



**National Textile University**  
**Department of Computer Science**

**Subject**  
**Operating System**

**Submitted to:**  
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**Submitted by:**  
**Kashmir Jamshaid**

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**Registration Number**  
**23-NTU-CS-1167**

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**Home\_Task**  
**01**

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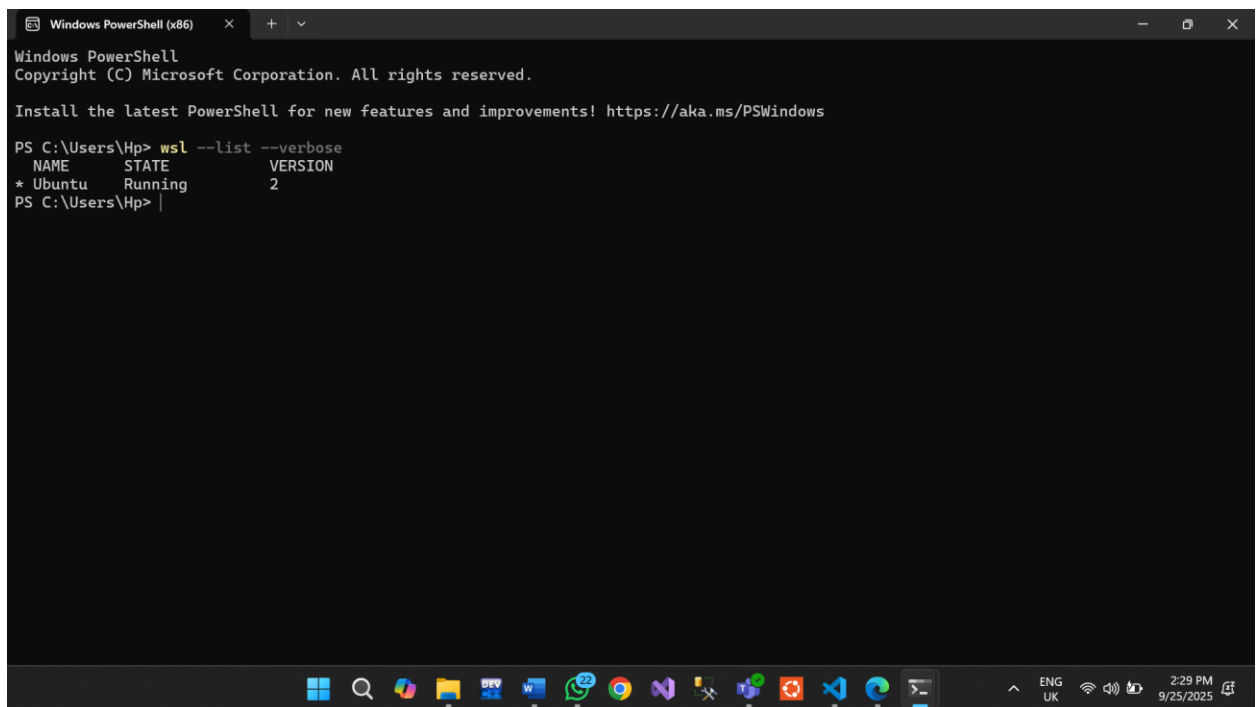
**Semester**  
**5th**

## Part A:

### WSL2 & Ubuntu Setup 1.

1-Verify WSL2 and Ubuntu installation Verify installation by running the following command in powershell:

**wsl --list—verbose**



```
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\Hp> wsl --list --verbose
  NAME      STATE      VERSION
* Ubuntu    Running    2
PS C:\Users\Hp> |
```

### 2.Update Ubuntu environment

Run the following command in Ubuntu:

