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Git as I understand (6): Search

If you are working in a big open source project, like Linux kernel, you definitely need some search capability to get what you want. Even if you are doing some very small project, every once in a while, you forget where and when you make some change, you also need efficient way to find out where you are.

1. branch and tag

Within a repository, in the highest level, git organize artifacts via branch. Release points are only marked via "tag" and bug fix will happen on specific release branch. It is always a good idea to get a bird eye's view for a git repository before you dive into detail. Use Linux Kernel tree as an example: [luke@rmbp linux]\$ git branch -avv

```
* master                                1860e37 [origin/master] Linux 3.15
remotes/origin/HEAD                    -> origin/master
remotes/origin/linux-2.6.11.y          8e63197 Linux 2.6.11.12
remotes/origin/linux-2.6.12.y          d04a379 Linux 2.6.12.6
remotes/origin/linux-2.6.13.y          816e9c6 Linux 2.6.13.5
remotes/origin/linux-2.6.14.y          789f444 Linux 2.6.14.7
.....
remotes/origin/linux-2.6.38.y          4b7a6d2 Linux 2.6.38.8
remotes/origin/linux-2.6.39.y          ea0dc0d Linux 2.6.39.4
remotes/origin/linux-3.0.y             5dba9dd Linux 3.0.101
remotes/origin/linux-3.1.y            9bb1282 Linux 3.1.10
remotes/origin/linux-3.10.y            c2f7eb8 Linux 3.10.42
remotes/origin/linux-3.11.y            5ee54f3 Linux 3.11.10
remotes/origin/linux-3.12.y            80e7980 Linux 3.12.21
remotes/origin/linux-3.13.y            2d20120 Linux 3.13.11
.....
remotes/origin/master                  1860e37 Linux 3.15
```

Here we can see linux will have separate branch for a specific release. We can also specify a pattern to limit the branch output:

```
[luke@rmbp linux]$ git branch --list -avv *3.1*
remotes/origin/linux-3.1.y            9bb1282 Linux 3.1.10
remotes/origin/linux-3.10.y            c2f7eb8 Linux 3.10.42
remotes/origin/linux-3.11.y            5ee54f3 Linux 3.11.10
remotes/origin/linux-3.12.y            80e7980 Linux 3.12.21
remotes/origin/linux-3.13.y            2d20120 Linux 3.13.11
remotes/origin/linux-3.14.y            a1bc295 Linux 3.14.6
remotes/origin/linux-3.15.y            1860e37 Linux 3.15
```

Linux use "tag" to mark release. Here is all the tags:

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Linux From Scratch for ...  
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Linux From Scratch for ...  
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Linux From Scratch for ...  
Git as I understand (7): ...

Linux From Scratch for ...  
Git as I understand (5): ...

Linux From Scratch for ...  
Git as I understand (4): ...

Linux From Scratch for ...  
Git as I understand (3): ...

Linux From Scratch for ...  
Git as I understand (2): r...

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Git as I understand (1): ...

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Mac book pro 11.3 Linux...

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v2.6.12-rc3

v2.6.12-rc4

.....

We can also limit the tag list output with a "pattern":

```
[luke@rmbp linux]$ git tag --list v3.14.*
```

v3.14.1

v3.14.2

v3.14.3

v3.14.4

v3.14.5

v3.14.6

The linux kernel employs version format of "version-patch level-subpatch level-correction-extraversion". For example,

v2.6.17-rc6: version 2 patch level 6 subpatch level 17 extraversion rc6

v2.6.17.10: version 2 patch level 6 subpatch level 17 correction 10

For a specific commit/tag, we can ask git to list all branches which contains this commit/tag:

```
[luke@rmbp linux]$ git branch -avv --contains v3.8.9
```

```
remotes/origin/linux-3.8.y dbf932a Linux 3.8.13
```

```
[luke@rmbp linux]$ git branch -avv --contains v3.8
```

```
* master 1860e37 [origin/master] Linux 3.15
```

```
remotes/origin/HEAD -> origin/master
```

```
remotes/origin/linux-3.10.y 8537711 Linux 3.10.43
```

```
remotes/origin/linux-3.11.y 5ee54f3 Linux 3.11.10
```

```
remotes/origin/linux-3.12.y fe7b290 Linux 3.12.22
```

```
remotes/origin/linux-3.13.y 2d20120 Linux 3.13.11
```

```
remotes/origin/linux-3.14.y fce5b5f Linux 3.14.7
```

```
remotes/origin/linux-3.15.y 1860e37 Linux 3.15
```

```
remotes/origin/linux-3.8.y dbf932a Linux 3.8.13
```

```
remotes/origin/linux-3.9.y 896f500 Linux 3.9.11
```

```
remotes/origin/master 1860e37 Linux 3.15
```

```
[luke@rmbp linux]$ git branch -avv --contains v3.8.9
```

```
remotes/origin/linux-3.8.y dbf932a Linux 3.8.13
```

From the output, we can see the major linux kernel version like v3.8/v3.9 are tagged on master branch, while minor bug fix version like v3.8.9 are only tagged on specific release branch.

