

Coding Club 2021 - Python Session 1

Coding Process
Overview



Agenda

1

Setting the Scene
(15 min)

2

First Script (45 min)

3

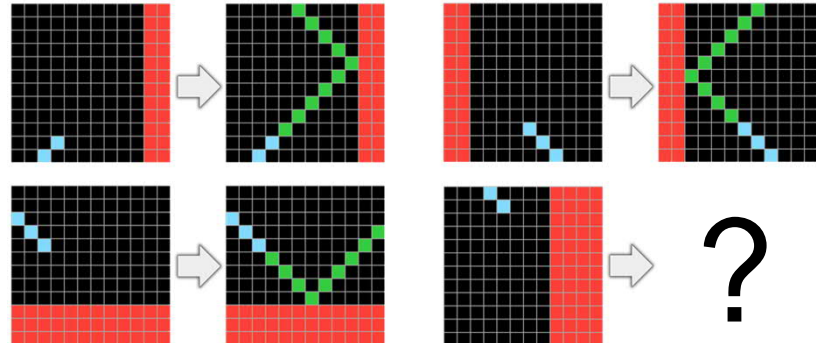
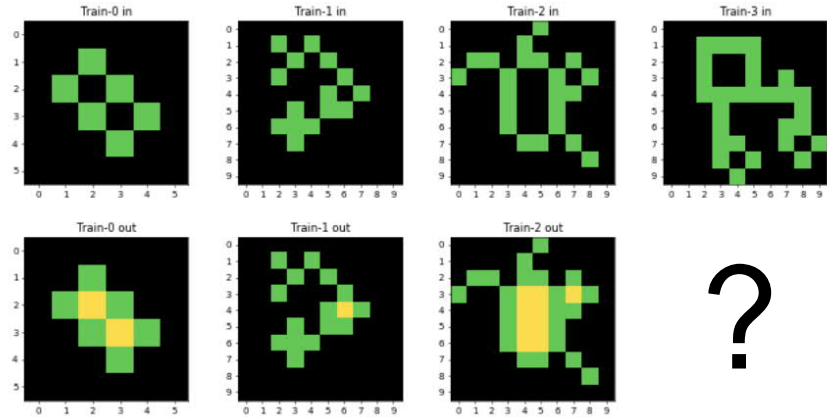
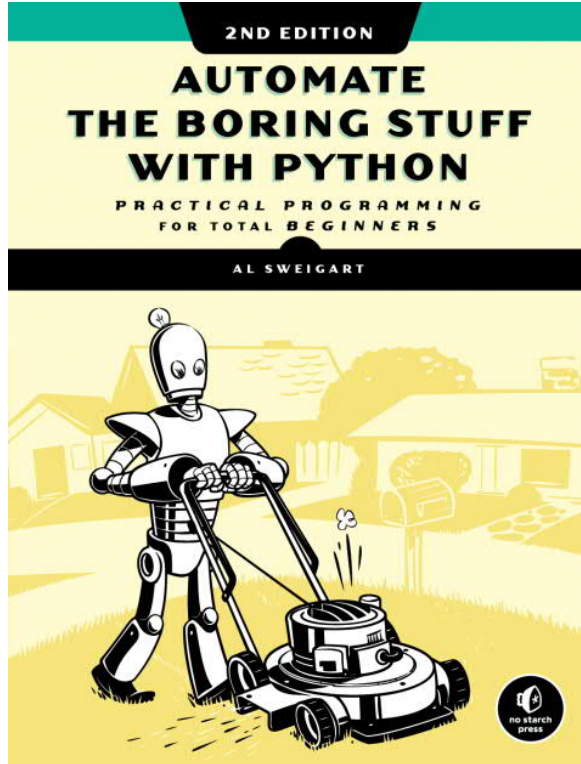
Collaboration and Distribution
(30 min)

4

What's next

Setting the Scene (15 min)

- Nature of Python



Setting the Scene (15 min)

- Nature of Python



Hardcoding vs Softcoding



Setting the Scene (15 min)

