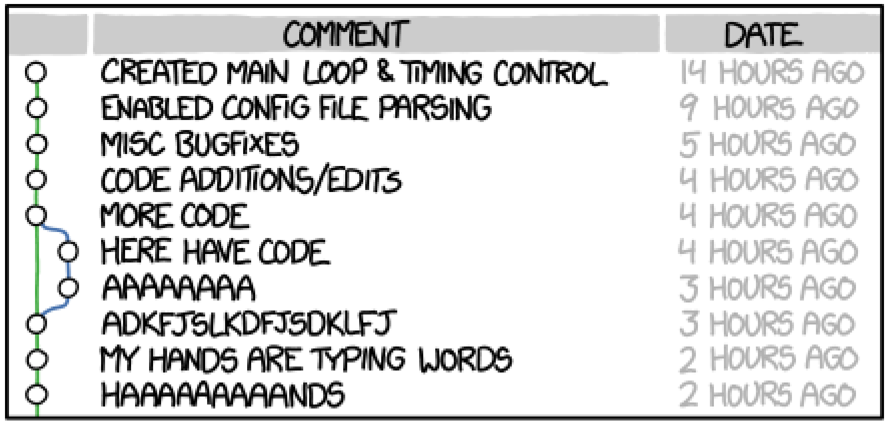
Git and R Markdown

Why they are useful and how to get started

What is Git?

- Distributed version control
- Manages changes without overwriting them

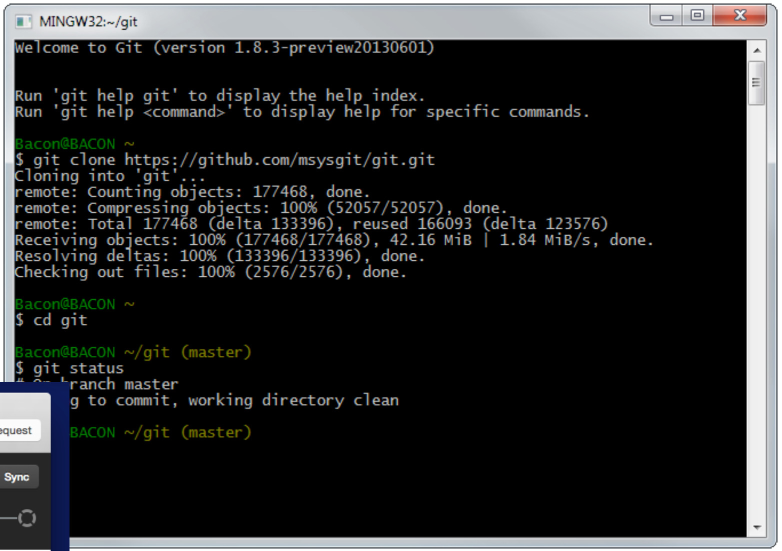


	COMMENT	DATE
○	CREATED MAIN LOOP & TIMING CONTROL	14 HOURS AGO
○	ENABLED CONFIG FILE PARSING	9 HOURS AGO
○	MISC BUGFIXES	5 HOURS AGO
○	CODE ADDITIONS/EDITS	4 HOURS AGO
○	MORE CODE	4 HOURS AGO
○	HERE HAVE CODE	4 HOURS AGO
○	AAAAAAAA	3 HOURS AGO
○	ADKFJSLKDFJSDKLFJ	3 HOURS AGO
○	MY HANDS ARE TYPING WORDS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

