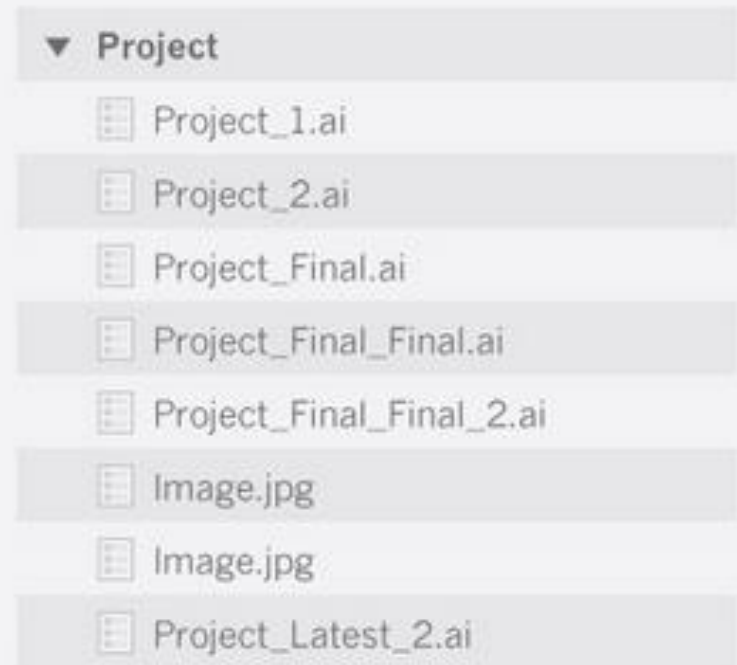# *Introduction to Git and GitHub*

What, Why and How?

About me

- Microservice Tester @ Ericsson
- Current Interest: Embedded Hardware
- Learning to play flute
- Love to play sports and cook
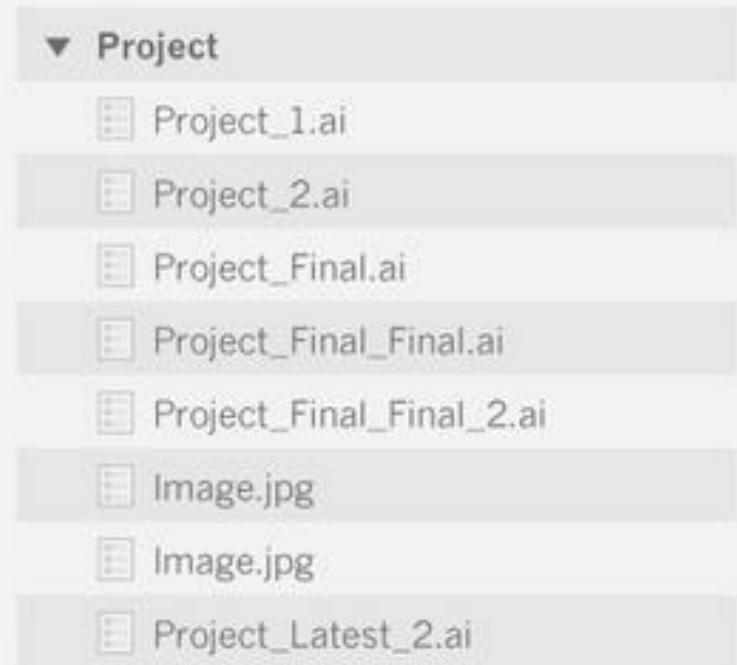- linkedin.com/in/faisal-hussain-elte/

Understanding the problem

- The traditional way has only:
- CTRL+S
- CTRL+Z, CTRL+Y (Until you save)
- Doesn't work for more than 1 person
- Unorganized

▼ Project
- Project_1.ai
- Project_2.ai
- Project_Final.ai
- Project_Final_Final.ai
- Project_Final_Final_2.ai
- Image.jpg
- Image.jpg
- Project_Latest_2.ai

Understanding the problem

- What was changed?

