


Introduction to UNIX

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CONNECTING
SCIENCE

Introduction to UNIX

Operating System (OS)

Virtual Machine (VM)

Using UNIX

UNIX Commands

Introduction to UNIX

Operating System (OS)

Virtual Machine (VM)

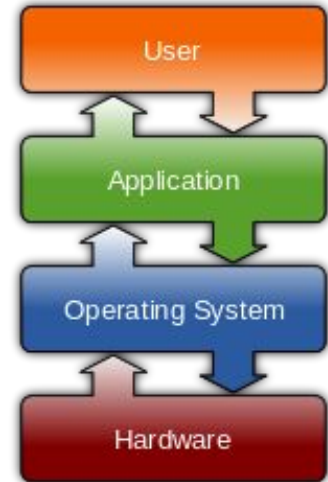
Using UNIX

UNIX Commands

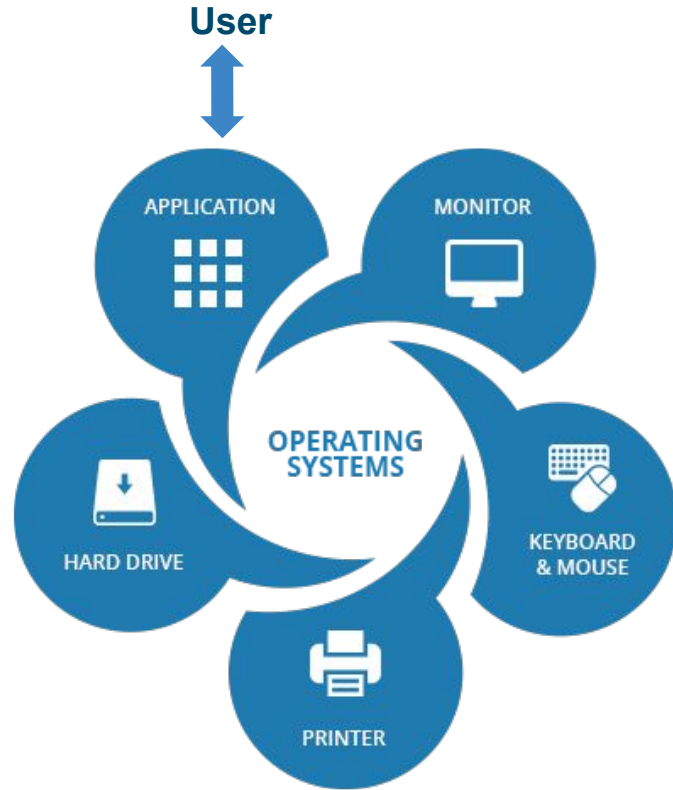
Operating System (OS)



- ▶ Software that supports the computer's basic functions
 - ▶ Manages computer hardware (screen, mouse, keyboard)
 - ▶ Provides tools for managing files, running software
 - ▶ Provides a way via software applications to interact with the computer



Operating System (OS)



► Examples:



Mac OS X



ANDROID



Questions?

Introduction to UNIX

Operating System (OS)

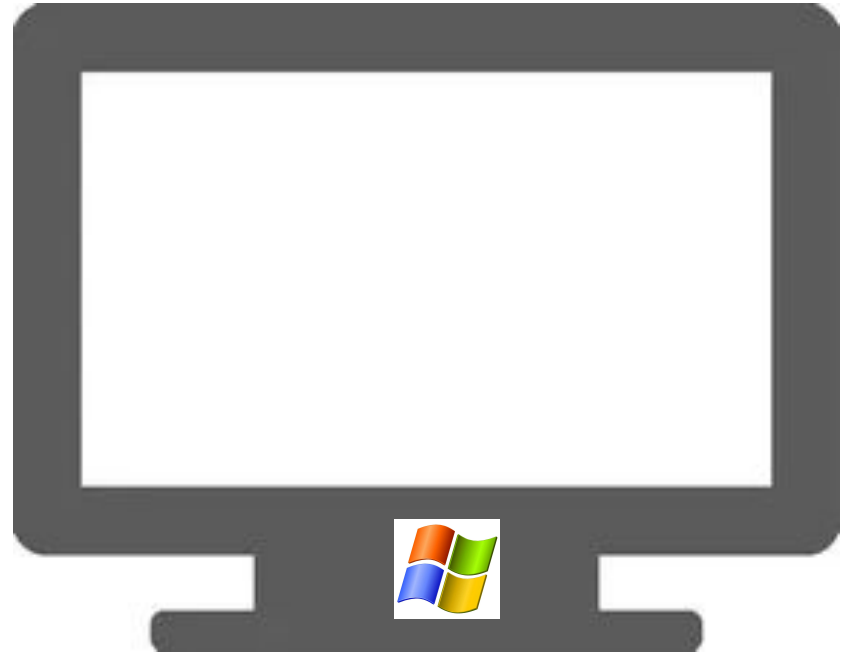
Virtual Machine (VM)

