CSE130: Principles of Computer Systems Design

Teaching Assistant: Nilufar Ferdous

Environment Setting

- You can download the host software from for Windows and OSX from https://www.virtualbox.org/wiki/Downloads
- You can download the Ubuntu 18.04.3 installation ISO image from https://ubuntu.com/download/desktop and click the download button in the Ubuntu 18.04.3 LTS box.

Root user

Before you install packages, becoming root using the su root command.

#su –

After you installed packages, using following command to logout root:

#exit

Installs the git system:

#pkg install git

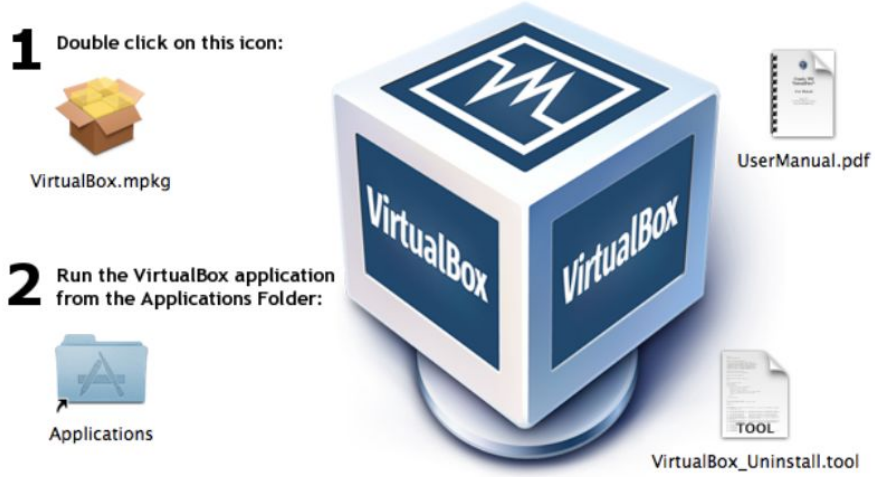
1) Download VirtualBox

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

Save the DMG to a location on your computer where you will be able to find it (Downloads, Desktop, etc.). If you are on a Mac, you need the version for “OS X hosts.”

