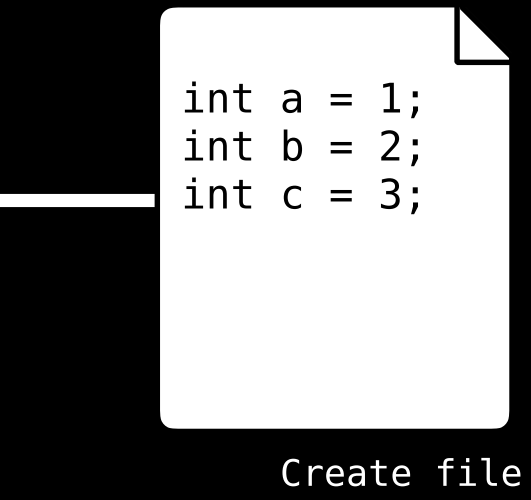
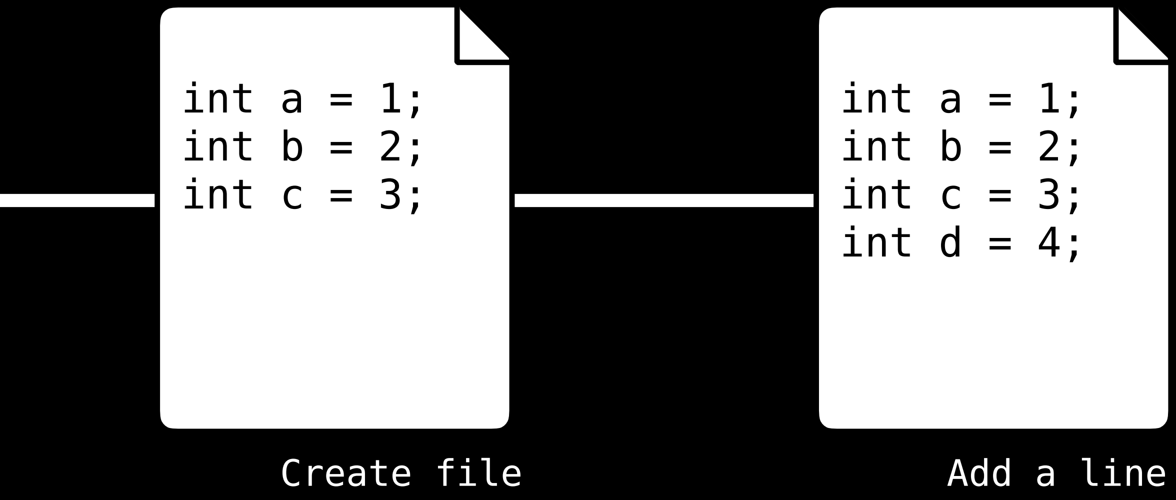
What is Git?

Keep track of changes to code.



```
int a = 1;
int b = 2;
int c = 3;
```

Keep track of changes to code.



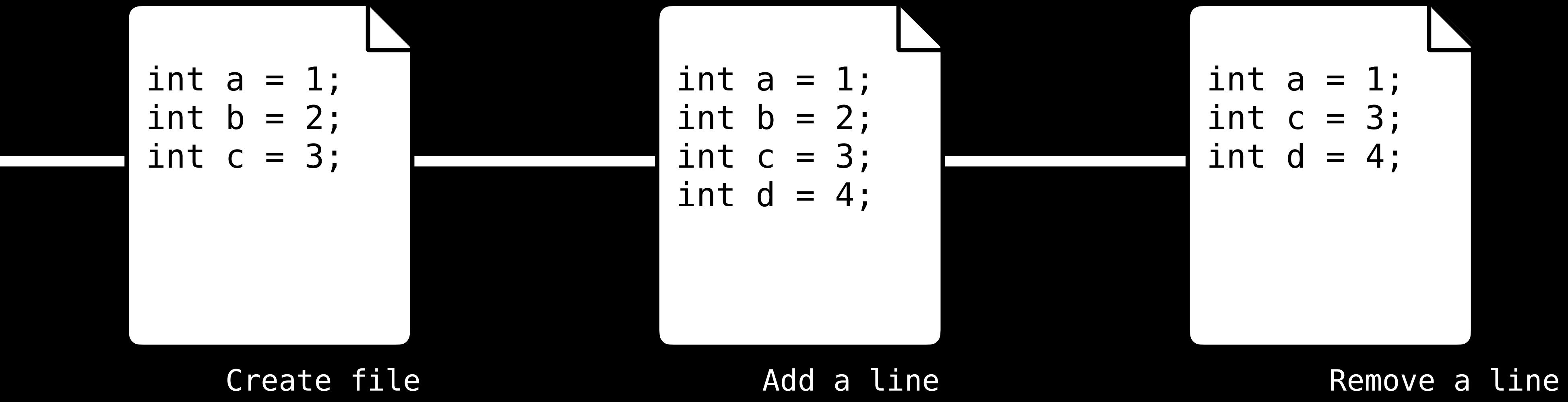
```
int a = 1;
int b = 2;
int c = 3;
```

Create file

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

Add a line

Keep track of changes to code.

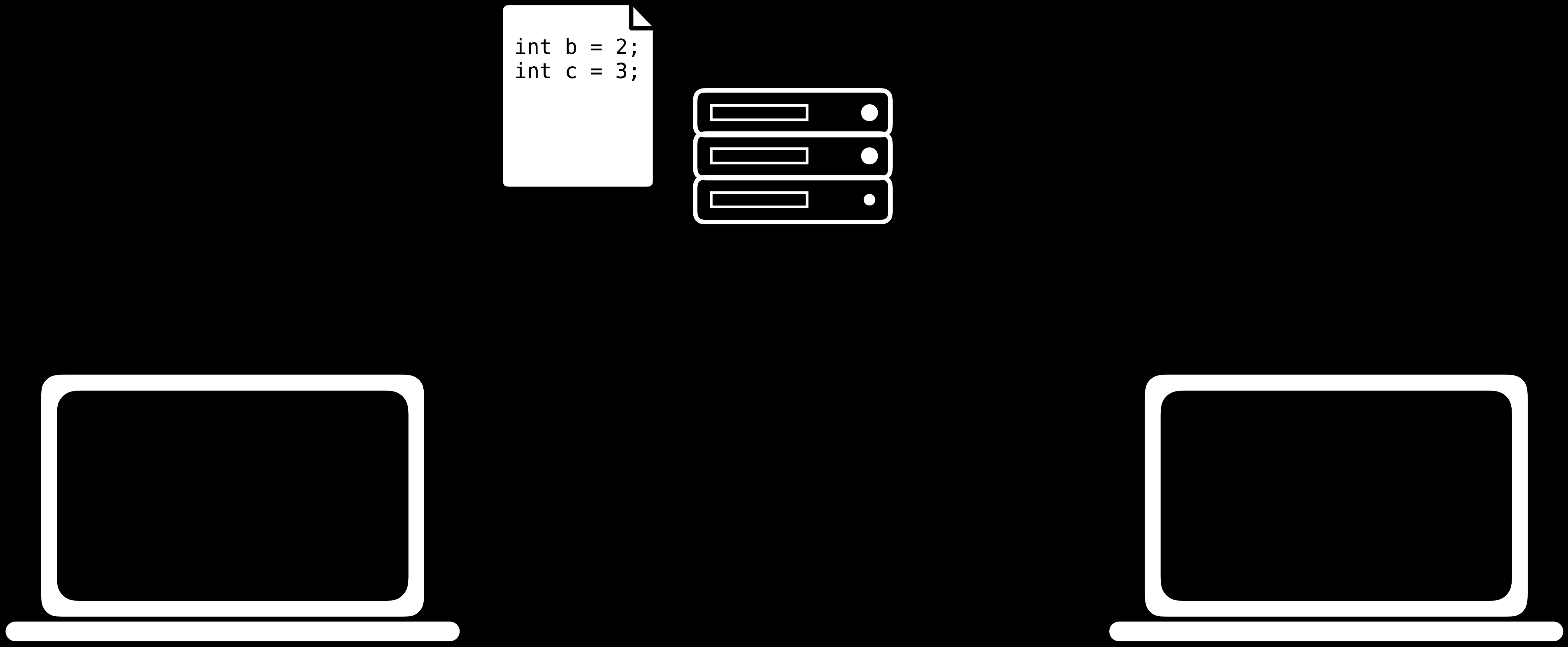


```
int a = 1;
int b = 2;
int c = 3;
```

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

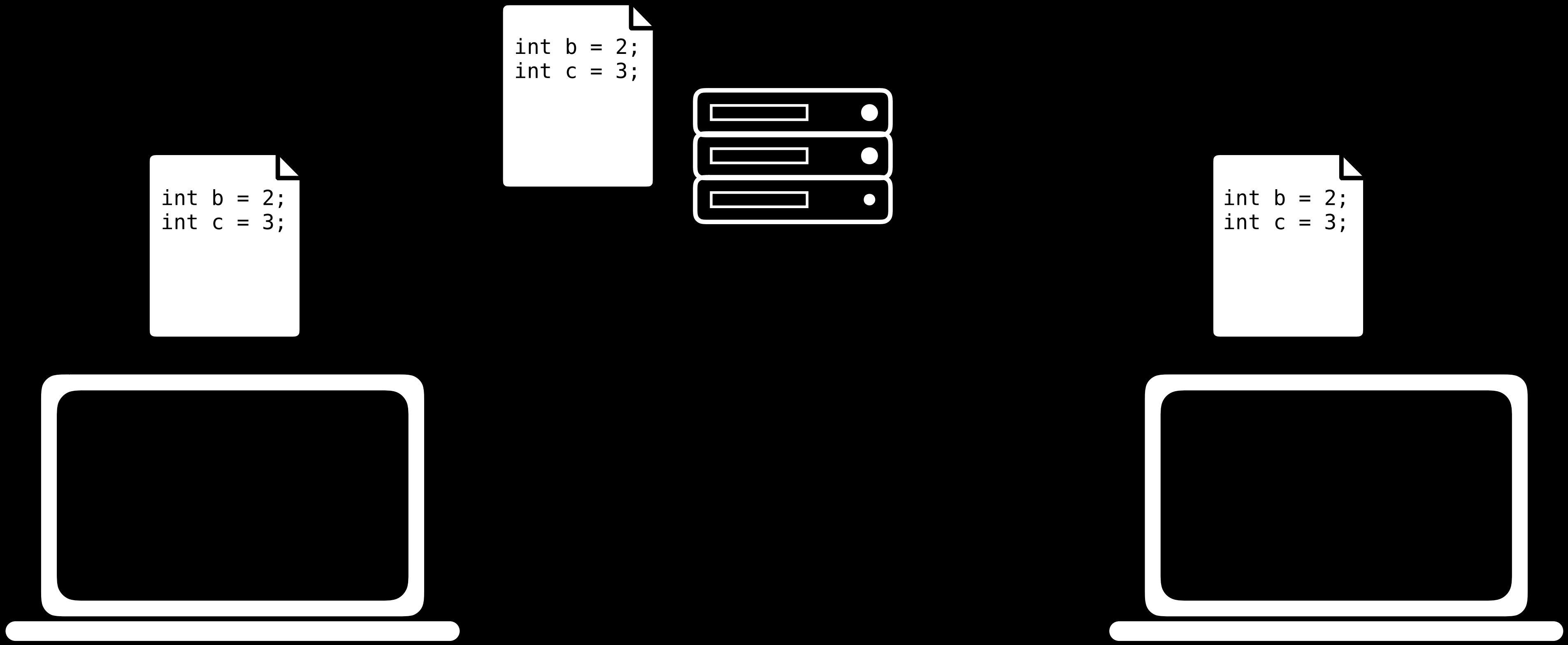
```
int a = 1;
int c = 3;
int d = 4;
```

