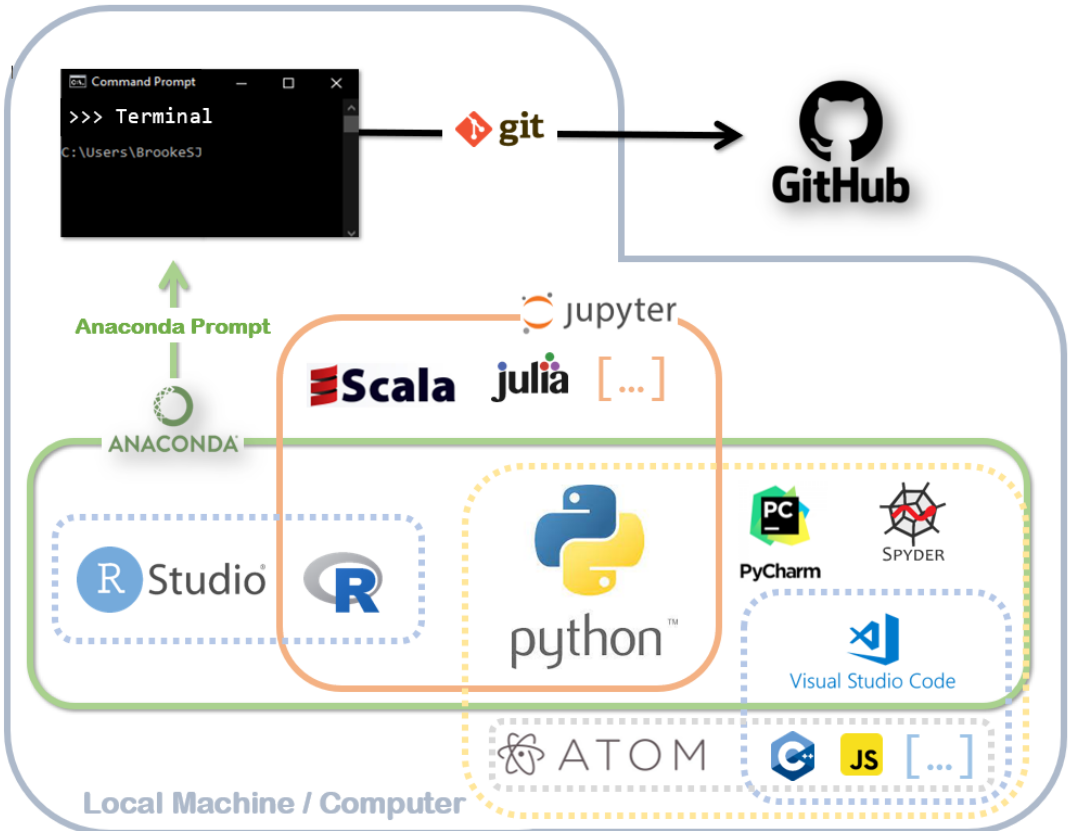
MY470 Computer Programming

Anaconda, Jupyter, and GitHub

Week 1 Lab

Map of Software Tools and Options



IDEs

- Integrated development environment
- A software application that facilitates computer programming and software development
  - Text editor with syntax highlighting, auto completion and smart indentation
  - Shell with syntax highlighting
  - Popular libraries
  - (Debugger)
- For example:
  - Spyder
  - PyCharm
  - VSCode + Terminal
  - **Jupyter + Anaconda**

Anaconda

- Freemium open-source cross-platform distribution of the Pyhton and R programming languages
  - `conda` – package management system
  - `pandas`, `numpy`, `statsmodels`, `networkx`, `scikit-learn`, `matplotlib` – packages for data science
  - Anaconda Navigator – graphical user interface
  - Jupyter Notebook – web app for creating and sharing code

Installing Anaconda

- Go to https://www.anaconda.com/download/ (https://www.anaconda.com/download/)
- Select your OS
- Follow instructions

Jupyter

- Open-source web application for creating and sharing documents with:
  - Live code
  - Equations
  - Visualizations
  - Explanatory text
- Supports more than 40 programming languages, including Python and R
- Notebook files have *.ipynb* extension and can be easily shared, e.g. on GitHub

Launching Jupyter

- Launch Anaconda Navigator and click on Jupyter Notebook icon

or

- Open Terminal/cmd and type:

```
> jupyter notebook
```

Using Jupyter

- New → Notebook: Python 3

- Insert → Insert Cell Below
- Cell → Cell Type →
  - Markdown
    - Lightweight markup language
    - See cheatsheet: https://github.com/adam-p/markdown-here/wiki/Markdown-Cheatsheet (https://github.com/adam-p/markdown-here/wiki/Markdown-Cheatsheet)
    - CTRL+ENTER to run
    - Double-click to edit
  - Code
    - CTRL+ENTER to run
- Cell → Run All
  - Code is run top-down so you can use code from cells above in current cell

Using Jupyter for Slides

- Install RISE

```
> conda install -c conda-forge rise
```

- Restart Jupyter
- View → Cell Toolbar → Slideshow to determine slideshow flow
- Click on Enter/Exit Live Reveal Slideshow

