Lab 7

Name : Inshal Nasir

Section : A

Roll No: 38

Task 1 :

```
Alli@DESKTOP-KQE4P80 MINGW64 ~ (main)
$ printenv
ProgramFiles(x86)=C:\Program Files (x86)
!::=::\
CommonProgramFiles(x86)=C:\Program Files (x86)\Common Files
PyCharm Community Edition=C:\Program Files\JetBrains\PyCharm Community Edition
024.2.4\bin;
SHELL=/usr/bin/bash
NUMBER_OF_PROCESSORS=8
FPS_BROWSER_USER_PROFILE_STRING=Default
PROCESSOR_LEVEL=6
TERM_PROGRAM_VERSION=3.8.1
MINGW_PREFIX=/mingw64
PKG_CONFIG_PATH=/mingw64/lib/pkgconfig:/mingw64/share/pkgconfig
USERDOMAIN_ROAMINGPROFILE=DESKTOP-KQE4P80
HOSTNAME=DESKTOP-KQE4P80
PROGRAMFILES=C:\Program Files
MSYSTEM=MINGW64
PATHEXT=.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC
ORIGINAL_TEMP=/tmp
MINGW_CHOST=x86_64-w64-mingw32
```

```
Alli@DESKTOP-KQE4P80 MINGW64 ~ (main)
$ printenv | grep SHELL
SHELL=/usr/bin/bash

Alli@DESKTOP-KQE4P80 MINGW64 ~ (main)
$ printenv | grep Home

Alli@DESKTOP-KQE4P80 MINGW64 ~ (main)
$ printenv | grep USER
FPS_BROWSER_USER_PROFILE_STRING=Default
USERDOMAIN_ROAMINGPROFILE=DESKTOP-KQE4P80
USERDOMAIN=DESKTOP-KQE4P80
USERPROFILE=C:\Users\Alli
ALLUSERSPROFILE=C:\ProgramData
USERNAME=Alli
```

Task 2:

```
Alli@DESKTOP-KQE4P80 MINGW64 ~ (main)
$ export DB_URL="postgres://db.example.local:5432/mydb"
export DB_USER="labuser"
export DB_PASSWORD="labpass123"

Alli@DESKTOP-KQE4P80 MINGW64 ~ (main)
$ echo "$DB_URL"
echo "$DB_USER"
echo "$DB_PASSWORD"
postgres://db.example.local:5432/mydb
labuser
labpass123

Alli@DESKTOP-KQE4P80 MINGW64 ~ (main)
$ ^[[200~printenv | grep '^DB_'~
bash: $'\E[200~printenv': command not found

Alli@DESKTOP-KQE4P80 MINGW64 ~ (main)
$ printenv | grep '^DB_'
DB_PASSWORD=labpass123
DB_USER=labuser
DB_URL=postgres://db.example.local:5432/mydb
```

Task 3:

```
Alli@DESKTOP-KQE4P80 MINGW64 ~ (main)
$ vim ~/.bashrc
# add at the end:
# Lab 7 persistent DB variables
export DB_URL="postgres://db.example.local:5432/mydb"
export DB_USER="labuser"
export DB_PASSWORD="labpass123"

Alli@DESKTOP-KQE4P80 MINGW64 ~ (main)
$ source ~/.bashrc
echo "$DB_URL"
echo "$DB_USER"
echo "$DB_PASSWORD"
printenv | grep '^DB_'
bash: /c/Users/Alli/.bashrc: No such file or directory
postgres://db.example.local:5432/mydb
labuser
labpass123
DB_PASSWORD=labpass123
DB_USER=labuser
DB_URL=postgres://db.example.local:5432/mydb

Alli@DESKTOP-KQE4P80 MINGW64 ~ (main)
$ echo "$DB_URL"
printenv | grep '^DB_'
postgres://db.example.local:5432/mydb
DB_PASSWORD=labpass123
DB_USER=labuser
DB_URL=postgres://db.example.local:5432/mydb

Alli@DESKTOP-KQE4P80 MINGW64   (main)
```

Task 4:

```
PATH="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin"
```

```
najra@ubuntu-lab:~$ echo $PATH
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin
```

```
PATH="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin"
Class="CC-5A"
```

```
najra@ubuntu-lab:~$ sudo cat /etc/environment
PATH="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin"
Class="CC-5A"
```

-

```
> #!/bin/bash
> echo "Welcome to Cloud Computing $USER"
> EOF
```

```
PATH=$PATH:~

-- INSERT --
```