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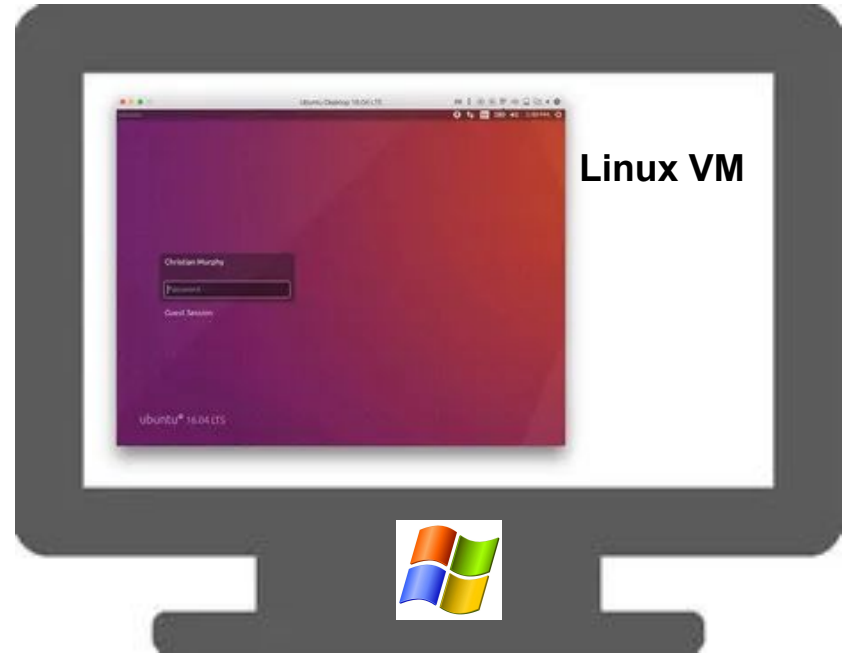
**An Operating System in
another Operating System**



Virtual Machine (VM)

**An Operating System in
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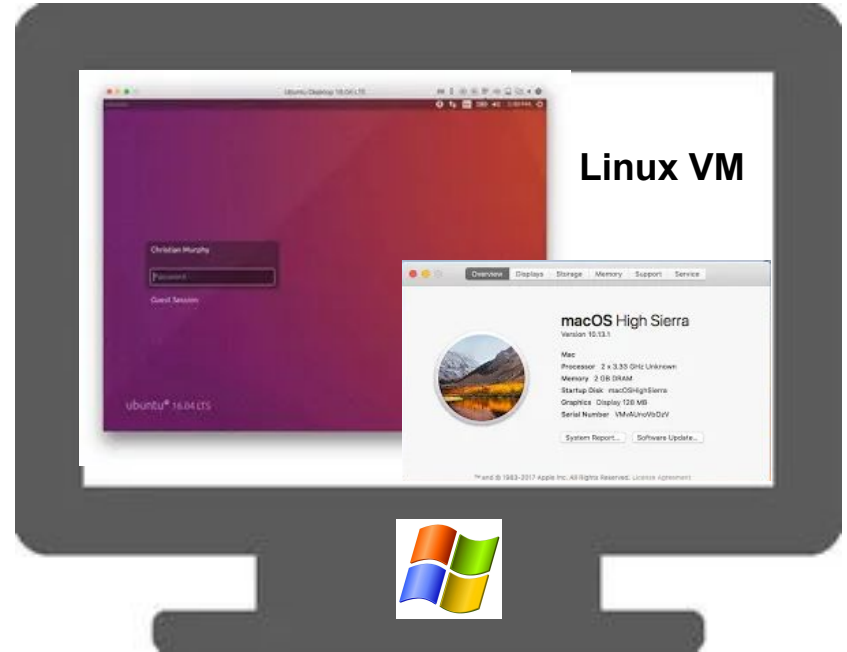
- **Linux OS VM on a
Window OS**



Virtual Machine (VM)

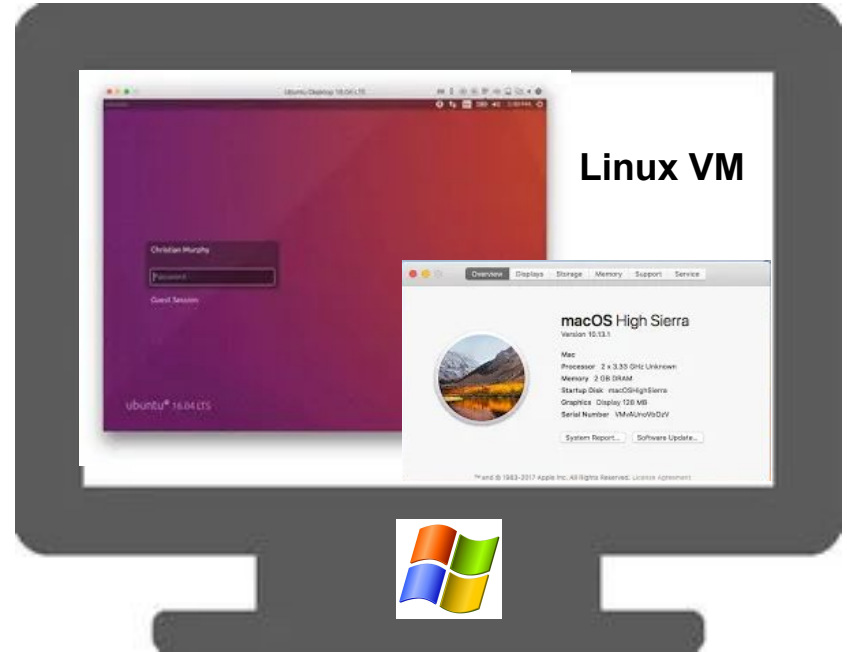
**An Operating System in
another Operating System**