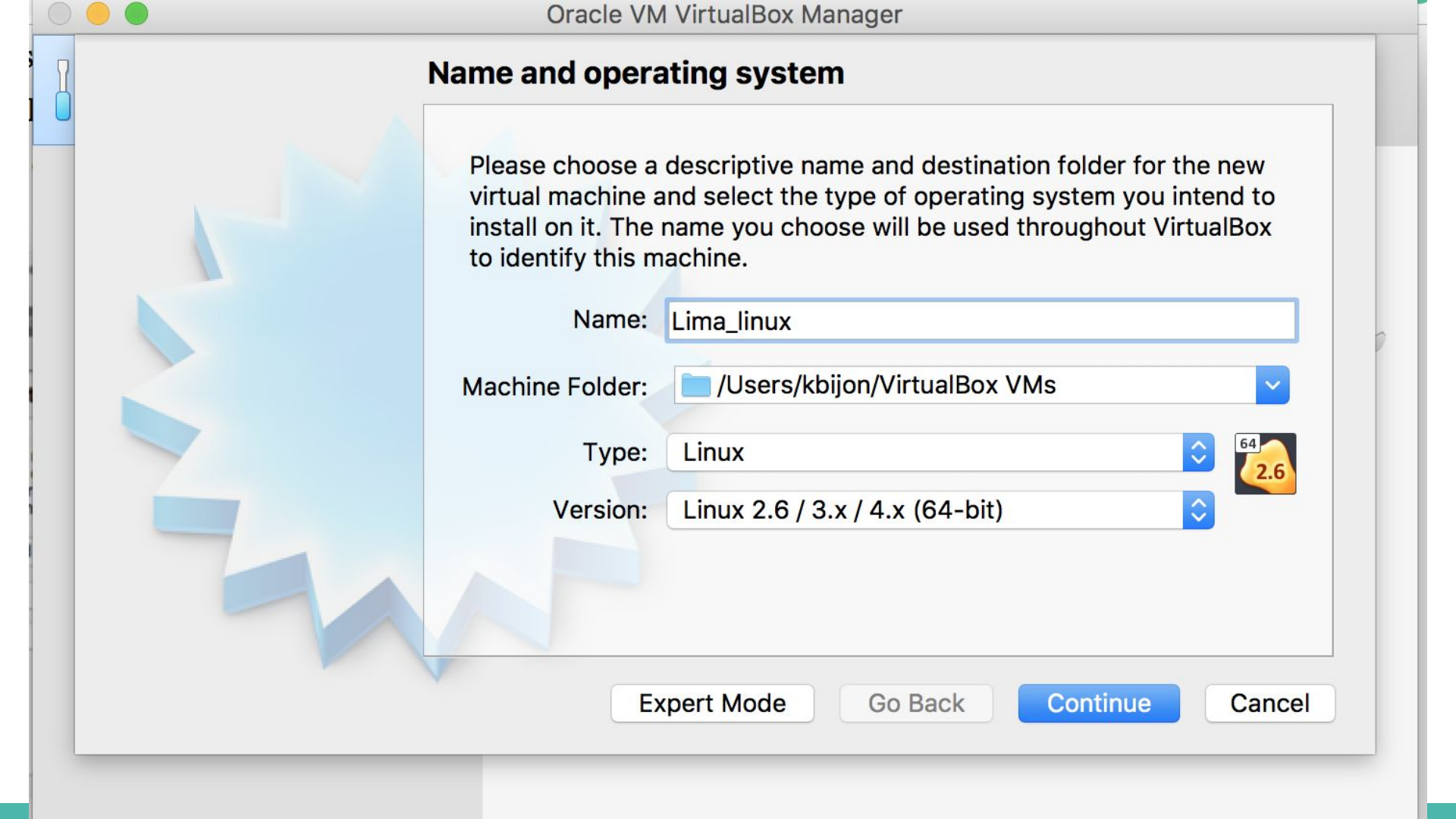
2) Install VirtualBox

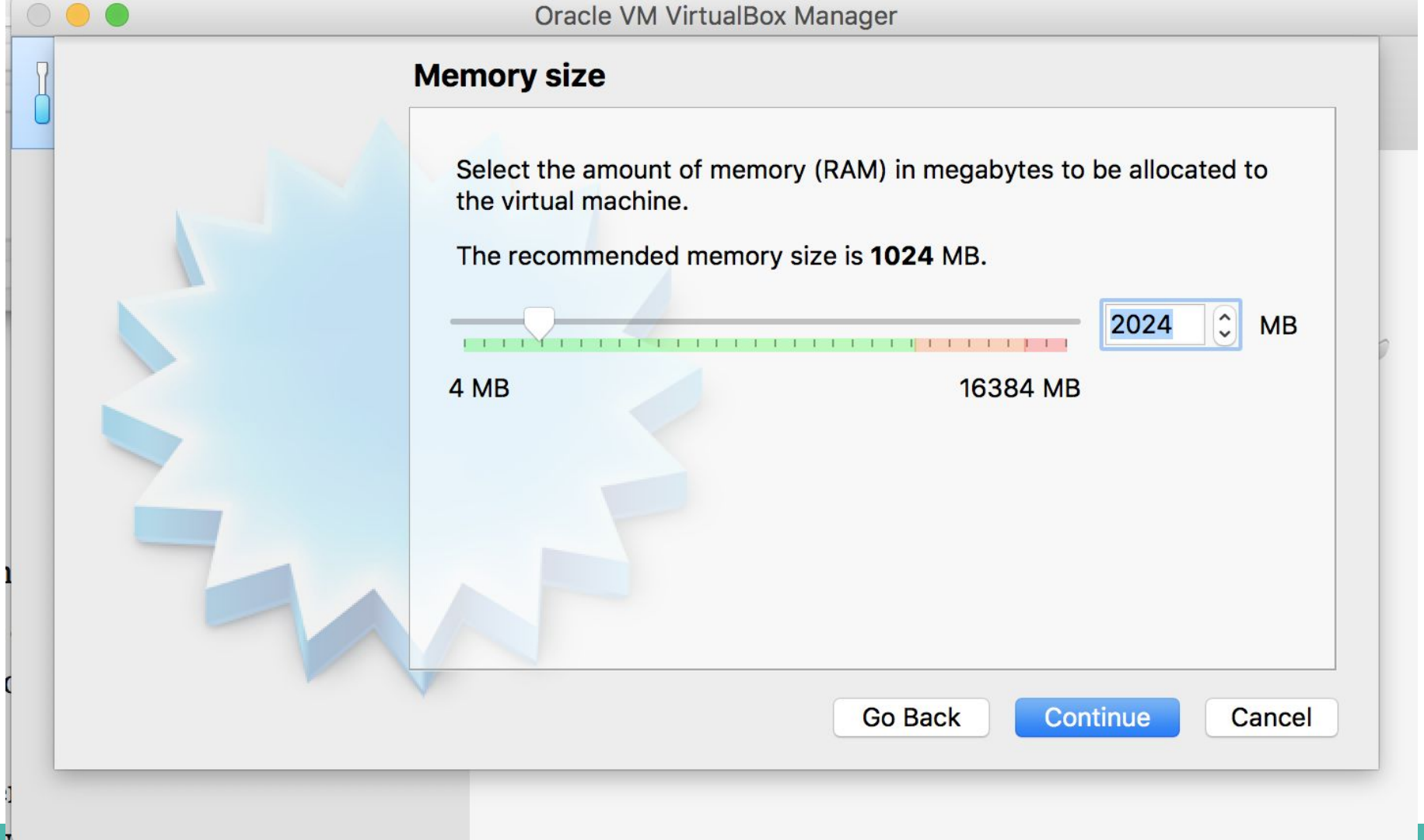
VirtualBox must be installed before it can be used. When you mount the DMG, you must then run the VirtualBox installer, which will place VirtualBox into your Applications folder.

