



National Textile University

Department of Computer Science

Subject:

Operating System

Submitted to:

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Reg number:

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Lab no. :
1

Semester:
5th

Lab 1 Plan: WSL2 Setup and Ubuntu Configuration

Objective

The purpose of this lab is to introduce students to Windows Subsystem for Linux (WSL2) and guide them through the installation, setup, and configuration of Ubuntu. By the end of this lab, students should be able to run and use a Linux environment on Windows for development and operating system–related tasks.

Learning Outcomes

After completing this lab, students will be able to:

1. Understand the concept and advantages of WSL2.
2. Install and enable WSL2 on Windows.
3. Install Ubuntu from Microsoft Store.
4. Configure Ubuntu environment (update, upgrade, user setup).
5. Run basic Linux commands in Ubuntu under WSL2.

Lab Activities

Task 01: Installing WSL2 on Windows

Step 1: Open PowerShell as Administrator.

Step 2: Run command to enable WSL and Virtual Machine Platform:

```
wsl.exe --install -d Ubuntu-24.04
```

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\ADVISOR> wsl.exe --install -d Ubuntu-24.04
```

Task 02: Verifying setup on Windows

Step 1: Open Ubuntu 24.04 in Windows terminal or Ubuntu shell directly

Step 2: Create new user and password

```
fizza1157@DESKTOP-P8HNL3: ~
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.6.87.2-microsoft-standard-WSL2 x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Sat Sep 20 15:15:38 PKT 2025

System load:  0.09           Processes:            34
Usage of /:   0.2% of 1006.85GB Users logged in:       1
Memory usage: 5%            IPv4 address for eth0: 172.19.78.198
Swap usage:   0%

This message is shown once a day. To disable it please create the
/home/fizza1157/.hushlogin file.
fizza1157@DESKTOP-P8HNL3S:~$
```

Step 3: Run the following
commands `sudo apt update` `sudo apt`
`upgrade`

```
shanza1209@DESKTOP-LIS8T7J: ~/Lab06
shanza1209@DESKTOP-LIS8T7J:~/Lab06$ sudo apt install build-essential
[sudo] password for shanza1209:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libdrm-nouveau2 libdrm-radeon1 libgl1-amber-dri libglapi-mesa libllvm17t64 libxcb-dri2-0
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  bzip2 dpkg-dev fakeroot g++ g++-13 g++-13-x86-64-linux-gnu g++-x86-64-linux-gnu libalgorithm-diff-perl
  libalgorithm-diff-xs-perl libalgorithm-merge-perl libdpkg-perl libfakeroot libfile-fcntllock-perl libstdc++-13-dev
  lto-disabled-list make
Suggested packages:
  bzip2-doc debian-keyring g++-multilib g++-13-multilib gcc-13-doc bzip libstdc++-13-doc make-doc
The following NEW packages will be installed:
  build-essential bzip2 dpkg-dev fakeroot g++ g++-13 g++-13-x86-64-linux-gnu g++-x86-64-linux-gnu
  libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl libdpkg-perl libfakeroot
  libfile-fcntllock-perl libstdc++-13-dev lto-disabled-list make
0 upgraded, 17 newly installed, 0 to remove and 4 not upgraded.
Need to get 16.4 MB of archives.
After this operation, 61.3 MB of additional disk space will be used.
Do you want to continue? [Y/n] _

Select shanza1209@DESKTOP-LIS8T7J:~/Lab06
Setting up g++ (4:13.2.0-7ubuntu1) ...
update-alternatives: using /usr/bin/g++ to provide /usr/bin/c++ (c++) in auto mode
Setting up build-essential (12.10ubuntu1) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.6) ...
shanza1209@DESKTOP-LIS8T7J:~/Lab06$ sudo apt install build-essential -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
build-essential is already the newest version (12.10ubuntu1).
The following packages were automatically installed and are no longer required:
  libdrm-nouveau2 libdrm-radeon1 libgl1-amber-dri libglapi-mesa libllvm17t64 libxcb-dri2-0
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 4 not upgraded.
shanza1209@DESKTOP-LIS8T7J:~/Lab06$
```

