

# Open Source SW

## Lecture 8

### Git-3. Branching and Merging

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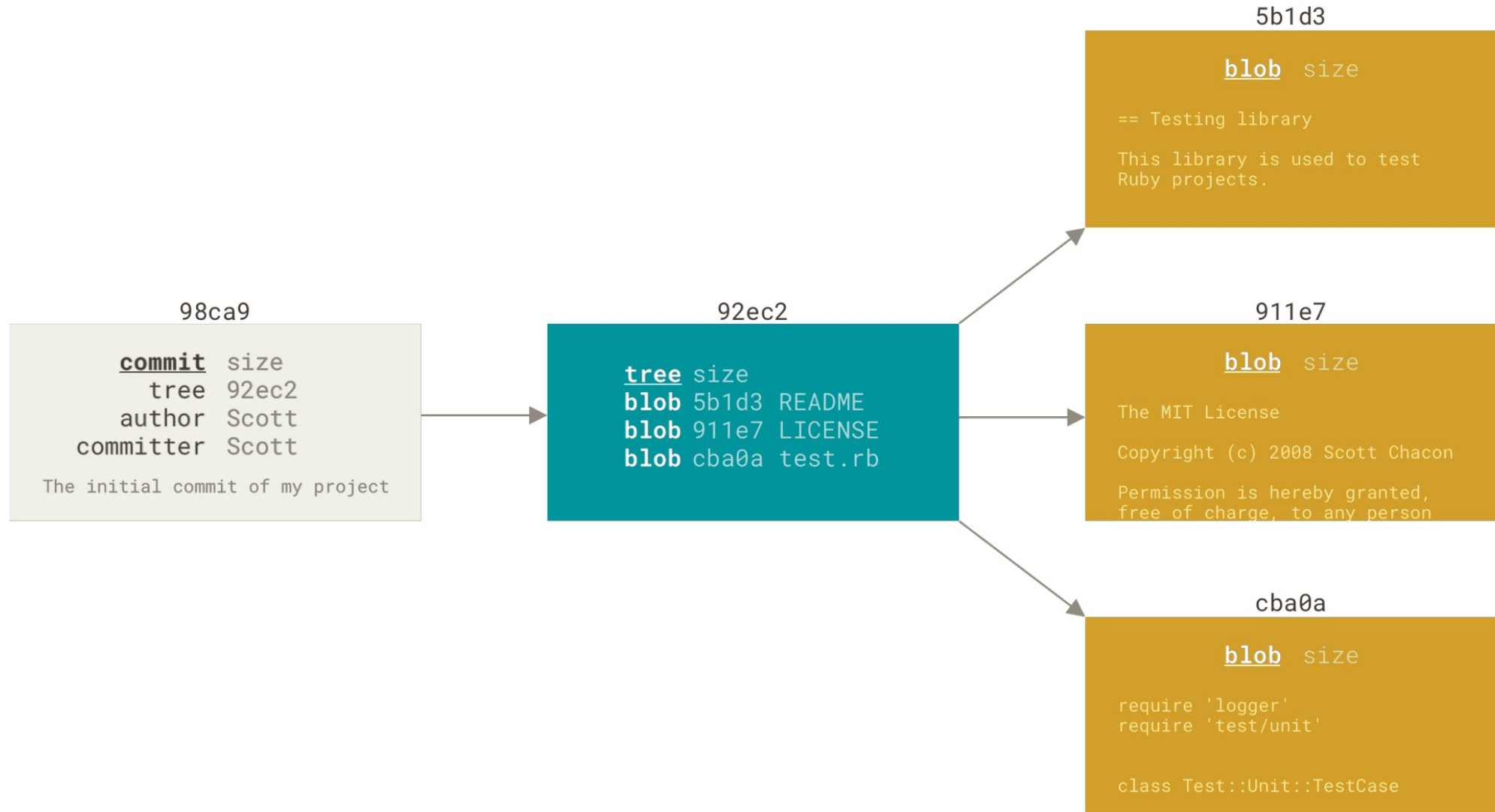


# Git Branching and Merging

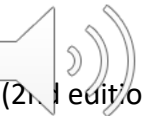
- Branching: Diverge from the “main” development stream and work without interrupting the main branch
- Merging: Uniting two branches to one branch
- Why matters?
  - Developing without messing with the deployed “main” branch
  - Testing a new feature, issue resolving, error fixing, ...
  - Test sufficiently before you deploy
  - (Remote branch) Collaboration



