CLOUD COMPUTING LAB

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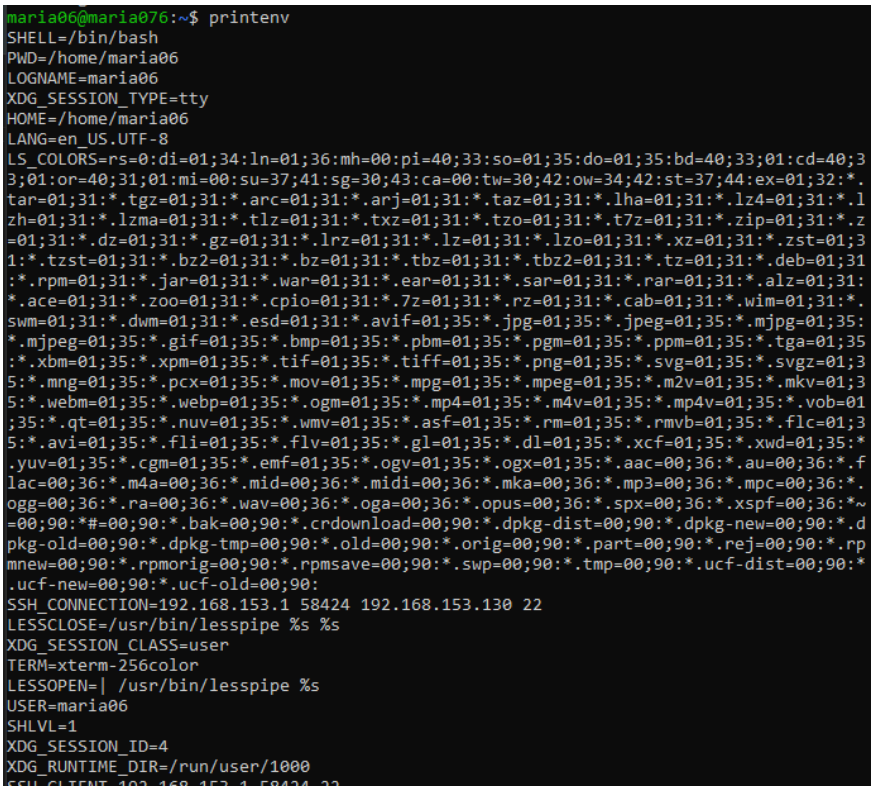
LAB #07

TASK 1 — Print & filter environment variables

task1_printenv_all.png



task1_grep_shell_home_user.png

```
maria06@maria076:~$ printenv | grep SHELL
intenv |SHELL=/bin/bash
maria06@maria076:~$ printenv | grep HOME
HOME=/home/maria06
maria06@maria076:~$ printenv | grep USER
USER=maria06
maria06@maria076:~$
```

TASK 2 — Export DB_* variables temporarily and observe scope

task2_exports_all.png

```
maria06@maria076:~$ export DB_URL="postgres://db.example.local:5432/mydb"
maria06@maria076:~$ export DB_USER="labuser"
maria06@maria076:~$ export DB_PASSWORD="labpass123"
```

task2_echoes_all.png

```
maria06@maria076:~$ echo "$DB_URL"
postgres://db.example.local:5432/mydb
$DB_maria06@maria076:~$ echo "$DB_USER"
labuser
maria06@maria076:~$ echo "$DB_PASSWORD"
labpass123
```

task2_printenv_grep_db.png

```
maria06@maria076:~$ printenv | grep '^DB_'
DB_PASSWORD=labpass123
DB_USER=labuser
DB_URL=postgres://db.example.local:5432/mydb
maria06@maria076:~$
```

task2_after_restart_checks.png

```
maria06@maria076:~$ echo "$DB_URL"

maria06@maria076:~$ printenv | grep '^DB_'
maria06@maria076:~$
```

