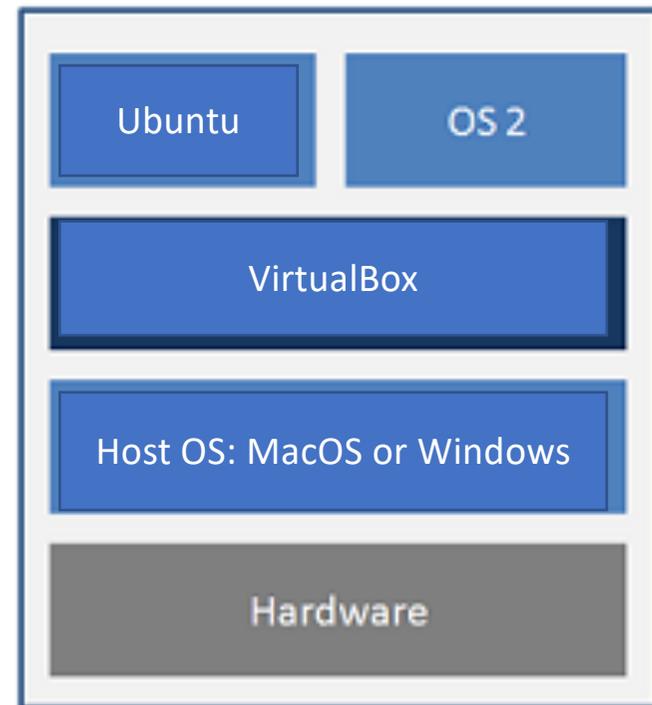


LING 408/508: Programming for Linguists

Lecture 5

Last Time

- Installing Ubuntu 18.04 LTS on top of VirtualBox
- Your Homework 2: *did everyone succeed?*
- Next slide: MacOS Catalina Problem



Hosted Architecture

MacOS Catalina

[Homar Aguilar] solved the issue by installing VB 6.0 instead of VB 6.1. (https://www.virtualbox.org/wiki/Download_Old_Builds_6_0)

forums.virtualbox.org › viewtopic ▼

[virtualbox.org • View topic - Virtualbox installation issue on ...](#)

Dec 12, 2019 - I am trying to install **Virtualbox 6.1.0** on Mac OS **Catalina**. The installation is not successful. I read many blogs to enable the installation in ...

forums.virtualbox.org › viewtopic ▼

[virtualbox.org • View topic - Installation on MacOS 10.15.1 fails](#)

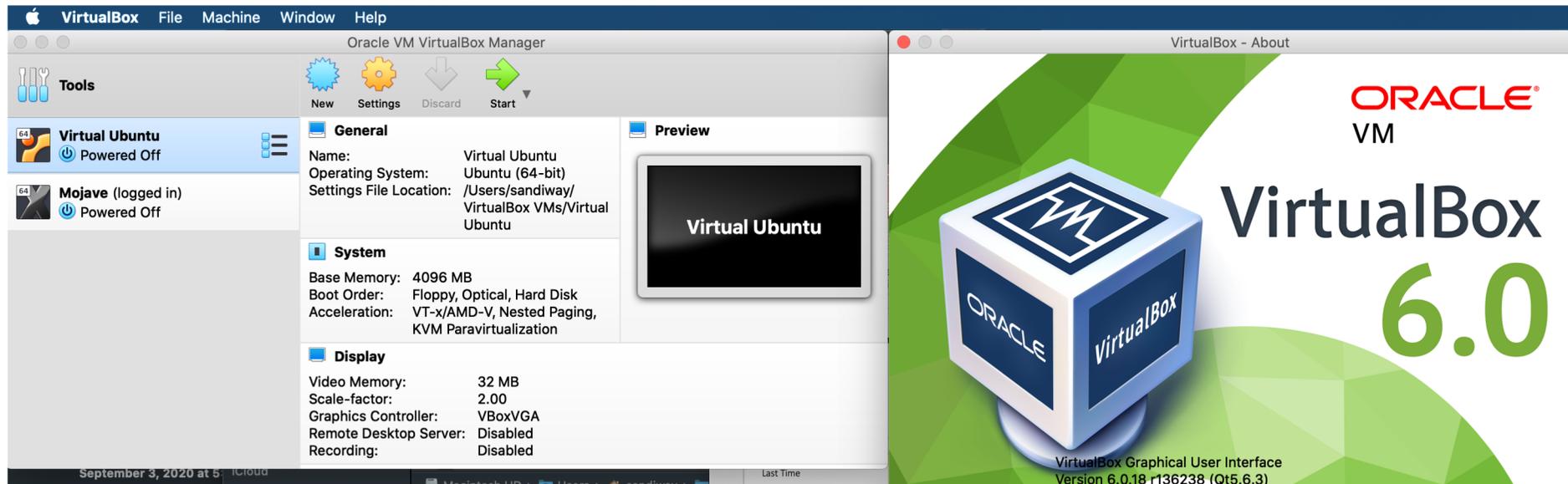
Nov 12, 2019 - I just updated to MacOS 10.15.1 (**Catalina**) and I want to install **VirtualBox** (6.0.14), but the ... by socratis » Wed Nov 13, 2019 6:47 am. Timo002 ...

