Git workshop III

TYH Lab git Workshop II
by Paul Z Cheng

Review

- git daily commands
- Onion model
- Flow with the log
- resolving merge conflict

After install connecting to online platform

Before all the fun of `git clone`, `git fetch`, `git pull`, or `git push`

- ssh
  https://docs.github.com/en/github/authenticating-to-github/connecting-to-github-with-ssh
- 2FA

  https://docs.github.com/en/github/authenticating-to-github/securing-your-account-with-two-factor-authentication-2fa

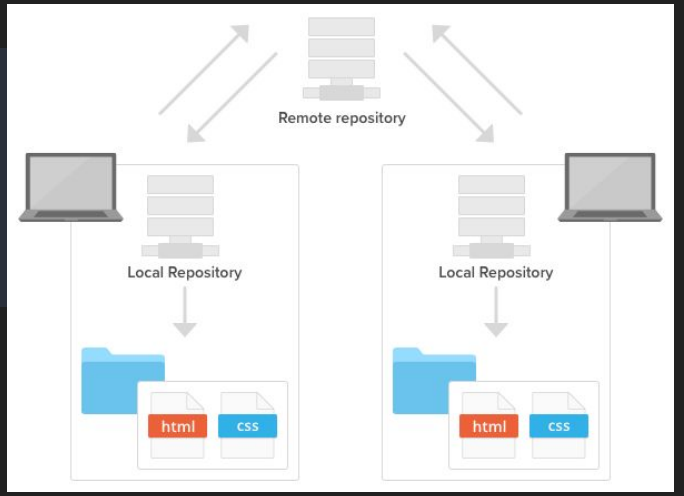
- http

configure your settings

```
git init
git config --global user.name "Paul Z. Cheng"
git config --global user.email
paul.z.cheng@gmail.com
git config --global core.editor atom
```

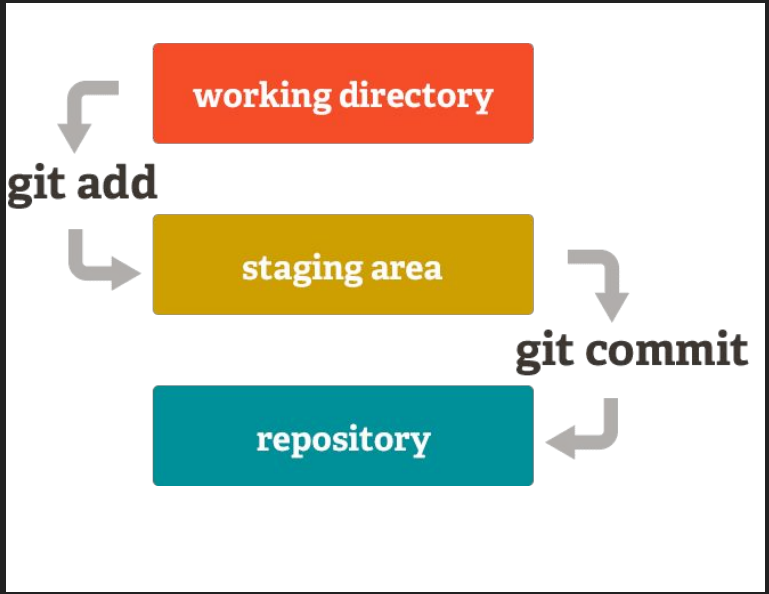
set up your repository

```
## Clone a directory
git clone < git URL >
# ..... some awesome code session later and as above
# git remote setup
git remote add origin <Remote URL>
```



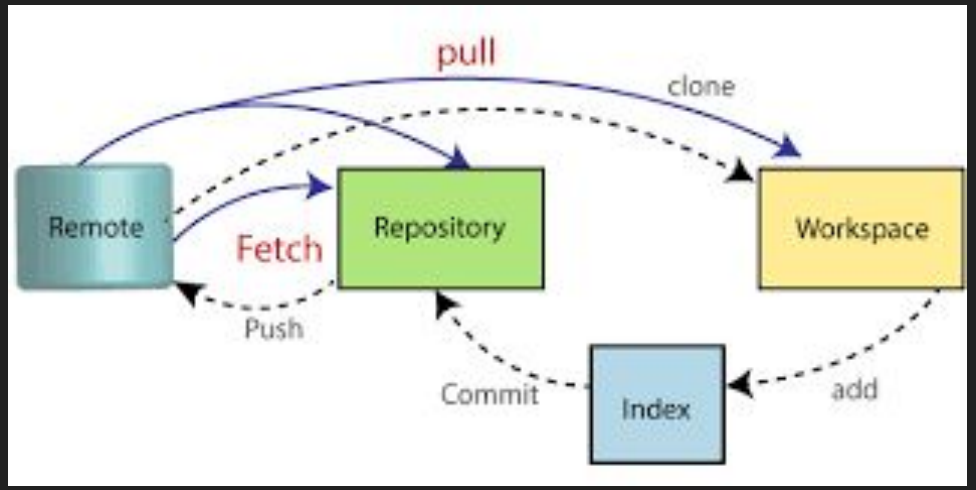
Daily edited and saving

```
## some awesome coding and editing of your working area later
# check working area has any need to update
git status

# Stage files
git add "file names"
git add .

# everything that has been changed
# Commit related to "document your add"
git commit -m "xx files update"
# change message
git commit -amend -m "change"

# check out commits
git log
```



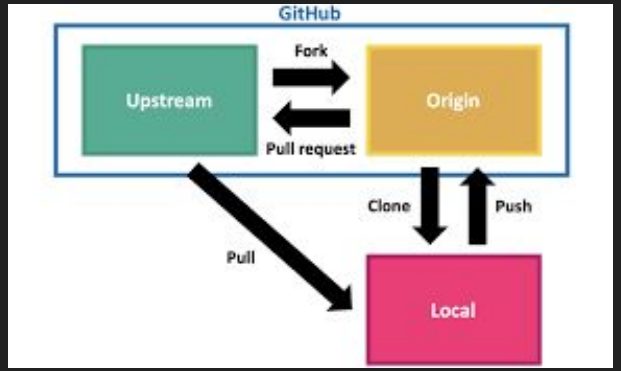
Push and pull

```
# fetch method
git fetch origin master
# solve conflict or not
git merge origin master

# Pull method
git pull origin master
# update remote
git push master origin
```



Exercise to setup remote connection with master

```
# after you set everything up with your own fork
git remote add upstream https://github.com/paul30402/gitasktic.git

# solve merge conflict if you did something different to master
git fetch upstream/master
git diff upstream/master master
git merge upstream/master master

# push it to your own fork
git checkout master
git push master origin
```

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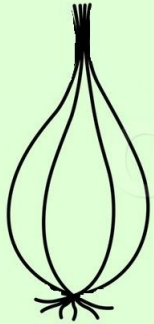
Onion

Git is a
Persistent Map

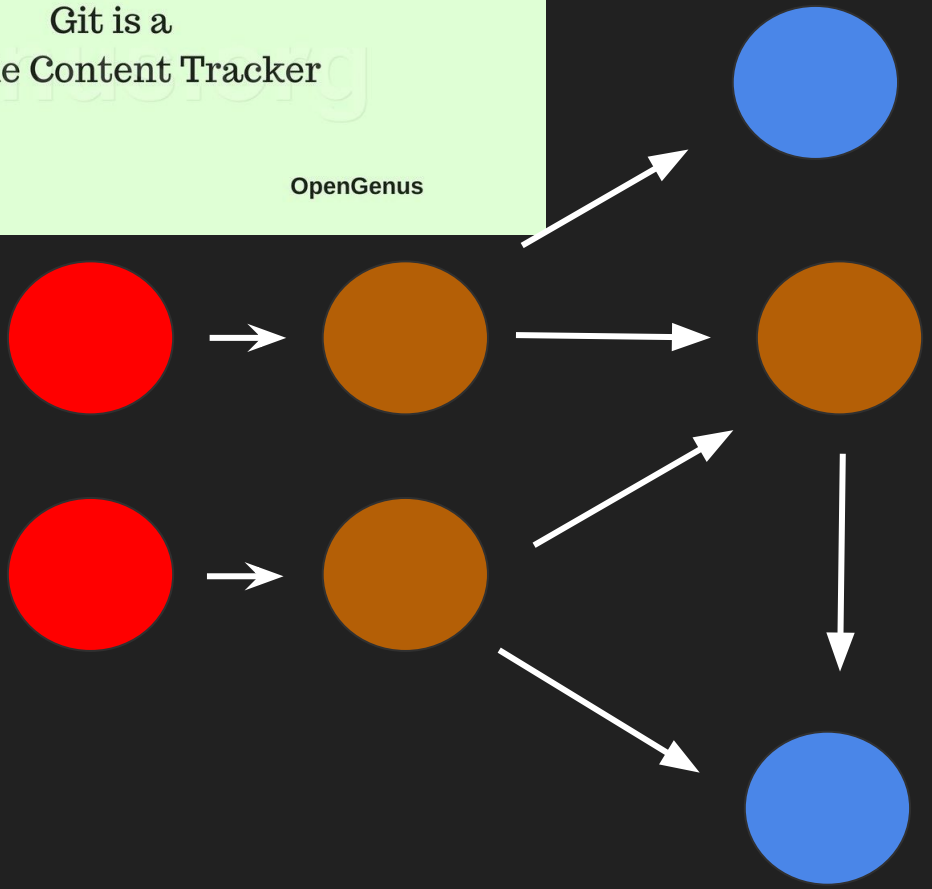
OpenGenus

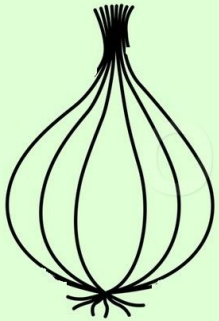
e884135b2103c673e876e850879539079033e670



