

# How to set up EECS-213 labs with Virtual Box

For students who would like to setup a Linux system similar to those in Wilkinson and T lab in their PCs, Virtual Box is a good alternative. Virtual Box supports the creation and management of guest virtual machines running versions and derivations of Windows, Linux, BSD, OS/2, Solaris, Haiku, OSx86 and others, and limited virtualization of OS X guests on Apple hardware.

To setup the virtual box machine in your systems, please do the following instructions step by step and let us know if you have any issues:

- 1) Please visit the Virtual Box website by using the following link and install one of the version based on your system OS.

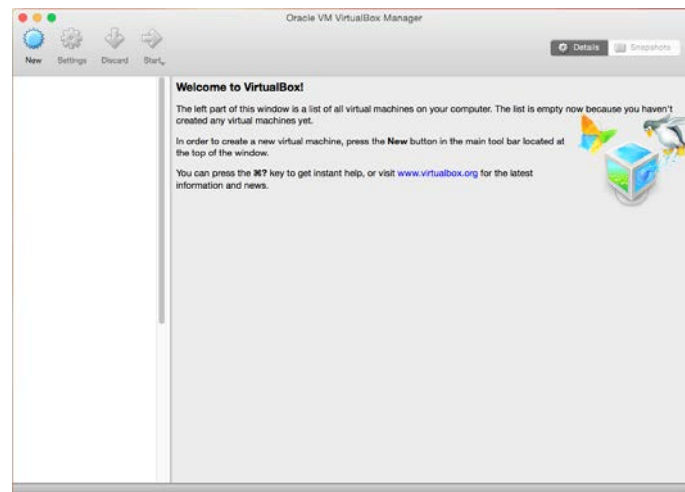
<https://www.virtualbox.org/wiki/Downloads>

Also, if you need additional information about virtual box, you can also take a look at the following link:

<https://www.virtualbox.org/manual/UserManual.html>

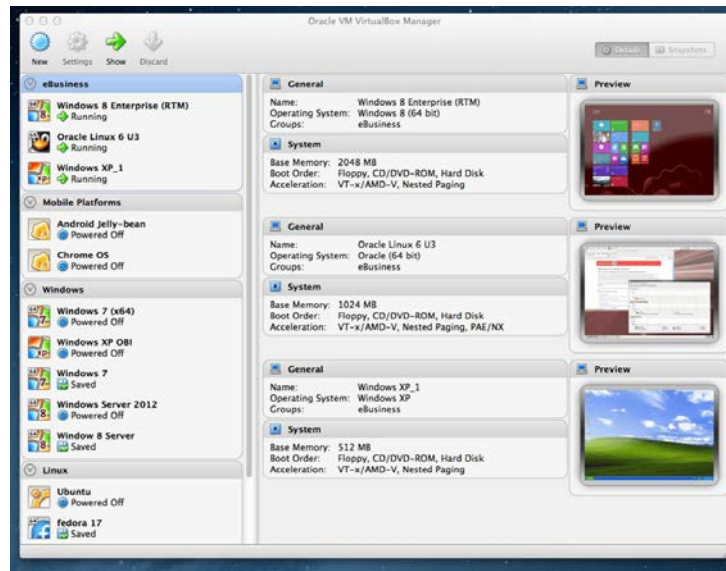
- 2) After installation, you can start VirtualBox as follows:
  - On a Windows host, in the standard "Programs" menu, click on the item in the "VirtualBox" group. On Vista or Windows 7, you can also type "VirtualBox" in the search box of the "Start" menu.
  - On a Mac OS X host, in the Finder, double-click on the "VirtualBox" item in the "Applications" folder.
  - On a Linux or Solaris host, depending on your desktop environment, a "VirtualBox" item may have been placed in either the "System" or "System Tools" group of your "Applications" menu. Alternatively, you can type VirtualBox in a terminal.