- **Linux and macOS VM
on a Window OS**



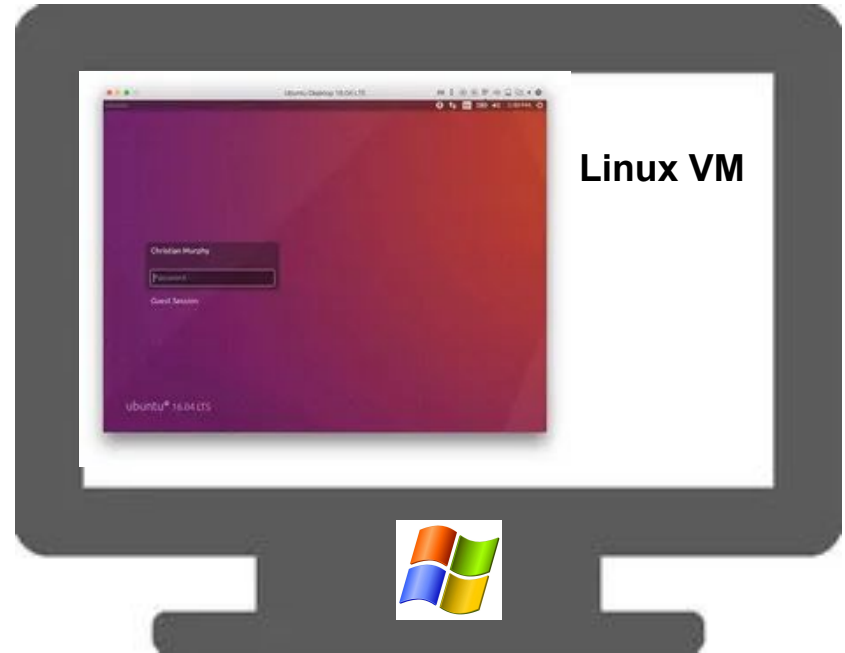
Virtual Machine (VM)

- ▶ VM is a computer environment that can be run on any computer
 - ▶ OS, data, software applications
- ▶ Allows you to run one OS (Linux) on another OS (Windows)



Virtual Machine (VM)

- ▶ Created a VM for this course
 - ▶ Linux OS
 - ▶ Data for practicals
 - ▶ Bioinformatics software (bwa, samtools, vcftools, velvet etc.)
- ▶ Continue to use it after the course



Questions?

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Operating System (OS)

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Using UNIX

UNIX Commands

Unix

- ▶ What is Unix?
 - ▶ Standard operating system (alternative to MS Windows, Mac OS)
 - ▶ Provides a way for you to interact with the computer
 - ▶ Many 'flavours' of Unix, using Linux
 - ▶ Originally created to provide a free UNIX-like OS for PC
-

Unix

▶ What is Unix?