Synchronizes code between different people.



```
int b = 2;
int c = 3;
```

Synchronizes code between different people.



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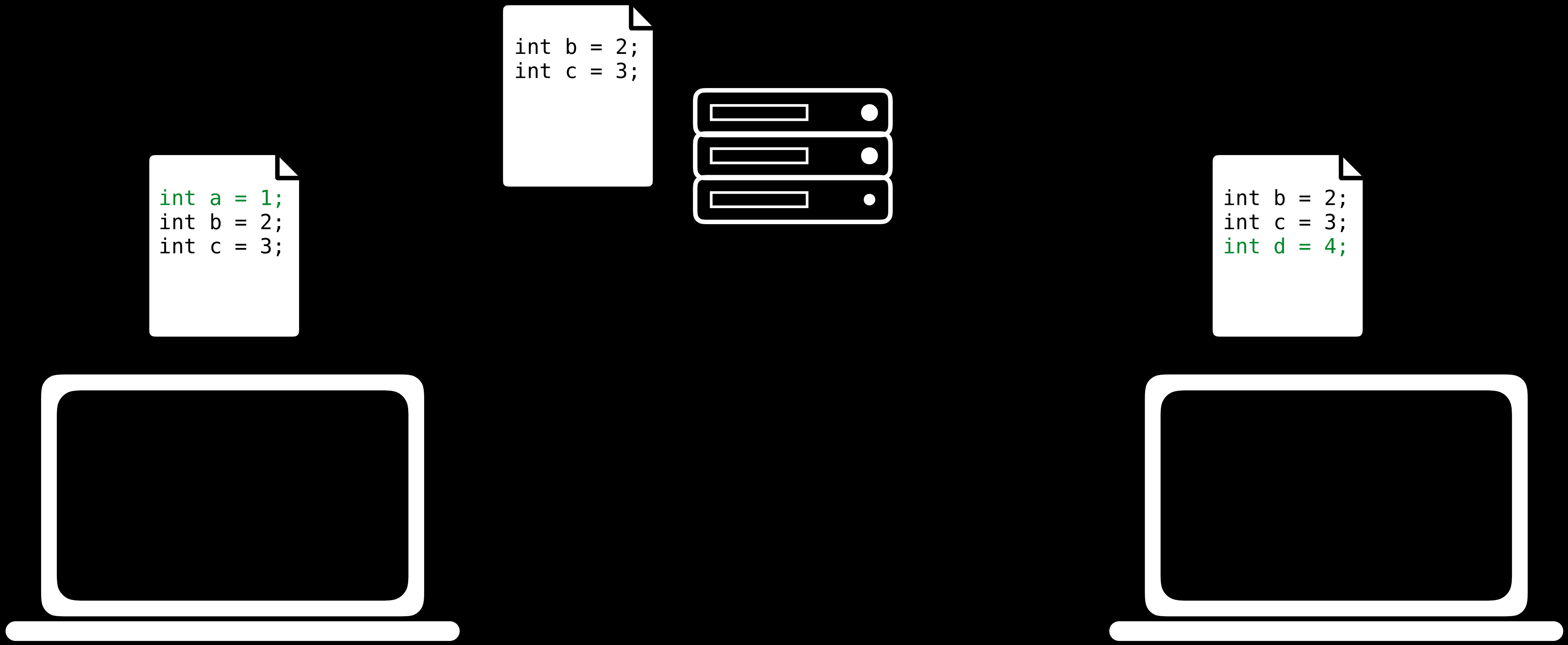

```
int a = 1;
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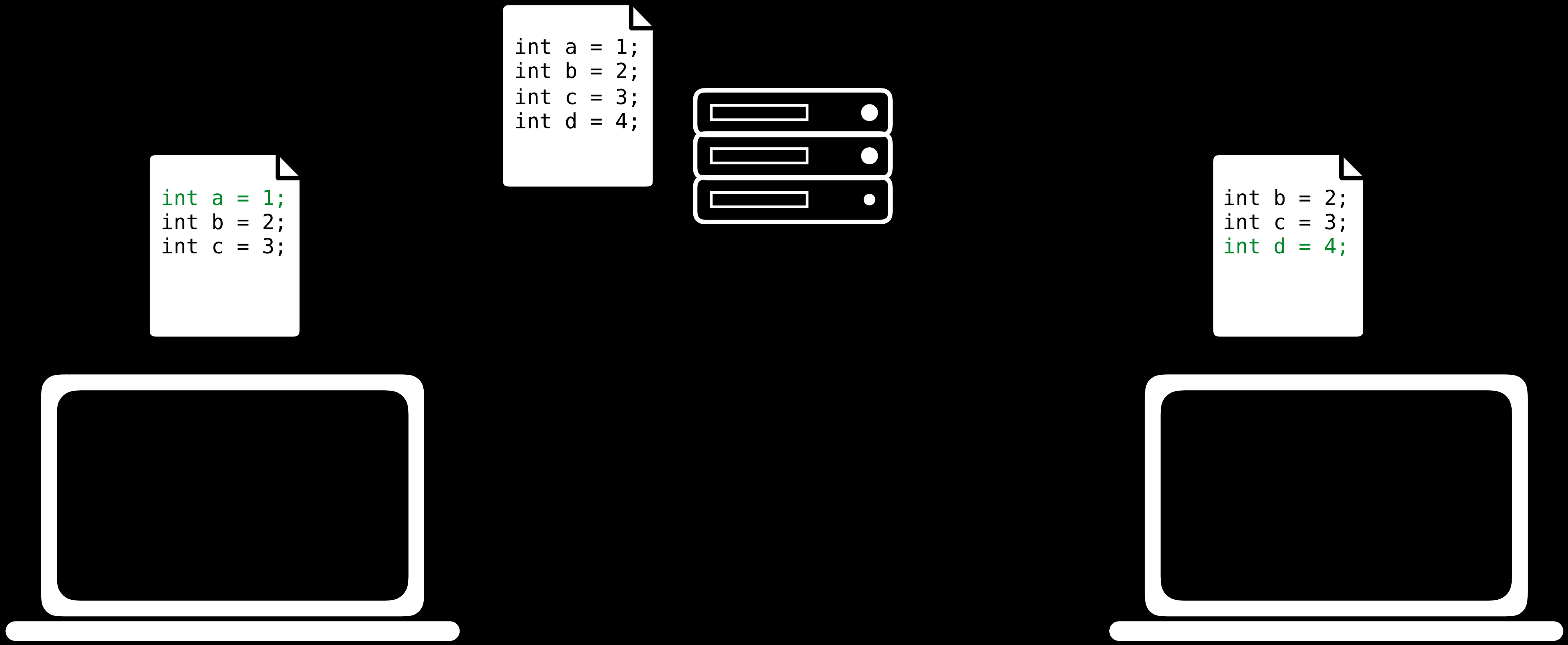
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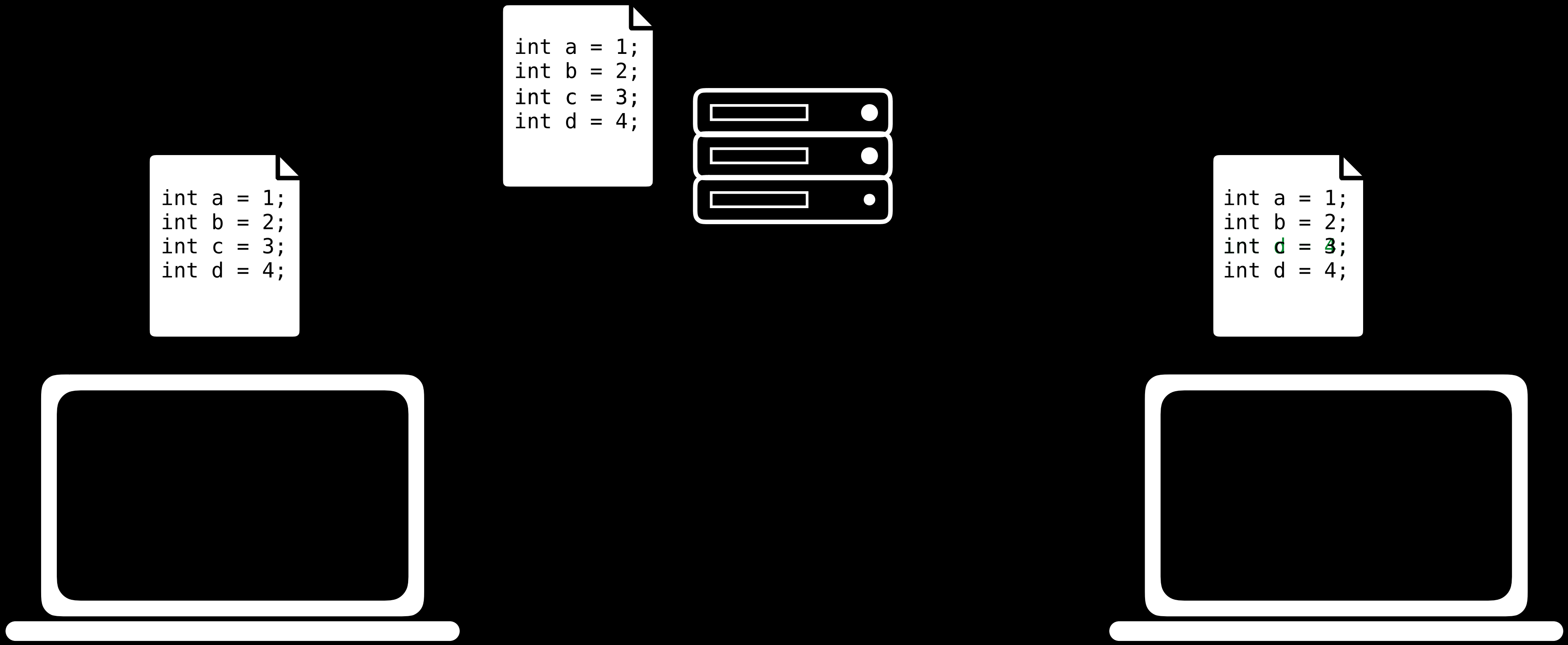

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```

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int a = 1;
int b = 2;
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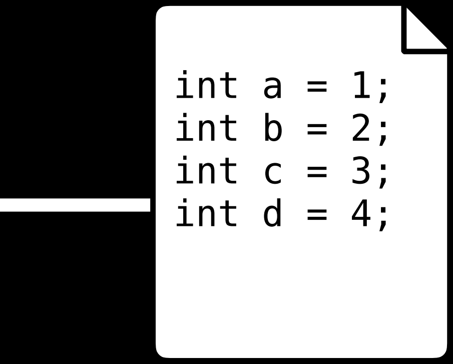
```

