

# **Bioinformatica II**

**LM Biologia Evoluzionistica, Università di Padova**

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## **Esercitazione 3**

**Padova, 2 novembre 2016**

## **GUIDA**

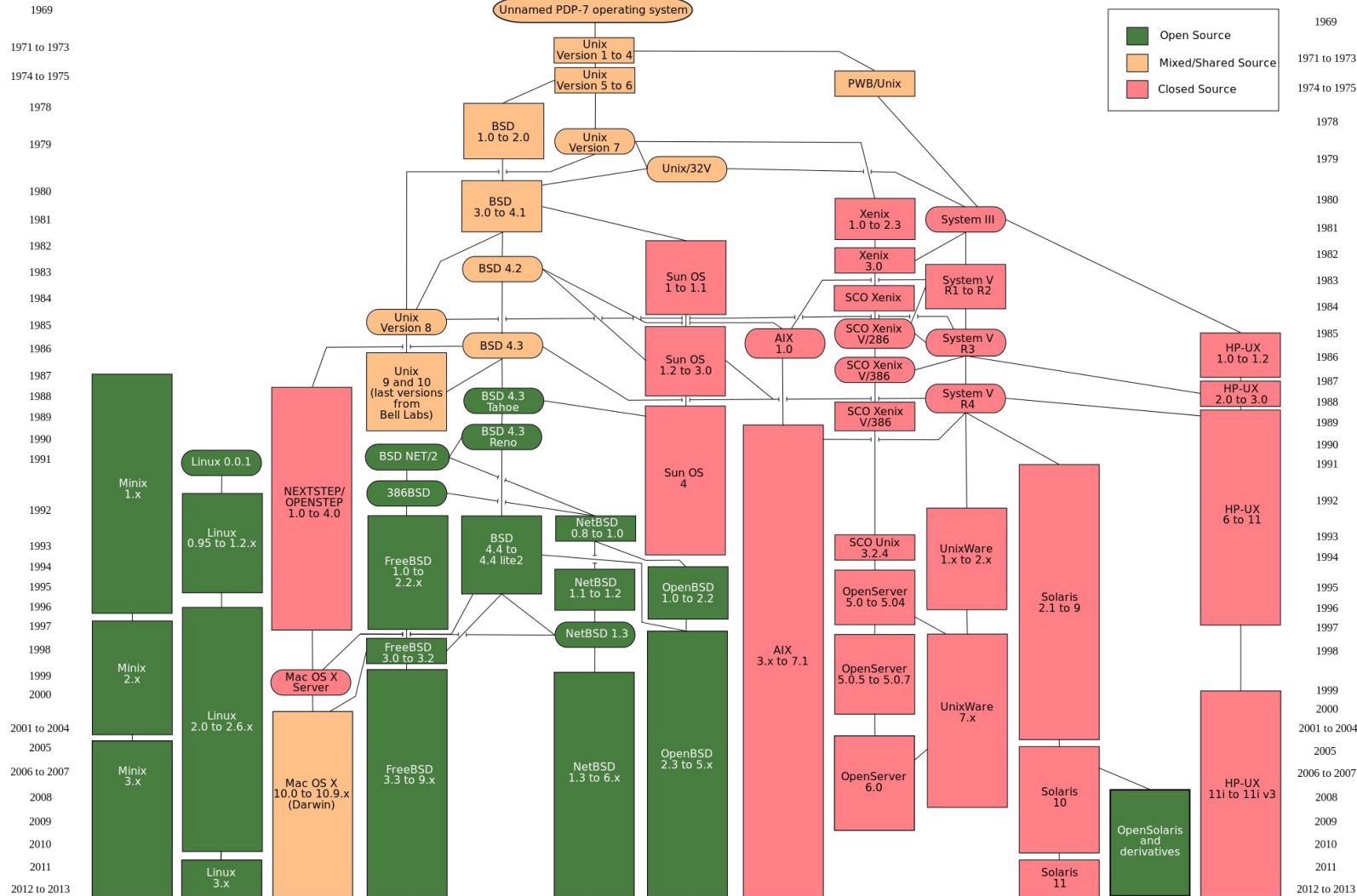
# Obiettivo dell'esercitazione

L'obiettivo dell'esercitazione è quello di installare nel proprio computer una macchina “virtuale” su cui far girare il sistema operativo Ubuntu Linux per potersi esercitare con i comandi Unix che verranno spiegati nel resto del corso.

Verrà inoltre fatta una breve introduzione alla command line dei sistemi Unix.

