Worksheet 01

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Topics

- Git

Prerequisites (installations)

This is your checklist:

- ☑ Access to terminal
- ☑ Install Git
- ☑ Sign up for a GitHub account
- ☑ Choose editor
- ☑ Set up ssh keys
- ☑ Configure git

Step 1: Work Environment: Access to Terminal

- Mac/Linux: use **Terminal**
- Windows:
  - Option 1: Power Shell (https://www.digitalcitizen.life/simple-questions-what-powershell-what-can-you-do-it)
  - Option 2: Git Bash (recommended)

Step 2: Install Git

- Mac:
  - Git (https://git-scm.com/download/mac)
- Windows:
  - Git for Windows (Git Bash) (https://gitforwindows.org/)
- Linux:
  - Install Git on Linux (https://www.atlassian.com/git/tutorials/install-git#linux)

Confirm Git is installed by typing `git --version` on your terminal

Step 3: Sign up for a GitHub Account

Go to github.com (https://github.com/)

Step 4: Choose a Graphical Editor

- Try Visual Studio Code
  - Visual Studio Code (https://visualstudio.microsoft.com/downloads/)

- OR one of these other editors
    - Sublime Text 3 (https://www.sublimetext.com/)
    - Atom (https://atom.io/)
    - Notepad++ (https://notepad-plus-plus.org/) (for Windows)

Step 5: SSH Setup

Mac & Linux Users

Go to home directory (in terminal)

```
% cd ~
% pwd
/Users/gallettilance
```

Go to `.ssh` directory

```
% pwd
/Users/gallettilance
% cd .ssh
% pwd
/Users/gallettilance/.ssh
```

Note: If you do not have the `.ssh` directory, you can create it

- if you are in your home directory:
    - `mkdir .ssh`
- if you are not in your home directory:
    - `mkdir ~/.ssh`

Generate `id_rsa` keypair files if needed

- **Note:** these `id_rsa` files contain a special password for your computer to be connect to network services (Ex: GitHub, AWS).
- Check to see if these files exist by typing `ls -alt`
- If you do not have these two files (`id_rsa` and `id_rsa.pub`), create them by typing:
    - `ssh-keygen`
    - Hit `enter` **3 times**

```
% pwd
/Users/gallettilance/.ssh
% ls
% ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/Users/gallettilance/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /Users/gallettilance/.ssh/id_rsa.
Your public key has been saved in /Users/gallettilance/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:jmDJes1qOzDi8KynXLGQ098JMSRnbIyt0w7vSgEsr2E gallettilance@RESHAMAs-MacBook-Pro.local
The key's randomart image is:
+---[RSA 2048]----+
|   .=+           |
|.  .==           |
|.o  +o           |
|..+= oo          |
|.E.+X.  S        |
|+o=o=*oo.        |
|++.*o.+o.        |
|..*.oo           |
|o= o+o           |
+----[SHA256]-----+
% ls
total 16
-rw-------  1   1675 Dec 17 12:20 id_rsa
-rw-r--r--  1    422 Dec 17 12:20 id_rsa.pub
%
```

Navigate to the `.ssh` directory

```
cd ~/.ssh
```

open `id_rsa.pub` using your editor of choice and copy its contents. Add `ssh` key to GitHub by following these steps:

- go to your [GitHub account (https://github.com/)](https://github.com/) (create one if you don't have one, and save your user name and password somewhere easily accessible for you.)
- click on your avatar/profile picture (upper right of screen)
- go to `Settings`
- on left of screen, select `SSH and GPG keys`
- Select `New SSH key`
- for "Title": entitle it "GitHub key"
- for "Key": paste key from clipboard here
- click `Add SSH key`

- save, exit, confirm GitHub password as requested

Windows Users

Follow [How to Create SSH Keys with PuTTY on Windows (https://www.digitalocean.com/docs/droplets/how-to/add-ssh-keys/create-with-putty/)](https://www.digitalocean.com/docs/droplets/how-to/add-ssh-keys/create-with-putty/)

For Windows 10 or 11

- Press Windows+R
- Enter cmd
- In the opened Command Prompt, type in “ssh-keygen”
- Press Enter
- You can choose to enter a passphrase, it will not be displayed.
- Go to the shown path to find your file named id_rsa.pub Ex. C:\Users\user/ .ssh/id_rsa.pub
- Open the file with a notepad and copy everything
- Go to github and click settings at top right
- Go to SSH and GPG keys, click New SSH key and paste your SSH key here.
- Click Add SSH key. You might be asked to enter Github password.
- Go back to your Command Prompt and type in “ssh -T [git@github.com (mailto:git@github.com)](mailto:git@github.com)”
- Enter your SSH passphrase.
- You will see “You’ve successfully authenticated” in the following message. Which means you are now connected to Github.