**sudo apt update && sudo apt upgrade -y**

```
kashmirkj@Kashmirpc: ~$ sudo apt update && sudo apt upgrade -y
[sudo] password for kashmirkj:
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:4 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [1164 kB]
Get:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:6 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1043 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [197 kB]
Get:8 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [21.6 kB]
Get:9 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata [8704 B]
Get:10 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [588 kB]
Get:11 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [52.2 kB]
Get:12 http://security.ubuntu.com/ubuntu noble-security/universe amd64 c-n-f Metadata [18.8 kB]
Get:13 http://archive.ubuntu.com/ubuntu noble-updates/main Translation-en [282 kB]
Get:14 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [1855 kB]
Get:15 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [175 kB]
Get:16 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 c-n-f Metadata [15.3 kB]
Get:17 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [1485 kB]
Get:18 http://security.ubuntu.com/ubuntu noble-security/restricted Translation-en [419 kB]
Get:19 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Components [212 B]
Get:20 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [212 B]
Get:21 http://archive.ubuntu.com/ubuntu noble-updates/universe Translation-en [299 kB]
Get:22 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [377 kB]
Get:23 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 c-n-f Metadata [31.1 kB]
Get:24 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [1897 kB]
Get:25 http://archive.ubuntu.com/ubuntu noble-updates/restricted Translation-en [441 kB]
Get:26 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:27 http://archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [908 B]
Get:28 http://archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [7072 B]
Get:29 http://archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [19.2 kB]
Get:30 http://archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [212 B]
Get:31 http://archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 Components [212 B]
Fetched 11.5 MB in 18s (1124 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
10 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following package was automatically installed and is no longer required:
liblvm2
Use 'sudo apt autoremove' to remove it.
The following packages will be upgraded:
dpkg dpkg-dev libc-bin libc-dev-bin libc-devtools libc6 libc6-dev libdpkg-perl libpan-modules libpan-modules-bin
libpan-runtime libpan0g linux-libc-dev locales
10 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
14 standard LTS security updates
Need to get 15.3 MB of archives.
After this operation, 10.3 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 dpkg amd64 1.22.6ubuntu0.5 [1282 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libc-devtools amd64 2.39-0ubuntu0.6 [79.3 kB]
Get:3 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libc6-dev amd64 2.39-0ubuntu0.6 [2125 kB]
Get:4 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libc-dev-bin amd64 2.39-0ubuntu0.6 [29.8 kB]
Get:5 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 linux-libc-dev amd64 6.8-0ubuntu0.6 [1921 kB]
Get:6 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libc6 amd64 2.39-0ubuntu0.6 [1263 kB]
Get:7 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libc-bin amd64 2.39-0ubuntu0.6 [682 kB]
Get:8 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libpan0g amd64 1.5.3-Subuntu0.5 [67.8 kB]
Get:9 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libpan-modules-bin amd64 1.5.3-Subuntu0.5 [51.9 kB]
Get:10 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libpan-modules amd64 1.5.3-Subuntu0.5 [286 kB]
```

## Part B: Git & GitHub SSH

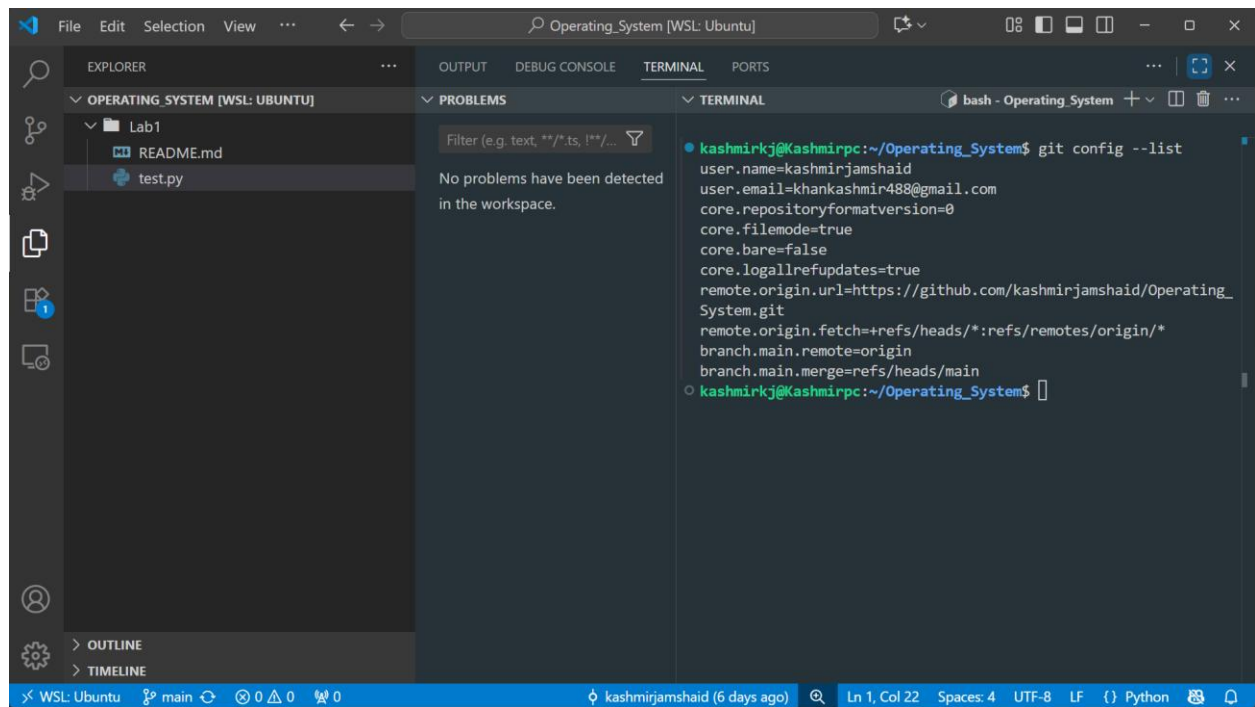
### Setup 1. Configure Git Set your name and email:

`git config --global user.name "Your Name"`

`git config --global user.email "your@email.com"`

### Show your config:

`git config --list`



## 2. Generate SSH Keys

**Run:**

```
ssh-keygen -t ed25519
```

### Copy the public key:

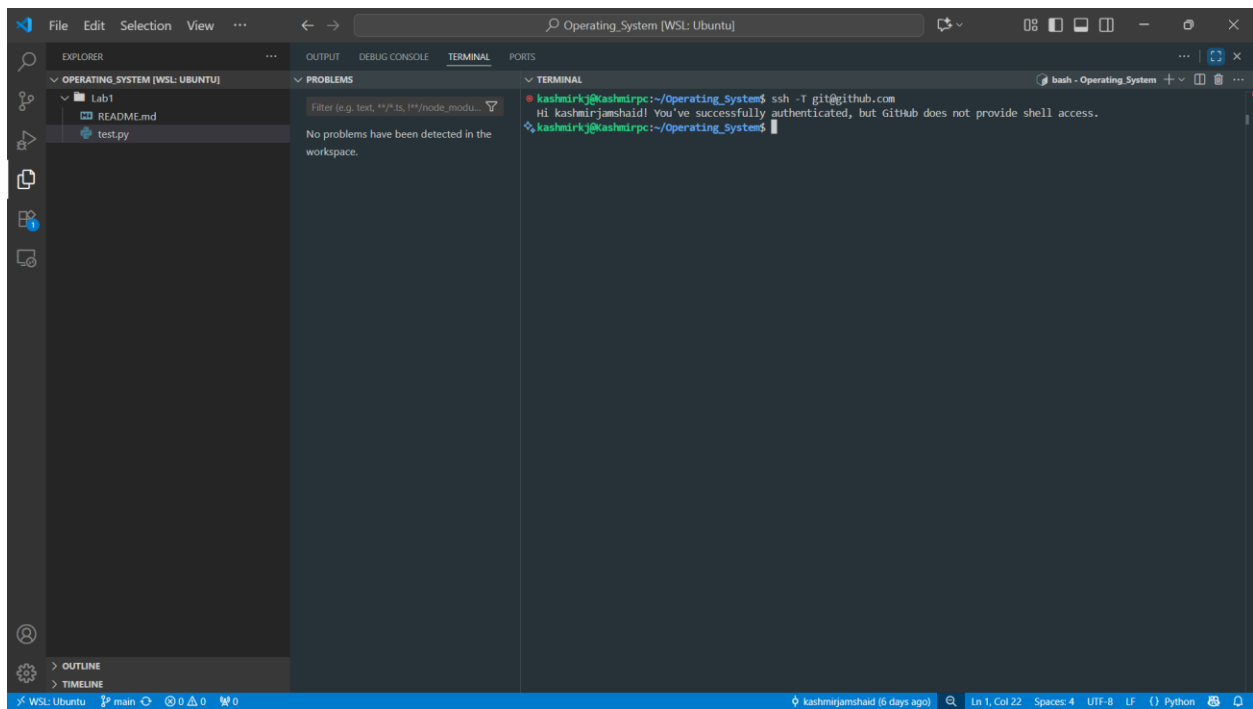
```
cat ~/.ssh/id_ed25519.pub
```

**Add this key to your GitHub account under**

## Settings → SSH and GPG keys

### 3. Test Connection

**ssh-T git@github.com**



## Part C:

### C Programming Environment & Practice

#### Step 1: Install Build Tools

Before writing C programs, install the build-essential package which contains gcc , g++ , and other tools required for compiling.