We can glean the time stamp information for all the tags, so we can draw a high level picture of Linux Kernel release schedule:

```
[luke@rmbp linux]$ git tag --list v3.1[34]-rc* > tags
```

```
[luke@rmbp linux]$ vi tags
```

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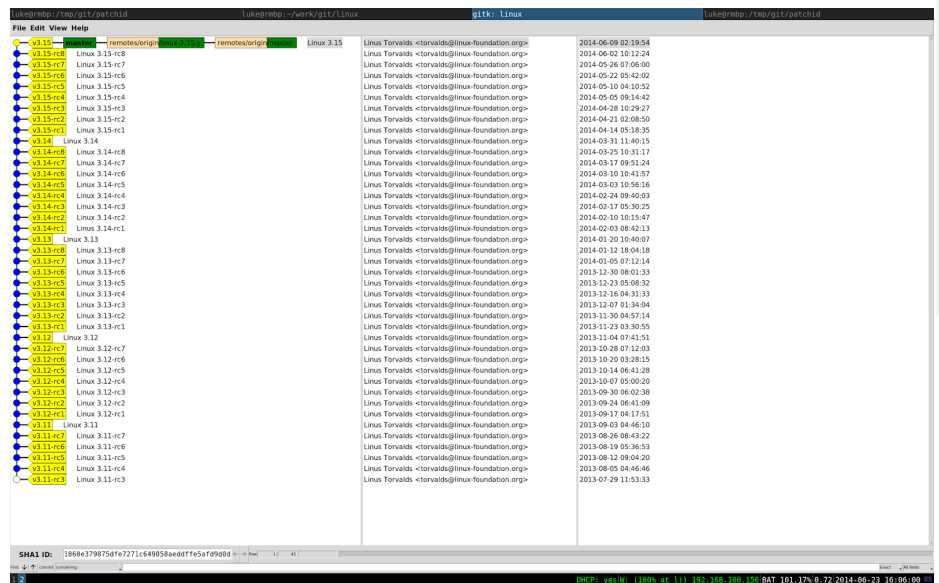
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to help us gain a summary view on project history. Use the Linux Kernel project for example again:

```
[luke@rmbp linux]$ gitk -all --simplify-by-decoration -n 40
```



[http://3.bp.blogspot.com/-](http://3.bp.blogspot.com/-Yh5iOYTth3A/U6fhWafzqRI/AAAAAAAAABs0/xujlkjiYfJQ/s1600/gitk19.png)

[Yh5iOYTth3A/U6fhWafzqRI/AAAAAAAAABs0/xujlkjiYfJQ/s1600/gitk19.png](http://3.bp.blogspot.com/-Yh5iOYTth3A/U6fhWafzqRI/AAAAAAAAABs0/xujlkjiYfJQ/s1600/gitk19.png)

## 2. file grep

Just like normal unix command "grep", git provides "git grep" to search text pattern in text files. The text file could reside in work tree, index tree, or committed tree object.

```
[luke@rmbp linux]$ git grep -i "mac book" v3.15 -- Documentation
```

```
v3.15:Documentation/sound/alsa/HD-Audio-Models.txt: macbook Intel Mac Book
(eq. type 5)
```

```
v3.15:Documentation/sound/alsa/HD-Audio-Models.txt: macbook-pro-v1 Intel Mac
Book Pro 1st generation (eq. type 3)
```

```
v3.15:Documentation/sound/alsa/HD-Audio-Models.txt: macbook-pro Intel
Mac Book Pro 2nd generation (eq. type 3)
```

In the above example, I search for files under "v3.15" which has the pattern "mac book" (case ignored). Only file under path "Documentation/" will be listed.