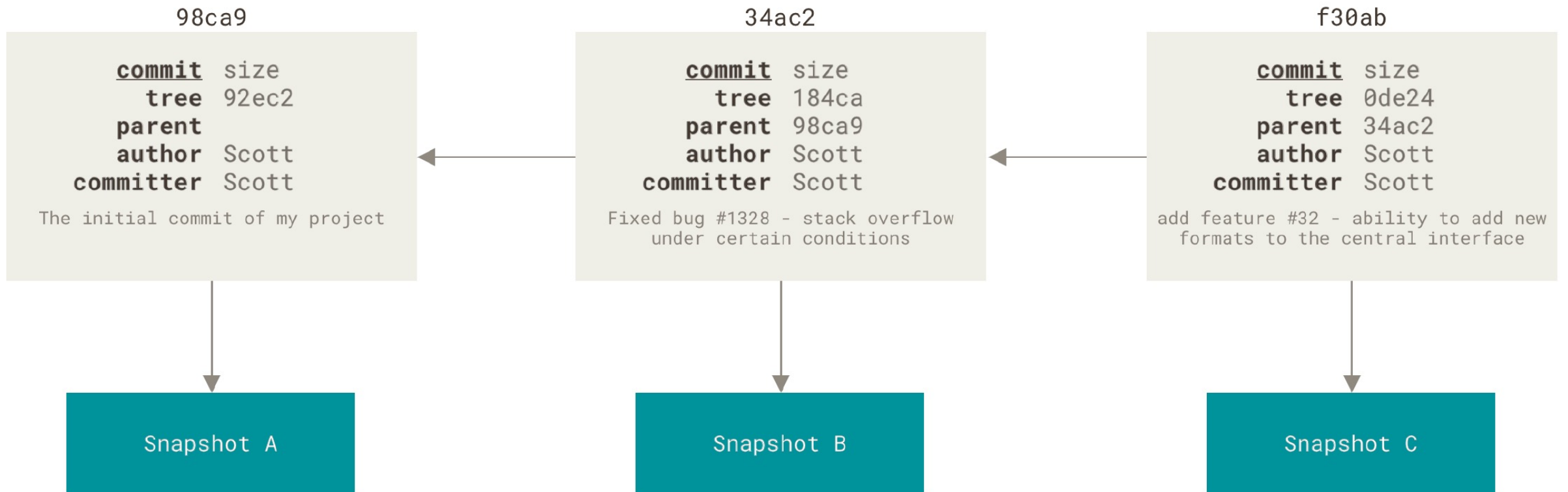
# Structure of Git Commit



Source: Chacon and Straub, Pro Git (2nd edition)



# Commit Object



Source: Chacon and Straub, Pro Git (2nd edition)



# Making a new git repository

```
$ cd branch-test/  
$ git init
```

```
$ echo "# practicing git branching and merging" >> README.md  
$ cat README.md  
# practicing git branching and merging
```

```
$ echo "first edition" >> edition.txt  
$ cat edition.txt  
first edition
```

```
$ ls -lha  
total 20K  
drwxrwxr-x 3 youngmin youngmin 4.0K 10월 18 17:20 .  
drwxrwxr-x 7 youngmin youngmin 4.0K 10월 18 17:17 ..  
drwxrwxr-x 7 youngmin youngmin 4.0K 10월 18 17:18 .git  
-rw-rw-r-- 1 youngmin youngmin 39 10월 18 17:20 README.md  
-rw-rw-r-- 1 youngmin youngmin 14 10월 18 17:20 edition.txt
```



# Commit the new repository

```
$ git status
On branch master

No commits yet

Untracked files:
  (use "git add <file>..." to include in what will be committed)
    README.md
    edition.txt

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

```
$ git add .
```

```
$ git commit -m "first commit"
[master (root-commit) 66206d2] first commit
2 files changed, 2 insertions(+)
create mode 100644 README.md
create mode 100644 edition.txt
```



# Commit the new repository