TASK 3 — Make DB_* variables persistent in

task3_bashrc_added.png

```
maria06@maria076: ~
# ~/.bashrc: executed by bash(1) for non-login shells.
# (then in vim: go to end and add:)
 # Lab 7 persistent DB variables
 export DB_URL="postgres://db.example.local:5432/mydb"
 export DB_USER="labuser"
 export DB_PASSWORD="labpass123"
 # save and exit
```

task3_source_and_verification.png

```
maria06@maria076:~$ source ~/.bashrc
"
echo "$DB_PASSWORD"
printenv | grep 'maria06@maria076:~$ echo "$DB_URL"
postgres://db.example.local:5432/mydb
maria06@maria076:~$ echo "$DB_USER"
labuser
maria06@maria076:~$ echo "$DB_PASSWORD"
labpass123
maria06@maria076:~$ printenv | grep '^DB_'
DB_PASSWORD=labpass123
DB_USER=labuser
DB_URL=postgres://db.example.local:5432/mydb
maria06@maria076:~$
```

task3_after_restart_persistent.png

```
maria06@maria076:~$ echo "$DB_URL"
postgres://db.example.local:5432/mydb
maria06@maria076:~$ printenv | grep '^DB_'
DB_PASSWORD=labpass123
DB_USER=labuser
DB_URL=postgres://db.example.local:5432/mydb
```

TASK 4 — System-wide environment variable, welcome script, and PATH

task4_etc_environment_before.png

```
maria06@maria076:~$ sudo cat /etc/environment
[sudo] password for maria06:
PATH="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/lo
cal/games:/snap/bin"
maria06@maria076:~$
```

task4_echo_path_before.png

```
maria06@maria076:~$ echo "$PATH"
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/ga
mes:/snap/bin
maria06@maria076:~$
```

task4_etc_environment_after.png

```
maria06@maria076:~$ sudo cat /etc/environment
ggTH="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/lo
cal/games:/snap/bin"# add line:
# Class="CC-<your_class_name>"
```

task4_etc_environment_after.png

```
maria06@maria076:~$ echo $Class

maria06@maria076:~$ echo "$PATH"
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/ga
mes:/snap/bin
maria06@maria076:~$
```

task4_welcome_create_and_chmod.png

```
maria06@maria076:~$ cat > ~/welcome <<'EOF'
> #!/bin/bash
> echo "Welcome to Cloud Computing $USER"
> EOF
maria06@maria076:~$
maria06@maria076:~$ chmod +x ~/welcome
maria06@maria076:~$ ls -l ~/welcome
-rwxrwxr-x 1 maria06 maria06 52 Nov  9 19:27 /home/maria06/welcome
maria06@maria076:~$
```

task4_welcome_run_dot.png

```
maria06@maria076:~$ cd ~
maria06@maria076:~$ ./welcome
Welcome to Cloud Computing maria06
maria06@maria076:~$
```

task4_bashrc_source_and_welcome.png

```
maria06@maria076:~$ cd ~
maria06@maria076:~$ welcome
```

TASK 5 — Block and allow SSH using ufw

task5_ufw_enable_and_status.png

```
maria06@maria076:~$ sudo ufw enable
sudo ufw status verbose
Command may disrupt existing ssh connections. Proceed with operation (y|n)? Aborted
maria06@maria076:~$
```

task5_ufw_enable_and_status.png

```
maria06@maria076:~$ sudo ufw deny 22/tcp
sudo ufw status numbered
Rules updated
Rules updated (v6)
maria06@maria076:~$
```

task5_ufw_allow_reload_status.png

```
maria06@maria076:~$ sudo ufw allow 22/tcp
[sudo] password for maria06:
Sorry, try again.
[sudo] password for maria06:
Rules updated
Rules updated (v6)
maria06@maria076:~$ sudo ufw reload
Firewall not enabled (skipping reload)
maria06@maria076:~$ sudo ufw status
Status: inactive
maria06@maria076:~$
```

