GIT: Push 'n Run

Erik Regla

GITで何?



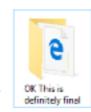
Gitとは、分散型バージョン管理システムの一つで、もともとLinuxのソースコードを効果的に管理するために開発されました。













What is GIT?



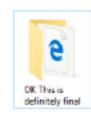
 Git is a distributed version control system, originally developed to effectively manage Linux source code.





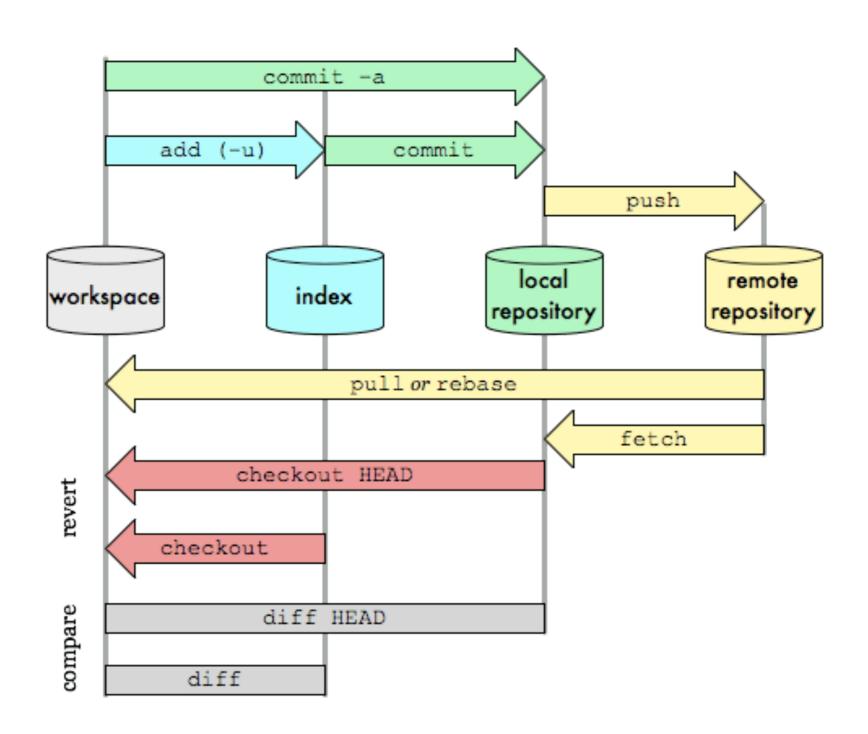








GIT Architecture Overview



GIT/VersionControl basic terms

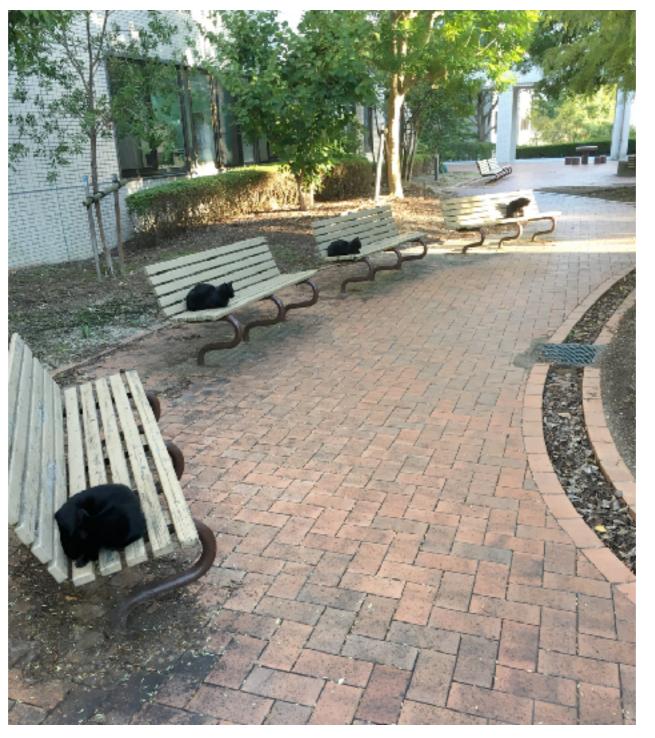
- A set of changes over the repository tracked files is called a commit.
- The users can push changes from the local repository onto the remote repository and pull changes from remote repo to local.
- Users can also merge contents of two commits in a single one.
 This is commonly used when performing branching, which can be seen as separate 'workspaces' for performing version control.
- Sometimes, when the commits involved in a merge operation changes the same lines or the same blocks, it's said to be a conflict between those two commits, because git is not able to resolve which commit has precedence on each conflicted line.

GIT/VersionControl basic commands

- Initialise repository: git init
- track file: git add <file>
- commit: git commit -a -m <commit_message>
- clone: git clone <repo_address>
- push: git push
- pull: git pull
- create new branch: git checkout -b new_branch
- change to new branch: git checkout new_branch
- check status: git status
- merge other branch into current: git merge <branch_to_merge>

