# Installing Virtual Box and setting up the Virtual Machine on Windows

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## Introduction to Virtual Box and Virtual Machine

Virtual Box is a cross-platform application developed by Oracle which enables you to create Virtual Machines (VMs). The VM generates a guest operating system (such as Linux) derived from a host operating system (The host operating system is the primary and foundational operating system that runs directly on the physical hardware of a computer.). Therefore, sufficient RAM, processors, and memory in the host operating system are essential for smooth running of VMs.

**Note:** The VM file (.vdi) contains all the software installed for the course.

## Host OS Requirements for Virtual Box

* RAM requirement: 8GB (preferably 12GB)
* Processor requirement: 4 processors (preferably 8)
* Hard disk space: 100GB

**Note:** The current version in use is Virtual Box 7.0.

## Installation of Virtual Box

1. **Download VirtualBox:**

Navigate to the official VirtualBox website (<https://www.virtualbox.org/>) and go to the "Downloads" section. Choose the version that matches your Windows operating system (32-bit or 64-bit).

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1. **Download Extension Pack (Optional):**

If needed, download the VirtualBox Extension Pack from the same "Downloads" section. This pack provides additional functionalities like USB 2.0 and 3.0 support, VirtualBox Remote Desktop Protocol (VRDP), and more.

1. **Run the Installer:**

Locate the downloaded VirtualBox installer file (.exe) and double-click to run it. Follow the on-screen instructions provided by the installer. Click "Next" to proceed through the setup wizard. You may customize installation options if desired.

1. **Install Extension Pack (Optional):**

If you downloaded the Extension Pack, double-click on the file (e.g., Oracle\_VM\_VirtualBox\_Extension\_Pack-6.0.14-133895.vbox-extpack) to install it. This can be done after VirtualBox installation.

1. **Complete the Installation:**

Once the installation is complete, click "Finish" to exit the installer.

## Creating a Virtual Machine (VM)

1. **Start VirtualBox:**

Locate the VirtualBox shortcut on your desktop or find it in the Start Menu. Double-click on the VirtualBox icon to launch the application.

1. **Create a Virtual Machine:**

In the VirtualBox Manager, click "New" to create a new virtual machine. Enter a name for your virtual machine (e.g., "CourseName 2024"). Choose "Linux" as the type and select "Ubuntu 64-bit" as the version. For example, we have taken CourseName as “GCM 24 Linux”.

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1. **Memory (RAM) Allocation:**

In the window that follows, determine the amount of RAM to allocate, keeping it close to the top of the green section on a PC. Also, adjust the number of processors, ideally half of the available ones. Click Next when settings are configured.

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1. **Hard Disk:**

Indicate the location of the virtual machine file you downloaded. Choose 'Use an existing virtual hard disk file,' click the icon next to the menu, and add the .vdi file. Confirm your selection in the summary window and click Finish.

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1. **Follow Ubuntu Installation Wizard:**

Follow the on-screen instructions to install Ubuntu. Choose language, keyboard layout, and select "Install Ubuntu." Follow the prompts for time zone, user account, and installation type.

1. **Complete Installation:**

Allow the installation process to complete. Once finished, restart the virtual machine. Double-check your choices in the confirmation window. Once satisfied, start the virtual machine by highlighting its name and clicking the 'Start' icon in the manager window.

1. **Login Ubuntu:**

The virtual machine will go through a boot process. After a short time, a window will appear. For this course, the user account is named 'manager,' and the password, if required, is also 'manager'.

## Running and Managing VMs

Adjusting the screen size in an Ubuntu virtual machine (VM) within VirtualBox involves installing and configuring the VirtualBox Guest Additions. By installing VirtualBox Guest Additions, you enable features like automatic screen resizing, improved graphics performance, and seamless mouse integration between your host machine and the Ubuntu VM. Here are the steps to achieve this:

1. **Start Ubuntu VM:**

Ensure that your Ubuntu VM is running.

1. **Insert Guest Additions CD:**

In the VirtualBox menu, go to "Devices" and choose "Insert Guest Additions CD image." This action virtually inserts the Guest Additions CD into your Ubuntu VM.

1. **Open Terminal:**

Open a terminal window in Ubuntu. You can do this by pressing ‘Ctrl + Alt + T’ or using the application launcher.

1. **Navigate to the CD Directory:**

Change to the directory where the Guest Additions CD is mounted. This is often located in the ‘/media’ directory. Use the following command to navigate to the directory: A black rectangular object with a black border

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**Note:** The directory name may vary based on your VirtualBox version.

1. **Run Guest Additions Installer:**

Run the Guest Additions installer by entering the following command in the terminal:

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**Note:** You may be prompted to enter your password.

1. **Follow Installation Wizard:**

The Guest Additions installer will launch an installation wizard. Follow the prompts to complete the installation.

1. **Reboot Ubuntu VM:**

After the installation is complete, it's recommended to reboot your Ubuntu VM to apply the changes.

1. **Adjust Screen Size:**

Once the VM has restarted, the screen resolution should automatically adjust to match your VirtualBox window size. If it doesn't, you can manually adjust the screen size in the Ubuntu VM.

Go to "Settings" > "Displays" in the Ubuntu system settings.

You should see different screen resolutions available. Select the desired resolution that fits your VirtualBox window.

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1. **Verify Changes:**

Confirm that the screen resolution has changed and suits your preferences.

1. **Manage VM Settings:**

In the VirtualBox Manager, you can manage VM settings by selecting the VM and clicking on "Settings." Here, you can adjust parameters such as RAM allocation, processors, and storage.

1. **Snapshot and Clone:**

VirtualBox allows you to take snapshots of your VM at different states, providing a backup mechanism. You can also clone VMs for testing or development purposes.

1. **Shut Down and Save State:**

Properly shut down your VM when finished, either by choosing "Shut Down" from within the guest OS or by selecting the VM in the VirtualBox Manager and clicking the "Close" button. Optionally, you can save the machine state to resume exactly where you left off.

## Additional Resources and Troubleshooting

* Virtual Box Documentation: <https://www.virtualbox.org/wiki/Documentation>
* Virtual Box Manual: <https://www.virtualbox.org/manual/ch01.html>
* Virtual Box Forum: <https://forums.virtualbox.org/index.php> (helpful for finding similar problem queries and solutions)
* Ubuntu Documentation: <https://help.ubuntu.com/>
* Ubuntu Community Support: <https://ubuntu.com/support/community-support>
* Stack overflow: <https://stackoverflow.com/> (Public Q&A platform for debugging)
* Bioinformatics (BioStars) Forum: <https://www.biostars.org/t/Forum/> (General Bioinformatics queries)