# Sistemi operativi UNIX





# Distribuzioni linux



debian



ubuntu



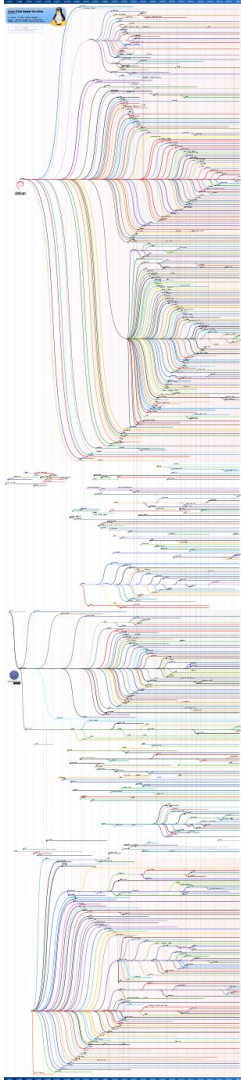
redhat



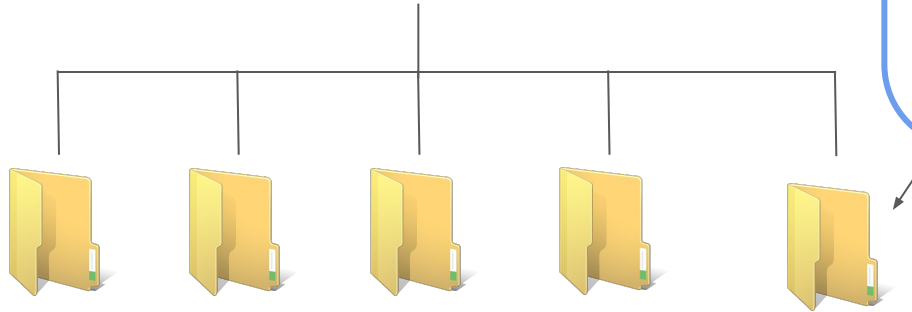
fedora



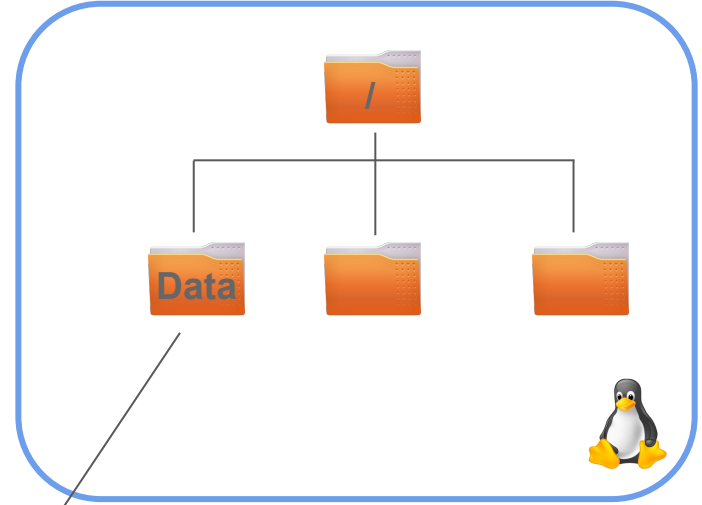
slackware  
linux



# Macchine virtuali



Shared data



## Creazione di una macchina virtuale

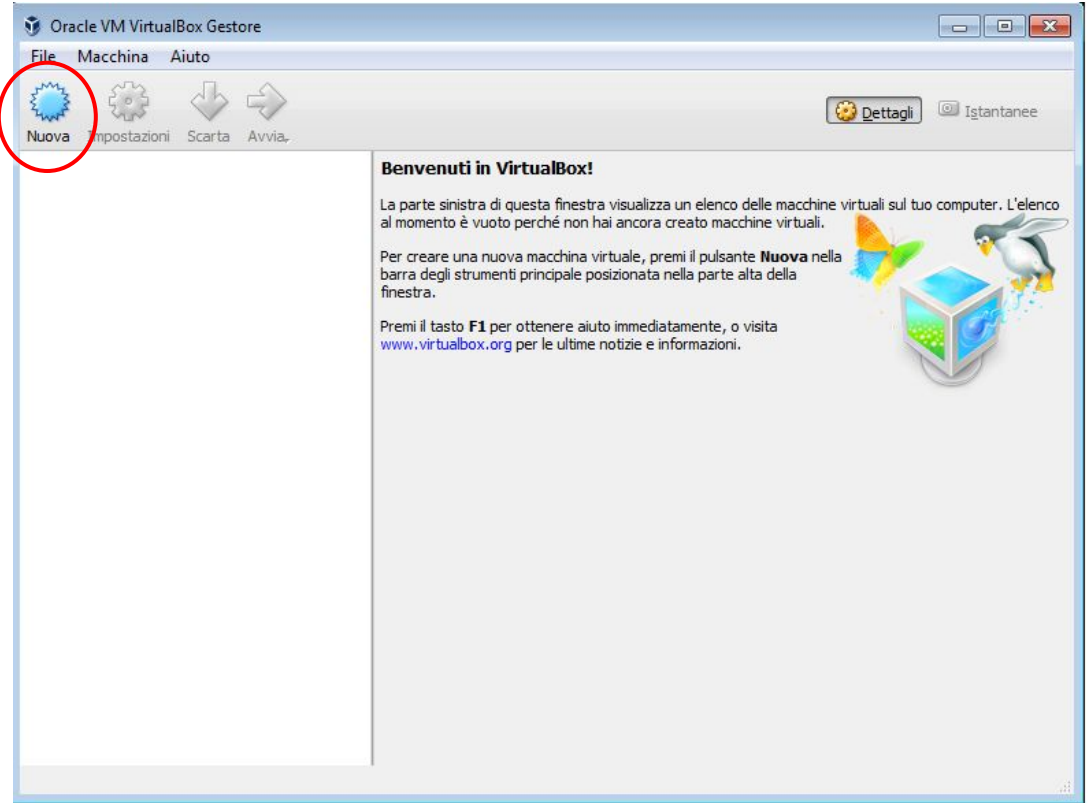
- Versione del sistema operativo guest: Ubuntu 16.04
- Dimensione del “disco virtuale”: 4.8 Giga (Controllare di avere abbastanza spazio sul proprio hard disk)



# Alternative web per chi non vuole usare una macchina virtuale

- [https://www.tutorialspoint.com/unix\\_terminal\\_online.php](https://www.tutorialspoint.com/unix_terminal_online.php)
- <http://webminal.org> (necessario iscriversi)

Cliccare sul tasto “Nuova”  
per creare una nuova  
“macchina virtuale”



Scegliere un nome per la nuova macchina virtuale, scegliere Linux come tipo di macchina virtuale e Ubuntu (32-bit) come versione e cliccare sul bottone “Avanti”

Crea macchina virtuale

### Nome e sistema operativo

Scegli un nome descrittivo per la nuova macchina virtuale e seleziona il tipo di sistema operativo che desideri installare. Il nome che scegli sarà utilizzato da VirtualBox per identificare questa macchina.

