal>set var=90

C:\Users\M.Hamzah Iqbal>echo %var%
90
```

HOST NAME:

```
muhammad@muhammad-VMware-Virtual-Platform:~/Documents$ hostname
muhammad-VMware-Virtual-Platform
```

```
C:\Users\M.Hamzah Iqbal>hostname
M_HamzahIqbal
```

PING

```
muhammad@muhammad-VMware-Virtual-Platform:~$ ping 192.168.30.132
PING 192.168.30.132 (192.168.30.132) 56(84) bytes of data.
64 bytes from 192.168.30.132: icmp_seq=1 ttl=64 time=7.11 ms
64 bytes from 192.168.30.132: icmp_seq=2 ttl=64 time=0.034 ms
64 bytes from 192.168.30.132: icmp_seq=3 ttl=64 time=0.034 ms
64 bytes from 192.168.30.132: icmp_seq=4 ttl=64 time=0.030 ms
64 bytes from 192.168.30.132: icmp_seq=5 ttl=64 time=0.107 ms
```

```
C:\Users\M.Hamzah Iqbal>ping google.com

Pinging google.com [2a00:1450:4018:809::200e] with 32 bytes of data:
Reply from 2a00:1450:4018:809::200e: time=49ms
Reply from 2a00:1450:4018:809::200e: time=104ms
Reply from 2a00:1450:4018:809::200e: time=89ms
Reply from 2a00:1450:4018:809::200e: time=90ms

Ping statistics for 2a00:1450:4018:809::200e:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 49ms, Maximum = 104ms, Average = 83ms
```

IP CONFIGURATION

```
muhammad@muhammad-VMware-Virtual-Platform:~$ ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.30.132  netmask 255.255.255.0  broadcast 192.168.30.255
```

```
Connection-specific DNS Suffix  . :
Link-local IPv6 Address . . . . . : fe80::5400:3e9a:935e:6ae6%14
IPv4 Address. . . . . . . . . . . : 192.168.118.1
Subnet Mask . . . . . . . . . . . : 255.255.255.0
Default Gateway . . . . . . . . . :
```

DATE AND TIME

```
muhammad@muhammad-VMware-Virtual-Platform:~$ date
Tue Nov 26 10:43:25 PM PKT 2024
```

```
C:\Users\M.Hamzah Iqbal>time/T
09:57 AM
```

```
C:\Users\M.Hamzah Iqbal>date/T
Sun 11/24/2024
```

Practical Task 2:

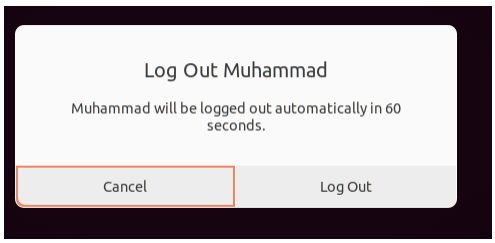
Why do we use LINUX?

- Linux is widely used because it is open-source, free, and highly customizable, making it ideal for developers, system administrators, and businesses.
- It is known for its stability, security, and efficiency, offering better performance, especially on servers and older hardware.
- Linux supports a wide range of applications, programming languages, and tools, making it a preferred choice for software development, hosting, and cloud computing. Its community-driven nature ensures constant updates and a large support network.

Practical Task 3:

Does the Ctrl+Alt+Del key combination work on Linux??

The Ctrl+Alt+Del key combination on Linux doesn't bring up security options or the Task Manager like in Windows, but it typically prompts you to log out.



Practical Task 4:

How does case sensitivity affect the way you use commands?

In Linux, case sensitivity means that uppercase and lowercase letters are treated as different. For example, "File.txt" and "file.txt" are seen as two separate files. You need to type commands and file names exactly as they are, because **ls** is correct, but **LS** will cause an error. Due to case sensitivity, it is important to be accurate in Linux.

Practical Task5:

Write a command that will do the following

- **Create a new directory “Linux” in your home directory.**

```
muhammad@muhammad-VMware-Virtual-Platform:/home$ ls -a ~
.  ..  .bash_logout  .bashrc  .cache  .config  Desktop  Documents  Downloads  .local  Music  Pictures  .profile  Public  snap  .ssh
muhammad@muhammad-VMware-Virtual-Platform:/home$ mkdir ~/Linux
muhammad@muhammad-VMware-Virtual-Platform:/home$ ls -a ~
.  ..  .bash_logout  .bashrc  .cache  .config  Desktop  Documents  Downloads  Linux  .local  Music  Pictures  .profile  Public  snap
```

- **Make Linux your working directory.**

```
muhammad@muhammad-VMware-Virtual-Platform:/home$ cd Linux
muhammad@muhammad-VMware-Virtual-Platform:/home/Linux$ ech
```

- **Create a txt file” Student name” that contains your name and roll no.**

  //We have taken permission in first line to write in the file.