Step 6: Configure Git

Git / GitHub (In Class)

a) what is the difference between git and github?

Git is is a version control system that allows your to track changes in your code, so that you can move back and forth between the changes in your code. Github is a website (cloud platform) that allows your to backup and manage you timeline of code and also allows you to collaborate on the code with others.

b) what command would you use to copy a repo locally?

Git Clone

c) what button would you use to make a copy of a repo in GitHub?

fork in the top right

d) let's say you have a copy of a repo in GitHub but that repo changes, does your copy on your laptop change too? why / why not?

Nope your repository sits separetly from the one on github, to get those changes you must pull from the repository in GitHub. It dosent pull changes automatically because of possible conflicts of the code in your repo vs the one online.

e) what are the three commands you use to create a new save point in your git repo and back it up to GitHub?

git add

git commit

git push

f) how would you make your local and remote copies change so that they have the most up-to-date version of the repo they are copied from?

You would have to pull from upstream main, which is the main associated with your forked repository. Once its updated your remote repository you can then pull the changes from there onto your local repository.

g) why are there sometimes conflicts between copied repos / branches? How do you resolve them?

because multiple people can be working on the same repository at the same time. The changes in their code may overlap with the changes in your branch. So if they push to the main branch and then you do, you have to choose which changes you want to keep.

h) describe all the steps needed to make a PR to contribute your notes to the class repository.

1. Fork the class repository
2. Clone the class repository to your local machine
3. create a new branch to develop a feature (in this case your class notes)
4. On github move to your feature branch
5. create a pull request to push changes to the upstream/main repo

i) Write here some other commands we used in class and what they mean / how to use them:

Git merge - merging a branch into yours to recieve certain changes Git rebase - changes the base of feature branch (rebase) to be at the head of the master branch Git checkout - moves the head of the branch to some other point in the branch Git status - checks for unpushed changes

Exercise

a) Create a public repo on your github called "polynomial". Create a folder on your laptop called "polynomial" and initialize it as a git repo. Add a remote called "origin" pointing to the github repo you just created. Create a file called "polynomial.py" with the following code:

```
class X:
    def __init__(self):
        pass

    def __repr__(self):
        return "X"

class Int:
    def __init__(self, i):
        self.i = i

    def __repr__(self):
        return str(self.i)

class Add:
    def __init__(self, p1, p2):
        self.p1 = p1
        self.p2 = p2

    def __repr__(self):
        return repr(self.p1) + " + " + repr(self.p2)

class Mul:
    def __init__(self, p1, p2):
        self.p1 = p1
        self.p2 = p2

    def __repr__(self):
        if isinstance(self.p1, Add):
            if isinstance(self.p2, Add):
```

Type *Markdown* and LaTeX: α^2

Exercise

Fork the course repo. Clone that fork locally. Ensure there is a remote called origin pointing to your fork and add a remote called upstream pointing to the course repo. Create a new branch called "worksheet_01". Checkout this new branch. In the `student_notes` folder, create a new file called `<your_last_name>_<your_first_name>_worksheet_01.txt` . In this file, answer the following question:

```
A friend presents you with a coin they claim to be fair. You fli
p the coin 5 times and it lands on Heads every single time. You
flip the coin another 5 times, same result. How many times must
this happen for you to start doubting the fairness of the coin?
Explain your reasoning a bit.
```

add and commit this change with the message "contributing class notes". Push the changes to the origin/worksheet_01 branch. Create a Pull Request against the course repo from this branch on github. Provide a link below to this PR.

```
https://github.com/gallettilance/Data-Science-Fundamentals/pull/388
```

In [ ]:

```

```