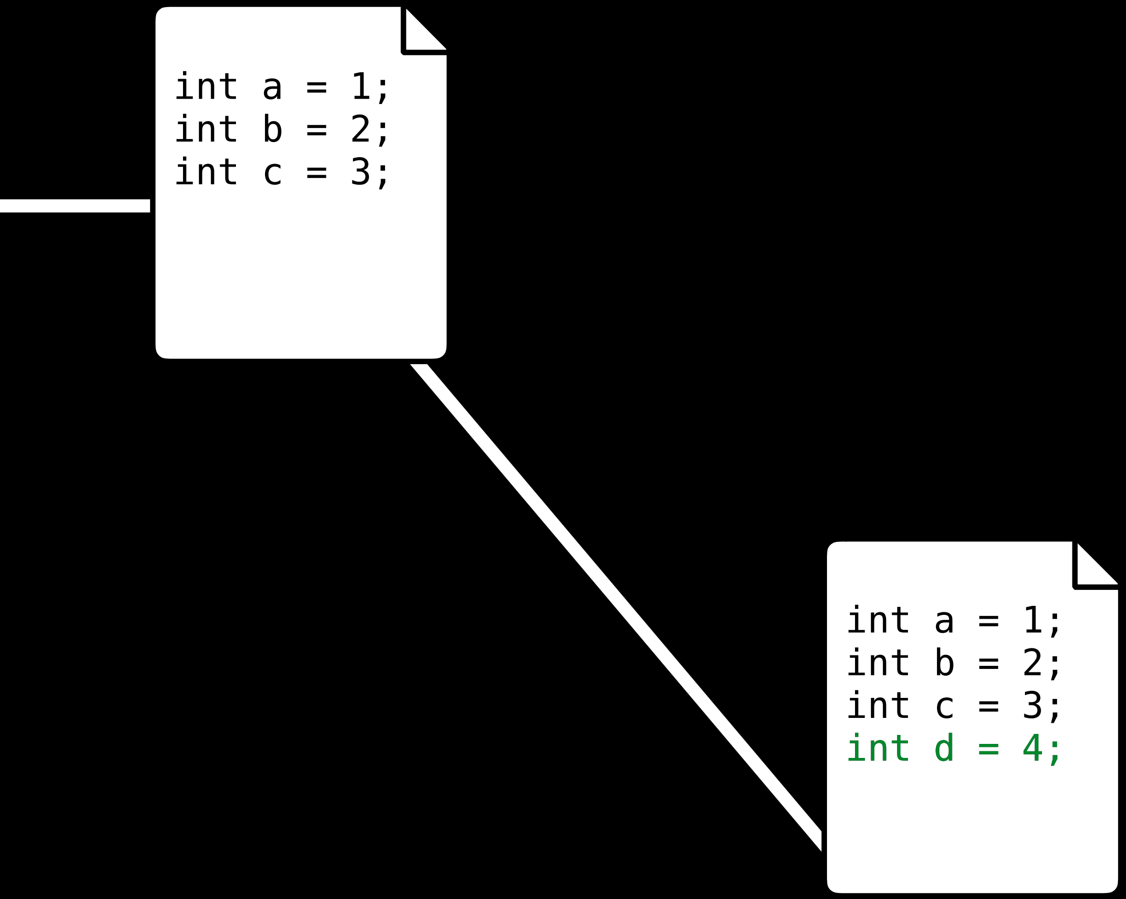
```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
int d = 4;
```

Test changes to code without losing the original.



```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

Test changes to code without losing the original.



```
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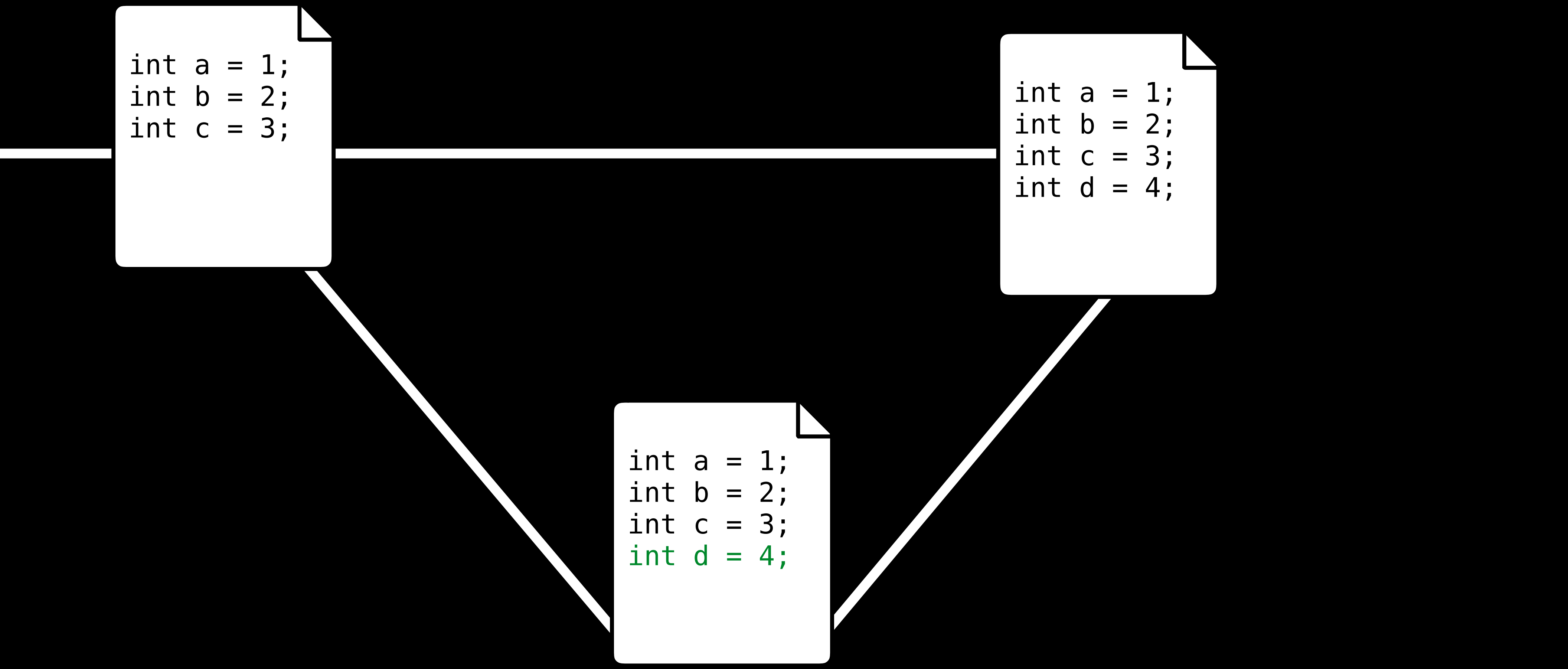

```
int a = 1;
int b = 2;
int c = 3;
```

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

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int a = 1;
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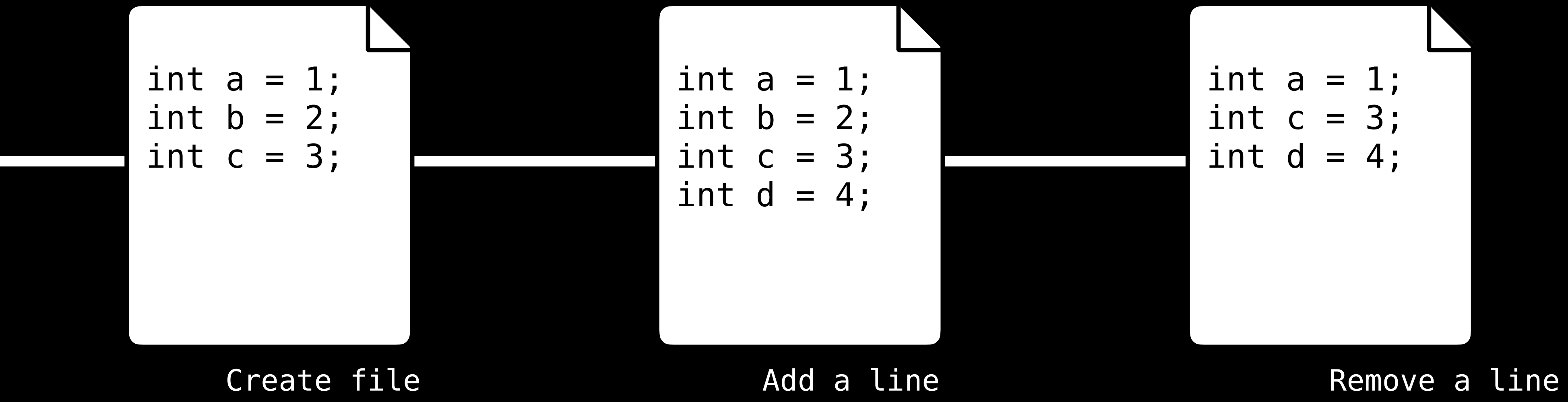
Revert back to old versions of code.



```
int a = 1;
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int c = 3;
```