## 3. Search for commits

Per git's design, commits are always organized via branch, or in a more general sense, via "reference". When we want to search for commits, we first need to identify in which branch/branches to search for commit. A branch in git is actually two things:

- A reference to a commit, implied as the branch tip;
- a commit set which is reachable in commit DAG from the reference(branch tip)

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```
[luke@rmbp patchid]$ git lg
* 660218f (middle) k3
* ed5e5b4 k2
* 28b3682 k1
| * 5928e12 (left) l3
| * 89e4290 l2
| * e0c5392 l1
|/
| * edc7654 (right) r3
| * 0e2ca07 r2
| * cdf1d1f r1
|/
* 9be22c6 (HEAD, master) m2
* 875d734 m1

[luke@rmbp patchid]$ git l --branches=l*
5928e12 l3
89e4290 l2
e0c5392 l1
9be22c6 m2
875d734 m1

[luke@rmbp patchid]$ git l --branches=m*
660218f k3
ed5e5b4 k2
28b3682 k1
9be22c6 m2
875d734 m1

[luke@rmbp patchid]$ git l --branches=r*
edc7654 r3
0e2ca07 r2
cdf1d1f r1
9be22c6 m2
875d734 m1
```

More interestingly, "git rev-list" allows you to do set operation on the identified commit sets, and output the set operation result as final super commit set. For example, if we have branch tip b1.....bn, here are some typical set operation:

**Union:**

```
git rev-list b1 b2 b3 (b1 u b2 u b3 or b1+b2+b3)
```

**Complement:**

```
git rev-list b1 ^b2 (b1\b2 or b1 - b2)
git rev-list b2..b1
```

**Symmetric Difference:**

```
git rev-list b1...b2 ( (b1 - b2) u (b2 - b1) )
```

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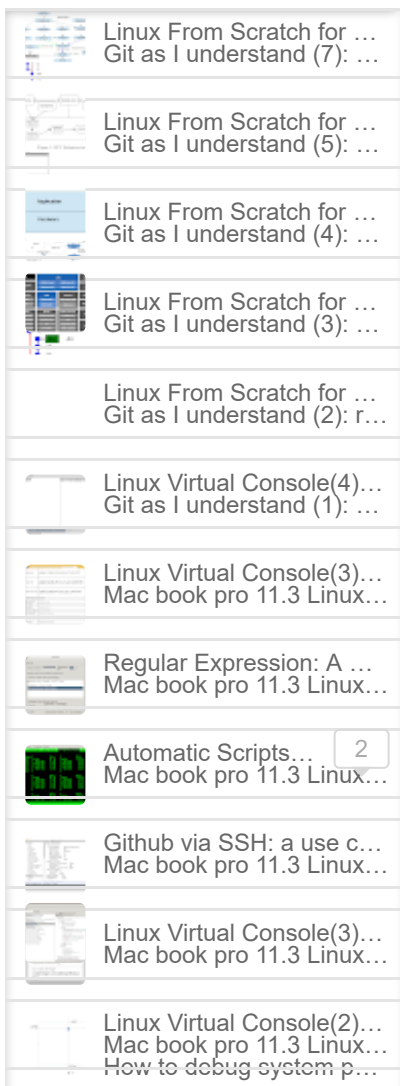
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```
git rev-list $(git merge-base --all b1 b2) (b1 ∩ b2)
```

After the "super set of commits" are identified, git rev-list allow you to further filters this commit sets based on the meta data of commit objects. Commit object has many meta data, like author, committer, date, commit message, etc. We can use these meta-info to limit the output of commit search. Since git log relies on "git rev-list", we will use "git log" to show the commit filter options in "rev-list":

**a. author**

```
[luke@rmbp linux]$ git log --author="linus t*" -i | grep ^Author
Author: Linus Torvalds <torvalds@linux-foundation.org>
Author: Linus Torvalds <torvalds@linux-foundation.org>
Author: Linus Torvalds <torvalds@linux-foundation.org>
Author: Linus Torvalds <torvalds@linux-foundation.org>
Author: Linus Torvalds <torvalds@linux-foundation.org>
```

**b. committer**

```
[luke@rmbp linux]$ git log --committer="Nicholas Bellinger" --format=full |
grep ^Commit
Commit: Nicholas Bellinger <nab@linux-iscsi.org>
Commit: Nicholas Bellinger <nab@linux-iscsi.org>
Commit: Nicholas Bellinger <nab@linux-iscsi.org>
Commit: Nicholas Bellinger <nab@linux-iscsi.org>
Commit: Nicholas Bellinger <nab@linux-iscsi.org>
Commit: Nicholas Bellinger <nab@linux-iscsi.org>
```