Git is a
Simple Content Tracker

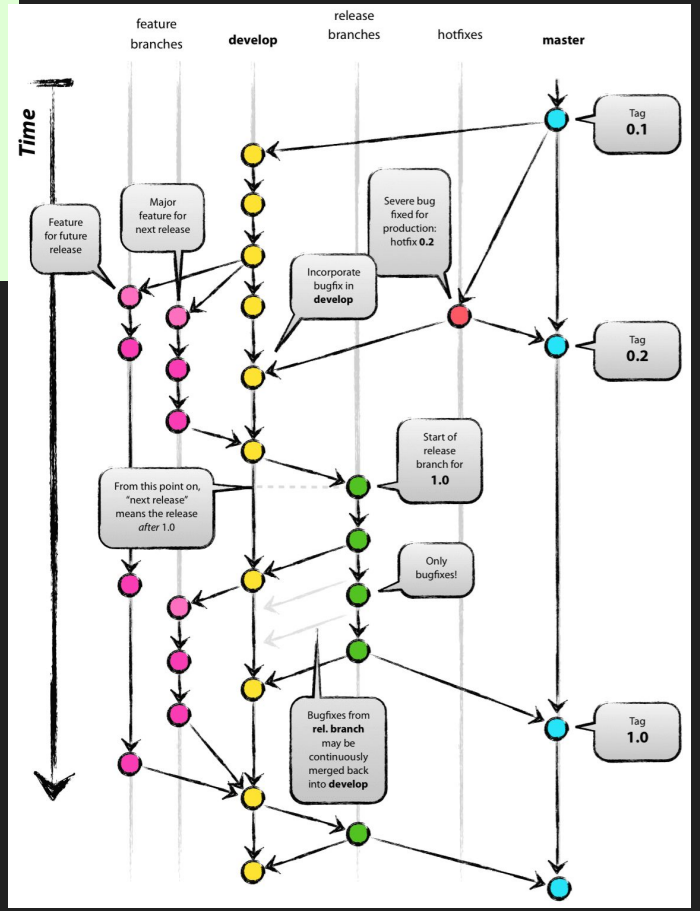
OpenGenus

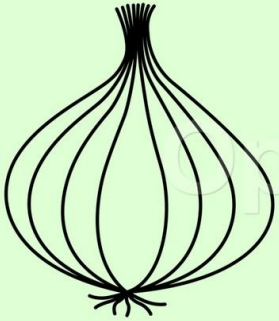




Git is a Revision Control System

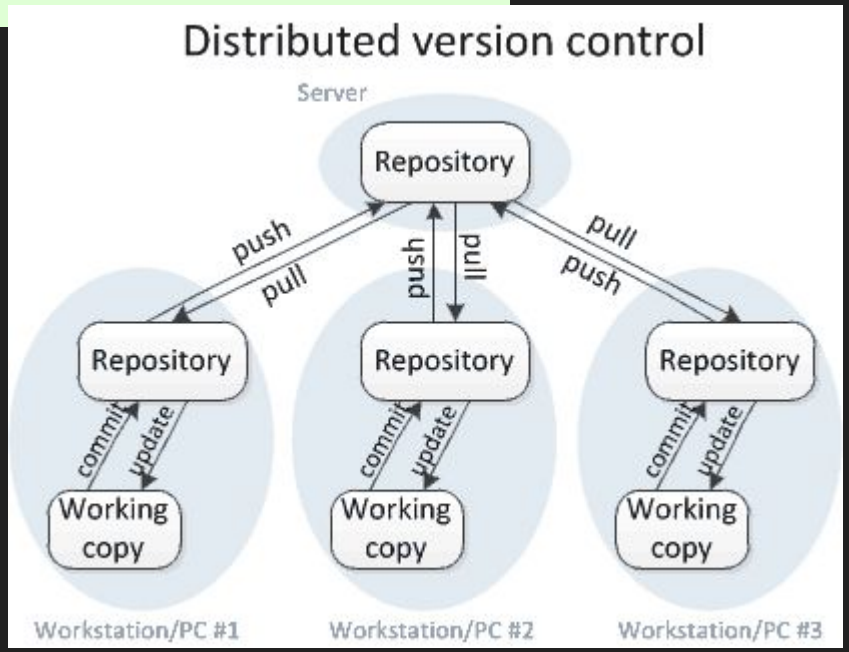
OpenGenus





Git is a
Distributed Revision Control System

OpenGenus

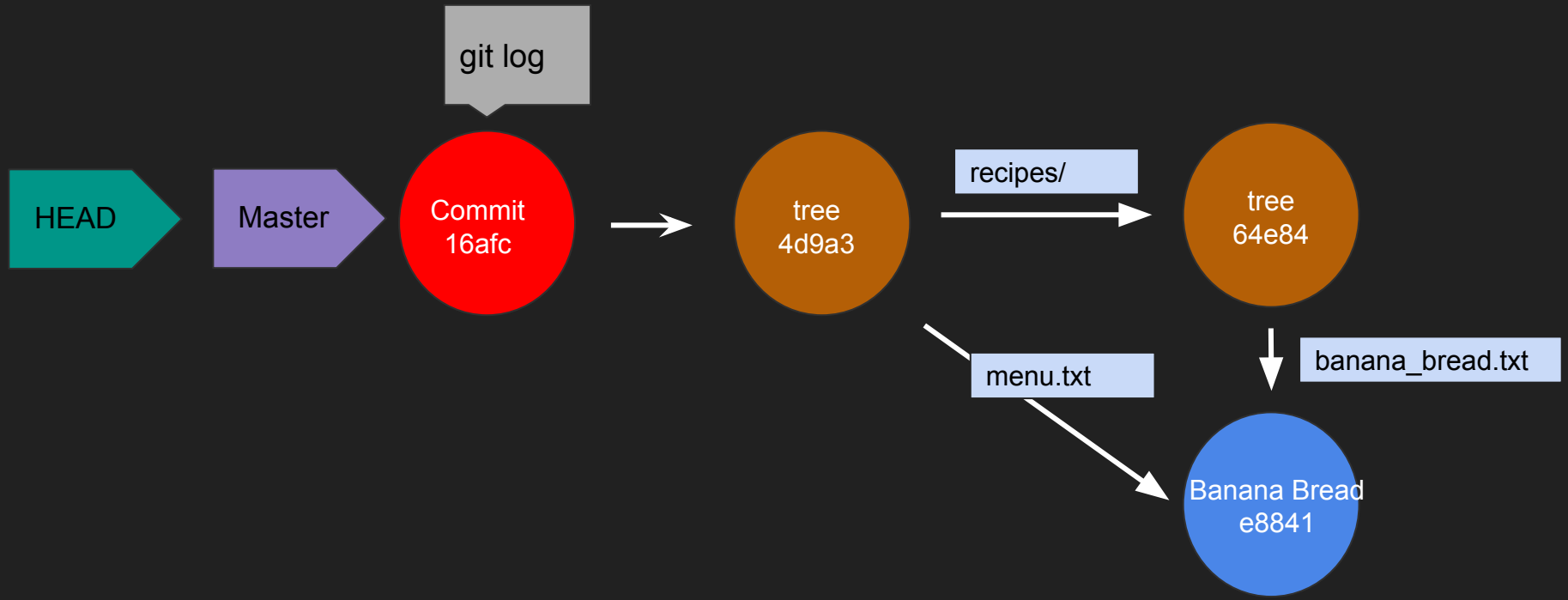


Flow with log

Review the blob blob blob blob

blob
e884135b2103c673e876e850879539079033e670

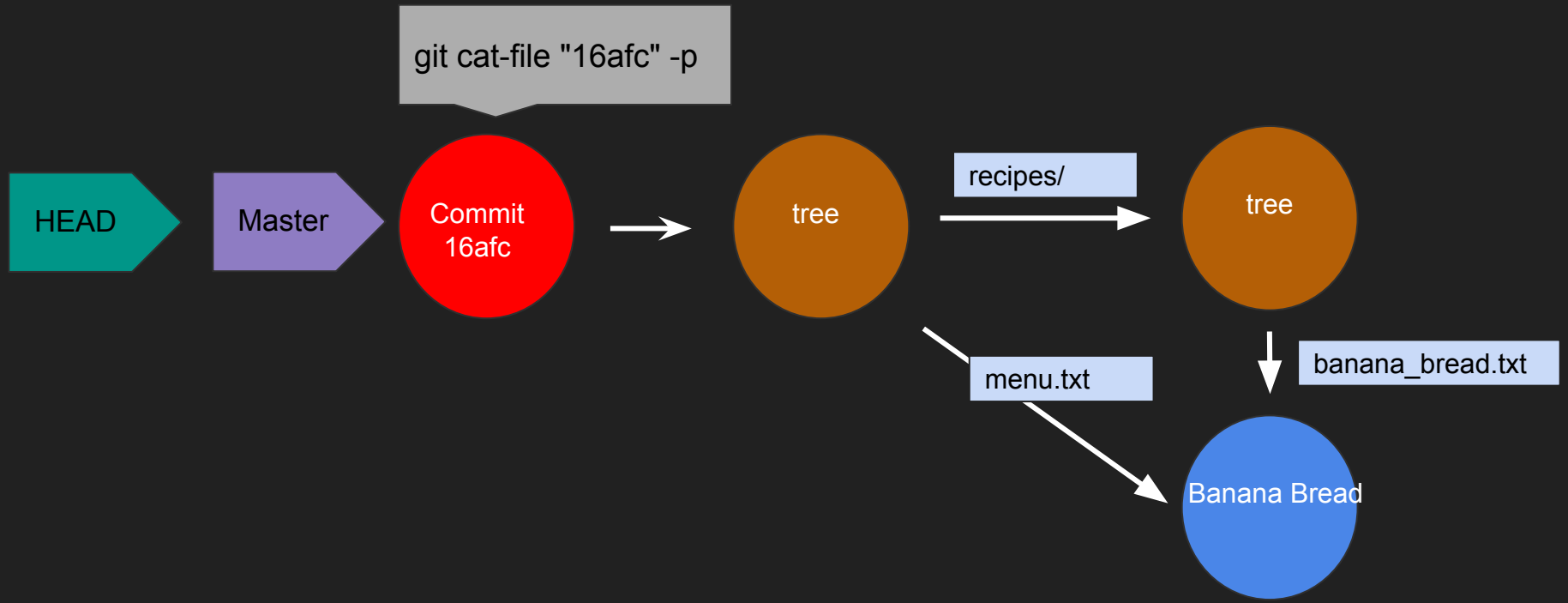
git commit : Tree and blob



```
git init
git log
```

```
commit 16afc70b0211807255c00e9ac7d5bee648075a43 (HEAD -> master)
Author: Paul Z. Cheng <paul.z.cheng@gmail.com>
Date:   Sat May 8 15:00:49 2021 +0800

    initial commit
```