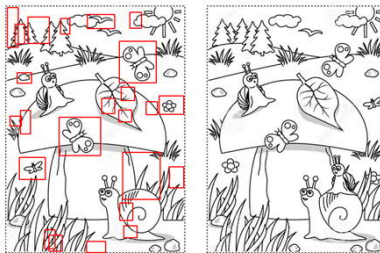
- Nature of Python



is used in AI (machine learning), with rising star



Computer Vision



Data Manipulation

Excel Training

File Home Insert Page Layout Formulas Data Review View Tell me what you want to do

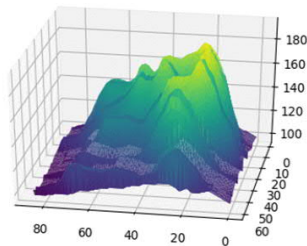
Calibri 11 A⁺ [Bulleted List Icon] [Numbered List Icon] [Decrease Indent Icon] [Increase Indent Icon] [Wrap Text Icon] General

B I U [Text Color Icon] [Background Color Icon] [Decrease Indent Icon] [Increase Indent Icon] [Merge & Center Icon] \$ % [Number Format Icon]

Font Paragraph Styles Alignment Numbers

G12

	A	B	C	D	E	F	G	H
1	Student	Class	School	Major				
2	Baxter, Roger	2017 SOP		Pharmacy				
3	Wilson, Elaine	2020 A&S		Health Psychology				
4	Su, James	2018 SOP		Pharmaceutical Science				
5	Smith, Jane	2019 A&S		Health Sciences				
6								

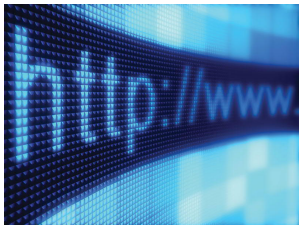


Natural Language

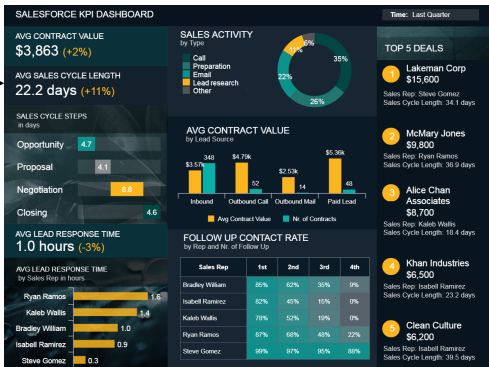


Setting the Scene (15 min)

Internet Scrapping



Real-Time Dashboard



Setting the Scene (15 min)

- Get the right tools

PYTHON 2.X



PYTHON 3.X

← LEGACY

It is still entrenched in the software at certain companies

2

LIBRARY

Many older libraries built for Python 2 are not forwards compatible

0100
0001

ASCII

Strings are stored as ASCII by default

≈

7/2=3

It rounds your calculation down to the nearest whole number

```
</>
```

```
print("WELCOME TO  
GEEKSFORGEKS")
```

It rounds your calculation down to the nearest whole number

FUTURE →

It will take over Python 2 by the end of 2019

LIBRARY

3

Many of today's developers are creating libraries strictly for use with Python 3

UNICODE

Text Strings are Unicode by default

7/2=3.5

This expression will result in the expected result

```
print("WELCOME TO  
GEEKSFORGEKS")
```

This expression will result in the expected result

ANACONDA NAVIGATOR

Upgrade Now

Sign in to Anaconda Cloud

Home

Environments

Projects (beta)

Learning

Community

Documentation

Developer Blog

Feedback



Applications on

anaconda

Channels

Refresh



jupyter
notebook

5.0.0

Web-based, interactive computing notebook environment. Edit and run human-readable docs while describing the data analysis.

Launch



qtconsole

4.3.1

PyQt GUI that supports inline figures, proper multiline editing with syntax highlighting, graphical calltips, and more.

Launch



spyder

3.2.4

Scientific Python Development Environment. Powerful Python IDE with advanced editing, interactive testing, debugging and introspection features

Launch



glueviz



jupyterlab



orange3

Preview of upcoming sessions

10-15 min

Review last week's topic
and discuss assignment

15 mins

Background and theory
of current week's content

60-90 min

Coding time.