When you start Virtual Box for the first time, a window like the following should come up:



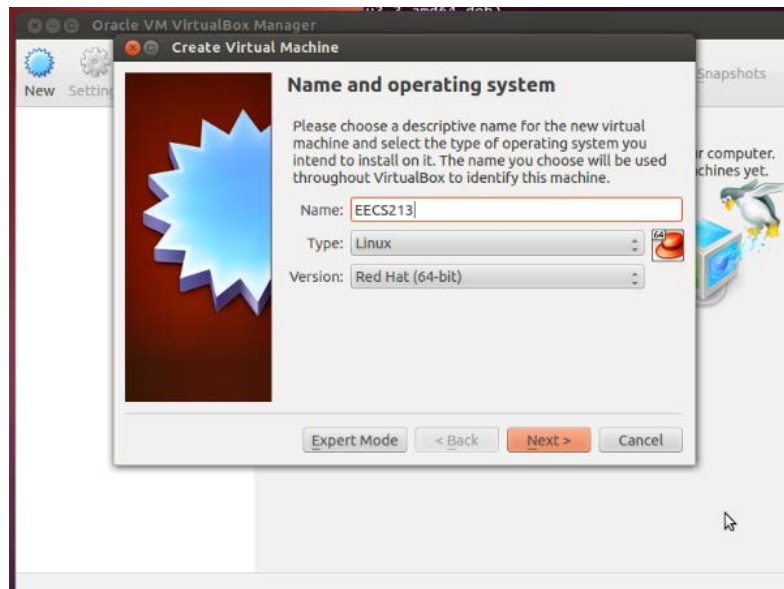
This window is called the "VirtualBox Manager". On the left, you can see a pane that will later list all your virtual machines. Since you have not created any, the list is empty. A row of buttons above it allows you to create new VMs and work on existing VMs, once you have some. The pane on the right displays the properties of the virtual machine currently selected, if any. Again, since you don't have any machines yet, the pane displays a welcome message.

To give you an idea what VirtualBox might look like later, after you have created many machines, here's another example:



- 3) Click on the "New" button at the top of the Virtual Box Manager window. A wizard will pop up to guide you through setting up a new virtual machine (VM). The wizard will ask you for the bare minimum of information that is needed to create a VM, in particular:
- The VM name will later be shown in the VM list of the VirtualBox Manager window, and it will be used for the VM's files on disk.
  - For "Operating System Type", select the operating system that you want to install later.

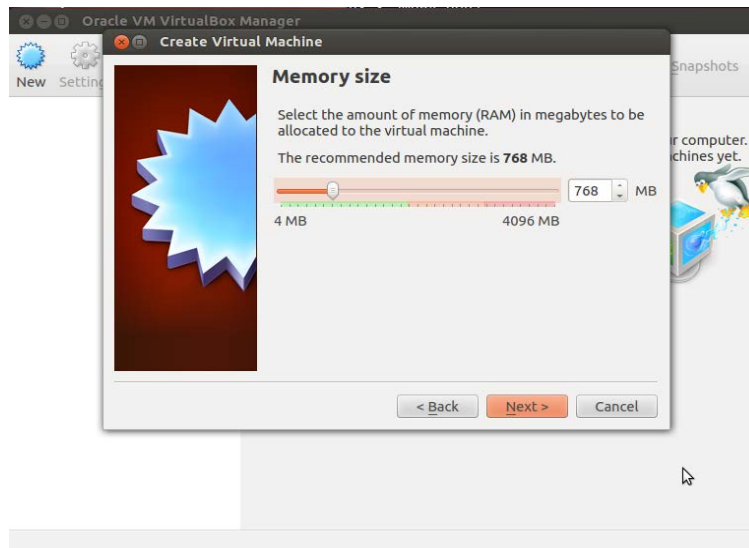
In order to setup the appropriate OS in your VM for our Lab assignments, please fill in all three GUI elements exactly similar to the following figure:



**Note:** For those who are using windows and running VirtualBox on a 64-bit machine, but only being offered the ability to build 32-bit virtual machines, please take a look at the following video to solve the issue:

<https://www.youtube.com/watch?v=1wc3fjGtPHU>

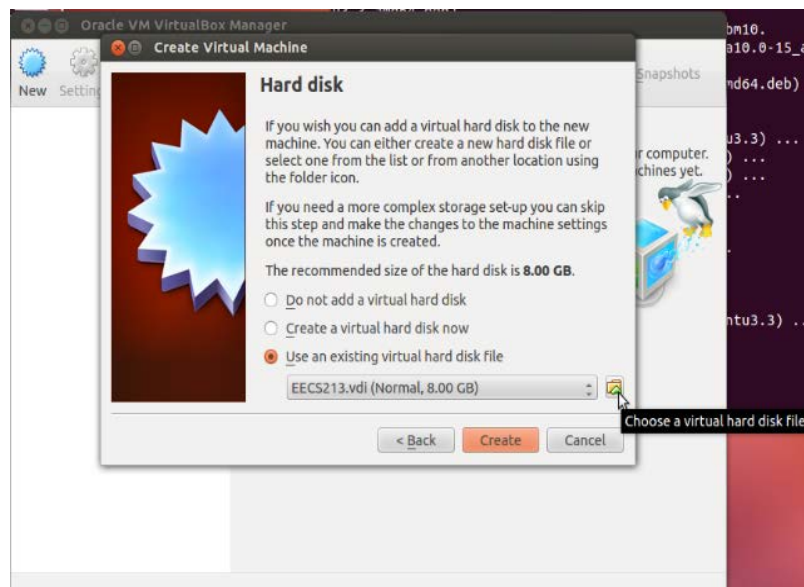
- 4) Next, you need to specify the memory size for your virtual system. Virtual Box usually recommends a size based on your system properties similar to the following figure:



Choose this setting carefully! The memory you give to the VM will not be available to your host OS while the VM is running, so do not specify more than you can spare. For example, if your host machine has 1 GB of RAM and you enter 512 MB as the amount of RAM for a particular virtual machine, while that VM is running, you will only have 512 MB left for all the other software on your host. If you run two VMs at the same time, even more memory will be allocated for the second VM (which may not even be able to start if that memory is not available). On the other hand, you should specify as much as your guest OS (and your applications) will require to run properly. Please note that you can change this number later, but you need to shut down the virtual machine to adjust it.

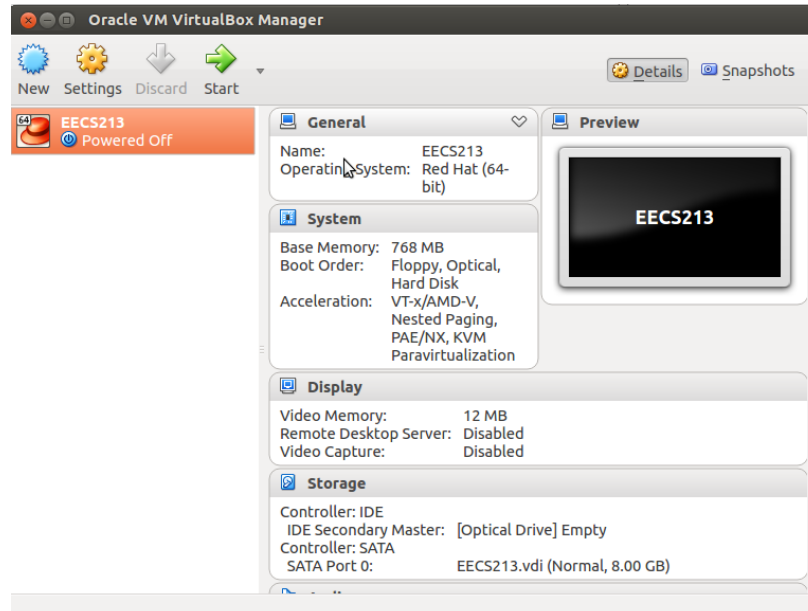
**It would be good to follow the recommended size by virtual box.**

- 5) Next, you must specify a virtual hard disk for your VM. The wizard shows you the following window:



For our Lab, please click on the button showing by the mouse arrow and choose the “EECS213.vdi” file in your directory. This file is available on Canvas. After that click on the create button and now your VM has been created.

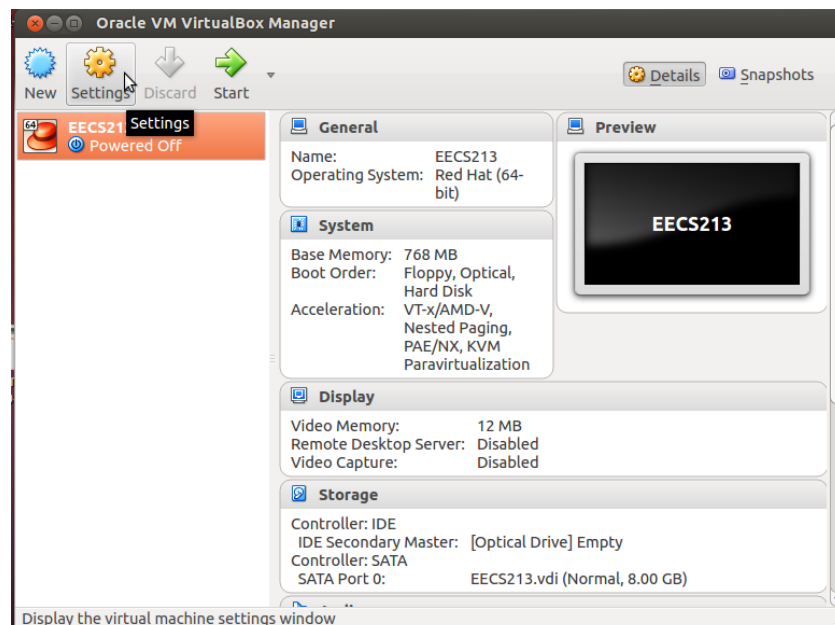
After that if you have done all the previous steps correctly, you should see the following wizard:



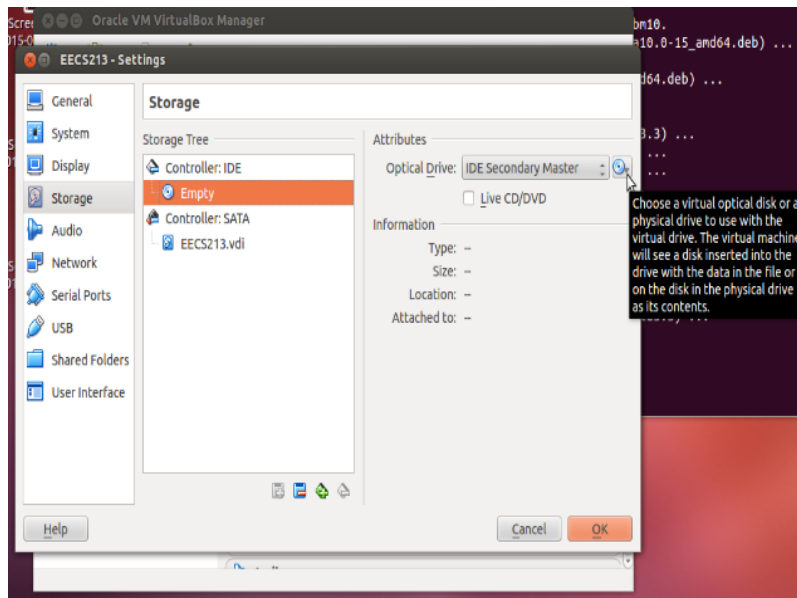
- 6) In this step, you need to specify your OS image file in your VM. To do so, first please go to a link to CentOS Live ISO, from which you can install the OS onto the VM:

[http://bay.uchicago.edu/centos/6.7/isos/x86\\_64/CentOS-6.7-x86\\_64-LiveDVD.iso](http://bay.uchicago.edu/centos/6.7/isos/x86_64/CentOS-6.7-x86_64-LiveDVD.iso)

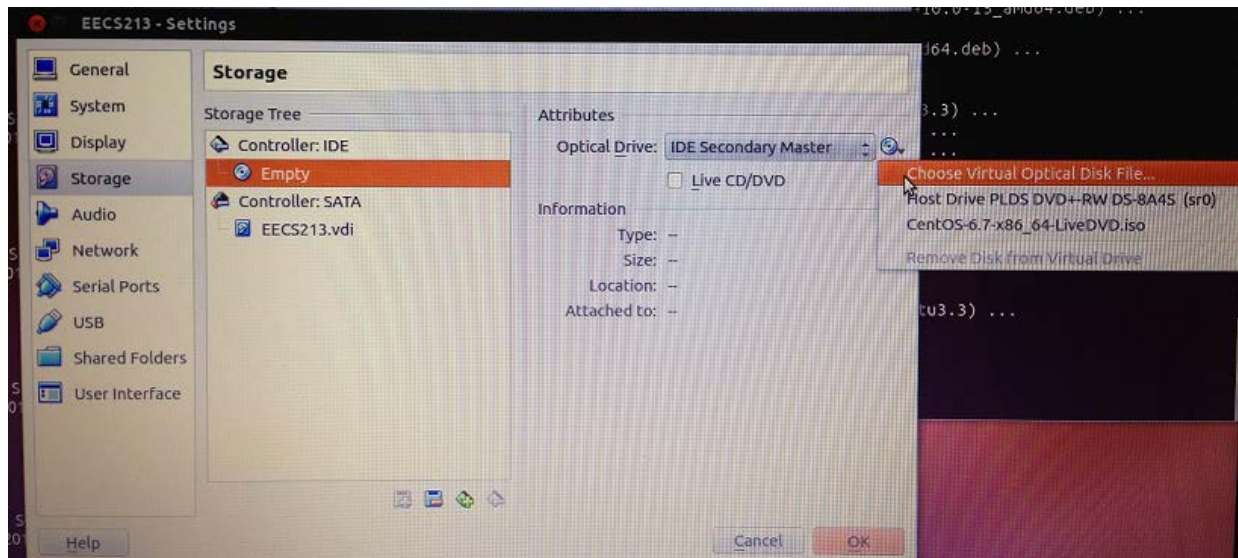
Then, click on your VM (i.e., EECS213) showing in the VM virtual box manager main window and click Settings on the toolbar similar to the following figure:



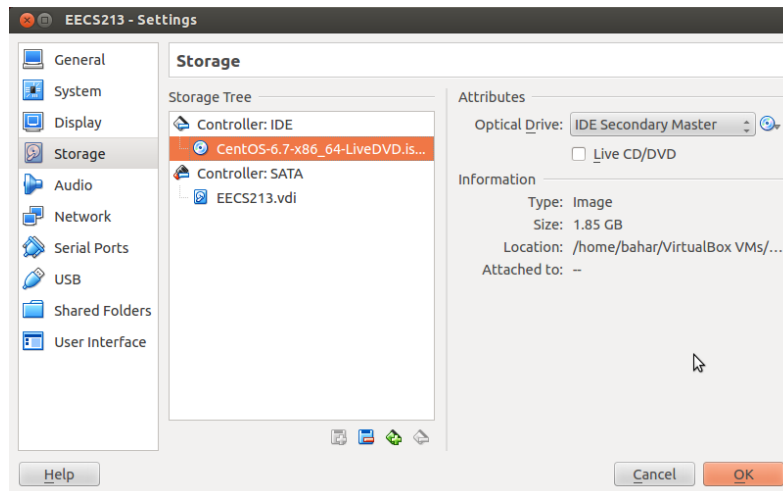
Then click on storage part and a wizard shows you the following window:



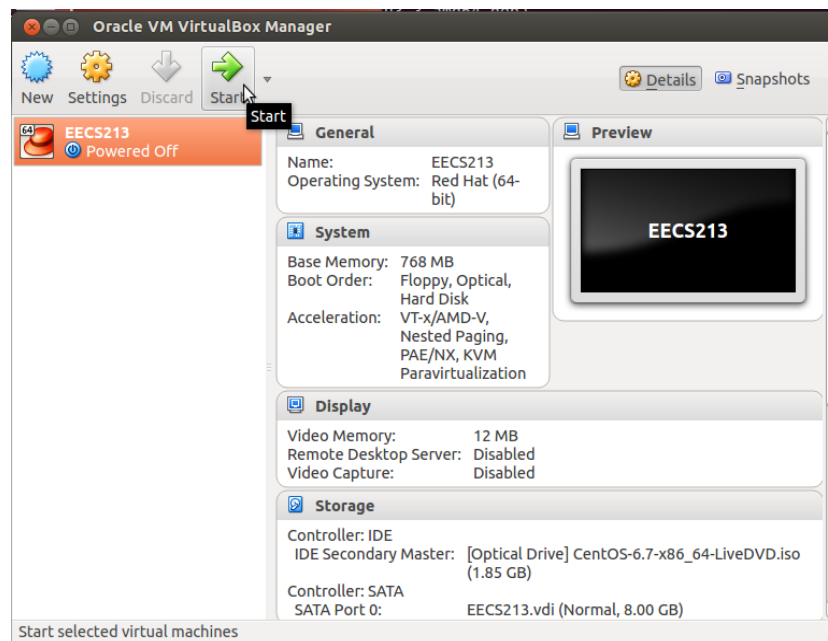
Then click on the button with CD image showing by the mouse arrow to specify your CentOS image file similar to the following figure:



After adding the CentOS image to your virtual box, the wizard should show your OS name in the “storage tree” part similar to the following figure:



- 7) Now, your VM is ready and you can turn on your VM by pressing the start button as shown in the following picture:



Then, please wait until the system auto login finished and after that, your system is ready to use. Please note that in order to bring your mouse arrow to your VM, you need to click on the VM window. Also, in order to bring it back to your main system, just press the Ctrl right button.

