Geo Images and Git

Presented by:
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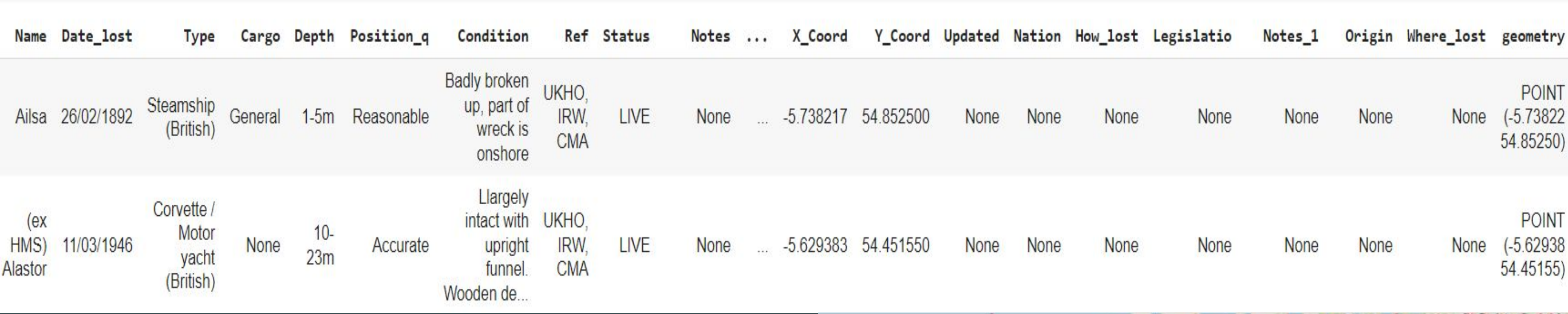
Flax & Teal 2024

Contents:

For DAERA's list of protected shipwrecks , we will find

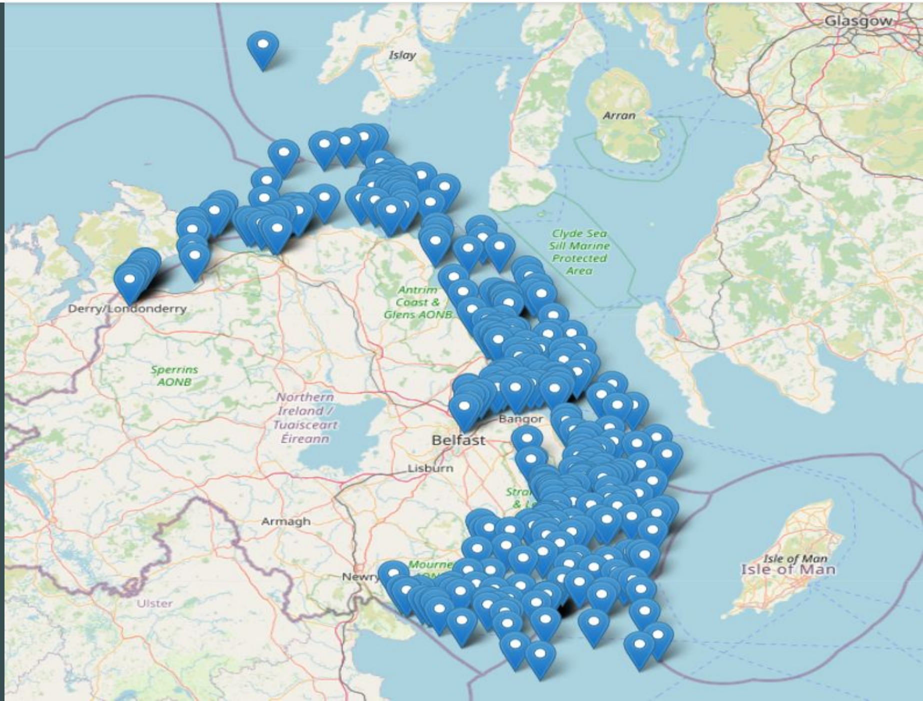
- Whether shipwrecks in the 1800s, 1900s or 2000s have different likely locations.
- Do wrecks cluster near groups of ports?
- Are wrecks more common in deep water or shallow water?

Geopandas is a popular library used to analys and work with geospatial data in Python.



Name	Date_lost	Type	Cargo	Depth	Position_q	Condition	Ref	Status	Notes	...	X_Coord	Y_Coord	Updated	Nation	How_lost	Legislatio	Notes_1	Origin	Where_lost	geometry
Ailsa	26/02/1892	Steamship (British)	General	1-5m	Reasonable	Badly broken up, part of wreck is onshore	UKHO, IRW, CMA	LIVE	None	...	-5.738217	54.852500	None	None	None	None	None	None	None	POINT (-5.73822 54.85250)
(ex HMS) Alastor	11/03/1946	Corvette / Motor yacht (British)	None	10-23m	Accurate	Llargely intact with upright funnel. Wooden de...	UKHO, IRW, CMA	LIVE	None	...	-5.629383	54.451550	None	None	None	None	None	None	None	POINT (-5.62938 54.45155)

To understand the relationships between their data's physical location and their geographical context , we can visualize the data using **Folium.**



