CS6
Practical System Skills
Fall 2019 edition
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Open questions from last lecture
15.20 Checking out remote tags

⇒ clone the repo first via `git clone`, then you can list available tags via `git tag -l`

⇒ checkout a specific tag via `git checkout tags/<tagname>`

Example:

```
wget https://github.com/ethereum/go-ethereum.git &&
cd go-ethereum &&
git checkout tags/v1.0.2
```
To rebase on the master run

git checkout feature && git rebase master

you can use git checkout --ours or git checkout --theirs

Note: Meaning of theirs/ours is flipped in rebase mode, i.e.

--theirs is referring to the feature branch
--ours is referring to the master branch

to continue the rebase if no changes are made to the commit, use git rebase --skip
16.01 What is python?

⇒ developed by Guido van Rossum in the early 1990s
   → named after Monty Python, has a snake as mascot

⇒ python is an *interpreted language*

⇒ *dynamically typed*, i.e. the type of a variable
   is determined during runtime

⇒ high-level language with many built-in
   features like lists, tuples, dictionaries (hashmaps),
   sets, ...
16.02 Who uses python?

<table>
<thead>
<tr>
<th>Web backend</th>
<th>Data analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Image of Dropbox logo]</td>
<td>[Image of Netflix logo]</td>
</tr>
<tr>
<td>[Image of Quora logo]</td>
<td>[Image of Spotify logo]</td>
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<tr>
<td>[Image of Instagram logo]</td>
<td>[Image of YouTube logo]</td>
</tr>
<tr>
<td>+ many more</td>
<td>+ many more</td>
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</tbody>
</table>

Note: An interesting talk why Instagram choose Python [https://www.youtube.com/watch?v=66XoCk79kjM](https://www.youtube.com/watch?v=66XoCk79kjM)
16.02 Python resources

Official tutorial: https://docs.python.org/3.7/tutorial/index.html

Other useful resources:
https://www.codecademy.com/learn/learn-python-3
https://www.programiz.com/python-programming/tutorial

+ many more available online on Udemy, Coursera, ...
16.03 Installing python

⇒ There are many python versions, we'll be using python 3.7

   → often you see code for python 2.7,
      however 2.7 will be deprecated 2020

⇒ Use a package manager to install python:

   - Mac OS X
     ```
     brew install python3
     ```
   - Ubuntu:
     ```
     sudo apt update && sudo apt install software-properties-common &&
     sudo add-apt-repository ppa:deadsnakes/ppa &&
     sudo apt install python3.7
     ```
   - Debian: [https://linuxize.com/post/how-to-install-python-3-7-on-debian-9/](https://linuxize.com/post/how-to-install-python-3-7-on-debian-9/)
16.04 Working with python - how to develop code?

⇒ the python interpreter can be accessed using different ways.
   Popular are

(1) **interactive mode**
   entering `python3` in bash starts python3 in REPL mode,
   `python3 -c "<some python3 code>"` can be used to directly execute code

(2) **file mode**
   save code in a file and execute via `python3 code.py` or `./code.py` with a shebang line. There are also IDEs like pycharm to work with `.py` files

(3) **notebooks**
   instead of the limited REPL, have a web interface to work like in Mathematica.
   Popular are jupyter notebooks or zeppelin notebooks. Many vendors also have commercial notebook offerings (IBM/Databricks/Cloudera/Google/MS/...).
16.05 python in interactive mode

tuxmachine:~ tux$ python3
Python 3.7.4 (default, Sep 28 2019, 16:39:19)
[Clang 11.0.0 (clang-1100.0.33.8)] on darwin
Type "help", "copyright", "credits" or "license" for more information.

>>> credits
    Thanks to CWI, CNRI, BeOpen.com, Zope Corporation and a cast of thousands
    for supporting Python development. See www.python.org for more information.

>>> 1 + 2
3

>>> x = 17

>>> x ** 2
289

>>> exit()

you can type expressions or statements

use exit() to quit the REPL or Ctrl + D
16.06 python in file mode

```sh
#!/usr/bin/env python3
print("hello world!")
```

- `echo -e '#!/usr/bin/env python3\nprint("hello world!")'` > `hw.py` && `python3 hw.py`
- `chmod +x hw.py` && `./hw.py`
- `python3 -c 'print("hello world!")'`

**execute file in python3**

**specifying a shebang line allows execution via ./**

**-c option to specify python program as string (works for bash too)**
There are multiple IDEs available for python3 development

- **PyCharm** (free for students w. Github education pack)
- Spyder
- Visual Studio with Python Tools for Visual Studio
16.07 Notebooks

⇒ Popular (especially amongst data scientists) are notebooks

→ we'll be using jupyter notebooks

⇒ Install them via

pip3 install jupyter

(python package index)

⇒ start via jupyter notebook

(launches notebook webui)

*install pip via instructions on http://pip.pypa.io or on Ubuntu via apt-get install python3-pip
python3 language essentials
16.08 Time to learn some python!

⇒ best via interactive notebook!

⇒ git clone https://github.com/brownecs6/PythonIntro

⇒ Lab today: Intro to Python
End of lecture.

Next class: Thu, 4pm-5:20pm @ CIT 477