git commit : Tree and blob



What is inside of initial commit

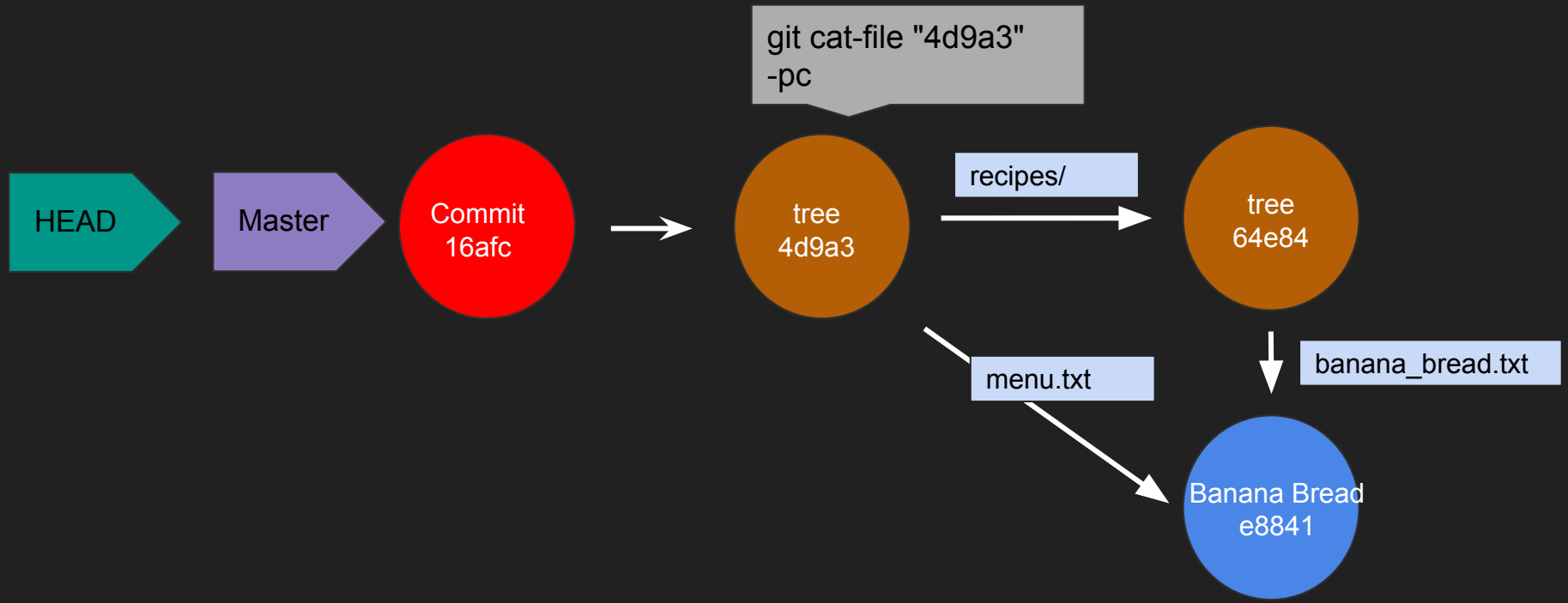
```
git cat-file "16afc70" -t
```

```
commit
```

```
git cat-file "16afc70" -p
```

```
tree 4d9a300bc821b3cb30ef3ae9e63d48f22cf0bc6c
author Paul Z. Cheng <paul.z.cheng@gmail.com> 1620457249 +0800
committer Paul Z. Cheng <paul.z.cheng@gmail.com> 1620457249 +0800

initial commit
```

git commit : Tree and blob



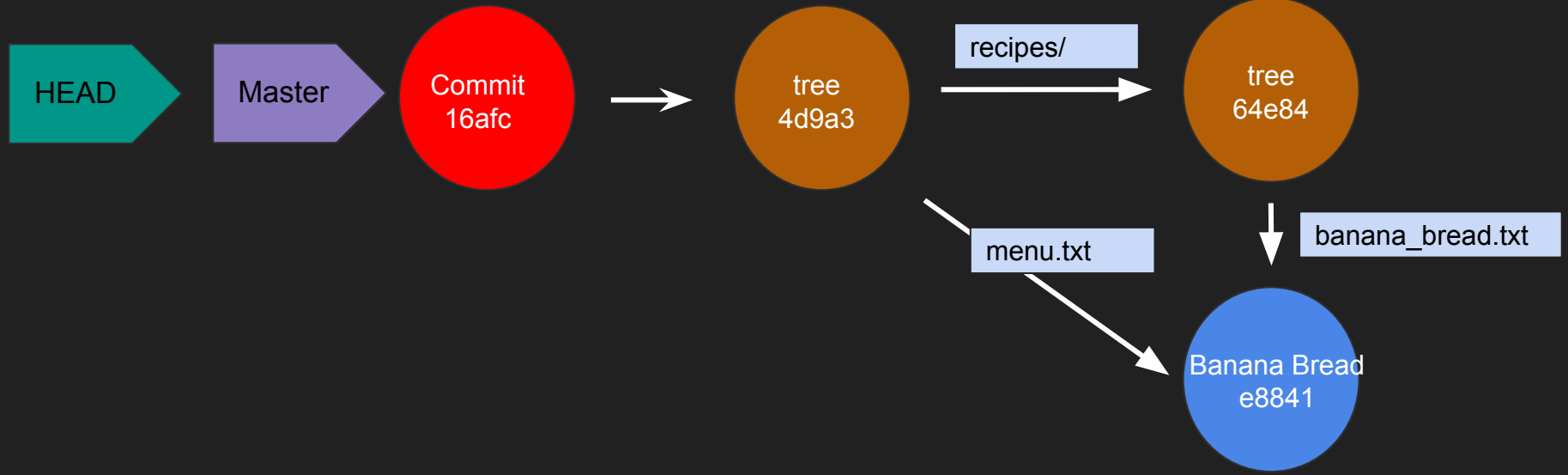
```
git cat-file "4d9a3" -t
```

```
tree
```

```
git cat-file "4d9a3" -p
```

```
100644 blob e884135b2103c673e876e850879539079033e670  menu.txt
040000 tree 64e841cef75b1b1c4f9a5fe8e0e0559e8d806842  recipes
```

git commit : Tree and blob



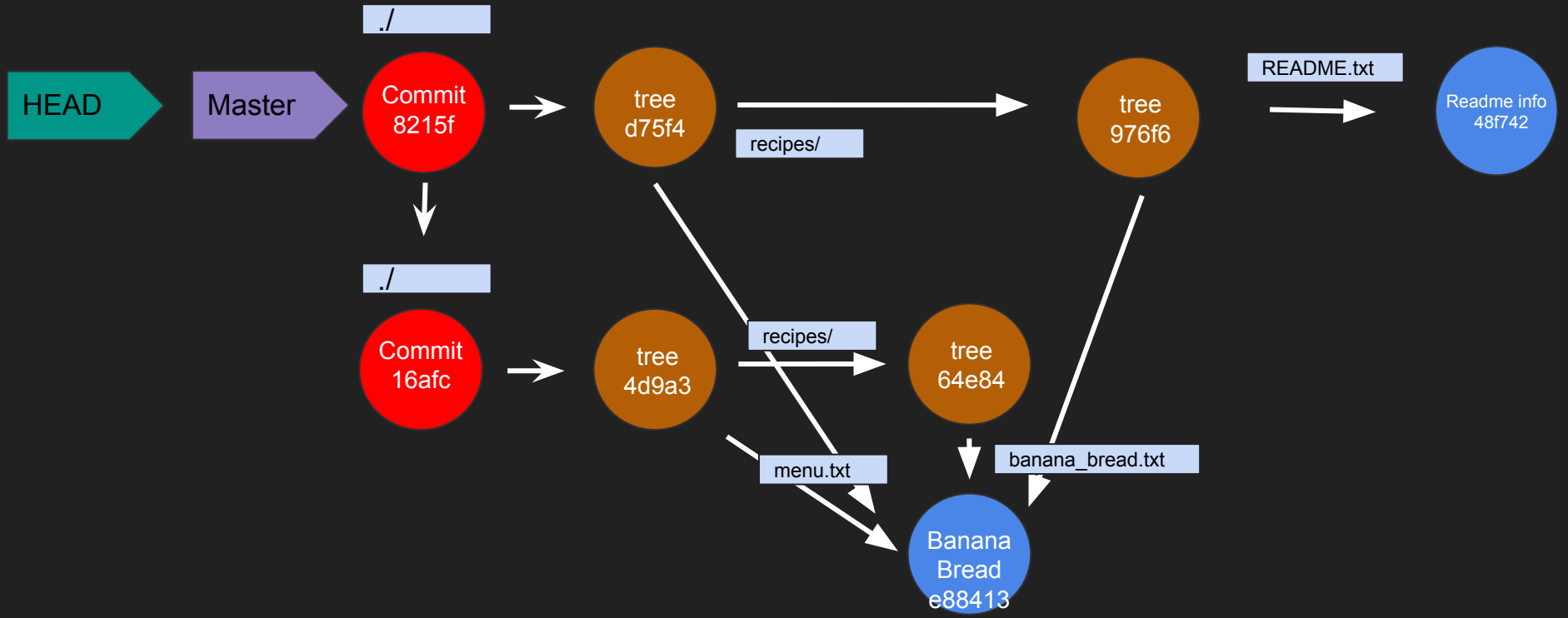
Add some changes to README file

```
git commit -m "Add descriptor README file"
```

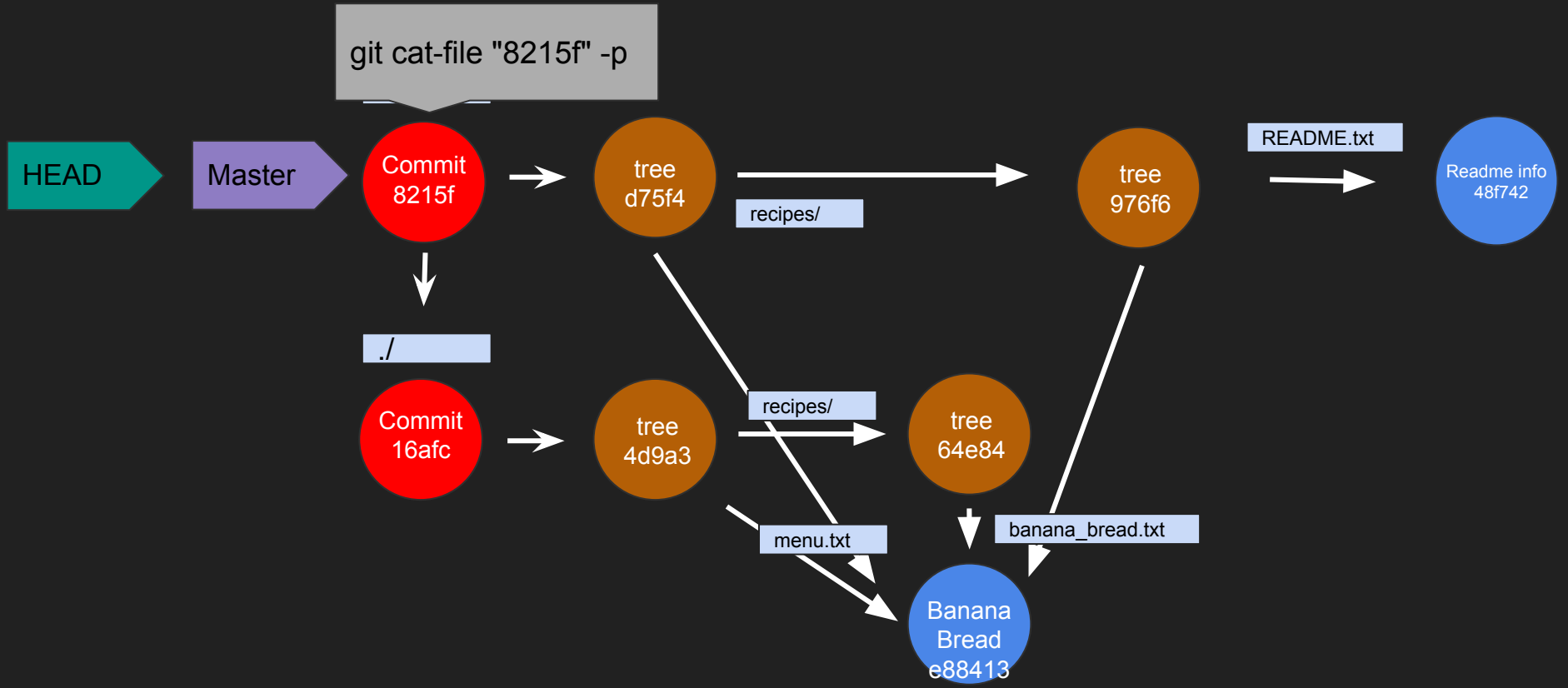
```
git log
```

```
commit 8215f3b135223478fbde164d42b20263110d8739  (HEAD, master)
Author: Paul Z. Cheng <paul.z.cheng@gmail.com>
Date:   Sat May 8 15:18:41 2021 +0800

    Add descriptor README file

commit 16afc70b0211807255c00e9ac7d5bee648075a43
Author: Paul Z. Cheng <paul.z.cheng@gmail.com>
Date:   Sat May 8 15:00:49 2021 +0800

    initial commit
```

