

Creating a Virtual Machine to use Macaulay2 on Windows

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There are three main routes for using Macaulay2 on a Windows machine:

1. Hosted on the web at web.macaulay2.com or cloud.sagemath.com/
2. Using cygwin (www.cygwin.com).
3. Hosting it on a virtual machine.

Here I will try to help you with the third option. Note: Macaulay2 is now suggesting the in beta “Windows Subsystem for Linux” (https://msdn.microsoft.com/en-gb/commandline/wsl/install_guide).

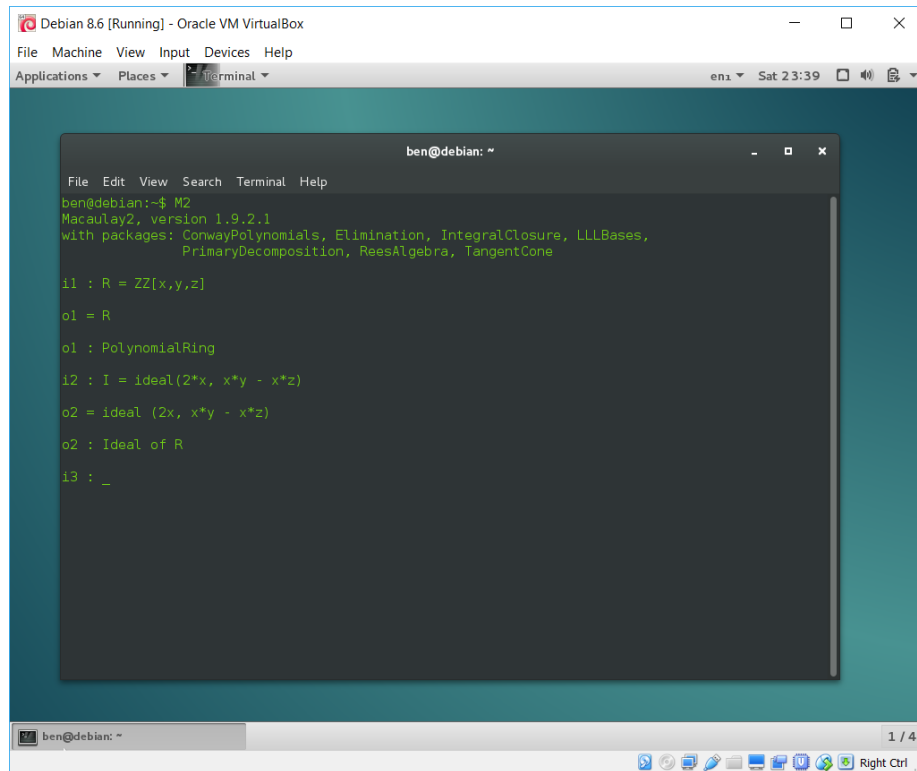


Figure 1: Debian virtual machine running Macaulay2.

1 Instructions

1. The first step is to install VirtualBox from virtualbox.org. You will want the “Windows Hosts” version seen in Figure 2.
2. The next step is to download an ISO for your selected Linux Distribution. Here you can download a 64 or 32 bit operating system, but a 64-bit OS seems to have more complications attached and as we are only using this for Macaulay2 we will go with a 32-bit i386 based operating system. I have downloaded debian-mirror.anlx.net/current/i386/iso-cd/debian-8.6.0-i386-netinst.iso for this demonstration.
3. Run virtual box and select new in the top left corner (Figure 3).
4. First you will be asked to give the VM a name. For this to be most useful, the name of the operating system you are using along with the version number. Then select the type of OS you are using, Figure 4.
5. Next you have to select the amount of memory and hard drive space you want to allocate the virtual machine. Bear in mind that while your VM is running that you will not have access to the allocated memory on your Windows PC which may cause a performance issues. I have found that 1GB of RAM for the VM gives adequate performance. I recommend the DVI hard disk file type and Dynamically Allocated with 8GB of storage.



Figure 2: Virtual Box Website

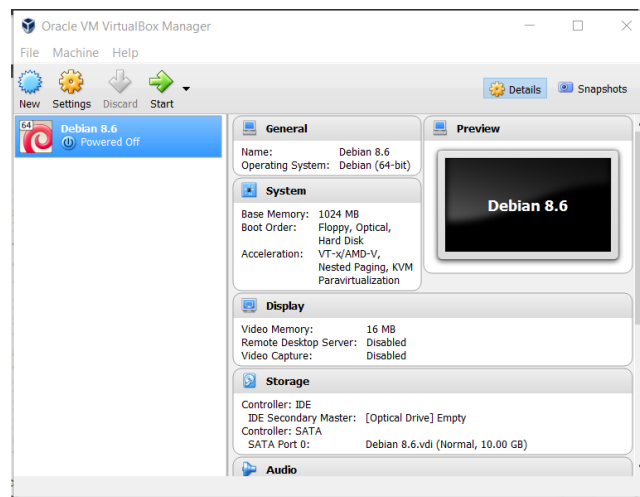


Figure 3: The Virtual Box GUI

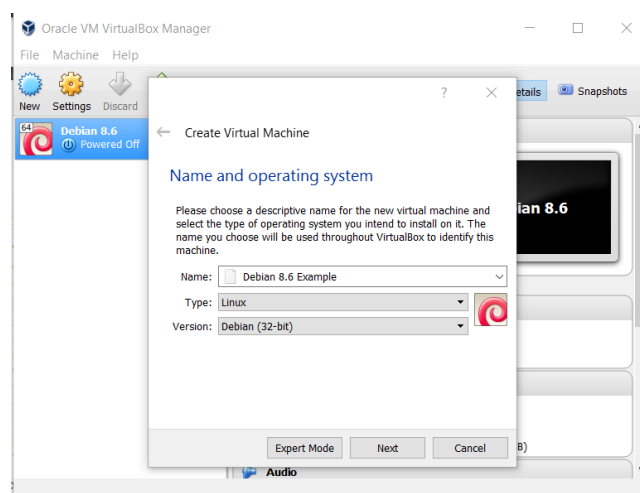


Figure 4: Example naming.