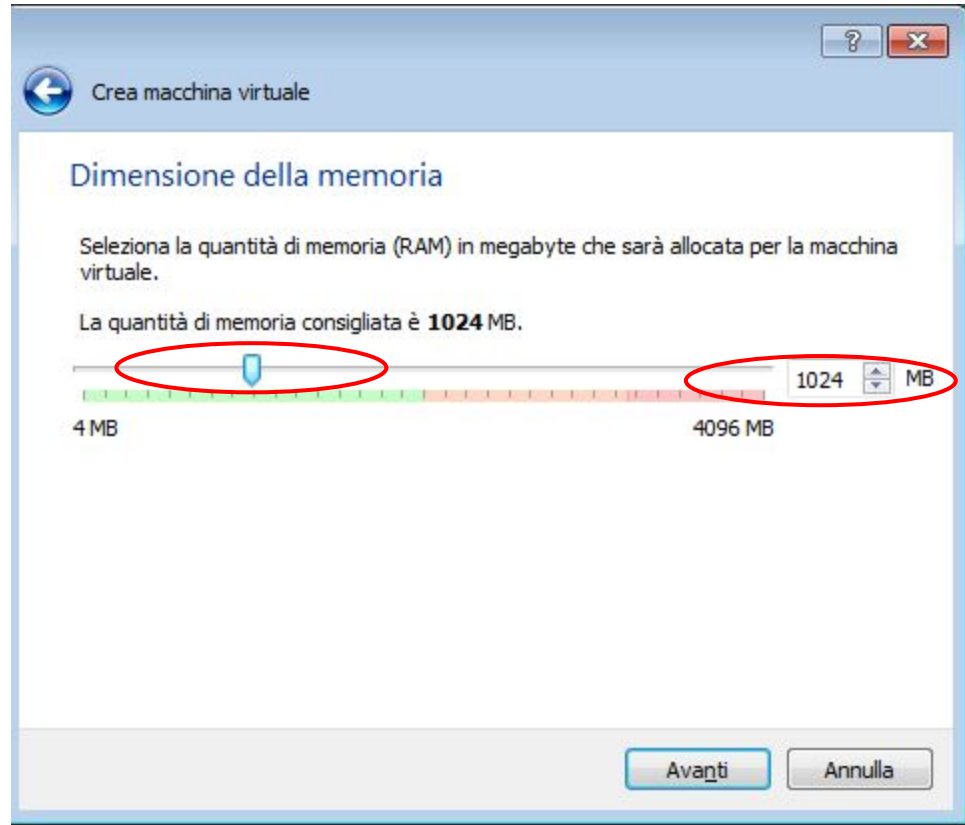
Nome: Ubuntu

Tipo: Linux

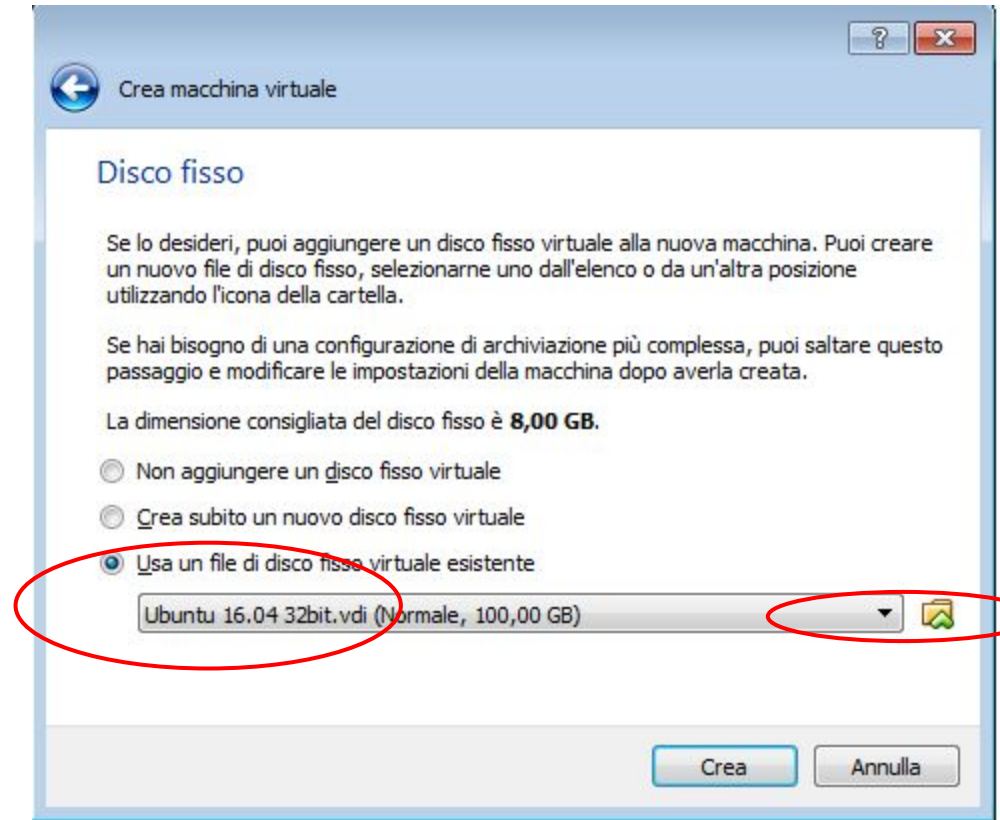
Versione: Ubuntu (32-bit)

Modalità esperta Avanti Annulla

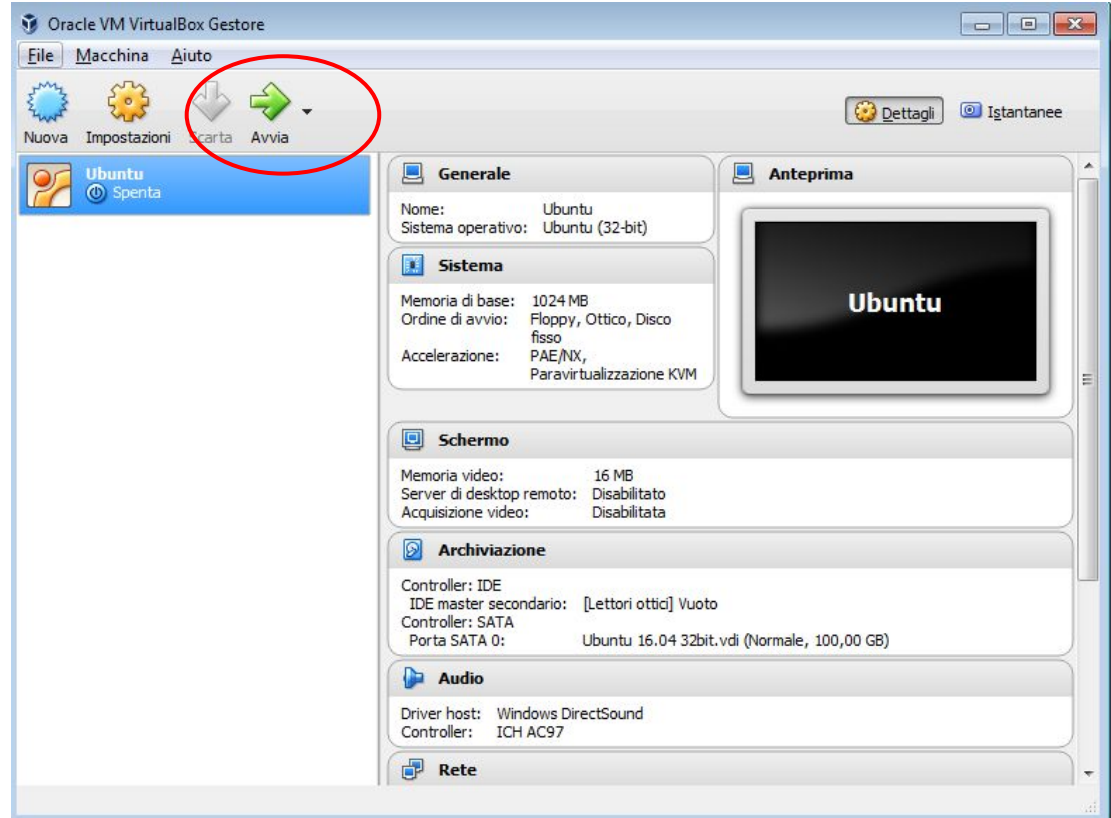
In base alle caratteristiche del vostro computer, selezionare quanta memoria RAM assegnare alla macchina virtuale.