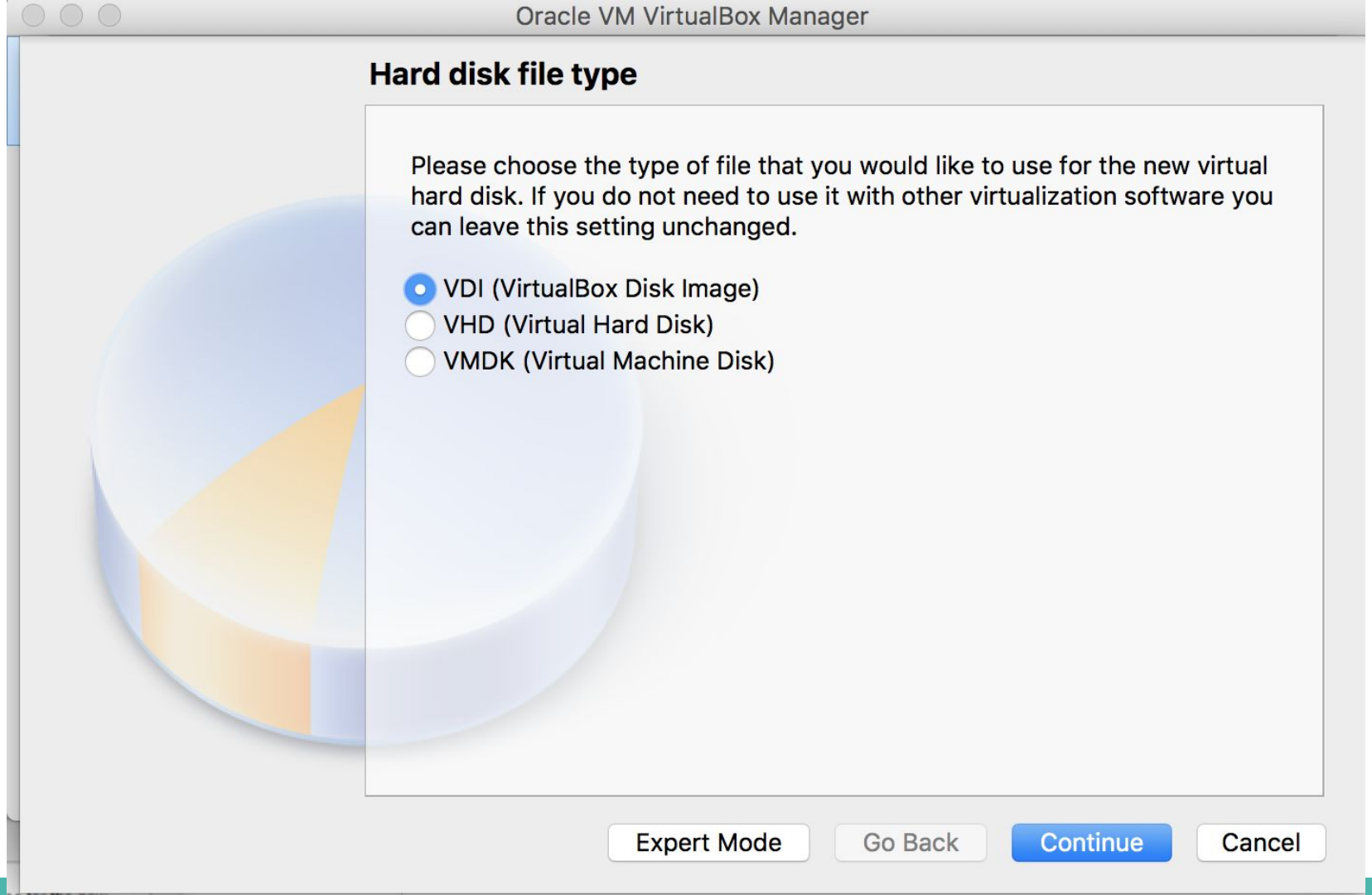


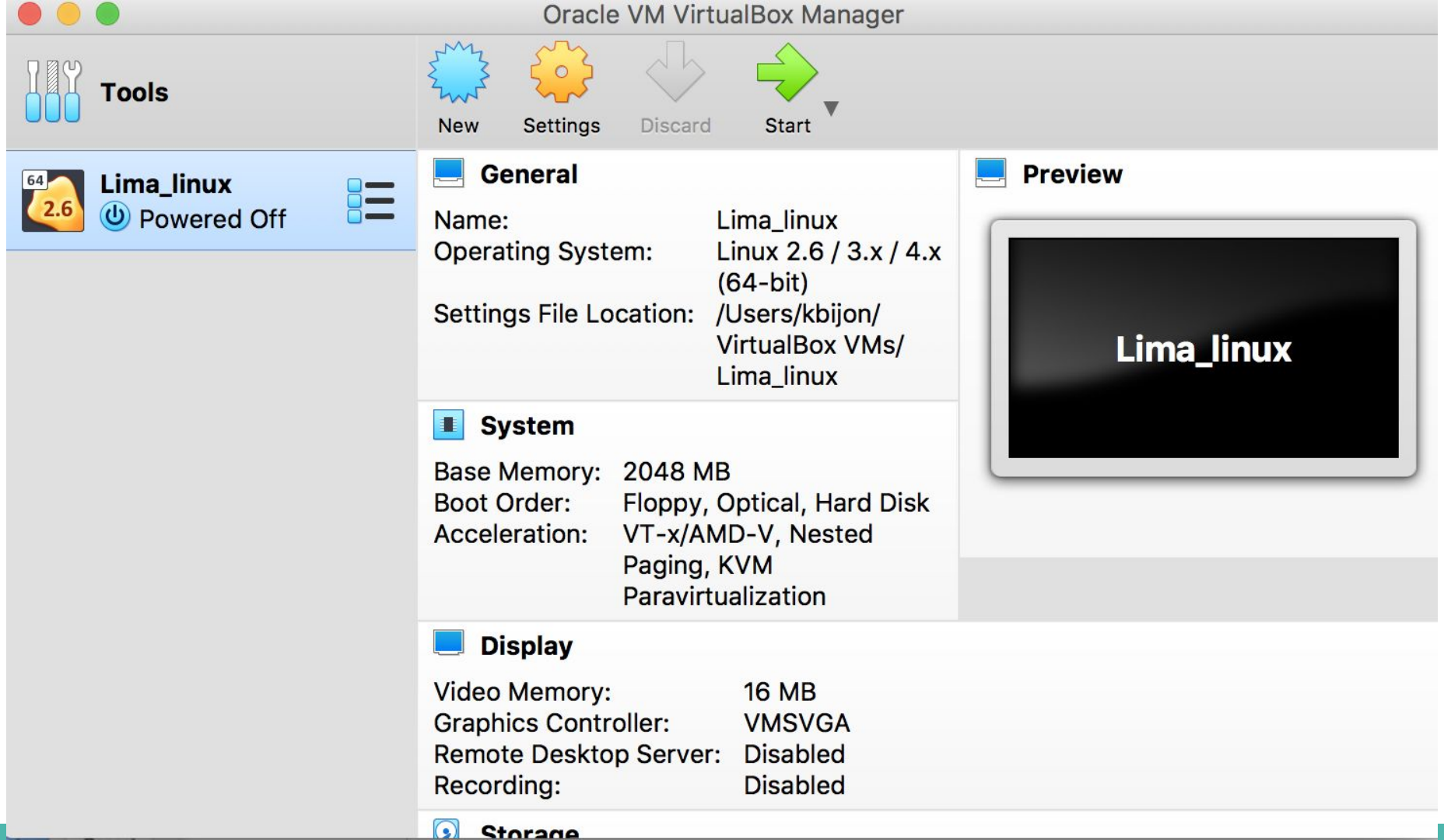
3) Create your Virtual Machine (VM)