- Why was it changed? Can you always remember this?

- Small changes but the size doubles

- Messy and difficult to collaborate with others

- It's painfully slow 🐌

▼ Project
- Project_1.ai
- Project_2.ai
- Project_Final.ai
- Project_Final_Final.ai
- Project_Final_Final_2.ai
- Image.jpg
- Image.jpg
- Project_Latest_2.ai

Git Version Control

- Version Control = Track Changes 🐾
- Developed by Linus Torvalds 16 years ago
- Free and open source §
- Lightning fast
- Distributed (Spread out over the internet across multiple people)
- It's not only for code!
- It's a separate entity on it's own.
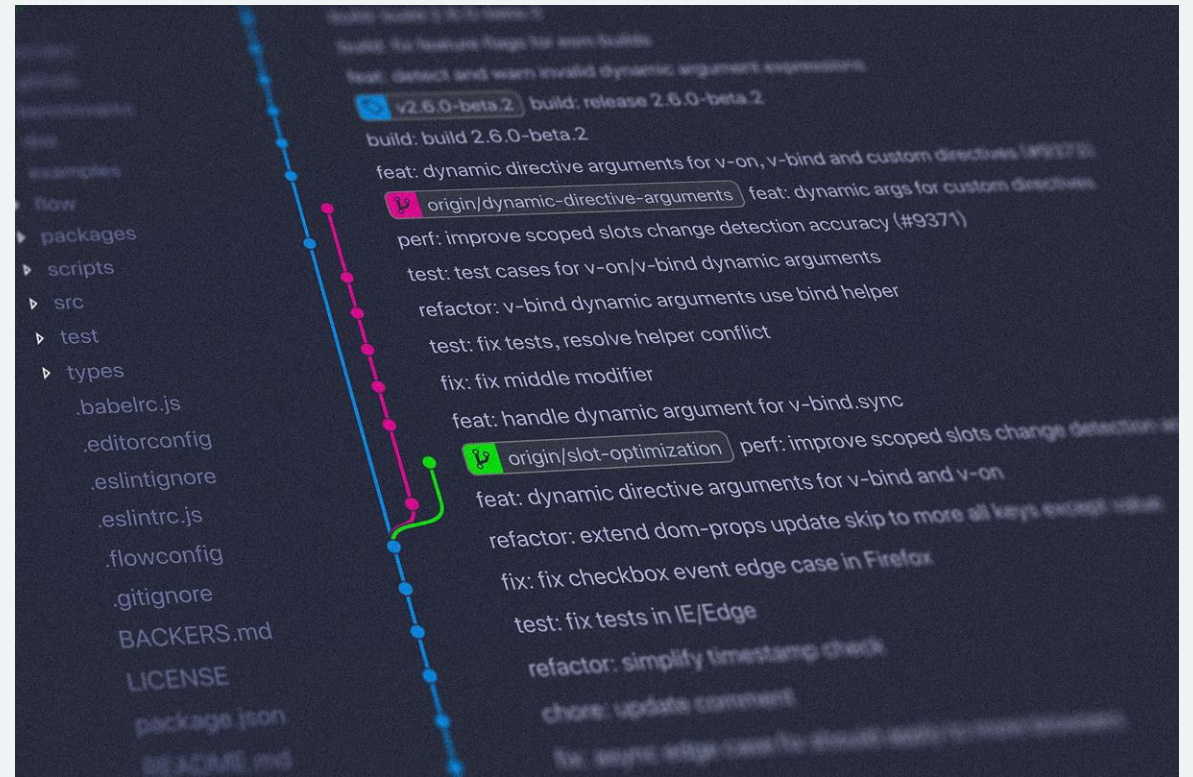
When and Where will I use this?