TASK 6 — Configure SSH key-based login from Windows host

A. On Windows host (client) — group related client actions:

task6_windows_sshkey_and_list.png

```
maria06@maria076:~$ cat ~/.ssh/id_lab7.pub
ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIIb9pzHMS2QPPwgBivIM7swdhoi9UpcVaIqTmlopQIT6 lab_
key
maria06@maria076:~$
```

task6_windows_public_key.png

```
>> ssh-keygen -t ed25519 -f $env:USERPROFILE\.ssh\id_lab7 -C "lab_key"


    Directory: C:\Users\Administrator\.ssh


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----         10/3/2025   7:58 AM            419 id_ed25519
-a----         10/3/2025   7:58 AM            105 id_ed25519.pub
-a----         11/8/2025  11:24 AM           1677 known_hosts
-a----         11/8/2025  11:23 AM            926 known_hosts.old
Generating public/private ed25519 key pair.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in C:\Users\Administrator\.ssh\id_lab7
Your public key has been saved in C:\Users\Administrator\.ssh\id_lab7.pub
The key fingerprint is:
SHA256:S8kiQaNde3F8FaNS1VgibsKACxMp9QjMOLq1EeVwqQ4 lab_key
The key's randomart image is:
+--[ED25519 256]--+
|=.++=oo ..o o=*o |
|++=Xoo + +.ooo.. |
|.oo==.. + +..    |
|E + .. o + .     |
| = o. . S        |
|. o  . o .       |
|       .         |
|                 |
|                 |
+----[SHA256]-----+
```

task6_windows_known_hosts_cleared_and_empty.png

```
C:\Users\Administrator>type %USERPROFILE%\.ssh\id_lab7.pub
ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIDYR/kb11NqjAoIIvh/kY/kDHSEnULpqEqHTrQPpJqJJ lab_key

C:\Users\Administrator>
```

```
C:\Users\Administrator>del %USERPROFILE%\.ssh\known_hosts

C:\Users\Administrator>type %USERPROFILE%\.ssh\known_hosts
```

task6_windows_ssh_accept_hostkey_and_login.png

```
C:\Users\Administrator>ssh maria06@192.168.153.130
The authenticity of host '192.168.153.130 (192.168.153.130)' can't be established.
ED25519 key fingerprint is SHA256:XmKnQT0I0NpXovxnTS7Yt840suUHQqPigCA6Nt9ROcc.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.153.130' (ED25519) to the list of known hosts.
maria06@192.168.153.130's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-87-generic x86_64)

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

 System information as of Tue Nov 11 03:47:59 AM UTC 2025

  System load:  0.08              Processes:             219
  Usage of /:   56.8% of 9.75GB   Users logged in:       1
  Memory usage: 15%               IPv4 address for ens33: 192.168.153.130
  Swap usage:   0%
```

task6_windows_known_hosts_after_connect.png

```
C:\Users\Administrator>type %USERPROFILE%\.ssh\known_hosts
192.168.153.130 ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIFcaq/OdiF/p76y9dVWmwiQh8A1JKHBbmbFmVThK6kG1
192.168.153.130 ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQDfrqZWN0j4a2jOCxF+fqMdVJlW7/z9tI/mW7ZJ9yKrGpgwWCVjekH49P0nnTwIs21A
shInmAuWIKj+sWYrxOTqEcxS9nJHyYGRZXdfDdJDe2bb4iKovO3Ge2bNmlvfXLRC1iNfPNQdv4d8euKUiCCf6RIo6nGg5U/F+HvO04QmWmYo9+RJeio/l6ho
itEwfXc8R4ruX2696BGlVRcULUB90llkYDqXdd1xImJV0/Aa8L3qy22t07/26aOJQ7BEKDVebjC2m4JtR8zlPz9N9Vg4/59wyUCr28P8XNH6CYKbCM1vtNix
iFldh7kqbZ2YwR2yFOTigyu5icChyoIOBcGcNHMTfRPCLZuCUlG03YIWqMDeXtdNxZX3PFSpA32fYEvd0HElApwYOdaVyAcxB4olxE2WEhbNU8OYWIzaOqrM
jxoqsJLaybf9mop/2Rakb20gH2OM6NPoihklyRFQRW9cPHAs4l3EBTyfCNEbAnHtXFN7FcGlD85pDKgpMoVWHsk=
192.168.153.130 ecdsa-sha2-nistp256 AAAAE2VjZHNhLXNoYTItbmlzdHAyNTYAAAAIbmlzdHAyNTYAAABBBNfl5JCJc8GIBLhBPhIxIZZEQwPM6RMo
bJstfqZM1lUF1DXGzhJJBVRWyGy6URZJ1bKzGCaZ6YwOImzVHbaiGSA=
```