Run:

```
sudo apt install build-essential
```

```
kashmirkj@Kashmirpc: ~$ sudo apt update && sudo apt upgrade -y
[sudo] password for kashmirkj:
Get:1 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease
Get:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:4 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [1143 kB]
Get:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:6 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1415 kB]
Get:7 http://archive.ubuntu.com/ubuntu noble-updates/main Translation-en [278 kB]
Get:8 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [175 kB]
Get:9 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [1489 kB]
Get:10 http://archive.ubuntu.com/ubuntu noble-updates/universe Translation-en [299 kB]
Get:11 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [21.6 kB]
Get:12 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata [5794 B]
Get:13 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [880 kB]
Get:14 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [377 kB]
Get:15 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:16 http://archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940 B]
Get:17 http://archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [7976 B]
Get:18 http://archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [19.2 kB]
Get:19 http://archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [216 B]
Get:20 http://archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 Components [212 B]
Get:21 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [105 kB]
Get:22 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [52.3 kB]
Get:23 http://security.ubuntu.com/ubuntu noble-security/universe amd64 c-n-f Metadata [18.0 kB]
Get:24 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Components [212 B]
Get:25 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 c-n-f Metadata [520 B]
Get:26 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [212 B]
Get:27 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 c-n-f Metadata [384 B]
Fetched 6755 kB in 42s (160 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
2 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following package was automatically installed and is no longer required:
  liblvm2
Use 'sudo apt autoremove' to remove it.
The following packages will be upgraded:
  landscape-client landscape-common
2 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Need to get 218 kB of archives.
After this operation, 1824 B of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 landscape-client amd64 24.02-0ubuntu5.6 [124 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 landscape-common amd64 24.02-0ubuntu5.6 [93.2 kB]
Fetched 218 kB in 15s (14.7 kB/s)
Preconfiguring packages ...
(Reading database ... 4971 files and directories currently installed.)
Preparing to unpack .../landscape-client_24.02-0ubuntu5.6_amd64.deb ...
Unpacking landscape-client (24.02-0ubuntu5.6) over (24.02-0ubuntu5.3) ...
Preparing to unpack .../landscape-common_24.02-0ubuntu5.6_amd64.deb ...
Unpacking landscape-common (24.02-0ubuntu5.6) over (24.02-0ubuntu5.3) ...
Setting up landscape-common (24.02-0ubuntu5.6) ...
Setting up landscape-client (24.02-0ubuntu5.6) ...
Processing triggers for man-db (2.12.0-4build2) ...
kashmirkj@Kashmirpc: ~$ sudo apt install build-essential -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
```

Verify installation by checking the version of gcc :

## gcc -version

```
kashmirkj@Kashmirpc: ~$ gcc -v
Using built-in specs.
COLLECT_GCC=gcc
COLLECT_LTO_WRAPPER=/usr/libexec/gcc/x86_64-linux-gnu/13/lto-wrapper
OFFLOAD_TARGET_NAMES=nvptx-none:amdgcn-amdhsa
OFFLOAD_TARGET_DEFAULT=1
Target: x86_64-linux-gnu
Configured with: ../src/configure -v --with-pkgversion='Ubuntu 13.3.0-6ubuntu2~24.04' --with-bugurl=file:///usr/share/doc/gcc-13/README.Bugs --enable-languages=c,ada,c++,go,d,fortran,objc,obj-c++,m2 --prefix=/usr --with-gcc-major-version-only --program-suffix=-13 --program-prefix=x86_64-linux-gnu- --enable-shared --enable-linker-build-id --libexecdir=/usr/libexec --without-included-gettext --enable-threads=posix --libdir=/usr/lib --enable-nls --enable-bootstrap --enable-clocale=gnu --enable-libstdcxx-debug --enable-libstdcxx-time=yes --with-default-libstdcxx-abi=new --enable-libstdcxx-backtrace --enable-gnu-unique-object --disable-vtable-verify --enable-plugin --enable-default-pie --with-system-zlib --enable-libphobos-checking=release --with-target-system-zlib=auto --enable-objc-gc=auto --enable-multithread --disable-werror --enable-cet --with-arch=32=i686 --with-abi=m64 --with-multilib-list=m32,m64,mx32 --enable-multilib --with-tune=generic --enable-offload-targets=nvptx-none=/build/gcc-13-fg75Ri/gcc-13-13.3.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-13-fg75Ri/gcc-13-13.3.0/debian/tmp-gcn/usr --enable-offload-defaulted --without-cuda-driver --enable-checking=release --build=x86_64-linux-gnu --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-build-config=bootstrap-lto-lean --enable-link-serialization=2
Thread model: posix
Supported LTO compression algorithms: zlib zstd
gcc version 13.3.0 (Ubuntu 13.3.0-6ubuntu2~24.04)
kashmirkj@Kashmirpc: ~$
```

