

Version control

(using git)

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Sections

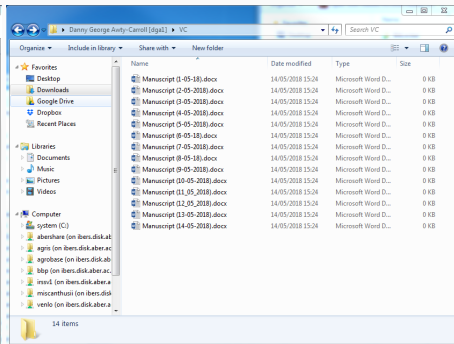
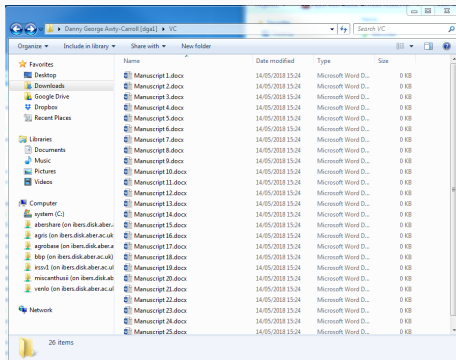
This will focus on using git in windows with a UI

1. Why version control?
2. Version control system
3. Platform
4. UI
5. Using git
6. Questions
& Demo

Why version control?

What is version control

This is just the management of versions of a document.
One document through time.



All of us use some version control

Where things get complicated

Numbering or dating documents works OK but can fall down when

- There are multiple documents that need to work together (i.e. a script and data)
- There are multiple people working on the documents (are they on the latest version and merging changes)
- There are updates to the project that may break things
- Line changes need to be reviewed

Some of this is solved in programs like word with track changes (so you see who altered what when)

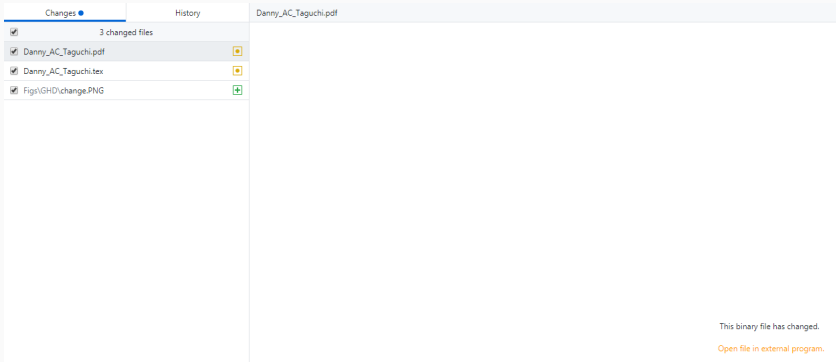
What version control systems can do

- Give line by line user by user line changes
- Makes a stretcher to the version control so there can be side branches (this is where the project can take a detour and be merged back in later)
- Minimise problems of multiple users working on the same document at the same time

Changes ●	History	Danny_AC_Taguchi.tex
2 changed files		@@ -72,14 +72,14 @@ Some of this is solved in programs like word with track changes (so you see who
✓ Danny_AC_Taguchi.pdf		72 72 \begin{frame}[fragile]{what version control systems can do}
✓ Danny_AC_Taguchi.tex		73 73 \begin{itemize}
		74 74 \begin{itemize}
		75 - \item There are multiple documents that need to work together (i.e. a script and data)
		76 - \item There are multiple people working on the documents (are they on the latest version and merging changes)
		77 - \item There are updates to the project that may break things
		78 - \item Line changes need to be reviewed
		75 + \item Give line by line user by user line changes
		76 + \item Make a stretcher to versions so there can be side branches
		77 + \item Minimise problems of multiple users working on the same document at the same time
		78 \end{itemize}
		79 \end{frame}
		80 \end{frame}
		81 \end{frame}
		82 - \begin{frame}[fragile]{what version control systems can do}
		81 +
		82 + \begin{frame}[fragile]{what version control systems can do}
		83 \begin{itemize}
		84 \item There are multiple documents that need to work together (i.e. a script and data)
		85 \item There are multiple people working on the documents (are they on the latest version and merging changes)

What version control systems can't do

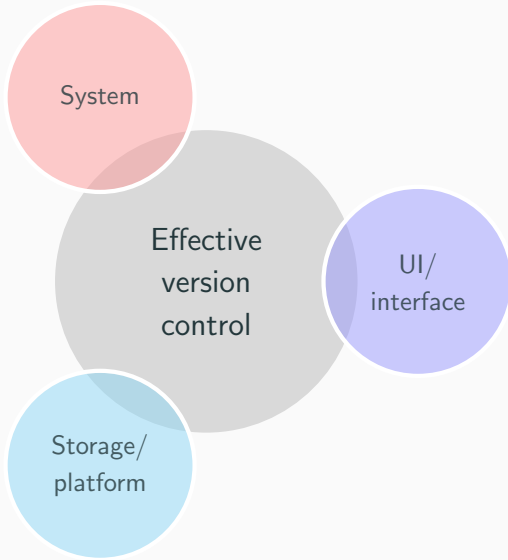
- Add much extra control to binary files (not plan text)
- Back up in real time



Version control system

What version control system?

The first thing about version control systems is which system (we will cover git)



What version control system?

- There are two popular version control systems (git SVN)
- We will cover git as it is the most popular, the one I know and easiest to use
- Git was developed in 2005 by Linus Torvalds

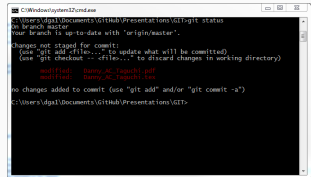


(Principal developer of Linux)

What is git?