Demo

How branching is supposed to work

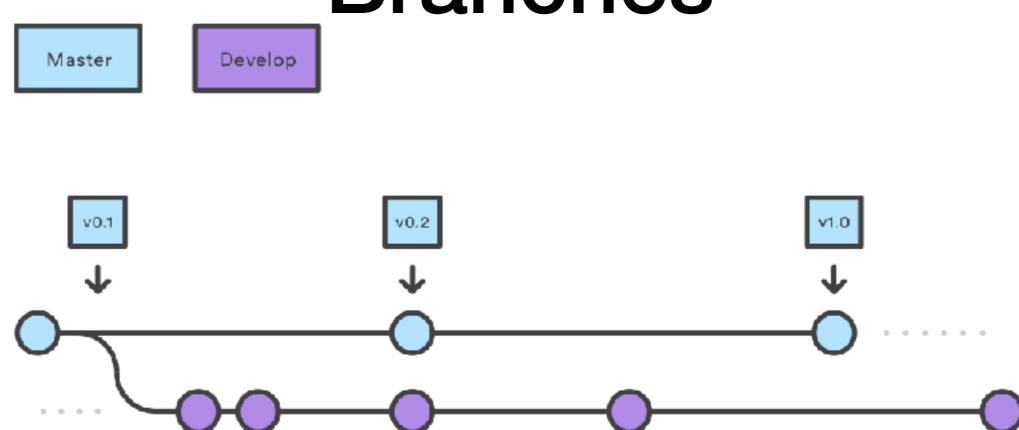


https://twitter.com/savdlmn/status/913313169006764035

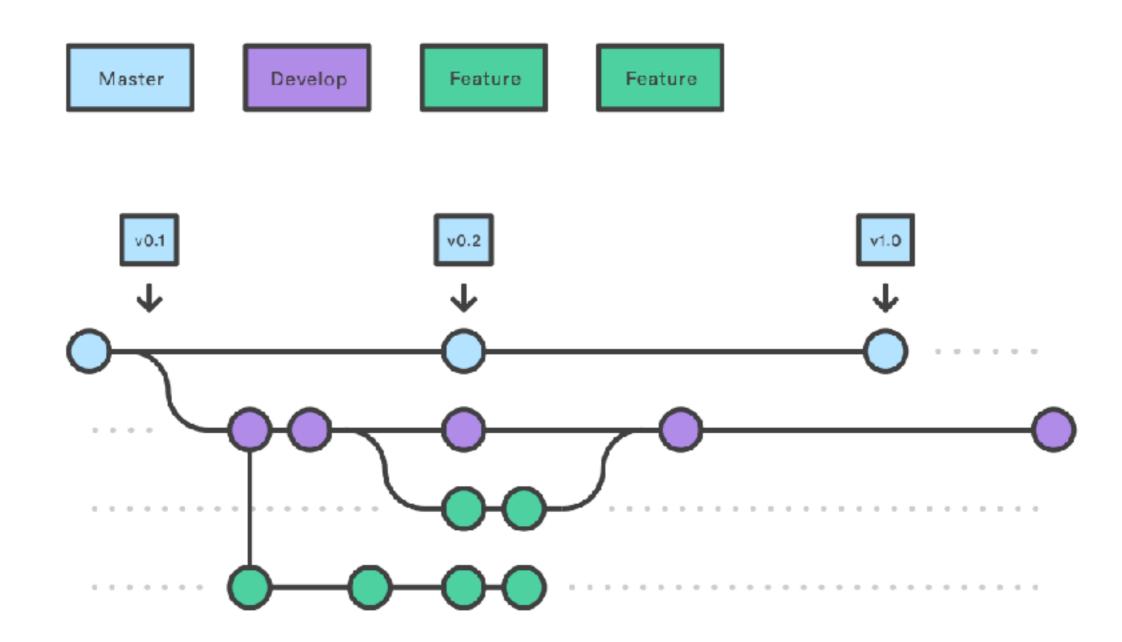
How branching works in practice



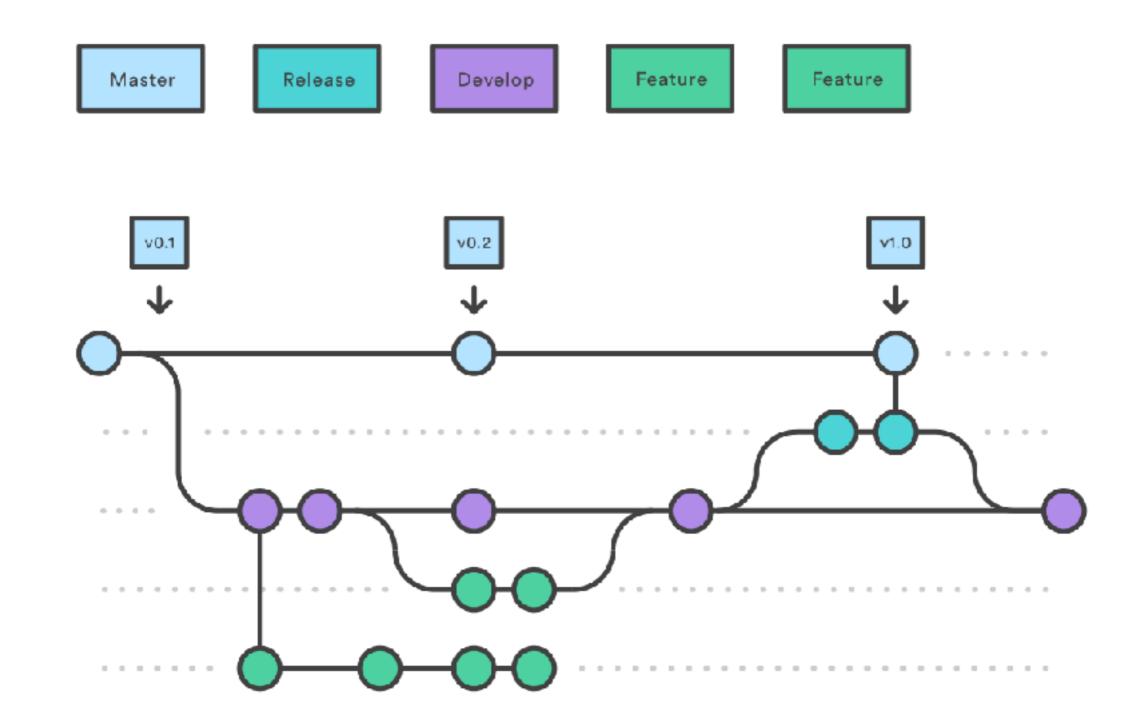
GIT-Flow: Historical Branches



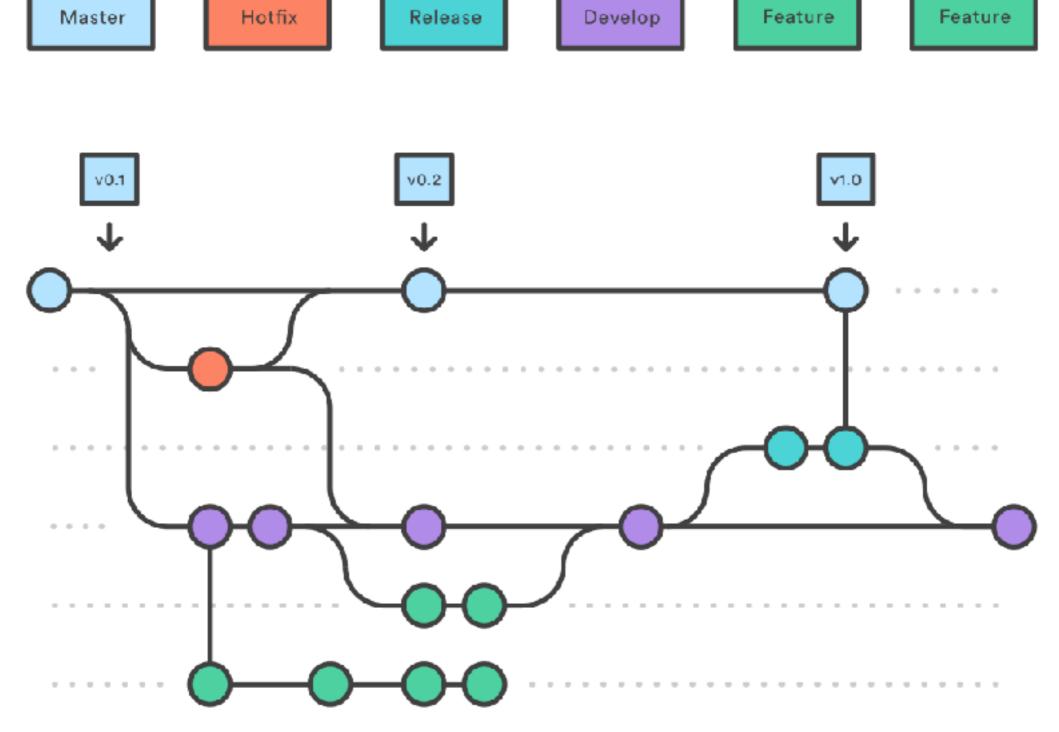
GIT-Flow: Future Branches



GIT-Flow: Release Branches



GIT-Flow: Maintenance Branches



```
#include <stdio.h>
  int sum(int a, int b){
       // someone has to implement this.
5
      return 0;
7
   int main(){
       int a = 0, b = 0;
10
       printf("Ingrese a: ");
11
       scanf("%d\n", &a);
12
       printf("Ingrese b: ");
13
       scanf("%d\n", &b);
14
       int result = sum(a, b);
15
       printf("Resultado a+b: %d", result);
16
       return 0;
```

master

```
#include <stdio.h>
          int sum(int a, int b){
                return a+b;
         5
         6
           int main(){
               int a = 0, b = 0;
                printf("Ingrese a: ");
                scanf("%d\n", &a);
                printf("Ingrese b: ");
       11
printf("Resultado a+
                scanf("%d\n", &b);
        12
  maste
               int result = sum(a, b);
                printf("Resultado a+b: %d", result);
       15
                return 0;
        16 }
```