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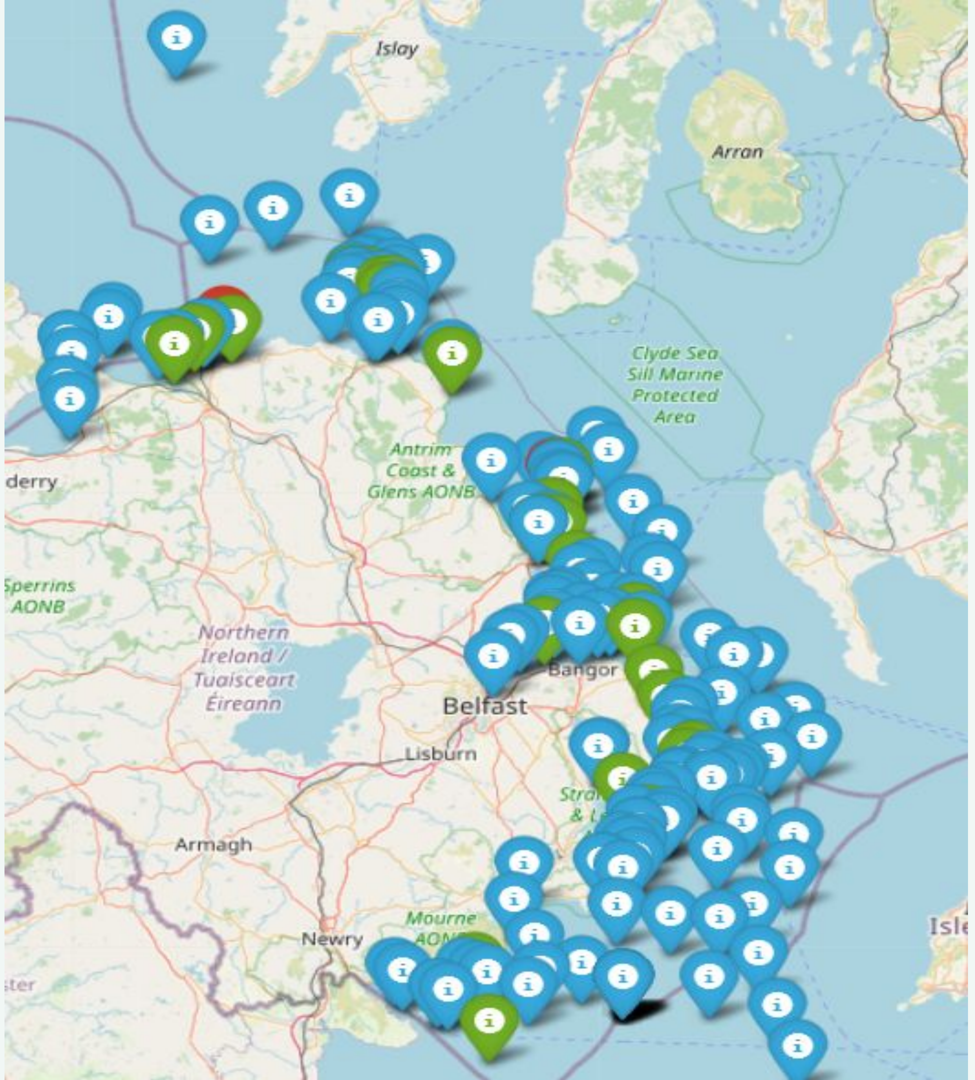
Whether shipwrecks in the 1800s, 1900s or 2000s have different likely locations ?

Century:	Colour
18:	Red
19:	Green
20:	Blue


Islay
Arran
Clyde Sea Sill Marine Protected Area
Antrim Coast & Glens AONB
derry
Sperrins AONB
Northern Ireland / Tuaisceart Éireann
Bangor
Belfast
Lisburn
Armagh
Newry
Mourne AON
Isle

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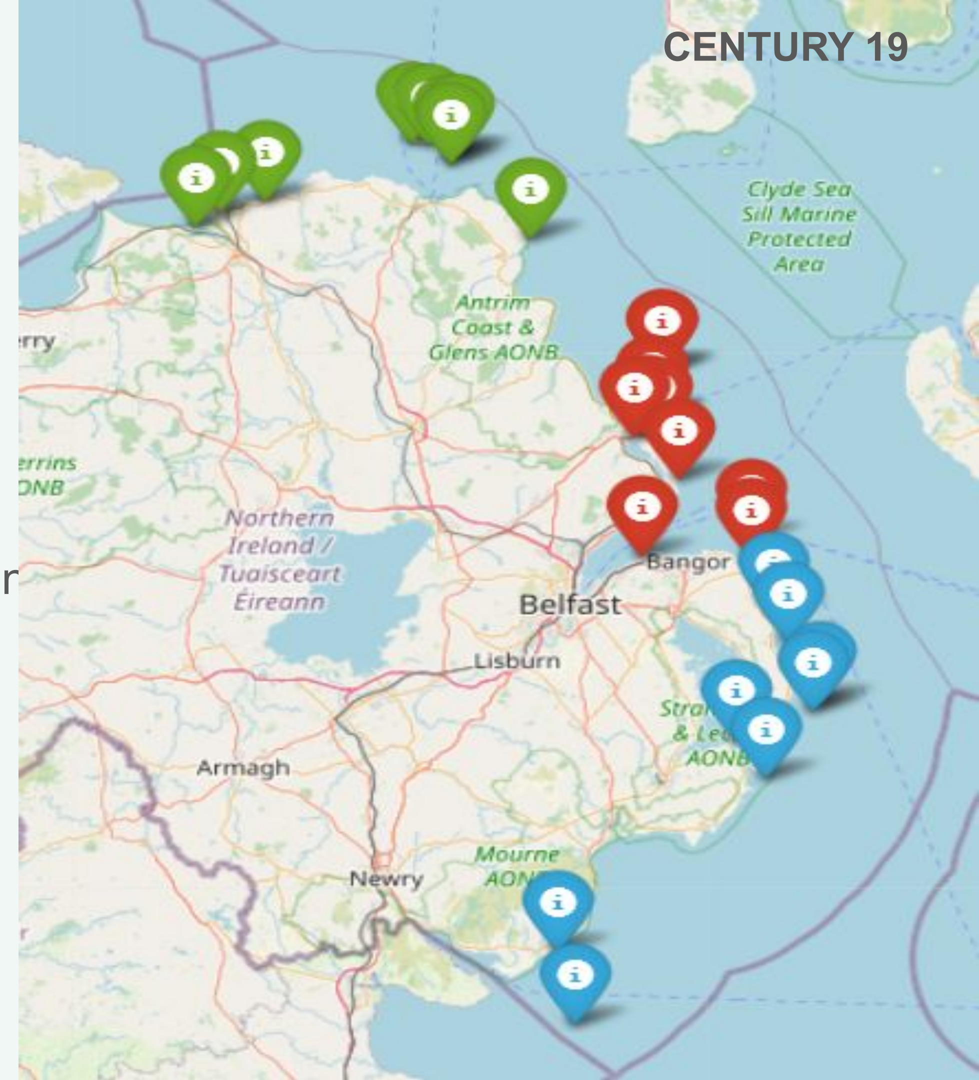
Do wrecks cluster near groups of ports?