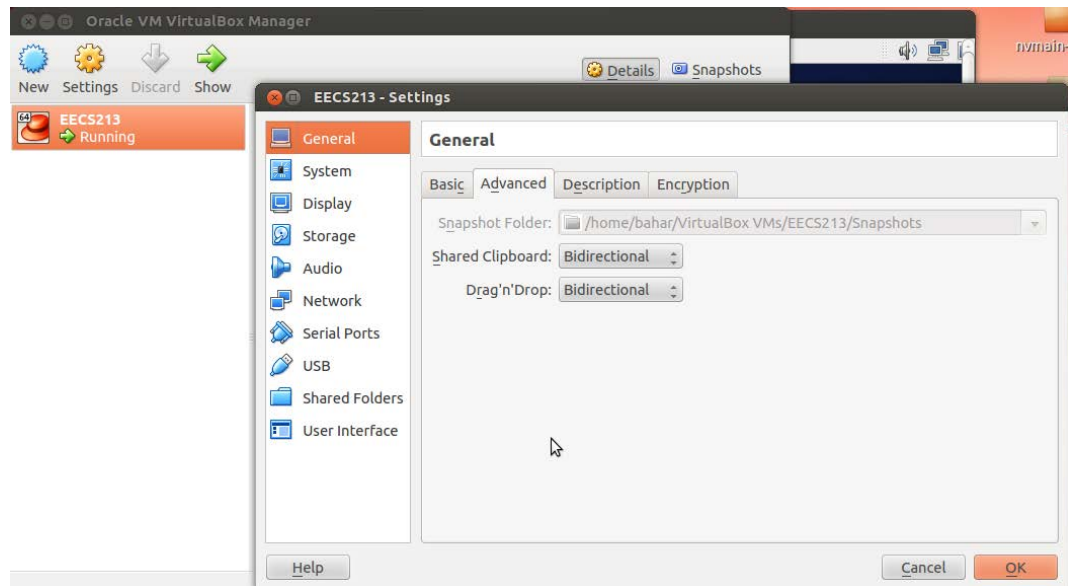
- 8) Before downloading your lab handout from Canvas, you need to do the following step. Please open a terminal in the system and type the following commands and press enter:

**sudo yum install gcc-c++**

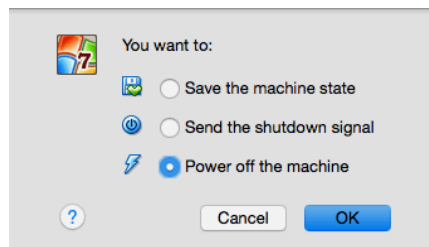
- 9) There are two options to copy your lab handout to the VM. The first one is: if your local machine is connected to internet, your VM is connected as well. So, you can easily download the handout from Canvas. Another option you have is to copy the file from your local machine to the VM. To enable copying text between the host and guest machines, first make sure the virtual machine for which you want to enable



the setting is powered off. Then, on the Settings dialog box, make sure General is selected in the left pane. Select the Advanced tab on the right and select Bidirectional from the Shared Clipboard drop-down list. This will allow you to copy text in both directions, from the host to the guest and vice versa. Click OK to accept the change and close the dialog box similar to the following figure. You can also select Bidirectional from the Drag'n'Drop drop-down list. This allows you to drag and drop files between the host and guest machines.



- 10) After downloading your Lab handout and copy it to a directory. The last step you need to use before start working on your lab is changing the Makefile in the lab handout directory. In this case, please modify the line "CFLAGS = -O -Wall -m32" in Makefile of datalab-handout to "CFLAGS = -O -Wall -m64".
- 11) When you click on the "Close" button of your virtual machine window (at the top right of the window, just like you would close any other window on your system), VirtualBox asks you whether you want to "save" or "power off" the VM similar to the following figure:



The difference between these three options is crucial. They mean:

**Save the machine state (The recommended option):** With this option, VirtualBox "freezes" the virtual machine by completely saving its state to your local disk. When you start the VM again later, you will find that the VM continues exactly where it was left off.

**Send the shutdown signal:** This will send an ACPI shutdown signal to the virtual machine, which has the same effect as if you had pressed the power button on a real computer.

**Power off the machine:** With this option, VirtualBox also stops running the virtual machine, but without saving its state.