- Functional programming (IP-18fFUNPEG) repository
- Tools of software projects (IP-18KVPRJG)
- Software Technology (IP-12SRPRJG)
- Internship & Job
- Every project when you understand Git
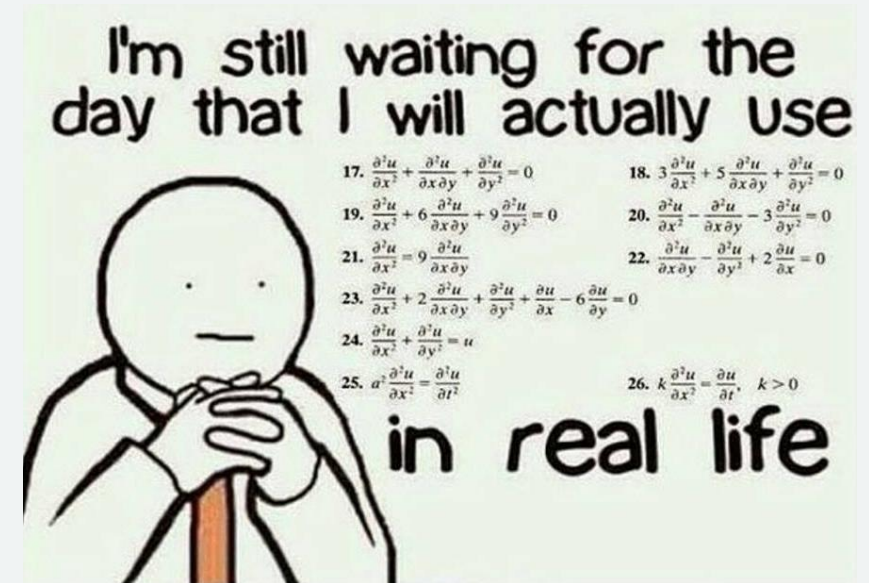
GitHub

- Largest code host in the world, with 40 million users and more than 190 million repositories

- Partly a social network

- Nice project management tools baked in

Simplified Git dictionary

Traditional	Git (Better at everything)
Download project.zip from google drive	git clone <repository url>
Download project_final.zip	git fetch
Create a new folder to start a new idea	git branch
CTRL+S	git commit
Make a new .zip and upload to google drive	git push
Open 2 windows and compare manually	git diff
CTRL+Z and CTRL+Y	git checkout
A folder	Repository (repo)

Command Line vs GUI

- Better to learn CLI as most of the help online is in the form of CLI commands

- If you learn the git commands then you can use every gui easily but not the other way around.

- In reality you will end up using both.
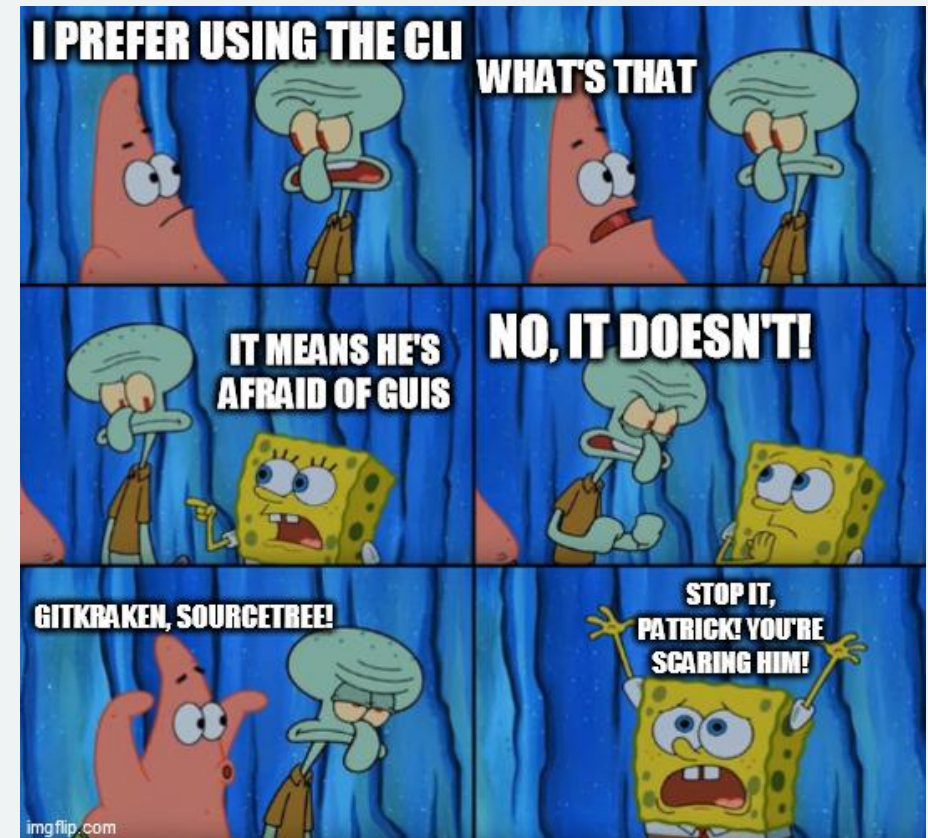
Children's Stories