Setting the Scene (15 min)

- Anticipated weekly dedication
 - 1.5 – 2 hours face-to-face in-class learning
 - 0.5 – 1 hour assignment and knowledge seeking
 - Timecode (1 hour professional development with narratives, 1 hour your time)
 - Invitation to each session will only be sent to those who has indicated interest

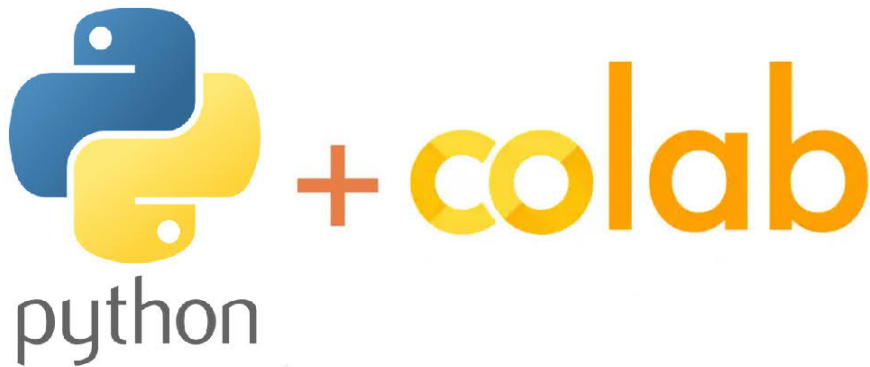
Professional Excellence/Training Timesheet Codes					
This is the cost of onboarding inductions, internal and external training. This is the cost associated with fostering professional excellence through publishing papers, presenting papers at conferences, participation in committees on technical subjects, etc.					
	AUX	New South Wales	South Australia	Queensland	Victoria
General	AUX084OTCCC05	NSW084OTCBA01	SAN084OTCBA01	QLD084OTCBA01	VIC084OTCBA01
Advisory		NSW084OTCAD01	SAN084OTCAD01	QLD084OTCAD01	VIC084OTCAD01
Built Environment		NSW084OTCBE01	SAN084OTCBE01	QLD084OTCBE01	VIC084OTCBE01
Energy		NSW084OTCEE01	SAN084OTCEE01	QLD084OTCEE01	VIC084OTCEE01
Transport		NSW084OTCTR01	SAN084OTCTR01	QLD084OTCTR01	VIC084OTCTR01
Water		NSW084OTCWA01	SAN084OTCWA01	QLD084OTCWA01	VIC084OTCWA01

First Script (45 min refer to notebook)

- Python Basics

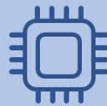
Collaboration and Distribution (30 min)

- Cloud collaboration



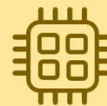
Username: mmpython1

Password: RonaldMacDonald2021



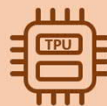
CPU

- Small models
- Small datasets
- Useful for design space exploration



GPU

- Medium-to-large models, datasets
- Image, video processing
- Application on CUDA or OpenCL