```
$ nano edition.txt
```

```
$ cat edition.txt  
first edition  
second edition
```

```
$ git add edition.txt
```

```
$ git commit -m "second commit"  
[master 59d8464] second commit  
1 file changed, 1 insertion(+)
```



# Commit the new repository

```
$ nano edition.txt
```

```
$ cat edition.txt  
first edition  
second edition  
third edition
```

```
$ git add edition.txt
```

```
$ git commit -m "third commit"  
[master 29b4f9d] third commit  
1 file changed, 1 insertion(+)
```





# Checking commit log

```
$ git log
commit 29b4f9d5500e69dbb55a7d0a9cd6cc8ad37a04ac (HEAD -> master)
Author: Youngmin Oh <prof.youngminoh@gmail.com>
Date:   Tue Oct 18 17:22:27 2022 +0900

    third commit

commit 59d84644872a3d79bcd6ff04343fcb0112341621
Author: Youngmin Oh <prof.youngminoh@gmail.com>
Date:   Tue Oct 18 17:21:43 2022 +0900

    second commit

commit 66206d2d6cabab1b2ebdee6e413b2840dfdab04b
Author: Youngmin Oh <prof.youngminoh@gmail.com>
Date:   Tue Oct 18 17:21:01 2022 +0900

    first commit
```



# Making and Switching to a new branch

```
$ git branch  
* master
```

```
$ git branch testing
```

```
$ git branch  
* master  
testing
```

```
$ git log --oneline --decorate  
29b4f9d (HEAD -> master, testing) third commit  
59d8464 second commit  
66206d2 first commit
```

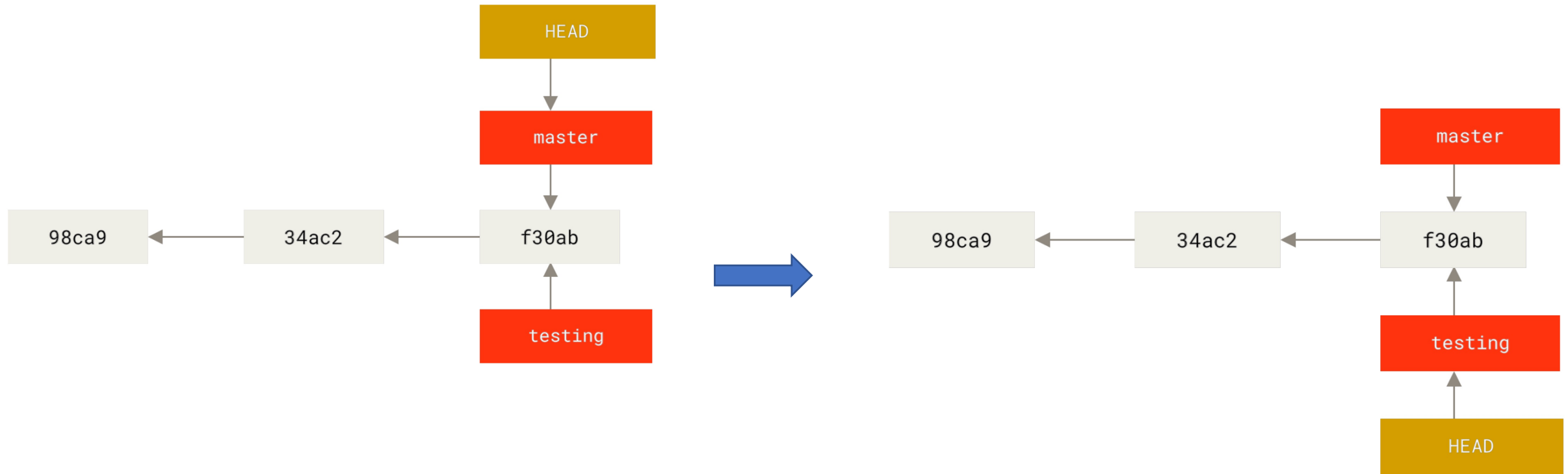
```
$ git checkout testing  
Switched to branch 'testing'
```

```
$ git branch  
master  
* testing
```

```
29b4f9d (HEAD -> testing, master) third commit  
59d8464 second commit  
66206d2 first commit
```



# git checkout



Source: Chacon and Straub, Pro Git (2nd edition)



# Commit at the new branch

