

## CSE 321 Lab Ubuntu Setup for xv6 (macOS ARM 64/ Apple silicon version)

### T0: Install VirtualBox in macOS ARM 64

1. Execute Terminal.
2. Run `brew --version` in the Terminal and check if Homebrew is already installed.
  - a. If you see a version number, Homebrew is installed → go to **Step 4**.
  - b. If you see command not found, install Homebrew (**next step**).
3. Install Homebrew (if needed).
  - a. Run `xcode-select --install` in the Terminal to install Apple Command Line Tools (if you never did).
  - b. Run `/bin/bash -c "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/HEAD/install.sh)"` to install Homebrew for Apple Silicon.
  - c. Run `echo 'eval "$((/opt/homebrew/bin/brew shellenv)"' >> ~/.zprofile`  
`eval "$((/opt/homebrew/bin/brew shellenv)"'` to add Homebrew to your PATH.
  - d. Run `brew --version` in the Terminal to confirm the installation of Homebrew.
4. Update Homebrew.
  - a. Run `brew update`, `brew upgrade`, and `brew doctor` commands in the terminal.
    - If `brew doctor` prints only warnings, it is usually safe to continue.
5. Install VirtualBox using Homebrew.
  - a. Run `brew install --cask virtualbox` in the terminal to install VirtualBox.
    - During installation, you may see a prompt asking for permission to run software from an unidentified developer.
    - If macOS blocks something, go to: **System Settings → Privacy & Security → Security** and click **Allow** or **Open Anyway** for VirtualBox if shown.

### T1: Using the Virtual Machine for macOS ARM 64/ Apple silicon

Machine Credentials:

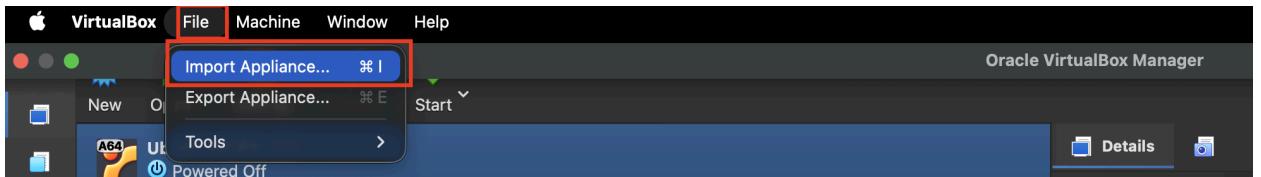
**OS: Ubuntu 25.04**

**Username: cse321**

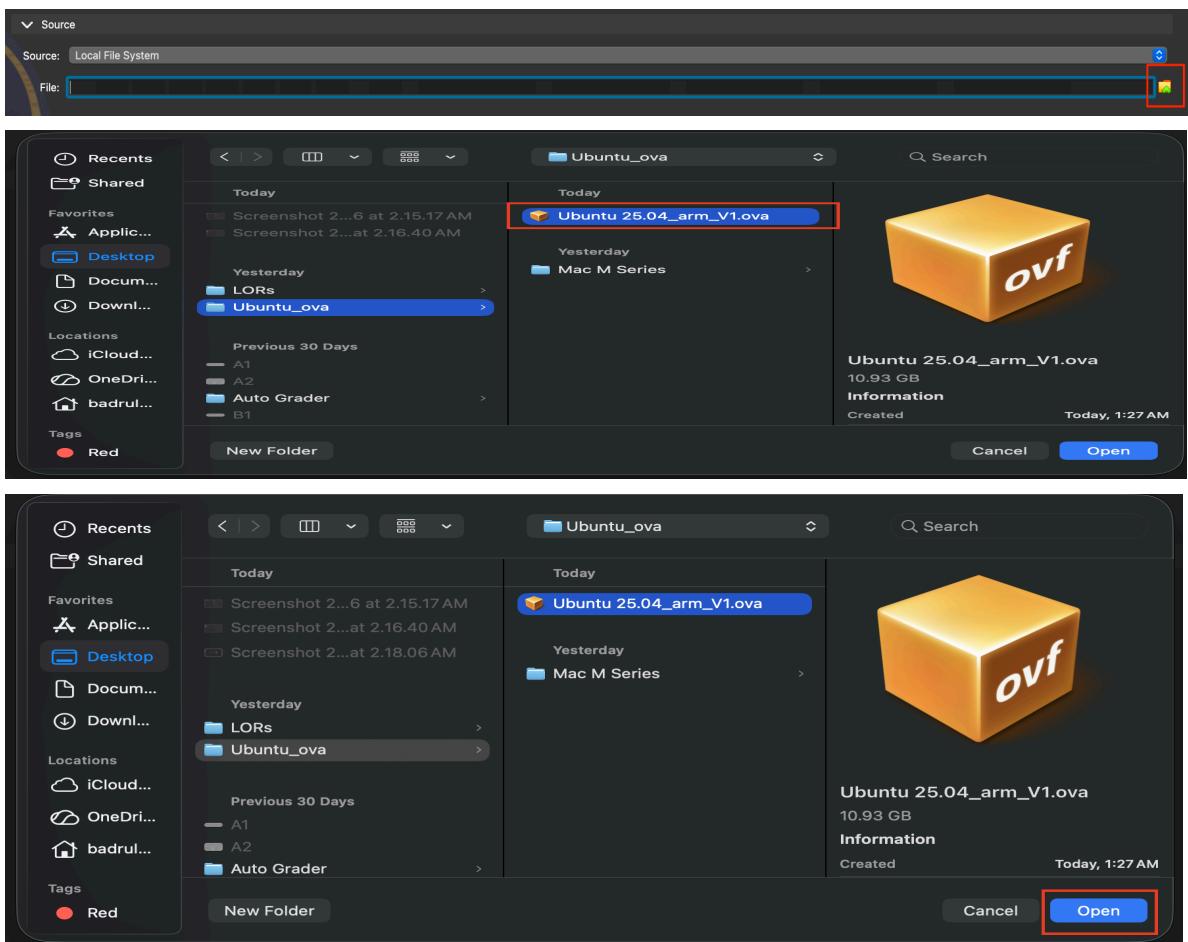
**Password: cse321**

1. Install VirtualBox following the steps shown in **T0**.
2. Download this [Ubuntu Virtual Machine Image](#). It comes pre-installed with all the necessary tools. The username and password for the machine are provided above.
3. After downloading the image, run VirtualBox and follow the steps below.

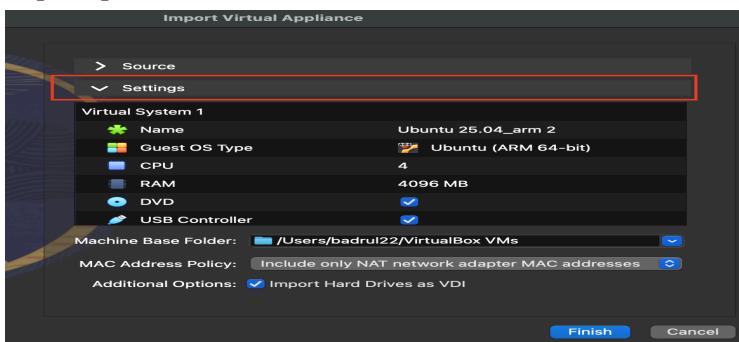
4. Go to **File -> Import Appliance.**



5. Click on the **File icon**, as shown, and then select the ***Ubuntu 25.04\_arm\_V1.ova*** file downloaded in **Step 2**. Then click **Open**.

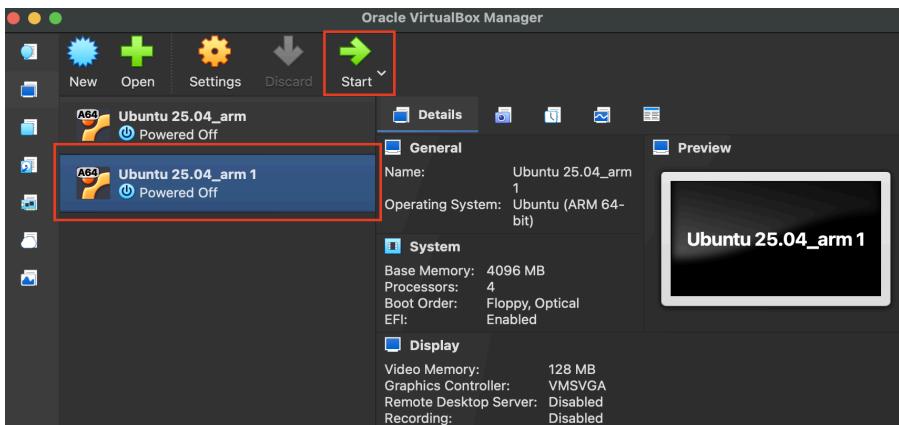


6. Keep the appliance's **Settings unchanged**. Then click **Finish** to complete the import procedure.





- Once importing is complete, select the machine and click **Start** to power the machine up.



- Log in to the machine using the provided credentials.
- Post-Login:** Once Ubuntu boots up properly, ensure the VM can access the Internet connection of your host device by executing the Terminal and running the command: `sudo apt update`. You will be prompted for the password again.
- Run xv6:** Change the working directory to `~/cse321/xv6-riscv`, and run `make clean` & `make qemu` commands in the Terminal.