- Git is just system of version control

A screenshot of a Windows command prompt window. The title bar reads "C:\Windows\system32\cmd.exe". The command prompt shows the following text:

```
C:\Users\dpal\Documents\GitHub\Presentation\GIT>git status
On branch master
Your branch is up-to-date with 'origin/master'.

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working directory)

        modified:   dummy_AC_Tapochi.pdf
        modified:   dummy_AC_Tapochi.tex

no changes added to commit (use "git add" and/or "git commit -a")
C:\Users\dpal\Documents\GitHub\Presentation\GIT>
```

- By default it is used through a terminal
- Git has projects with multiple documents called repositories (or repos)
- It then has a tree structure to manage the versions of the repository

Tree structure?



[master] 6c6faa5 My first commit - John Doe

[develop] 3e89ec8 Develop a feature - part 1 - John Doe

[develop] e188fa9 Develop a feature - part 2 - John Doe

[master] 665003d Fast bugfix - John Fixer

[myfeature] eaf618c New cool feature - John Feature

[master] 8f1e0e7 Merge branch 'develop' into 'master' - John Doe

[master] 6a3dacc Merge branch 'myfeature' into 'master' - John Doe

0.1

[master] abcdef0 Release of version 0.1 - John Releaser



The master branch is in grey with colour branches coming of and then being merged back

Key commands?

In the terminal interface there are some useful commands:



- *init* - initialise a repo
- *status* - tells you if you have files out of sync with the current version
- *commit* - adds commits to the current version - a change with a comment and an ID
- *add* - adds new files and current commit
- *remove* - removes files and current commit
- *push* - pushes commits to an online repo (only if using a git platform)
- *pull* - pulls commits from an online platform (only if using a git platform)

THIS IS GIT. IT TRACKS COLLABORATIVE WORK
ON PROJECTS THROUGH A BEAUTIFUL
DISTRIBUTED GRAPH THEORY TREE MODEL.

COOL. HOW DO WE USE IT?

NO IDEA. JUST MEMORIZE THESE SHELL
COMMANDS AND TYPE THEM TO SYNC UP.
IF YOU GET ERRORS, SAVE YOUR WORK
ELSEWHERE, DELETE THE PROJECT,
AND DOWNLOAD A FRESH COPY.



Platform

Which platform?

You can just use git with the terminal on your PC or you can store work on an online repository managing platform, the most popular of these are GitHub and Bitbucket

System

Effective
version
control

UI/
interface

Storage/
platform

(xkcd)



Why not just store the repository on Dropbox?

You can and it would be backed up and sharable, but there are problems:

- You can run into Dropbox syncing and git version control clashes
- If you share the files with a collaborator they aren't identified separately to you
- You or a collaborator can completely mess up the git system (mostly by deleting the records in the '.git' folder)
- If you do you can't just re-download



Which platform?

Bitbucket

- Allows unlimited public or private repositories
- Charges per collaborators over 5 on those repositories
- 1GB storage for **large** files all repositories, 5GB if using a .ac email



GitHub

- Has unlimited public repositories
- With unlimited collaborators
- Pay for private repositories
- However as a student or academic you can sign up for free private repositories
- GitHub is about $\times 4$ more popular than Bitbucket

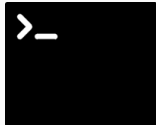
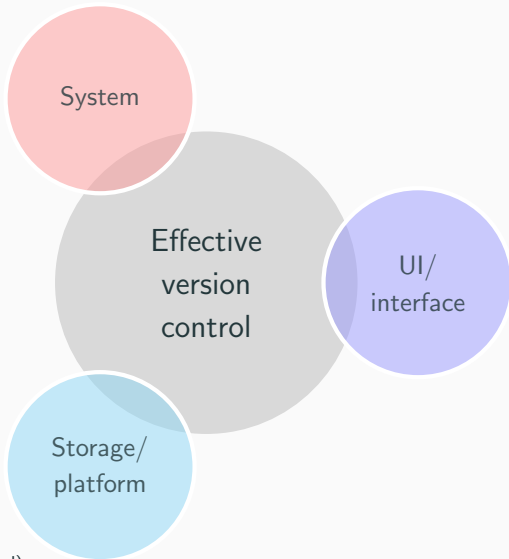


UI



Which UI?

You can just use git with the terminal but there is a friendlier interface



Which UI?

The Terminal

You can just use the terminal with the raw git commands as seen before... but:



- If you are not using it anyway or are happy using it a graphical UI is nice
- You don't need to remember commands or repo names
- You need to install git for widows
<https://git-scm.com/download/win>

```
C:\Windows\system32\cmd.exe

C:\Users\dgai\My Documents\GitHub\Presentations\GIT>git status
On branch master
Your branch is up-to-date with 'origin/master'.

Changes to be committed:
  (use "git reset HEAD <file>..." to unstage)

    new file:   Figs/git/Dropbox.png

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working directory)

    modified:   Danny_AC_Taguchi.pdf
    modified:   Danny_AC_Taguchi.tex

Untracked files:
  (use "git add <file>..." to include in what will be committed)

    Figs/git/gitdesktop.png
    Figs/git/terminal.png

C:\Users\dgai\My Documents\GitHub\Presentations\GIT>git commit -m "added image f
or dropbox"
```

(xkcd)

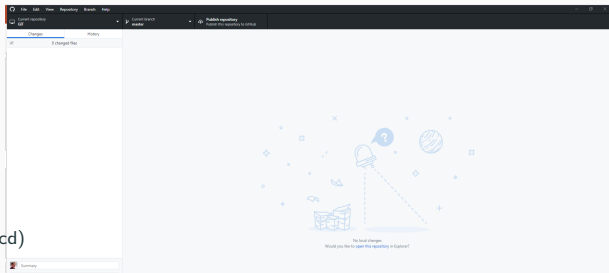
Which UI?