Create file

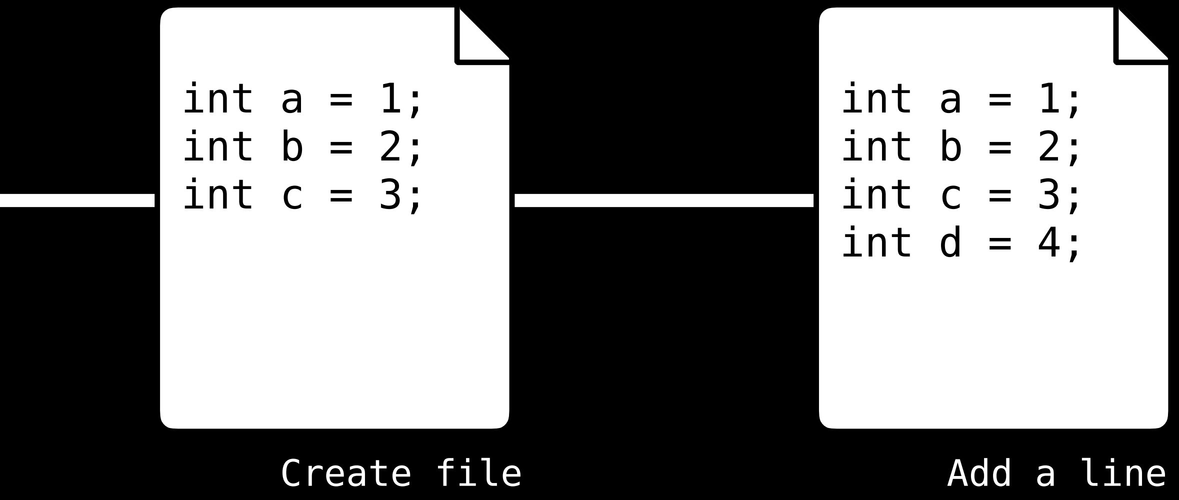
```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

Add a line

```
int a = 1;
int c = 3;
int d = 4;
```

Remove a line

Revert back to old versions of code.



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int a = 1;
int b = 2;
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```

Create file

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

Add a line

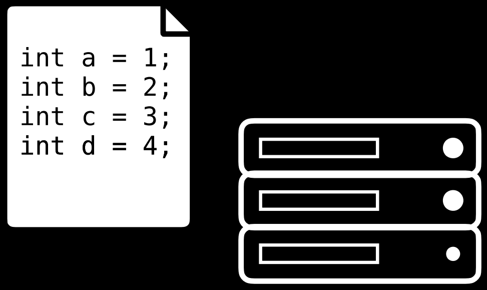
What is Git?

- Keeps track of changes to code.
- Synchronizes code between different people.
- Test changes to code without losing the original.
- Revert back to old versions of code.

```
git clone
```

`git clone <url>`

- makes a copy of a repository
- stores it on your computer
- a "fork" creates your own copy of someone else's repository



```
int a = 1;
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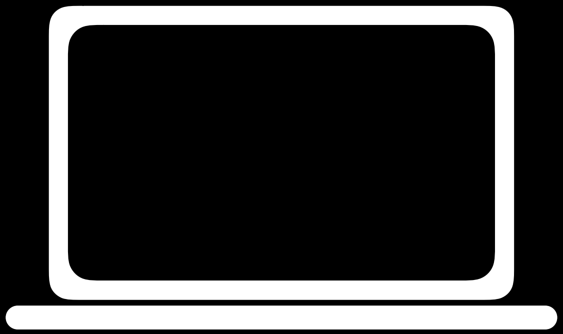
int c = 3;
int d = 4;
```



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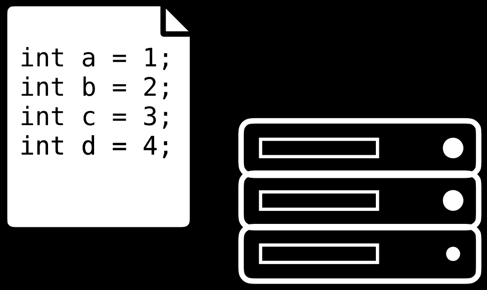

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```

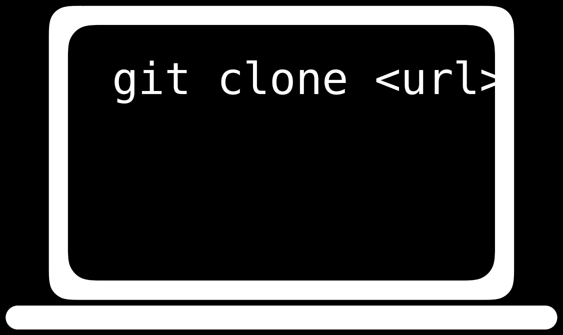

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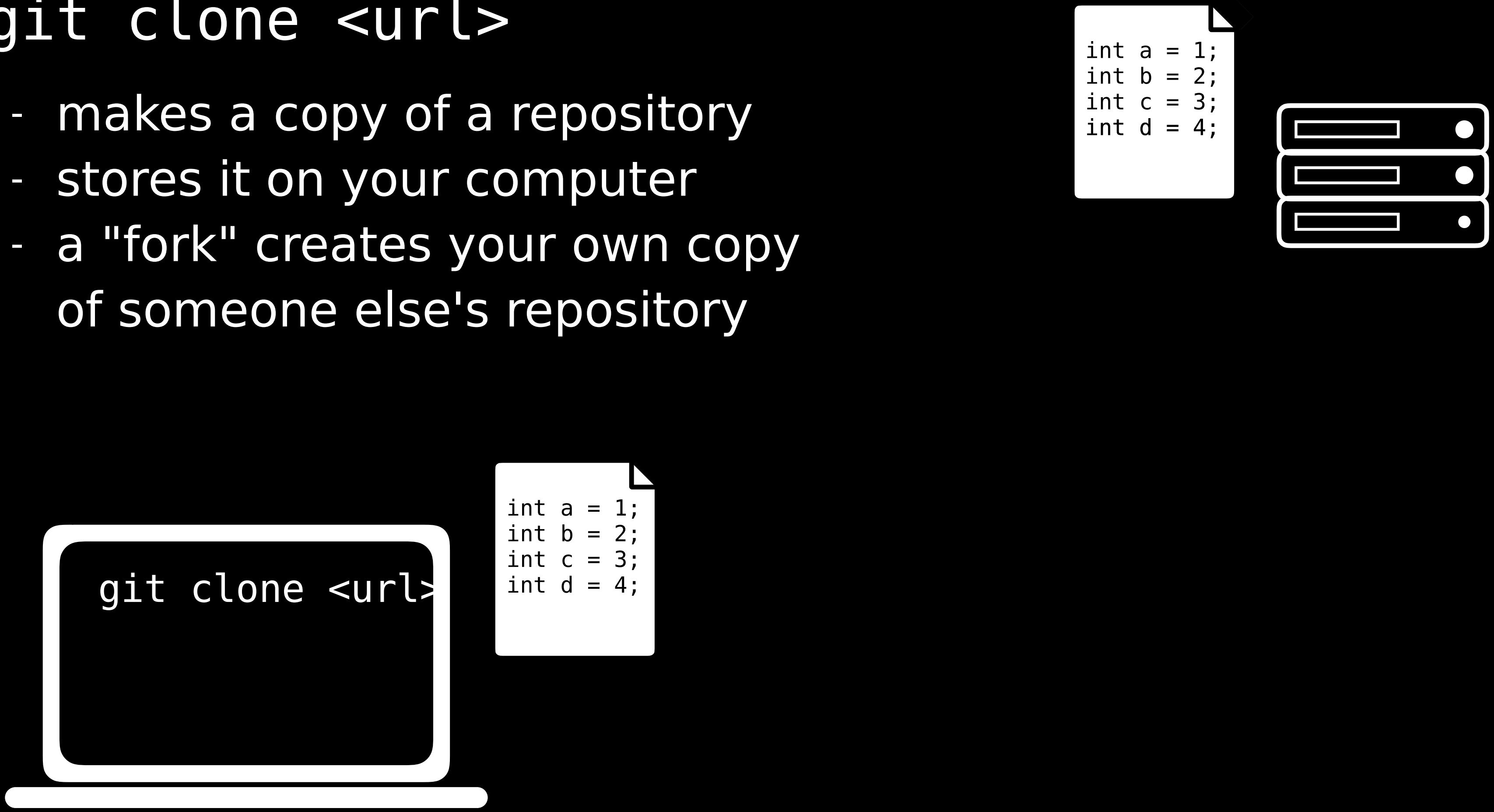

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```