forums.virtualbox.org › viewtopic ▼

[Virtualbox 6.1.4 crashes on Catalina 10.15.4 - VirtualBox forums](#)

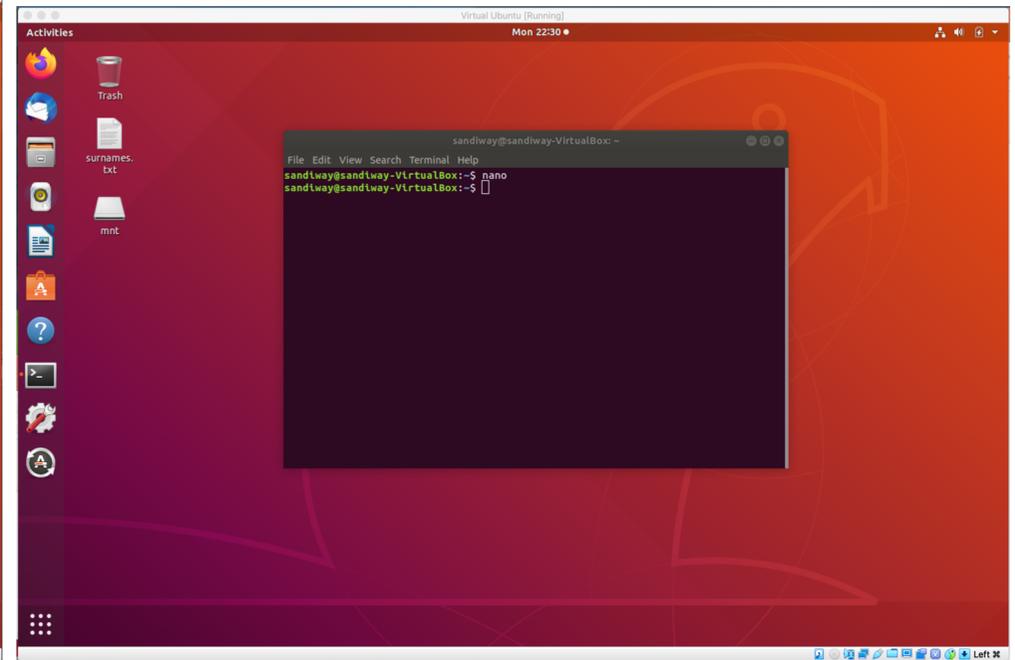
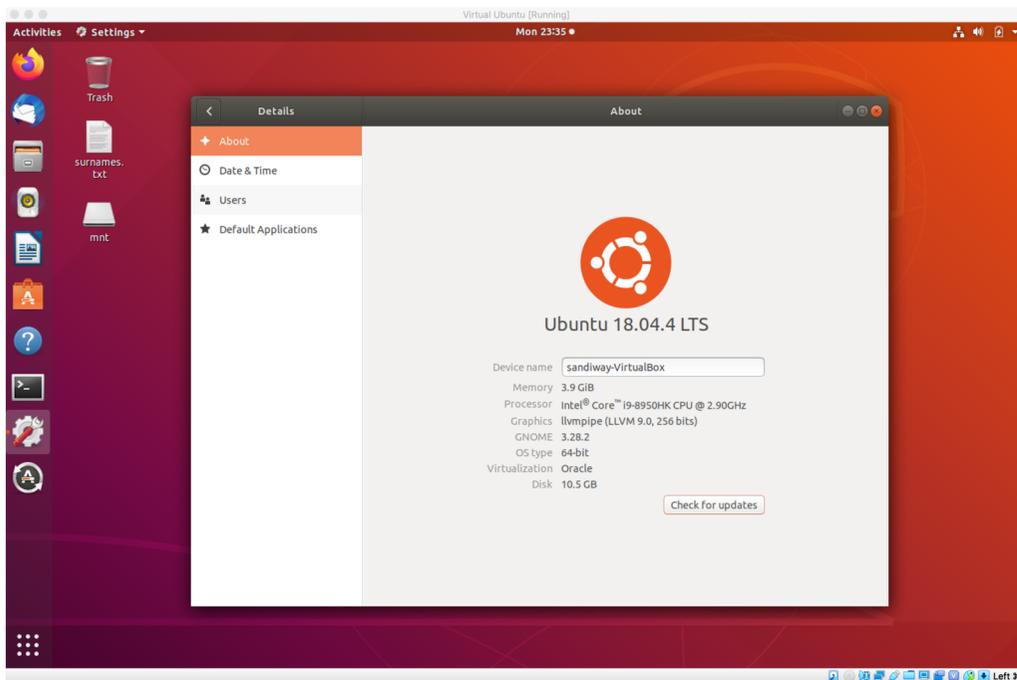
Apr 2, 2020 - I have a fresh build MacOS **Catalina** (10.15.4) running **Virtualbox 6.1.4** and cannot get a Windows VM to build via the Microsoft Developer ovf ...