Git Desktop

The essayist to use and most popular UI is git desktop:

- This is made by GitHub and integrates very well with GitHub or local (on pc) repositories
- It will work with other hosting platforms but less easily
- Is the essayist to use!
- Will install git for widows

<https://git-scm.com/download/win>

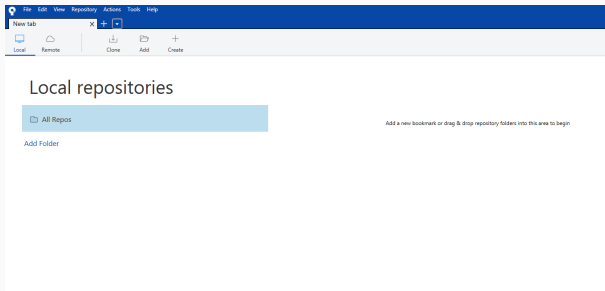


Which UI?

Sourcetree

- Sourcetree is owned by atlassian who owns Bitbucket
- It will work with other hosting platforms easily
- It has more complex controls
- Will install git for windows

<https://git-scm.com/download/win>



Using git

How to use git

This will assume use of GitHub and GitDesktop

<https://desktop.github.com>

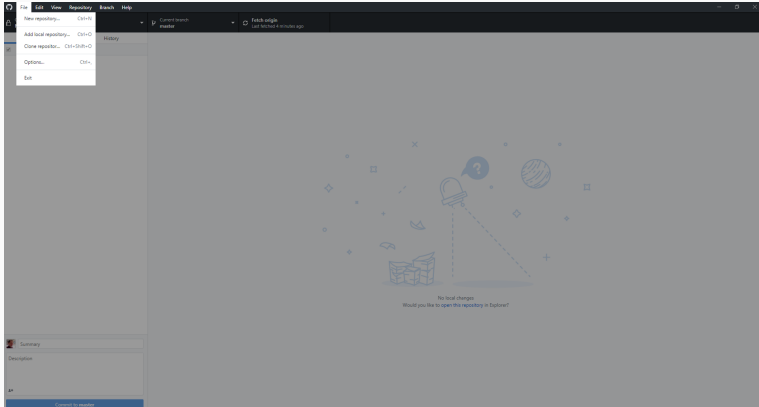
Following is a brief demonstration of the interface



(xkcd)

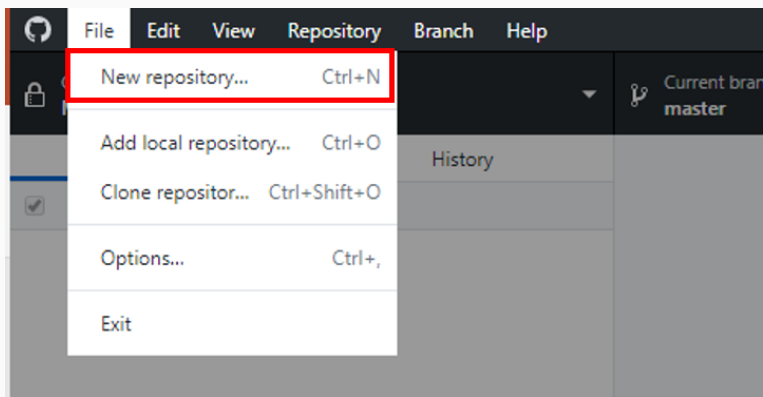


Adding a new repository



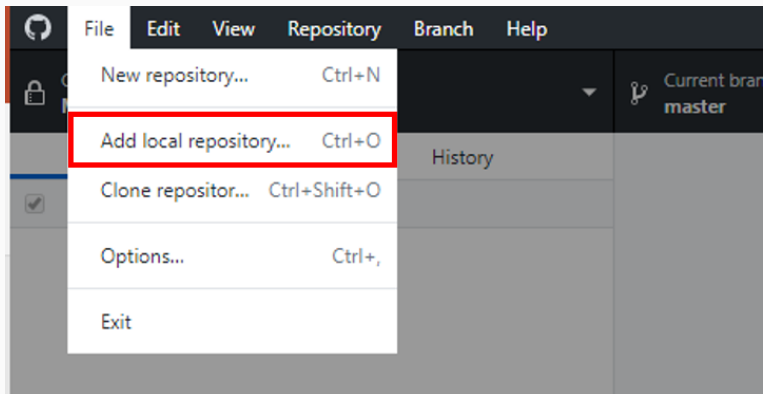
Adding a new repository

This makes a totally new repository (with no '.git' folder)



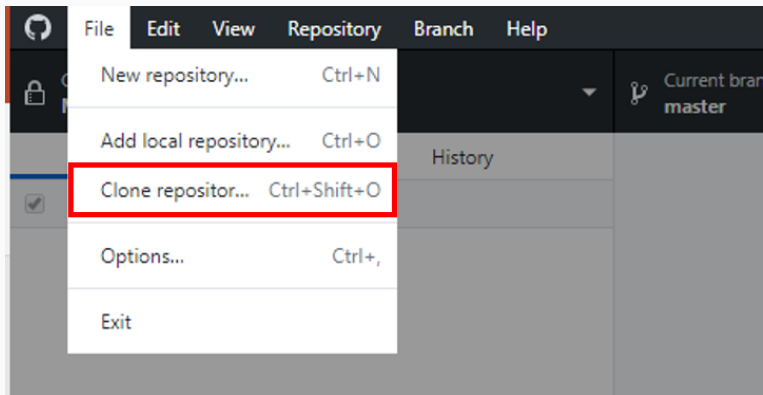
Adding a new repository

adds an existing repository (with a '.git' folder)