```
int a = 1;
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int c = 3;
int d = 4;
```

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int a = 1;
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```
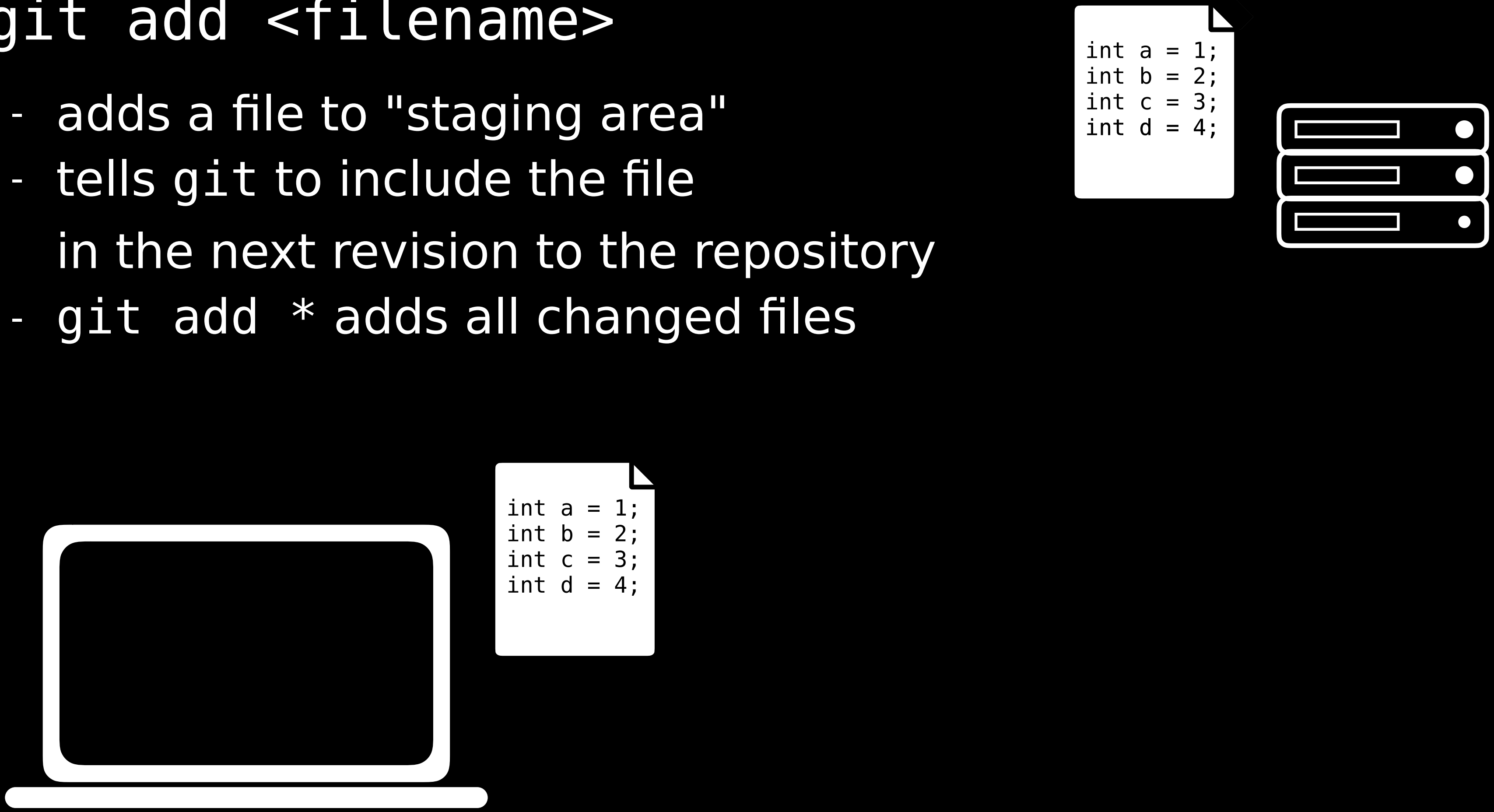

`git add`

`git add <filename>`

- adds a file to "staging area"
- tells `git` to include the file in the next revision to the repository
- `git add *` adds all changed files



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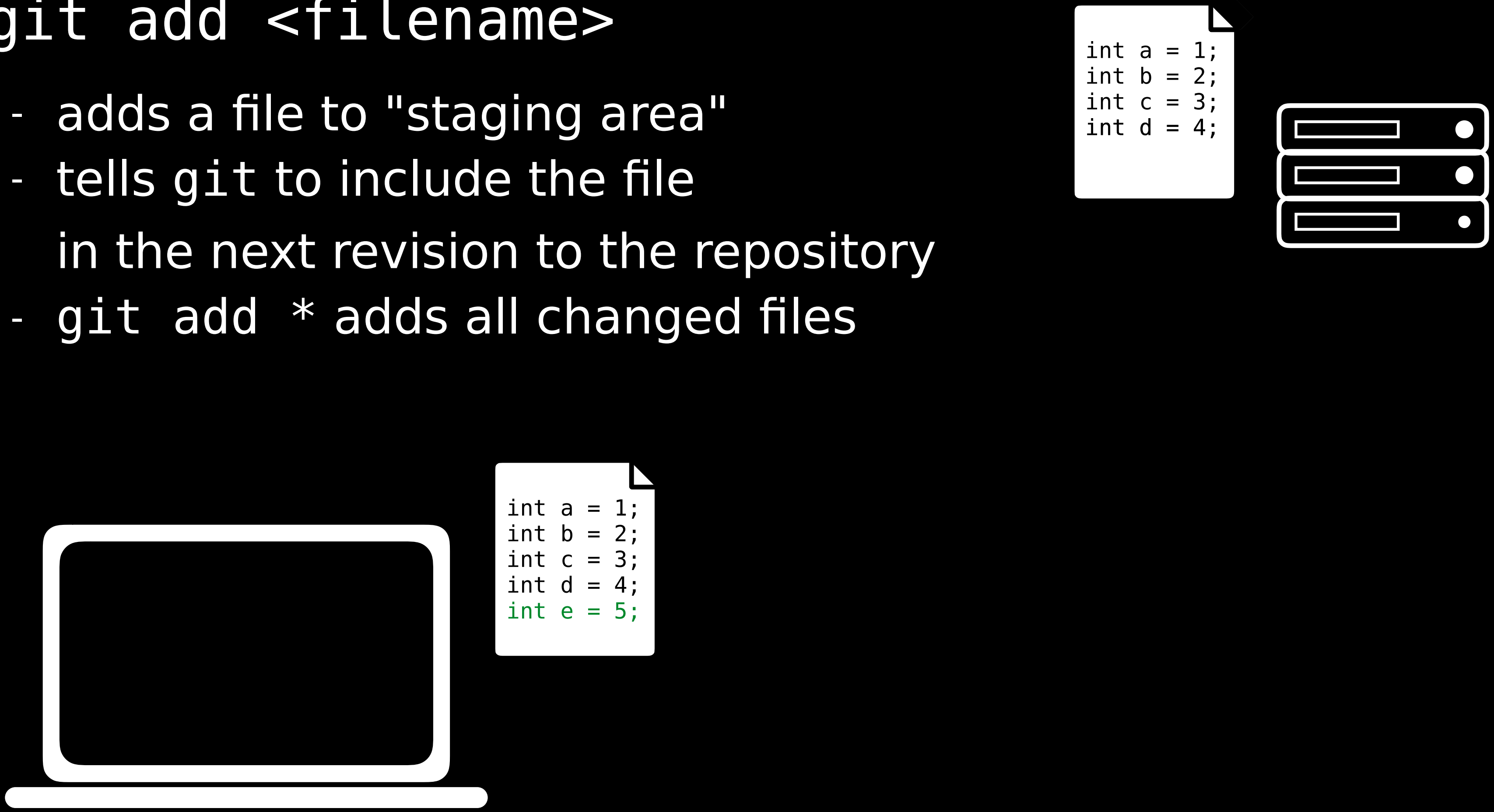

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
int e = 5;
```

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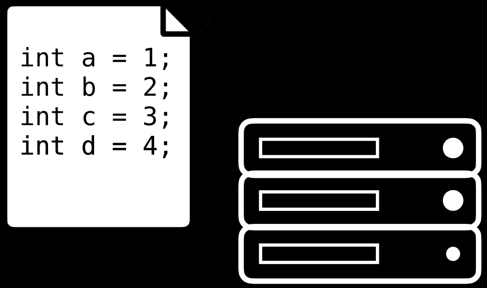

```
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```

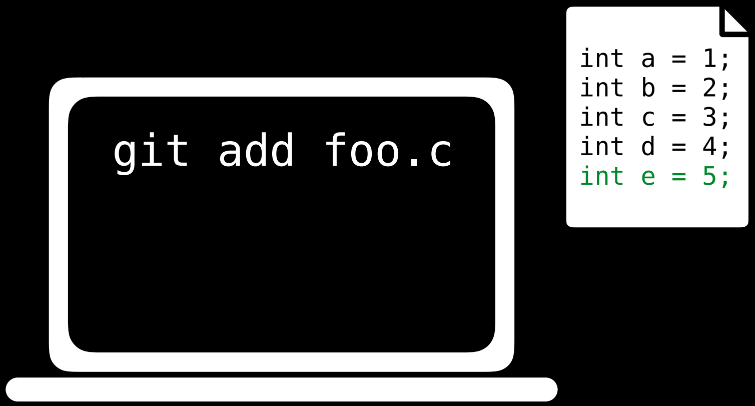

```
git add foo.c
```

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
int e = 5;
```

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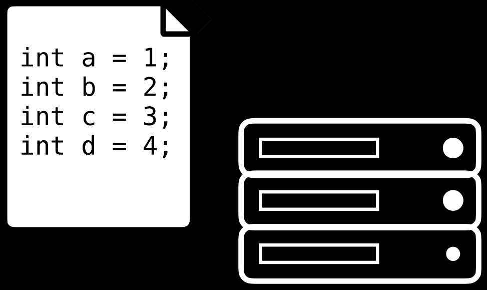

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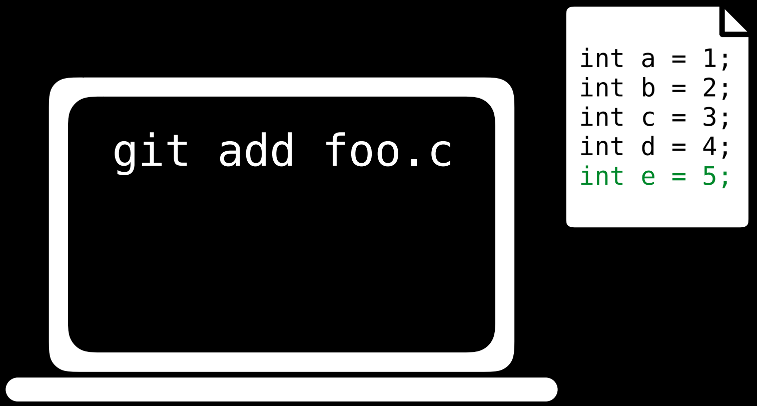


```
git add foo.c
```

