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Day 1

Please sign in below
Name | pronouns | USGS Science Center | Location | Favorite entertainment genre and example
1. Frank Engel | he/him/his | Oklahoma-Tex WSC | San Antonio | Sci-fi -- Ancillary Justice/Old Man's War
2. Russ Lotspeich | he/him/his | Virginia-West Virginia WSC | Richmond | Sports -- Rudy
3. Bryce Redinger| he/him| Nevada WSC | Motorsport
4. Chris MacPherson| he/him/his | NY WSC | Milford PA | Sci-fi -- H2G2
5. Bryce McClenney| he/him/his| SAWSC WSC| Raleigh NC|Fishing
6. David Coyle | he/him/his | WMA/OSD/HNB | Reston VA | Sailing
7. Al Ruddy|he/him/his|PA WSC|Bridgeville (Pittsburgh) PA|Biking
7. Nick Grim | he/him/his | PA WSC | New Cumberland PA | Hiking
8. Jon Duffie| he/him/his | CMWSC | St. Louis, MO | Kayaking
9. Chris Lewis| he/him/his | MD-DE-DC WSC | Dover, De | Sports
10. Keegan Johnson | he/him/his | UMid WSC | Madison, WI, | Sports -- Basketball
11. Matt Gyves | he/him/his | PA WSC | Downingtown, PA | Music
12. Joshua Keele | he/him/his | TX & IL WSC | Urbana, IL | Farming - Dairy / Motocross
13. Matt Nicotra | he/him/his | Colorado WSC | Denver, CO | cycling/downhill
14. Paul Reneau | he/him/his | UMid WSC | Maddison, WI, | Outdoors
15. Joseph Bell | he/him/his| MD WSC| Baltimore, MD| Immersion sims; racing, fps
16. Chris Gazoorian | he/him/his | NY WSC | Troy, NY | broadcast TV
17. Gerald Kunkle | he/him/his | HIF | Stennis Space Center, MS |
18. Stephan Shansey - He/Him - NJ WSC - Westampton NJ - Guitar
19. Sean Andrews | he/him/his | New England WSC | Augusta Maine | Sci-fi -- Firefly
20. Skylar Smith | he/him/his | CMWSC | Urbana IL | Red Dirt Country - Cody Jinks
21. Mark Henneberg/he/him/COWSC/Grand Jct CO/Outdoors
22. Alex Graziano | he/him/his | NY WSC | Troy, NY | Hiking
23. Jane Ho (instructor)/she/her/(not USGS) Ontario Clean Water Agency/Toronto, Canada/music
24. Annajiat Alim Rasel (instructor) | he/him/his | Brac University, Bangladesh
25. Dave Owens | he/him/his | Middleton, WI | Documentaries - PBS

26. Henry Doyle | he/him | Central Midwest WSC | Urbana, IL | sci-fi - Jurassic Park

List of github user profiles
https://github.com/annajiat
https://github.com/frank-engel-usgs
https://github.com/jjyh
https://github.com/rlotspei
https://github.com/CjmacP
https://github.com/ngrim
https://github.com/Breding
https://github.com/bjmcclen
https://github.com/hfdoyle
https://github.com/agraz1
https://github.com/sshansey
https://github.com/mfhenneb
https://github.com/sean-andrews-usgs
https://github.com/dlcoyle-usgs
https://github.com/ajruddy
https://github.com/JonDuff
https://github.com/sskylar228
https://github.com/crlewisusgs
https://github.com/keeganejohnson
https://github.com/mgyves
https://github.com/JD161
https://github.com/MJNWATER/MJNWATER
https://github.com/pcreneau
https://github.com/belljm9
https://github.com/cgaz-gs
https://github.com/gkunkle
https://github.com/jjyh
https://github.com/dwowens-USGS
https://github.com/marianarius/

Previewing Lessons

Python: Novice Inflamation (Frank)

General Setup Info:

I am using PyCharm as my IDE, so I will not be able to attest to success with Anaconda. For Pycharm, I set up the project as follows (after following steps at https://swcarpentry.github.io/python-novice-inflammation/setup.html other than installing Anaconda):

1. In PyCharm, Open Project, navigate to `swc-python` folder
2. Create a new python3 venv, and check for dependencies by opening all *.py files and looking at `import` statements (numpy)
3. In Settings > Project: swc-python > Python Interpreter, I installed `numpy`, `matplotlib`, and `jupyter` by clicking the "+" button and seraching by name for each module.
4. Start Jupyter Notebook by ckucking the `Terminal` tab in the lower half of Pycharm's IDE, and

typing `jupyter notebook` [ENTER]

5. A new Notebook Server instance is opened in my web browser. I created a new Notebook for executing test code
6. Started the lesson, using cells in Jupyter Notebook. Note that in Notebook, you can change cell types between Markdown (a sort of rich text) and code/interpreter input. See Jupyter `Help` menu for more, including lots of keyboard hotkeys.