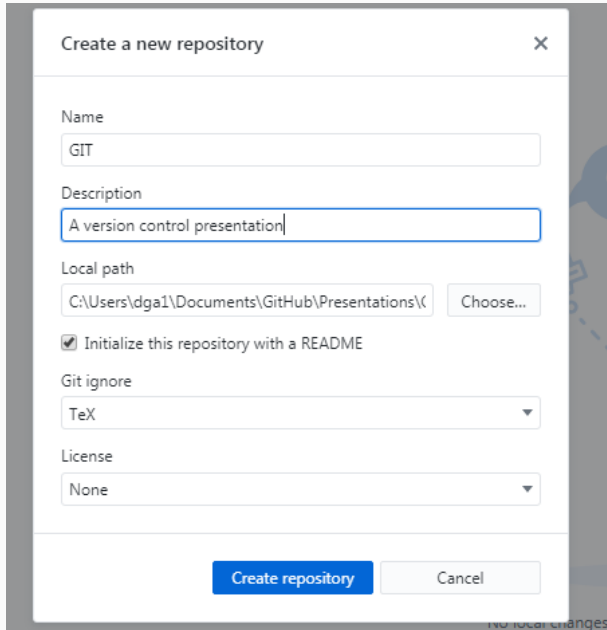
Adding a new repository

Copies
an online
repositor-
y to
the PC



Adding a new repository

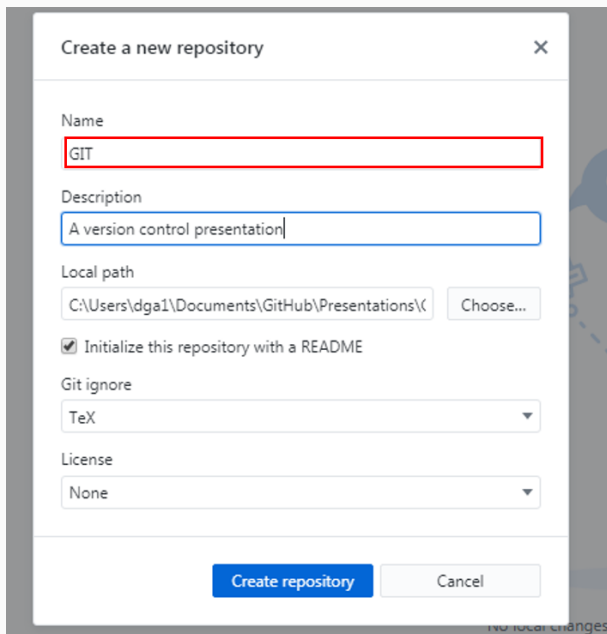
new repository
menu



The screenshot shows a 'Create a new repository' dialog box with the following fields and options:

- Name:** A text input field containing 'GIT'.
- Description:** A text input field containing 'A version control presentation'.
- Local path:** A text input field containing 'C:\Users\dga1\Documents\GitHub\Ppresentations\(' and a 'Choose...' button to the right.
- Initialize this repository with a README:** A checked checkbox.
- Git ignore:** A dropdown menu showing 'TeX'.
- License:** A dropdown menu showing 'None'.
- Buttons:** 'Create repository' (blue) and 'Cancel' (grey) at the bottom.

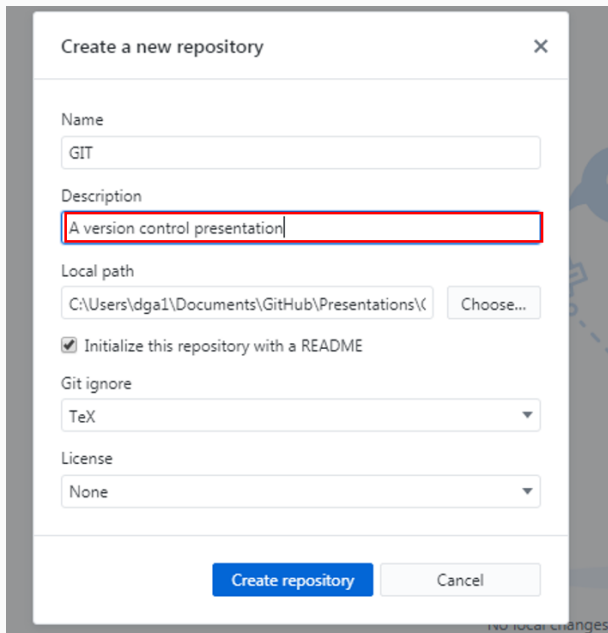
Adding a new repository



The screenshot shows a 'Create a new repository' dialog box with the following fields and options:

- Name:** A text input field containing 'GIT', highlighted with a red border.
- Description:** A text input field containing 'A version control presentation'.
- Local path:** A text input field containing 'C:\Users\dga1\Documents\GitHub\Presentations\(' and a 'Choose...' button.
- Initialize this repository with a README:** A checked checkbox.
- Git ignore:** A dropdown menu showing 'TeX'.
- License:** A dropdown menu showing 'None'.
- Buttons:** 'Create repository' (blue) and 'Cancel' (grey) at the bottom.

