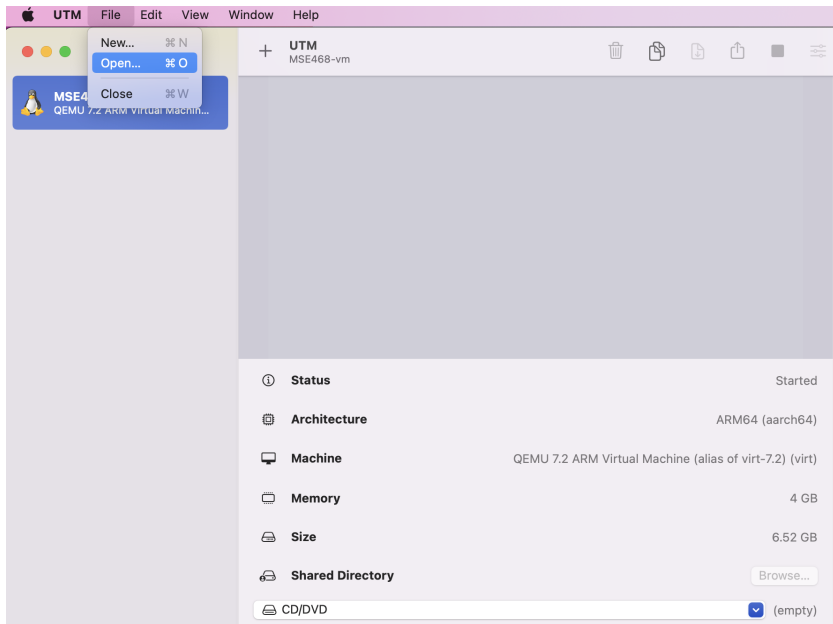# Virtual Machine (Macbook M chip) Installation Guide

NOTE! DURING THIS PROCEDURE, YOU WILL NEED TO HAVE ABOUT 20GB OF FREE DISK SPACE. MAKE SURE THIS IS THE CASE BEFORE STARTING.
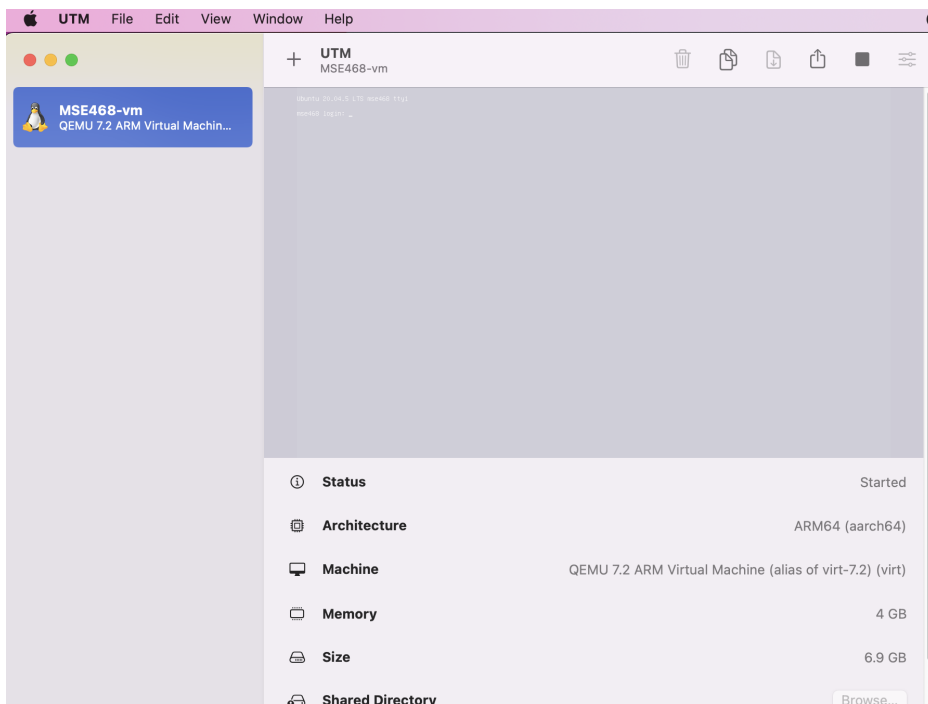
ALSO: PLEASE TEST THE INSTALLATION AND REPORT YOUR RESULTS (DEADLINE IS INDICATED ON MOODLE)

Note: if you have an earlier Mac that does NOT have an M chip, you should use the other instruction file (using VirtualBox).

1. Install UTM (if not installed). Download and install UTM — you can get either a free version from https://docs.getutm.app/installation/macos/ (use the "Download from GitHub" button), or (optionally) pay a small amount for it to get updates and to its support development

2. Download `MSE468-Spring2025_2.utm.zip` to a folder of your local machine from: https://drive.google.com/file/d/18kyYUycR7O1GQXmXHsiDqhAC5vRR1Tek/view?usp=sharing

3. Unarchive it to get the image with the suffix .utm. Move this file to a permanent location on your system, **since once you start running the virtual machine (VM) you can no longer move it**. You can delete the `.zip` file after expanding it to clear up some space on your disk.