```
$ echo "add a new feature" >> new_feature.txt
```

```
$ git add new_feature.txt
```

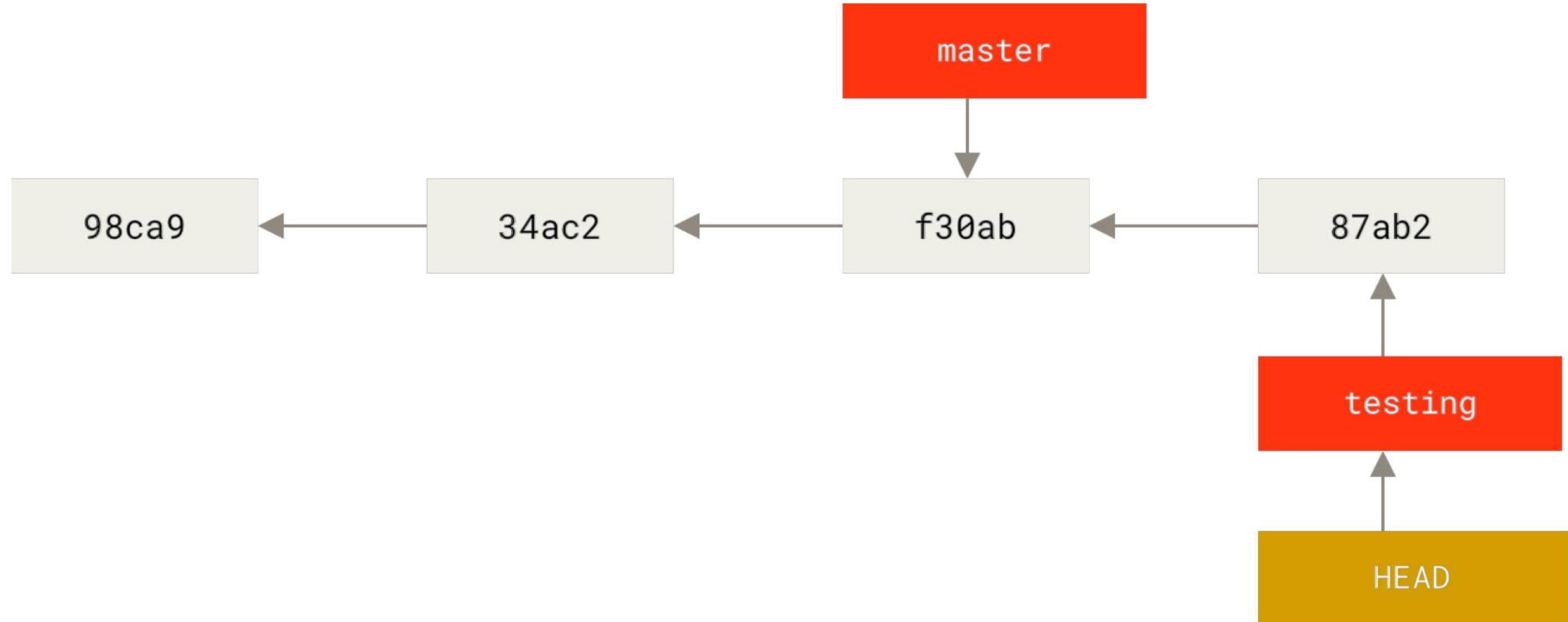
```
$ git commit -m "new feature"
[testing 6437c5e] new feature
1 file changed, 1 insertion(+)
create mode 100644 new_feature.txt
```

```
$ ls -lha
total 24K
drwxrwxr-x 3 youngmin youngmin 4.0K 10월 18 17:25 .
drwxrwxr-x 7 youngmin youngmin 4.0K 10월 18 17:17 ..
drwxrwxr-x 8 youngmin youngmin 4.0K 10월 18 17:25 .git
-rw-rw-r-- 1 youngmin youngmin 39 10월 18 17:20 README.md
-rw-rw-r-- 1 youngmin youngmin 43 10월 18 17:22 edition.txt
-rw-rw-r-- 1 youngmin youngmin 18 10월 18 17:25 new_feature.txt
```