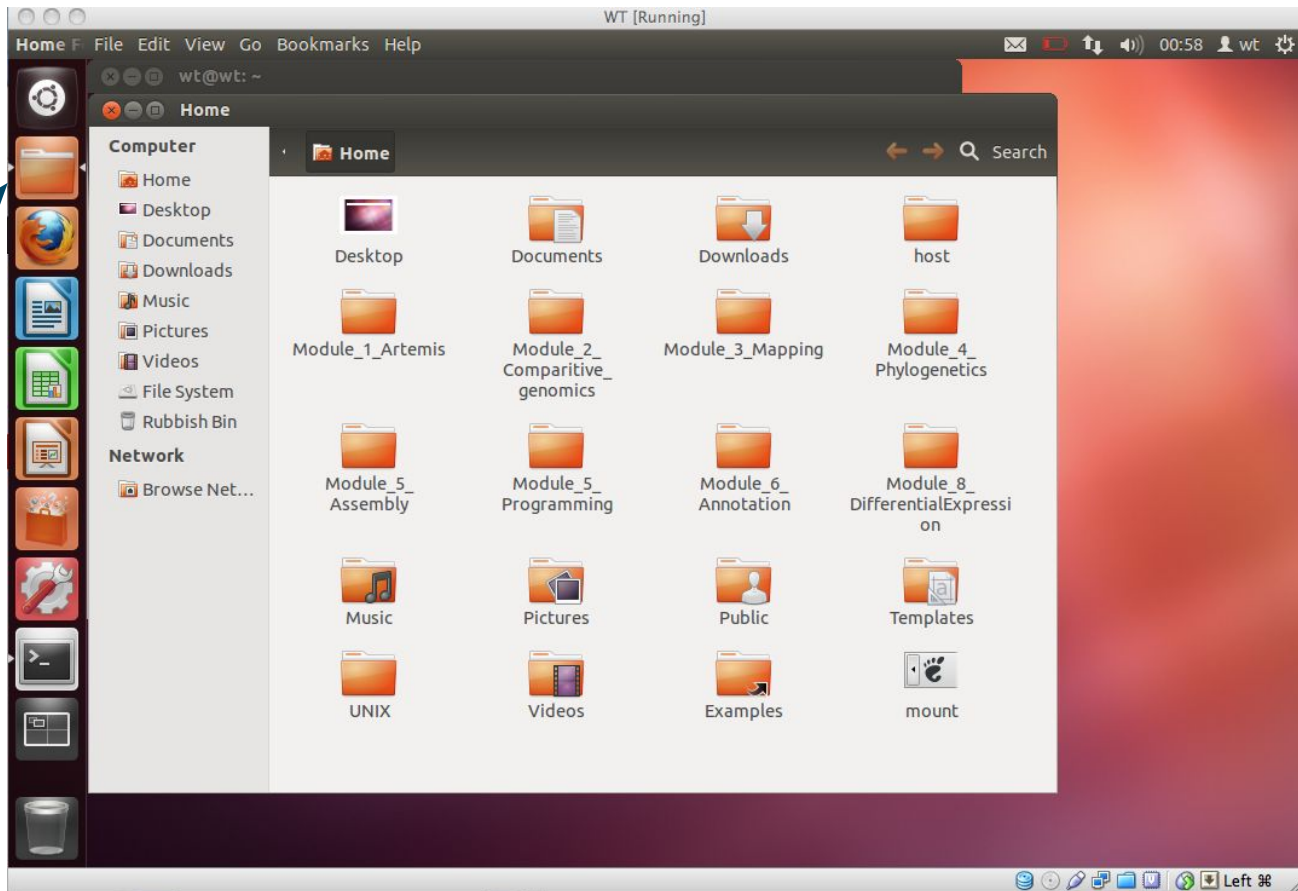
- ▶ Standard operating system (alternative to MS Windows, Mac OS)
- ▶ Provides a way for you to interact with the computer
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▶ Why use Unix?

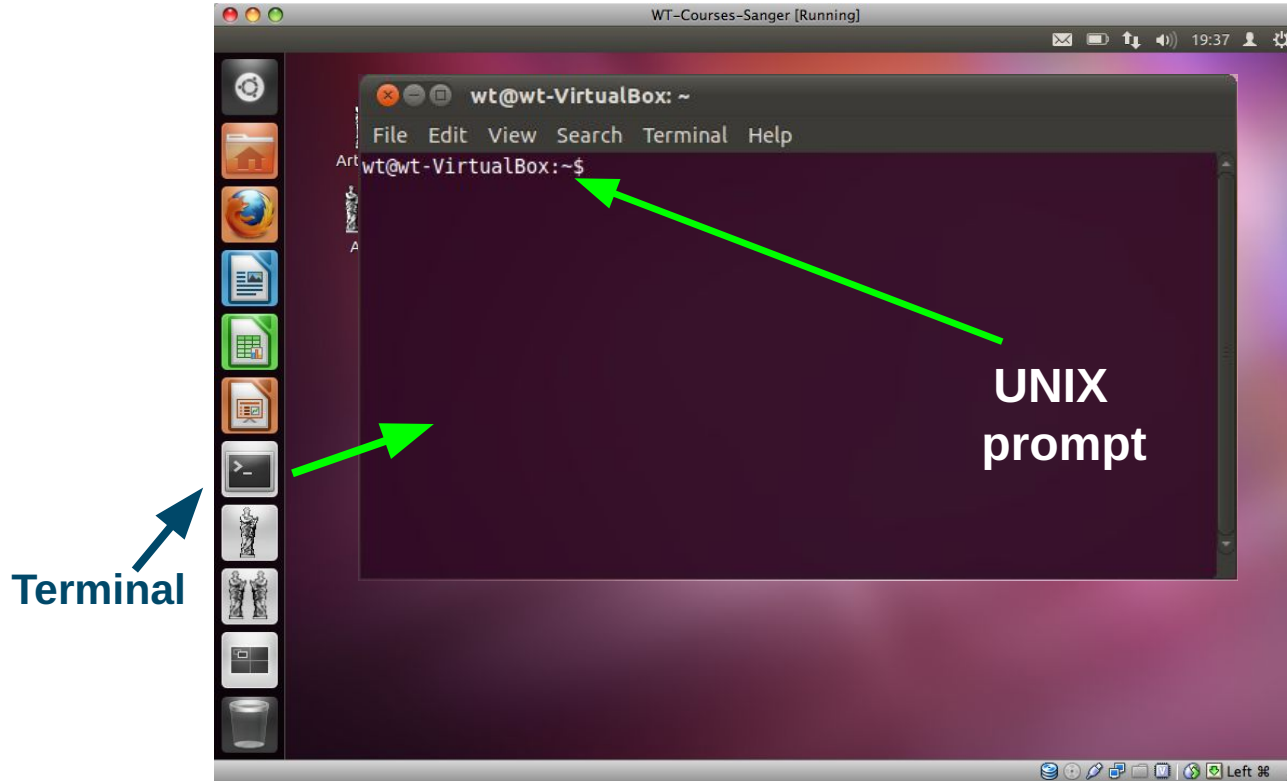
- ▶ Output of lots of biological research exists in large text files
- ▶ Very suitable for working with such files
- ▶ Powerful and flexible commands for processing large text files
- ▶ Save you time
- ▶ Widely used in scientific community
- ▶ Powerful, robust and stable operating system