K-means clustering algorithm:

- Specify the number of clusters
- Randomly initialise the cluster centers(centroids).
- Assign each data point to the closest cluster center.
- Recompute the cluster center as the mear of all data in that cluster.
- Repeat the above 2 steps until the custer assignment stop changing or maximum iteration is reached (if specified).

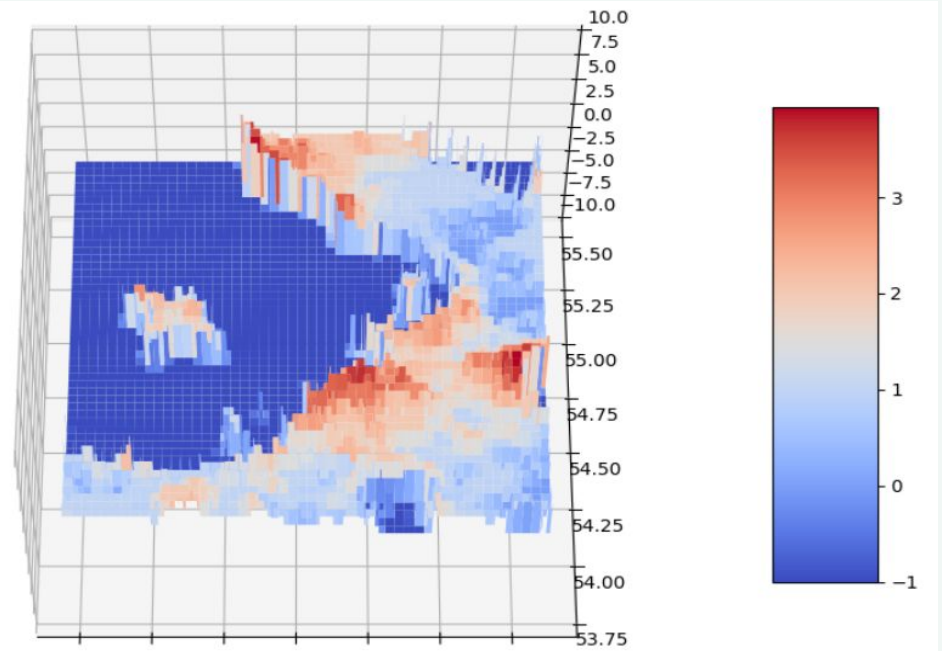

CENTURY 19
Clyde Sea Sill Marine Protected Area
Antrim Coast & Glens AONB
Northern Ireland / Tuaisceart Éireann
Bangor
Belfast
Lisburn
Armagh
Newry
Mourne AONB

Are wrecks more common in deep water or shallow water?

Is there a correlation between depth and number of wrecks ?

splitting it into segments of deep & shallow

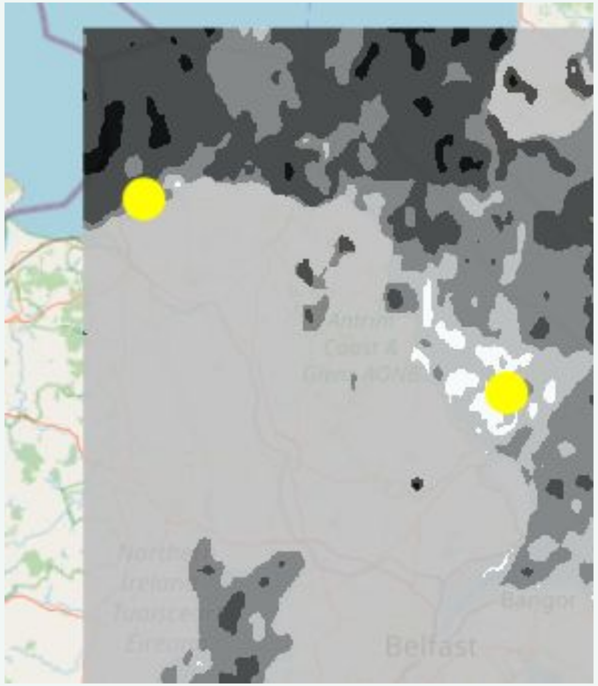
Satellite image of coast



3-D surface plot of sea depth layers

- **Segment -1**: Not part of sea.
- **Segment 0**: **Shallowest** part of sea .
- **Segment 1**: Slightly deeper part of sea than segment 0.
- **Segment 2**: Mid-level depth in the sea.
- **Segment 3**: Deeper part of sea than segment 2.
- **Segment 4**: **Deepest** part of sea

Segment 0 Segment 1 Segment 2 Segment 3 Segment 4.