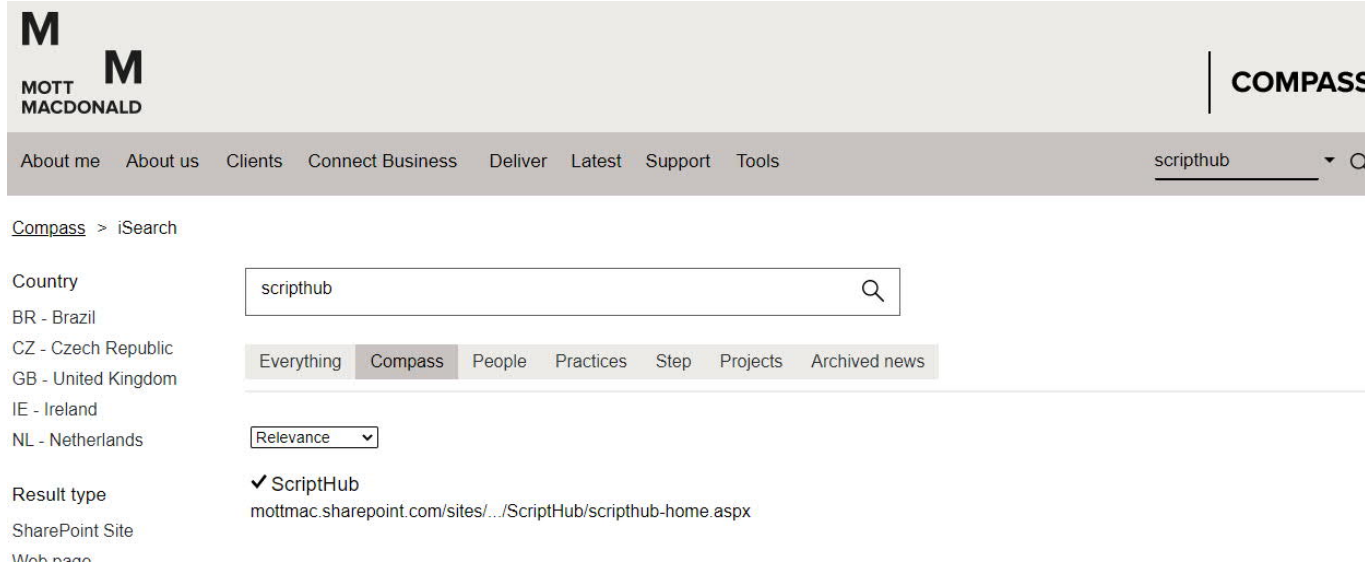


TPU

- Matrix computations
- Dense vector processing
- No custom TensorFlow operations

Collaboration and Distribution (30 min)

- Cloud documentation



The screenshot shows the Mott MacDonald COMPASS search interface. The header includes the Mott MacDonald logo and the COMPASS brand name. A navigation bar lists various sections: About me, About us, Clients, Connect Business, Deliver, Latest, Support, and Tools. A search bar on the right contains the text 'scripthub'. Below the header, the search results are displayed under the heading 'Compass > iSearch'. The results are filtered by country (BR - Brazil, CZ - Czech Republic, GB - United Kingdom, IE - Ireland, NL - Netherlands) and result type (ScriptHub, SharePoint Site, Web page). The search term 'scripthub' is entered in the search box. The results are sorted by Relevance. The first result is 'ScriptHub' with the URL 'mottmac.sharepoint.com/sites/.../ScriptHub/scripthub-home.aspx'.



GitHub is a cloud-based service that provides software storage, management and development using Git, an open-source version control system.

The Mott MacDonald Global organisation on GitHub houses all scripts created and contributed to by Mott MacDonald employees, in repositories that can be accessed by other members.

Collaboration and Distribution (30 min)

COMPASS TOOLS

ScriptHub

Published 3/26/2021



ScriptHub is a service which provides colleagues with the tools to develop and improve their skills in software and scripting development, enhancing information security and data literacy across our business.

Find best practice knowledge bases and templates for each supported language or technology and access code repositories on GitHub's Mott MacDonald organisation. We are using GitHub to enable secure code-sharing across teams and offices.

ScriptHub and all its features are managed with appropriate security and privacy measures alongside a modernised approach to the storage and development of code.



Access code repository

GitHub is a cloud-based service that provides software storage, management and development using Git, an open-source version control system.

The Mott MacDonald Global organisation on GitHub houses all scripts created and contributed to by Mott MacDonald employees, in repositories that can be accessed by other members.

To explore the scripts both private to Mott MacDonald and open-source, or to contribute your own scripts, firstly create a GitHub account using your Mott MacDonald email then request to join our organisation.

Step 1: sign up to GitHub

Step 2: Request to join MottMac on GitHub



<https://github.com/mottmacdonaldglobal>

Contact and support

Talk to someone

To discuss any aspects of ScriptHub, contact our **key contacts**.

Group discussion

The [Automation and Computational Yammer community](#) is a great place to ask questions and share your experiences to help other users.

Key contacts



Collaboration and Distribution (30 min)



M

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MOTT
MACDONALD

MOTT
MACDONALD

Opening opportunities with connected thinking. We turn the obstacles you face into sustainable infrastructure and development solutions.
<https://www.mottmac.com/>

Repositories 120

Packages

People 260

Teams 13

Projects 1

Find a repository...