My installation (MacOS Catalina)

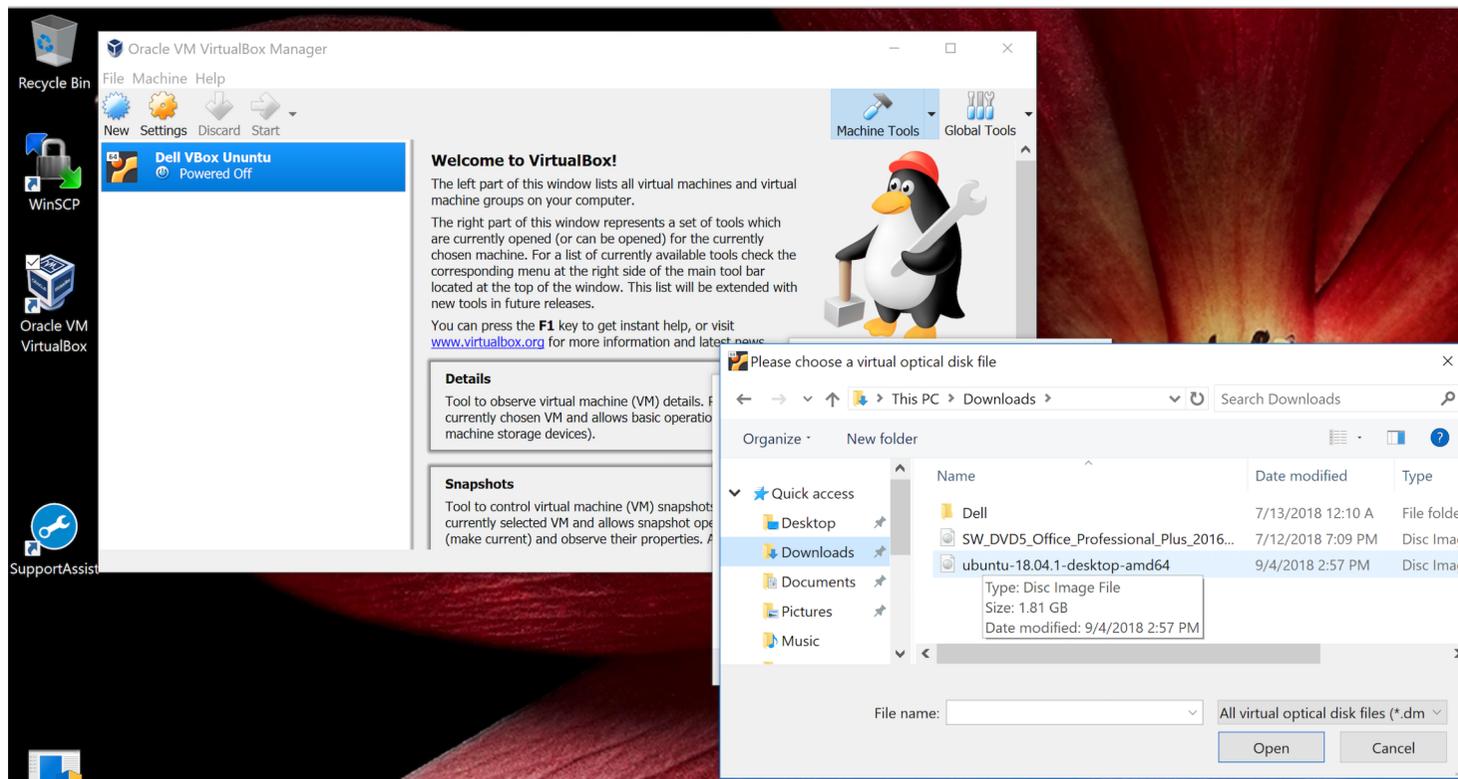