Using Unix

File
Explorer



Terminal and Command line



Introduction to UNIX

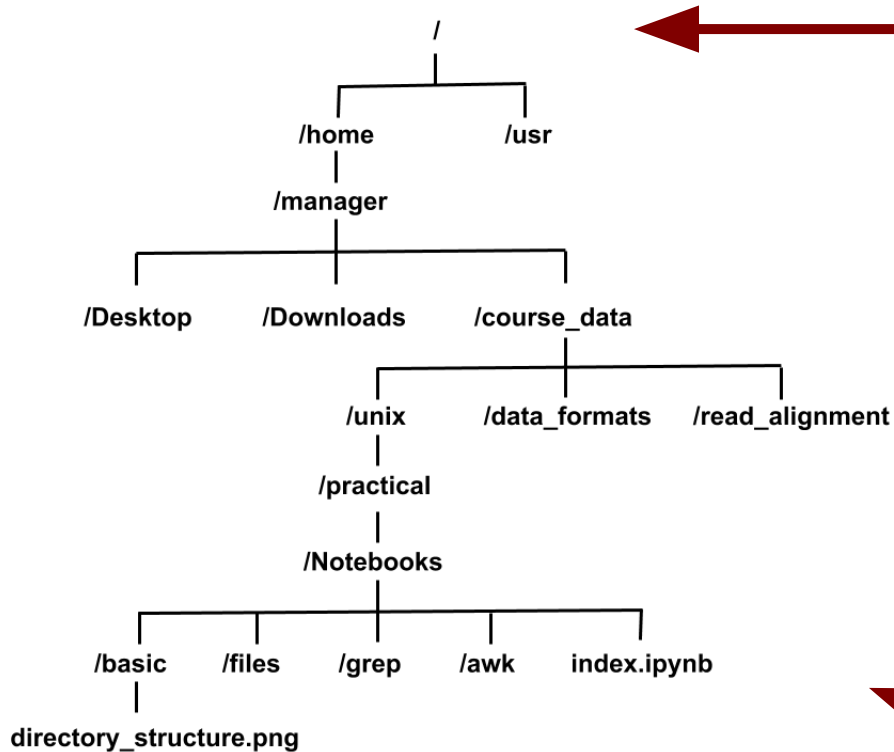
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Directory Structure



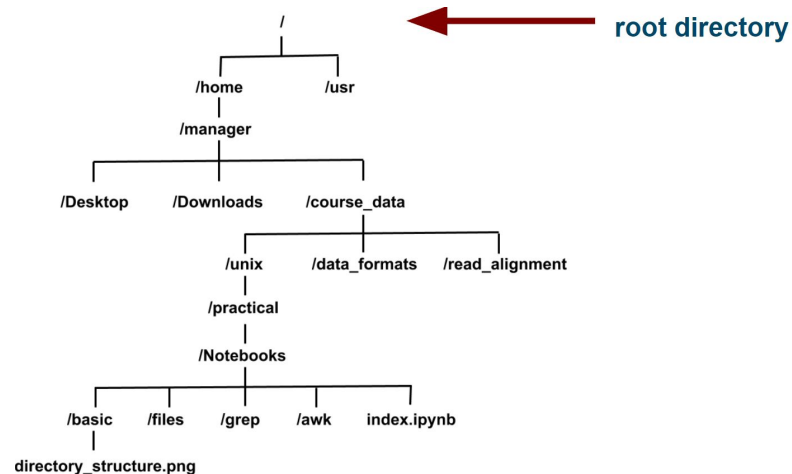
/home/manager/course_data/unix/practical/Notebooks/index.ipynb