Antrim Coast & Glens AONB
Northern Ireland Tuaisceart Éireann
Bangor
Belfast

Century 18

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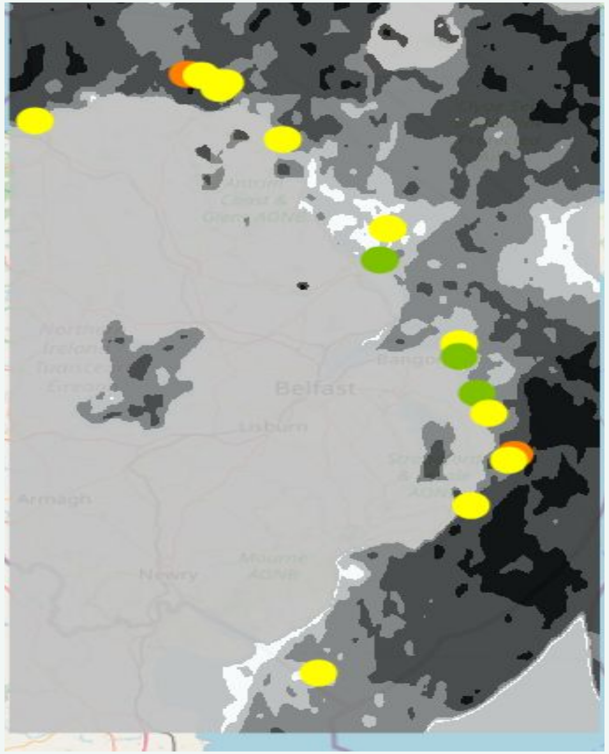
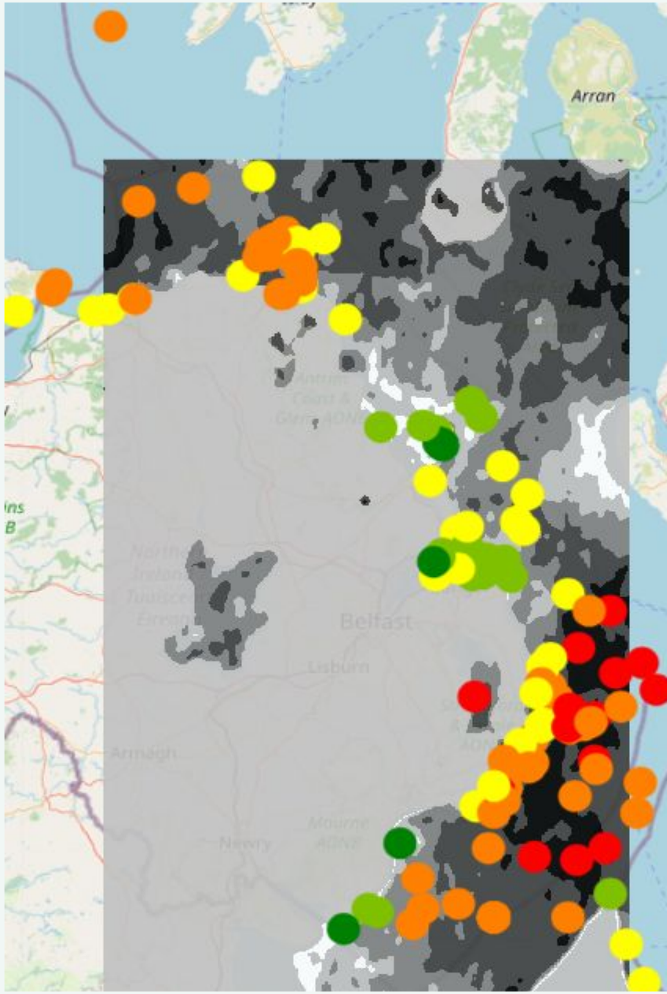

Antrim Coast & Glens AONB
Northern Ireland Tuaisceart Éireann
Bangor
Belfast
Lisburn
Armagh
Newry
Mourne AONB

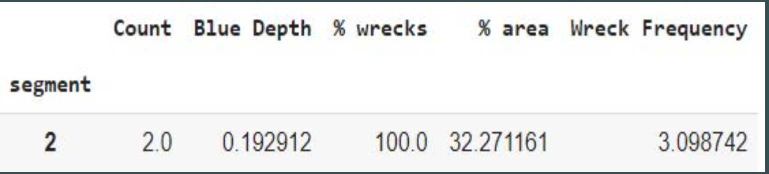
Century 19


Arran
Antrim Coast & Glens AONB
Northern Ireland Tuaisceart Éireann
Belfast
Lisburn
Armagh
Newry
Mourne AONB

Century 20

Results

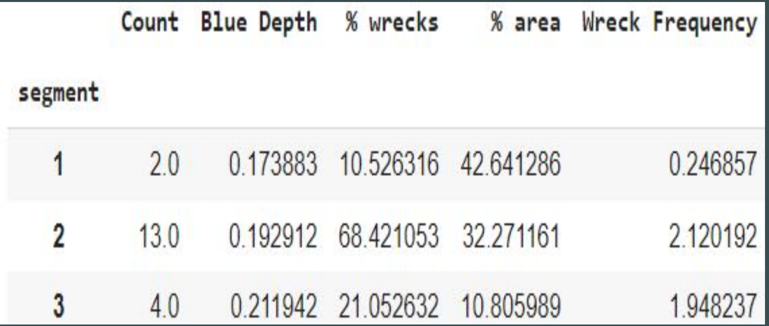
Century 18



	Count	Blue Depth	% wrecks	% area	Wreck Frequency
segment					
2	2.0	0.192912	100.0	32.271161	3.098742