Commit README.txt



Commit README.txt



```
git cat-file "8215f" -p
```

```
tree d75f44bf1fb72cde2479ba4fc68b269b37a92298
parent 16afc70b0211807255c00e9ac7d5bee648075a43
author Paul Z. Cheng <paul.z.cheng@gmail.com> 1620458321 +0800
committer Paul Z. Cheng <paul.z.cheng@gmail.com> 1620458321 +0800

Add descriptor README file
```

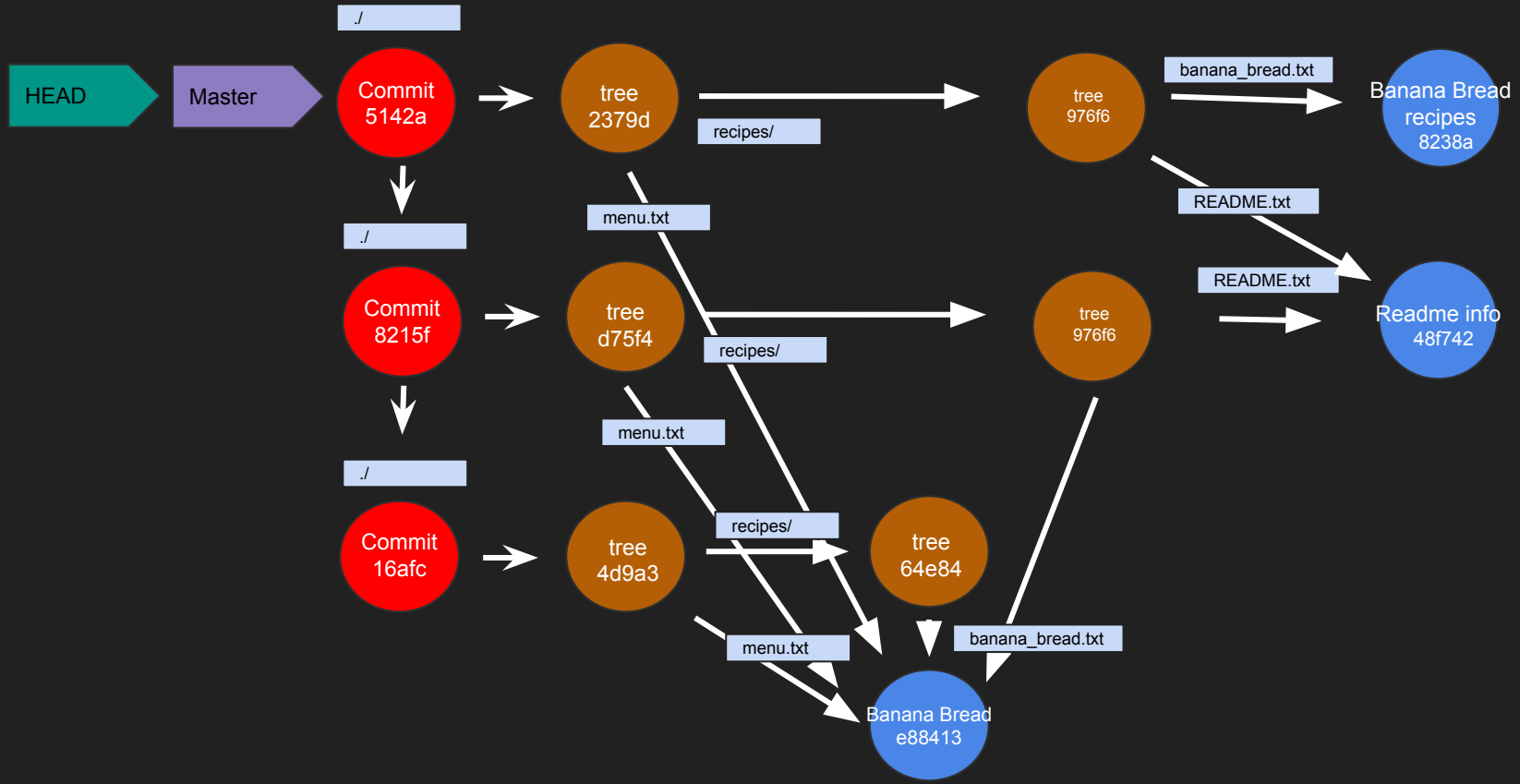
Add banana bread recipe

```
git add banana_bread.txt
git commit -m "paul's banana_bread recipe"
```

Banana Bread

3 ripe bananas
1/3 cup melted unsalted butter
1 teaspoon baking soda
1 pinch of salt
3/4 cup sugar
1 egg
1 teaspoon vanilla extract
3/2 cups all-purpose flour

Commit add banana_bread.txt recipes



Annotated tag

```
git tag -a mytag
# check out tag
git tag
```

```
mytag
```

tag is saved inside of .git/refs/tags/mytag with flowing sha1
386d6273736b896086867f6439bc536920735594

tag is store inside the .git/refs/tags

```
.
├── branches
├── COMMIT_EDITMSG
├── config
├── description
├── HEAD
├── hooks
├── index
├── info
├── logs
├── objects
└── refs
    ├── heads
    │   └── master
    └── tags
        └── mytag
```

Annotated tag, What is inside the tag

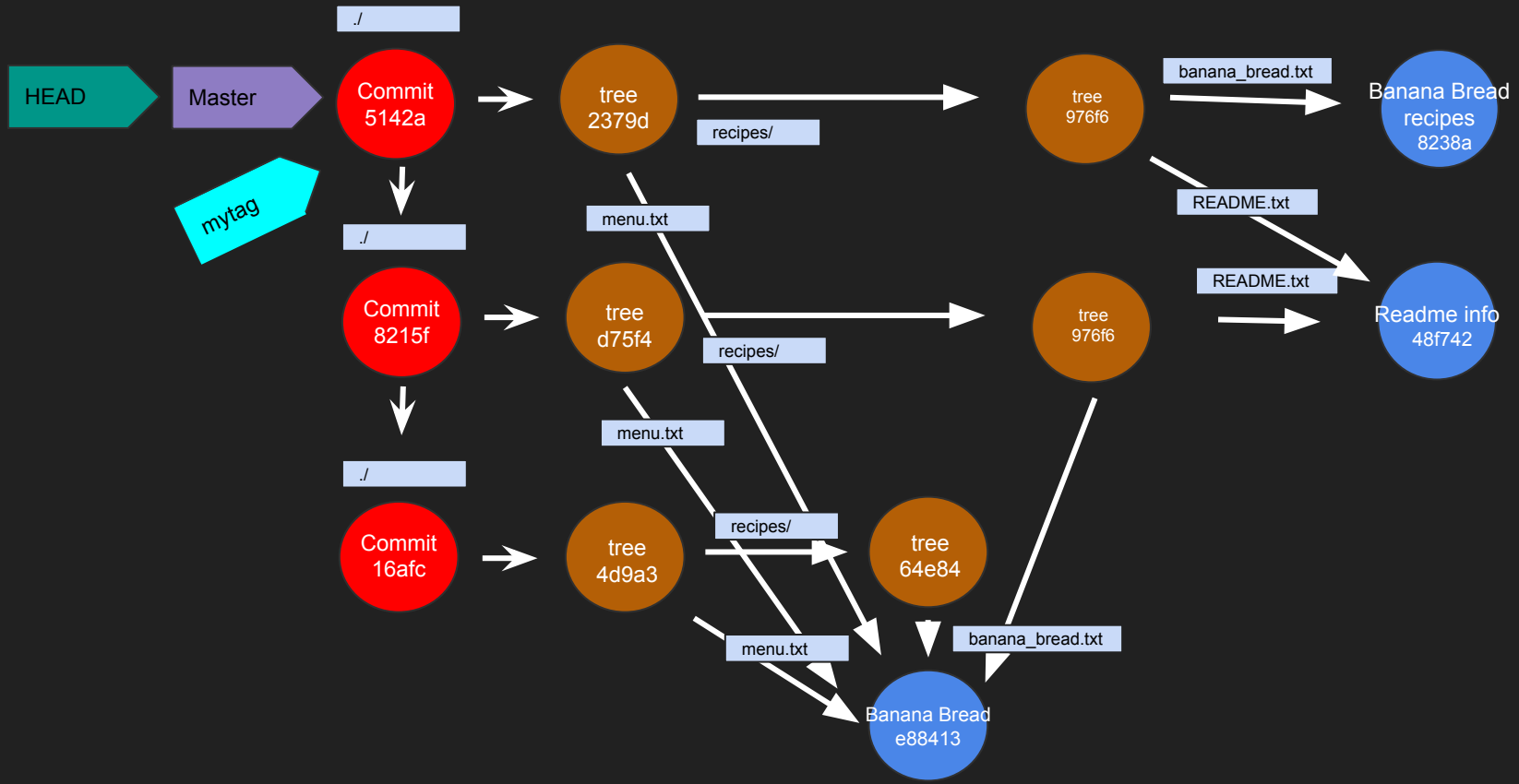
```
git cat-file "386d62" -p
```

```
object 5142a9653e8795ae428751c70782d9673d5bce41
type commit
tag mytag
tagger Paul Z. Cheng <paul.z.cheng@gmail.com> 1620564511 +0800

my tag
```

```
git cat-file "5142a" -p
```

```
tree 2379dc77acaa599e55b713f128b34f9dc9cbce25
parent 8215f3b135223478fbde164d42b20263110d8739
author Paul Z. Cheng <paul.z.cheng@gmail.com> 1620459827 +0800
committer Paul Z. Cheng <paul.z.cheng@gmail.com> 1620459827 +0800

paul's banana_bread receipt
```

