Evolutionary Computing COMP 5660-001/6660-001/6660-D01 – Auburn University Fall 2023 – Python Environment Setup Guide

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1 Overview

In this assignment, you will create the development environment used for assignments throughout the course. You will start by creating a Linux environment using one of several virtualization options. These options will result in a good experience and it is up to the student to pick which method they prefer, though we make recommendations in case this is entirely new to you. In any case, an Ubuntu 20.04 (22.04 is also fine) environment will be created and Anaconda will be set up to provide Python package management. Once environment creation is complete, you will complete a brief introduction to GitHub.

2 Linux Setup

We require development for a Linux environment in this course. For development and grading purposes, we prescribe the use of Ubuntu (20.04 or 22.04) for all assignments. If you already have a machine running Ubuntu, you can skip to the next section. If you're running another distro of Linux, reach out to the TAs to check if your existing OS install will work. For everyone else, you'll be creating a Linux environment using some form of virtualization. We make the following recommendations based on your OS and hardware:

- Windows 10 or newer We recommend installing Ubuntu using Windows Subsystem for Linux, but you can also use a virtual machine if you already have one or are more comfortable with this approach.
- Older versions of Windows and Intel-based Mac We recommend installing Ubuntu in a virtual machine.
- Non-Intel Mac, ChromeOS, tablets, etc. Virtualization is poorly supported on these devices or requires paid software. You are welcome to use any virtualization software at your disposal, but otherwise please contact the TAs.

2.1 Windows Subsystem for Linux (WSL)

For more information on setting up WSL, please read the official installation documentation from Microsoft: https://docs.microsoft.com/en-us/windows/wsl/install-win10.

2.2 Virtual Machine

You are welcome to use the virtualization software of your choice, but we recommend VirtualBox as it's free and relatively easy to use. A guide to installing an Ubuntu VM with VirtualBox can be found in the appendix. Note, however, that this guide was created using Windows 10 and you may encounter interface discrepancies. You can also use VMware or another tool, if you're more familiar with another virtualization software capable of supporting Ubuntu.

3 Anaconda Setup

Use the following terminal commands to download and install Anaconda:

```
wget https://repo.anaconda.com/archive/Anaconda3-2022.05-Linux-x86_64.sh
chmod 755 ./Anaconda3-2022.05-Linux-x86_64.sh
./Anaconda3-2022.05-Linux-x86_64.sh
```

4 GitHub Setup

Now we're going to walk through the process of setting up your repository and submitting your assignment. First, sign into your GitHub account (or create a new one). Make sure you have verified your email address. Then, follow this link https://classroom.github.com/a/E8i7jPa9 and wait a few seconds until the repository is set up (you need to refresh the page). Follow the instructions in README.md to complete your first assignment. The assignment is due Monday, August 21st at 10:00 PM.

5 Appendix

5.1 VirtualBox

First, download the Ubuntu 20.04 Desktop installation image: https://ubuntu.com/download/desktop

Visit the following page to download the VirtualBox installer that is appropriate for the target machine: https://www.virtualbox.org/wiki/Downloads

Once VirtualBox is installed, a new virtual machine instance must be created. After launching Virtual-Box, click the "New" button.



Use the following dialog to select an appropriate name and storage location for the new VM. Use this dialog to select Linux Ubuntu (64-bit) as the Type and Version as shown here.

Name and c	operating system
rivanic and c	peruting system
machine and sel The name you c machine.	ect the type of operating system you intend to install on it. hoose will be used throughout VirtualBox to identify this
Name:	
	creset to default >
Machine Folder:	sicace to defidure?
Machine Folder: Type:	Linux - 54
Machine Folder: Type: Version:	Linux Ubuntu (64-bit)

Next, set the amount of RAM that will be allocated to the VM. A minimum of 4 GB is recommended. However, if the target machine has enough RAM to allow for a higher setting, that can allow the VM to be more effective. This setting can also be changed after setup at any time as long as the VM is powered down.

			?	×
← (reate Virtual Machine			
M	emory size			
Se	lect the amount of memory (RAM) in meg tual machine.	abytes to be alloc	ated to	the
Th	e recommended memory size is 1024 MB			
			2048	MB
4 M	В	16384 MB		
		Next	Car	ncel

The next step will be to create a new virtual hard disk.

		?	×
← Create Virtual Machine			
Hard disk			
If you wish you can add a virtual hard disk to the either create a new hard disk file or select one fi location using the folder icon.	e new machine. rom the list or fi	You car om ano	n ther
If you need a more complex storage set-up you the changes to the machine settings once the m	can skip this ste achine is create	ep and r d.	nake
The recommended size of the hard disk is 10.00	GB.		
O Do not add a virtual hard disk			
Oreate a virtual hard disk now			
O Use an existing virtual hard disk file			
ISE_S6_VM.vmdk (Normal, 64.00 GB)		Ŧ	
	Create	Cance	el

Use the default setting of VDI (VirtualBox Disk Image)

		?	×
← Create Virtual Hard Disk			
Hard disk file type			
Please choose the type of file that you would li hard disk. If you do not need to use it with oth can leave this setting unchanged.	ke to use for the r er virtualization so	new virtu oftware y	ial /ou
VDI (VirtualBox Disk Image)			
○ VHD (Virtual Hard Disk)			
O VMDK (Virtual Machine Disk)			
Expert Mode	Next	Can	icel

Next, select how storage will be allocated on the physical disk. It is recommended to use the default option of Dynamic allocation, but if a fixed size is desired that option can be selected as well.