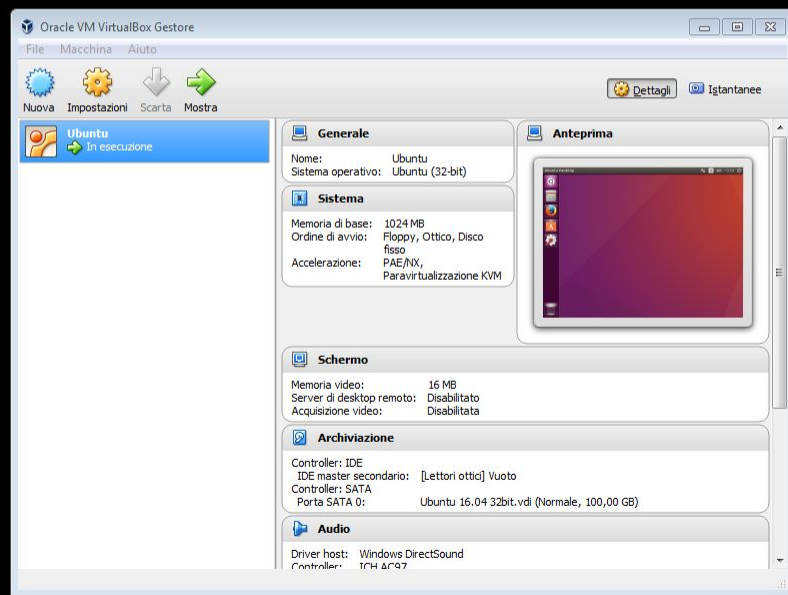
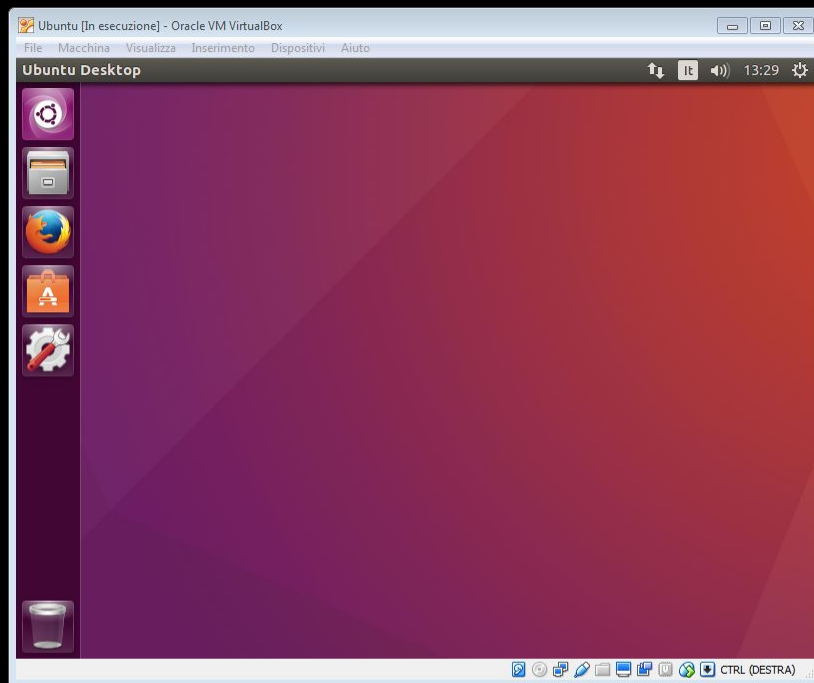


Scegliere l'opzione "Usa un disco fisso virtuale esistente" e scegliere il file .vdi che vi è stato fornito, cliccare "Crea"



Accendere la macchina virtuale e avviare il sistema operativo cliccando il bottone “Avvia”







# Shell





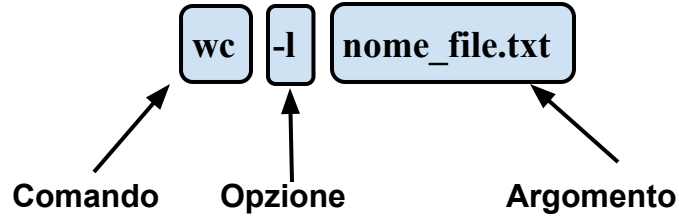
# What is the command line?