```
muhammad@muhammad-VMware-Virtual-Platform:/home/Linux$ ls -ld ~/Linux
drwxrwxr-x 2 muhammad muhammad 4096 Nov 26 18:57 /home/muhammad/Linux
muhammad@muhammad-VMware-Virtual-Platform:/home/Linux$ chmod u+w ~/Linux
muhammad@muhammad-VMware-Virtual-Platform:/home/Linux$ sudo echo "Name: Muhammad Hamzah Iqbal Roll no:F24604018" > ~/Linux/Student_name.txt
[sudo] password for muhammad:
```

```
muhammad@muhammad-VMware-Virtual-Platform:/home/Linux$ ls
home  Student_name.txt
```

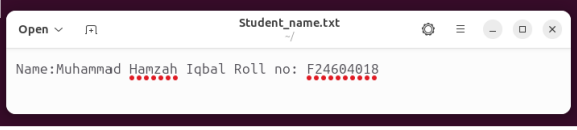
- **Then copy that txt file to your home directory.**

```
muhammad@muhammad-VMware-Virtual-Platform:/home/Linux$ cp ~/Linux/Student_name.txt ~/
```

```
muhammad@muhammad-VMware-Virtual-Platform:/home$ ls
Linux  muhammad  Student_name.txt
```

- **Open that txt file.**

```
muhammad@muhammad-VMware-Virtual-Platform:/home$ xdg-open ~/Student_name.txt
muhammad@muhammad-VMware-Virtual-Platform:/home$
```



- **Delete the txt file and Linux directory.**

```
muhammad@muhammad-VMware-Virtual-Platform:/home$ rm Student_name.txt && rm -rf Linux
```

```
muhammad@muhammad-VMware-Virtual-Platform:/home$ ls
muhammad
```

Task #6: (Home Assignment)

Explain each command mentioned in the manual and take a screenshot of your implementation : All screenshots of implementation are attached in Task 1.

- Help: Displays help information for commands.
- Change Directory: Changes to the current working directory.
- Output Current Directory: Prints the current directory.
- Create Directory: Creates a new directory.
- Delete Directory: Deletes a directory.
- File: Removes a file or a directory according to the user needs.
- List Directory: Lists the contents of a directory.
- Copy: Copies files or directories.
- Move/Rename: Moves or renames files or directories.
- Print File: Displays the contents of a file.
- View File: Displays file contents and allows user to edit.
- And/Or Logic: Executes the second command based on the success/failure of the first.
- Piping: Sends the output of one command as input to another.
- Write/Read File: Redirects output/input to/from a file.
- Search for Files: Finds files based on a pattern.
- Print: Outputs text to the terminal.
- Kill Process: Terminates a running process.
- Compare Files: Compares two files line by line.
- Edit File: Opens a file in an editor for editing.
- Replace: Replaces text in a file or output.
- Clear Terminal: Clears the terminal screen.
- Wait: Pauses execution for a specified time.
- OS Version: Displays information about the operating system.
- Environment Variables: Displays the assigned value of environment variables.
- Sorting: Sorts lines of text.
- File Permissions: Changes ownership or permissions of files.
- Machine Name: Displays the machine's hostname.
- Pinging: Sends network packets to a host to check connectivity.
- Memory: Displays memory usage and system processes.
- Services: Manages system services.
- Restart OS: Restarts the operating system.
- IP: Displays or configures network interfaces.
- Print Time & Date: Prints the current time and date

Post Lab Activity

Task #1:

What do you understand by Linux Kernel? Is it legal to edit it?

The Linux Kernel is the core part of the Linux operating system. It enables communication between hardware and software. Key roles of the Linux Kernel include:

Process Management: Deals with processes running on the system.
Memory Management: Allocations and management of system memory.
Device Management: Interfaces with hardware devices through drivers.
File System Management: Maintains and organizes data on storage devices.
Networking: Enables communication among systems over networks.

Editing the Linux Kernel is legal as it's open source under the GPL license, allowing modification, redistribution, and sharing while retaining its open nature. Modifications must be made public under the same licensing terms as the original code.

Task #2:

What are the kinds of permissions under Linux?

In Linux, permissions on file and directories control who can read, write, or execute them. There are of three types: read (view contents), write (modify), and execute (run or access).

1. Read (r):
    - For Files: Allows viewing the contents of the file.
        - Example: If a file has read permission, you can open and view its contents using commands like **cat** or **less**.
    - For Directories: Allows listing the contents of the directory.
        - Example: If a directory has read permission, you can list its files using the **ls** command.

2. Write (w):
    - For Files: Allows modifying the contents of the file.
        - Example: If a file has write permission, you can edit it using a text editor like **nano** or **vi**.
    - For Directories: Allows creating, deleting, and renaming files within the directory.
        - Example: If a directory has write permission, you can create new files in it using the **touch** command or delete files using the **rm** command.
3. Execute (x):
    - For Files: Allows running the file as a program.
        - If a script or program has execute permission, you can run it directly from the command line.
    - For Directories: Allows accessing the directory and its contents.
        - If a directory has execute permission, you can change into it using the **cd** command.
        - The **sudo** command is for opening files on force

Special permissions in Linux give extra control over files and directories:

1. SUID (Set User ID): Lets a file run with the owner's permission, not the users.
2. SGID (Set Group ID): Lets a file run with the group's permissions, not the users. For directories, new files inherit the directory's group.
3. Sticky Bit: Prevents users from deleting files they don't own in a shared directory.

To change permissions, we can use the **chmod** command. To see current permissions, we can use **ls -l**.