- Management wants to start a story series about a cat and mouse and their adventures.

- Using both Git and Github

- Collaboration between many writers

- The aim is to understand the concepts through an easy example.

Setting up Git

- Install git from git-scm.com with default settings
- `git config --global user.name "William Hanna"`
- `git config --global user.email "william.hanna@nbc.com"`

Related People

Author ![icon] Akshay Singh

Add an author

Last Modified By ![icon] Gaurav Pandey

Creating our repo

- https://github.com/new

Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? Import a repository.

Owner *   Repository name *

NobleAscent ▾   /   stories ✓

Great repository names are short and memorable. Need inspiration? How about **refactored-octo-fortnight**?

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.

Initialize this repository with:
Skip this step if you're importing an existing repository.

☑ **Add a README file**
This is where you can write a long description for your project. Learn more.

☐ **Add .gitignore**
Choose which files not to track from a list of templates. Learn more.
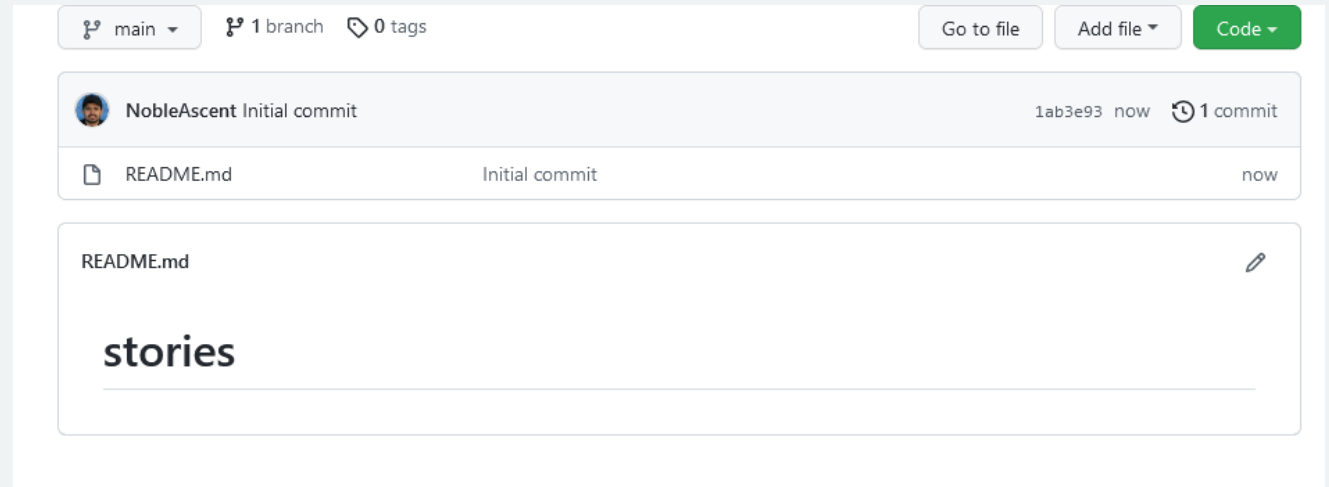
☐ **Choose a license**
A license tells others what they can and can't do with your code. Learn more.