#include <stdio.h>



```
3 int sum(int a, int b){
4    return a+b;
5 }
6
7 int main(){
8    int a = 0, b = 0;
9    printf("Ingrese a: ");
10    scanf("%d\n", &a);
11    printf("Ingrese b: ");
12    scanf("%d\n", &b);
13    int result = sum(a, b);
14    printf("Resultado a+b: %d", result);
15    return 0;
16 }
```

developer_1

master

```
#include <stdio.h>
        3 vint sum(int a, int b){
              int result = a + b;
              return result;
        6
        8 int main(){
              int a = 0, b = 0;
               printf("Ingrese a: ");
       10
               scanf("%d\n", &a);
       11
printf("Resultado a
               printf("Ingrese b: ");
       12
               scanf("%d\n", &b);
      13
  maste
               int result = sum(a, b);
               printf("Resultado a+b: %d", result);
              return 0;
       17
```

developer_2



```
1 #include <stdio.h>
2
3 int sum(int a, int b){
4    return a+b;
5 }
6
7 int main(){
8    int a = 0, b = 0;
9    printf("Ingrese a: ");
scanf("%d\n", &a);
printf("Ingrese b: ");
scanf("%d\n", &b);
int result = sum(a, b);
printf("Resultado a+b: %d", result);
return 0;
```

developer_1

#include <stdio.h>

int sum(int a, int b){
 // someone has to implement this.
 return 0;

int main(){
 int a = 0, b = 0;
 printf("Ingrese a: ");
 scanf("%d\n", &a);
 printf("Ingrese b: ");
 scanf("%d\n", &b);
 int result = sum(a, b);
 printf("Resultado a+b: %d", result);
 return 0;

// Printf("Resultado a+b: %d", result);
// Printf("Resultado a+b: %d", resultado a+b: %





```
1 #include <stdio.h>
2
3 * int sum(int a, int b){
4     int result = a + b;
5     return result;
6 }
7
8 * int main(){
9     int a = 0, b = 0;
10     printf("Ingrese a: ");
scanf("%d\n", &a);
11     scanf("%d\n", &b);
12     printf("Ingrese b: ");
scanf("%d\n", &b);
int result = sum(a, b);
printf("Resultado a+b: %d", result);
16     return 0;
17 }
```

developer_2



```
1 #include <stdio.h>
2
3 int sum(int a, int b){
4    return a+b;
5 }
6
7 int main(){
8    int a = 0, b = 0;
9    printf("Ingrese a: ");
$ scanf("%d\n", &a);
printf("Ingrese b: ");
$ scanf("%d\n", &b);
int result = sum(a, b);
printf("Resultado a+b: %d", result);
15    return 0;
```







```
1 #include <stdio.h>
2
3 * int sum(int a, int b){
4     int result = a + b;
5     return result;
6 }
7
8 * int main(){
9     int a = 0, b = 0;
10     printf("Ingrese a: ");
11     scanf("%d\n", &a);
12     printf("Ingrese b: ");
13     scanf("%d\n", &b);
14     int result = sum(a, b);
15     printf("Resultado a+b: %d", result);
16     return 0;
17 }
```

developer_2



```
1 #include <stdio.h>
2
3 int sum(int a, int b){
4    return a+b;
5 }
6
7 int main(){
8    int a = 0, b = 0;
9    printf("Ingrese a: ");
10    scanf("%d\n", &a);
11    printf("Ingrese b: ");
```

```
Likuky_nekoi@waifu: ~/Downloads/test git merge developer_1

White the state of the
```

```
7
8 int main(){
9    int a = 0, b = 0;
10    printf("Ingrese a: ");
11    scanf("%d\n", &a);
12    printf("Ingrese b: ");
13    scanf("%d\n", &b);
14    int result = sum(a, b);
15    printf("Resultado a+b: %d", result);
16    return 0;
17 }
```

developer_2

```
kuky_nek
Updating
Fast-forw
main.c |
1 file c
kuky_nek
Auto-merg
CONFLICT
Automatic
x kuky_n
18
```

```
#include <stdio.h>
 2
   int sum(int a, int b){
   <<<<< HEAD
 5
        return a+b;
   _____
       int result = a + b;
        return result;
 9
   >>>>> developer_2
10
12 int main(){
13
       int a = 0, b = 0;
14
        printf("Ingrese a: ");
        scanf("%d\n", &a);
15
        printf("Ingrese b: ");
16
17
        scanf("%d\n", &b);
        int result = sum(a, b);
18
19
        printf("Resultado a+b: %d", result);
20
        return 0;
21 }
                  developer_2
```

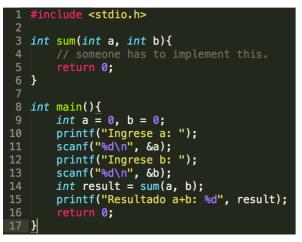


```
#include <stdio.h>
  int sum(int a, int b){
      return a+b;
7 int main(){
      int a = 0, b = 0;
      printf("Ingrese a: ");
      scanf("%d\n", &a);
      printf("Ingrese b: ");
      scanf("%d\n", &b);
      int result = sum(a, b);
      printf("Resultado a+b: %d", result);
      return 0;
```



```
#include <stdio.h>
   int sum(int a, int b){
   <<<< HEAD
      return a+b;
       int result = a + b;
       return result;
 9 >>>>> developer_2
10 }
12 int main(){
       int a = 0, b = 0;
       printf("Ingrese a: ");
scanf("%d\n", &a);
       printf("Ingrese b: ");
       scanf("%d\n", &b);
       int result = sum(a, b);
       printf("Resultado a+b: %d", result);
```