÷	Create Virtual Hard Disk
	Storage on physical hard disk
	Please choose whether the new virtual hard disk file should grow as it is used (dynamically allocated) or if it should be created at its maximum size (fixed size).
	A dynamically allocated hard disk file will only use space on your physical hard disk as it fills up (up to a maximum fixed size), although it will not shrink again automatically when space on it is freed.
	A fixed size hard disk file may take longer to create on some systems but is often faster to use.
	Dynamically allocated
	○ Eixed size
	Next Cancel

? ×

Select the desired location and size for the virtual hard disk. If a dynamic allocation method was selected in the previous step, this setting will be used to limit the maximum size of the virtual drive (allocation will take place as needed up to the selected size). If a fixed size was selected, the size entered here will be immediately reserved on the physical drive. The minimum recommended size is 20 GB.

File location and siz	e		
Please type the name of th on the folder icon to select	e new virtual hard disk file into the a different folder to create the file	e box below e in.	or cli
Select the size of the virtua	al hard disk in megabytes. This size virtual machine will be able to store	is the limit	on the
anount of the data that a		- on and man	
		20	.00 G
4.00 MB	2.00 TB	20	1.00 G
4.00 MB	2.00 TB	20	1.00 G

At this point the VM setup will be complete. However, the Linux Ubuntu operating system must still be installed. Select the new VM and click the settings button.



Use the settings menu to select Storage from the left hand menu. Next, select the currently empty device under the IDE controller. Then, click the CD icon and click the option to choose a disk file to select a disk which will be loaded into the virtual drive. Use the file browser dialog to select the Ubuntu 20.04 Desktop image that was downloaded earlier.

	x seconds				
T 📃	General	Storage			
	System	Storage Devices	Attributes Optical Drive:	IDE Secondary Device 0	
•	Storage	Controller: SATA	Information	Live CD/DVD	Choose a virtual optical disk or a physical drive to use with the virtu
	Audio Network	uu 🖸 .vdi	Size: Location:	-	disk inserted into the drive with th data in the file or on the disk in th physical drive as its contents.
	Serial Ports		Attached to:	-	
	USB Shared Folders				
=	User Interface				
		🖕 🖓 🛱 📴		OK Car	cel

The Storage dialog should now show that the Ubuntu image is loaded into the IDE controller's virtual disk drive. Click "ok" to close the settings dialog.



The VM can now be powered on. Click the start button.



The VM will start up and boot from the selected Ubuntu Desktop image found in the virtual disk drive. Click the Install Ubuntu button.



Select the desired keyboard layout for the VM.



Use the default values for the updates and other software options



Next, instruct the installer to erase the entire disk. This will only erase the virtual disk (none of the host system files will be erased). Click the Install Now button and then select Continue from the following dialog to begin the installation process.

🜠 test [Running] - Oracle VM VirtualBox	-			\times
File Machine View Input Devices Help				
Sun 16:30	- ^	4 (1)	Φ	•
Install				8
Installation type				
This computer currently has no detected operating systems. What would you like to do?				
Erase disk and install Ubuntu Warning: This will delete all your programs, documents, photos, music, and any other files in all operating sys	tems.			
 Encrypt the new Ubuntu installation for security You will choose a security key in the next step. 				
 Use LVM with the new Ubuntu installation This will set up Logical Volume Management. It allows taking snapshots and easier partition resizing. 				
 Something else You can create or resize partitions yourself, or choose multiple partitions for Ubuntu. 				
Quit Back	Ins	itall I	Now	
• • • • • •				
	2010	R	ight C	tri .:

Follow the prompts to select an appropriate time zone and configure a user and password for the VM's guest operating system. When the installation is complete, click the Restart Now button.



At this point, the installer will pause to give the user time to remove the installation disk. VirtualBox usually handles this automatically, but to verify the Ubuntu disk has been removed, click Devices then Optical Devices and ensure there is no check mark next to the Ubuntu disk image. If there is a check mark, click the disk image menu option and select force unmount. Hit the enter key to reboot the machine.



Upon rebooting, the login screen with the configured user name should appear. If the Ubuntu installation menu appears again, it will need to be removed manually through the settings dialog. Shutdown the machine. Using the menu, select Machine, then ACPI Shutdown.



Now that the machine is powered off, use the VirtualBox settings menu to remove the Ubuntu installation disk image.

🗿 Oracle	VM VirtualBox Manage	er		-		×
<u>File M</u> a	😟 test - Settings			?	×	
	General	Storage				
80 I	System	Storage Devices	Attributes	TTT Council on Device Council		
	Display	 Controller: IDE ubuntu-18.04.5-desktop-amd6 	Optical Drive:	Live CD/DVD		Choose/Create a Virtual Optical Disk
2	Audio	Controller: SATA	Type: Size:	Image 2.04 GB	1	ubuntu-18.04.5-desktop-amd64.iso
	Network		Location: Attached to:	D: Wate (Downloads)ubuntu-18 	(<u>)</u> F	Remove Disk from Virtual Drive
	Senar Ports					
	Shared Folders					
	User Interface					
		💩 💿 📓		180-00-080		
		ananter 11 Inter excurring m	LIESTIN ING L	OK Cancel		

Now that the disk has been removed, close the settings dialog and start the VM again.