My installation (MacOS Catalina)

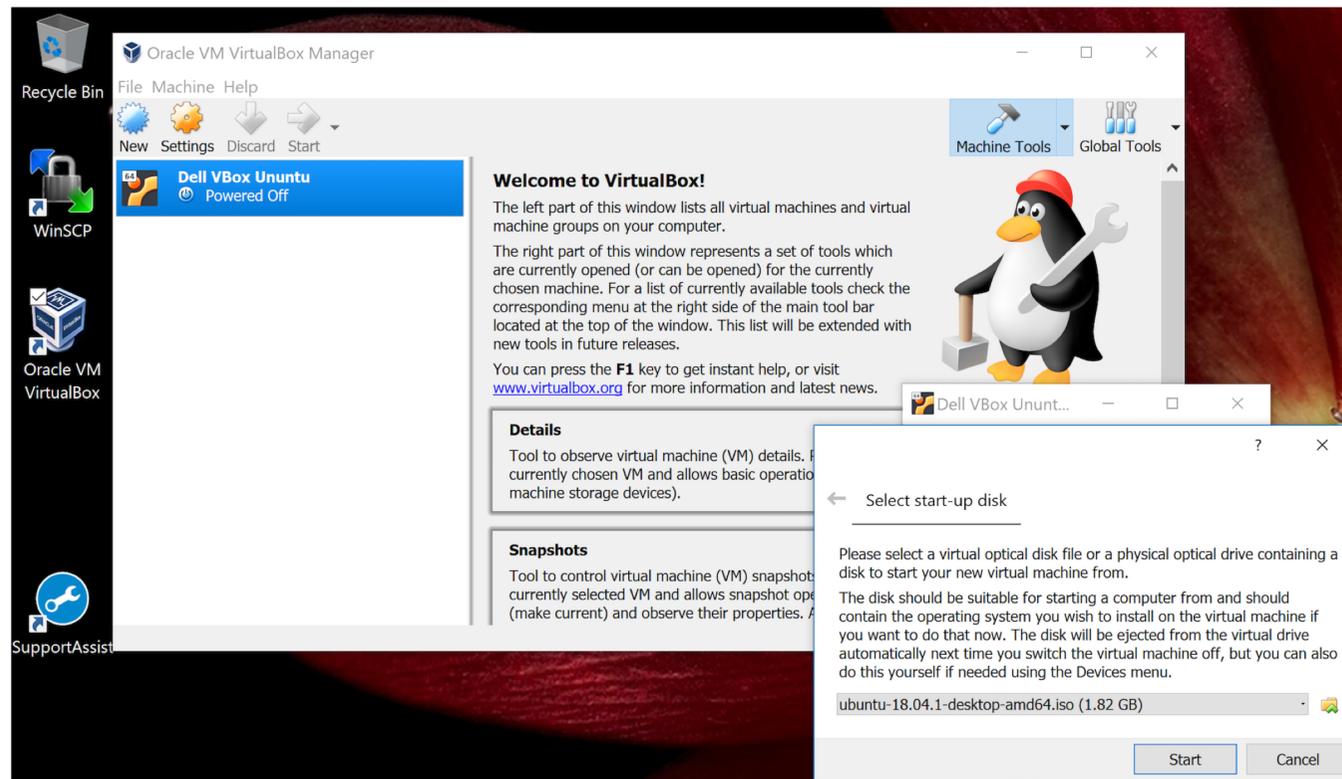
- Terminal then nano:



My Windows 10 install



My Windows 10 install



A Windows 10 alternative

- Windows Subsystem for Linux
 - <https://docs.microsoft.com/en-us/windows/wsl/>

Windows Subsystem for Linux Documentation

07/22/2020 • 2 minutes to read • 

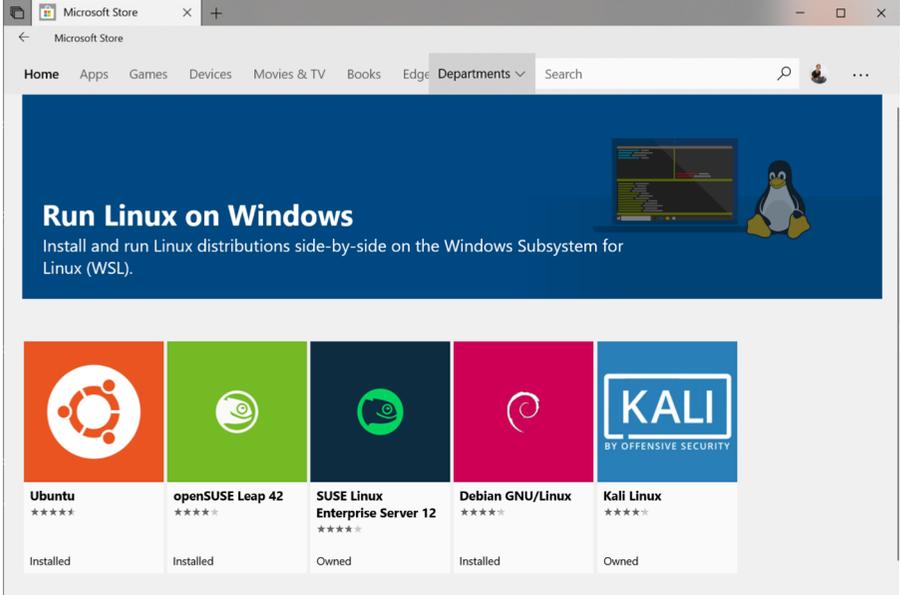
The Windows Subsystem for Linux lets developers run a GNU/Linux environment -- including most command-line tools, utilities, and applications -- directly on Windows, unmodified, without the overhead of a traditional virtual machine or dualboot setup.

Learn more here

- [What is the Windows Subsystem for Linux?](#)
- [What's new with WSL 2?](#)
- [Compare WSL 2 and WSL 1](#)
- [Read frequently asked questions](#)