1. When you run VirtualBox for the first time, there will be no virtual machines (VMs) installed.

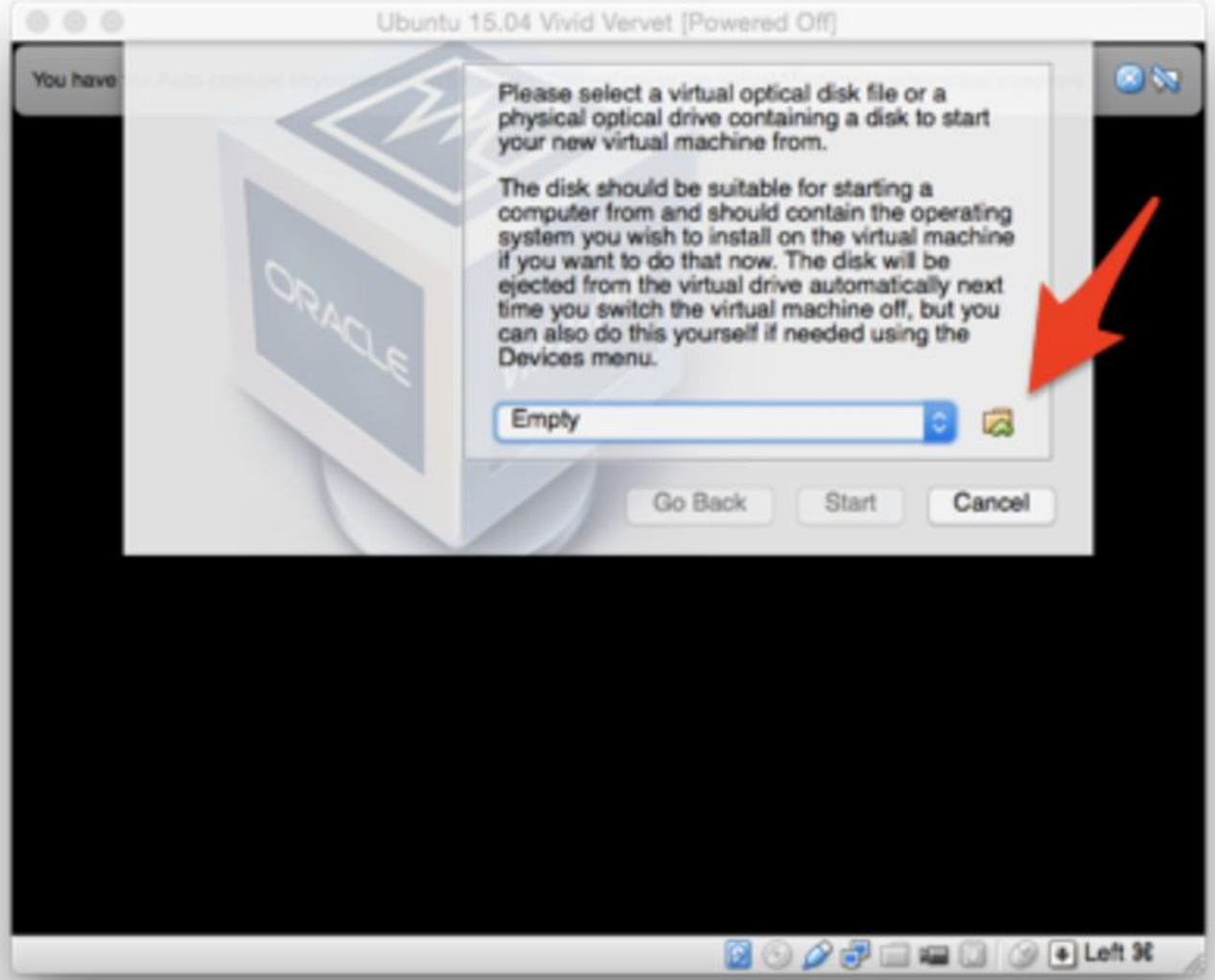

Oracle VM VirtualBox Manager
Name and operating system
Please choose a descriptive name and destination folder for the new virtual machine and select the type of operating system you intend to install on it. The name you choose will be used throughout VirtualBox to identify this machine.
Name:
Lima_linux
Machine Folder:
/Users/kbijon/VirtualBox VMs
Type:
Linux
Version:
Linux 2.6 / 3.x / 4.x (64-bit)
64
2.6
Expert Mode
Go Back
Continue
Cancel