developer_1



master

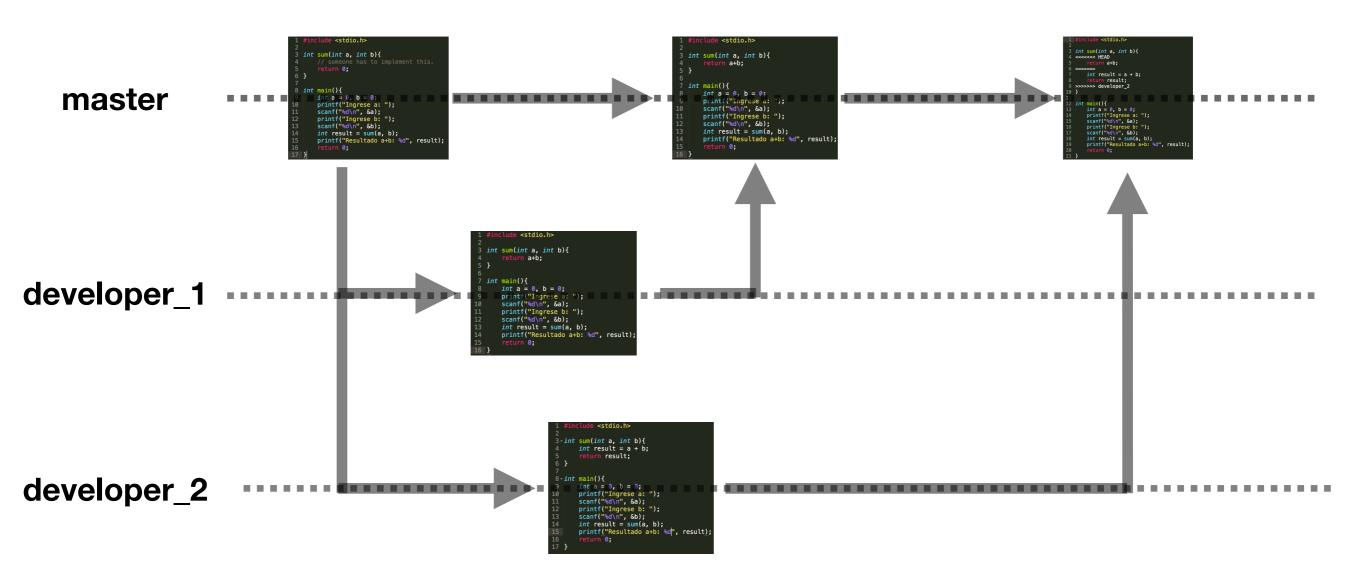




developer_2



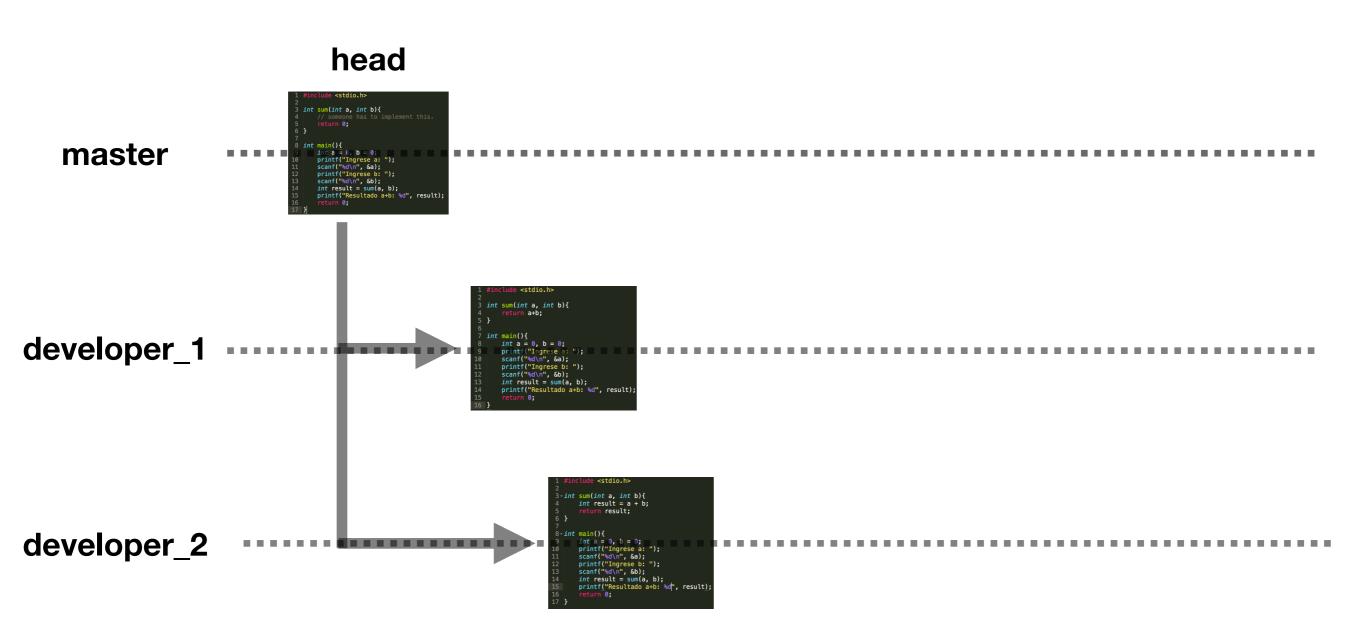
master* (merging)