The window, which is usually called the command line or command-line interface, is a text-based application for viewing, handling, and manipulating files on your computer. It's much like Windows Explorer or Finder on the Mac, but without the graphical interface. Other names for the command line are:

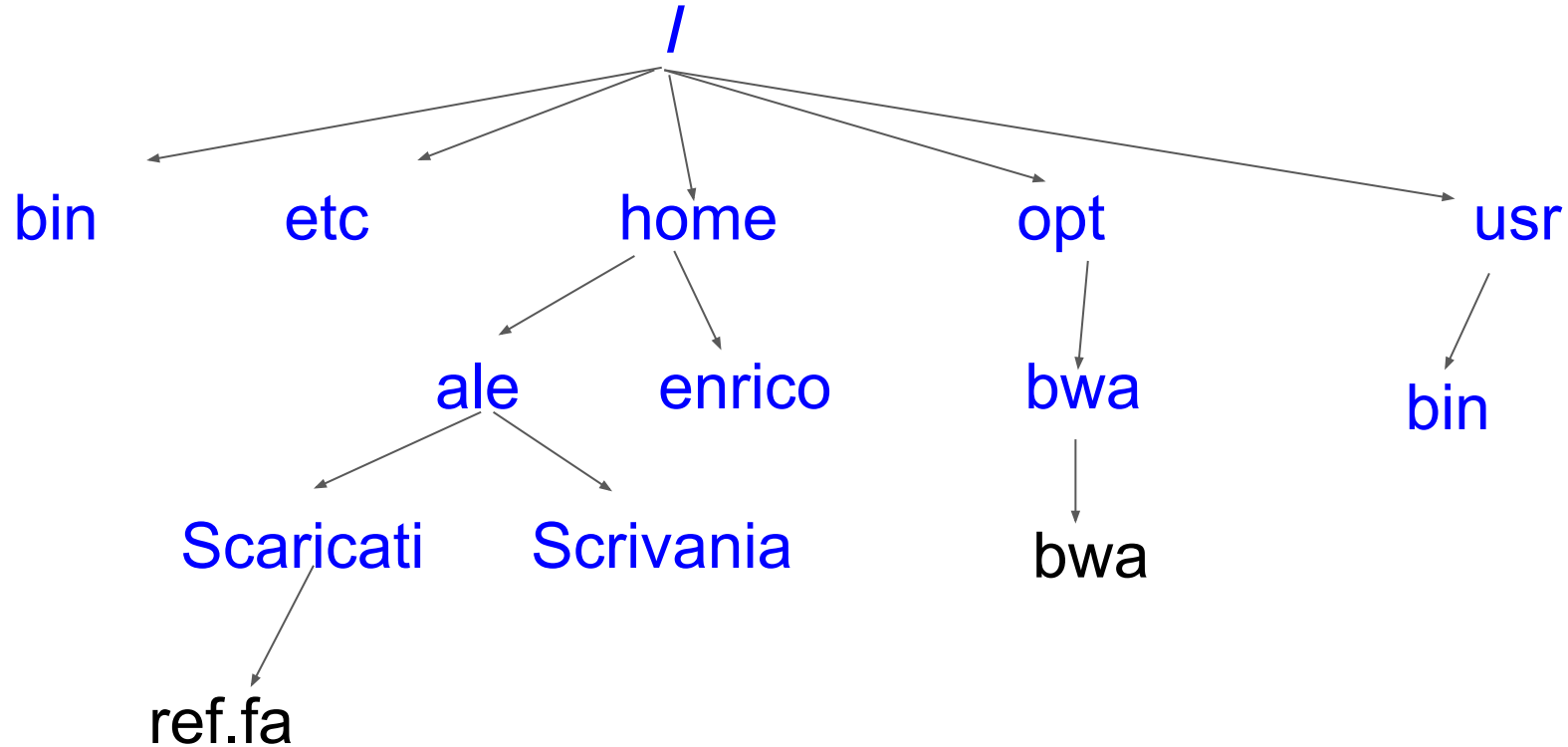
*cmd, CLI, prompt, console or terminal.*