Adding a new repository

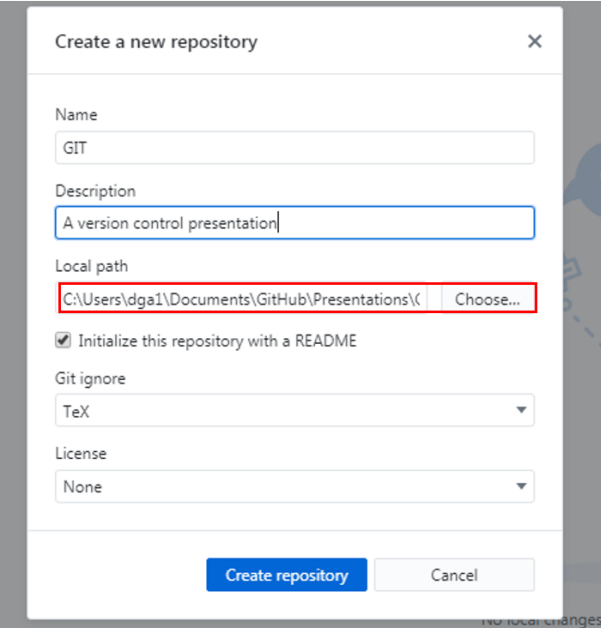


The screenshot shows a 'Create a new repository' dialog box with the following fields and options:

- Name:** A text input field containing 'GIT'.
- Description:** A text input field containing 'A version control presentation', which is highlighted with a red border.
- Local path:** A text input field containing 'C:\Users\dga1\Documents\GitHub\Ppresentations\(' and a 'Choose...' button to the right.
- Initialize this repository with a README:** A checked checkbox.
- Git ignore:** A dropdown menu showing 'TeX'.
- License:** A dropdown menu showing 'None'.
- Buttons:** 'Create repository' (blue) and 'Cancel' (grey) at the bottom.

Adding a new repository

The folder **in which** to store the git repository folder.

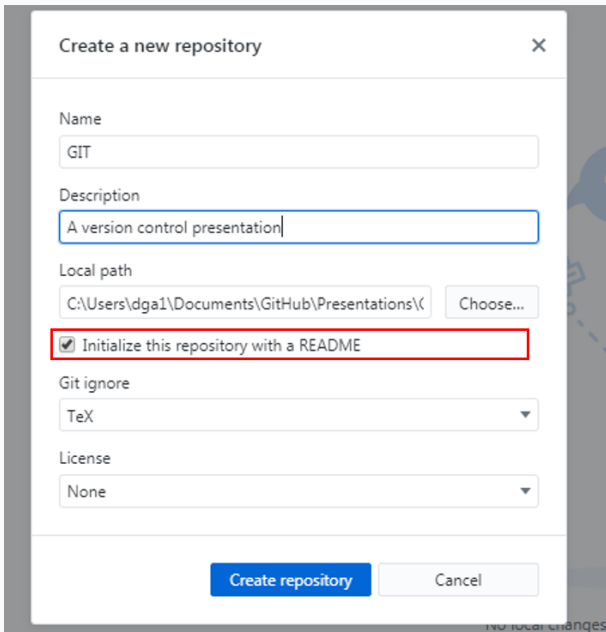


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- Name:** A text input field containing 'GIT'.
- Description:** A text input field containing 'A version control presentation'.
- Local path:** A text input field containing 'C:\Users\dga1\Documents\GitHub\Presentations\(' and a 'Choose...' button. This entire row is highlighted with a red rectangle.
- Initialize this repository with a README:** A checked checkbox.
- Git ignore:** A dropdown menu with 'TeX' selected.
- License:** A dropdown menu with 'None' selected.
- Buttons:** 'Create repository' (blue) and 'Cancel' (grey) buttons at the bottom.

Adding a new repository

This will initialise the repository with a readme containing the description.

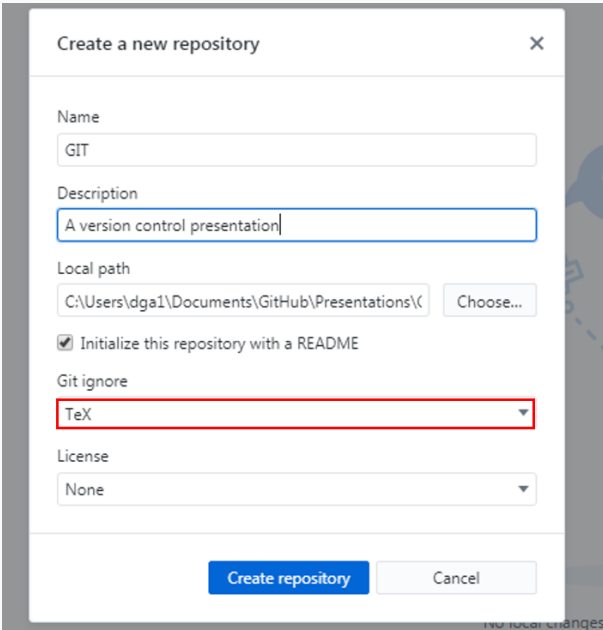


The screenshot shows a 'Create a new repository' dialog box with the following fields and options:

- Name:** A text input field containing 'GIT'.
- Description:** A text input field containing 'A version control presentation'.
- Local path:** A text input field containing 'C:\Users\dga1\Documents\GitHub\Presentations\(' and a 'Choose...' button.
- Initialize this repository with a README:** A checkbox that is checked, highlighted with a red rectangle.
- Git ignore:** A dropdown menu showing 'TeX'.
- License:** A dropdown menu showing 'None'.
- Buttons:** 'Create repository' (blue) and 'Cancel' (grey) at the bottom.