Type

Language

Sort

New

python_template

Private template

Template Repository for Python Projects

0 0 0 0 0

Updated on 30 Mar

AGS_classify_ground_Pells

Private

This code automatically classifies rock in the ground according to the Pells classification system (used extensively in Sydney, Australia). The input is data stored in AGS files, specifically the AGS 3.1 RTA 1.1 format used by the NSW government. Also includes a module that exports relevant data from the AGS file into a format readable by CLiq. ...

ags geotechnical liquefaction cliq rock-classification

Python 0 0 0 0 0

Updated 6 days ago

shapefile_to_GRP_input

Private

This is a script that converts shapefile geometry to text input for GRP (Ground Response Program), an in-house MM command line tool for predicting settlement due to excavation and tunnelling.

python settlement geotechnical ground-movement damage-assessment

Python 0 1 0 0 0

Updated 9 days ago

Top languages

Python Visual Basic .NET

Jupyter Notebook R C#

Most used topics

dynamo revit vba vba-excel

python

People

260

SMARTCITIES HACK 2021

All Python session materials (including assignment solutions) will be uploaded to Github

Add repository

☐ Select all☐ mottmacdonaldglobal/dynamo_introduction

Private updated 19 days ago

Read

1.

☐ mottmacdonaldglobal/dynamo_template

Private template updated 19 days ago

2.

main 1 branch 0 tags

Go to file

Add file

Code

Use this template

tatjanasomova	Update README.md	68dbed4	17 days ago	3 commits
📁	.gitattributes	Initial commit	18 days ago	
📁	All-RVT-DynamoTemplate_2020.dyn	new files added	18 days ago	
📁	LICENSE	new files added	18 days ago	
📁	README.md	Update README.md	17 days ago	
📁	thumbnail.png	new files added	18 days ago	

README.md

dynamo_template

Create a new repository from dynamo_template

The new repository will start with the same files and folders as mottmacdonaldglobal/dynamo_template.

Owner *

mottmacdonaldglobal

Repository name *

Great repository names are short and memorable. Need inspiration? How about [supreme-octo-succotash](#)?

Description (optional)

☐ Public

Anyone on the internet can see this repository. You choose who can commit.

☒ Private

You choose who can see and commit to this repository.

☐ Include all branches

Copy all branches from mottmacdonaldglobal/dynamo_template and not just main.

Create repository from template

Who has access

PRIVATE REPOSITORY



Only those with access to this repository can view it.

[Manage](#)

BASE ROLE

None

No base role set. Only [Owners](#) and those with direct access can clone this repository.

[Set base role](#)

DIRECT ACCESS



0 teams or members have access to this repository. Only [Owners](#) can contribute to this repository.

Manage access

[Create team](#)



You haven't added any teams or people yet

Organization owners can manage individual and team access to the organization's repositories. Team maintainers can also manage a team's repository access. [Learn more about organization access](#)

[Invite teams or people](#)



Search or jump to...



[Pull requests](#)

[Issues](#)

[Marketplace](#)

[Explore](#)



[MOTT MACDONA...](#) / [dynamo_coding_club](#)

[Discussions](#)

[Members](#) 4

[Teams](#) 0

[Repositories](#) 2

[Projects](#) 0

[Settings](#)

25 pending members

Add a member

☐ 4 members 0 child team members

Role ▾

☐ [Maria Mingallon](#) mariamingallonMM

☐ [tatjanasomova](#)

☐ [Kate Molony](#) KateMolony

☐ [AnnaMoskvitina](#)





Invite teams or people to Coding-club-test



AnnaMoskvitina



Choose a role

discuss your project.

- ☐ **Triage**
Recommended for contributors who need to manage issues and pull requests without write access.
- ☐ **Write**
Recommended for contributors who actively push to your project.
- ☐ **Maintain**
Recommended for project managers who need to manage the repository without access to sensitive or destructive actions.
- ☒ **Admin**
Recommended for people who need full access to the project, including sensitive and destructive actions like managing security or deleting a repository.

Add AnnaMoskvitina to this repository



Invite teams or people to Coding-club-test



dynamo_coding_club
dynamo_coding_club



Choose a role

- ☒ **Read**
Recommended for non-code contributors who want to view or discuss your project.
- ☐ **Triage**
Recommended for contributors who need to manage issues and pull requests without write access.
- ☐ **Write**
Recommended for contributors who actively push to your project.
- ☐ **Maintain**
Recommended for project managers who need to manage the repository without access to sensitive or destructive actions.

Add mottmacdonaldglobal/dynamo_coding_club to this r...