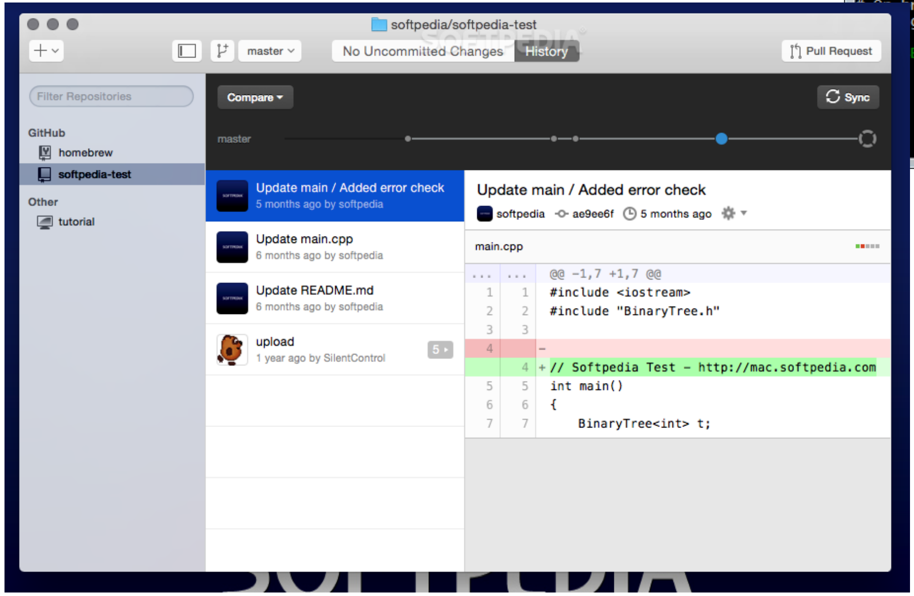
AS A PROJECT DRAGS ON, MY GIT COMMIT MESSAGES GET LESS AND LESS INFORMATIVE.

What is Git?

- Distributed version control
- Shell software and GUIs



```
Welcome to Git (version 1.8.3-preview20130601)

Run 'git help git' to display the help index.
Run 'git help <command>' to display help for specific commands.

Bacon@BACON ~
$ git clone https://github.com/msysgit/git.git
Cloning into 'git'...
remote: Counting objects: 177468, done.
remote: Compressing objects: 100% (52057/52057), done.
remote: Total 177468 (delta 133396), reused 166093 (delta 123576)
Receiving objects: 100% (177468/177468), 42.16 MiB | 1.84 MiB/s, done.
Resolving deltas: 100% (133396/133396), done.
Checking out files: 100% (2576/2576), done.

Bacon@BACON ~
$ cd git

Bacon@BACON ~/git (master)
$ git status
# O   ranch master
    g to commit, working directory clean

    BACON ~/git (master)
```



Update main / Added error check
5 months ago by softpedia

Update main.cpp
6 months ago by softpedia

Update README.md
6 months ago by softpedia

upload
1 year ago by SilentControl

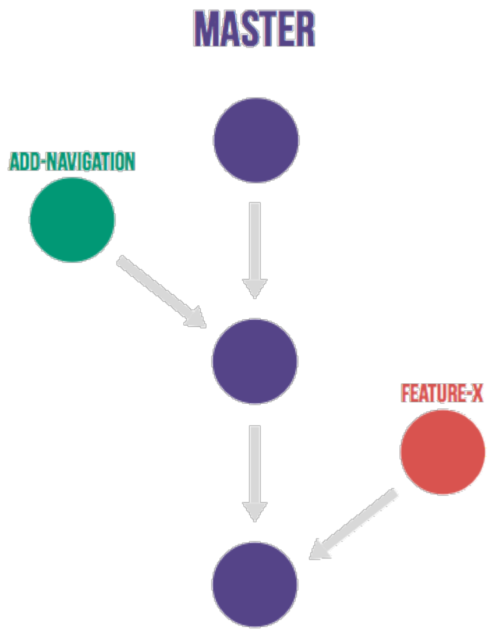
Update main / Added error check
softpedia ae9ee6f 5 months ago

main.cpp

```
@@ -1,7 +1,7 @@
 #include <iostream>
 #include "BinaryTree.h"

-
+// Softpedia Test - http://mac.softpedia.com
 int main()
 {
     BinaryTree<int> t;
```

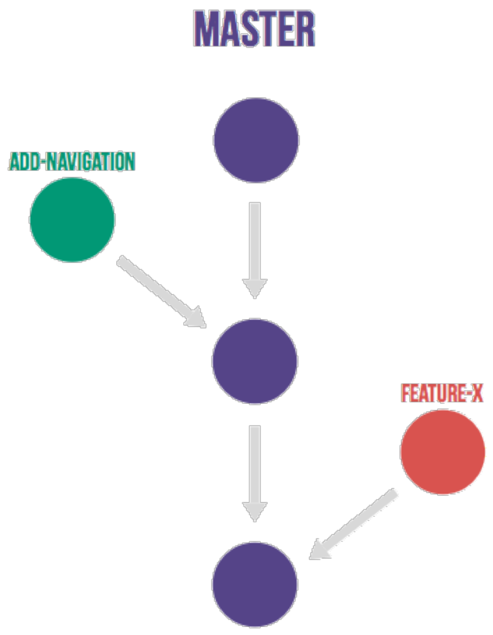
What is Git?