# MOVING AROUND (Filesystem UNIX)

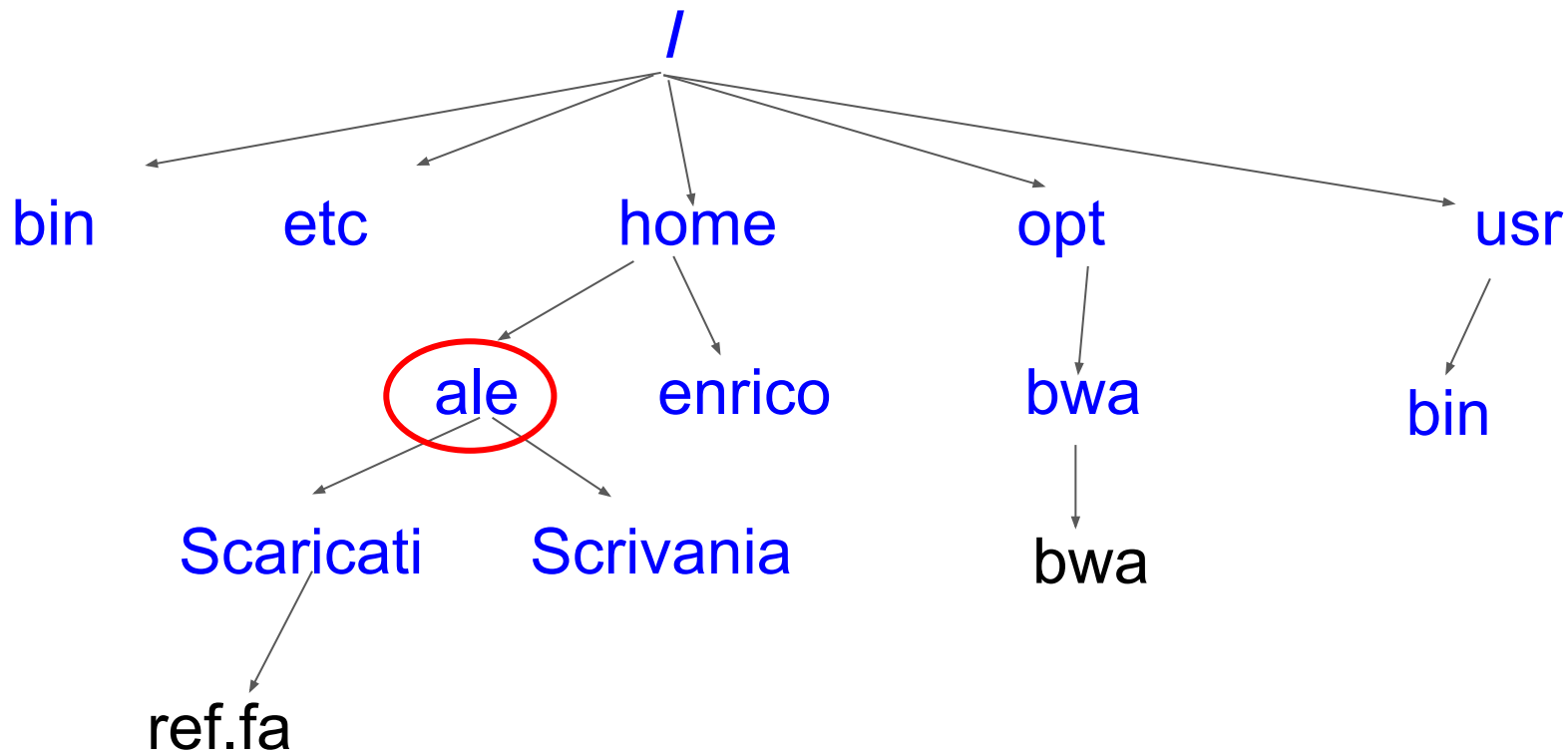
# Anatomia di un comando UNIX



# File system organization

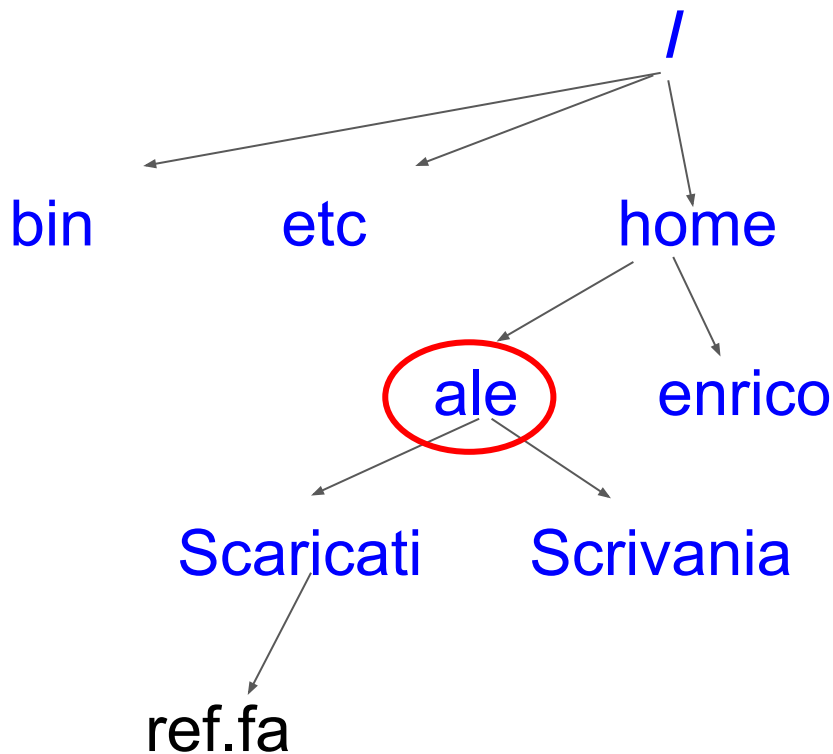


# The “home” Directory



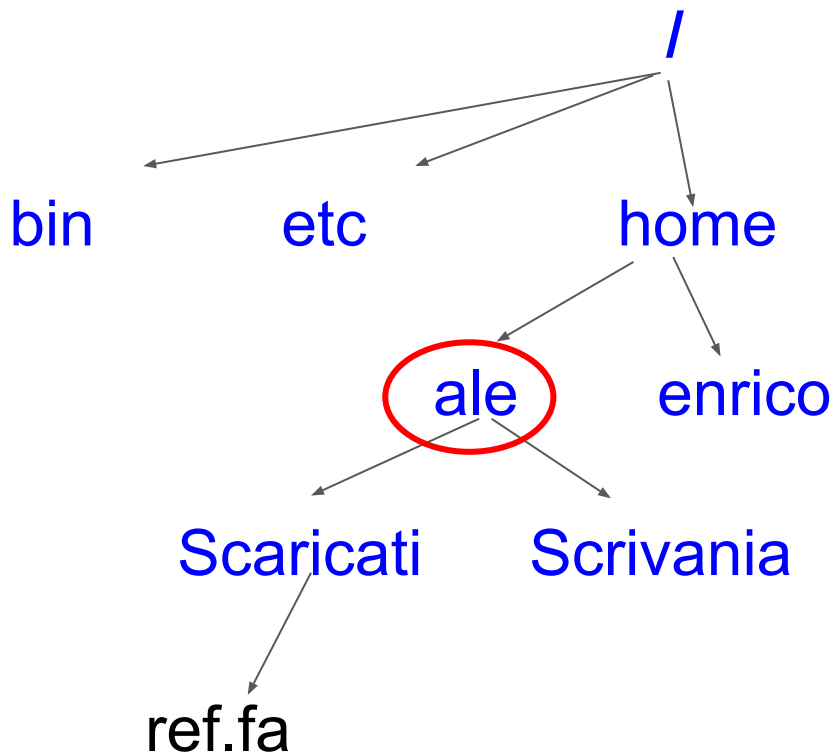
Each user has one

# The current/working direcotry



The shell always has one current directory. It starts from user's home

# The current/working directory



*Print working directory:*

**\$pwd**

**/home/ale**

*List files in current directory:*