1. Only segment (2) is represented
2. Limited data
3. Concentrated area of wrecks.
4. Not a comprehensive view

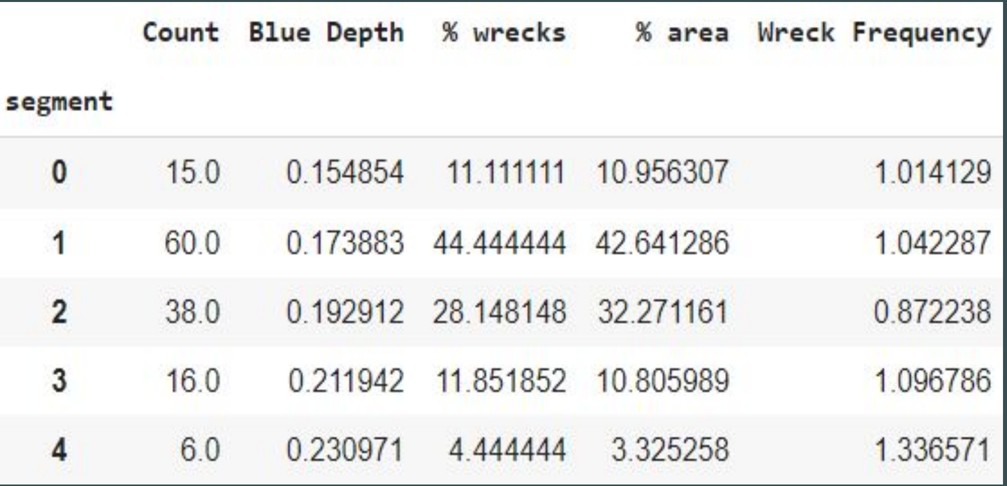
Century 19



	Count	Blue Depth	% wrecks	% area	Wreck Frequency
segment					
1	2.0	0.173883	10.526316	42.641286	0.246857
2	13.0	0.192912	68.421053	32.271161	2.120192
3	4.0	0.211942	21.052632	10.805989	1.948237

1. Three segments (1, 2, 3)
2. Segment 2 , highest wreck frequency
3. Particular risk areas
4. Better documentation
5. Increased seafaring activity.

Century 20



segment	Count	Blue Depth	% wrecks	% area	Wreck Frequency
0	15.0	0.154854	11.111111	10.956307	1.014129
1	60.0	0.173883	44.444444	42.641286	1.042287
2	38.0	0.192912	28.148148	32.271161	0.872238
3	16.0	0.211942	11.851852	10.805989	1.096786
4	6.0	0.230971	4.444444	3.325258	1.336571

1. **Five segments (0, 1, 2, 3, 4)**
2. **Most data points.**
3. **More evenly distributed wrecks**
4. **Segment 4 , highest frequency (1.336571).**
5. **Better documentation**
6. **Increased seafaring activity.**
7. **Most comprehensive dataset**
8. **Most reliable analysis.**

Identifying Risk Areas **Changes Over Time** **Safety and Navigation**

INTRODUCTION TO GIT

- **Open source project** originally developed in 2005 by **Linus Torvalds**

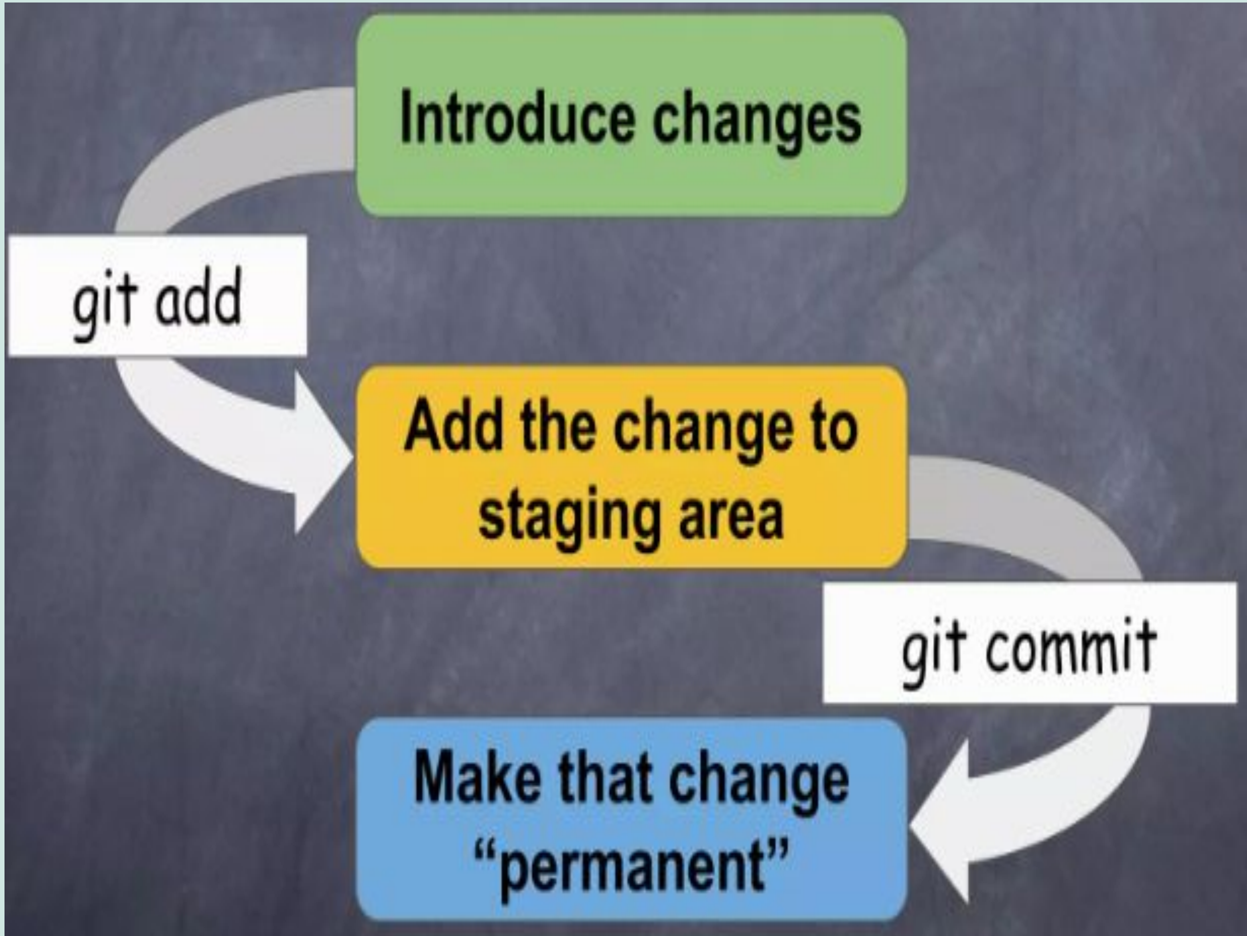
- Something that sits on the top of your file system and manipulates files.