Get started

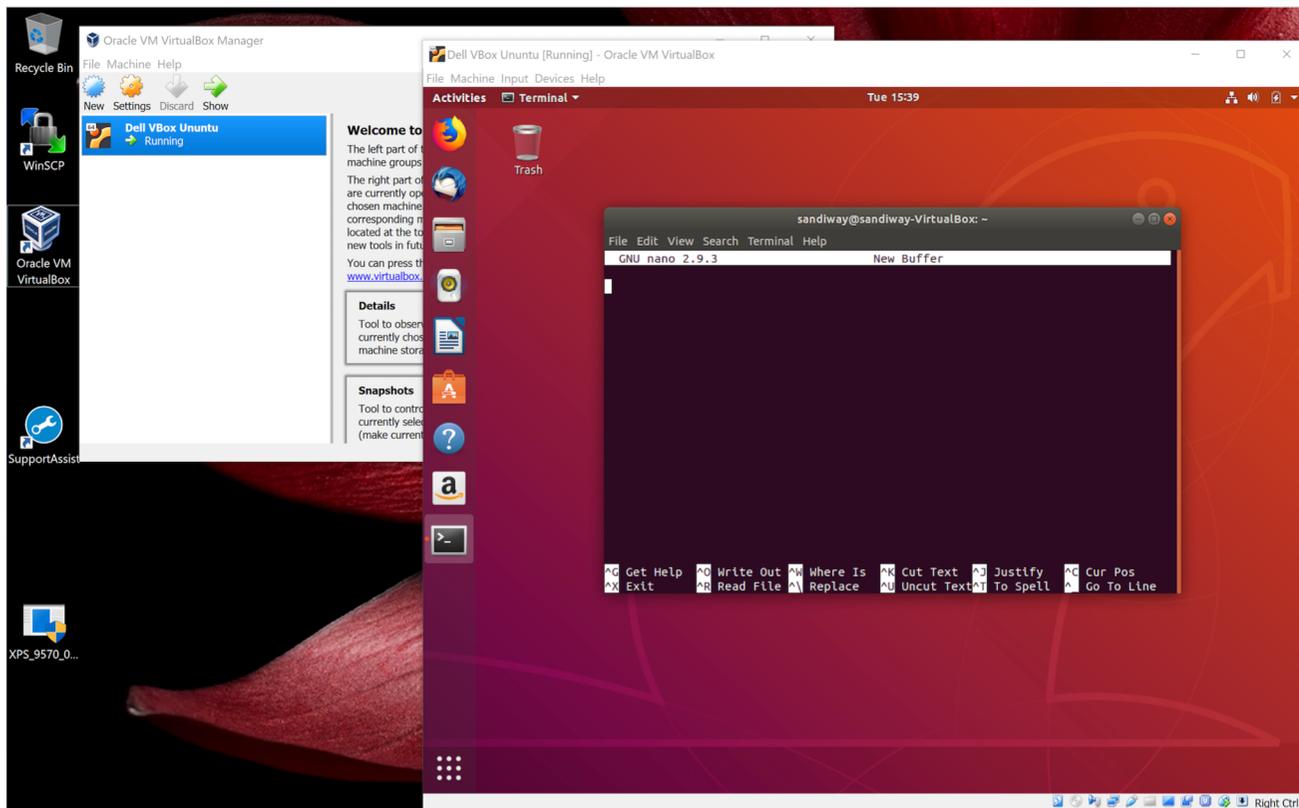
- [Install WSL1](#)
- [Update to WSL2](#)



The screenshot shows the Microsoft Store interface with a search for Linux distributions. The main banner reads "Run Linux on Windows" and "Install and run Linux distributions side-by-side on the Windows Subsystem for Linux (WSL)". Below the banner, five Linux distributions are listed with their logos, names, star ratings, and installation status:

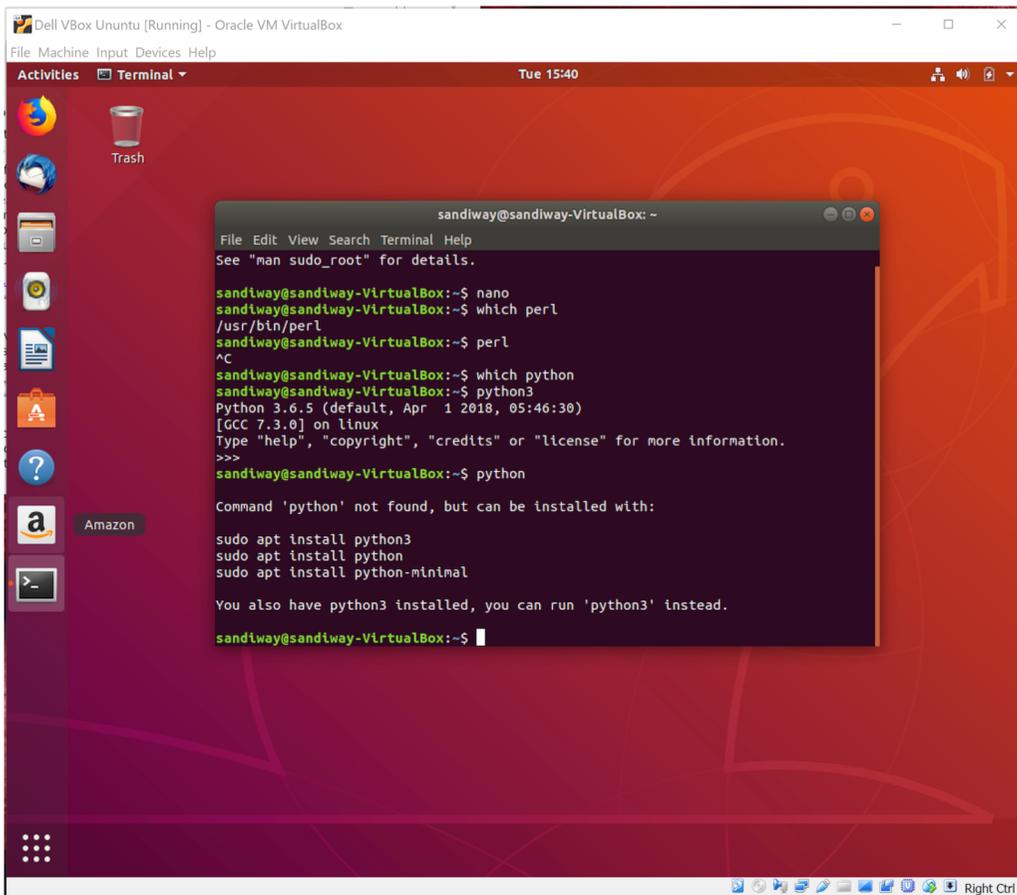
Distribution	Star Rating	Status
Ubuntu	★★★★★	Installed
openSUSE Leap 42	★★★★★	Installed
SUSE Linux Enterprise Server 12	★★★★★	Owned
Debian GNU/Linux	★★★★★	Installed
Kali Linux	★★★★★	Owned

Ubuntu



- Text editor (built in)
 - nano is a decent one for (use inside Terminal)
 - can install others via
 - `sudo apt-get install`
- or
 - `sudo apt install`

Ubuntu



```
Dell VBox Ununtu [Running] - Oracle VM VirtualBox
File Machine Input Devices Help
Activities Terminal Tue 15:40

sandlway@sandlway-VirtualBox: ~
File Edit View Search Terminal Help
See "man sudo_root" for details.

sandlway@sandlway-VirtualBox:~$ nano
sandlway@sandlway-VirtualBox:~$ which perl
/usr/bin/perl
sandlway@sandlway-VirtualBox:~$ perl
^C
sandlway@sandlway-VirtualBox:~$ which python
sandlway@sandlway-VirtualBox:~$ python3
Python 3.6.5 (default, Apr 1 2018, 05:46:30)
[GCC 7.3.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>>
sandlway@sandlway-VirtualBox:~$ python
Command 'python' not found, but can be installed with:

sudo apt install python3
sudo apt install python
sudo apt install python-minimal

You also have python3 installed, you can run 'python3' instead.
sandlway@sandlway-VirtualBox:~$
```

- Notes:

- which *command* returns path to *command* if found
- perl is pre-installed.
- python3 is pre-installed.