```
shanza1209@DESKTOP-LIS8TTJ: ~/Lab06
Setting up dpkg-dev (1.22.6ubuntu6.5) ...
Setting up g++-x86-64-linux-gnu (4:13.2.0-7ubuntu1) ...
Setting up g++-13 (13.3.0-6ubuntu2-24.04) ...
Setting up g++ (4:13.2.0-7ubuntu1) ...
update-alternatives: using /usr/bin/g++ to provide /usr/bin/c++ (c++) in auto mode
Setting up build-essential (12.10ubuntu1) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.6) ...
shanza1209@DESKTOP-LIS8TTJ:~/Lab06$ sudo apt install build-essential -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
build-essential is already the newest version (12.10ubuntu1).
The following packages were automatically installed and are no longer required:
  libdrm-nouveau2 libdrm-radeon1 libgl1-amber-dri libglapi-mesa libllvm17t64 libxcb-dri2-0
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 4 not upgraded.
shanza1209@DESKTOP-LIS8TTJ:~/Lab06$ g++ --version
g++ (Ubuntu 13.3.0-6ubuntu2-24.04) 13.3.0
Copyright (C) 2023 Free Software Foundation, Inc.
This is free software; see the source for copying conditions. There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

shanza1209@DESKTOP-LIS8TTJ:~/Lab06$ git config --list
user.email=shabbirtoor76@gmail.com
user.name=shanza-12
shanza1209@DESKTOP-LIS8TTJ:~/Lab06$ ssh-keygen -t ed25519
Generating public/private ed25519 key pair.
Enter file in which to save the key (/home/shanza1209/.ssh/id_ed25519):
Created directory '/home/shanza1209/.ssh'.
Enter passphrase (empty for no passphrase):
Your identification has been saved in /home/shanza1209/.ssh/id_ed25519
Your public key has been saved in /home/shanza1209/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:9NVCr2sH23CueZfh2Gz36TdcDPdCa7/HLaleASpceY shanza1209@DESKTOP-LIS8TTJ
The key's randomart image is:
+--[ED25519 256]--+
|                .oXo|
|                .+o/*|
|                .o.*oX|
|                .+oooo+|
|                S .. Oo .|
|                o E+ .|
|                o o+ .|
|                .+.*+|
|                .+.*+|
+-----[SHA256]-----+
shanza1209@DESKTOP-LIS8TTJ:~/Lab06$
```

```
shanza1209@DESKTOP-LIS8TTJ: ~/ssh
Your identification has been saved in /home/shanza1209/.ssh/id_ed25519
Your public key has been saved in /home/shanza1209/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:9NVCr2sH23CueZfh2Gz36TdcDPdCa7/HLaleASpceY shanza1209@DESKTOP-LIS8TTJ
The key's randomart image is:
+--[ED25519 256]--+
|                .oXo|
|                .+o/*|
|                .o.*oX|
|                .+oooo+|
|                S .. Oo .|
|                o E+ .|
|                o o+ .|
|                .+.*+|
|                .+.*+|
+-----[SHA256]-----+
shanza1209@DESKTOP-LIS8TTJ:~/Lab06$ cd ~/.ssh/
shanza1209@DESKTOP-LIS8TTJ:~/ssh$ ssh -T git@github.com
The authenticity of host 'github.com (20.207.73.82)' can't be established.
ED25519 key fingerprint is SHA256:+DIY3wvvV6TuJhbpZisf/zLD40zPPMSVHdkr4UVC0qU.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? y
Please type 'yes', 'no' or the fingerprint: y
Please type 'yes', 'no' or the fingerprint: yes
Warning: Permanently added 'github.com' (ED25519) to the list of known hosts.
git@github.com: Permission denied (publickey).
shanza1209@DESKTOP-LIS8TTJ:~/ssh$ git config --global user.email "shabbirtoor76@gmail.com"
shanza1209@DESKTOP-LIS8TTJ:~/ssh$ git config --global user.name "shanza-12"
shanza1209@DESKTOP-LIS8TTJ:~/ssh$ git config --list
user.email=shabbirtoor76@gmail.com
user.name=shanza-12
shanza1209@DESKTOP-LIS8TTJ:~/ssh$
```

Generate SSH Key:

```
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh
/home/shanza1209/.ssh/id_ed25519 already exists.
Overwrite (y/n)? y
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/shanza1209/.ssh/id_ed25519
Your public key has been saved in /home/shanza1209/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:AKfKxNHj73Vv+yzDQP+10S6qveirD3X18W7s0CX591M shabbirtoor76@gmail.com
The key's randomart image is:
+--[ED25519 256]--+
| .o... |
| .++ |
| o... |
| o . . . |
| o . S.+o+ . |
| . oo*o+ .E |
| . . .o+oo.o+ |
| . . .B.o+o |
| . . .+*+*o.o |
+-----[SHA256]-----+
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh$ ls
id_ed25519 id_ed25519.pub known_hosts
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh$ cat ~/.ssh/id_ed25519.pub
ssh-ed25519 AAAAC3NzaC1lIDNTESAAAAIDZ5S11DXVsrRZK1IjMEzyKSe50IUzcyUSKcDg1bxq8P shabbirtoor76@gmail.com
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh$ ssh -T git@github.com
git@github.com: Permission denied (publickey).
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh$ git clone git@github.com:shanza-12/wsl_lab1.git
Cloning into 'wsl_lab1'...
git@github.com: Permission denied (publickey).
fatal: Could not read from remote repository.

Please make sure you have the correct access rights
and the repository exists.
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh$
```

Navigate to SSH Folder:

```
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh
+-----[SHA256]-----+
shanza1209@DESKTOP-LIS8TTJ: ~/Lab06$ cd ~/.ssh/
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh$ ssh -T git@github.com
The authenticity of host 'github.com (20.207.73.82)' can't be established.
ED25519 key fingerprint is SHA256:0iY3wvV6Tuj3hpbZisf/zLDAB:PMSvHdkr4bvc0QU.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? y
Please type 'yes', 'no' or the fingerprint: yes
Warning: Permanently added 'github.com' (ED25519) to the list of known hosts.
git@github.com: Permission denied (publickey).
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh$ git config --global user.email "shabbirtoor76@gmail.com"
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh$ git config --global user.name "shanza-12"
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh$ git config --list
user.email=shabbirtoor76@gmail.com
user.name=shanza-12
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh$ cd ~/.ssh
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh$ ssh-keygen -t ed25519 -C "shabbirtoor76@gmail.com"
Generating public/private ed25519 key pair.
Enter file in which to save the key (/home/shanza1209/.ssh/id_ed25519):
/home/shanza1209/.ssh/id_ed25519 already exists.
Overwrite (y/n)? y
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/shanza1209/.ssh/id_ed25519
Your public key has been saved in /home/shanza1209/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:AKfKxNHj73Vv+yzDQP+10S6qveirD3X18W7s0CX591M shabbirtoor76@gmail.com
The key's randomart image is:
+--[ED25519 256]--+
| .o... |
| .++ |
| o... |
| o . . . |
| o . S.+o+ . |
| . oo*o+ .E |
| . . .o+oo.o+ |
| . . .B.o+o |
| . . .+*+*o.o |
+-----[SHA256]-----+
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh$ ls
id_ed25519 id_ed25519.pub known_hosts
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh$ cat ~/.ssh/id_ed25519.pub
ssh-ed25519 AAAAC3NzaC1lIDNTESAAAAIDZ5S11DXVsrRZK1IjMEzyKSe50IUzcyUSKcDg1bxq8P shabbirtoor76@gmail.com
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh$ ssh -T git@github.com
git@github.com: Permission denied (publickey).
shanza1209@DESKTOP-LIS8TTJ: ~/.ssh$ git clone git@github.com:shanza-12/wsl_lab1.git
Cloning into 'wsl_lab1'...
git@github.com: Permission denied (publickey).
```

Copy Public Key and add to Github and then test connection:

```
shanza1209@DESKTOP-LIS8TTJ: ~
0 ...
0 . . . .
0 . S.+o+ . .
. oo*o+ .E
...o+oo.o=
.. -b.o+o|
..+*+*+o.o|
+----[SHA256]-----+
shanza1209@DESKTOP-LIS8TTJ:~/.ssh$ ls
id_ed25519 id_ed25519.pub known_hosts
shanza1209@DESKTOP-LIS8TTJ:~/.ssh$ cat ~/.ssh/id_ed25519.pub
ssh-ed25519 AAAAC3NzaC1lZD11NTESAAAIIDZS1lDkV5RkZKLiJNEzykSe50IUzcyUSKcDgIbxq8P shabbirtoor76@gmail.com
shanza1209@DESKTOP-LIS8TTJ:~/.ssh$ ssh -T git@github.com
git@github.com: Permission denied (publickey).
shanza1209@DESKTOP-LIS8TTJ:~/.ssh$ git clone git@github.com:shanza-12/wsl_lab1.git
Cloning into 'wsl_lab1'...
git@github.com: Permission denied (publickey).
fatal: Could not read from remote repository.