Unix Commands

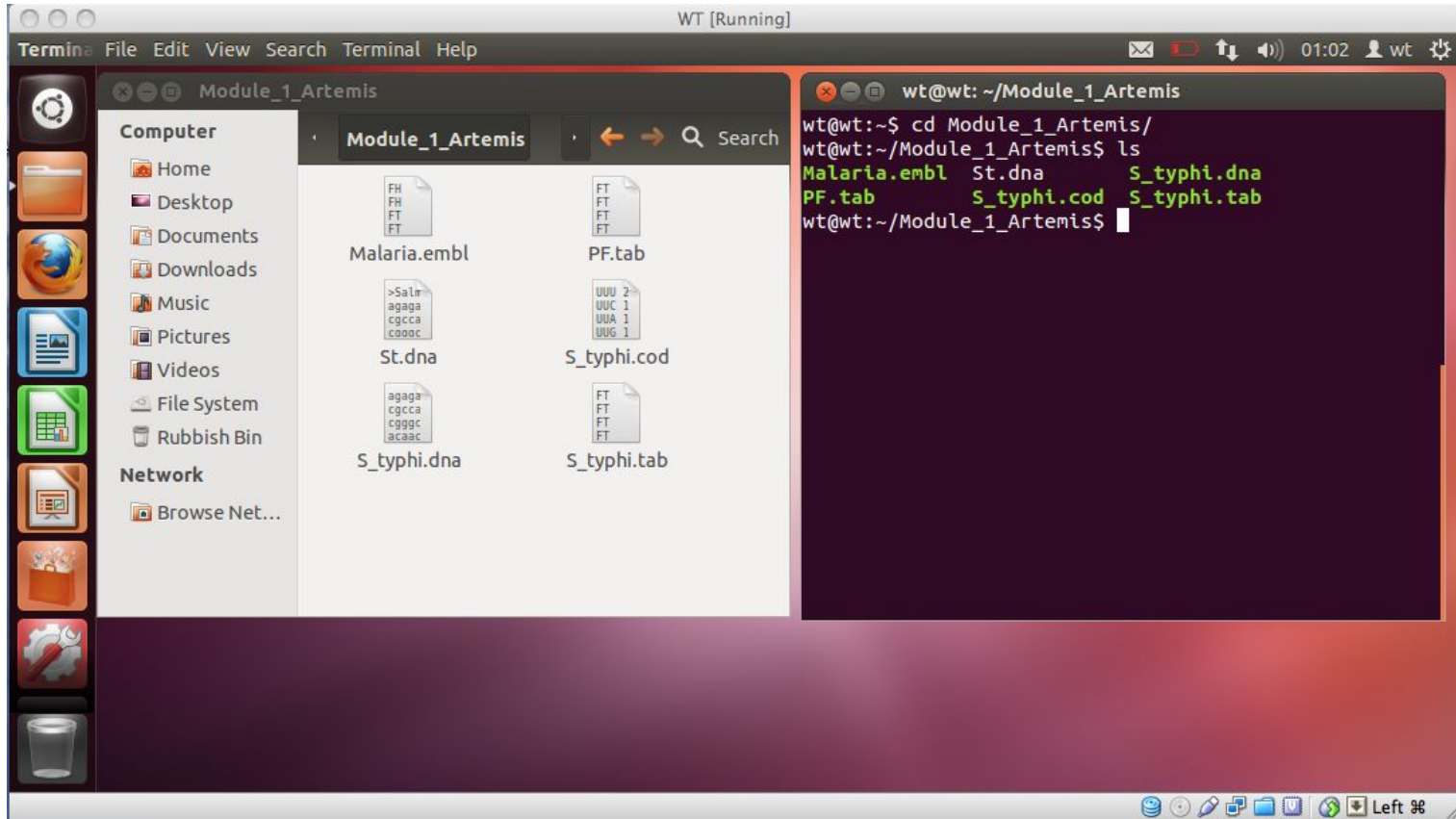
Command	What it does
<code>ls</code>	List the contents of the current directory
<code>cd</code>	Changes a directory
<code>mv</code>	Moves a file
<code>cp</code>	Copies a file
<code>rm</code>	Remove a file
<code>less</code>	Displays the contents of a file
<code>head</code>	Displays the first ten lines of a file
<code>tail</code>	Displays the last ten lines of a file
<code>cat</code>	Concatenate files together
<code>pwd</code>	Print working directory
<code>mkdir</code>	Make a new directory