This will set ⑂ main as the default branch. Change the default name in your settings.
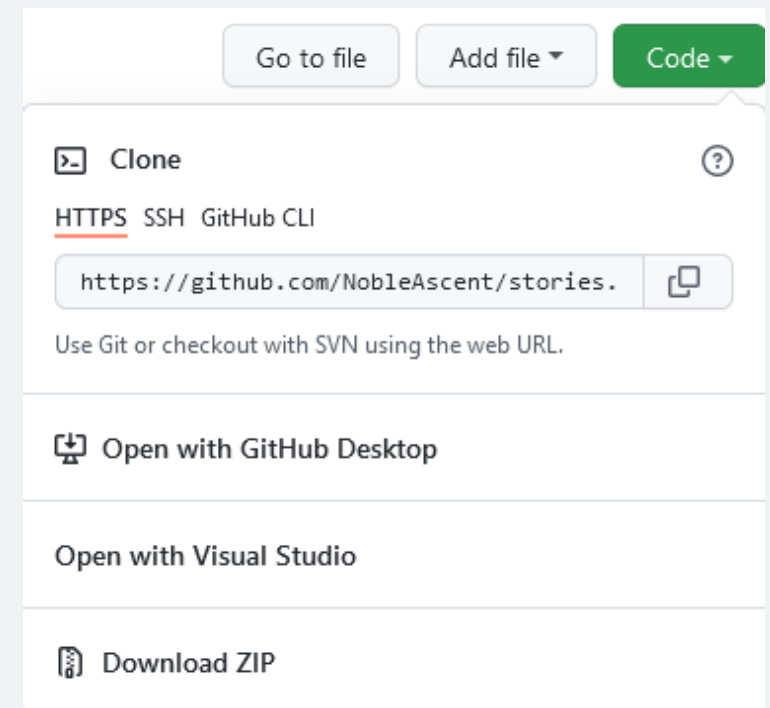
Create repository

Our Repository

- Homepage/Dashboard

- Current Branch

- Number of branches and tags

- Number of commits

- Current commit hash (ID)

- Renders the readme file

Git clone

- Create a copy of the repository locally
- Clone using the HTTPS link
- git clone https://github.com/NobleAscent/stories.git
- Clone output really doesn't matter unless there is an error

```
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
Receiving objects: 100% (3/3), done.
```

Go to file   Add file ▾   Code ▾

>_ Clone   ⑦

HTTPS SSH GitHub CLI

https://github.com/NobleAscent/stories. ⧉

Use Git or checkout with SVN using the web URL.

⊞ Open with GitHub Desktop

Open with Visual Studio

⬚ Download ZIP

.git

- This is what makes git work.

- Just don't delete it or play with it.

- It's hidden by default

```
02/12/2021  14:08    <DIR>          .
02/12/2021  14:08    <DIR>          ..
02/12/2021  14:01    <DIR>          .git
02/12/2021  14:01                9 README.md
               1 File(s)              9 bytes
               3 Dir(s)  79,168,589,824 bytes free
```

```
C:\Users\John\Desktop>git status
fatal: not a git repository (or any of the parent directories): .git
```

Our First Story


```
Jinx hides among some toy soldiers,
but Tom spots him and the mouse runs off,
saluting the cat like a real soldier would.

The mouse hides inside a Christmas fairy light,
causing him to glow. Not fooled, Tom grabs Jinx
and is promptly electrocuted.

Jinx then runs out of teh house through the letterbox
of the front door.As Tom opens the lid of the letterbox
to see where Jinx has gone, Jinx hurls a snowball at
his face. Tom angrily barricades the slot to prevent
Jinx from getting back into the house.
```