Adding a new repository

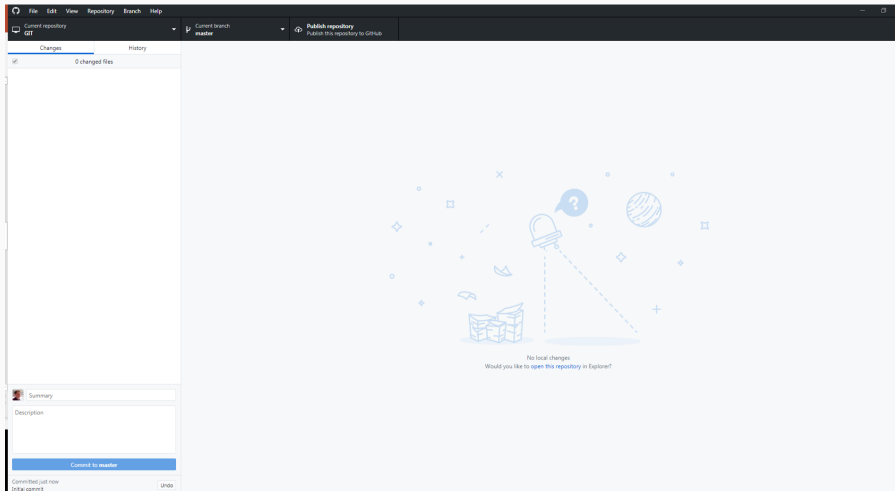
This is a file called
'`.gitignore`'
which lists files
& folders to not
version control



The screenshot shows a 'Create a new repository' dialog box with the following fields and options:

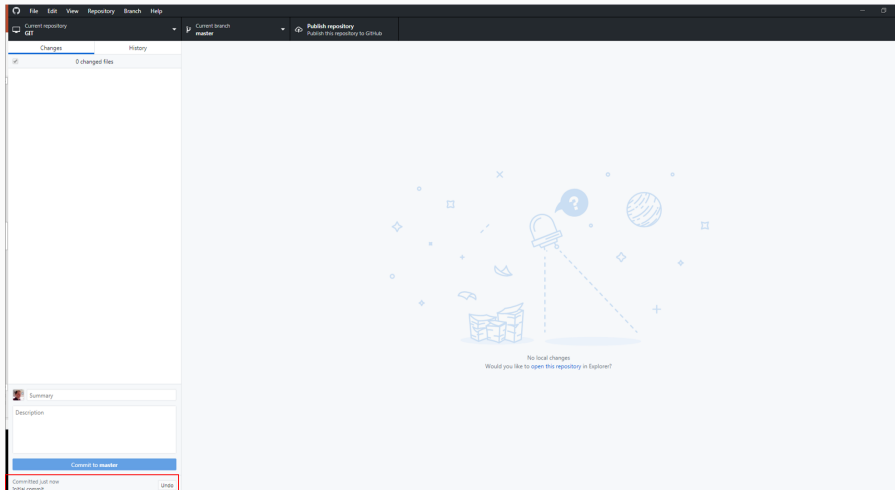
- Name:** A text input field containing 'GIT'.
- Description:** A text input field containing 'A version control presentation'.
- Local path:** A text input field containing 'C:\Users\dga1\Documents\GitHub\Presentations\(' and a 'Choose...' button to the right.
- Initialize this repository with a README:** A checked checkbox.
- Git ignore:** A dropdown menu with 'TeX' selected and highlighted by a red border.
- License:** A dropdown menu with 'None' selected.
- Buttons:** 'Create repository' (blue) and 'Cancel' (gray) buttons at the bottom.