GIT REPOSITORY

- The purpose of git is to manage a project, or a set of files, as they change over time.
- Git stores this info in a data structure called a repository.

Github is a web based Git repository hosting service

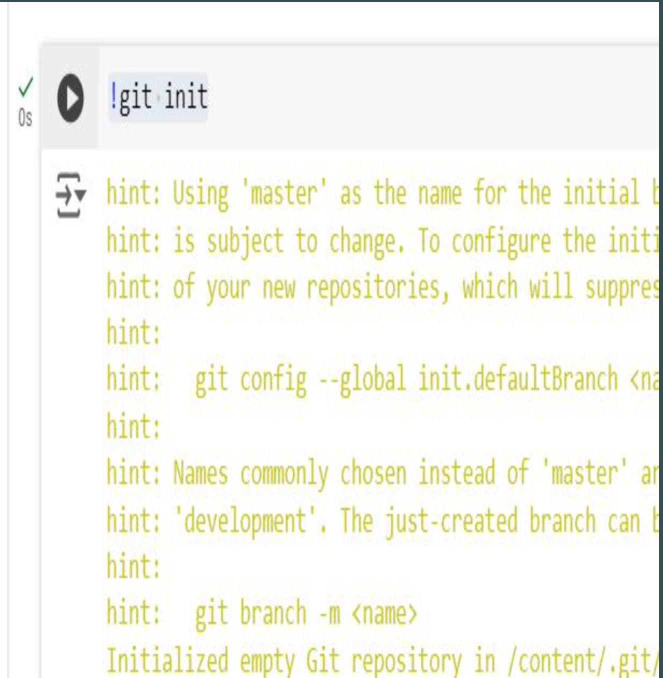
HOW DO THEY DO IT ….



Commonly Git Commands

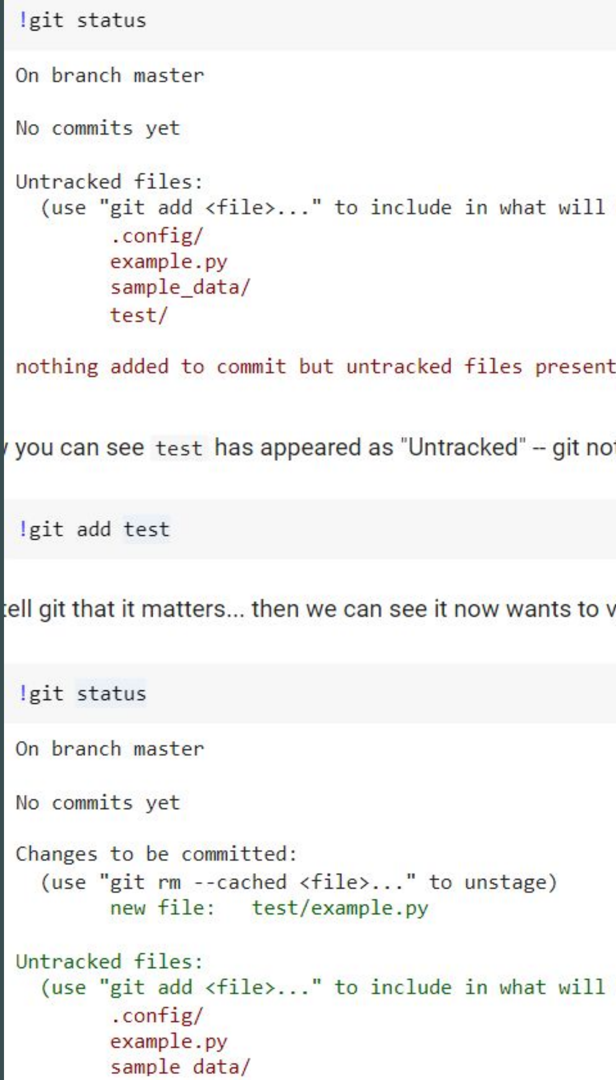
- STATUS

- INIT



```
!git init

hint: Using 'master' as the name for the initial b
hint: is subject to change. To configure the initi
hint: of your new repositories, which will suppres
hint:
hint:   git config --global init.defaultBranch <na
hint:
hint: Names commonly chosen instead of 'master' ar
hint: 'development'. The just-created branch can b
hint:
hint:   git branch -m <name>
Initialized empty Git repository in /content/.git/
```