Git status

```
C:\Users\John\Desktop\stories>git status
On branch main
Your branch is up to date with 'origin/main'.

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

nothing added to commit but untracked files present (use "git add" to track)
```

- What's up?
- We must add files we want git to track. (Green)
- Untracked means that git is ignoring this file. (Red)
- git add .

```
C:\Users\John\Desktop\stories>git add .

C:\Users\John\Desktop\stories>
```

Git status

```
C:\Users\John\Desktop\stories>git status
On branch main
Your branch is up to date with 'origin/main'.

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        new file:    The Night Before Christmas.txt.txt
```

- Git add takes the file from untracked to staged. (Green)
- Only staged files are included in a commit.
- Adding and editing files is not very different.

Git commit

- Commit messages tell us what and why?
- 5fe4f2f is the identifier of the commit
- Write good commit messages so the intent and execution are clear
- Bad commit messages cause headaches


```
C:\Users\John\Desktop\stories>git commit -m "It's december
so I wrote a christmas story with lots of toys and gifts"
[main 5fe4f2f] It's december so I wrote a christmas story w
ith lots of toys and gifts
 1 file changed, 11 insertions(+)
 create mode 100644 The Night Before Christmas.txt.txt
```
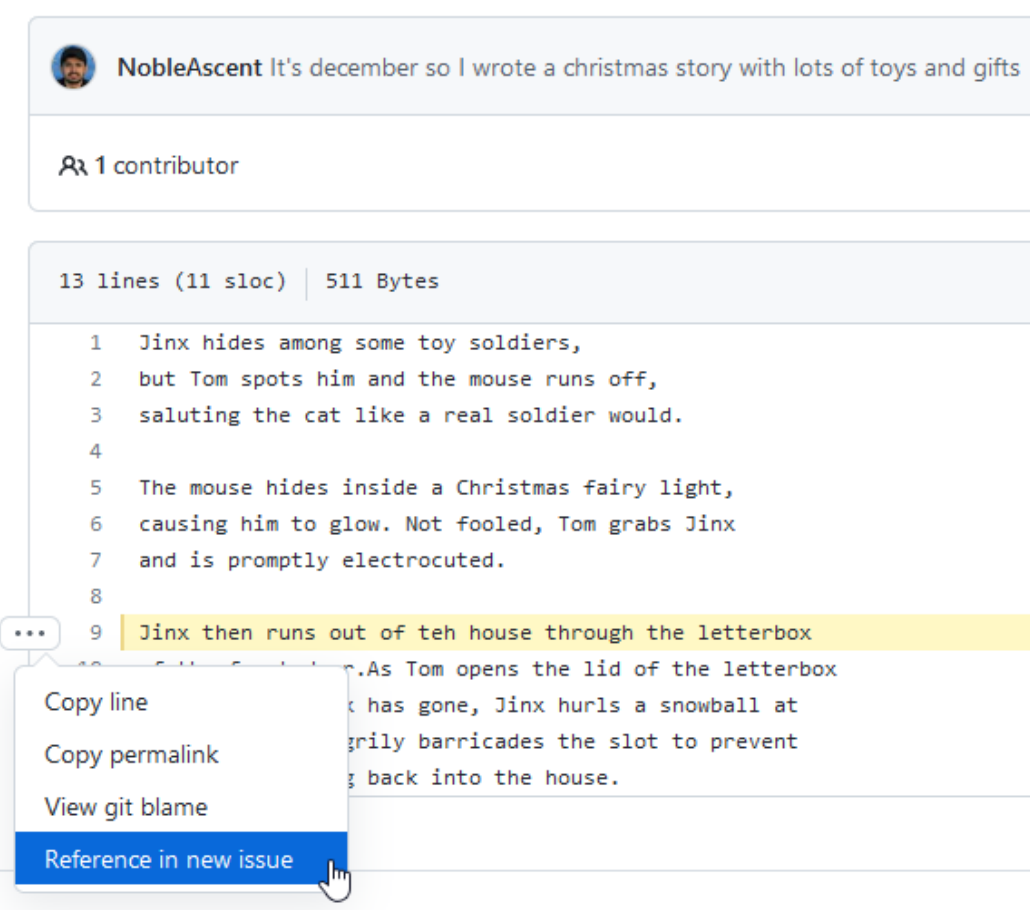
Git push