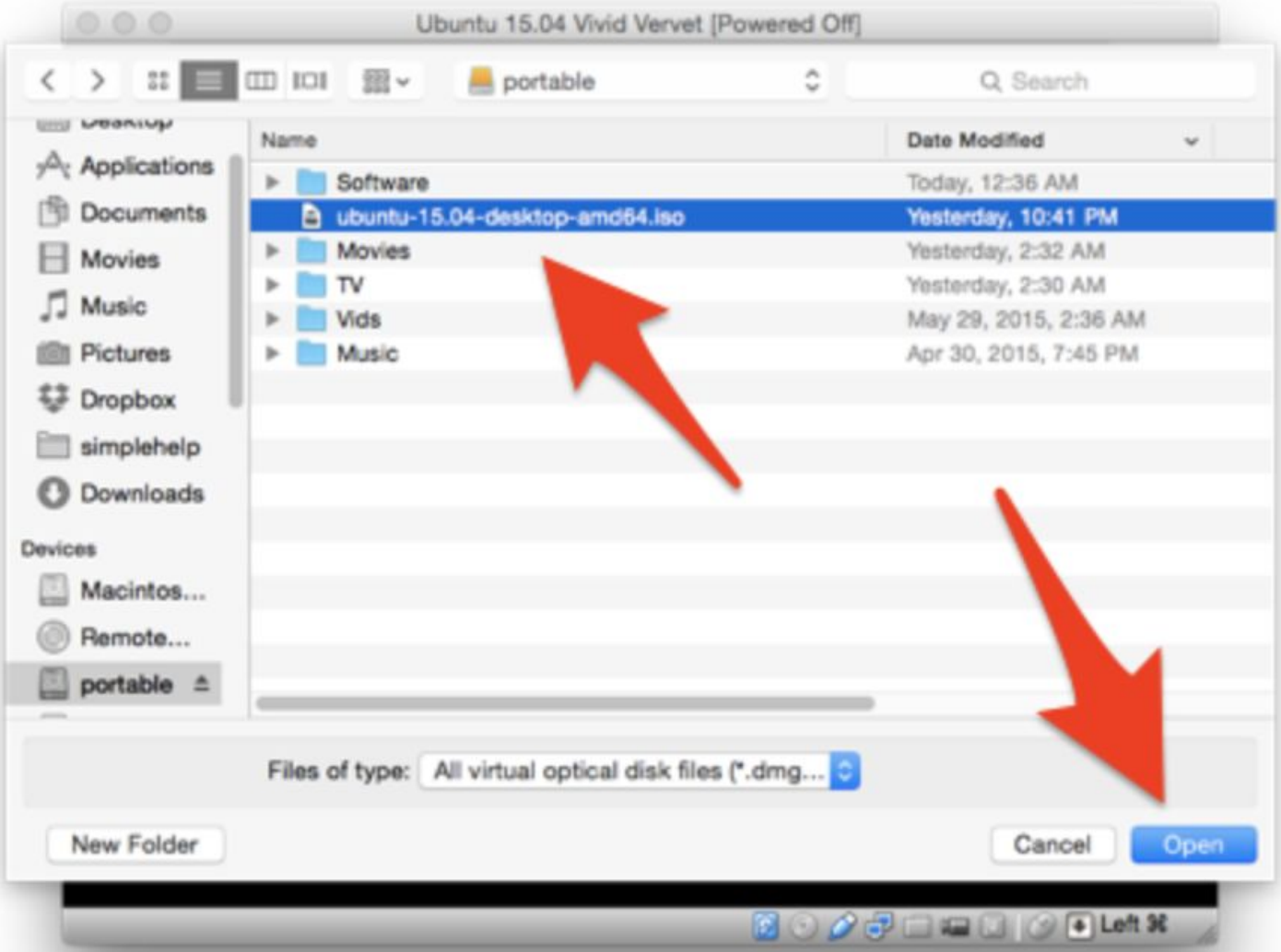

Oracle VM VirtualBox Manager
Memory size
Select the amount of memory (RAM) in megabytes to be allocated to the virtual machine.
The recommended memory size is 1024 MB.
2024
MB
4 MB
16384 MB
Go Back
Continue
Cancel