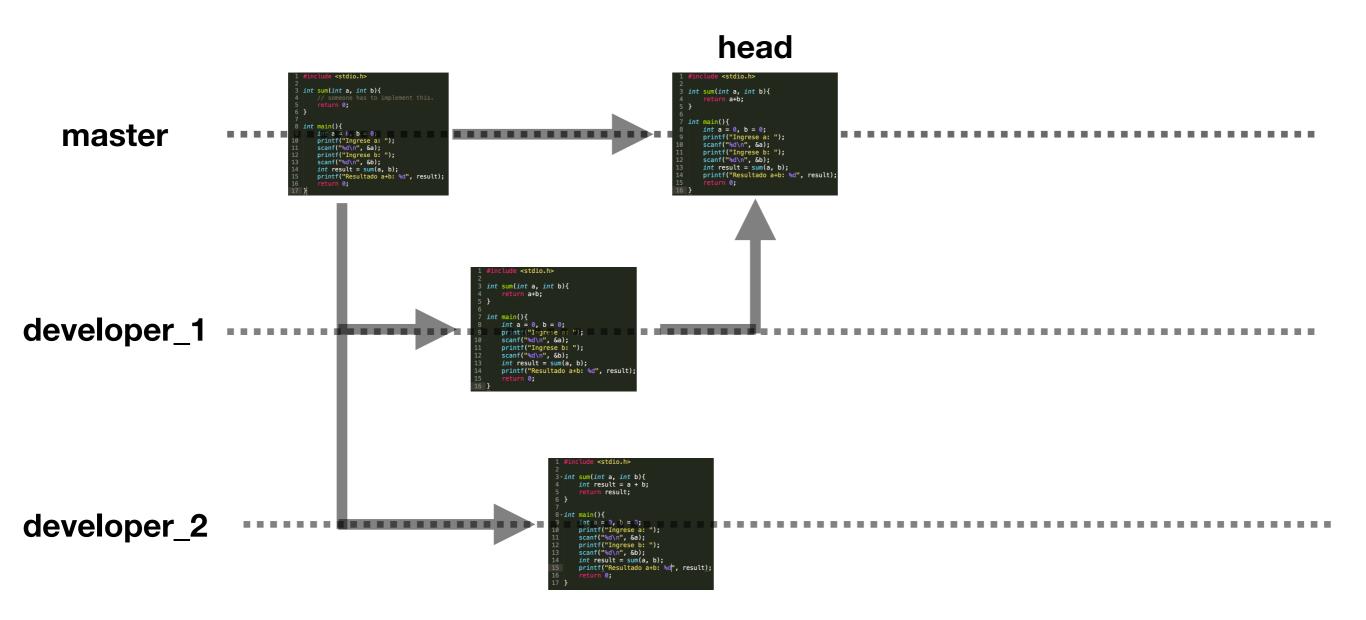


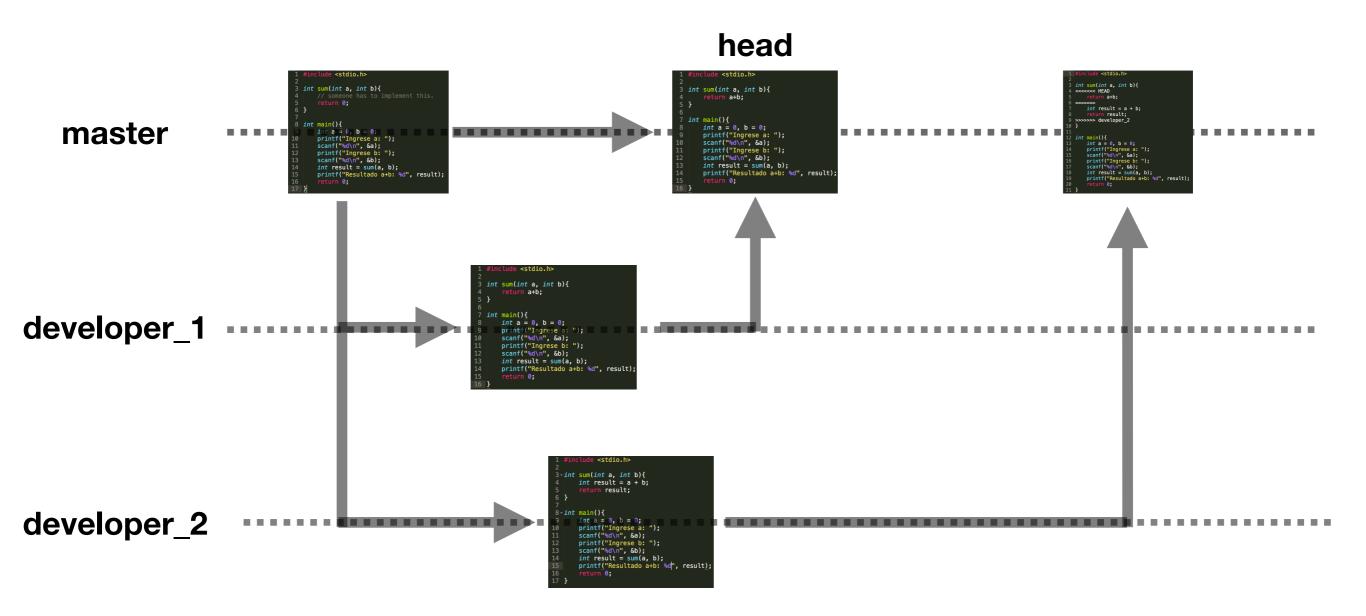
head

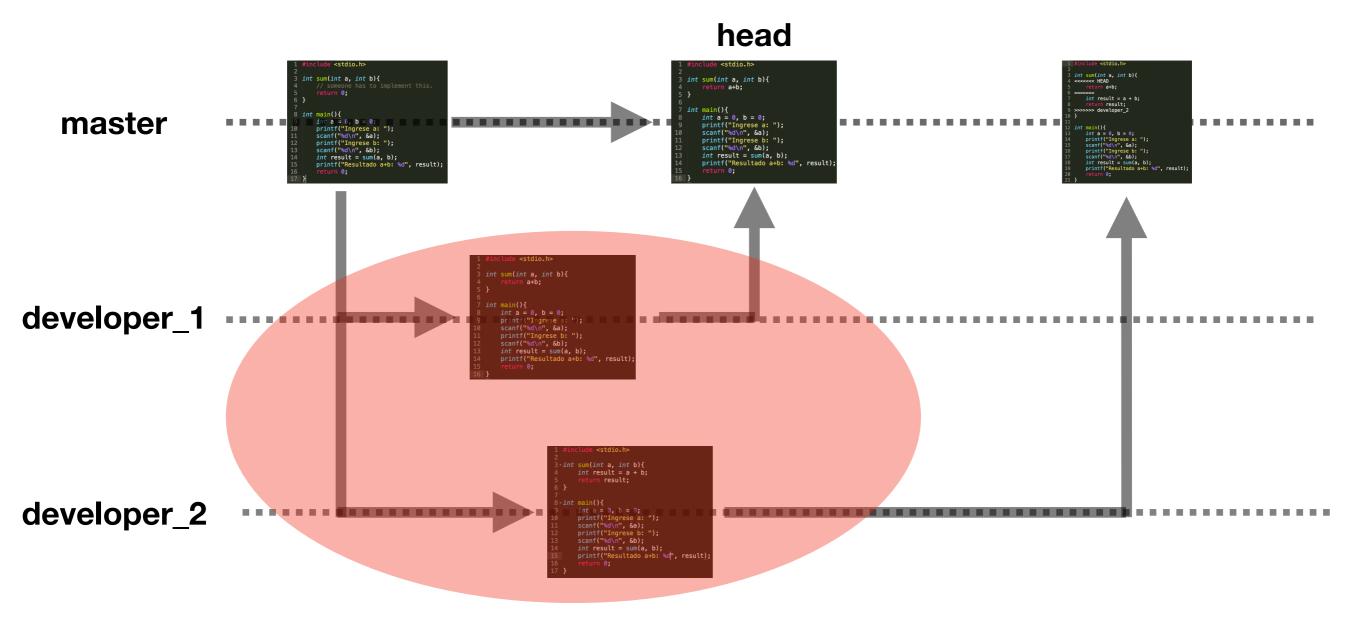
master

```
3 int sum(int a, int b){
4     // someone has to implement this.
5     return 0;
6 }
7
8     int main(){
9         int a = 0, b = 0;
10         printf("Ingrese a: ");
11         scanf("%d\n", &a);
12         printf("Ingrese b: ");
13         scanf("%d\n", &ba);
14         int result = sum(a, b);
15         printf("Resultado a+b: %d", result);
16         return 0;
17 }
```