Annotated Tag

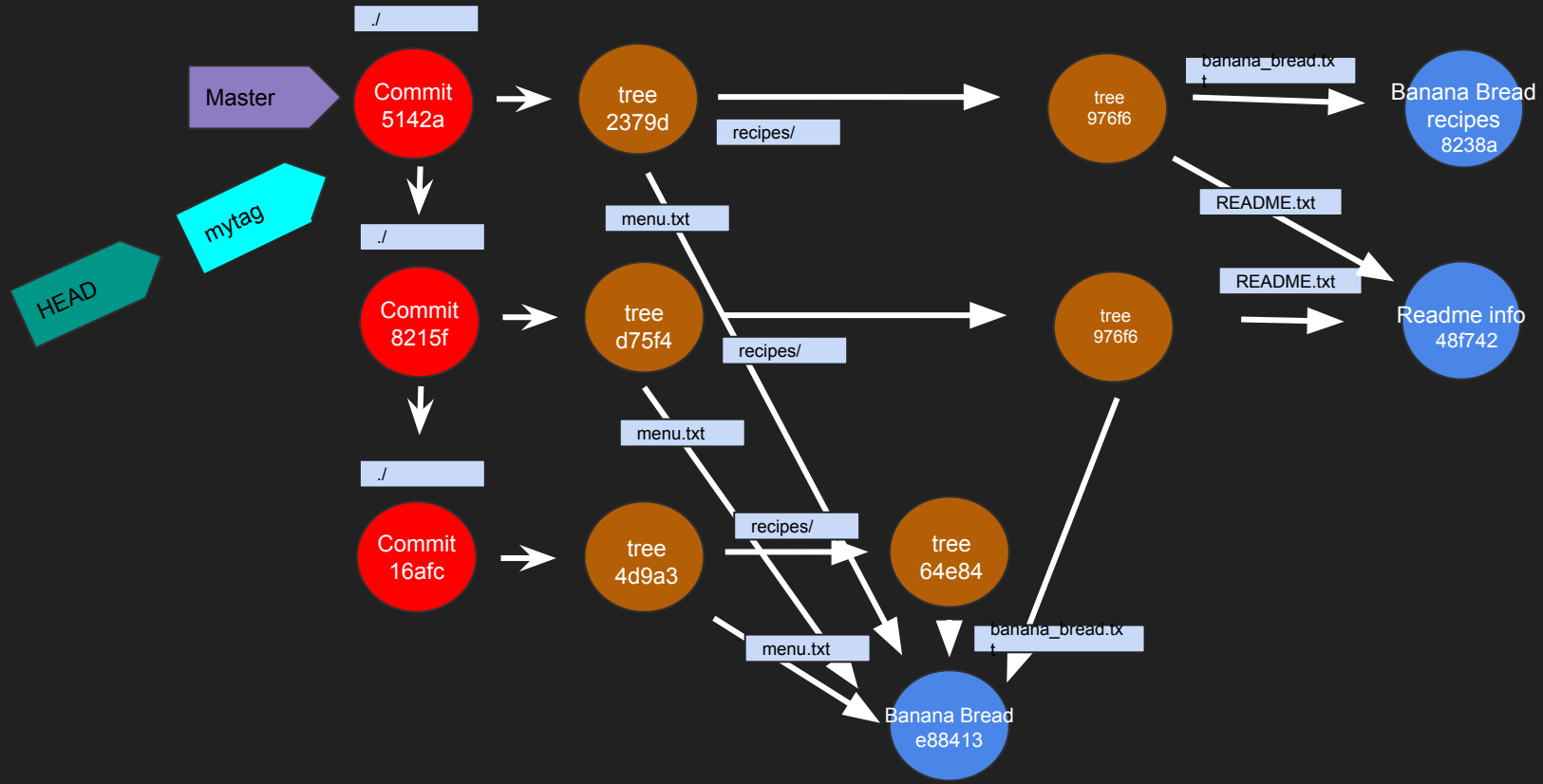


Similar to detached head

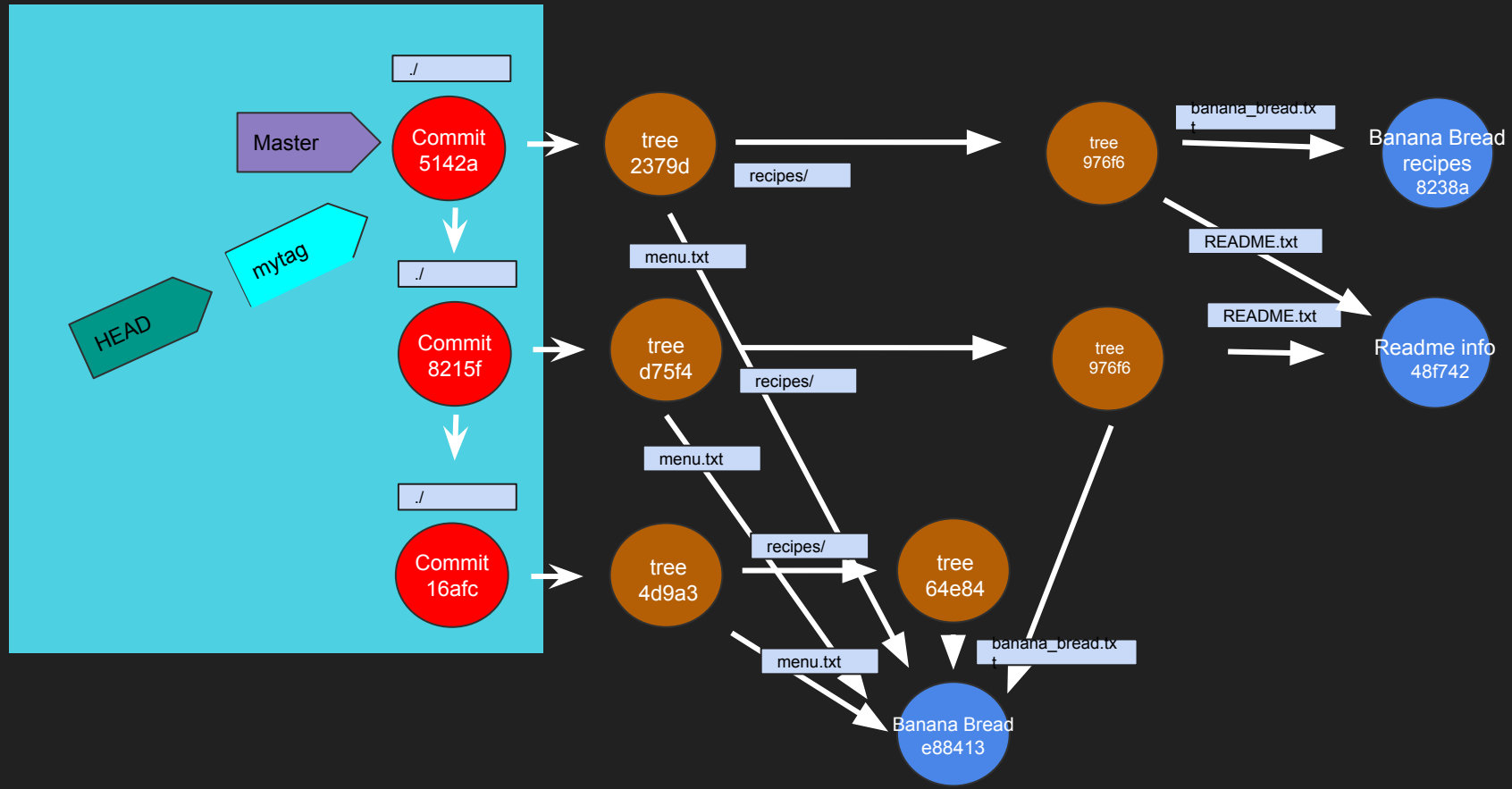
```
git checkout mytag
```

```
You are in 'detached HEAD' state. You can look around, make experimental
changes and commit them, and you can discard any commits you make in this
state without impacting any branches by switching back to a branch.

If you want to create a new branch to retain commits you create, you may
do so (now or later) by using -c with the switch command. Example:

  git switch -c <new-branch-name>

Or undo this operation with:

  git switch -

Turn off this advice by setting config variable advice.detachedHead to false

HEAD is now at 5142a96 paul's banana_bread recipt
```

Detached head checkout tag

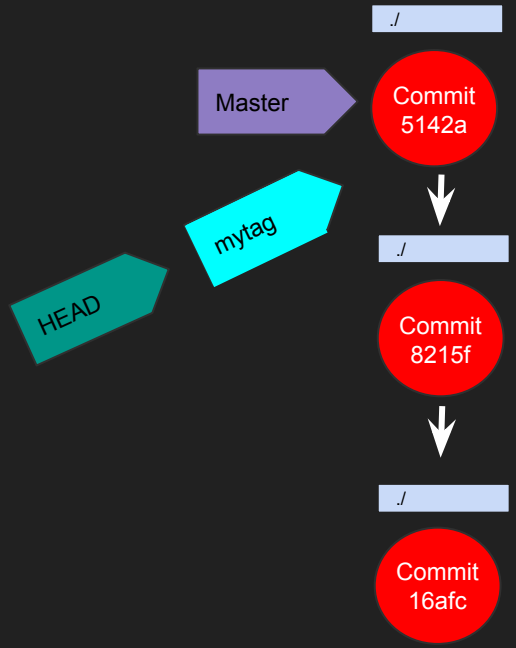


git log


./
Master
Commit
5142a
tree
2379d
recipes/
tree
976f6
banana_bread.tx
t
Banana Bread
recipes
8238a
README.txt
mytag
./
menu.txt
HEAD
Commit
8215f
tree
d75f4
recipes/
tree
976f6
README.txt
Readme info
48f742
menu.txt
./
Commit
16afc
tree
4d9a3
recipes/
tree
64e84
banana_bread.tx
t
menu.txt
Banana Bread
e88413

git log

```
commit 5142a9653e8795ae428751c70782d9673d5bce41 (Head, tag: mytag, master)
Author: Paul Z. Cheng <paul.z.cheng@gmail.com>
Date:   Sat May 8 15:43:47 2021 +0800

    paul's banana_bread recipe

commit 8215f3b135223478fbde164d42b20263110d8739
Author: Paul Z. Cheng <paul.z.cheng@gmail.com>
Date:   Sat May 8 15:18:41 2021 +0800

    Add descriptor README file

commit 16afc70b0211807255c00e9ac7d5bee648075a43
Author: Paul Z. Cheng <paul.z.cheng@gmail.com>
Date:   Sat May 8 15:00:49 2021 +0800

    initial commit
```



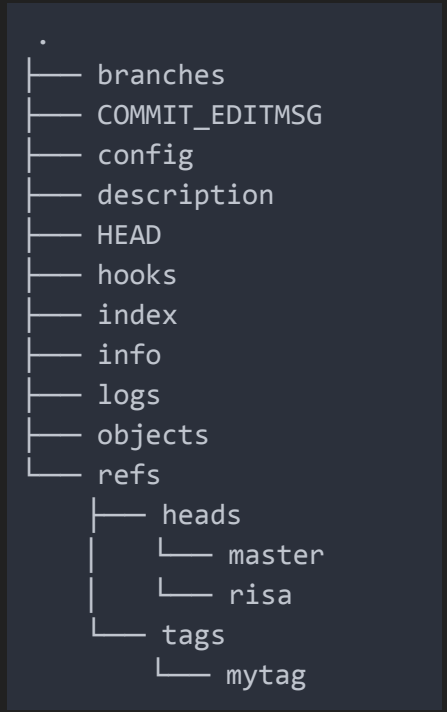
Branching visualization

```
git checkout master
git branch risa
"make some changes to banana bread.txt"
git add banana_bread.txt
git commit -m "Risa's recipe."
```