- Lets show it to the boss
- 5fe4f2f is the identifier of the commit
- Just tells us statistics about it's performance

```
C:\Users\John\Desktop\stories>git push
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 4 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 640 bytes | 640.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
To https://github.com/NobleAscent/stories.git
   1ab3e93..5fe4f2f  main -> main
```

Giving feedback

- Lets point out some problems and improvements
- Go over the commit and select the line to reference
- Create an issue

Giving feedback

- Tag developers
- Tag a specific commit or line
- Attach files and paste screenshots

Giving feedback

- Tag developers
- Tag a specific commit or line
- Attach files and paste screenshots

NobleAscent commented 1 hour ago • edited ▾

The script is good but there need to be some modifications

1. Spelling mistake:

   stories/The Night Before Christmas.txt.txt
   Line 9 in dd3738f

   ```
   9          Jinx then runs out of teh house through the letterbox
   ```

2. The filename contains the extension twice

3. Management has decided to rename the mouse to jerry

😊   👍 1   👀 1

Git diff

- The writer fixed the story and wants to see his changes

```
C:\Users\John\Desktop\stories>git diff
diff --git a/The Night Before Christmas.txt.txt b/The Night Before Christmas.txt.txt
index 5fab521..9bda481 100644
--- a/The Night Before Christmas.txt.txt
+++ b/The Night Before Christmas.txt.txt
@@ -1,13 +1,13 @@
-Jinx hides among some toy soldiers,
+Jerry hides among some toy soldiers,█
 but Tom spots him and the mouse runs off,
 saluting the cat like a real soldier would.

 The mouse hides inside a Christmas fairy light,
-causing him to glow. Not fooled, Tom grabs Jinx
+causing him to glow. Not fooled, Tom grabs Jerry
 and is promptly electrocuted.

-Jinx then runs out of teh house through the letterbox
+Jerry then runs out of teh house through the letterbox█
 of the front door.As Tom opens the lid of the letterbox
-to see where Jinx has gone, Jinx hurls a snowball at
+to see where Jerry has gone,Jerry hurls a snowball at█
 his face. Tom angrily barricades the slot to prevent
-Jinx from getting back into the house.
\ No newline at end of file
+Jerry from getting back into the house.
\ No newline at end of file
```

Beginner git workflow

- add
- commit
- push

```
C:\Users\John\Desktop\stories>git add "The Night Before Christmas.txt.txt"

C:\Users\John\Desktop\stories>git commit -m "Spelling fixed and name changed. Cannot
 rename file because of operating system issue"
[main 74c42dc] Spelling fixed and name changed. Cannot rename file because of operat
ing system issue
 1 file changed, 5 insertions(+), 5 deletions(-)

C:\Users\John\Desktop\stories>git push
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 4 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 392 bytes | 392.00 KiB/s, done.
Total 3 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/NobleAscent/stories.git
   dd3738f..74c42dc  main -> main
```

GitHub diff

- Can be seen by pressing on the commit hash
  In the dashboard
  or in the commit history as well

Lets be writer2

- We need to collaborate to successfully resolve the issue.
- Both writers will work together on this project