**c. date**

we can limit the log output via commit date:

```
[luke@rmbp linux]$ git log --format=fuller --since=2014-06-05 --until=2014-06-07 --date=iso | grep -E '^CommitDate'
CommitDate: 2014-06-06 13:21:16 -0700
CommitDate: 2014-06-06 12:00:46 -0700
CommitDate: 2014-06-06 09:53:32 -0700
CommitDate: 2014-06-06 08:53:41 -0700
CommitDate: 2014-06-06 01:22:41 -07007040b6d1febfbdbd9c1595efb751d492cd2503f96
CommitDate: 2014-06-06 01:21:12 -0700
CommitDate: 2014-06-05 13:09:44 -0700
CommitDate: 2014-06-05 12:51:05 -0700
CommitDate: 2014-06-05 12:31:32 -0700
CommitDate: 2014-06-05 12:31:07 -0700
CommitDate: 2014-06-05 12:31:07 -0700
CommitDate: 2014-06-05 12:31:07 -0700
CommitDate: 2014-06-05 12:31:07 -0700
CommitDate: 2014-06-05 16:33:08 +0200
CommitDate: 2014-06-05 16:33:07 +0200
```

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color

This resulted in **macbook pro**'s no longer finding the rom images, and

ata\_piix: only enable the first port on apple **macbook pro**

ata\_piix: only enable the first port on apple **macbook pro**

ICH8M on apple **macbook pro** occasionally locks up completely during PCS

As macbook/**macbook pro**'s also have to live with a single mouse button the

USB HID: handle multi-interface devices for Apple **macbook pro** properly

USB HID: handle multi-interface devices for Apple **macbook pro** properly

"--grep" will grep the commit message and limit the commit output which match this grep pattern.

e. parent commits

"--merges/--min-parent=2" will select merge commit, "--no-merges/--max-parent=1" will select non-merge commits.

f. special filter options for "symmetric difference"

When we provide a "A...B" range to rev-list/rev-log, there are special options to select "left/right" sides commits. Here "A" is considered left-side set, "B" is considered "right-side" set. For example:

```
[luke@rmbp patchid]$ git lg
* 5928e12 (left) 13
* 89e4290 12
* e0c5392 11
| * edc7654 (HEAD, right) r3
| * 0e2ca07 r2
| * cdf1d1f r1
|/
* 9be22c6 (master) m2
* 875d734 m1

[luke@rmbp patchid]$ git rev-list --left-right left...right
<5928e122c9526222b95f9f4d3f52c7b834cc51dc
>edc765446270655cb97a79422e38c7363eeac4f0
<89e4290979ea0bfb390fe703b9a76ff8020f7b93
<e0c539244ad6635e0ec8036b86946b7de6d6bdcf
>0e2ca071fdebe29d207cf9908c10bff92592eb9b
>cdf1d1f049b5488dcd9a9c790eb57d8a9a9ba7a9
```

Here "<" marks the commits on left-side, ">" marks the commits on right-side.

```
[luke@rmbp patchid]$ git rev-list --left-only --left-right left...right
<5928e122c9526222b95f9f4d3f52c7b834cc51dc
<89e4290979ea0bfb390fe703b9a76ff8020f7b93
<e0c539244ad6635e0ec8036b86946b7de6d6bdcf
```

Here only "left-side" commits are displayed.

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```
=edc765446270655cb97a79422e38c7363eeac4f0
<89e4290979ea0bfb390fe703b9a76ff8020f7b93
<e0c539244ad6635e0ec8036b86946b7de6d6bdcf
>0e2ca071fdebe29d207cf9908c10bfff92592eb9b
>cdf1d1f049b5488dcd9a9c790eb57d8a9a9ba7a9
```

Here commit "5928e" and "edc76" has identical patch id, so they are marked with "=". You can also skipped such commits via option "--cherry-pick":

```
[luke@rmbp patchid]$ git rev-list --cherry-pick --left-right left...right
<89e4290979ea0bfb390fe703b9a76ff8020f7b93
<e0c539244ad6635e0ec8036b86946b7de6d6bdcf
>0e2ca071fdebe29d207cf9908c10bfff92592eb9b
>cdf1d1f049b5488dcd9a9c790eb57d8a9a9ba7a9
```

We can see two commits are excluded from output.

Under many circumstances, left side is the upstream branch, right side is your feature branch. When you want to find out what commits have been merged/applied into upstream branch already, you can use "--cherry" option. It is equal to options "--right-only --cherry-mark --no-merges".