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
int e = 5;
```

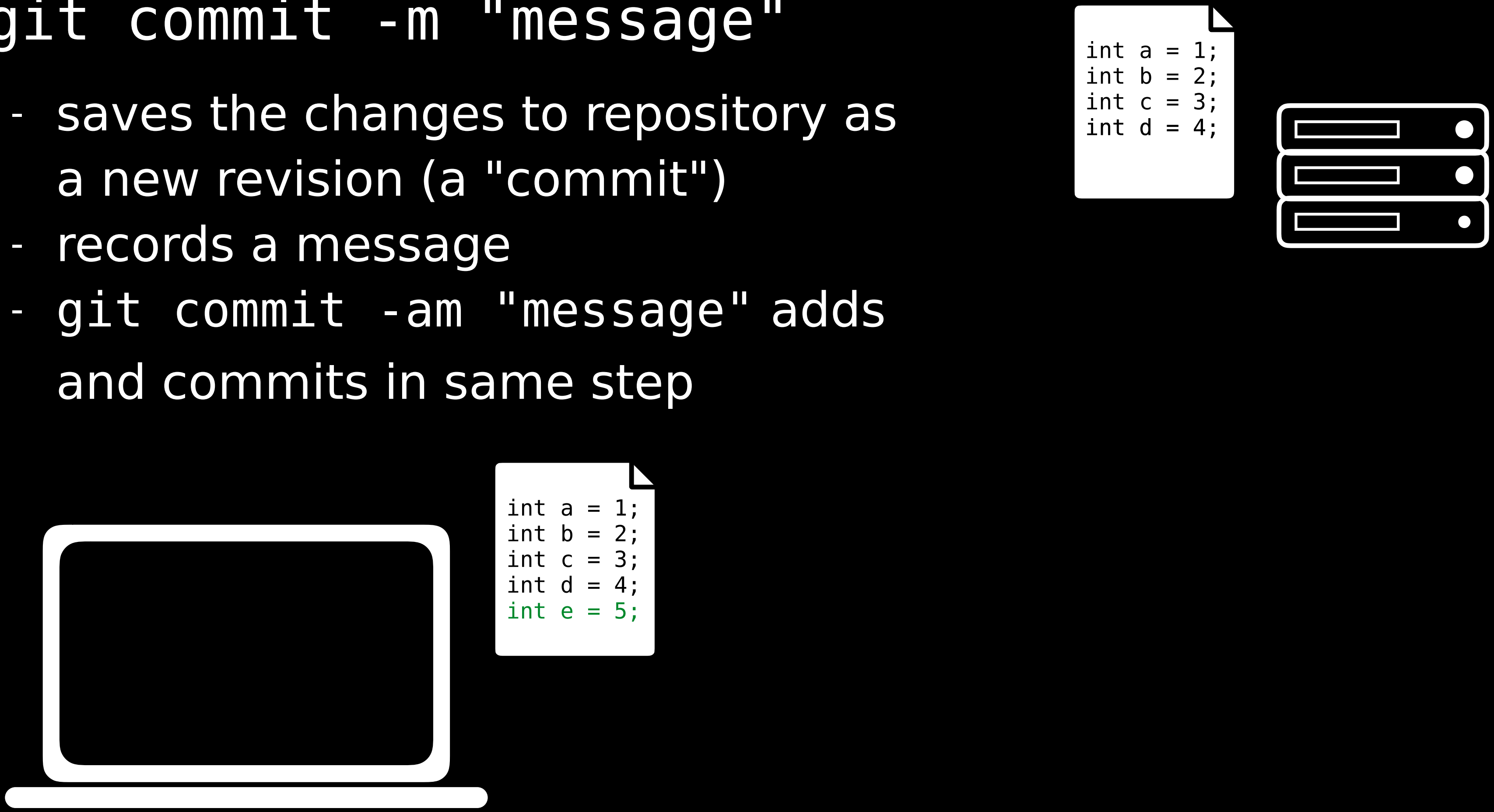
```
Changes to be committed:

    modified: foo.c
```

```
git commit
```

`git commit -m "message"`

- saves the changes to repository as a new revision (a "commit")
- records a message
- `git commit -am "message"` adds and commits in same step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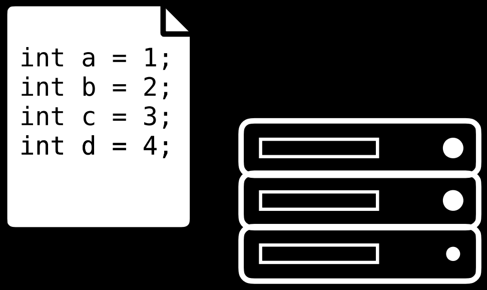

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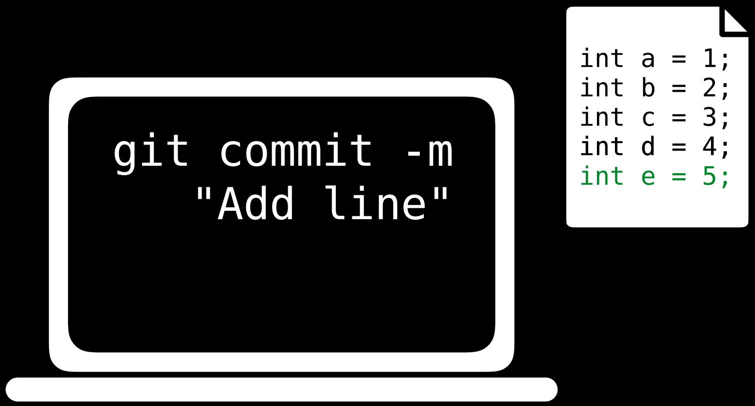

```
git commit -m
   "Add line"
```

```
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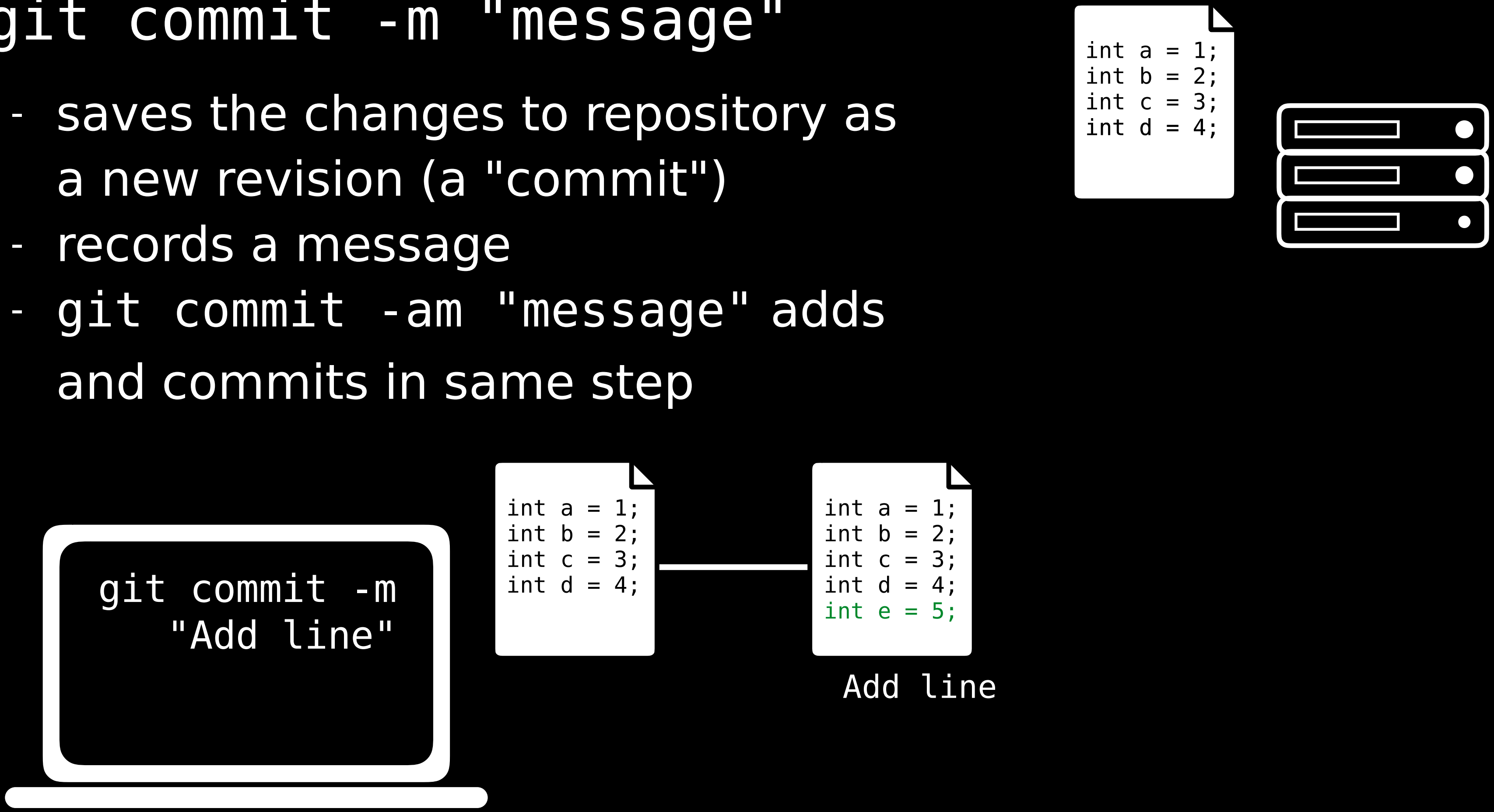
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```