- ADD



```
!git status

On branch master

No commits yet

Untracked files:
  (use "git add <file>..." to include in what will
        .config/
        example.py
        sample_data/
        test/

nothing added to commit but untracked files present
```

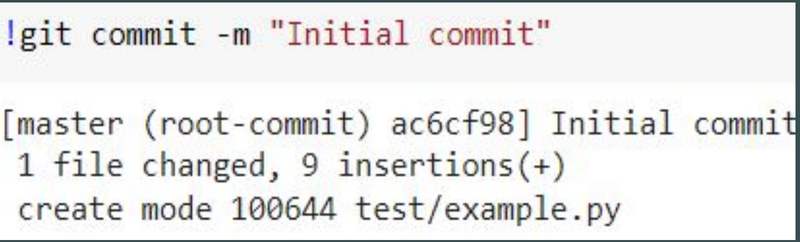
you can see `test` has appeared as "Untracked" -- git no

```
!git add test
```

ell git that it matters... then we can see it now wants to v

```
!git status

On branch master

No commits yet

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)
        new file:   test/example.py

Untracked files:
  (use "git add <file>..." to include in what will
        .config/
        example.py
        sample_data/
```

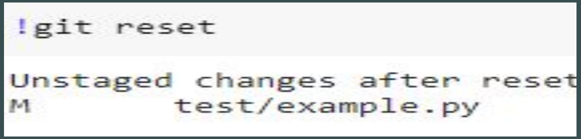
- COMMIT



```
!git commit -m "Initial commit"
```

```
[master (root-commit) ac6cf98] Initial commit
 1 file changed, 9 insertions(+)
 create mode 100644 test/example.py
```

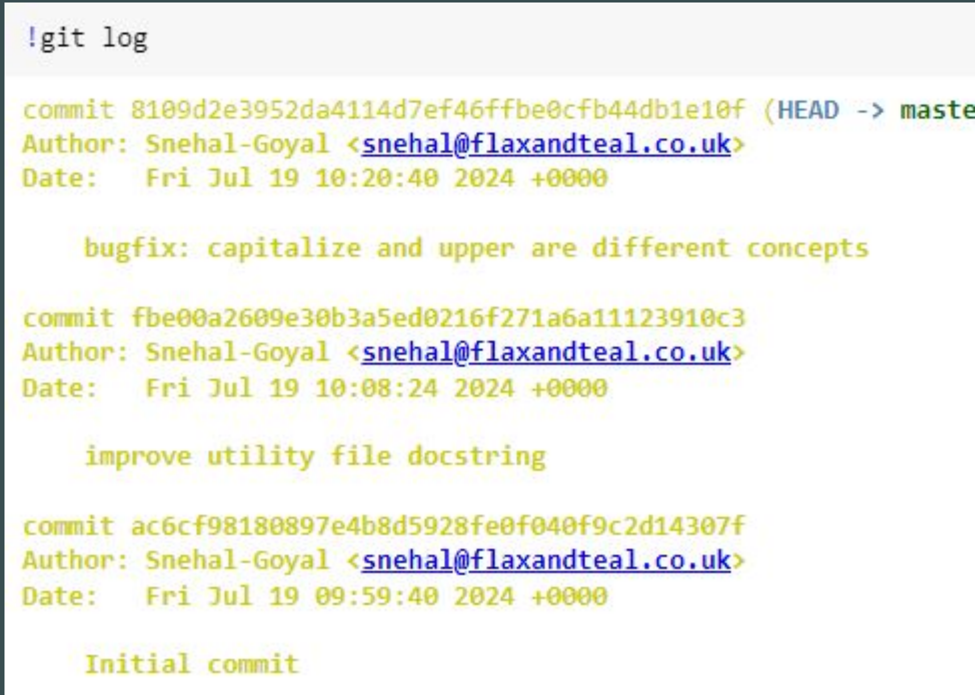
- RESET



```
!git reset
```

```
Unstaged changes after reset
M       test/example.py
```

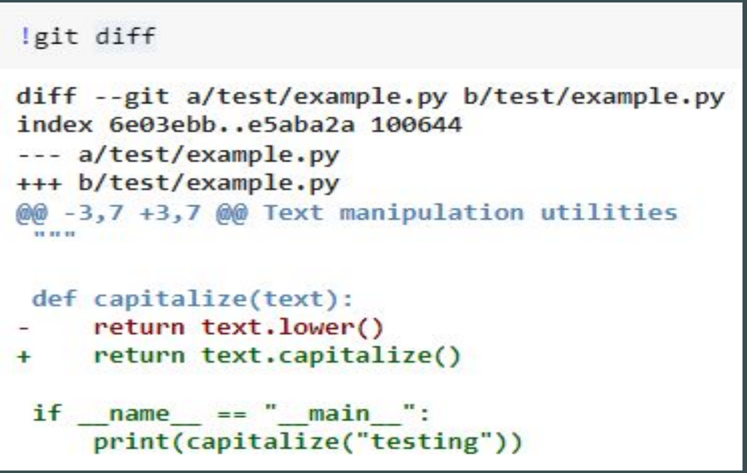
- LOG : commit history of your repository.



```
!git log
```

```
commit 8109d2e3952da4114d7ef46ffbe0cfb44db1e10f (HEAD -> maste
Author: Snehal-Goyal <snehal@flaxandteal.co.uk>
Date:   Fri Jul 19 10:20:40 2024 +0000

    bugfix: capitalize and upper are different concepts

commit fbe00a2609e30b3a5ed0216f271a6a11123910c3
Author: Snehal-Goyal <snehal@flaxandteal.co.uk>
Date:   Fri Jul 19 10:08:24 2024 +0000

    improve utility file docstring

commit ac6cf98180897e4b8d5928fe0f040f9c2d14307f
Author: Snehal-Goyal <snehal@flaxandteal.co.uk>
Date:   Fri Jul 19 09:59:40 2024 +0000

    Initial commit
```

