**Minix Virtual Machine Setup**

The purpose of this laboratory is to create and configure a Minix Virtual Machine (VM) to be used in the next laboratories.

Today's goals are:

* Installation of Minix OS
* Basic Kernel modification
* Command-line interface changes

**1) Download Minix VirtualBox Zip File (Apple Silicon Users go to 1a)**

[Minix3 Stable.zip](https://drive.google.com/file/d/156yyRhVNgcAuiFmz0RqrYljgzGgqJXDC/view?usp=sharing)

Extract the folder from the .zip file by double clicking the file selecting the file and right clicking Extract.

**1a) Download Minix QEMU Zip File**

[minix3.img.zip](https://drive.google.com/file/d/1HdNapvRpwVpLha3nj-0MUbt7FvIaGFe7/view?usp=sharing)

Extract the file from the .zip file to a particular folder by double clicking the file selecting the file and right clicking Extract.

**2) Open the VM (Apple Silicon Users go to 2a)**

* Open Minix3 Stable folder
* Double-click Minix3 Stable.vbox
* Press Start Button in VirtualBox
* The username is: root
* The password is: 12345678

**2a) Open Minix3 with QEMU**

* Install Homebrew [http://brew.sh](http://brew.sh/)
* Right-click the folder containing the extracted minix3.img file and click "New Terminal at Folder"
* Install QEMU by running in the terminal the following command: brew install qemu
* To start Minix3 run the following command: qemu-system-i386 -m 2048 -net user,hostfwd=tcp::10022-:22 -net nic -hda minix3.img
* The username is: root
* The password is: 12345678

**--------------------------------------- HOW TO ---------------------------------------**

**How to Check Installation (Optional)**

* Minix includes a series of test to check the status of the system
* Navigate to /*usr/*src/test
* Type make
* Wait for compilation to finished
* To run the test type ./run

**How to Compile Kernel Image (no need to do at this point)**

* navigate to /*usr*/src/releasetools
* type *make hdboot* to compile kernel image
* restart with sync and shutdown

**Remote connectivity and IDE Setup**

**Option 1 (RECOMMENDED): Setup Remote Systems in VSCode**

Install the following extension in VSCode: [SSH Client](https://marketplace.visualstudio.com/items?itemName=cweijan.vscode-ssh)

Add new connection by pressing the '+' button with the following parameters:

To navigate in Minix directory click on the new created connection.

If you need to open the terminal in a given directory right-click on it and press "Open In Terminal"

**Option 2: Setup Remote Systems in CLion**<https://www.jetbrains.com/es-es/clion/features/>

Install CLion with the default configuration. Installation details: https://www.jetbrains.com/help/clion/installation-guide.html  
If you have previously installed PyCharm or JetBrains applications you can use that same user account to log into CLion.  
If you don't have a JetBrain account you can create a free one as a student using the upr email.

-**Open the virtual machine (with minix) and log in .**

-Open CLion and create a **new project-> Select the option C Executabe -> create**

-**Tools -> Deployment -> Browse Remote Host**

-A Remote Host menu will appear on the right with the <None> option selected. **Click on the three-dot button (...)**that is next to this drop-down list.

A small window will appear to add a server

-**Put a name to your server**(preferably minix)

-In **Type select SFTP**

The Deployment window will appear

-Click on the **three points (...) of SSH CONFIGURATION**

-Add a new SSH configuration:

**host**: localhost  
**port**: 2222  
**username**: root  
In **password** the minix vm password  
Click on **test connection** (a success message should appear)  
Click on OK

- **In the Deployment window also test the connection.** If success is displayed, click OK

In the right window will appear all the minix folders and files. **Now you can open or create files in the virtual machine using CLion.**

**-Option 3: Setup Remote Systems in Eclipse**

<http://wiki.minix3.org/doku.php?id=developersguide:eclipsetutorial>

Select Work with: "--All available sites--" as repository source

Only follow the instructions for sections:

* Install C/C++ support
  + Programming Languages > C/C++ Development Tools SDK
* Remote System Explorer installation:
  + General Purpose Tools > Remote System Explorer End-User Runtime

**Login to Minix using Eclipse Remote Systems**

Open the Remote Systems view by clicking on Eclipse's Menu bar > Window > Show View > Other > Remote Systems > Remote Systems

Create a new connection on the remote systems, using localhost as IP. Click Finish.

Edit the SSH port by right clicking SSH Shells under the connection you just created

Click Properties > subsystems > port > set 2222

Connect to Minix by expanding the Sftp files tree > Root > /

Enter root as username and the vm minix password as password

# Exercise #1

## 100/100

Modify the the command line interface to display each binary file executed. Navigate to **/*usr*/src/servers/pm/exec.c** and modify the code to print the executed program. Example: if the **ls** program is executed (**/bin/ls**), the interface will display “Executing ls”

* Modity the **exec.c** program
* Recompile the kernel
* Test program (by running any command on the shell)

**Kernel Compilation**

* navigate to /*usr*/src/releasetools
* type *make hdboot* to compile kernel image
* restart with sync and shutdown