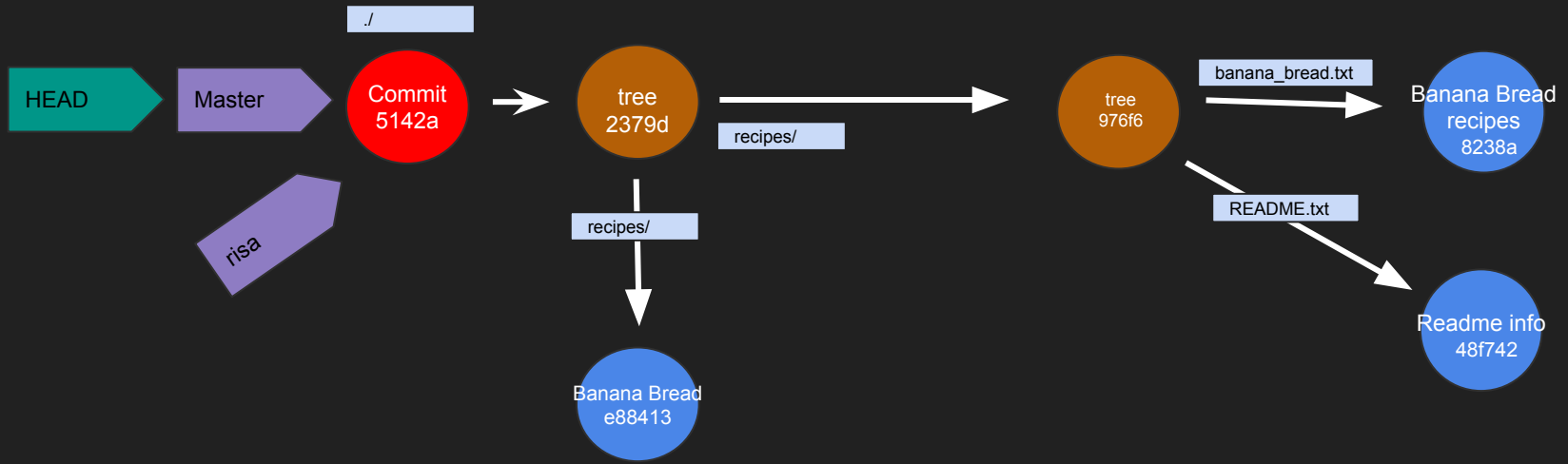
Banana Bread

4 ripe bananas
1/3 cup melted unsalted butter
1 teaspoon baking soda
1 pinch of salt
2 cup sugar
2 egg
1 teaspoon vanilla extract
3/2 cups all-purpose flour

risa branch is store inside the .git/refs/heads



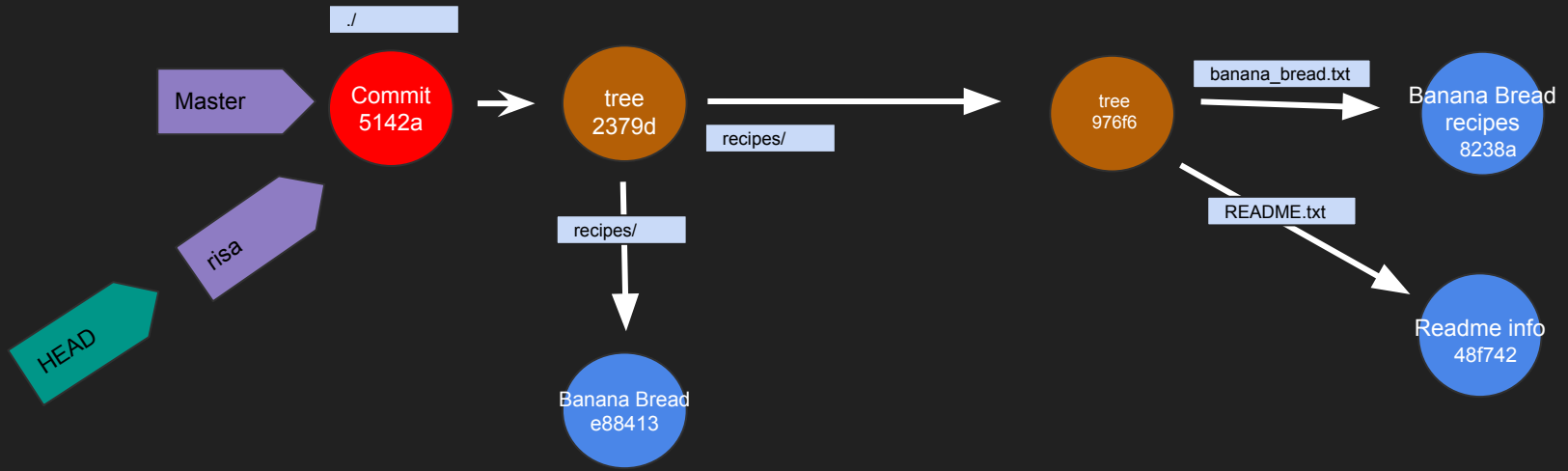
git branch risa



Branching

Creating a tag with reference to commit

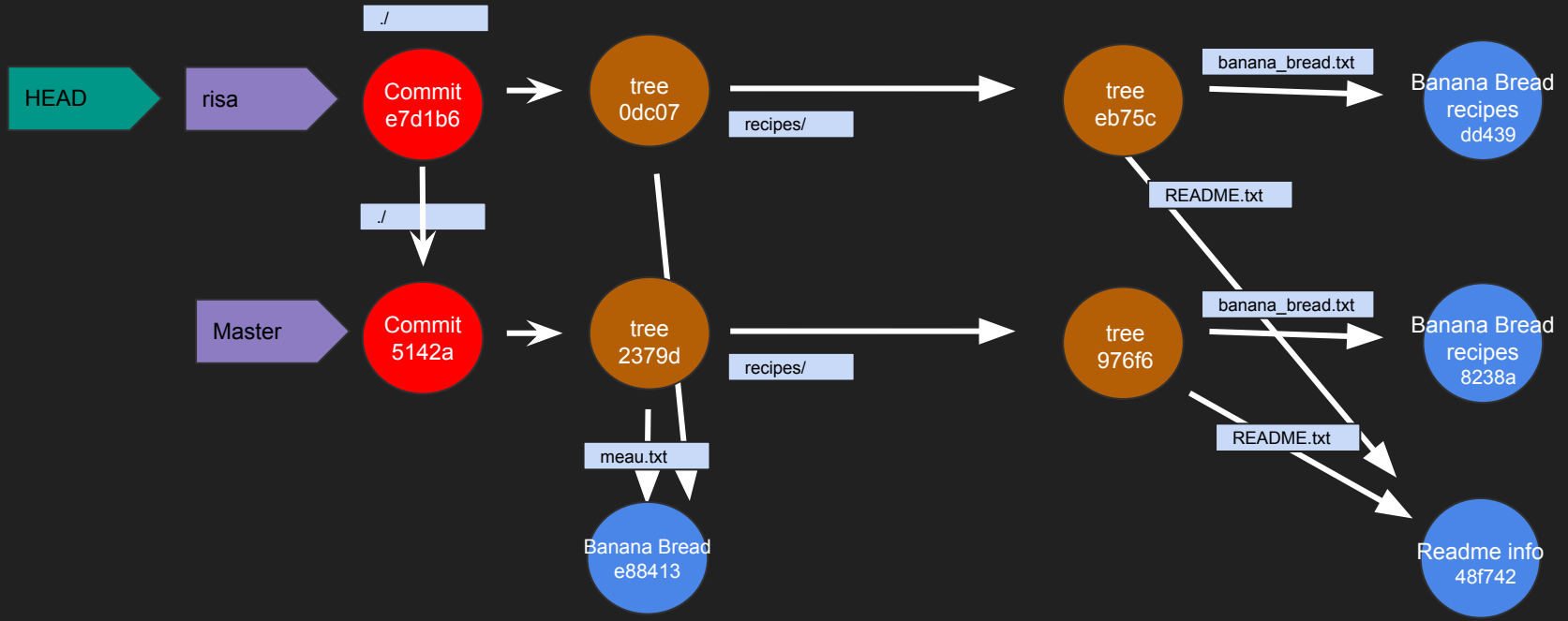
git checkout risa



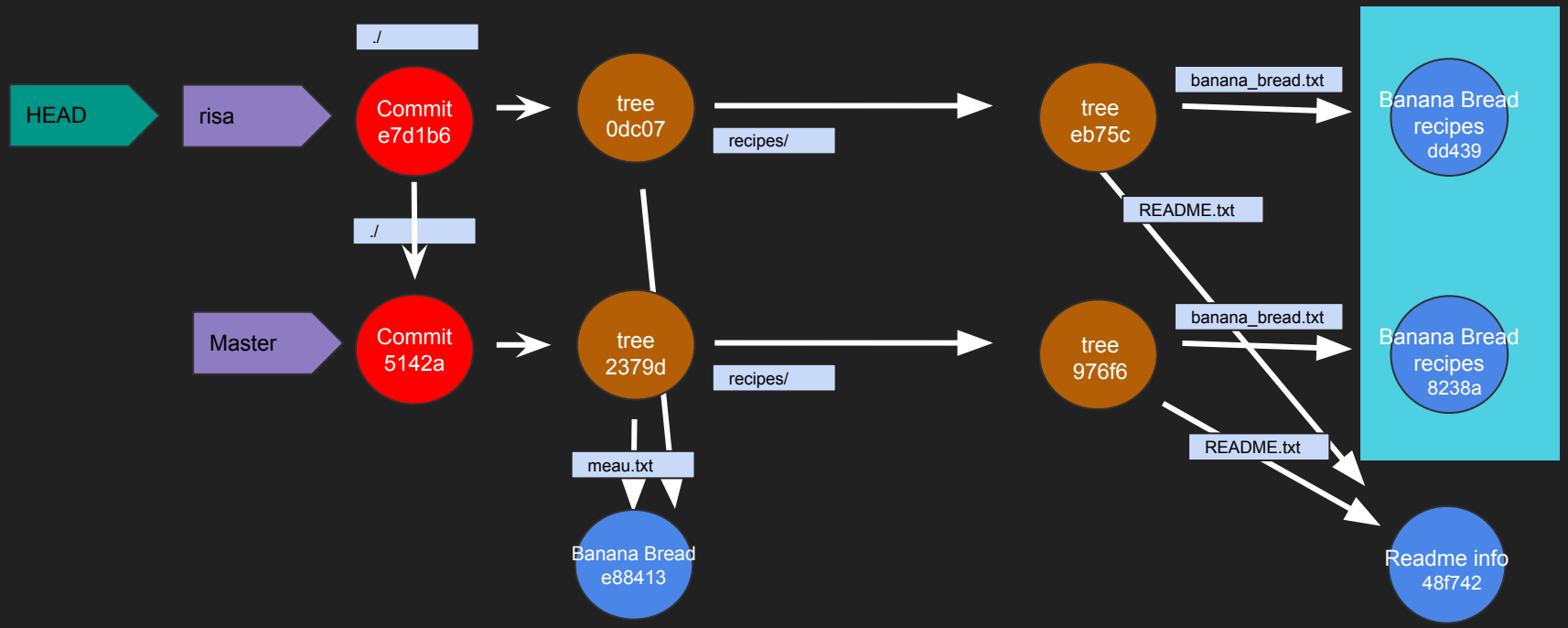
Branching

Moving Head to referencing to a branch or commit

git commit -m "Risa's recipe."