Ubuntu

- Terminal:

The shell has a programming language

- runs a shell: **bash**
- enter commands: some are built-in to the shell, others are executable files in specified directories (\$PATH), still others will require apt-get install or apt install.

```
sandiway@sandiway-VirtualBox:~$ swipl
The program 'swipl' is currently not installed. You can install
it by typing:
sudo apt-get install swi-prolog-nox
```

- command history is editable (up-arrow to retrieve...)
- pre-defined environment variables: **env**
- lots of packages are pre-loaded: **wish**, **python**, **perl**, etc.
- **dpkg** (package manager for Debian)
- **man** *command-name* (brings up manual page)

`dpkg -l (list)`

Shell

- simple commands:

- **pwd**
- **ls (ls -a)**

print working directory

list current directory

(-a option: show . (dot) files too)

- **cd**
- **mkdir**
- **which** *name*

change directory

create a new directory

prints the directory where command *name* is located, or nothing if it can't be found in the PATH

- **man** *name*
- **echo \$SHELL**
- **echo \$PATH**

display manual page for command *name*

prints the shell (\$ prefixes a variable)

shows the directories where the shell will look for commands

Shell

Directory shortcuts:

- your home directory: ~
- current directory: .
- parent directory: ..

• Examples:

- **cd ..**
- **mkdir ~/tmp**
- **touch tmp**

(go to parent directory)

(create a new directory called tmp in your home directory)

(create a new file tmp in the current directory if tmp doesn't already exist, or update the timestamp)

- **ls -l tmp**

(list attributes of file tmp in long format)

```
-rw-r--r-- 1 sandiway staff 0 Sep 4 09:26 tmp
```

permissions
user group all
r = read
w = write
x = execute

owner

group

size
(bytes)

date
time
modified

filename

cat command

- See <http://www.linfo.org/cat.html>

- | | | | |
|-----|--|----------|---|
| 1. | <code>cat file1</code> | | (print contents of file1) |
| 2. | <code>cat file1 > file2</code> | | ('>' = redirect output to file2) |
| 3. | <code>cat file2 more</code> | | (' ' = pipe output to command more) |
| 4. | <code>more file1</code> | – easier | (stops at end of screen, hit space to show more) |
| 5. | <code>less file1</code> | – easier | (allows page by page display) |
| 6. | <code>cat > file1</code> | | (create file1 with input from terminal until Control-D EOF) |
| 7. | <code>cat</code> | | (input from terminal goes to terminal) |
| 8. | <code>cat >> file1</code> | | (append input from terminal to file file1) |
| 9. | <code>cat file1 > file2</code> | | (file copy) |
| 10. | <code>cp file1 file2</code> | – easier | (cp = copy) |
| 11. | <code>cat file1 file2 file3</code> | | (prints all 3 files) |
| 12. | <code>cat file1 file2 file3 > file4</code> | | (prints all 3 files to file4) |
| 13. | <code>cat file1 file2 file3 sort > file4</code> | | (3 files sorted alphabetically to file4) |
| 14. | <code>cat - file5 > file6</code> | | ('-' = input from terminal) |
| 15. | <code>cat file7 - > file8</code> | | |

Shell Arithmetic

- at the shell prompt:

- `expr 1 + 3`
- `expr 2 '*' 2`
- `echo `expr 1 + 3``
- `i=2`
- `expr $i + 1`

(Need spaces cf. `expr 1+3`)
(cf. `expr 2 * 2`)

(NO SPACES! cf. `i = 2`)

- `let x=1+3`
- `echo $x`
- `let i=$i+1`
- `echo $i`

(cf. `let x=1 + 3`)

(also ok `let i=i+1`)

- `((x = 1+ 3))`
- `echo $x`
- `echo $((1+3))`
- `((i=i+1))`

(spaces not significant)

(also ok `let i=$i+1`)

Comparison operators

- Format:
if [\$x OP \$y]; then
...
(else/elif...)
fi
- [...] is known as *test*
- OP:
 - -eq *equals*
 - -ne *not equals*
 - -gt *greater than*
 - -ge *greater than or equals*
 - -lt *less than*
 - -le *less than or equals*

- Examples:
 - echo \$x \$i
2 5
 - test \$x -le \$i
 - echo \$? *(exit status)*
0
 - test \$x -le \$i -a \$i -lt \$x
 - echo \$?
1

Input

- At a terminal:
 - `read -p "Name: " name`
 - `read -p "Enter X and Y: " x y`
 - `echo $x`
 - `echo $y`