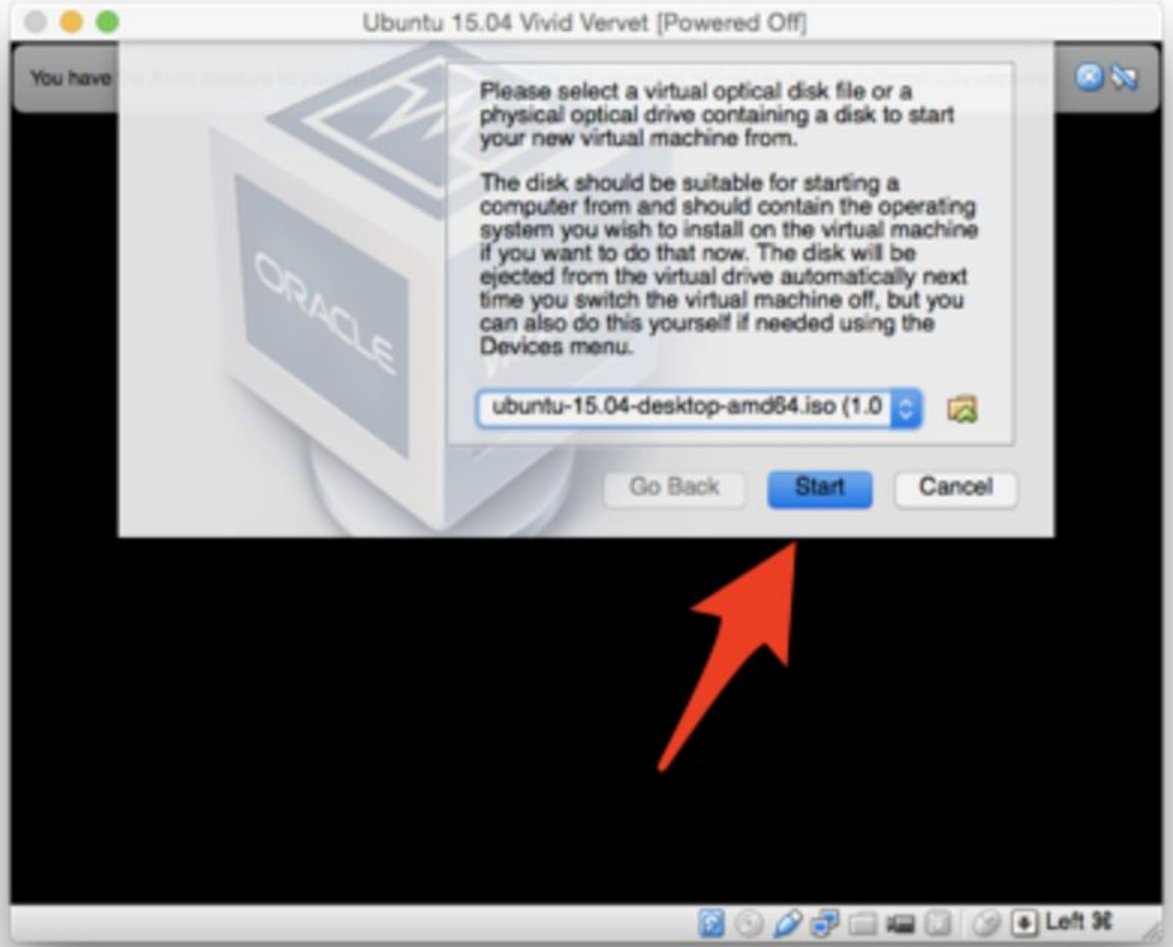

Oracle VM VirtualBox Manager
Hard disk file type
Please choose the type of file that you would like to use for the new virtual hard disk. If you do not need to use it with other virtualization software you can leave this setting unchanged.
VDI (VirtualBox Disk Image)
VHD (Virtual Hard Disk)
VMDK (Virtual Machine Disk)
Expert Mode
Go Back
Continue
Cancel

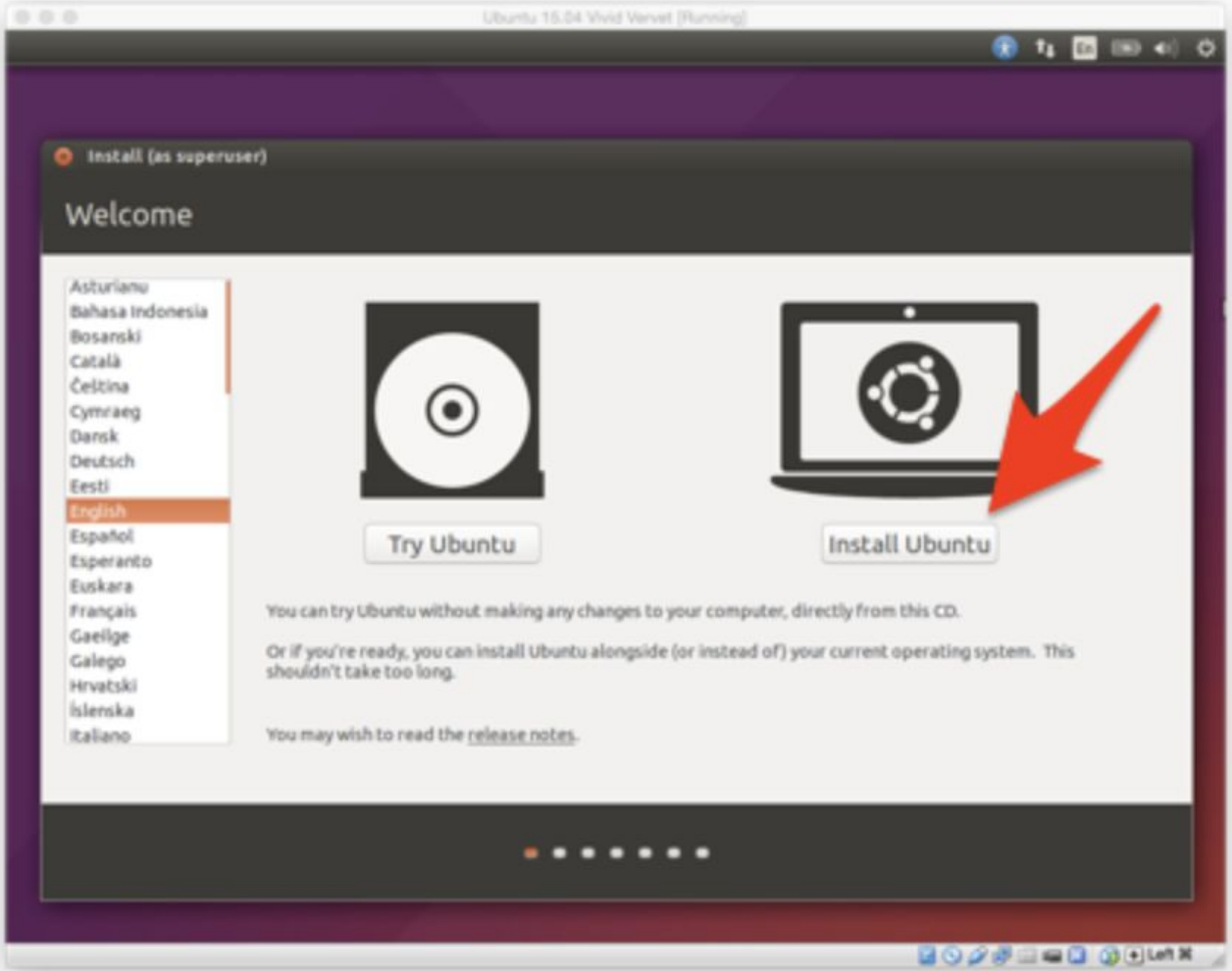

Oracle VM VirtualBox Manager
Tools
New
Settings
Discard
Start
Lima_linux
Powered Off
General
Name: Lima_linux
Operating System: Linux 2.6 / 3.x / 4.x (64-bit)
Settings File Location: /Users/kbijon/VirtualBox VMs/Lima_linux
Preview
Lima_linux
System
Base Memory: 2048 MB
Boot Order: Floppy, Optical, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging, KVM Paravirtualization
Display
Video Memory: 16 MB
Graphics Controller: VMSVGA
Remote Desktop Server: Disabled
Recording: Disabled
Storage