4. Launch UTM.

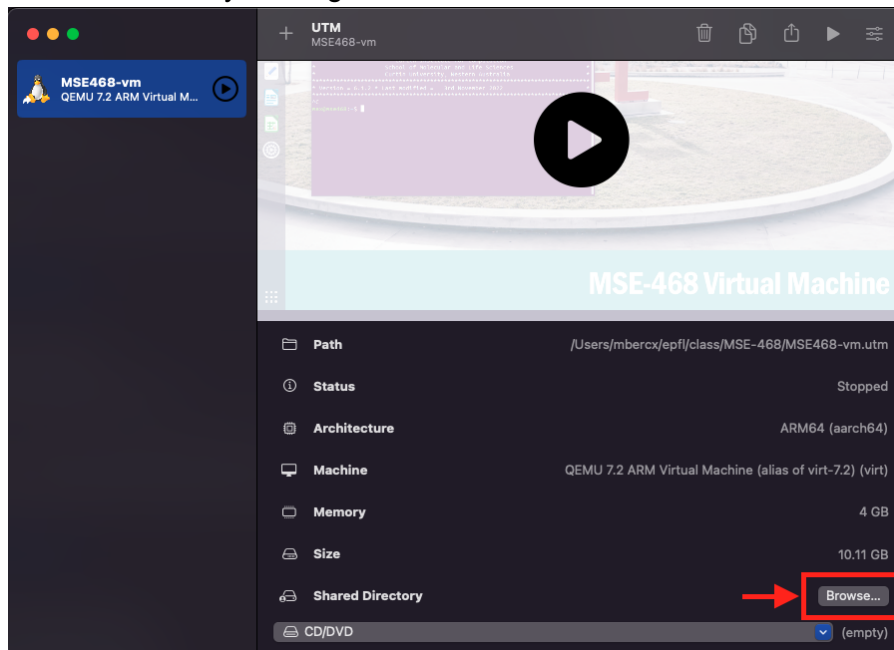5. Choose from the menu the option "File > Open".

6. Navigate to the path where you unarchived the `MSE468-vmM1.utm` image, and select it. Click open. **IMPORTANT**: **do not move or delete the .utm image after opening it!** UTM relies on the path of the image file not changing.

7. In the main window select the newly created entry "MSE468-vm" from the left pane, then double click to Start. This will launch the virtual machine.

8. After a few minutes, the Ubuntu desktop is booted. If it prompts a window for "Software Update", click **cancel**! (Do **not** update the virtual machine throughout the course, otherwise, it might break the necessary software for the course)

9. In the Ubuntu desktop, click the "Terminal" icon that appears in the sidebar on the left of the screen. In the terminal, you can launch LAMMPS, Quantum ESPRESSO, etc. for the calculations.

10. Set up a shared folder between the virtual machine and your macOS. With the shared folder, you can easily exchange files and access your results from the virtual machine. You need to execute the following steps:

    a. Shut down the VM if you are running it.
    b. Select the VM instance in UTM and click the "Browse" button next to the "Shared Directory" setting.

    c. Navigate to the directory on your macOS that you want to use to share files with the VM, select it and click "Open".
    d. Start the VM, open a terminal and execute the commands below.
    e. Create the shared directory which will be shared with your macOS one:

```
mkdir shared
```

    f. Mount the shared directory. Since this is a `sudo` command you will be prompted for the sudo password (as a reminder, the **user is max** and the **password is aiida**):

```
sudo mount -t 9p -o trans=virtio share shared -oversion=9p2000.L
```

Since the mount is not persistent, this will have to be executed every time you boot the VM!

Hint: To avoid the necessity of copying the command again and again, you can also prepare a small script:

1. Use gedit or nano to create a new file: mount-shared.sh
2. Add the following two lines to the file:

```
#!/bin/bash
sudo mount -t 9p -o trans=virtio share shared -oversion=9p2000.L
```

3. Save it and change the permission with the following command (use the terminal): chmod +x mount-shared.sh
4. Whenever you reboot the VM, simply execute the script with (you will be asked for the password: **aiida**):

```
./mount-shared.sh
```

ONLY FOR ADVANCED USERS: You can also automate this process by adding the following line to the /etc/fstab file:

```
share /home/max/shared 9p  trans=virtio,version=9p2000.L
```

Only do it if you know what you are doing. If something fails, the VM won't start anymore.

g. Change the owner to the current user:

```
sudo chown -R $USER shared
```

Notes:

h. The full instructions from UTM on how to set up sharing a directory and the clipboard can be found at: https://docs.getutm.app/guest-support/linux/
i. We **recommend** that, inside the Virtual Machine, you save all your files always inside the shared folder you set up at this point.
j. **IMPORTANT**! At the end of each class, we strongly encourage you to save a copy of all the files you produced during the lab, in a USB stick or in any other safe backup location, to avoid data loss that can result into having to run again, and delays in providing your lab reports, with a consequent risk of losing points for your exercises.