- Distributed version control
- Manages changes without overwriting them
- Local and remote copies



What is Git?

- Distributed version control
- Manages changes without overwriting them
- Local and remote copies
- GitHub: Collaborative platform and hosting service

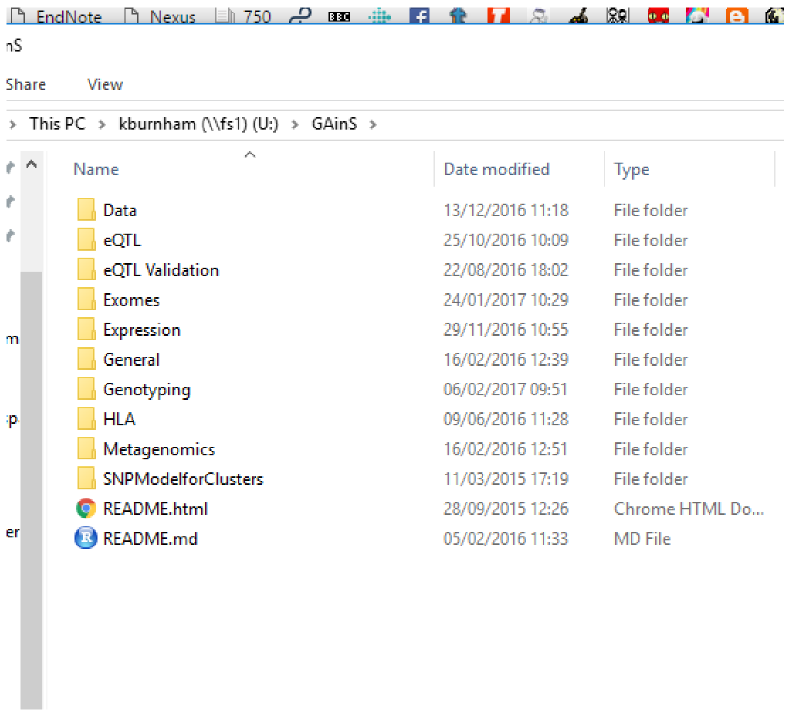


Why use Git?

- Code sharing and publishing, a programmer's Linked In?
- Or: Word track changes + Dropbox shared folders
- Not just for code: any type of file
- Not just for coders: GUIs available
- Manages and stores revisions: filing system for drafts
- Joint projects
- Public repositories are helpful e.g. ATAC-seq QC

How do you use Git?

- Usual folder structure on your computer



EndNote Nexus 750

nS

Share View

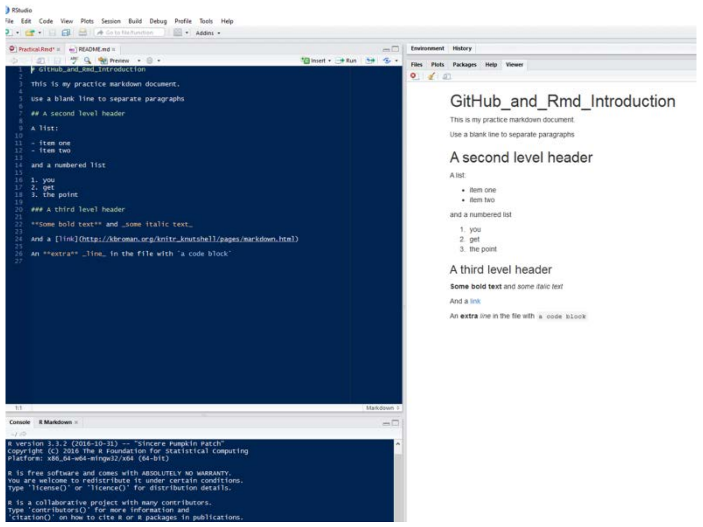
This PC > kburnham (\\fs1) (U:) > GAinS >