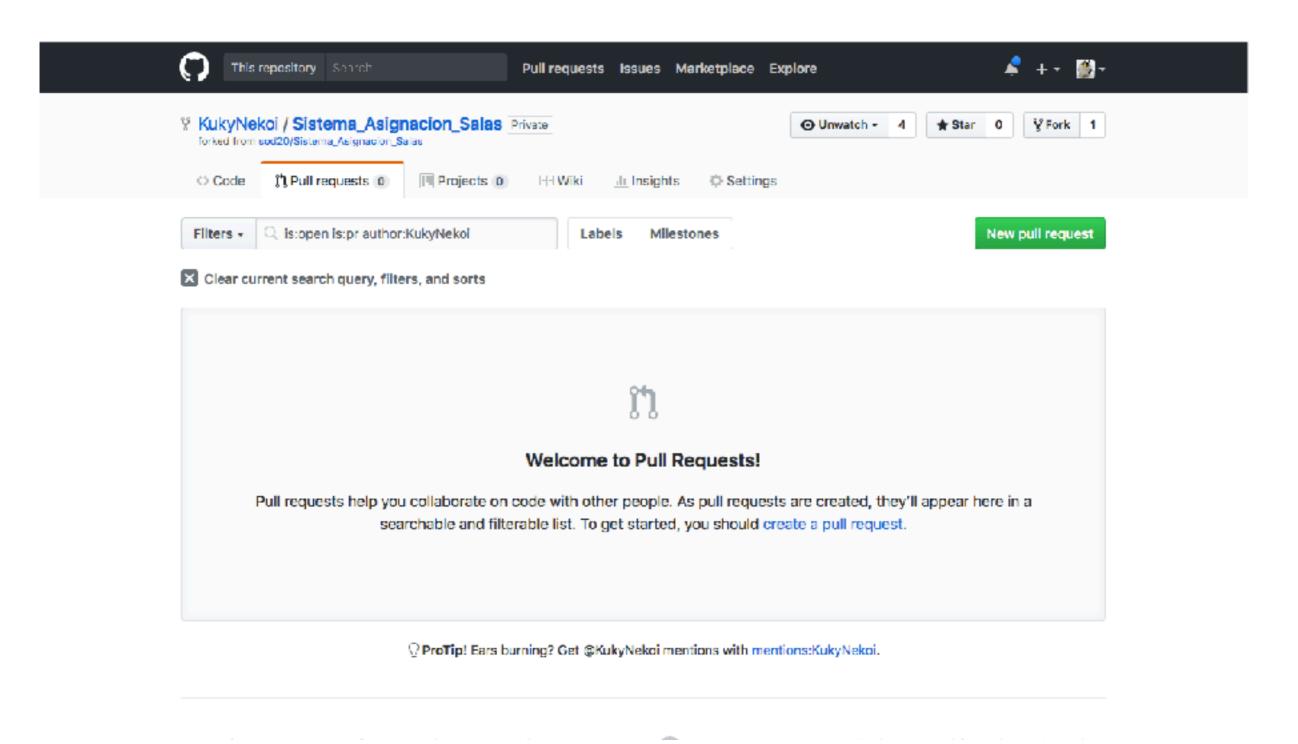



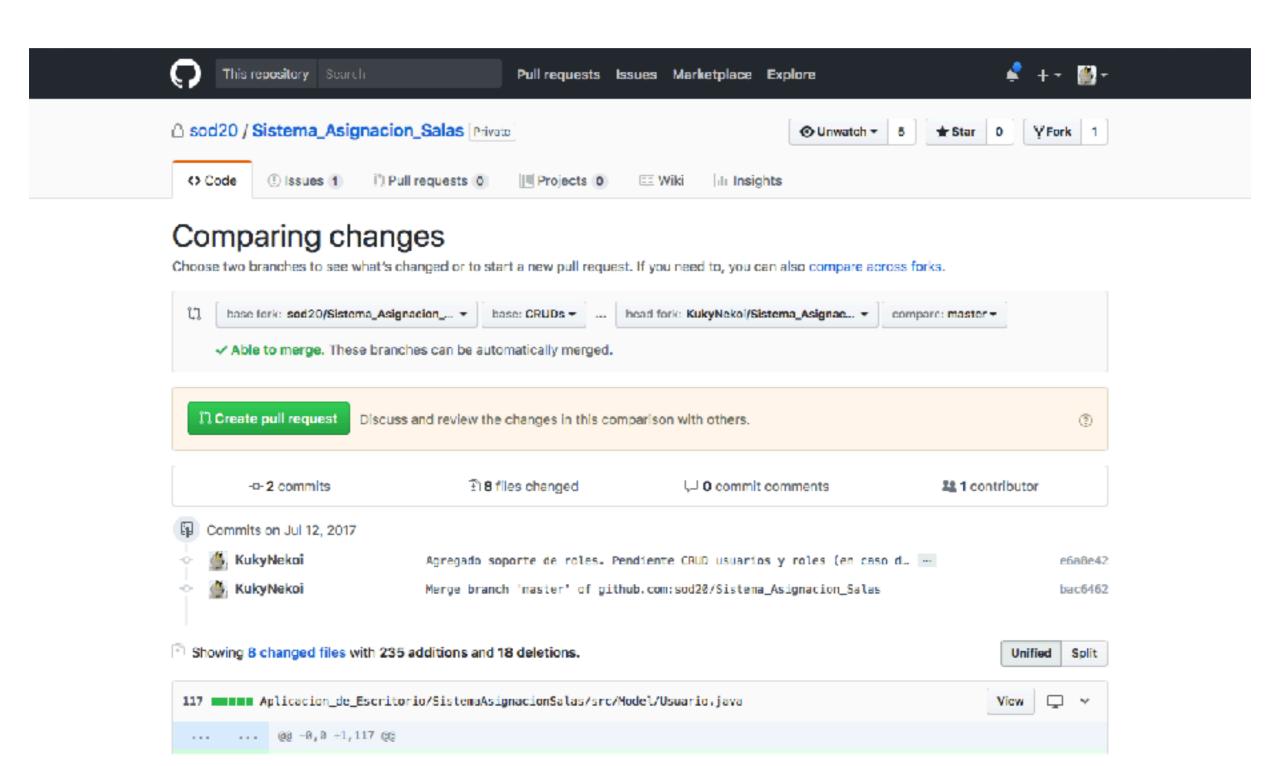


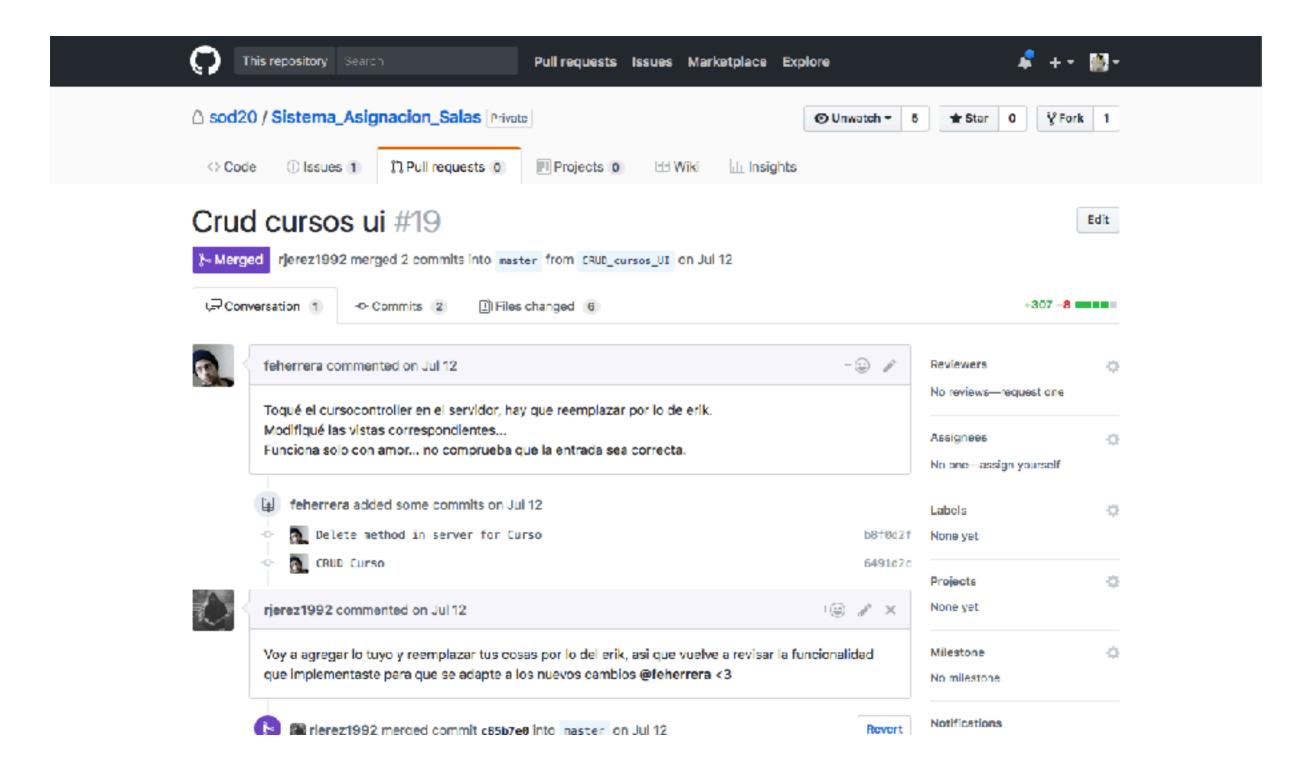


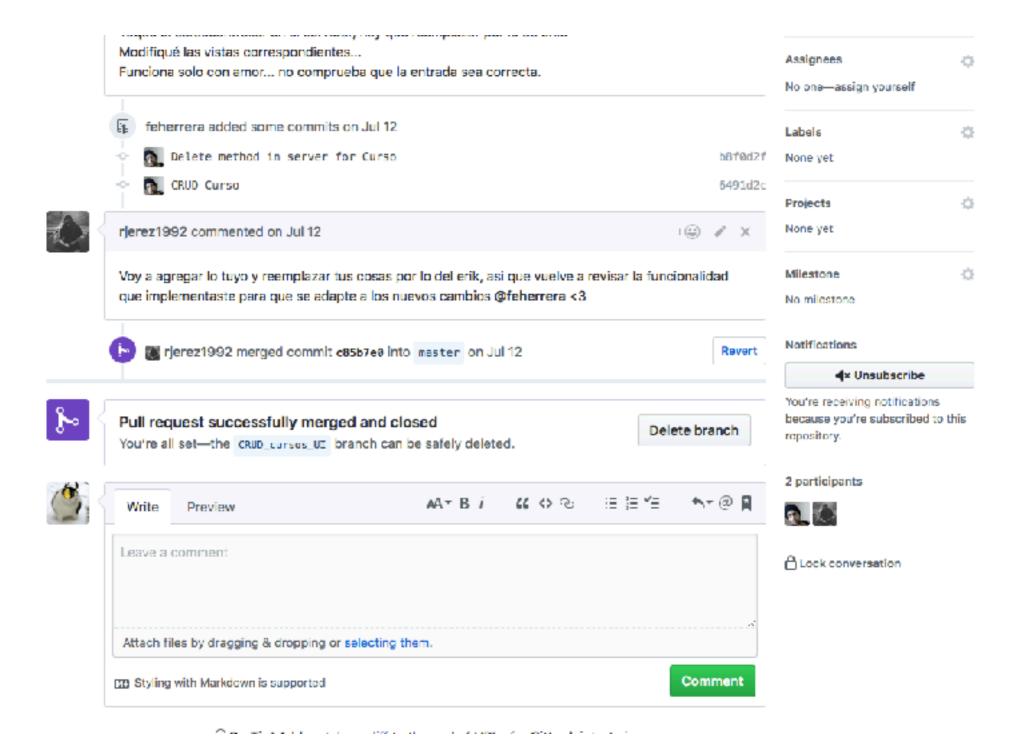


Those two commits share the same origin



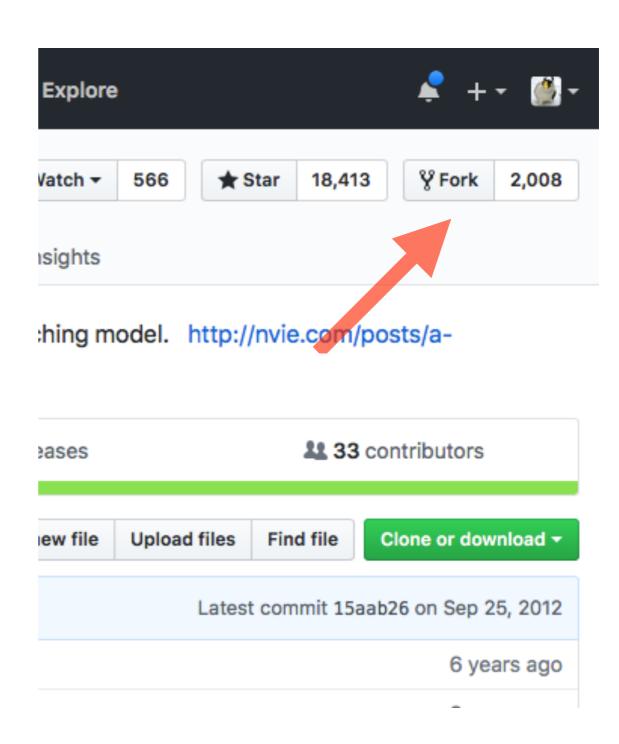






Forking repos

- Forks serve as a way to "remotely clone a repository".
- As they are "clones" of the original repo, users can also initiate "pull requests" from the forked repo to the original one.
- There is also a branching model for users who prefer forks to branches: Forking Workflow.



GIT Blame

- GIT also allows to track which person changed which line at a given moment (or to summarize all the changes).
- git-blame rarely gives useful results with this command, so git-log is prefered instead.

```
1)#ifndef FIFMHNI_C
                                 2017-09-03 05:41:53 -0306
                 [@KuRy_NeKo1
6 fcad5b2
                 BKOKy NeKoi
                                 2817-89-83 85:41:53 -0386
                                                                 2)#define FIFMHNI C
6 fcad5 b2
                 @KuKy NeKoi
                                 2817-89-83 85:41:53 -0388
                                                                 3)
                 @KuKy NeKoi
                                 2017-09-03 23:37:17 -0306
                                                                 4)#include "../include/element.h"
acb97d57
                 Maky_NeKoi
                                 2017-09-03 21:43:54 -0300
                                                                 5)#include <assert.h>
                 I@KuKy_NeKo1
                                                                 6)#include <math.h>
                                 2017-09-04 00:36:07 -0300
1de95373
                                 2017-09-03 22:34:10 -0300
                                                                 7)#include <stdbool.h>
                                 2017-09-03 21:43:54 -0306
c2dae1ba
                                                                 9) * This implementation assumes that all elements as
                                 2817-89-83 21:43:54 -0386
                                                                 10) ★ instances. While is true that there is a small;
                                 2017-09-03 21:43:54 -0306
                                 2817-89-83 21:43:54 -0386

 * an extra indirection level, it should not be no

                                 2817-89-83 21:43:54 -9386
96036036
                 Not Conmitted Yet
                                         2017-10-10 17:52:26 -0300
                                                                          14) ≠ @brief Initialises an element
                                         2017-10-10 17:52:26 -0300
                 (Not Connitted Yet
96096096
                                         2017-10-10 17:52:26 -0300
                                                                          15) # @note — An element is a n-dimensional ve
                 Not Connitted Yet
96096096
                 INot Committed Yet
                                         2017-10-10 17:52:26 -0300
                                                                          16) # @peram *element: memory pointer to the
                                         2017-10-10 17:52:26 -0300
                                                                          17) # @param dim: the n-dimensions
                 INot Conmitted Yet
                                                                          18) * @retval None
                 Not Conmitted Yet
                                         2017-10-10 17:52:26 -0300
86086086
                                         2017-10-10 17:52:26 -0300
                 Not Conmitted Yet
c2dae1ba
                                                                 20)void element_init(element_t Melement, size_t dim){
                 SKuky NeKon
                                2017-09-03 21:43:54 -0300
c2dae1ba
                 @KuRy_NeKo1
                                 2817-89-83 21:43:54 -0388
                                                                        element->dim = dim;
                                                                 21)
c2dae1ba
                                 2817-89-83 21:43:54 -0388
                                                                 22)
                                                                        element->data = nalloc(sizeof(double) * dim);
                (BKuKy NeKo)
6 fcad5 b2
                 DKuKy NeKoi
                                 2817-89-83 85:41:53 -0388
                                                                 23)
