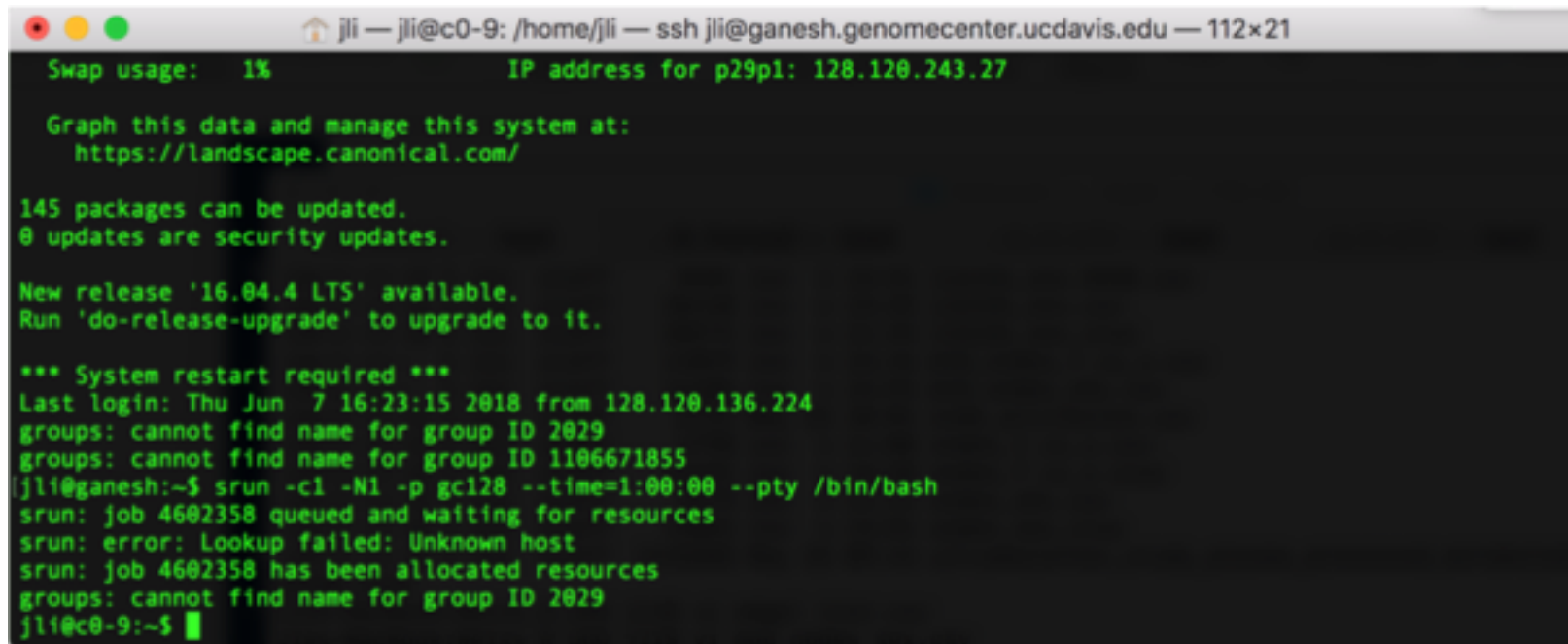# Introduction to Command Line

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What is command line interface

- CLI is a tool into which one can type commands to perform tasks.
- The user interface that accepts the typed responses and displays the data on the screen is called a shell: bash, tcsh…
- An all-text display

What is command line interface

- A prompt is a short text message at the start of the command line on CLI.
  - Ends with $ in bash shell
  - Commands are typed after the prompt

What is command line interface

- Standard input
- Standard output

File structure in CLI

/bin/	Essential User Command Binaries
/boot/	Static Files of the boot loader
/dev/	Device Files
/etc/	Host specific system configuration
/home/	User home Directories
/lib/	Shared Libraries
/media/	Removable Madia
/mnt/	Mounted Filesystem
/opt/	Add-on Application software package
/sbin/	System Binaries
/srv/	Data for service from system
/tmp/	Temporary Files
/usr/	User Utilities and Applications
/proc/	Process Information