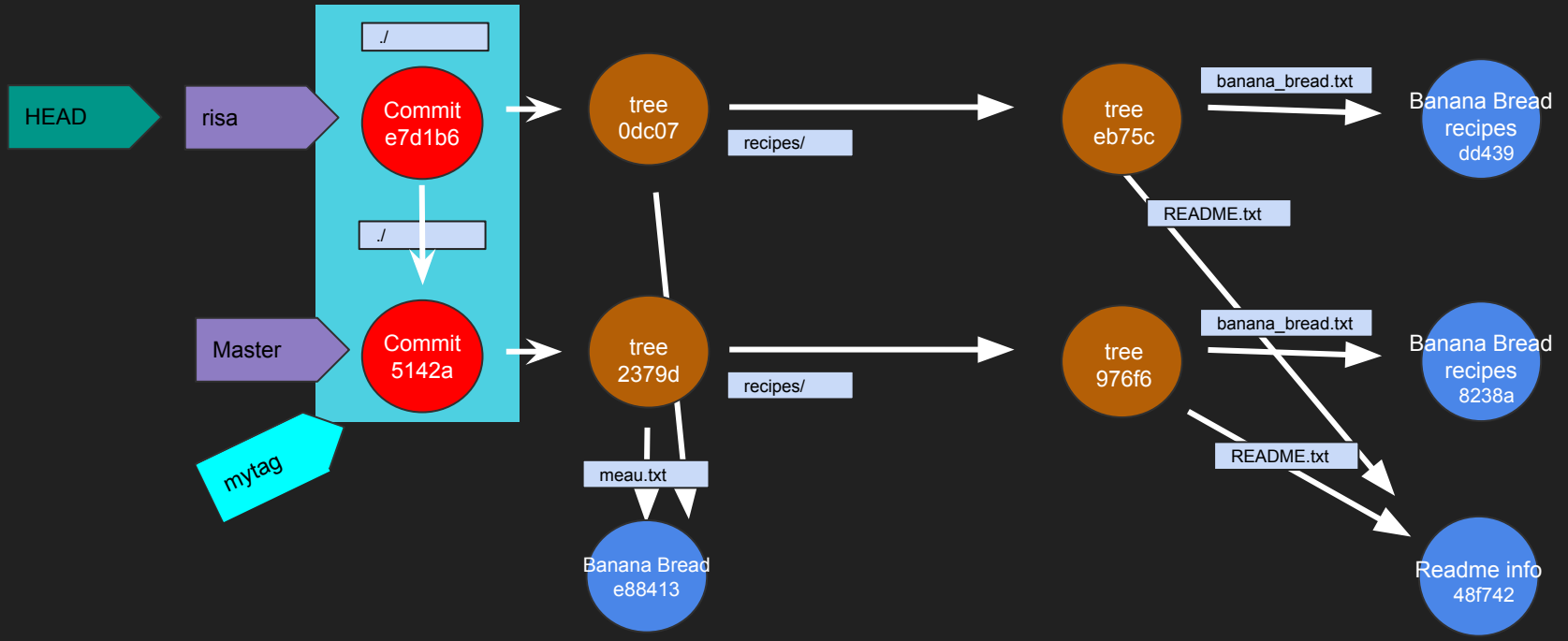
git diff risa master



git diff risa master

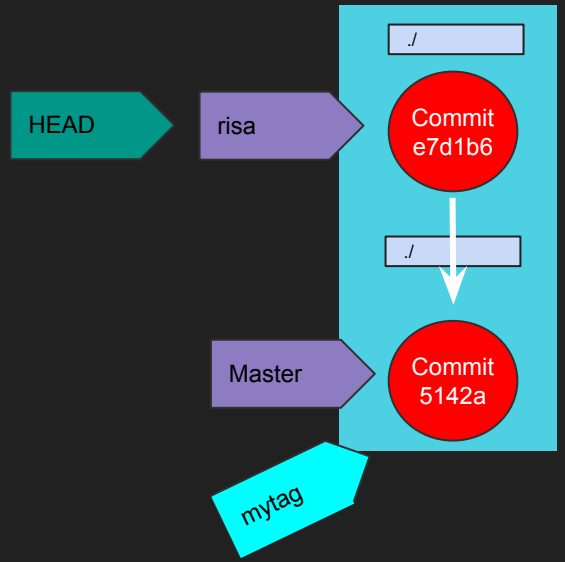
```
diff --git a/recipes/banana_bread.txt b/recipes/banana_bread.txt
index dd43918..8238a5e 100644
--- a/recipes/banana_bread.txt
+++ b/recipes/banana_bread.txt
@@ -1,10 +1,10 @@
 Banana Bread

-4 ripe bananas
+3 ripe bananas
 1/3 cup melted unsalted butter
 1 teaspoon baking soda
 1 pinch of salt
-2 cup sugar
-2 egg
+3/4 cup sugar
+1 egg
 1 teaspoon vanilla extract
 3/2 cups all-purpose flour
```

The relationship between risa and master



git log

```
commit e7d1b63cee8d473945c4794faebe8340d1257bb4 (HEAD -> risa)
Author: Paul Z. Cheng <paul.z.cheng@gmail.com>
Date:   Sun May 9 21:40:37 2021 +0800

    Risa's recipe.

commit 5142a9653e8795ae428751c70782d9673d5bce41 (tag: mytag, master)
Author: Paul Z. Cheng <paul.z.cheng@gmail.com>
Date:   Sat May 8 15:43:47 2021 +0800

    paul's banana_bread recipt
```



Resolving merge conflict.

When merging two branch, git tells us what to do next:
"Fix conflicts and then commit the result."

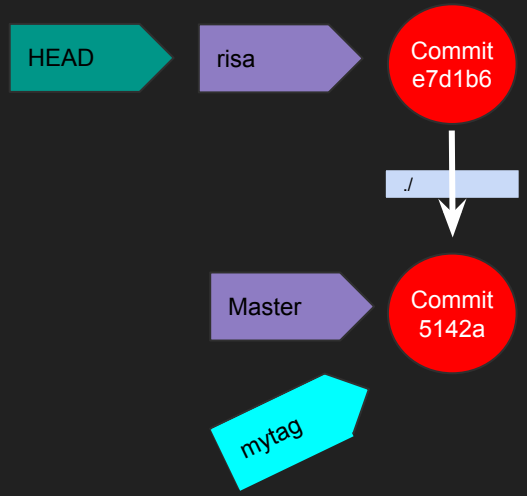
Step 1: Open the conflicted file and merge the changes with edits.

Step 2: Stage the change.

Step 3: Run **git commit** to finish the merge process.

Before continuing, you may run **git status** and read what it says.

Example



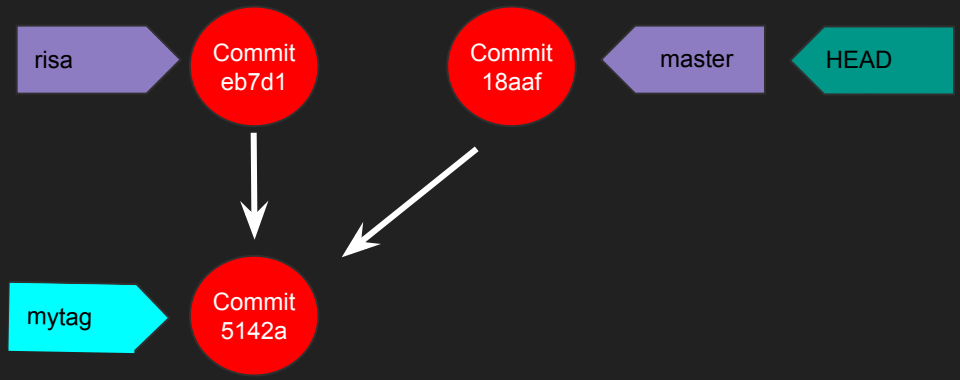
```
diff --git a/recipes/banana_bread.txt b/recipes/banana_bread.txt
index dd43918..8238a5e 100644
--- a/recipes/banana_bread.txt
+++ b/recipes/banana_bread.txt
@@ -1,10 +1,10 @@
 Banana Bread

-4 ripe bananas
+3 ripe bananas
 1/3 cup melted unsalted butter
 1 teaspoon baking soda
 1 pinch of salt
-2 cup sugar
-2 egg
+3/4 cup sugar
+1 egg
 1 teaspoon vanilla extract
 3/2 cups all-purpose flour
```

Make some changes to recipe

Banana Bread

3.5 ripe bananas
1/3 cup melted unsalted butter
1 teaspoon baking soda
1 pinch of salt
1 cup sugar
1 egg
1 teaspoon vanilla extract
3/2 cups all-purpose flour

```
git add .
git commit -m "New recipe after seen risa."
```



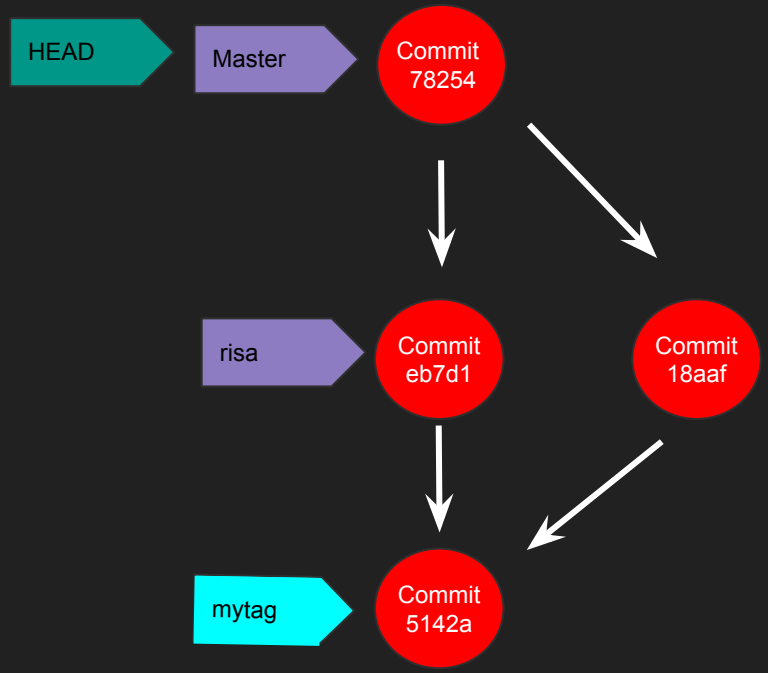
```
<<<<<<< HEAD
3.5 ripe bananas
1/3 cup melted unsalted butter
1 teaspoon baking soda
1 pinch of salt
1 cup sugar
1 egg
=======
4 ripe bananas
1/3 cup melted unsalted butter
1 teaspoon baking soda
1 pinch of salt
2 cup sugar
2 egg
>>>>>>> risa
1 teaspoon vanilla extract
3/2 cups all-purpose flour
```

save this

```
3.5 ripe bananas
1/3 cup melted unsalted butter
1 teaspoon baking soda
1 pinch of salt
1 cup sugar
1 egg
1 teaspoon vanilla extract
3/2 cups all-purpose flour
```