Task 5

```
Command may disrupt existing ssh connections. Proceed with operation (y|n)? y
Firewall is active and enabled on system startup

Status: active
Logging: on (low)
Default: deny (incoming), allow (outgoing), deny (routed)
New profiles: skip
```

```
Rule added
Rule added (v6)
```

```
logout
Connection to 192.168.161.129 closed.
PS C:\Users\HP> ssh hajra@192.168.161.129
ssh: connect to host 192.168.161.129 port 22: Connection timed out
PS C:\Users\HP>
```

```
The list of available updates is more than a week old.
To check for new updates run: sudo apt update

hajra@ubuntu-lab:~$ sudo ufw allow 22/tcp
[sudo] password for hajra:
Rule updated
Rule updated (v6)
hajra@ubuntu-lab:~$ sudo ufw reload
Firewall reloaded
hajra@ubuntu-lab:~$ sudo ufw status
Status: active

To                         Action      From
--                         ------      ----
22/tcp                     ALLOW       Anywhere
Anywhere on vxlan.calico   ALLOW       Anywhere
Anywhere on cali+          ALLOW       Anywhere
22/tcp (v6)                ALLOW       Anywhere (v6)
Anywhere (v6) on vxlan.calico ALLOW      Anywhere (v6)
Anywhere (v6) on cali+     ALLOW       Anywhere (v6)

Anywhere                   ALLOW OUT   Anywhere on vxlan.calico
Anywhere                   ALLOW OUT   Anywhere on cali+
Anywhere (v6)              ALLOW OUT   Anywhere (v6) on vxlan.calico
Anywhere (v6)              ALLOW OUT   Anywhere (v6) on cali+
```

```
PS C:\Users\HP> ssh hajra@192.168.161.129
hajra@192.168.161.129's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-86-generic x86_64)

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

 System information as of Sat 15 Nov 14:01:30 UTC 2025

  System load:  1.31               Processes:             318
  Usage of /:   47.2% of 37.29GB   Users logged in:       1
  Memory usage: 57%                IPv4 address for ens33: 192.168.161.129
  Swap usage:   11%

 * Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
   just raised the bar for easy, resilient and secure K8s cluster deployment.

   https://ubuntu.com/engage/secure-kubernetes-at-the-edge

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

12 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

Last login: Sat Nov 15 08:51:04 2025 from 192.168.161.1
hajra@ubuntu-lab:~$
```