/ Root Directory

- Usually, **/home** is the user accounts reside, ie. user's home directory.
  - For example, for a user that has a user name of "jli": /home/jli
  - It is the directory that a user is first at after logging into the system.
  - The *tilde* (~) represents a user's home directory.
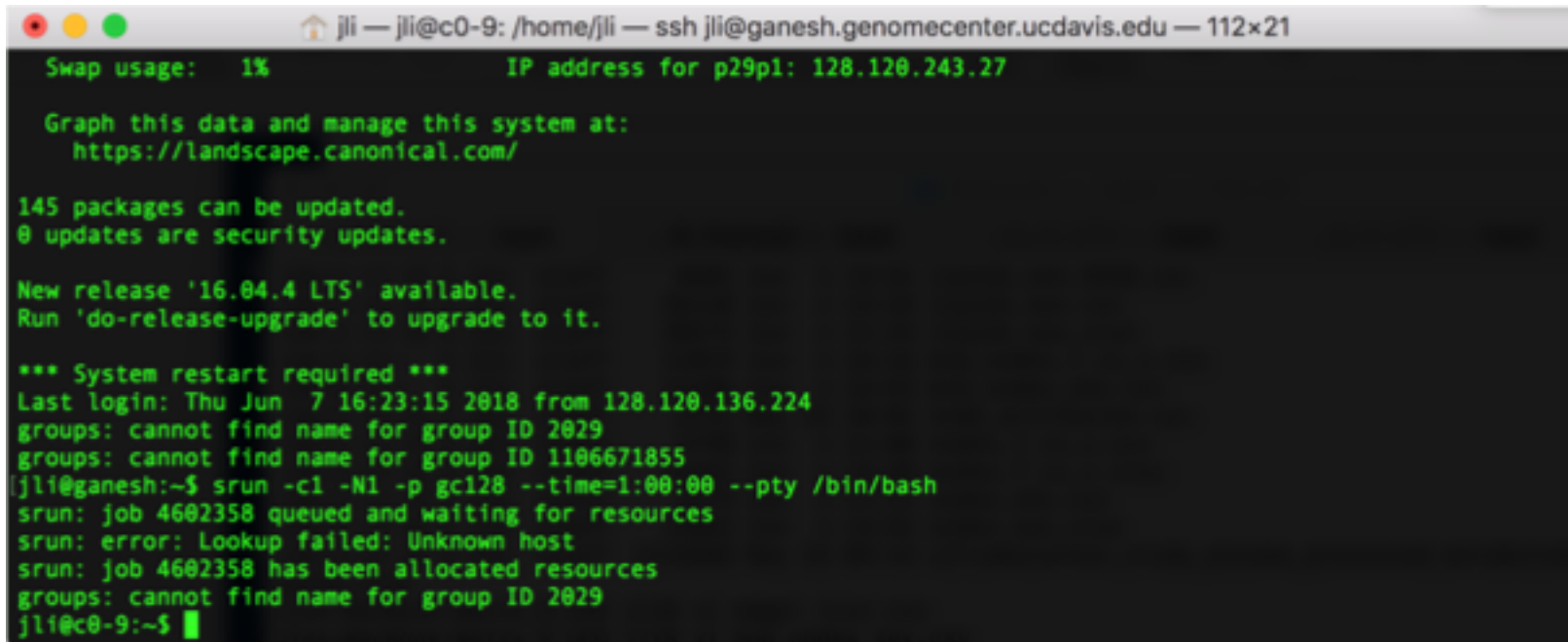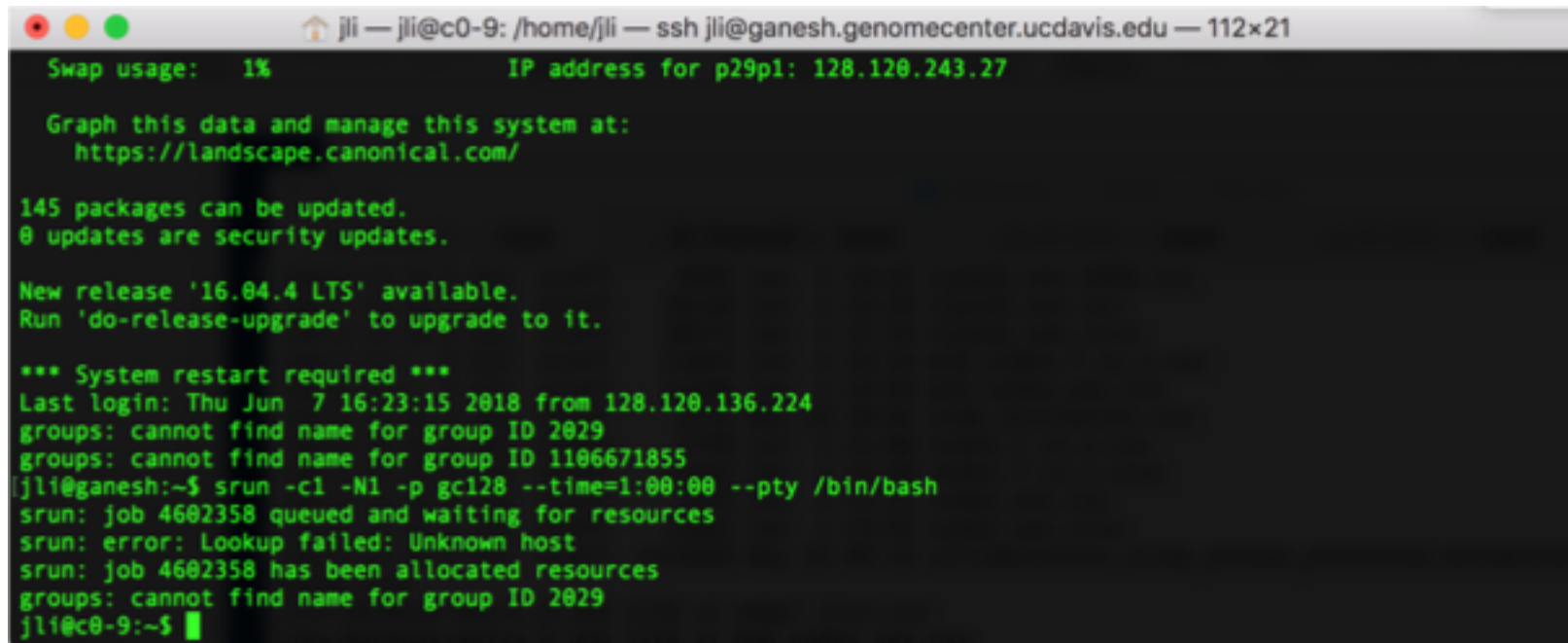
```
[jli@ganesh:~$ srun -c1 -N1 -p gc128 --time=1:00:00 --pty /bin/bash
srun: job 4603200 queued and waiting for resources
srun: error: Lookup failed: Unknown host
srun: job 4603200 has been allocated resources
groups: cannot find name for group ID 2029
jli@c0-15:~$
```