Please make sure you have the correct access rights
and the repository exists.
shanza1209@DESKTOP-LIS8TTJ:~/.ssh$ cd wsl_lab1
-bash: cd: wsl_lab1: No such file or directory
shanza1209@DESKTOP-LIS8TTJ:~/.ssh$ pwd
/home/shanza1209/.ssh
shanza1209@DESKTOP-LIS8TTJ:~/.ssh$ cd ~
shanza1209@DESKTOP-LIS8TTJ:~$ ls
Lab06 Lab4_05 Lab_07 Labs_05
shanza1209@DESKTOP-LIS8TTJ:~$ cd ~
shanza1209@DESKTOP-LIS8TTJ:~$ ls
Lab06 Lab4_05 Lab_07 Labs_05 WSL_Lab1
shanza1209@DESKTOP-LIS8TTJ:~$ cd WSL_Lab1
shanza1209@DESKTOP-LIS8TTJ:~/WSL_Lab1$ echo " # My first WSL lab project" > README.md
shanza1209@DESKTOP-LIS8TTJ:~/WSL_Lab1$ git add .
fatal: not a git repository (or any of the parent directories): .git
shanza1209@DESKTOP-LIS8TTJ:~/WSL_Lab1$ cd lab1_wsl
-bash: cd: lab1_wsl: No such file or directory
shanza1209@DESKTOP-LIS8TTJ:~/WSL_Lab1$ cd lab1_wsl
-bash: cd: lab1_wsl: No such file or directory
shanza1209@DESKTOP-LIS8TTJ:~/WSL_Lab1$ cd ~
shanza1209@DESKTOP-LIS8TTJ:~$ cd lab1_wsl
-bash: cd: lab1_wsl: No such file or directory
shanza1209@DESKTOP-LIS8TTJ:~$
```

Clone Repo via SSH


```
shanza1209@DESKTOP-LIS8TT:~  
Please make sure you have the correct access rights  
and the repository exists.  
shanza1209@DESKTOP-LIS8TT:~/.ssh$ cd wsl_lab1  
-bash: cd: wsl_lab1: No such file or directory  
shanza1209@DESKTOP-LIS8TT:~/.ssh$ pwd  
/home/shanza1209/.ssh  
shanza1209@DESKTOP-LIS8TT:~/.ssh$ cd ~  
shanza1209@DESKTOP-LIS8TT:~$ ls  
Lab06  Lab4_OS  Lab_07  Labs_OS  
shanza1209@DESKTOP-LIS8TT:~$ cd ~  
shanza1209@DESKTOP-LIS8TT:~$ ls  
Lab06  Lab4_OS  Lab_07  Labs_OS  wsl_lab1  
shanza1209@DESKTOP-LIS8TT:~$ cd wsl_lab1  
shanza1209@DESKTOP-LIS8TT:~/wsl_lab1$ echo "# My first WSL lab project"> README.md  
shanza1209@DESKTOP-LIS8TT:~/wsl_lab1$ git add .  
fatal: not a git repository (or any of the parent directories): .git  
shanza1209@DESKTOP-LIS8TT:~/wsl_lab1$ cd lab1_wsl  
-bash: cd: lab1_wsl: No such file or directory  
shanza1209@DESKTOP-LIS8TT:~/wsl_lab1$ cd lab1_wsl  
-bash: cd: lab1_wsl: No such file or directory  
shanza1209@DESKTOP-LIS8TT:~/wsl_lab1$ cd ~  
shanza1209@DESKTOP-LIS8TT:~$ cd lab1_wsl  
-bash: cd: lab1_wsl: No such file or directory  
shanza1209@DESKTOP-LIS8TT:~$ cd ~/.ssh/lab1_wsl  
-bash: cd: /home/shanza1209/.ssh/lab1_wsl: No such file or directory  
shanza1209@DESKTOP-LIS8TT:~$
```

Task 03: Linux filesystem and directory structure

Step 1: Explore Linux filesystem and basic linux files.

Step 2: Explore how Ubuntu (Linux) can access Windows file system under /mnt/c/.

Step 3: Practice creating files in Windows and accessing them in Ubuntu.