Using the repository



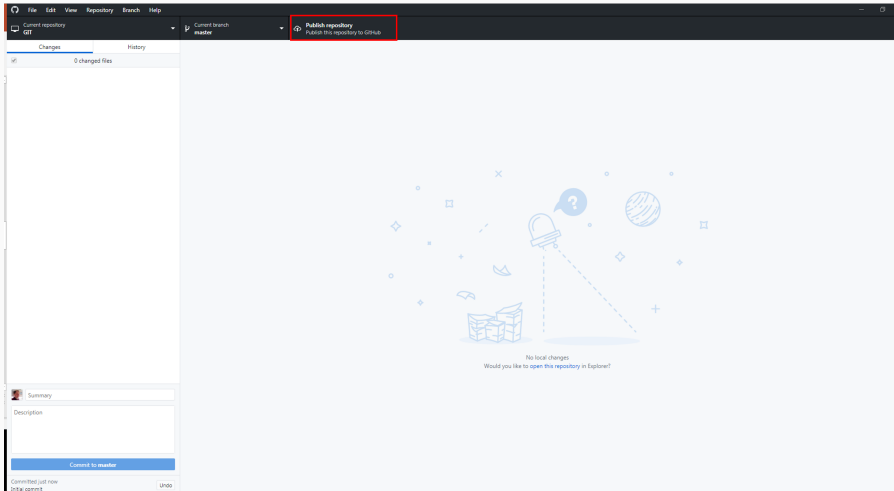
Using the repository

Now we have an initial commit of the readme done



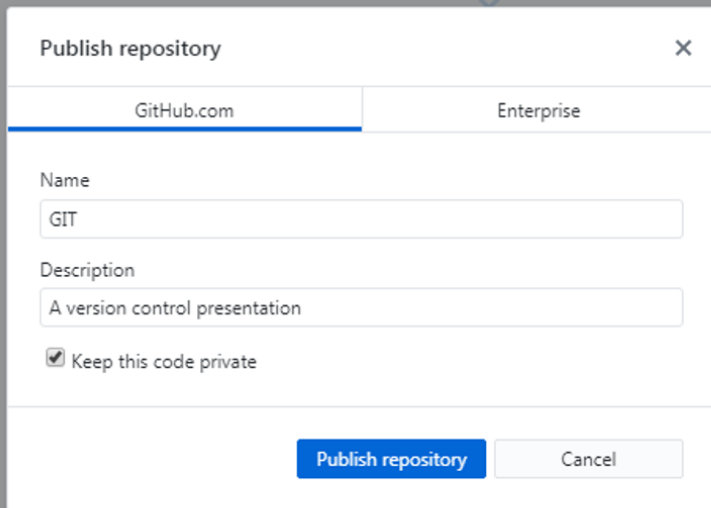
Using the repository

We can carry on making local commits or publish the repository to GitHub



Using the repository

We can publish to GitHub



The image shows a 'Publish repository' dialog box with a close button (X) in the top right corner. It features two tabs: 'GitHub.com' (selected) and 'Enterprise'. Below the tabs are three input fields: 'Name' with the text 'GIT', 'Description' with the text 'A version control presentation', and a checkbox labeled 'Keep this code private' which is checked. At the bottom are two buttons: 'Publish repository' (highlighted in blue) and 'Cancel'.

Publish repository X

GitHub.com Enterprise

Name
GIT

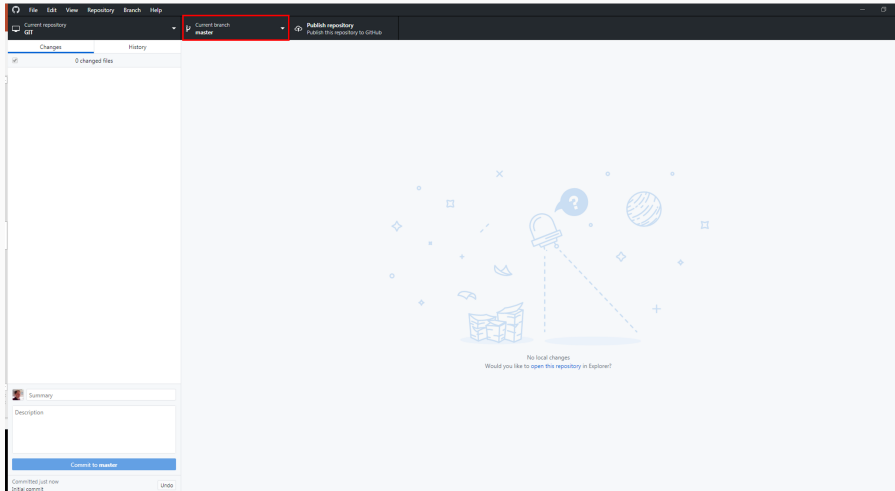
Description
A version control presentation