Unix Commands

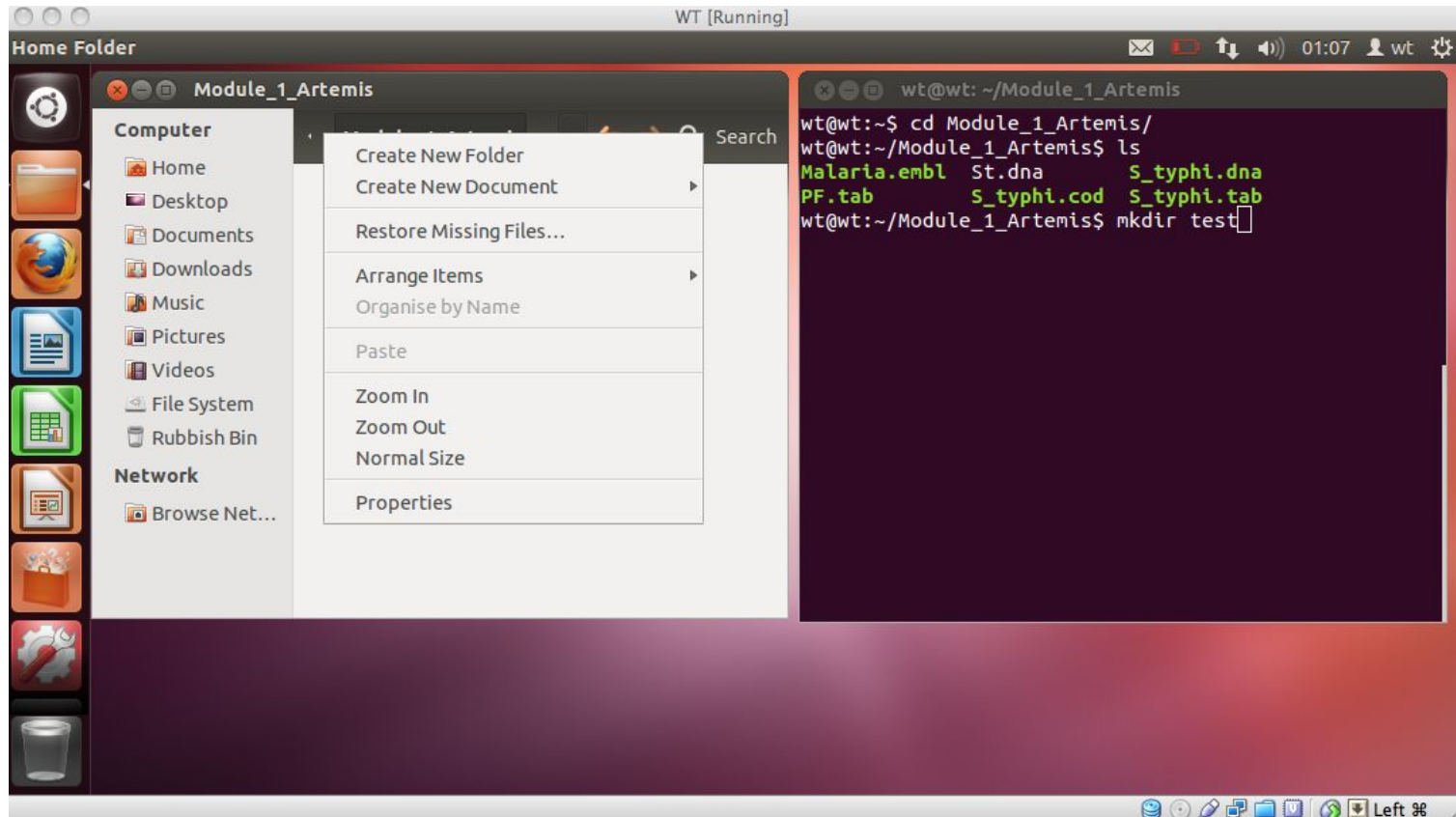
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ls command



mkdir command



Unix Tips & Tricks

- ▶ Unix is case sensitive
 - ▶ Typing LS is NOT the same as typing ls
 - ▶ You need to put spaces between
 - ▶ a command
 - ▶ the values passed to the command
 - ▶ **mkdir new_dir will create a new directory**
 - ▶ **mkdirnew_dir will just give an error!**
 - ▶ Unix is not psychic! If you misspell the name of command or a file it will not understand you
-

Unix Tips & Tricks

```
diogenes@diogenes-VirtualBox:~/re8k/linux-devkit/bin$ command -v arm-arago-linux-gnueabi-gcc
diogenes@diogenes-VirtualBox:~/re8k/linux-devkit/bin$ ls -ld ~/re8k/linux-devkit ~/re8k/linux-devkit
ln ~/arm-arago-linux-gnueabi-gcc
-rwxr-xr-x 1 diogenes diogenes 448843 Jul 1 2011 ./arm-arago-linux-gnueabi-gcc
drwxr-xr-x 12 diogenes diogenes 4096 Apr 15 17:28 /home/diogenes/re8k/linux-devkit
drwxr-xr-x 2 diogenes diogenes 4096 Sep 3 10:59 /home/diogenes/re8k/linux-devkit/bin
diogenes@diogenes-VirtualBox:~/re8k/linux-devkit/bin$ head -1 ./arm-arago-linux-gnueabi-gcc
#!/usr/bin/env sh
!++KX-linux.so.2
diogenes@diogenes-VirtualBox:~/re8k/linux-devkit/bin$ mount | grep "\s(stat -c%u,m)\s"
/dev/sda1 on / type ext4 (rw,errors=remount-ro)
diogenes@diogenes-VirtualBox:~/re8k/linux-devkit/bin$ ./arm-arago-linux-gnueabi-gcc
bash: ./arm-arago-linux-gnueabi-gcc: No such file or directory
diogenes@diogenes-VirtualBox:~/re8k/linux-devkit/bin$ ls
arm-arago-linux-gnueabi-addr2line  arm-arago-linux-gnueabi-ranlib  pkgc-key
arm-arago-linux-gnueabi-ar         arm-arago-linux-gnueabi-readelf  pkg-config
arm-arago-linux-gnueabi-as         arm-arago-linux-gnueabi-run      qdbuscpp2xml
arm-arago-linux-gnueabi-c++filt    arm-arago-linux-gnueabi-size     qdbuscpp2xml4
arm-arago-linux-gnueabi-cpp        arm-arago-linux-gnueabi-strings  qdbusxml2cpp
arm-arago-linux-gnueabi-g++        arm-arago-linux-gnueabi-strip    qdbusxml2cpp4
arm-arago-linux-gnueabi-gcc        i686-linux-libtool              qmake
arm-arago-linux-gnueabi-gccbug     libtool                         qmake2
arm-arago-linux-gnueabi-gcov       libtoolize                      rcc
arm-arago-linux-gnueabi-gdb        lrelease                       rcc4
arm-arago-linux-gnueabi-gdbtui     lrelease4                      signGP
arm-arago-linux-gnueabi-gprof      lupdate                         uic
arm-arago-linux-gnueabi-ld         lupdate4                       uic3
arm-arago-linux-gnueabi-nm         moc                             uic34
arm-arago-linux-gnueabi-objcopy    moc4                           uic4
arm-arago-linux-gnueabi-objdump    pkgc-cl                        update-alternatives
diogenes@diogenes-VirtualBox:~/re8k/linux-devkit/bin$
```

```
demo@demo-VirtualBox:~$ touch456 gfg
touch456: command not found
demo@demo-VirtualBox:~$ touch gfg
demo@demo-VirtualBox:~$
```

```
the Edit view terminal help
djroshan@ubuntu:~$ calc() { awk "BEGIN{ print $* }" ; }
djroshan@ubuntu:~$ calc (20*10)/2+100
bash: syntax error near unexpected token `20*10'
djroshan@ubuntu:~$ calc "(20*10)/2+100"
200
djroshan@ubuntu:~$
```

```
logan@HP: ~/Desktop
logan@HP:~/Desktop$ ls
Destination F1 'My second folder' Python Source
logan@HP:~/Desktop$ rm F1
rm: cannot remove 'F1': Is a directory
logan@HP:~/Desktop$ rm F1 -r
logan@HP:~/Desktop$ ls
Destination 'My second folder' Python Source
logan@HP:~/Desktop$
```