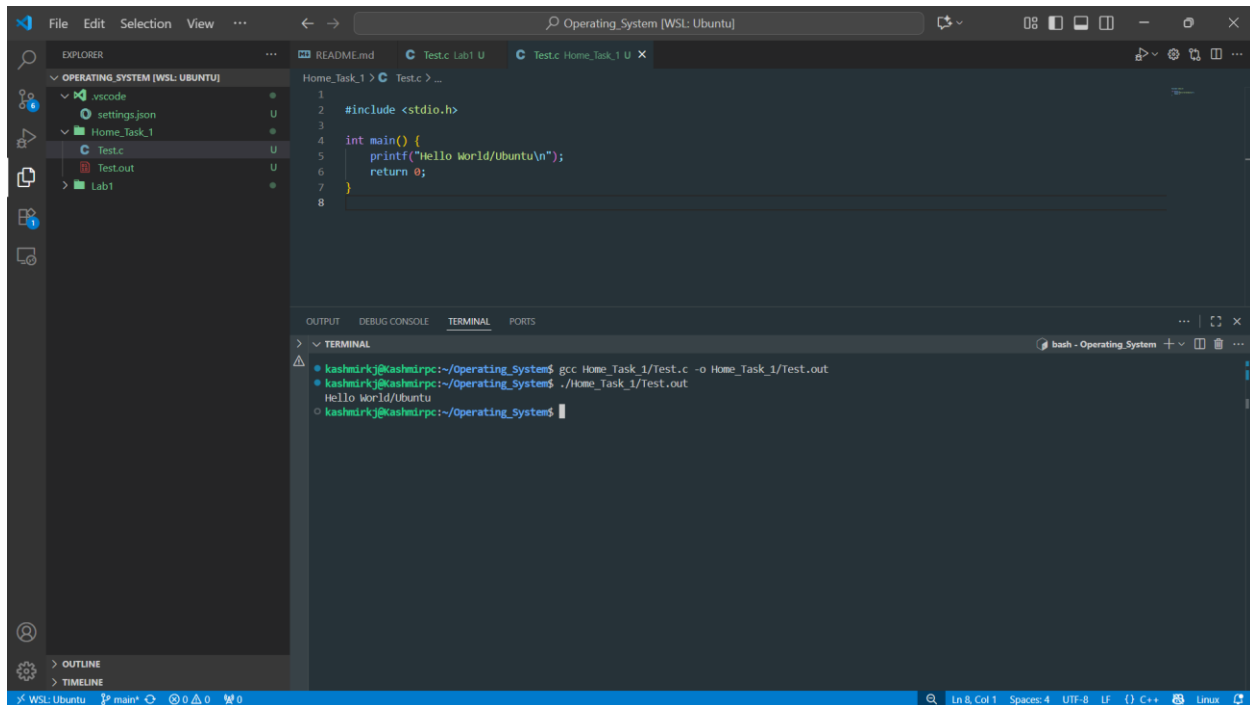
## Step 2:

### How to run a C Program

- First write a C program in a file with **.c** extension
- Compile the file using: **gcc filename.c -o filename.out**
- Execute it using: **./filename.out**

## Step 3:

**Write a C Program** Write a simple C program of your choice. It can be a Hello World program or any other.



The screenshot shows the Visual Studio Code interface with a project named 'Operating\_System' open in WSL (Ubuntu). The Explorer panel on the left shows the file structure: 'vscode', 'settings.json', 'Home\_task\_1', 'Test.c', 'Test.out', and 'Lab1'. The main editor displays the contents of 'Test.c', which is a simple C program that prints 'Hello World/Ubuntu\n'. The terminal at the bottom shows the execution of the program:

```
kashmirkj@kashmirpc:~/Operating_System$ gcc Home_Task_1/Test.c -o Home_Task_1/Test.out
kashmirkj@kashmirpc:~/Operating_System$ ./Home_Task_1/Test.out
Hello World/Ubuntu
kashmirkj@kashmirpc:~/Operating_System$
```