```
[luke@rmbp patchid]$ git rev-list --cherry left...right
=edc765446270655cb97a79422e38c7363eeac4f0
+0e2ca071fdebe29d207cf9908c10bfff92592eb9b
+cdf1d1f049b5488dcd9a9c790eb57d8a9a9ba7a9
```

## 4. search for commit based on diff content

This still searches for commit. Since it is so important, I listed it under a separate title.

Every commit normally introduces a change. And such changes are embedded in the diff between parent commit and this commit. This is why a commit is often called a changeset. Because the diff is based on text lines, we can search/grep the diff text and find out corresponding commits. Here is an example:

```
[luke@rmbp diffsearch]$ git l
84a8e2c initial commit
[luke@rmbp diffsearch]$ ls
hello.txt
[luke@rmbp diffsearch]$ cat hello.txt
hello
world
apple
orange
```

Now we introduce some change into hello.txt, and search the diff:

```
[luke@rmbp diffsearch]$ cat hello.txt
world
apple
```



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search

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```
--- a/hello.txt
+++ b/hello.txt
@@ -1,4 +1,5 @@

-hello
world
apple

-orange

-orange+orange tastes good

+alice in the wonder land

+hello

[luke@rmbp diffsearch]$ git commit -am "diff commit"
[master 125d730] diff commit

1 file changed, 3 insertions(+), 2 deletions(-)

[luke@rmbp diffsearch]$ git log --oneline
125d730 diff commit
84a8e2c initial commit
```

Please be reminded that in the diff output, there are some context lines like "world", "apple". When we search for diff, we only search for the actually delta, but not within the "context lines". The most simple search on diff is based on a path name. In diff content, if a path/file is recorded, then this commit is selected. For example:

```
[luke@rmbp patchid]$ git log -- r1.txt
commit cdf1d1f049b5488dcd9a9c790eb57d8a9a9ba7a9
Author: Luke Luo <luke.jf.luo@gmail.com>
Date: Mon Jun 23 13:40:44 2014 +0800

    r1

[luke@rmbp patchid]$ git show cdf1d1f049b5488dcd9a9c790eb57d8a9a9ba7a9
commit cdf1d1f049b5488dcd9a9c790eb57d8a9a9ba7a9
Author: Luke Luo <luke.jf.luo@gmail.com>
Date: Mon Jun 23 13:40:44 2014 +0800

    r1

diff --git a/r1.txt b/r1.txt
new file mode 100644
index 0000000..f7d55cf
--- /dev/null
+++ b/r1.txt
@@ -0,0 +1 @@
+r1
```

Here we search for commits which change the file/path "r1.txt". Since the commit touch "r1.txt"(add r1.txt into repository) so it is selected.

There are another two advanced ways to search for commits based on diffs:

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commit, it might have diff lines which contain this "literal string". For all "delete" diff lines ("-"), we sum the times of appearance of this literal strings as "d"; For all "add" diff lines ("+"), we also sum the times of appearance of this literal strings as "a". If "a-d" (a minus d) is not zero, then we can conclude that the number of literal string instances varied before and after this commit. That means, we use "-S" options to search for commits where "literal string" is added or deleted, but not the commits where "literal string" is only moved within the text.

```
[luke@rmbp diffsearch]$ git log -S "hello" -p
commit 84a8e2c4b82351a347aa0fbc273bcb5bec5dbe39
Author: Luke Luo <luke.jf.luo@gmail.com>
Date: Mon Jun 16 10:59:01 2014 +0800
```

```
initial commit
```

```
diff --git a/hello.txt b/hello.txt
new file mode 100644
index 0000000..2c4a39a
--- /dev/null
+++ b/hello.txt
@@ -0,0 +1,4 @@
+hello
+world
+apple
+orange
```

In this example, we search for literal string "hello". We only find the "initial commit" where we add "hello". For commit "diff commit", since it delete one instance of "hello" and add another instance of "hello" in another line, the net effect is a movement of "hello" within file, so "diff commit" is not selected in "git log -S hello" output.

If we add "--pickaxe-regex" option, then "-S xxx" will be treated as search for an regular expression.

```
[luke@rmbp diffsearch]$ git log -S "hell?" -p --pickaxe-regex
commit 84a8e2c4b82351a347aa0fbc273bcb5bec5dbe39
Author: Luke Luo <luke.jf.luo@gmail.com>
Date: Mon Jun 16 10:59:01 2014 +0800
```

```
initial commit
```

```
diff --git a/hello.txt b/hello.txt
new file mode 100644
index 0000000..2c4a39a
--- /dev/null
+++ b/hello.txt
@@ -0,0 +1,4 @@
```

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still the same as before, so only "initial commit" is selected for log output.