☒ Keep this code private

Publish repository Cancel

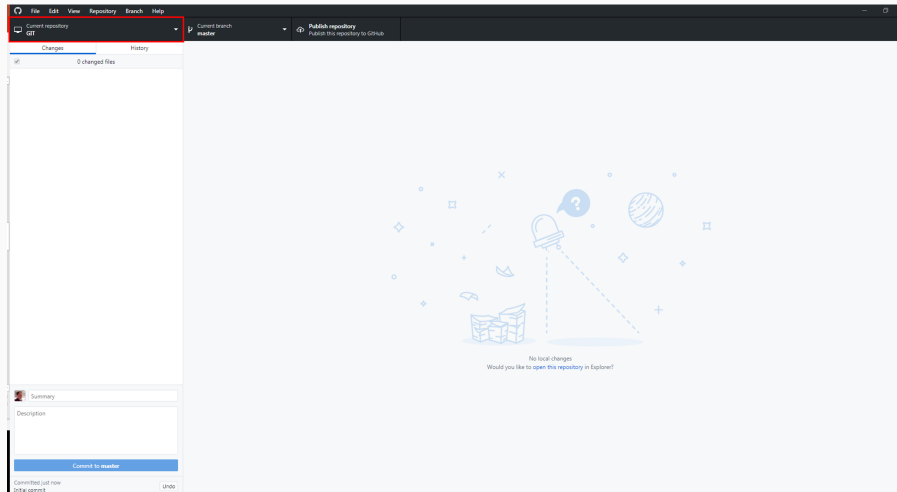
Using the repository

Make branches



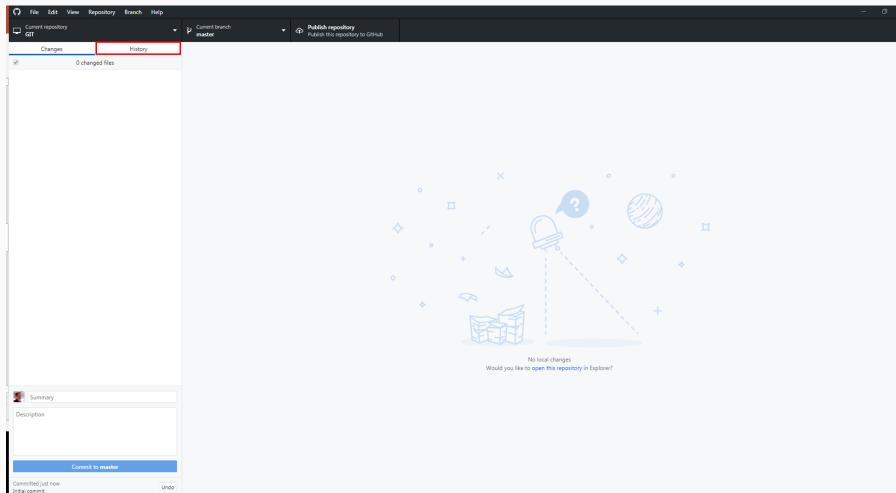
Using the repository

switch to another repository



Using the repository

look at the history of this repository



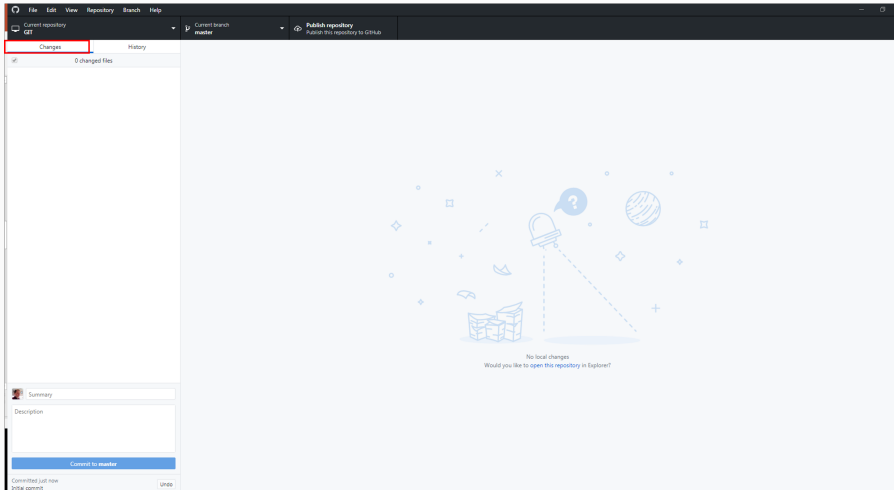
Using the repository

look at the history of this repository

The screenshot displays the GitHub web interface for a repository. The top navigation bar shows the current repository is 'GIT', the current branch is 'master', and a 'Push origin' button indicates the last fetch was 2 minutes ago. Below this, the 'Changes' tab is active, showing a list of commits. The most recent commit, 'A figure for committing changes on GHD' by Danny George Awty-Carroll [dga1], is highlighted in blue and marked as 'committed just now'. Below it, two other commits are listed: 'figures for Git Hub Desktop' (committed 8 minutes ago) and 'Initial commit' (committed 19 minutes ago). To the right, a file diff view for 'Figs\GHD\outline_08.png' is shown, indicating 1 changed file. The diff view includes a menu bar with 'File', 'Edit', 'View', 'Repository', 'Branch', and 'Help'. The file name 'Figs\GHD\outline_08.png' is listed with a green plus icon next to it, indicating a new file. The diff content area is currently empty.

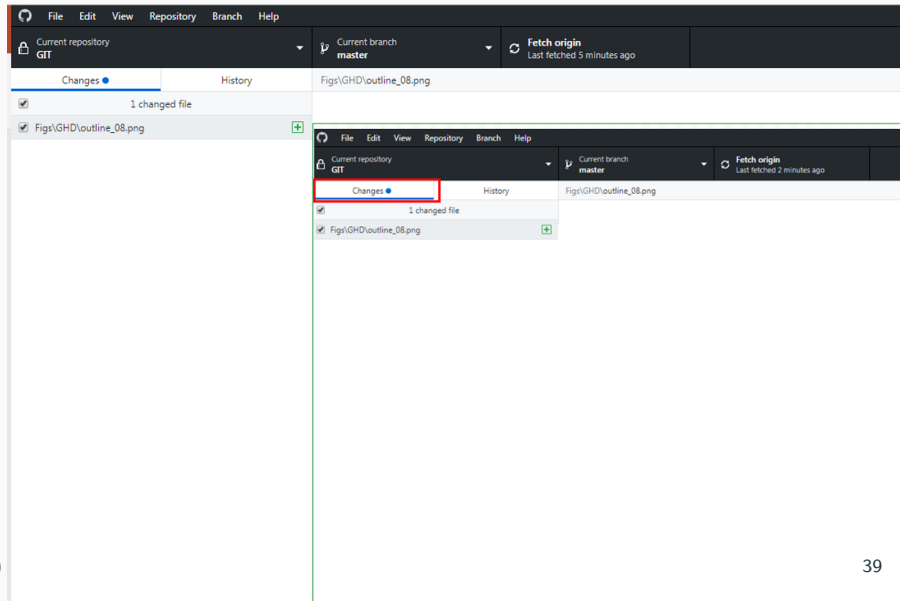
Using the repository

we can carry on making local commits or publish the repository to GitHub



Using the repository

we can carry on making local commits or publish the repository to GitHub



Questions & Demo

	COMMENT	DATE
○	CREATED MAIN LOOP & TIMING CONTROL	14 HOURS AGO
○	ENABLED CONFIG FILE PARSING	9 HOURS AGO
○	MISC BUGFIXES	5 HOURS AGO
○	CODE ADDITIONS/EDITS	4 HOURS AGO
○	MORE CODE	4 HOURS AGO
○	HERE HAVE CODE	4 HOURS AGO
○	AAAAA	3 HOURS AGO
○	ADKFJSLKDFJSDKLFJ	3 HOURS AGO
○	MY HANDS ARE TYPING WORDS	2 HOURS AGO
○	HAAAAAAAANDS	2 HOURS AGO

AS A PROJECT DRAGS ON, MY GIT COMMIT MESSAGES GET LESS AND LESS INFORMATIVE.