```
$ git log --oneline --decorate
6437c5e (HEAD -> testing) new feature
29b4f9d (master) third commit
59d8464 second commit
66206d2 first commit
```



# Commit at the new branch



Source: Chacon and Straub, Pro Git (2nd edition)



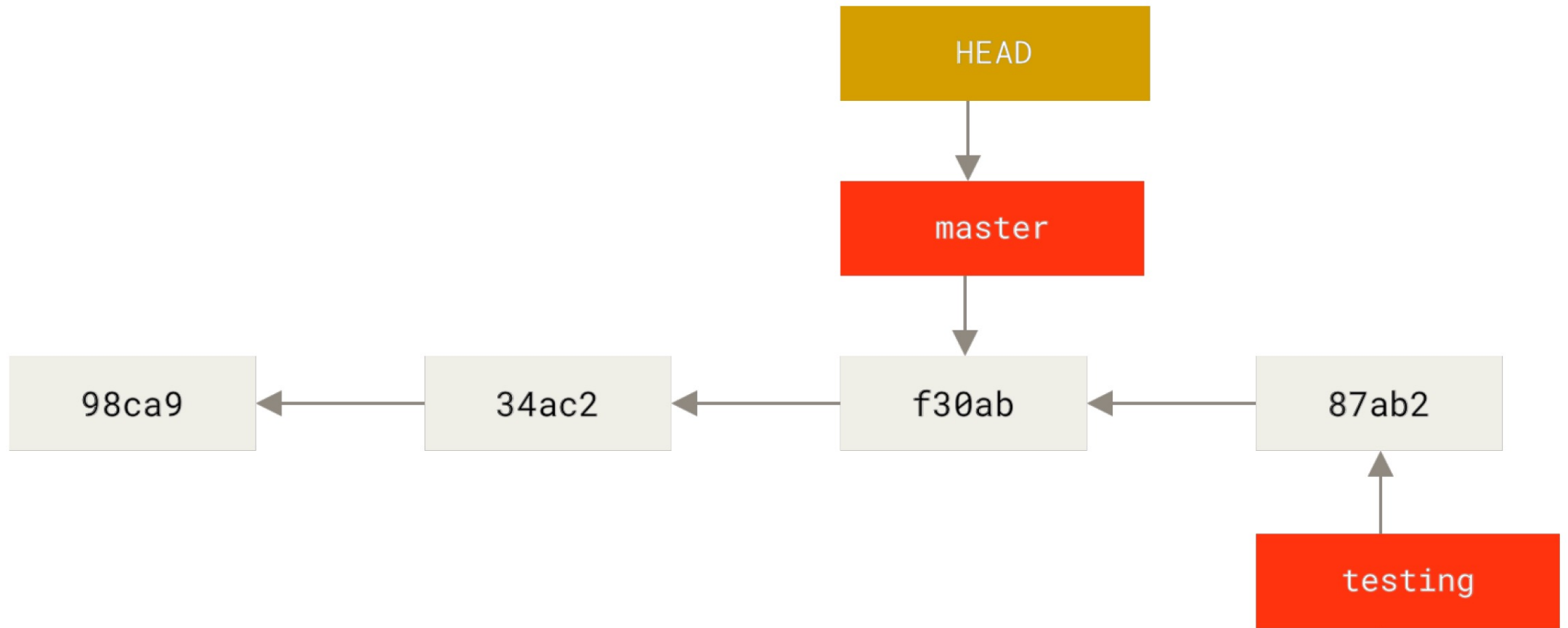
# Switching to master branch

```
$ git checkout master  
Switched to branch 'master'
```

```
$ ls -lha  
total 20K  
drwxrwxr-x 3 youngmin youngmin 4.0K 10월 18 17:26 .  
drwxrwxr-x 7 youngmin youngmin 4.0K 10월 18 17:17 ..  
drwxrwxr-x 8 youngmin youngmin 4.0K 10월 18 17:26 .git  
-rw-rw-r-- 1 youngmin youngmin 39 10월 18 17:20 README.md  
-rw-rw-r-- 1 youngmin youngmin 43 10월 18 17:22 edition.txt
```



# Switching to master branch



Source: Chacon and Straub, Pro Git (2nd edition)



# Resolving an issue at master branch

```
$ nano edition.txt
```

```
$ cat edition.txt  
first edition  
second edition  
third edition  
issue resolved
```