Questions?

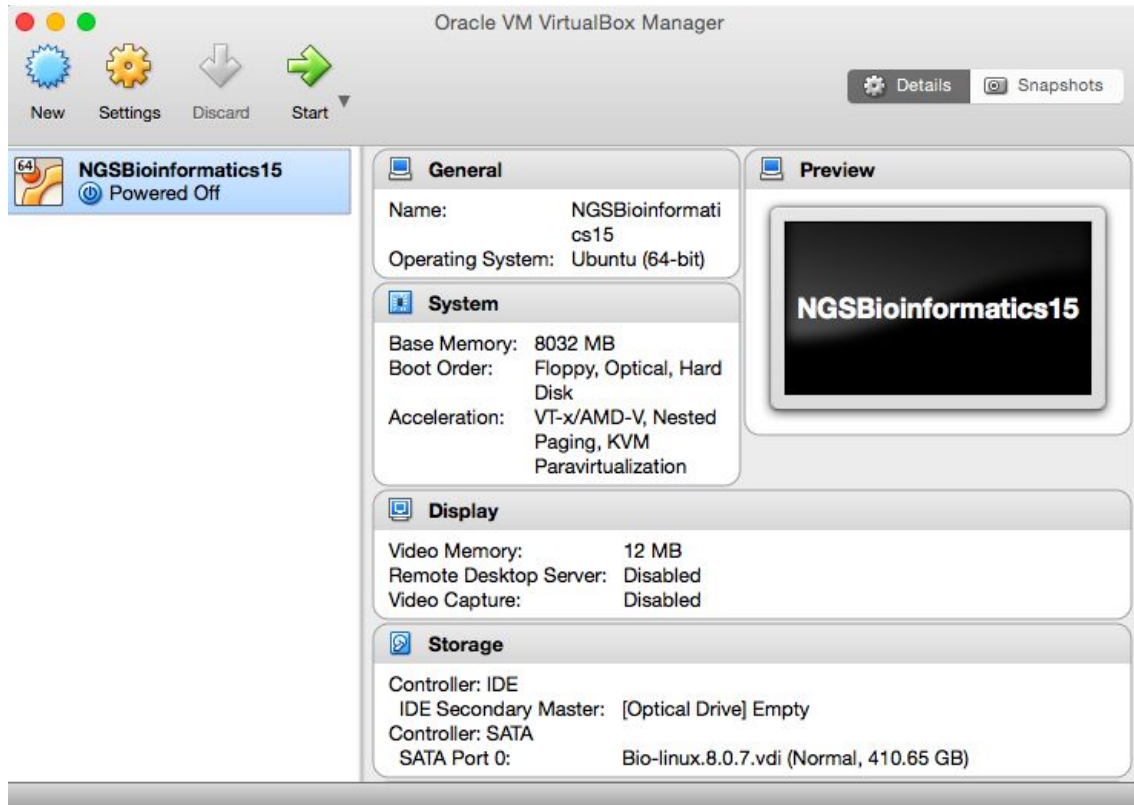
Practical Exercises

- ▶ Practical exercises are found on closed website (4A_unix.pdf) and on the VM (unix.pdf)
- ▶ Multiple sections

Section
Introduction
Basic
Files
grep
awk
Bash scripting

Questions?


Getting Started



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