General Tips and Pain Points

- **Pulling up a functions help:** if you are in Jupyter Notebook, and want to see the help for a function, you can type "?" at the end of the function (**`numpy.cumprod?`**). You need to evaluate the cell to see the help
- Keep in mind that you can review previous lessons using the < > buttons at the top and bottom of the lessons. This could come in handy for remembering a "recipe" called for in a new lesson.

Please download and save on Desktop
http://swcarpentry.github.io/shell-novice/data/shell-lesson-data.zip

Setup: https://carpentries.github.io/workshop-template/#shell

From David Coyle, a nice link for checking (linting) shell scripts: https://www.shellcheck.net/

MacOS users, please run the following command in Terminal
bash

Are you ready? Please use a + sign below
yes: +++++++++++++++++++
need-time:
need-help:

Current episode:
http://swcarpentry.github.io/shell-novice/01-intro/index.html

ls
lower LS for listing files and directories

clear
or
CTRL + L
to clear the screen

REPL
Read
Evaluate
Print
Loop

Current episode:
http://swcarpentry.github.io/shell-novice/02-filedir/index.html

pwd
print working directory

default
is the user's home directory

cd
cd ~

cd
change directory

yes: +++++++++++cd+++++++
need help:
need time:

If anyone is using One Drive to sync their Desktop Picture, etc, you may not have the location ~/Desktop.
Instead, search in cd OneDrive\ -\ DOI/Desktop.
Other option is to right-click on the location (say on your Desktop, or in Windows Explorer) and click "Git Bash Here..."

ls --help
help menu

https://explainshell.com/
https://explainshell.com/explain?cmd=ls+-F

ls --help | less

SPACEBAR
to go to next page / page down

b
to go to previous page / page up

q
to quit

arrow up / arrow down will scroll line by line

ls -l
long listing format

ls -l -h
ls -h -l
ls -lh
ls -hl
long listing format with human readable file sizes

Speed Check: Use a + plus sign for voting,
Go faster:
Go slower:
Okay: ++++++++++++++++

viewed contents of shell-lesson-data on desktop?
yes: +l++++++++++++++
need time:

need help: ++jbell
chris lewis [solved, via helping Matt]
jbell-quick link to shell-lesson data? i am duing this on my own pc, work not setup
joe: the data are here: http://swcarpentry.github.io/shell-novice/data/shell-lesson-data.zip
Thanks: jbell-home: resolved
Matt Nicotra directory doesn't show on desktop [solved]

up/down arrows toggle through previously used commands

cd
change directory

cd to change to home directory
cd -
to go to previous directory

relative path
giving directions from current location

absolution path
starts with /

cd ..
.. means the parent directory

. means current/present directory

Starting from /Users/amanda/data, which of the following commands could Amanda use to navigate to her home directory, which is /Users/amanda?

1. cd .
2. cd /
3. cd /home/amanda
4. cd ../..
5. cd ~
6. cd home
7. cd ~/data/..
8. cd
9. cd ..

1:
2:
3:
4:
5: +++++cd ..+++++++++
6:
7:
8: ++++++
9:++++++++++

1:
2:
3: ++
4: ++++++++++++++

ls   -F   ../backup

command (ls)
options/flags (-F)
parameter/argument (../backup)

http://swcarpentry.github.io/shell-novice/03-create/index.html

mkdir thesis

mkdir - make/create directory(ies)

rm to remove

rm file_name to remove a file
rm -r directory_name to remove folder/directory

ls
to verify thesis was created

naming
variable
file
directory
username
computer/device name

useclear
A-Z
a-z
0-9
_

short yet meaningful
8 to 11 characters
does not start with digit or _

nul
null
prn
rnd

From the chat:

- do we avoid spaces in file/var/dnames? Generally yes! Good practice is to avoid spaces and symbols.
- See style guides out there for conventions, Frank usis PEP-8 (very common) for example. Annajiat has a great list here: http://annajiat.blogspot.com/2020/08/python-code-convention-or-style-guide.html

nano draft.txt

write
publish or perish

CTRL+O to write (save)

when you see File Name to Write: draft.txt at the bottom
press ENTER to confirm filename

CTRL+X to exit

verify if the file got created

```
ls
```

verify if the file got saved

```
cat  draft.txt
```

(prints the contents)

```
command     < input_file.txt     > output_file.txt
```

I/O (input/output) redirection

```
 ls > list.txt
```

redirects output of ls command to a list.txt instead of showing on screen

input stream
output stream
error stream

>> to append

```
 echo bye >> file4.txt
```

CTRL + C to abort a command

mv to
rename
move (cut/paste)

From the chat (Advance/beyond scope of class): you can set up your bash to protect you files by defaul by setting "noclobber" Example behavior, verified in Git Bash for Windows:

```
$ echo hssi >foo
$ cat foo
hssi
$ set -o noclobber #set noclobber
$ echo hssssi >foo
```

```
bash: foo: cannot overwrite existing file
$ set +o noclobber #unset noclobber
$ echo hssssi >foo
$ cat foo
hssssi
```