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  "Add line"
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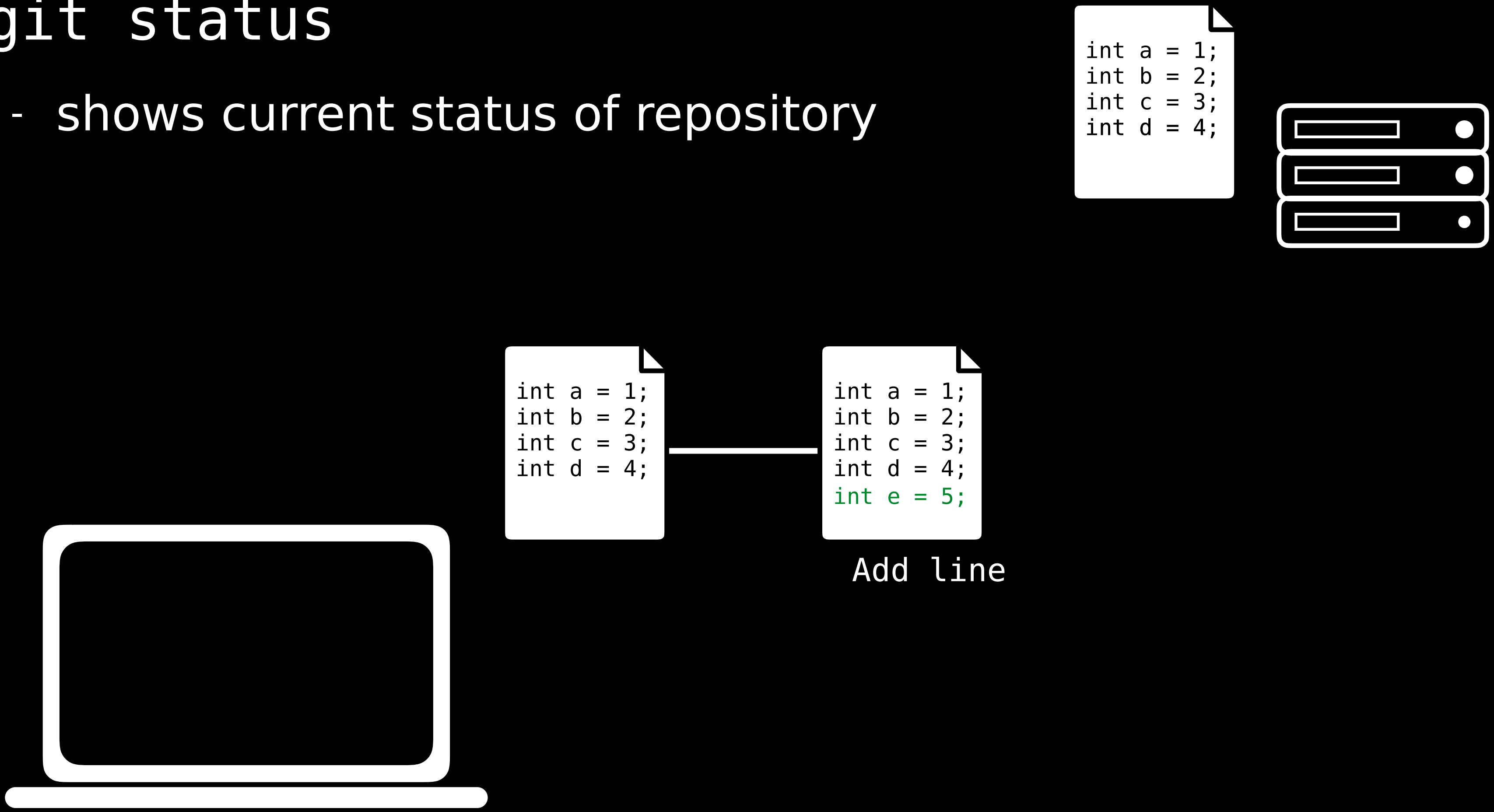
```

```
git status
```

git status

- shows current status of repository



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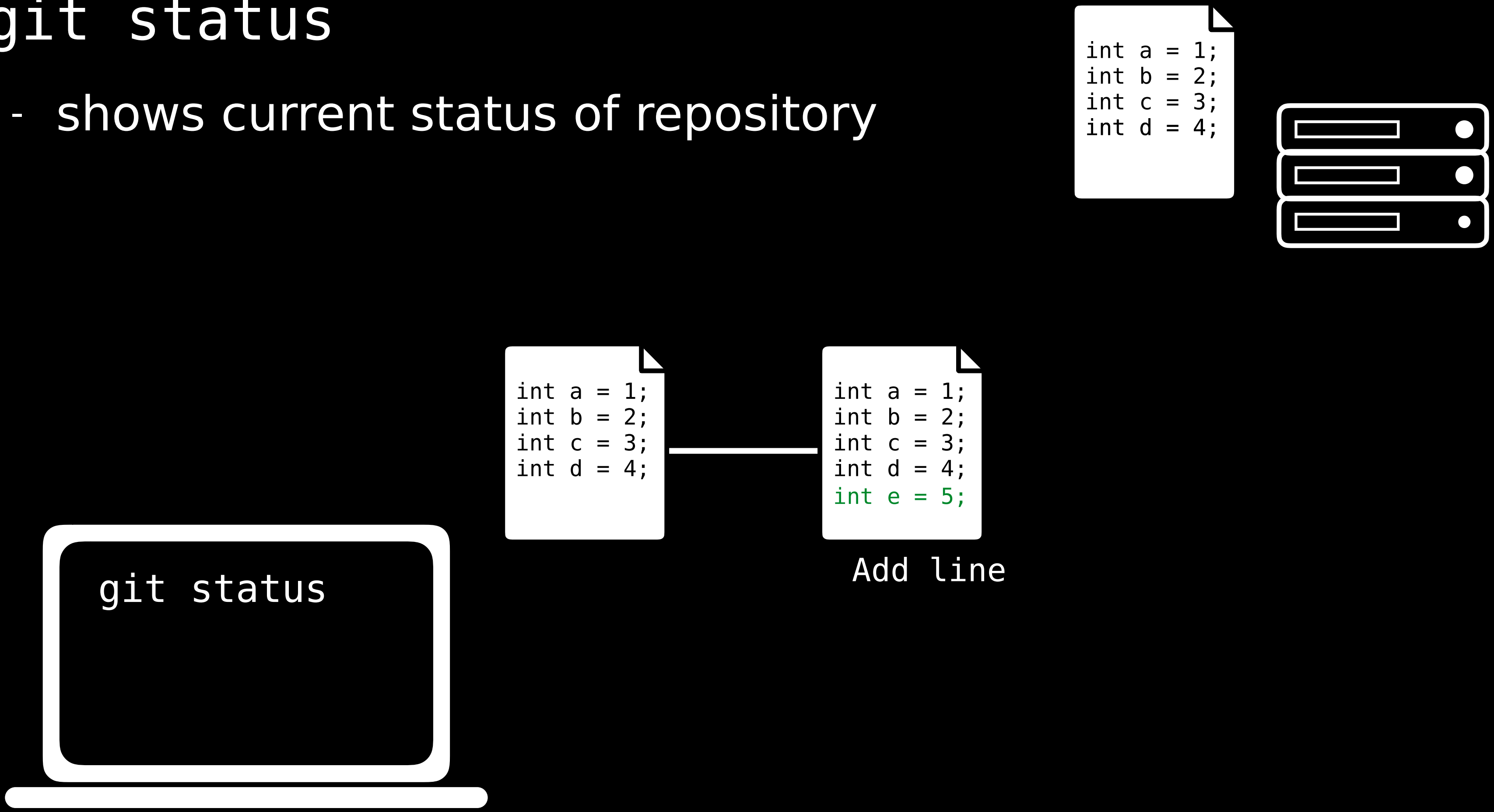

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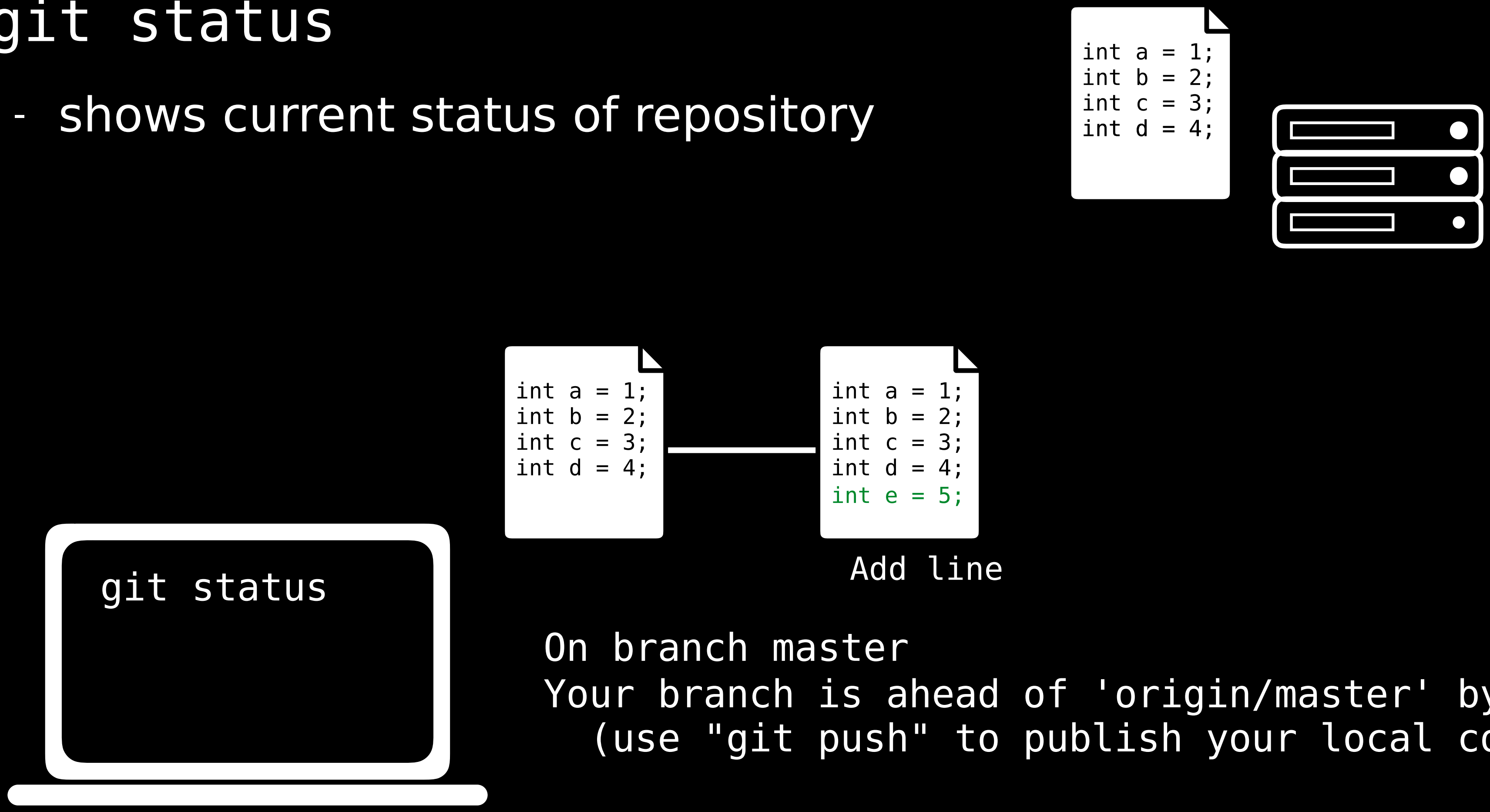

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```