```
$ git add edition.txt
```

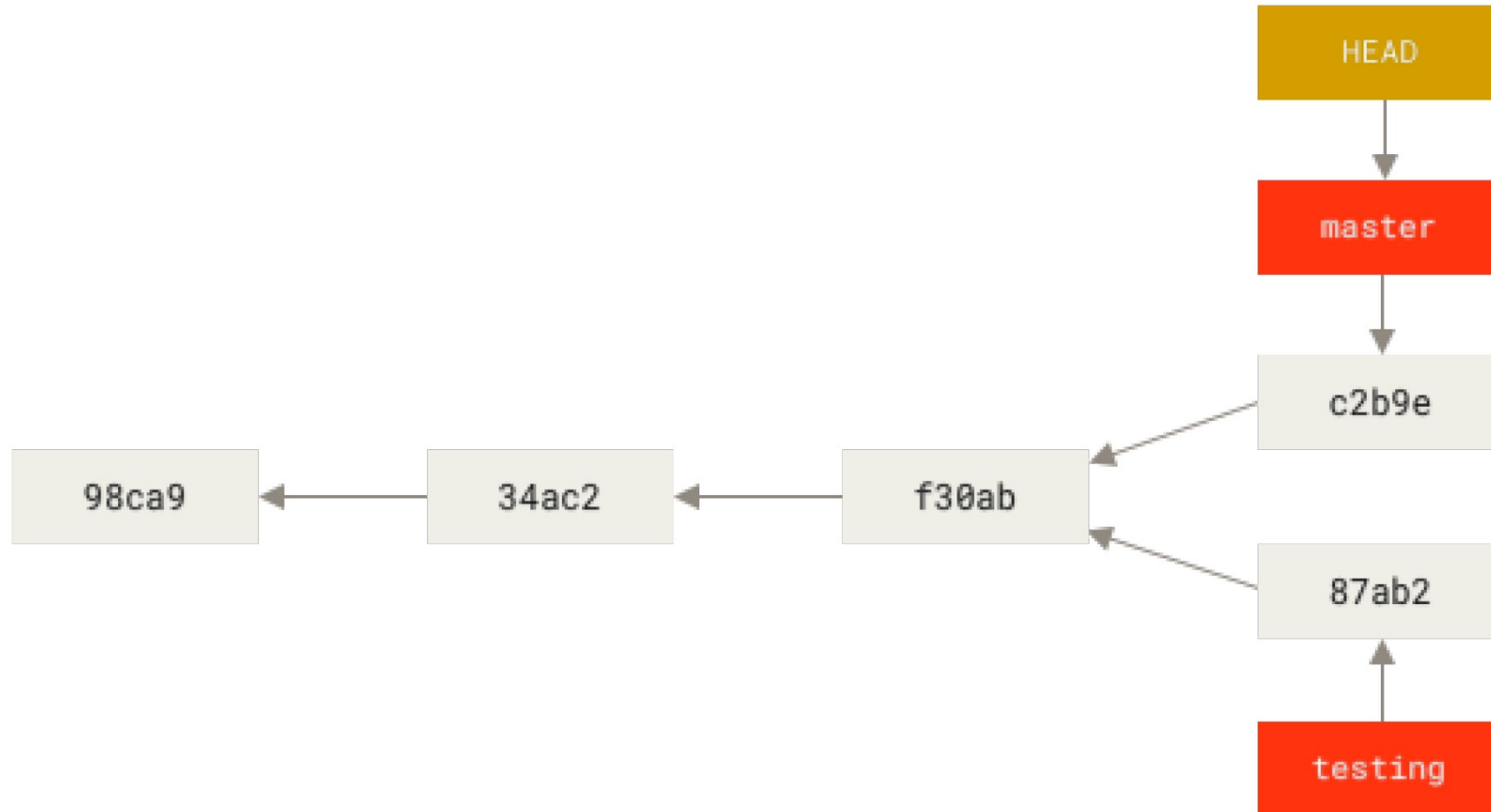
```
$ git commit -m "issue closed"  
[master 9862c02] issue closed  
1 file changed, 1 insertion(+)
```

```
$ git log --oneline --decorate --graph --all  
* 9862c02 (HEAD -> master) issue closed  
| * 6437c5e (testing) new feature  
|/  
* 29b4f9d third commit  
* 59d8464 second commit  
* 66206d2 first commit
```

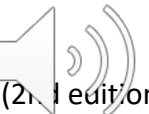




# Divergent history



Source: Chacon and Straub, Pro Git (2nd edition)



# git merge