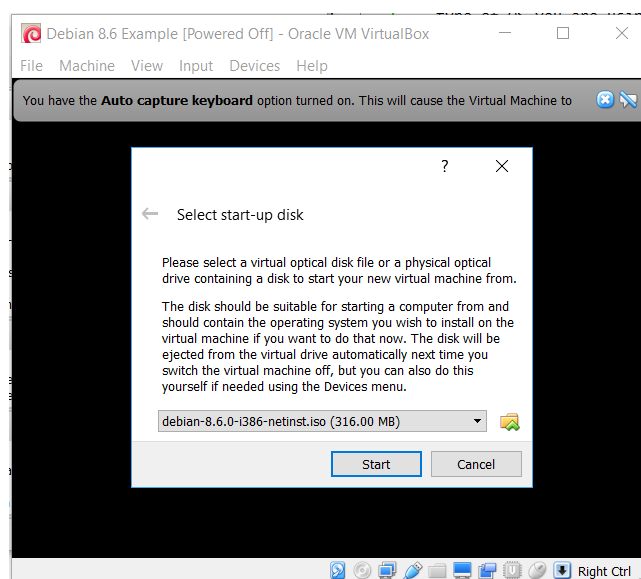


Figure 5: Prompt on first start up.

6. Now that you have created the VM, try running it. It should prompt you for the location of your ISO file, Figure 5.

From this point follow the install instructions. The administrator password is particularly important as this is what you will need in order to install software. VirtualBox contains software that will capture your mouse and keyboard while in the window, and will also have access to the internet connection of your main computer.

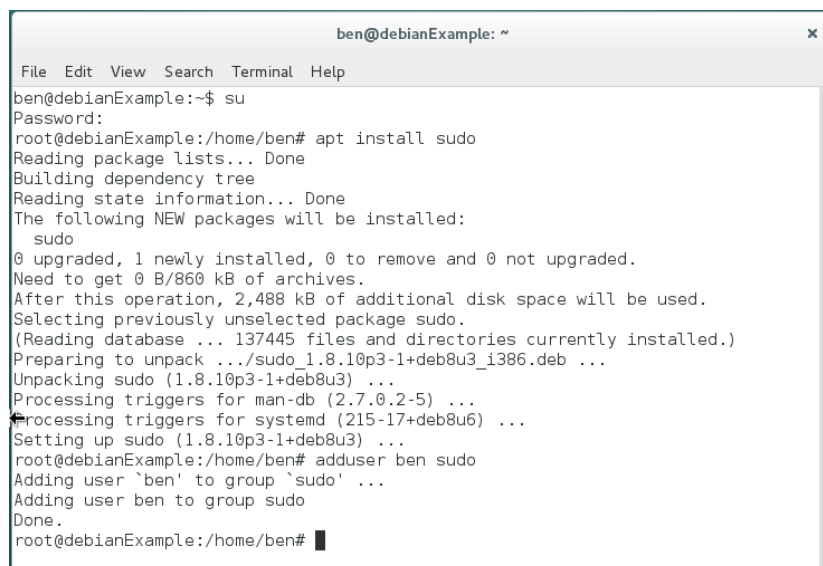
Now you have set up the Virtual Machine, you have two options for installing Macaulay2. You can either install using the instructions given on the website for your Linux distribution (<http://www.math.uiuc.edu/Macaulay2/Downloads/GNU-Linux/index.html>) or you can clone the Github repository (<https://github.com/Macaulay2/M2/>) and install following the instructions there.

For general Linux problems, Google will answer all of your questions.

1.1 If you used my download link

If you have used the ISO that I used you will probably want to install the sudo package which will let you perform tasks that require privileges (Figure 6) and is used a lot in the Macaulay2 install instructions for Debian.

Open the terminal and enter “su”. This will put you into the root user. Next enter “apt install sudo”, installing the sudo package. Finally “adduser USERNAME sudo” which adds your user to the group who are able to use the sudo command. Log out and back in and you will be able to use the command.

A terminal window titled "ben@debianExample: ~" with a menu bar (File, Edit, View, Search, Terminal, Help). The terminal shows a user named 'ben' switching to 'root' using 'su'. The root user then runs 'apt install sudo'. The output shows the package lists being read, the dependency tree being built, and the state information being read. It then lists the packages to be installed (sudo) and shows the progress of the installation, including unpacking and setting up the package. Finally, the root user runs 'adduser ben sudo' to create a new user named 'ben' with the 'sudo' group. The terminal ends with the prompt 'root@debianExample:/home/ben#'.

```
ben@debianExample:~$ su
Password:
root@debianExample:/home/ben# apt install sudo
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  sudo
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 0 B/860 kB of archives.
After this operation, 2,488 kB of additional disk space will be used.
Selecting previously unselected package sudo.
(Reading database ... 137445 files and directories currently installed.)
Preparing to unpack .../sudo_1.8.10p3-1+deb8u3_i386.deb ...
Unpacking sudo (1.8.10p3-1+deb8u3) ...
Processing triggers for man-db (2.7.0.2-5) ...
Processing triggers for systemd (215-17+deb8u6) ...
Setting up sudo (1.8.10p3-1+deb8u3) ...
root@debianExample:/home/ben# adduser ben sudo
Adding user `ben' to group `sudo' ...
Adding user ben to group sudo
Done.
root@debianExample:/home/ben#
```

Figure 6: Installing sudo