Shutting Down Jupyter

- Do not forget to Command+S / CTRL+S !
- Jupyter is a server and closing the browser window will not shut it down
- To close a notebook:
  - File → Close and Halt
  - On Notebook Dashboard → Slect notebook → Shutdown
- To shut down server:
  - On Notebook Dashboard → Quit
  - Terminal → CTRL+C → y

Alternative Python Workflow

- Use another IDE

or

- Use text editor (e.g. VSCode) to create .py files
- Run files in Terminal/cmd

```
> cd Path/to/file
> python filename.py
```

Working with GitHub

If you have not done this already:

- Create personal account on https://github.com/ (https://github.com/)
- Go to https://education.github.com/ (https://education.github.com/) and get the Student Developer Pack for some cool freebies

Three ways to interact with GitHub:

1. Browser

2. Command line
3. (GitHub Desktop)

Viewing Course Materials on GitHub (Browser)

- Syllabus and lectures at http://github.com/lse-my470/lectures (http://github.com/lse-my470/lectures)
- Answers to assignments at https://github.com/lse-my470/answers-to-assignments (https://github.com/lse-my470/answers-to-assignments)
  - To view this repository, you need to be added to the Students team on the MY470 organization on GitHub
  - Registered students should provide their GitHub username by filling out the **survey on Moodle**
  - Auditors should e-mail their GitHub username to m.tsvetkova@lse.ac.uk (mailto:m.tsvetkova@lse.ac.uk)
  - Do not forget to **accept the invitation** to join the team and organization!

Submitting Assignments on GitHub (Browser)

1. Wait for e-mail with link to assignment (sent on Monday evening)

- Accept invitation to assignment. This will automatically create a new repository with your username.
- **Clone/download** the repository (GitHub web interface)
- Make changes in downloaded file (Jupyter)
- Upload and **commit** changed file **directly to the master branch**. Do this before the deadline (GitHub web interface)
- We will automatically download all assignment repositories when the deadline has passed. We will then comment and mark your assignment directly in the main file you submitted
- Wait for a new commit from us to view our feedback (GitHub web interface)

Cloning Course Materials from GitHub (Command Line)

*Install and set up `git`

Follow instructions here: https://help.github.com/articles/set-up-git/ (https://help.github.com/articles/set-up-git/)

Cloning

```
> cd Path/to/directory
```

```
> git clone https://github.com/lse-my470/lectures.git
```

Updating

```
> cd Path/to/lectures
```

```
> git pull
```

- Similarly, clone and update `https://github.com/lse-my470/answers-to-assignments`
- Use Jupyter to annotate your local copies
- `add` and `commit` before `pull`ing

Submitting Assignments on GitHub (Command Line)

1. Accept invitation to assignment. This will automatically create a new repository with your username

- **Clone** the repository (Terminal)

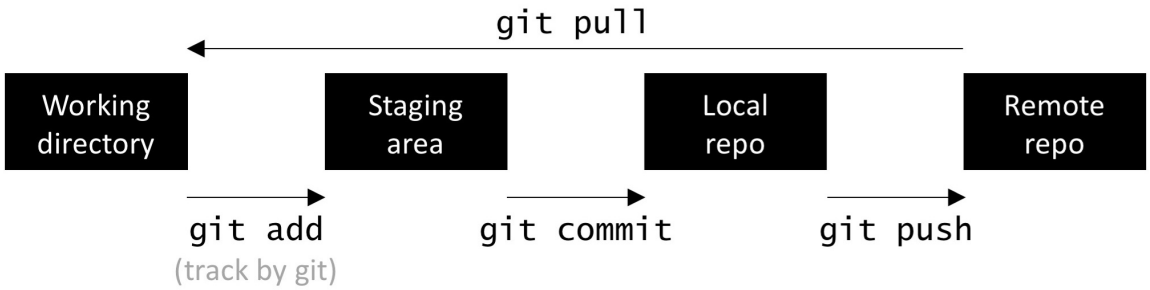
```
> cd Path/to/directory

> git clone link.git
```

(You can obtain the link when you click the "Clone or download" button on the GitHub page for the repository)
- Make changes in downloaded file (Jupyter)
- **Commit** changed file and **push to the master branch**. Do this before the deadline (Terminal)

```
> cd Path/to/directory

> git add --all

> git commit -m 'Submitting assignment'

> git push
```
- We will automatically download all assignment repositories when the deadline has passed. We will then comment and mark your assignment directly in the main file you submitted
- **Pull** the new version we commit to view our feedback (Terminal)

```
> cd Path/to/directory

> git pull
```

Submitting Assignments on GitHub (Command Line)



Submitting Assignments on GitHub: General Notes

- Do not forget to push (especially on GitHub Desktop!)
- Always check if the changes are online. If you cannot see them after refreshing, no one else can.
- GitHub does all the version control for you. Do not duplicate and rename files!

Week 1 Assignment (FORMATIVE)

- Write a simple program in a Jupyter notebook and submit it on GitHub
- E-mail with link to assignment will be sent by end of Monday