```
$ git merge testing
Merge made by the 'recursive' strategy.
 new_feature.txt | 1 +
 1 file changed, 1 insertion(+)
 create mode 100644 new_feature.txt
```

```
$ git log --oneline --decorate --graph --all
* 45ddc11 (HEAD -> master) Merge branch 'testing'
| \
| * 6437c5e (testing) new feature
* | 9862c02 issue closed
|/
* 29b4f9d third commit
* 59d8464 second commit
* 66206d2 first commit
```

```
$ git branch -d testing
Deleted branch testing (was 6437c5e).
```

```
$ git branch
* master
```



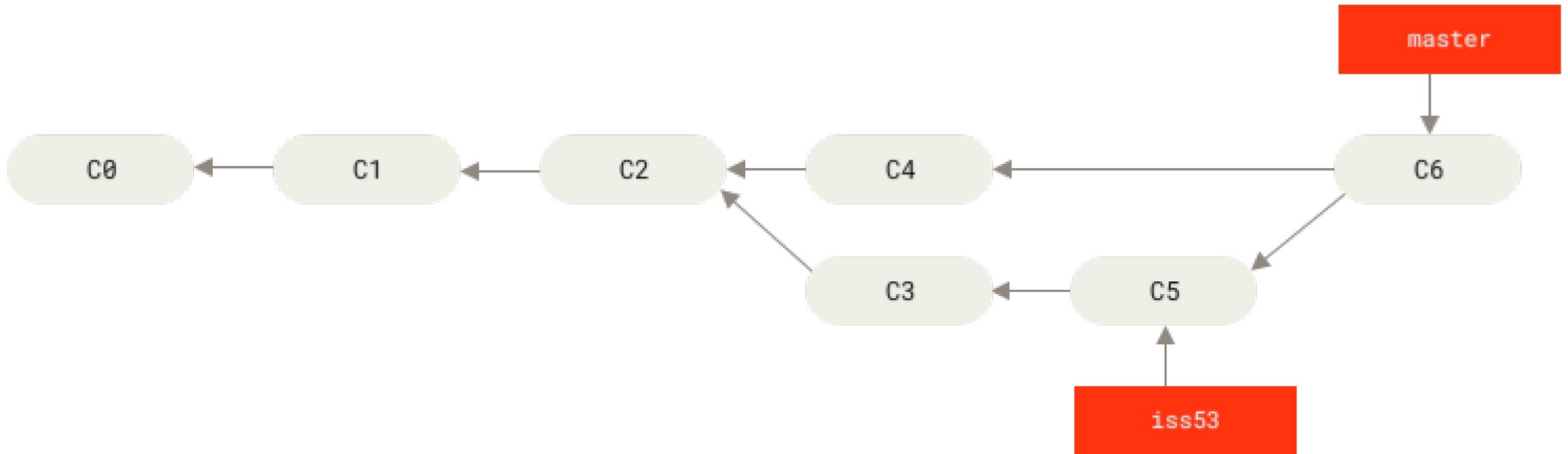
# Check merged repository

```
$ ls -lha
total 24K
drwxrwxr-x 3 youngmin youngmin 4.0K 10월 18 17:33 .
drwxrwxr-x 7 youngmin youngmin 4.0K 10월 18 17:17 ..
drwxrwxr-x 8 youngmin youngmin 4.0K 10월 18 17:35 .git
-rw-rw-r-- 1 youngmin youngmin 39 10월 18 17:20 README.md
-rw-rw-r-- 1 youngmin youngmin 58 10월 18 17:27 edition.txt
-rw-rw-r-- 1 youngmin youngmin 18 10월 18 17:33 new_feature.txt
```

```
$ cat edition.txt
first edition
second edition
third edition
issue resolved
```



# Merged commit



Source: Chacon and Straub, Pro Git (2nd edition)



# Lab 8: Branch and Merge

- Follow today's lecture in a new git repository
- Submit a screenshot of the result of `git log --oneline --decorate --graph --all`
- The file name must be “학번\_이름\_lab8.jpg” (or any common image format)