File structure in CLI (continued…)

- Absolute path: always starts with "/"
  - /home/jli/test/file1

- Relative path: always relative to where we currently are
  - a single dot (.) refers to the current directory
  - two dots (..) refers to the directory one level up

Syntax of a command in CLI

- a command plus the required parameters/arguments
- the separator used in issuing a command is space
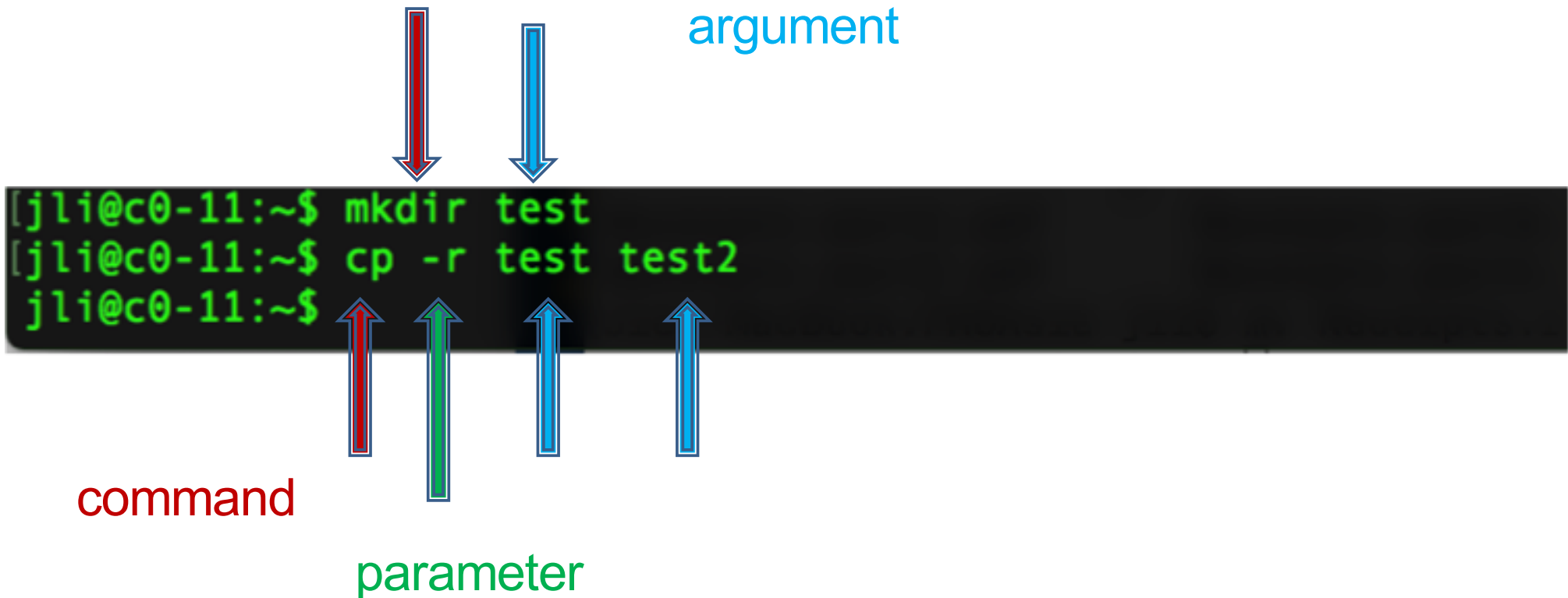
Move around in CLI