Task 6 :

```
Windows PowerShell
PS C:\Users\HP> ssh-keygen -t ed25519 -f $env:USERPROFILE\.ssh\id_lab7 -C "lab_key"
Generating public/private ed25519 key pair.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in C:\Users\HP\.ssh\id_lab7
Your public key has been saved in C:\Users\HP\.ssh\id_lab7.pub
The key fingerprint is:
SHA256:20HGs0xunlxoghY1dp+HkkmkoBTJc+6lLnWuHhwfwGo lab_key
The key's randomart image is:
+--[ED25519 256]--+
|    .oo. +.+     |
|    .+o.+ * + o  |
|    .++ . X + .  |
|    ..+.+ = .    |
|     E.+oS O .   |
|    . o+o.X +    |
|     oooo =      |
|     . ...       |
|      oo.        |
+----[SHA256]-----+
PS C:\Users\HP> ls $env:USERPROFILE\.ssh

    Directory: C:\Users\HP\.ssh

Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----        10/3/2025  11:59 AM            419 id_ed25519
-a----        10/3/2025  11:59 AM            110 id_ed25519.pub
-a----       11/15/2025   7:26 PM            444 id_lab7
-a----       11/15/2025   7:26 PM             90 id_lab7.pub
-a----        10/3/2025  12:09 PM           1671 known_hosts
-a----        10/3/2025  12:09 PM            938 known_hosts.old
```

```
PS C:\Users\HP> type $env:USERPROFILE\.ssh\id_lab7.pub
ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIK13ZoDhdGeMrOlZCEFIyBfO3NL649vzb6VEmALOOrMk lab_key
PS C:\Users\HP> Clear-Content $env:USERPROFILE\.ssh\known_hosts
PS C:\Users\HP> type $env:USERPROFILE\.ssh\known_hosts
PS C:\Users\HP>
```

```
PS C:\Users\HP> ssh hajra@192.168.161.129
The authenticity of host '192.168.161.129 (192.168.161.129)' can't be established.
ED25519 key fingerprint is SHA256:M5unwK7+jxUhr6KM3bbMPRkghlGd+Kq5uspTQZ5Up3w.
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 '192.168.161.129' (ED25519) to the list of known hosts.
hajra@192.168.161.129's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-86-generic x86_64)

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

 System information as of Sat 15 Nov 14:36:17 UTC 2025

  System load:  0.76              Processes:            286
  Usage of /:   47.2% of 37.29GB  Users logged in:      1
  Memory usage: 59%               IPv4 address for ens33: 192.168.161.129
  Swap usage:   13%

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   just raised the bar for easy, resilient and secure K8s cluster deployment.

   https://ubuntu.com/engage/secure-kubernetes-at-the-edge

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

12 additional security updates can be applied with ESM Apps.
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The list of available updates is more than a week old.
To check for new updates run: sudo apt update

Last login: Sat Nov 15 14:01:31 2025 from 192.168.161.1
hajra@ubuntu-lab:~$
```

```
PS C:\Users\HP> type $env:USERPROFILE\.ssh\known_hosts
192.168.161.129 ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIJYzutLZ5SAda15lBAnuaNwjKxRH0t/szJgPZbp66H0e
192.168.161.129 ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQDKGDfKL7zKStt5Vhetm6+rdFl7VjYLSvNSuAdRuXaBAMRQAqGOWupuCLANosORLWDYFavfjKCNdbjiElDYq2ZDepKkAp1z3/kB4BmsiXCPeVNR6y13cVXjlzKTrHRYXr1aoJo7j
GxBvdiY2kBmiR/fkFr7thLEyX1C9RCuCezzfxCgzQ6YPQEos0aPD4doCmoWixfdRtsi3w/Bq5O5XbCquoP7+nGja/8GGnGOsf93yjkQb2X3JN3lLIasDWsf5DwiLBCr04WElOtg7zmtDfrqtzuWvMC7xF/eG+xF5XxGZDAMHLeJcxln4AIPvtKk+V6jkT
C0YcMPxipaepgASarXMcFzIWIFjK5xnd7su/KHYL4fopfRlsTZiEfmwo8KRDJ8lX9U87pYRBRjgkxtIZYAS2I2gqDlIlwQOcHzoxUtvUPaxiVkPVrxraozR3AOOrU6GLXIt98GlJ1Ub188jHDbcicyNEHk/lpGphpllIKGnnc9ovGwd3vrmKPLIxsGigk
─
192.168.161.129 ecdsa-sha2-nistp256 AAAAE2VjZHNhLXNoYTItbmlzdHAyNTYAAAAIbmlzdHAyNTYAAABBBKTbWQIon63g9RHFo0nSZM+chmx0hfn9awISr1dfj7pS/i+PllJZgG0KO7NDp+in28qmIg30Lwdh7uwg4ED0XLE=
PS C:\Users\HP>
```

```
mkdir -p ~/.ssh
chmod 700 ~/.ssh
> ~/.ssh/authorized_keys
```

```
$ echo "ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIK13ZoDhdGeMrOlZCEFIyBfO3NL649vzb6VEmALOOrMk lab_key" >> ~/.ssh/authorized_keys
$ chmod 600 ~/.ssh/authorized_keys
$ cat ~/.ssh/authorized_keys

NzaC1lZDI1NTE5AAAAIK13ZoDhdGeMrOlZCEFIyBfO3NL649vzb6VEmALOOrMk lab_key
```

```
PS C:\Users\HP> ssh -i $env:USERPROFILE\.ssh\id_lab7 hajra@192.168.161.129
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-86-generic x86_64)

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

 System information as of Sat 15 Nov 15:31:13 UTC 2025

  System load:  0.72              Processes:            290
  Usage of /:   47.2% of 37.29GB  Users logged in:      1
  Memory usage: 61%               IPv4 address for ens33: 192.168.161.129
  Swap usage:   12%

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   https://ubuntu.com/engage/secure-kubernetes-at-the-edge

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

12 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm


The list of available updates is more than a week old.
To check for new updates run: sudo apt update

Last login: Sat Nov 15 15:25:21 2025 from 192.168.161.1
hajra@ubuntu-lab:~$
```