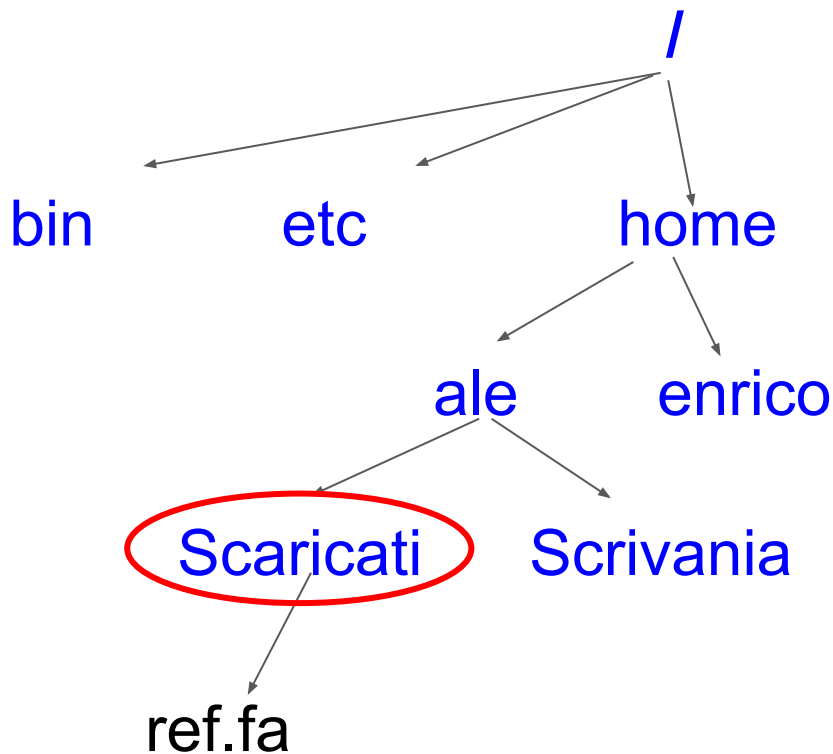
**\$ls**

**Scaricati Scrivani**

*Change working directory*

**\$cd Scaricati**

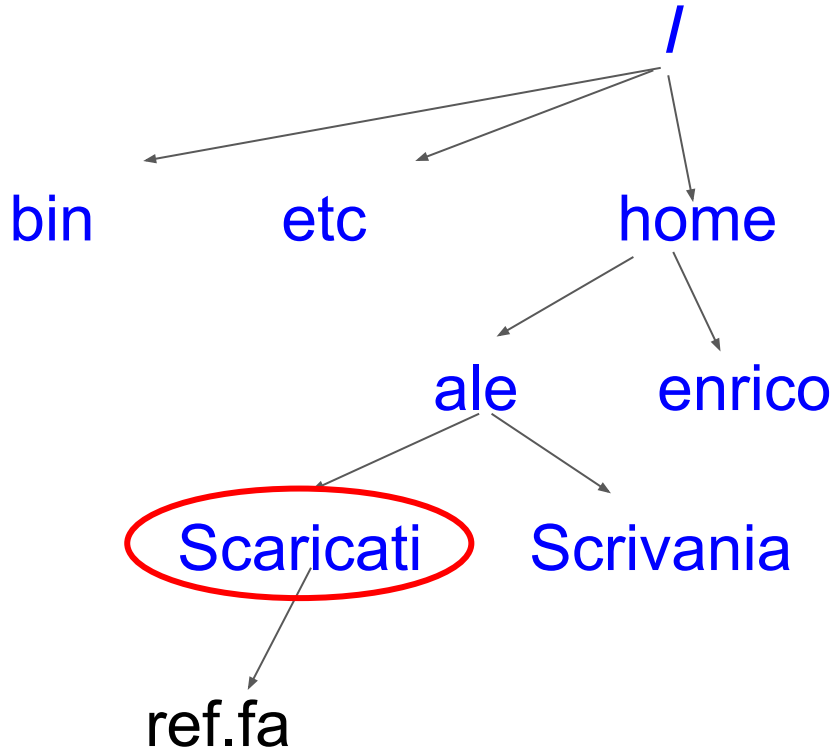
# The current/working direcotry



```
$pwd  
/home/ale/Scaricati  
$ls  
ref.fa
```



# Absolute and Relative Paths



Relative paths depend on the current directory

Absolute path starts from /:

/opt/bwa/bwa

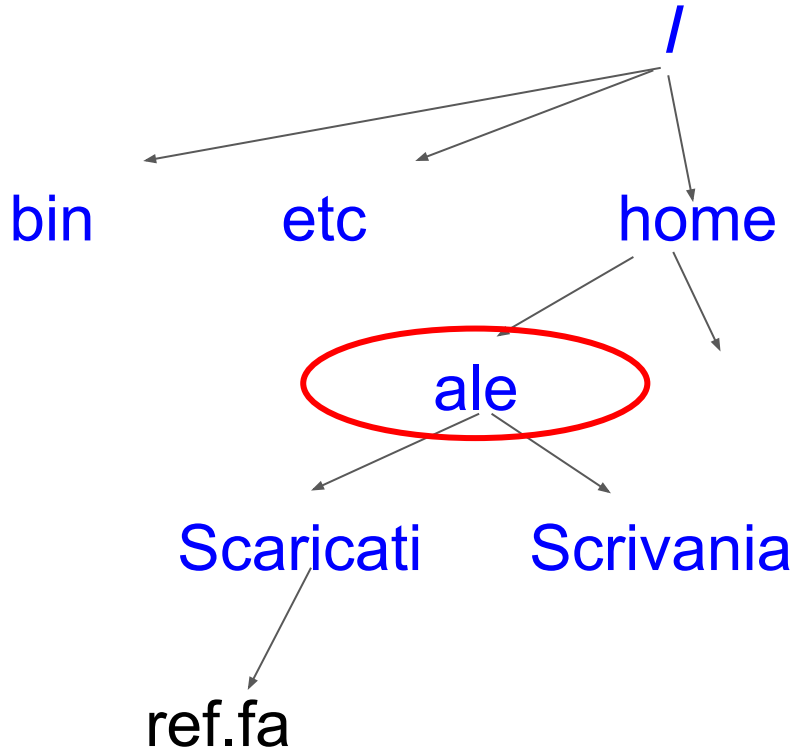
/home/ale

/home/ale/Scaricati/ref.fa

Relative paths start from the current directory:

ref.fa

# Absolute and Relative Paths

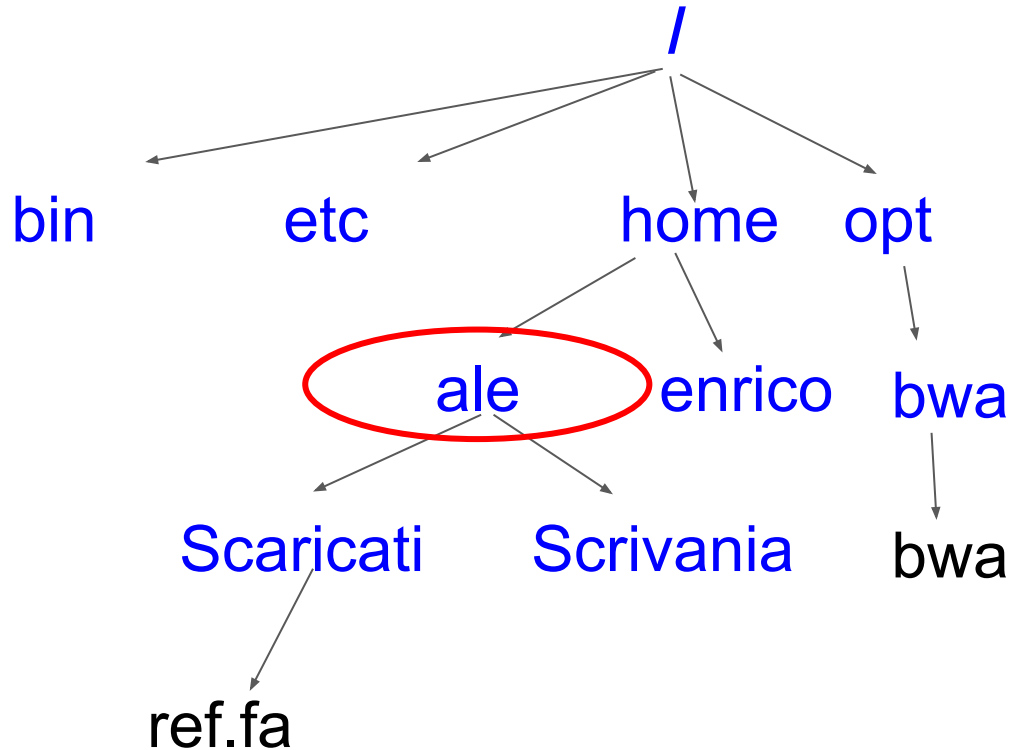


Relative paths start from the current directory:

`cd /home/ale`

`Scaricati/ref.fa`

# Relative Paths and special directories “.” and “..”



“.” and “..” are always present.:  
.. is the parent directory  
. is the current directory

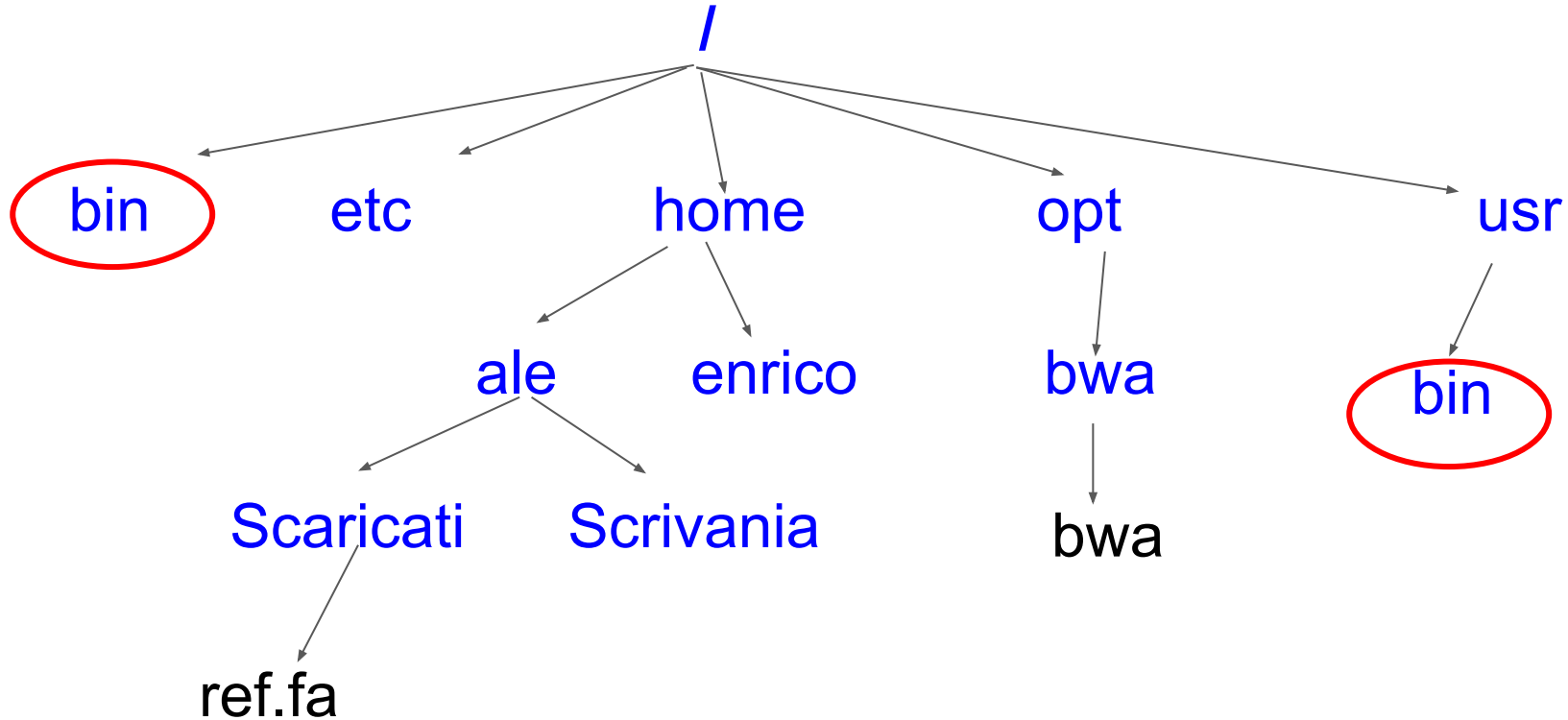
```
$pwd  
/home/ale  
ls ..  
ale enrico  
$cd ..  
$pwd  
/home/  
$ls ../opt/bwa  
bwa  
$cd  
$pwd  
/home/ale
```

# The PATH environmental variable

PATH is an environmental variable in Linux and other Unix-like operating systems that tells the shell which directories to search for executable files (i.e., ready-to-run programs) in response to commands issued by a user.

```
>>> echo $PATH
```

# The PATH environmental variable



# How to execute a program/command not in the PATH?