                                                                         returns
6 (cad5 b2
                 MKuKy NeKoi
                                 2017-09-03 05:41:53 -0300
                                                                 24) }
c2dee1ba
                                 2017-09-03 21:43:54 -0300
                 I@KuKy_NeKoi
00000000
                 INot Committed Yet
                                         2017-10-10 17:52:26 -0300
96096096
                                         2017-10-10 17:52:26 -0300
                                                                          27)/##
96096096
                 INot Conmitted Yet
                                         2017-10-10 17:52:26 -0300
                                                                          28) * @brief Checks the memory bounds for a (
96996996
                 Not Conditted Yet
                                         2017-10-10 17:52:26 -0300
                                                                          79) ★ @note uses the dimension to check the
авоавоав
                 (Not Conmitted Yet
                                         2017-10-10 17:52:26 -0300
                                                                          30) ▼ @param ▼element: the element
                 Not Conmitted Yet
                                         2017-10-10 17:52:26 -0300
                                                                          31) ♥ @param index: position to be checked.
                                         2017-10-10 17:52:26 -0300
                 (Not Committed Yet
                                                                          32) ▼ @retval true if the memory address is w
96096096
                 (Not Committed Yet
                                         2017-10-10 17:52:26 -0300
1de95373
                                 2017-09-03 22:34:10 -0306
                                                                 34) inline bool element checkbounds (element t *elemen
bed520e1
                                 2017-09-04 00:36:07 -0300
                                                                 35)
                                                                         return index >= 0 && index < element->din;
6fcad5b2
                 1@KuKy_NeKo1
                                2017-09-03 05:41:53 -0300
                                                                 36) (
c2dae1ba
                 @KuKy_NeKo1
                                 2017-09-03 21:43:54 -0300
                                                                 37)
                                         2017-10-10 17:52:26 -0300
96096096
                 Not Conmitted Yet
                                                                          39) ★ @brief Gets the i=th element (of the da
                 Not Conmitted Yet
                                         2017-10-10 17:52:26 -0300
                                                                          40) ■ @note Should be inlined.
                                         2017-10-10 17:52:26 -0300
96096096
                 (Not Conmitted Yet
                                                                          41) ▼ @param Felement: the vector to query
86086086
                 (Not Committed Yet
                                         2017-10-10 17:52:26 -0300
                                                                          42) ∓ @param index: the i-th position, start
96036036
                 (Not Committed Yet
                                         2017-10-10 17:52:26 -0300
                                                                          43) ∓ @retval a copy the i-th position value
96096096
                 (Not Connitted Yet
                                         2017-10-10 17:52:26 -0300
                                                                          44) #/
                                 2017-09-04 00:36:07 -0300
ped 520e1
                                                                 45)double element_get(element_t *element, size_t inde
                 I@KuKy_NeKoi
1de95373
                T@KuKy_NeKo1
                                2017-09-03 22:34:10 -0300
                                                                 46)
                                                                        assert[_element_checkbounds[element, index)
                 I@KuKy_NeKo1
                                                                 47)
c2dae1ba
                                 2017-09-03 21:43:54 -0300
                                                                         return element->data[index];
 ifcad5b2
                                 2017-09-03 05:41:53 -0306
```