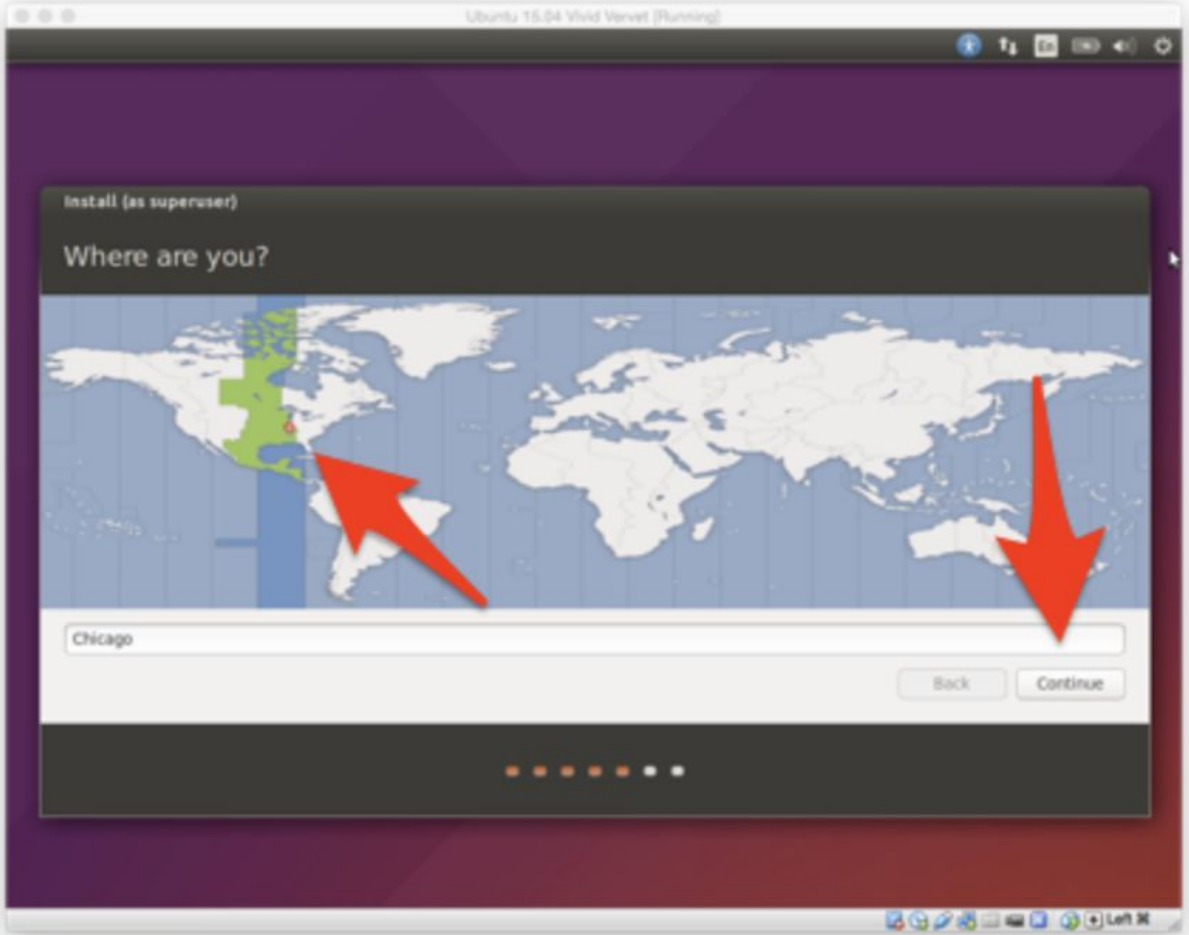

Oracle VM VirtualBox Manager
New
Settings
Start
Details
Snapshots
Ubuntu 15.04 Viv...
Powered Off
General
Name: Ubuntu 15.04 Vivid Vervet
Operating System: Ubuntu (64 bit)
System
Base Memory: 2048 MB
Boot Order: Floppy, CD/DVD, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging
Preview
Ubuntu 15.04 Vivid Vervet
Display
Video Memory: 12 MB
Remote Desktop Server: Disabled
Video Capture: Disabled
Storage


Ubuntu 15.04 Vivid Vervet [Powered Off]
You have
Please select a virtual optical disk file or a physical optical drive containing a disk to start your new virtual machine from.
The disk should be suitable for starting a computer from and should contain the operating system you wish to install on the virtual machine if you want to do that now. The disk will be ejected from the virtual drive automatically next time you switch the virtual machine off, but you can also do this yourself if needed using the Devices menu.
Empty
Go Back
Start
Cancel
Left ⌘


Ubuntu 15.04 Vivid Vervet [Powered Off]
portable
Search
Applications
Documents
Movies
Music
Pictures
Dropbox
simplehelp
Downloads
Devices
Macintos...
Remote...
portable
Name
Date Modified
Software
Today, 12:36 AM
ubuntu-15.04-desktop-amd64.iso
Yesterday, 10:41 PM
Movies
Yesterday, 2:32 AM
TV
Yesterday, 2:30 AM
Vids
May 29, 2015, 2:36 AM
Music
Apr 30, 2015, 7:45 PM
Files of type:
All virtual optical disk files (*.dmg...
New Folder
Cancel
Open
Left ⌘


Ubuntu 15.04 Vivid Vervet [Powered Off]
You have
Please select a virtual optical disk file or a physical optical drive containing a disk to start your new virtual machine from.
The disk should be suitable for starting a computer from and should contain the operating system you wish to install on the virtual machine if you want to do that now. The disk will be ejected from the virtual drive automatically next time you switch the virtual machine off, but you can also do this yourself if needed using the Devices menu.
ubuntu-15.04-desktop-amd64.iso (1.0
Go Back
Start
Cancel
Left ⌘


Ubuntu 15.04 Vivid Vervet [Running]
Install (as superuser)
Welcome
Asturianu
Bahasa Indonesia
Bosanski
Català
Čeština
Cymraeg
Dansk
Deutsch
Eesti
English
Español
Esperanto
Euskara
Français
Gaeilge
Galego
Hrvatski
Íslenska
Italiano
Try Ubuntu
Install Ubuntu
You can try Ubuntu without making any changes to your computer, directly from this CD.
Or if you're ready, you can install Ubuntu alongside (or instead of) your current operating system. This shouldn't take too long.
You may wish to read the release notes.