Options

Manage access

Security & analysis

Branches

Webhooks

Notifications

Integrations

Deploy keys

Actions

Secrets

Who has access

PRIVATE REPOSITORY



Only those with access to this repository can view it.

[Manage](#)

BASE ROLE

None

No base role set. Only [Owners](#) and those with direct access can clone this repository.

[Set base role](#)

DIRECT ACCESS



2 have access to this repository. [1 member](#). [1 team](#).

Manage access

[Create team](#)

[Invite teams or people](#)

☐ Select all

Type ▼ Role ▼

🔍 Find a team, organization member or outside collaborator...

☐  [AnnaMoskvitina](#)

Role: [Admin](#) ▼



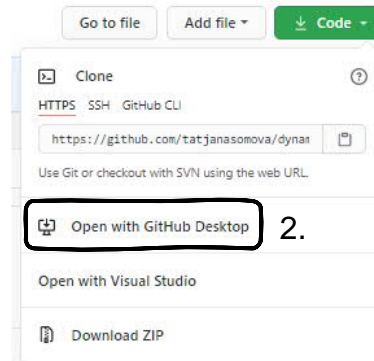
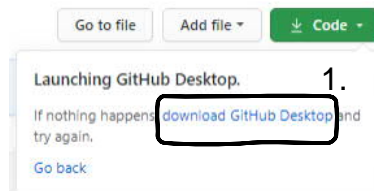
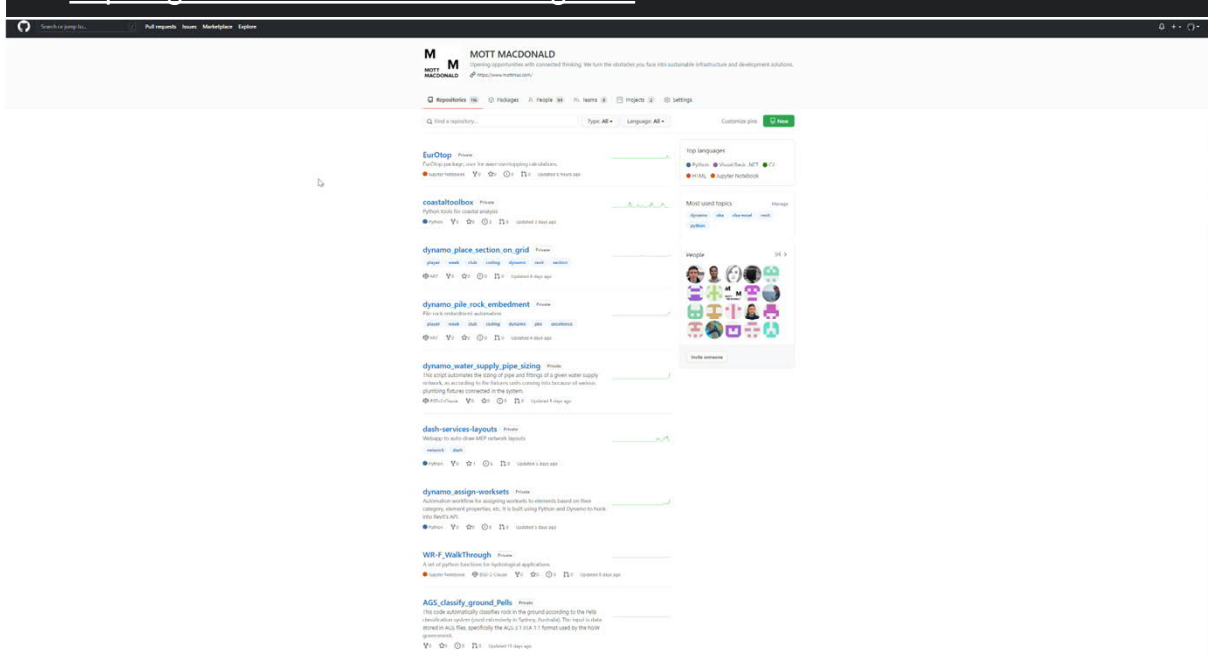
☐  [dynamo_coding_club](#)
@dynamo_coding_club • 4 members