- Command to find out where we currently are
  - **pwd** (**p**resent **w**orking **d**irectory)

- Command to change to another directory
  - **cd** (**c**hange **d**irectory)
    - use absolute path: *cd /home/jli/test/run1*
    - use relative path: cd ../
    - without any argument, by default, change to user's home directory

Display files in CLI

- Command to display a list of files
  - **ls**
    - without any other parameters, it list all files/directories inside the current directory
    - may be combined with a path to list a specific file/directory
    - to show all files/directories and their associated information: *ls -al*

```
drwxr-xr-x   12 jli   biocore     60 Apr  9 11:53 tmp
-rw-rw-r--    1 jli   biocore   1823 May 14 15:42 tt
-rw-rw-r--    1 jli   biocore   3614 Dec 27  2016 tt2
drwxr-xr-x    2 jli   biocore      3 Jun  8 10:31 .vim
-rw-r--r--    1 jli   biocore  29136 Jun  8 16:27 .viminfo
drwxrwxr-x    6 jli   biocore      6 Sep 26  2016 virtualenv
drwxrwxr-x    8 jli   biocore      9 Oct  6  2016 virtualenv-falcon
drwxrwxr-x    6 jli   biocore      6 Nov 17  2016 virtualenv-pysam
drwxrwxr-x    4 jli   biocore      4 Oct 20  2017 virtualenv-snakemake
drwxrwxr-x    6 jli   biocore      6 Nov  3  2016 virtualenv-tools
drwxrwxr-x    2 jli   biocore      2 Feb 10  2017 virtualenv-unzip
```

Move things around in CLI

- Command to move something from one place to another
  - **mv** (**m**ove)
    - two arguments required:
      - the file/directory that you want to be moved
      - the new location
    - it is also the command to rename things in CLI

Create things in CLI

- Command to create a directory
  - **mkdir** (**m**ak**e** **dir**ectory)
    - one argument required:
      - the directory that you want to create
    - may create multiple directories at the same time
    - by default, the directory is created in the current directory, unless an valid path is given

- Methods to create a file
  - text editor, such as vi, vim, Nano, Emacs
  - other commands, such as echo, cat

Make copies of things in CLI

- **cp** (**c**o**p**y)
  - two arguments required:
    - the thing to copy
    - the place to put the copied
  - use -r parameter to copy a directory

Remove things in CLI

- **rm** (**rem**ove)
  - by default, it only removes a file
  - in order to remove a directory, use -r parameter

```
drwxrwxr-x   2 jli biocore       2 Jun  8 17:28 test
```

```
[jli@c0-11:~$ rm test
 rm: cannot remove 'test': Is a directory
[jli@c0-11:~$ rm -r test
 jli@c0-11:~$ █
```

NEVER EVER use the following command, unless you really mean it

rm -rf *

Move things to/from a remote location in CLI

- Between two remote unix (command line) based locations
  - **scp** (**s**ecure **c**opy)
  - wget
  - curl
  - rsync
- On Windows/Mac machines
  - WinSCP
  - Filezilla
  - Cyberduck
  - many others