Ubuntu 15.04 Vivid Vervet [Running]
Install (as superuser)
Where are you?
Chicago
Back
Continue
Left ⌘

Creating Your Virtual Machine

Making a new machine

- Open VirtualBox, and click the "New" button. Give your virtual machine a name, select "Linux" for "Type", and select "Ubuntu (64-bit) under "Version".
- On the next screen, set the amount of memory for your machine (at least as much as the default, but not more than your host machine has!)
- On the next screen, hit "create", then "next", then "next" again. For the size of the disk, the default is fine. Hit "create".
- Select your new virtual machine, and click "Settings...", then go to "Storage". Select the optical drive under "Controller: IDE" labeled "Empty", click the disk icon on the right of the window, and click "Choose Virtual Optical Disk File", like so:

- Select the ISO image of Ubuntu you downloaded earlier.

Installing Ubuntu

- Select your virtual machine in the main menu, and hit "Start". This should boot the Ubuntu installation system.
- When it's ready, click "Install Ubuntu". Select your keyboard layout (default is English US).
- On the next screen, select either Normal Installation or Minimal Installation; either is fine, we'll be explicitly installing packages we need later on anyway. Minimal takes less space, but normal installs other things you can use and play around with. Pick one, and hit continue, and then "Install Now".
- Select your timezone, and then create a user account on the next screen. Hit next, and wait for the install to finish. When it's done, hit restart, then ENTER.

Set up

1. Basic packages. Install build-essential, clang, git, make, valgrind, lldb, clang-format. You can do this by opening a terminal and running:
   `sudo apt install build-essential clang git make valgrind lldb clang-format`
   This will install the packages you'll need to develop and submit your assignments.
2. Install an editor of your choice. This might be a graphical text editor, emacs, vim, etc.
3. Install the VirtualBox guest additions (improves the usability of the virtual machine). In a terminal, run:
   `sudo apt install virtualbox-guest-utils virtualbox-guest-x11 virtualbox-guest-dkms`
4. Reboot the machine (top right corner of Ubuntu's UI, there's a power icon).

System Call for Reading/ Writing File

Name

open : open a file

Declaration

#include <fcntl.h>
int open(const char *_path_**, int** _oflag_**, ...);**

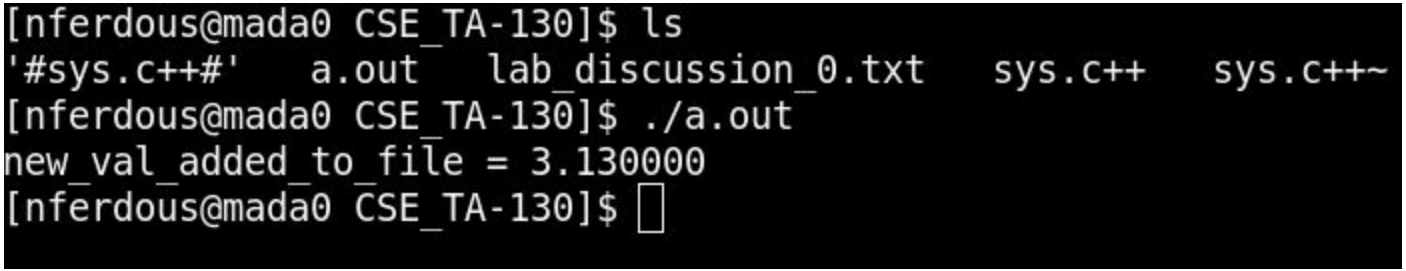
O_RDONLY :Open for reading only
O_WRONLY:Open for writing only
O_CREAT: the file shall be created

Example

```c
#include <unistd.h>
#include <fcntl.h>
#include <stdio.h>

int main()
{
    // Open file with write permission (create if doesn't exist).
    int fd = open("lab_discussion_0.txt", O_CREAT | O_WRONLY);
    float val = 3.13f;
    if (fd != -1) {
        write(fd, &val, sizeof(val));
        close(fd);
    }

    // Test read.
    fd = open("lab_discussion_0.txt", O_RDONLY);
    float new_val;
    if (fd != -1) {
        read(fd, &new_val, sizeof(new_val));
        printf("new_val_added_to_file = %f\n", new_val);
        close(fd);
    }
    return 0;
}
```


[nferdous@mada0 CSE_TA-130]$ ls
'#sys.c++#'   a.out   lab_discussion_0.txt   sys.c++   sys.c++~
[nferdous@mada0 CSE_TA-130]$ ./a.out
new_val_added_to_file = 3.130000
[nferdous@mada0 CSE_TA-130]$

Gitlab

- Clone a repository from gitlab
- Installs the git system:
  - #pkg install git
- Create an account in UCSC GitLab.
- Generate SSH key pair and upload the SSH key to GitLab
- Create your initial directory by cloning it from the server:

  #git clone https://gitlab.soe.ucsc.edu/gitlab/cse130/fall19-01-group/[CRUZID].git

Adding Files and Commit

- Add new files to your repository. Do this as follows: git add file1 file2
- Made some changes. You probably want to commit them, so the changes are recorded in the repository. Do this with:

  git commit -a -m message

  -a: commits all (the -a option) of the changes you've made to tracked files.

  -m:message on the command line

- Once you've made changes locally, you'll probably want to make the remote repository reflect your changes. Do this with the following command: git push --all


Question?


thank you