ANNEX A · PRACTICAL 2.2 — YOUR FIRST VIRTUAL MACHINE

Name: _____ **Date:** _____ **PC:** _____

You build a computer inside your computer and measure it from inside and from outside. Write your results here: you need them for the report.

TASK 1 Create the virtual machine

Server: _____ User: _____

1. Terminal on your PC (**Ctrl + Alt + T**), once:
   ```
   mkdir -p ~/.ssh && printf 'Host *\n  ControlMaster auto\n  ControlPath ~/.ssh/cm-%%C\n  ControlPersist 10m\n' >> ~/.ssh/config
   ```
   (one ssh connection for all the VM's windows: one password).
2. Open **Virtual Machine Manager**. `File` → `Add Connection` → Hypervisor: `Custom URI...` → type `qemu+ssh://<user>@<server>/session` → `Connect`. Type your password and wait up to a minute. Select the new connection in the list.
3. `File` → `New Virtual Machine`. `Connection` must show the server. Choose `Local install media (ISO image or CDROM)` → `Forward`.
4. Type `/srv/isos/debian-live-13.7.0-amd64-gnome.iso` in the box (do **not** use `Browse Local`: the ISO is on the server) → `Forward`.
5. Memory: `4096`. CPUs: `2` → `Forward`.
6. `Create a disk image for the virtual machine`: `10` GiB → `Forward`.
7. Name: `live-test`. Network selection: `Bridge device...`, Device name: `virbr0` → `Finish`.

DONE WHEN a new window opens and shows the Debian boot menu.

TASK 2 Boot the live system

Click inside the window, choose `Live system (amd64)` and press Enter. To get your mouse back at any time: **Ctrl + Alt**.

DONE WHEN you see a desktop. Press the **Super** key (the one with the logo), type `terminal`, press Enter.

TASK 3 Inside the guest: what does it believe?

Type each command in the guest's terminal, press Enter, and write the answer.

Command	It answers the question	Guest says
`nproc`	How many CPUs?	
`free -h`	How much RAM? (line `Mem:`, column `total`)	
`lsblk`	Which disk has 10G? Write its name.	
`ip -br a`	My address (the line that is not `lo`)	
`systemd-detect-virt`	Am I virtual? On what?	
`ping -c 3 debian.org`	Internet? Write the % packet loss.	

DONE WHEN all six cells are filled and the ping shows `0% packet loss`.

TASK 4 On the host: the truth

Today the host is the **class server**, not your PC. Open a terminal on your PC (**Ctrl + Alt + T**) and log in to the server: `ssh <user>@<server>` (same password). Run the same commands and fill the table. For the last row run: `virsh -c qemu:///session vol-info --pool default live-test.qcow2`. Type `exit` when you finish.

	Guest (copy from Task 3)	Host
`nproc`		
`free -h` total		
`ip -br a` address		
Disk	10 G	Capacity: Allocation:

DONE WHEN you can say which number is bigger in each row, and you found the line `virbr0` in the server's `ip -br a`.

TASK 5 Change the hardware

1. In the guest, open Text Editor, write your name, save it in Documents.
2. `Virtual Machine` → `Shut Down` → `Shut Down`. Still running after 30 s? `Shut Down` → `Force Off`.
3. `View` → `Details`. Put back the ejected ISO: `SATA CDROM 1` → Source path `/srv/isos/debian-live-13.7.0-amd64-gnome.iso` → `Apply`. `Boot Options`: tick `SATA CDROM 1`, move it to the top → `Apply`.
4. `Memory`: `2048` → `Apply`. `CPUs`: `1` → `Apply`.
5. `View` → `Console`, press ▸, boot the live system again, open the terminal.

`nproc` now says: _____ `free -h` total now says: _____ Is your file still in Documents? _____

DONE WHEN the two numbers changed. Then shut the VM down again. **Do not delete it**: we use it on Friday.

TASK 6 Report

Report template from 23/10, saved as `practical-2.2-surname.md`: the VM's specification, the two tables above, and your answers, in your own words:

1. What is the ISO file for?
2. The guest sees a 10 GB disk. Why does the file take so little space on the host?
3. Why did your file disappear after the restart?

Hand in: the `.md` file on Google Classroom before Friday 30/10, 11:15. **Marks (10):** VM with the right specification 3 · guest values 2 · host values and comparison 2 · hardware change 1 · answers and template 2.

EXIT TICKET

Alone, no notes. Tick one answer.

1. In the wizard, the ISO file plays the role of…

- ☐ a) the VM's hard disk
- ☐ b) the installation DVD or USB stick
- ☐ c) the VM's RAM
- ☐ d) the network cable

2. You create a 10 GiB qcow2 disk and install nothing. On the host the file takes…

- ☐ a) exactly 10 GiB
- ☐ b) 5 GiB: half is reserved
- ☐ c) a couple of MiB; it grows as the guest writes
- ☐ d) nothing: it only exists in RAM

3. With the NAT network (`virbr0`), the guest's address `192.168.122.x` comes from…

- ☐ a) a virtual router inside the host
- ☐ b) the school's router
- ☐ c) the guest's ISO file
- ☐ d) the internet provider

4. You saved a file in the live system, restarted, and it is gone. Why?

- ☐ a) The qcow2 disk was full
- ☐ b) NAT blocked it
- ☐ c) The ISO deleted it for safety
- ☐ d) The live system runs in RAM; nothing was installed on the disk

5. You want the VM to have 2 CPUs instead of 1. What do you do?

- ☐ a) Run `nproc 2` in the guest
- ☐ b) Shut it down, change it in Details, start it
- ☐ c) Buy a second CPU for the host
- ☐ d) Download a bigger ISO