Name	Date modified	Type
Data	13/12/2016 11:18	File folder
eQTL	25/10/2016 10:09	File folder
eQTL Validation	22/08/2016 18:02	File folder
Exomes	24/01/2017 10:29	File folder
Expression	29/11/2016 10:55	File folder
General	16/02/2016 12:39	File folder
Genotyping	06/02/2017 09:51	File folder
HLA	09/06/2016 11:28	File folder
Metagenomics	16/02/2016 12:51	File folder
SNPModelforClusters	11/03/2015 17:19	File folder
README.html	28/09/2015 12:26	Chrome HTML Do...
README.md	05/02/2016 11:33	MD File

How do you use Git?

- Usual folder structure on your computer

- Do some work (the hardest part)



```
# GitHub_and_Rmd_Introduction

This is my practice markdown document.

Use a blank line to separate paragraphs

## A second level header

A list:

- item one
- item two

and a numbered list

1. you
2. get
3. the point

### A third level header

**Some bold text** and _some italic text_

And a [link](http://kbroman.org/knitr_knutshell/pages/markdown.html)

An **extra** _line_ in the file with `a code block`
```

GitHub_and_Rmd_Introduction

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A third level header

Some bold text and *some italic text*

And a link

An **extra** *line* in the file with `a code block`

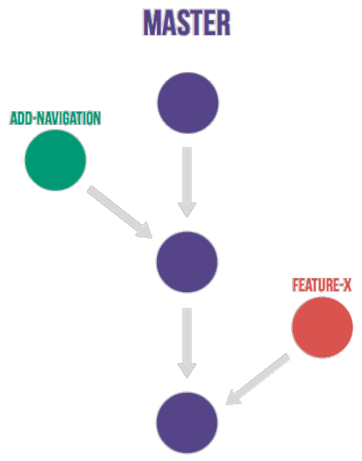
```
R version 3.3.2 (2016-10-31) -- "Sincere Pumpkin Patch"
Copyright (C) 2016 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.
```

How do you use Git?

- Usual folder structure on your computer
- Do some work
- Save your changes locally; Git notices and tracks them
- Confirm that you want these changes to be remembered
- Synchronise with a central copy of your folder on GitHub

How do you use Git?

- Download from the central copy to another computer (this could be you, or someone else)
- Do some work
- Synchronise (*push*) the changes to GitHub
- *Pull* them down to the first computer



Some terms you will come across

- **Repository** - a directory
- **Remote** - the online copy (also called the **origin**)
- **Clone** - download a whole repository
- **Add** - changes that you **add** are waiting **(staged)** to be stored
- **Commit** - store a snapshot
- **Push** - upload changes
- **Pull** - download changes and merge all together

Some terms you might come across

- **Revert** – reverse previous changes (but still store them)
- **Branch** - a parallel copy of the repository
- **Master** – the main/default branch
- **Fetch** - download changes
- **Checkout** – switch branches or discard changes
- **Merge -** combine branches
- **Fork** – duplicate a repository

What is R Markdown?

- Lightweight markup for interactive documents
- Instruction tags e.g. HTML, LaTeX
  - Word: WYSIWYG
- Readable markup + conversion tool
- Include code (R, Python, SQL) in your text
- Reproducible dynamic documents

Bookdown
PDF
LaTeX
TUFTE
HTML
R

Why use Markdown?

- Word + figures = Yuck.
- Generate nice HTML/PDFs/Word docs
- Good integration with GitHub
- REALLY useful for R(/python/bash/SQL) users: integrate code and generate summary docs all in one
- Reproducible and dynamic analysis
- (Parameters, slideshows, notebooks, websites…)

Why use Markdown?

```
<html>
<body>
<h1>Title</h1>
</head>
</html>
```

```
\documentclass[a4paper,12pt]
{report}
\textheight=23.5cm
\textwidth=15cm

\section{Title}
```

```
# Title
```

How do you use R Markdown?

- Open an R Markdown file in R Studio
- *Type as normal*
- Add code in chunks
- Click “Knit” to generate the document
- Open the file created in the same directory