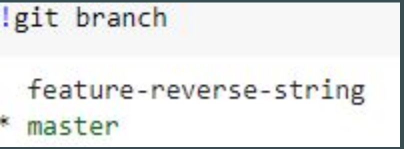
- DIFF : diff b/w staged and local copy



```
!git diff
```

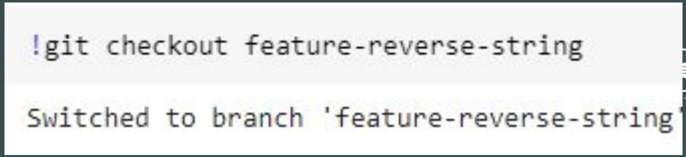
```
diff --git a/test/example.py b/test/example.py
index 6e03ebb..e5aba2a 100644
--- a/test/example.py
+++ b/test/example.py
@@ -3,7 +3,7 @@ Text manipulation utilities
 """

 def capitalize(text):
-    return text.lower()
+    return text.capitalize()

 if __name__ == "__main__":
     print(capitalize("testing"))
```

- BRANCH



```
!git branch

  feature-reverse-string
* master
```

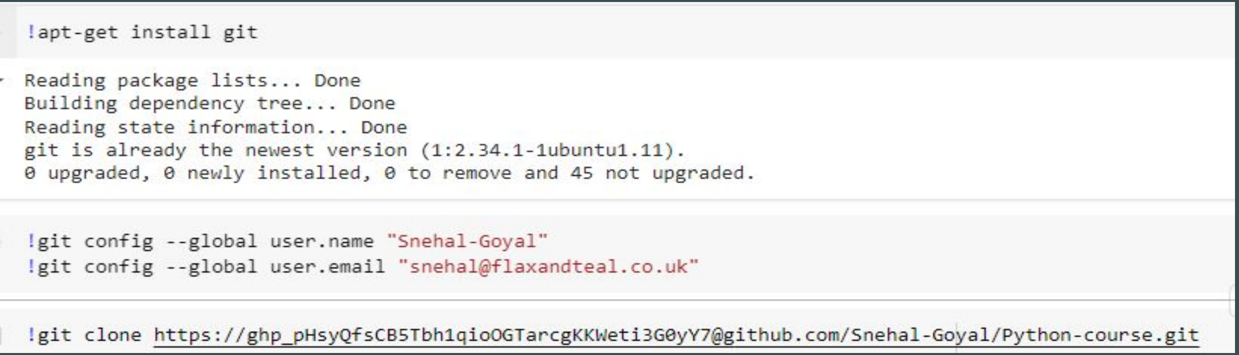
- CHECKOUT



```
!git checkout feature-reverse-string

Switched to branch 'feature-reverse-string
```

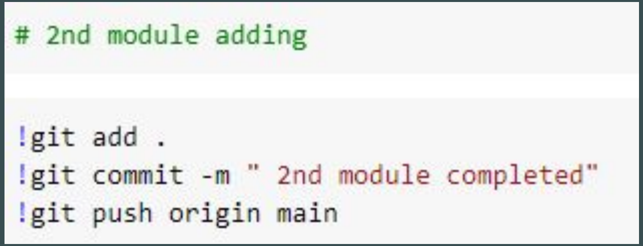
A complete code:

Step1:



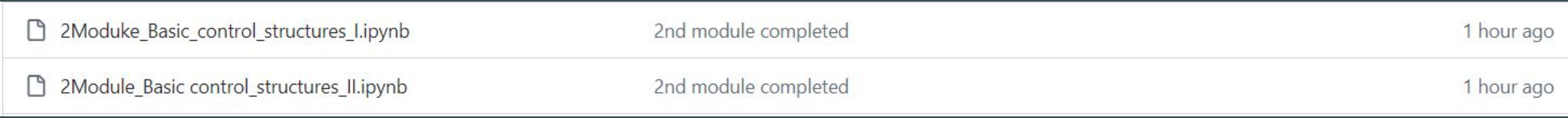
```
!apt-get install git

Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
git is already the newest version (1:2.34.1-1ubuntu1.11).
0 upgraded, 0 newly installed, 0 to remove and 45 not upgraded.

!git config --global user.name "Snehal-Goyal"
!git config --global user.email "snehal@flaxandteal.co.uk"

!git clone https://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@github.com/Snehal-Goyal/Python-course.git
```

Step2:



```
# 2nd module adding

!git add .
!git commit -m " 2nd module completed"
!git push origin main
```

Final output



2Moduke_Basic_control_structures_I.ipynb	2nd module completed	1 hour ago
2Module_Basic control_structures_II.ipynb	2nd module completed	1 hour ago

QUESTIONS

Thank you so much for your time