B. On Ubuntu server — group related server-side commands:

task6_server_clear_authorized_keys.png

```
maria06@maria076:~$ mkdir -p ~/.ssh
maria06@maria076:~$ chmod 700 ~/.ssh
maria06@maria076:~$ > ~/.ssh/authorized_keys
```

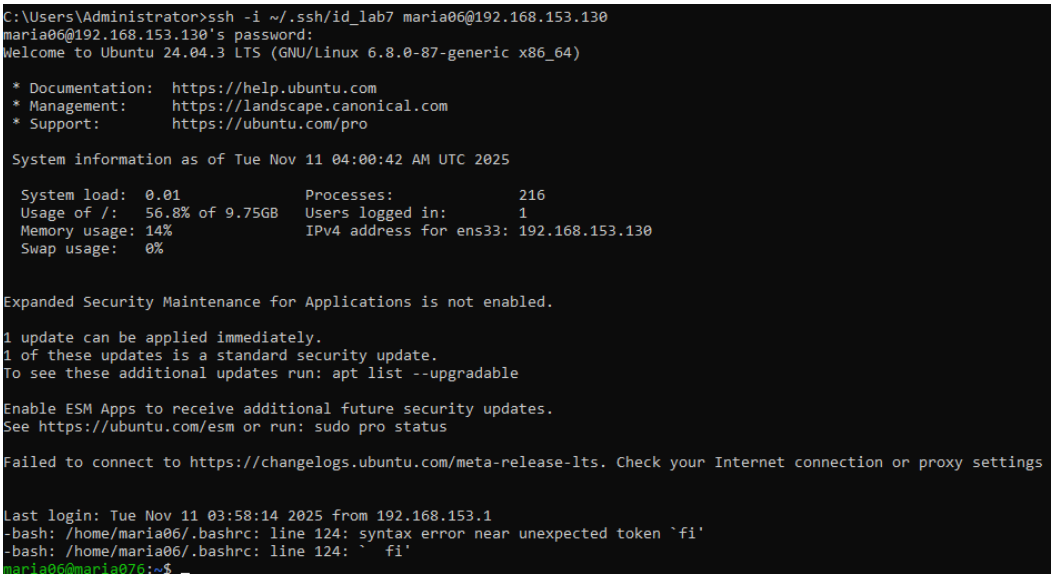
task6_server_add_key_and_show.png

```
maria06@maria076:~$ echo "ssh-ed25519 AAAA... yourpublickey ... comment" >> ~/.s
sh/authorized_keys
maria06@maria076:~$ chmod 600 ~/.ssh/authorized_keys
maria06@maria076:~$ cat ~/.ssh/authorized_keys
ssh-ed25519 AAAA... yourpublickey ... comment
maria06@maria076:~$
```

task6_ssh_passwordless_login.png

```
C:\Users\Administrator>ssh maria06@192.168.153.130
maria06@192.168.153.130's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-87-generic x86_64)

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

 System information as of Tue Nov 11 03:58:13 AM UTC 2025

  System load:  0.02              Processes:              214
  Usage of /:   56.8% of 9.75GB   Users logged in:        1
  Memory usage: 14%               IPv4 address for ens33: 192.168.153.1
  Swap usage:   0%


Expanded Security Maintenance for Applications is not enabled.

1 update can be applied immediately.
1 of these updates is a standard security update.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status
```

task6_ssh_with_identity_file.png


C:\Users\Administrator>ssh -i ~/.ssh/id_lab7 maria06@192.168.153.130
maria06@192.168.153.130's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-87-generic x86_64)
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/pro
System information as of Tue Nov 11 04:00:42 AM UTC 2025
System load: 0.01
Usage of /: 56.8% of 9.75GB
Memory usage: 14%
Swap usage: 0%
Processes: 216
Users logged in: 1
IPv4 address for ens33: 192.168.153.130
Expanded Security Maintenance for Applications is not enabled.
1 update can be applied immediately.
1 of these updates is a standard security update.
To see these additional updates run: apt list --upgradable
Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status
Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet connection or proxy settings
Last login: Tue Nov 11 03:58:14 2025 from 192.168.153.1
-bash: /home/maria06/.bashrc: line 124: syntax error near unexpected token `fi'
-bash: /home/maria06/.bashrc: line 124: ` fi'
maria06@maria076:~$