NobleAscent commented 1 minute ago • edited ▾

Cannot resolve the 3rd issue due to computer error. Others resolved in `74c42dc`

NobleAscent commented now

@writer2 will fix the issue

☺ 👍 1

Lets be writer2 (Getting the repo)

```
John@DESKTOP-E2E90KA MINGW64 ~/Desktop/projects
$ git clone https://github.com/NobleAscent/stories.git
Cloning into 'stories'...
remote: Enumerating objects: 12, done.
remote: Counting objects: 100% (12/12), done.
remote: Compressing objects: 100% (8/8), done.
remote: Total 12 (delta 4), reused 7 (delta 2), pack-reused 0
Receiving objects: 100% (12/12), done.
Resolving deltas: 100% (4/4), done.

John@DESKTOP-E2E90KA MINGW64 ~/Desktop/projects
$ cd stories/

John@DESKTOP-E2E90KA MINGW64 ~/Desktop/projects/stories (main)
$ mv The\ Night\ Before\ Christmas.txt.txt The\ Night\ Before\ Christmas.txt
```

Lets be writer2 (Git status)

- Rename is equivalent to deleting and creating a new file

- We need to git add the deleted file as well otherwise it would not be included in the commit

```
John@DESKTOP-E2E90KA MINGW64 ~/Desktop/projects/stories (main)
$ git status
On branch main
Your branch is up to date with 'origin/main'.

Changes not staged for commit:
  (use "git add/rm <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        deleted:    The Night Before Christmas.txt.txt

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

no changes added to commit (use "git add" and/or "git commit -a")
```

Lets be writer2 (Git push)

- Add, commit & push. In the commit message we can tag the issue.

```
John@DESKTOP-E2E9OKA MINGW64 ~/Desktop/projects/stories (main)
$ git add The\ Night\ Before\ Christmas.txt

John@DESKTOP-E2E9OKA MINGW64 ~/Desktop/projects/stories (main)
$ git commit -m "First story renamed. Fixes #1"
[main 2478fda] First story renamed. Fixes #1
 1 file changed, 13 insertions(+)
 create mode 100644 The Night Before Christmas.txt

John@DESKTOP-E2E9OKA MINGW64 ~/Desktop/projects/stories (main)
$ git push
Enumerating objects: 3, done.
Counting objects: 100% (3/3), done.
Delta compression using up to 4 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (2/2), 311 bytes | 311.00 KiB/s, done.
Total 2 (delta 0), reused 0 (delta 0), pack-reused 0
To https://github.com/NobleAscent/stories.git
   74c42dc..2478fda  main -> main
```

Lets be writer2 (Git push)

- Add, commit & push.
- In the commit message we can tag the issue and close it automatically

NobleAscent closed this in 2478fda

```
John@DESKTOP-E2E90KA MINGW64 ~/Desktop/projects/stories (main)
$ git add The\ Night\ Before\ Christmas.txt

John@DESKTOP-E2E90KA MINGW64 ~/Desktop/projects/stories (main)
$ git commit -m "First story renamed. Fixes #1"
[main 2478fda] First story renamed. Fixes #1
 1 file changed, 13 insertions(+)
 create mode 100644 The Night Before Christmas.txt

John@DESKTOP-E2E90KA MINGW64 ~/Desktop/projects/stories (main)
$ git push
Enumerating objects: 3, done.
Counting objects: 100% (3/3), done.
Delta compression using up to 4 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (2/2), 311 bytes | 311.00 KiB/s, done.
Total 2 (delta 0), reused 0 (delta 0), pack-reused 0
To https://github.com/NobleAscent/stories.git
   74c42dc..2478fda  main -> main
```

Quick Recap

- Commands we had to run once:
  clone

- Commands we had to run multiple times:
  add, commit, push

- Optional commands but very helpful:
  diff

Medium Git Workflow

- branch (A copy for experimentation)
- checkout (Switch and Use the specified branch)
- add
- commit
- push
- pull request (Merge the branch)
- Demo time (https://git-school.github.io/visualizing-git/)