Exam Evaluation Questions

Q1

```
Alli@DESKTOP-KQE4P80 MINGW64 ~ (main)
$ printenv
ProgramFiles(x86)=C:\Program Files (x86)
!::=::\
CommonProgramFiles(x86)=C:\Program Files (x86)\Common Files
PyCharm Community Edition=C:\Program Files\JetBrains\PyCharm Community Edition
024.2.4\bin;
SHELL=/usr/bin/bash
NUMBER_OF_PROCESSORS=8
FPS_BROWSER_USER_PROFILE_STRING=Default
PROCESSOR_LEVEL=6
TERM_PROGRAM_VERSION=3.8.1
MINGW_PREFIX=/mingw64
PKG_CONFIG_PATH=/mingw64/lib/pkgconfig:/mingw64/share/pkgconfig
USERDOMAIN_ROAMINGPROFILE=DESKTOP-KQE4P80
HOSTNAME=DESKTOP-KQE4P80
PROGRAMFILES=C:\Program Files
MSYSTEM=MINGW64
PATHEXT=.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC
ORIGINAL_TEMP=/tmp
MINGW_CHOST=x86_64-w64-mingw32
```

Q2

```
$ export STUDENT_NAME="John Doe"
$ export STUDENT_ROLL_NUMBER="12345"
$ export STUDENT_SEMESTER="3"
```

```
STUDENT_NAME=John Doe
STUDENT_SEMESTER=3
STUDENT_ROLL_NUMBER=12345
```

```
STUDENT_NAME=John Doe
STUDENT_SEMESTER=3
STUDENT_ROLL_NUMBER=12345
```

Q3

```
export STUDENT_NAME="John Doe"
export STUDENT_ROLL_NUMBER="12345"
export STUDENT_SEMESTER="3"

-- INSERT --
```

```
ho "$STUDENT_ROLL_NUMBER"
echo "$STUDENT_SEMESTER"
printenv | grep '^STUDENT_'
```

Q4

```
Status: active

To                          Action      From
--                          ------      ----
22/tcp                      ALLOW       Anywhere
Anywhere on vxlan.calico    ALLOW       Anywhere
Anywhere on cali+           ALLOW       Anywhere
22/tcp (v6)                 ALLOW       Anywhere (v6)
Anywhere (v6) on vxlan.calico ALLOW     Anywhere (v6)
Anywhere (v6) on cali+      ALLOW       Anywhere (v6)

Anywhere                    ALLOW OUT   Anywhere on vxlan.calico
Anywhere                    ALLOW OUT   Anywhere on cali+
Anywhere (v6)               ALLOW OUT   Anywhere (v6) on vxlan.calico
Anywhere (v6)               ALLOW OUT   Anywhere (v6) on cali+
```

```
Status: active

     To                          Action      From
     --                          ------      ----
[ 1] 22/tcp                      ALLOW IN    Anywhere
[ 2] Anywhere on vxlan.calico    ALLOW IN    Anywhere
[ 3] Anywhere                    ALLOW OUT   Anywhere on vxlan.calico   (out)
[ 4] Anywhere on cali+           ALLOW IN    Anywhere
[ 5] Anywhere                    ALLOW OUT   Anywhere on cali+          (out)
[ 6] 22/tcp (v6)                 ALLOW IN    Anywhere (v6)
[ 7] Anywhere (v6) on vxlan.calico ALLOW IN  Anywhere (v6)
[ 8] Anywhere (v6)               ALLOW OUT   Anywhere (v6) on vxlan.calico (out)
[ 9] Anywhere (v6) on cali+      ALLOW IN    Anywhere (v6)
[10] Anywhere (v6)               ALLOW OUT   Anywhere (v6) on cali+     (out)
```

```
PS C:\Users\HP> ping 192.168.161.129

Pinging 192.168.161.129 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.161.129:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PS C:\Users\HP>
```

```
PS C:\Users\HP> ping 192.168.161.129

Pinging 192.168.161.129 with 32 bytes of data:
Reply from 192.168.161.129: bytes=32 time<1ms TTL=64
Reply from 192.168.161.129: bytes=32 time<1ms TTL=64
Reply from 192.168.161.129: bytes=32 time=1ms TTL=64
Reply from 192.168.161.129: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.161.129:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
PS C:\Users\HP>
```