?
*

* means zero or more characters
? means exactly one character

https://en.wikipedia.org/wiki/KISS_principle
https://en.wikipedia.org/wiki/Don%27t_repeat_yourself
https://en.wikipedia.org/wiki/Rubber_duck_debugging

https://stackoverflow.com/questions/tagged/shell
https://codeblog.jonskeet.uk/2010/08/29/writing-the-perfect-question/

hi.sh

```
echo hello
echo bye
echo processing
```

bash hi.sh

. hi.sh
source hi.sh

```
chmod +x hi.sh
./hi.sh
```

https://tldp.org/guides.html
Advanced Bash-Scripting Guide
Bash Guide for Beginners

Using Git

On end of line conventions: https://en.wikipedia.org/wiki/Newline#Representation
More docs: https://git-scm.com/doc
https://www.git-scm.com/book/en/v2/Customizing-Git-Git-Configuration#_core_autocrlf
"If you’re programming on Windows and working with people who are not (or vice-versa), you’ll probably run into line-ending issues at some point. This is because Windows uses both a carriage-return character and a linefeed character for newlines in its files, whereas macOS and Linux systems use only

the linefeed character. This is a subtle but incredibly annoying fact of cross-platform work; many editors on Windows silently replace existing LF-style line endings with CRLF, or insert both line-ending characters when the user hits the enter key.
Git can handle this by auto-converting CRLF line endings into LF when you add a file to the index, and vice versa when it checks out code onto your filesystem. You can turn on this functionality with the core.autocrlf setting. "
Good templates for .gitignore files: https://github.com/github/gitignore

```
ls -al ~/.ssh
```

Speed check : -

Feedback form:
https://forms.gle/o5p7euvsUy6Lf8Nk6

Day 2

Please sign in below
Sean Andrews
Frank Engel
Chris MacPherson
Mark Henneberg
Russ Lotspeich
Bryce McClenney
Matt Nicotra
Joshua Keele
Chris Gazoorian
Henry Doyle
Nick Grim
Skylar Smith
BryceRedinger
Alex Graziano
Matt Gyves
Chris Lewis
Jon Duffie
Stephan Shansey
Gerald Kunkle
Joseph Bell
David Coyle
Dave Owens
Al Ruddy
Keegan Johnson
Paul Reneau
Sanjay Fuloria

What values do the variables mass and age have after each of the following statements? Test your answer by executing the lines.

```
mass = 47.5
age = 122
mass = mass * 2.0
age = age - 20
```

```
first, second = 'Grace', 'Hopper'
third, fourth = second, first
print(third, fourth)
```

What are the data types for the following variables ?

```
planet = 'Earth'
apples = 5
distance = 10.5
```

Write some additional code that slices the first and last columns of A, and stacks them into a 3x2 array. Make sure to print the results to verify your solution.

Common import statements

```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
```

After Lunch:
https://github.com/frank-engel-usgs/softwarecarpentry-usgs-aug2021

Day 3

Please sign in below

Frank Engel
Matt Nicotra
Bryce Redinger
Mark Henneberg
Bryce McClenney
Jon Duffie
Alex Graziano
Keegan Johnson
Sean Andrews
Henry Doyle
Chris MacPherson
Stephan Shansey
Joseph Bell (needs to leave @ 1100 et
Skylar Smith
Nick Grim
Russ Lotspeich
Dave Owens
Chris Lewis
Gerald Kunkle

Joshua Keele
Sanjay Fuloria
David Coyle
Al Ruddy
Paul Reneau

```
string_for_slicing = 'Observation date: 02-Feb-2013'
```

```
list_for_slicing = [['fluorine', 'F'],
                    ['chlorine', 'Cl'],
                    ['bromine', 'Br'],
                    ['iodine', 'I'],
                    ['astatine', 'At']]
```

Using range, write a loop that uses range to print the first 3 natural numbers:

Write a loop that calculates the same result as 5 ** 3 using multiplication (and without exponentiation).

Write a loop that calculates the sum of elements in a list by adding each element and printing the final value, so [124, 402, 36] prints 562

```
x = 5
coefs = [2, 4, 3]
y = coefs[0] * x**0 + coefs[1] * x**1 + coefs[2] * x**2
print(y)
```

Write a loop using enumerate(coefs) which computes the value y of any polynomial, given x and coefs.

https://www.go-fair.org/fair-principles/

iterator
loop (control) variable
https://www.python-graph-gallery.com/

viridis
color-blind friendly palette
Docs for matplot lib: https://matplotlib.org/stable/gallery/color/colormap_reference.html
Other pallettes specific for mapping (there's a few colorblind safe entries): https://colorbrewer2.org/

exercise
90 to 100: A
70 to 89: B
50 to 69: C
F

101: Error
-1: Error

assert

git blame
https://git-scm.com/docs/git-blame

git bisect
https://coderefinery.github.io/git-intro/10-archaeology/#finding-out-when-something-brokechanged-with-git-bisect

https://www.101computing.net/using-trace-tables/

http://pythontutor.com/visualize.html#mode=edit

https://floating-point-gui.de/languages/python/

https://en.wikipedia.org/wiki/Rubber_duck_debugging

https://realpython.com/python-print/

https://pandas.pydata.org/