11. (Optional) If you prefer to use your Macbook terminal (also e.g. to avoid issues with your keyboard layout, shortcuts, and also to transfer files into and out of the VM using *scp*), we forwarded port 22 to 2200 so you can ssh to the Virtual Machine (from your own computer) by using the command
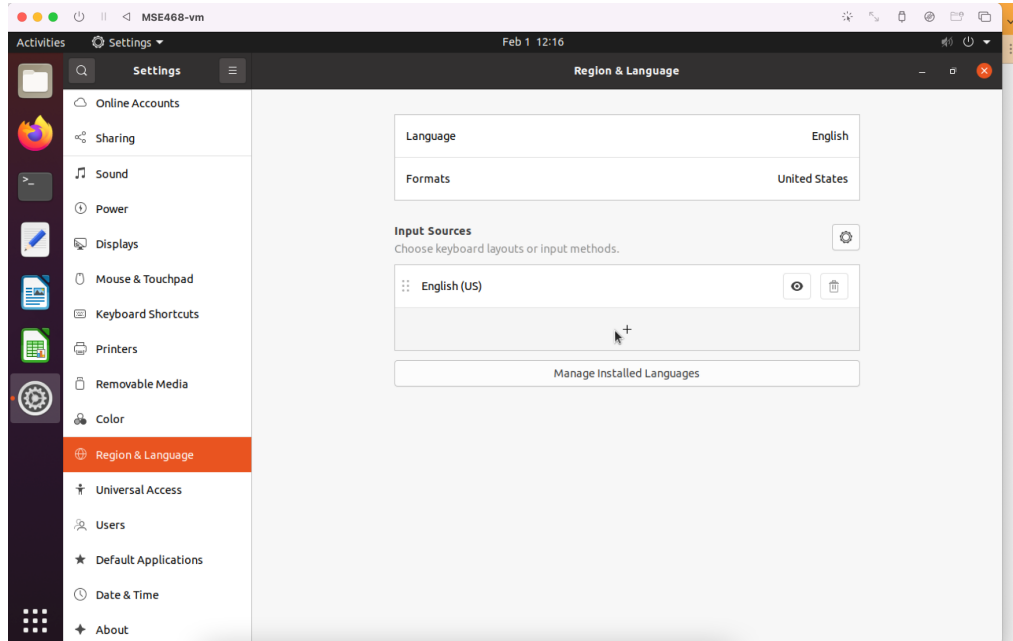
```
ssh -p 2200 max@127.0.0.1
```

and the password is aiida

12. (Optional) Keyboard layout
    In the Virtual Machine, the keyboard is the US one. In order to change it, go to "Settings" (the last icon on the left sidebar) and choose the same language as in the screenshot.

13. Congratulations! You just managed to connect to a virtual machine preconfigured for the course

Testing if everything works

To test that the virtual machine is properly configured, please complete the instructions contained in the document "*Testing the Virtual Machine (MSE-468).pdf*" on Moodle, **before the deadline that is indicated on Moodle** (so we have the time to help you solve any problem that you might have).

NOTE: In the document there is a link to a google form (very short) to fill by the date indicated above, to confirm that all works fine.
NOTE: if needed, the user is **max** and the password is **aiida**.

Final remarks

The virtual machine is generated based on *Quantum Mobile* (https://quantum-mobile.readthedocs.io/en/latest/index.html). If you encounter problems when using the virtual machine, here are some resources for FAQ and troubleshooting:
- https://quantum-mobile.readthedocs.io/en/latest/users/faq.html
- https://quantum-mobile.readthedocs.io/en/latest/users/troubleshoot.html
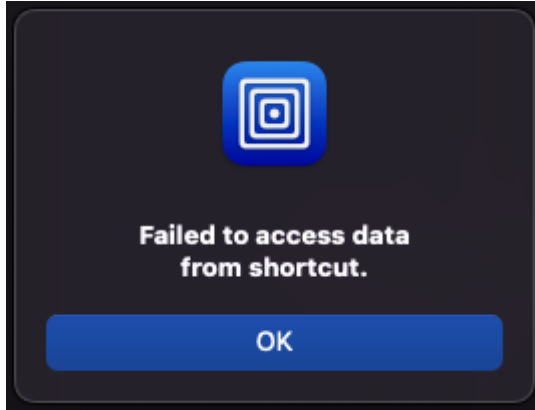(note however that the Quantum Mobile is based on VirtualBox and not UTM, so many of the points might not apply). In case of doubts/problems, ask the instructors.

Troubleshooting

Below we maintain a list of known issues when running the VM and possible solutions:

1. When opening or running the .utm image, you may encounter a "Failed to access data from shortcut" error:

    This can happen when you move the .utm file after opening it in UTM, or have removed the VM instance from UTM and are trying to reload it. If you've moved the .utm file, simply move it back to its location when you opened it, which you can find next to the "Path" in the main UTM view when selecting the VM instance. If you've removed the VM instance, you typically have to close and open UTM to be able to re-open the same image.