Useful tools

- Visual Studio Code: Has native integration with git tools as well as many useful plugins like git-lens which allow seamless integration with many git tools (like blame). It also identifies merge operations on the way allowing quick conflict resolution.
- Free
- Opensource

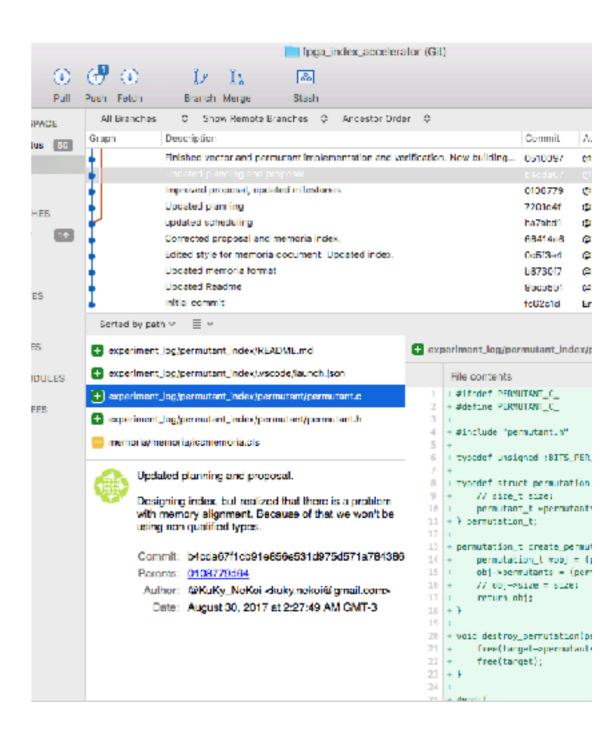
```
C main.c
        You, a few seconds ago | 2 authors (@KuKy_NeKol and others)
        #include <stdio.h>
        int sum(int a, int b){
       Accept Current Change | Accept Incoming Change | Accept Both Changes | Com
        <<<<<< HEAD (Current Change)
            int result = a + b;
            return result;
            return a+b:
        >>>>> developer 1 (Incoming Change)
        int main(){
            int a = 0, b = 0;
            printf("Ingrese a: ");
            scanf("%d\n", &a);
            printf("Ingrese b: ");
            scanf("%d\n", &b);
            int result = sum(a, b);
            printf("Resultado a+b: %d", result);
            return 0;

© @KuKy_NeKoi, 18 hours ago sum(int a, int b)

                                           Ln 5, Col 24 Spaces: 4
```

Useful tools

- SourceTree: Graphical frontend for GIT. Offers support for the entire workflow process, graphical inspectors and support for external diff tools.
- Free
- Propietary



Exercise

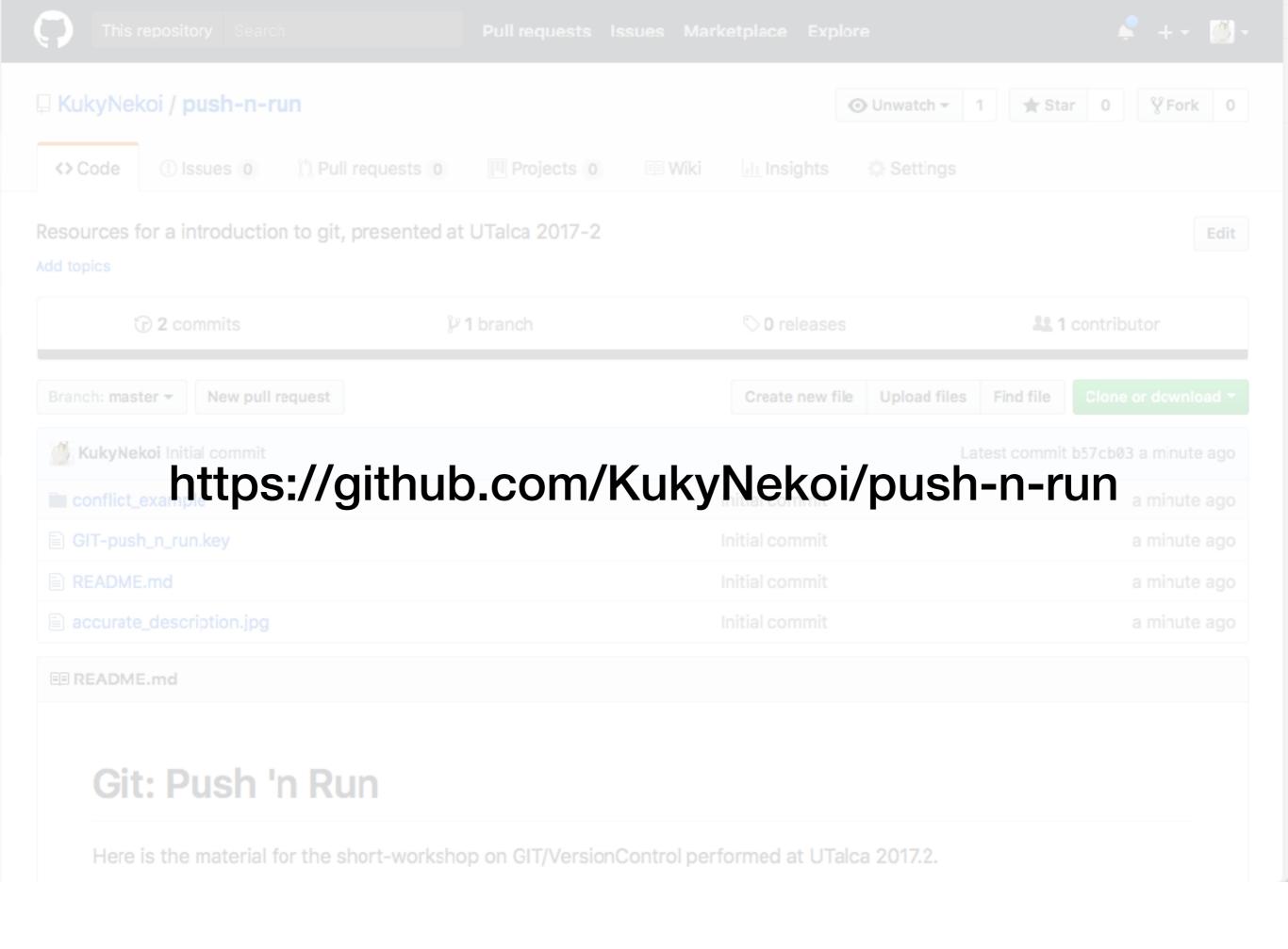
Let's build a small console LED Display simulator. This display has to show a certain patter using a dot-like display and has to scroll smoothly on the screen.

At high level, the features to be developed can be summarized as follows:

- Scroll a sequence of characters.
- Generate the character sequence to scroll using a text.
- Retrieve terminal dimensions on the fly.
- Read and write files for sequences.
- Load and run sequences on the program.

Steps to follow:

- Create an account on https://github.com
- Form teams with 4-5 people each.
- Decide which feature your team will work on. Define which one will be the gitmaster of your team.
- Remember to ask your gitmaster to integrate your code using pull requests. Do not attempt to overwrite others work.



thx:3