Role: [Read](#) ▼

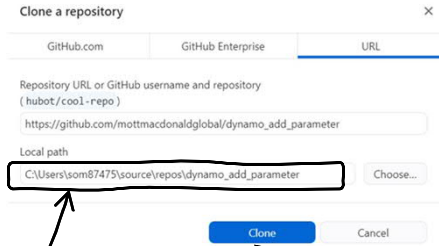


GitHub Repositories

- <https://github.com/mottmacdonaldglobal>



GitHub Repositories



1. Update local file

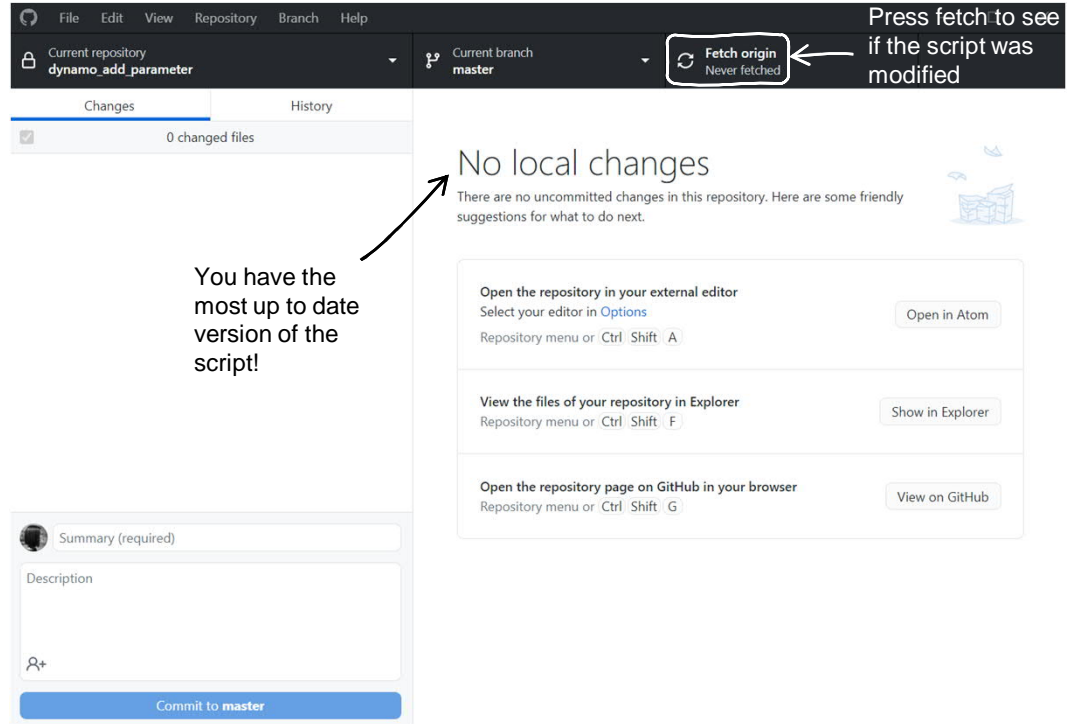
path.
If you are cloning a repository from GitHub for the first time, default local path will be:

C:\Users\som87475\Documents\GitHub

To keep your scripts organised add a subfolder for all Dynamo scripts:

C:\Users\som87475\Documents\GitHub\Dyna
mo

2. Clone repository!



You have the most up to date version of the script!

Collaboration and Distribution (30 min)

- Good habits

- Number your scripts and build up your personal knowledge library
- Lodge your journey for future easy reference
- Useful resources



Computational Design - Python - CV2 - Excel

<input type="checkbox"/> Name
001. Img restore
002. Img comparison
003. Panorama
004. Excel with python

	A	B	C	D	E	F	G
1			CV2	Stitching	Excel	Graphs	Selenium
2	001	Img restore	✓				
3	002	Img comparison	✓				
4	003	Panorama	✓	✓			
5	004	Excel with python			✓		
6	005	Plotting				✓	
7	006	Word cloud					
8							

This Session Assignment

- Github basics and Hello World code
 - Head to ScriptHub, set up Github account and join MM Github group
 - How many projects on Github written in Jupyter / Python?
 - Print prime numbers between 2 and 20 (run with class overview of how to find prime number)
 - Pip install opencv library (expect errors, what's the cause and how can we get around that?)