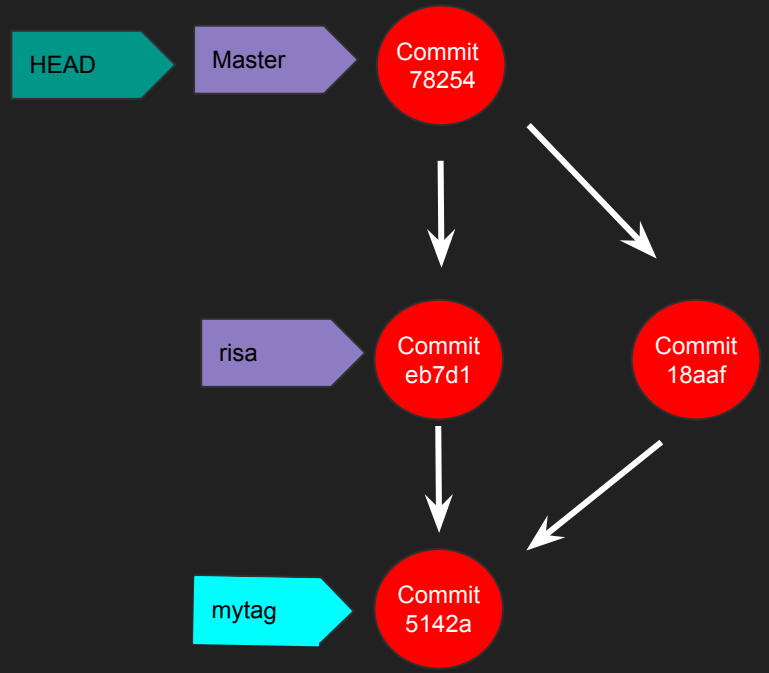
Merge conflict exercise

```
git add .
git commit -m "merge commit"
```



Wa la

```
commit 782546681f72e0c38c6d9fb9b6e2b505db0a7dda (HEAD -> master)
Merge: 18aaf3f e7d1b63
Author: Paul Z. Cheng <paul.z.cheng@gmail.com>
Date:   Mon May 10 11:03:34 2021 +0800

    merge commit

commit 18aaf3fc4dd2dc9abf95d58261e1a7415d26279d
Author: Paul Z. Cheng <paul.z.cheng@gmail.com>
Date:   Mon May 10 09:08:22 2021 +0800

    New recipe after seen risa.

commit e7d1b63cee8d473945c4794faebe8340d1257bb4 (risa)
Author: Paul Z. Cheng <paul.z.cheng@gmail.com>
Date:   Sun May 9 21:40:37 2021 +0800

    Risa's recipe.

commit 5142a9653e8795ae428751c70782d9673d5bce41 (tag: mytag)
Author: Paul Z. Cheng <paul.z.cheng@gmail.com>
Date:   Sat May 8 15:43:47 2021 +0800
```



Revert time exercise.

Step 1: setting up your repository with a python "MissNum.py" file.

(1) write a python function that find a missing number in a list

ex:

```
iter =  [0,1,2,4,5,6]
miss = miss_num_func(iter)
print(miss) # 3
```

(2) add and commit the changes

Step 2: Make some changes to "MissNum.py" file.

(1) write a python function that find missing numbers in a list
ex:

```
iter =  [0,1,2,4,5,6,8,9]]
miss = miss_num_func(iter)
for i in miss:
        print(i) # 3 7
```

(2) add and commit the changes after editing MissNum.py

Step 3: Reverting to step one and change file name.

(1) Check out Step 1
(2) Change the file name of MissNum.py to MissNum_2.py or cp.

Step 4: Create a new branch with reverted time step three.

(1) Make a new branch with name: revertime

Step 5: Merge branches

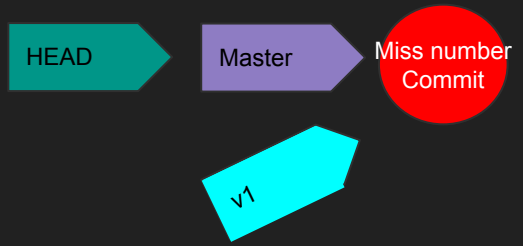
(1) Merge revertime with master

Results:

Master with MissNum.py and MissNum_2.py

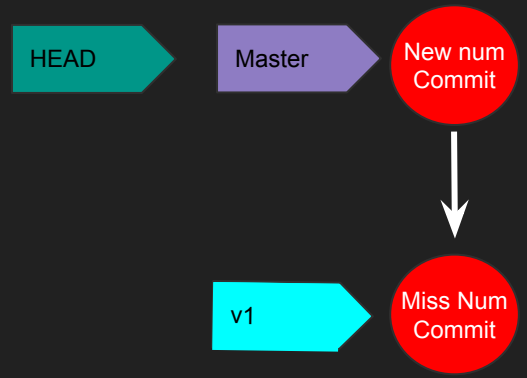
Miss number code and make a tag

```
git add miss_num.py
git commit -m "Missing number version I"
git tag v1
```



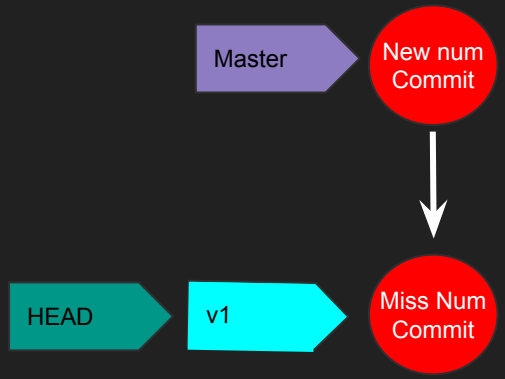
Update the function

```
git add miss_num.py
git commit -m "missing number takes in multiple missing
number."
```



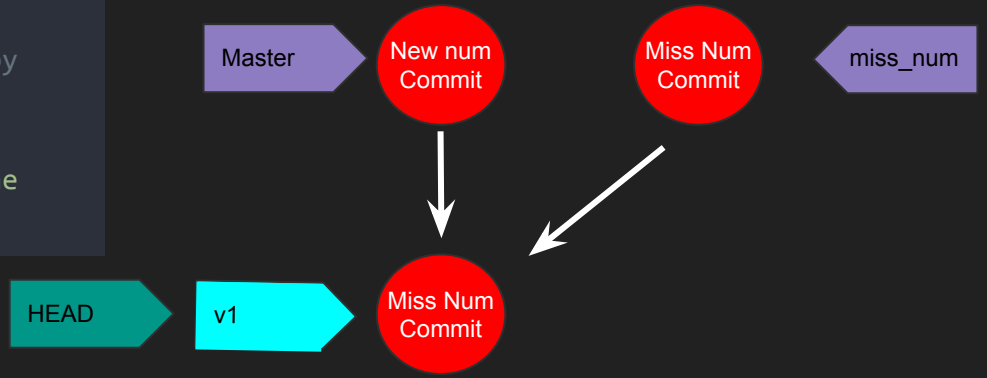
Checkout old tag, change name, create branch

```
git checkout v1
```



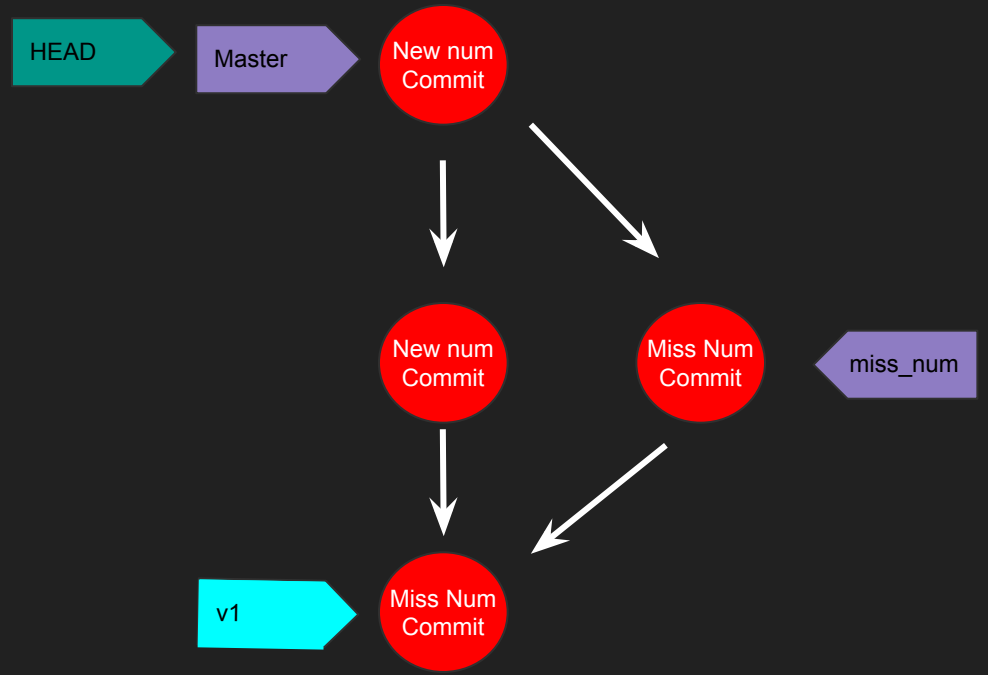
Create a new branch

```
git branch miss_num
mv miss_num_v1.py
atom miss_num_v1.py # add some comments in the .py file
git add miss_num_v1.py
git commit -m "Missing num version only detect one missing number"
```



Merge

```
git checkout master
git merge master miss_num

# ... moments later solving conflict
git add .
git commit -m "Merge commit with both missing number versions"
```



Check your log : log sharing

Team building exercise

Step 1: Pull the newest updated gitastic github from paul.

Step 2: Push the two function files into your fork

Step 3: Choose a partner to work and share each other fork and solve the merge conflict of the two function

Step 4: Create a new python function that incorporate both functions (Make sure to update each as you work.)

- **Able to run as independent file:"python miss_number.py"**
- **screen will print out: "Take in numbers:" and return missing value.**
  - **I expect to have if else statement in this.**
  - **if missing one number : print("There is one missing number : ***")**
  - **if multiple: print("there is multiple missing numbers : ***")**

Step 5: Send Paul a pull request with working miss_number.py.