For options "-G", it will search for an regular expression. But different from "-S", "-G" will "grep" all the diff (add or delete) lines, whenever there is a reg match, it will select this commit as output. So "-G" will select the "move" case in additions to "add" and "delete" cases.

```
[luke@rmmbp diffsearch]$ git log -G "hell?" -p
commit 125d7308f62e8516093cac83d83e1c42363fa618
Author: Luke Luo <luke.jf.luo@gmail.com>
Date: Mon Jun 16 11:02:39 2014 +0800
```

diff commit

```
diff --git a/hello.txt b/hello.txt
index 2c4a39a..d86b158 100644
--- a/hello.txt
+++ b/hello.txt
@@ -1,4 +1,5 @@
```

```
-hello
world
apple
-orange
+orange tastes good
+alice in the wonder land
+hello
```

```
commit 84a8e2c4b82351a347aa0fbc273bcb5bec5dbe39
Author: Luke Luo <luke.jf.luo@gmail.com>
Date: Mon Jun 16 10:59:01 2014 +0800
```

initial commit

```
diff --git a/hello.txt b/hello.txt
new file mode 100644
index 0000000..2c4a39a
--- /dev/null
+++ b/hello.txt
@@ -0,0 +1,4 @@
```

```
+hello
+world
+apple
+orange
```

initial commit

In this case with "-G", both "initial commit" and "diff commit" are selected for output.

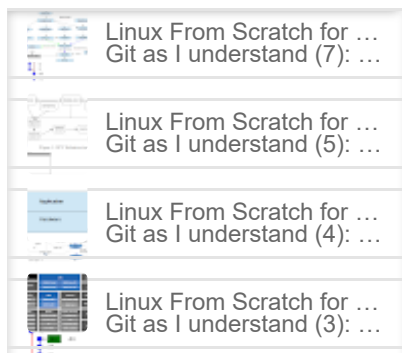
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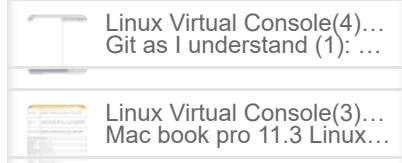
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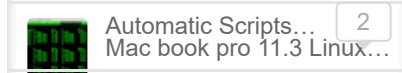
Git as I understand (6): ...



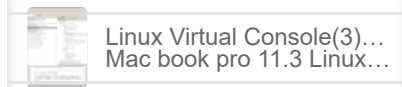
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interest in these lines might be they introduce bugs or new feature, or they work just well, but without enough comments to illustrate how they work. For such scenario, git provides a command "blame". With the help from blame, you can find out in which commit each line is last edited. For us to see this line in this file, the last "edit" must be "add"(+) instead of "delete"(-) or we just can see this line. So I think the algorithm for blame is:

- . for each line in file:
  - . find in the diff of current commit, and only in "add"(+) part;
  - . If not found, find it in parent commit diff, until it is found
  - . record the found commit with this line in the "blame" output

Here is an example.

```
[luke@rmbp blame]$ git l
d76ddb9 m4
bf0599d m3
4991d56 m2
0a17a1e m1

[luke@rmbp blame]$ cat blame.txt
a
b
c
d

[luke@rmbp blame]$ git blame blame.txt
^0a17a1e (Luke Luo 2014-06-16 22:44:45 +0800 1) a
4991d567 (Luke Luo 2014-06-16 22:44:57 +0800 2) b
bf0599d2 (Luke Luo 2014-06-16 22:45:08 +0800 3) c
d76ddb98 (Luke Luo 2014-06-16 22:45:24 +0800 4) d
```

In this example, we add a line each time in each commit. To verify git really find out the commit where a line is edited, we delete "a" from file, commit it, then add "a" into file again, then commit. We will blame this file again to see if "a" is bound with the last commit:

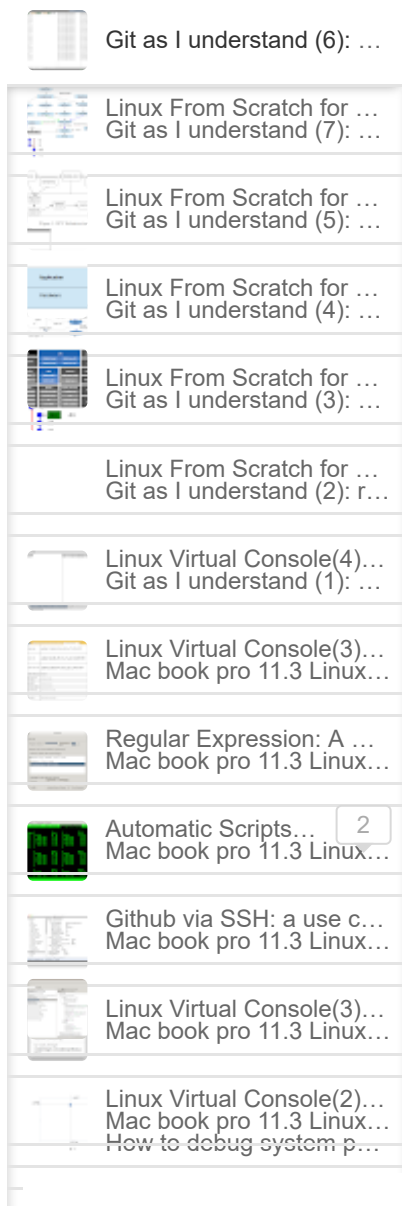
```
[luke@rmbp blame]$ vi blame.txt
[luke@rmbp blame]$ cat blame.txt
b
c
d

[luke@rmbp blame]$ git commit -am "m5"
[master 2c61ee6] m5
1 file changed, 1 deletion(-)

[luke@rmbp blame]$ vi blame.txt
[luke@rmbp blame]$ cat blame.txt
a
b
c
d
```

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```
d76ddb9 m4
bf0599d m3
4991d56 m2
0a17a1e m1
[luke@rmbp blame]$ git blame blame.txt
d87a09ab (Luke Luo 2014-06-16 22:51:19 +0800 1) a
4991d567 (Luke Luo 2014-06-16 22:44:57 +0800 2) b
bf0599d2 (Luke Luo 2014-06-16 22:45:08 +0800 3) c
d76ddb98 (Luke Luo 2014-06-16 22:45:24 +0800 4) d
```

We can see git did find out the last commit(m6) where line "a" is added into file.

## c. reverse blame

by default, blame find out the commit where a line is lastly added. You use it to find out why a line "appears". blame also provide a search way called "reverse", where you use it to find out why a line in original file "disappear".

We give git a starting point, git will use the lines in this start snapshot. It will traverse forward via the branch, and check the "delete"(-) content of diff. If a diff thunk contains a delete for a line, it will mark its parent commit. This parent commit will be the commit where this line last exists. After this commit, it will disappear.

Here is an example. We have a blame.txt will line "a/b/c/d/e" in original state. In following commit, we will delete a line per commit, until the blame.txt is empty. Then we will add line "a" again in next commit, then delete line "/a" again in another commit, then delete line "/a" again yet in another commit:

```
[luke@rmbp blame]$ git log --oneline
894f984 m8
9f49277 m7
2a84f46 m6
a95b8da m5
bafa147 m4
506a364 m3
314a3c6 m2
805836b m1
[luke@rmbp blame]$ git rev-list master
894f9844872abdfab6dd5d428f7744916cde679c
9f492775826c9051c69ee75552e976b52775f22b
2a84f468c5cdabeee736dd83818701ac36b9982c
a95b8daa1eed2e097a8f3a8e7575ef8eca172a24
bafa1476f1c3e99859415f5943f5d467f1409b44
506a364117e00894b1e8692e4b48f22c1d934050
314a3c6ed8c8190d22677cfcd6b65d37657f6cb
805836b160b1817b4883faa36d9e5aa24fc94c9c
```

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```
diff --git a/blame.txt b/blame.txt
index 7898192..e69de29 100644

--- a/blame.txt
+++ b/blame.txt
@@ -1,0,0 @@

-a

commit 9f492775826c9051c69ee75552e976b52775f22b
Author: Luke Luo <luke.jf.luo@gmail.com>
Date: Tue Jun 17 09:13:14 2014 +0800
```

m7

```
diff --git a/blame.txt b/blame.txt
index e69de29..7898192 100644

--- a/blame.txt
+++ b/blame.txt
@@ -0,0,1 @@

+a

commit 2a84f468c5cdabeee736dd83818701ac36b9982c
Author: Luke Luo <luke.jf.luo@gmail.com>
Date: Tue Jun 17 08:57:28 2014 +0800
```

m6

```
diff --git a/blame.txt b/blame.txt
index d905d9d..e69de29 100644

--- a/blame.txt
+++ b/blame.txt
@@ -1,0,0 @@

-e

commit a95b8daa1eed2e097a8f3a8e7575ef8eca172a24
Author: Luke Luo <luke.jf.luo@gmail.com>
Date: Tue Jun 17 08:57:19 2014 +0800
```

m5

```
diff --git a/blame.txt b/blame.txt
index 5ded0a3..d905d9d 100644

--- a/blame.txt
+++ b/blame.txt
@@ -1,2,1 @@

-d
e
```



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```
diff --git a/blame.txt b/blame.txt
```

```
index df3846e..5ded0a3 100644
```

```
--- a/blame.txt
```

```
+++ b/blame.txt
```

```
@@ -1,3 +1,2 @@
```

```
-c
```

```
d
```

```
e
```

```
commit 506a364117e00894b1e8692e4b48f22c1d934050
```

```
Author: Luke Luo <luke.jf.luo@gmail.com>
```

```
Date: Tue Jun 17 08:56:55 2014 +0800
```

```
m3
```

```
diff --git a/blame.txt b/blame.txt
```

```
index c677cc0..df3846e 100644
```

```
--- a/blame.txt
```

```
+++ b/blame.txt
```

```
@@ -1,4 +1,3 @@
```

```
-b
```

```
c
```

```
d
```

```
e
```

```
commit 314a3c6ed8c8190d22677cfcdf6b65d37657f6cb
```

```
Author: Luke Luo <luke.jf.luo@gmail.com>
```

```
Date: Tue Jun 17 08:56:47 2014 +0800
```

```
m2
```

```
diff --git a/blame.txt b/blame.txt
```

```
index 9405325..c677cc0 100644
```

```
--- a/blame.txt
```

```
+++ b/blame.txt
```

```
@@ -1,4 +1,3 @@
```

```
-a
```

```
b
```

```
c
```

```
d
```

```
commit 805836b160b1817b4883faa36d9e5aa24fc94c9c
```

```
Author: Luke Luo <luke.jf.luo@gmail.com>
```

```
Date: Tue Jun 17 08:56:31 2014 +0800
```

```
m1
```

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```
@@ -0,0 +1,5 @@
```

```
+a
```

```
+b
```

```
+c
```

```
+d
```

```
+e
```

```
[luke@rmbp blame]$ git blame --reverse master~7..master -- blame.txt
```

```
^805836b (Luke Luo 2014-06-17 08:56:31 +0800 1) a
```

```
314a3c6e (Luke Luo 2014-06-17 08:56:47 +0800 2) b
```

```
506a3641 (Luke Luo 2014-06-17 08:56:55 +0800 3) c
```

```
bafa1476 (Luke Luo 2014-06-17 08:57:06 +0800 4) d
```

```
a95b8daa (Luke Luo 2014-06-17 08:57:19 +0800 5) e
```

As we can see from the example above, git use the lines in <start> commit (805836b). Then for line "a", it find out the first commit where "a" exists but disappear in next commit. Although "a" appears in commit m7 and disappears in commit m8 again, git only find out commit m1/m2 where line "a" appears and disappears. So we can see "git blame --reverse" only mark the first commit where a line has the first "appears/disappears" toggle state.

Semantically, "git blame" find out the commit where a line first exists, and "git blame --reverse" find out the commit where a line last exists.

d. git log -L <start>,<end>:file

Since "git blame" is such a popular command among geek developers, newer version of git provides a similar functionality in "git log -L":

```
git log -L <start-line>,<end-line>:file
```

is semantically equal to :

```
git blame -L <start-line>,<end-line> -- file
```

But the output format is different. Here is an example:

```
[luke@rmbp 1]$ git blame -L 1, -- blame.txt
```

```
d310a0fe (Luke Luo 2014-06-17 09:42:39 +0800 1) a
```

```
624158af (Luke Luo 2014-06-17 09:41:58 +0800 2) b
```

```
e5f3da10 (Luke Luo 2014-06-17 09:42:05 +0800 3) c
```

```
[luke@rmbp 1]$ git log -L 1,:blame.txt --oneline
```

```
d310a0f m5
```

```
diff --git a/blame.txt b/blame.txt
```

```
--- a/blame.txt
```

```
+++ b/blame.txt
```


```
@@ -1,2 +1,3 @@
```

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```
--- a/blame.txt
+++ b/blame.txt
@@ -2,1 +2,2 @@
    b
+ c
624158a m2


diff --git a/blame.txt b/blame.txt
--- a/blame.txt
+++ b/blame.txt
@@ -2,0 +2,1 @@
+ b
```

Posted 17th June 2014 by [Luke Luo](#)

0

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