```
int a = 1;
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```

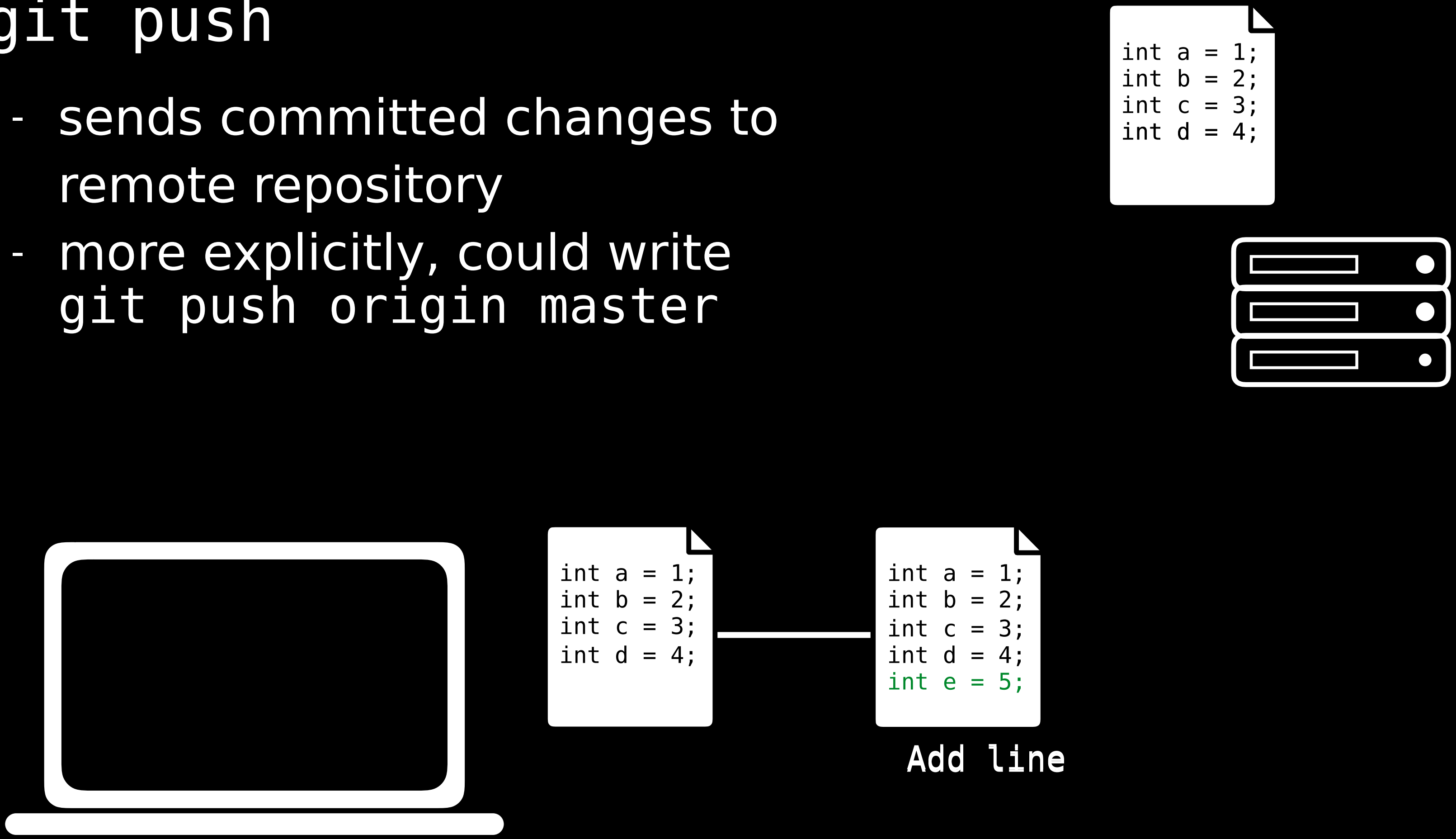
```
git status
```

```
On branch master
Your branch is ahead of 'origin/master' by 1 commi
  (use "git push" to publish your local commits)
```

```
git push
```

`git push`

- sends committed changes to remote repository
- more explicitly, could write `git push origin master`



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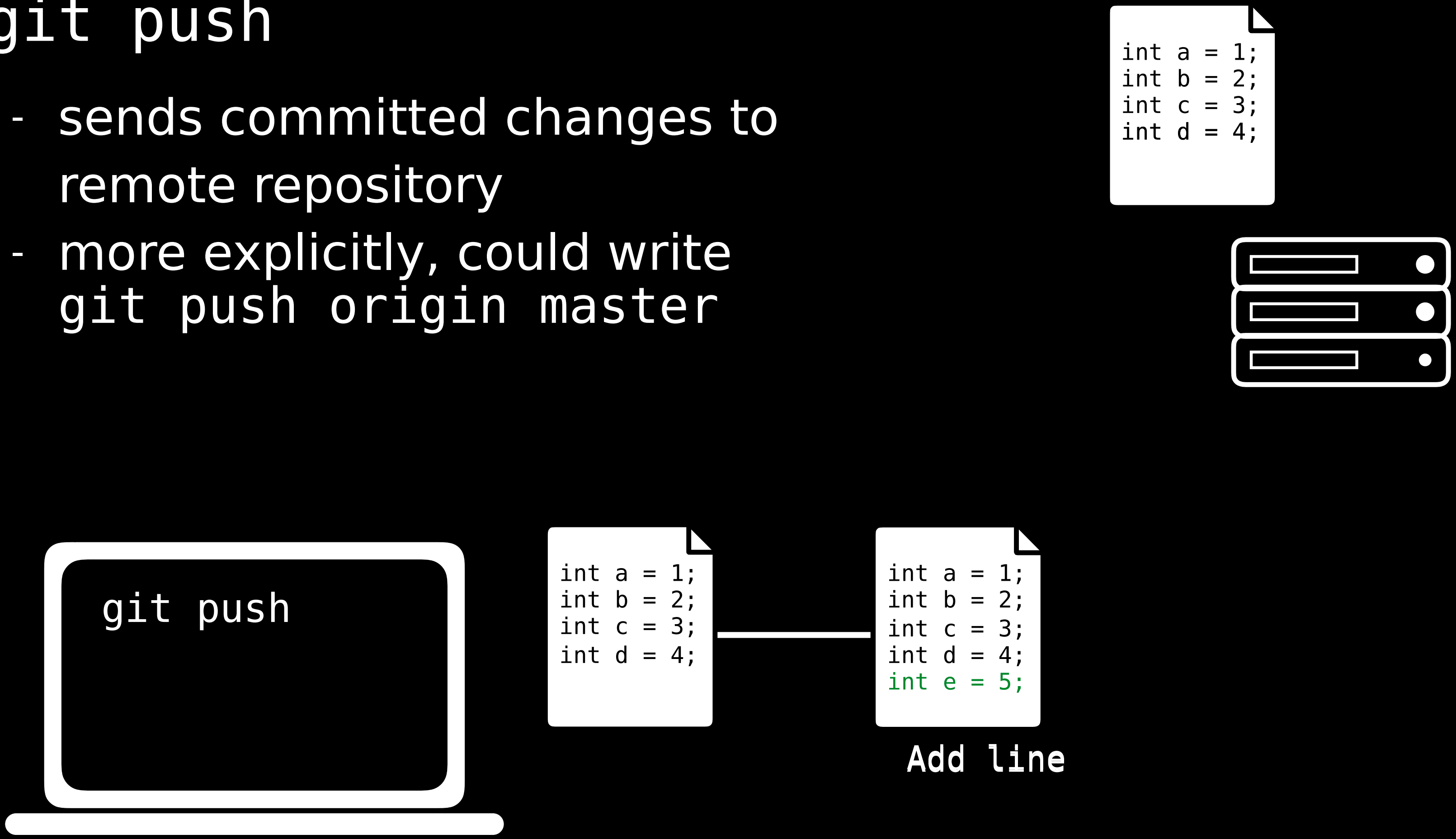

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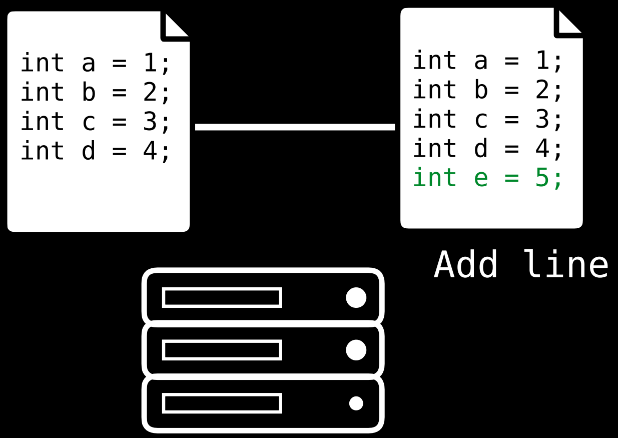

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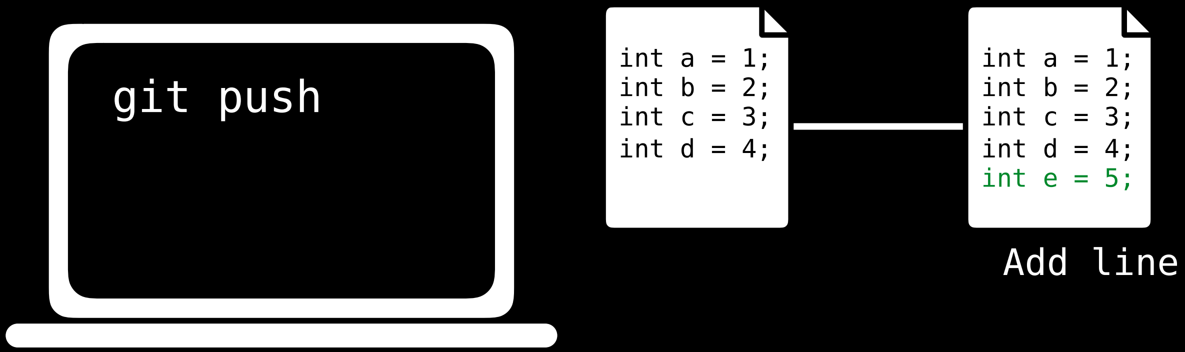

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```
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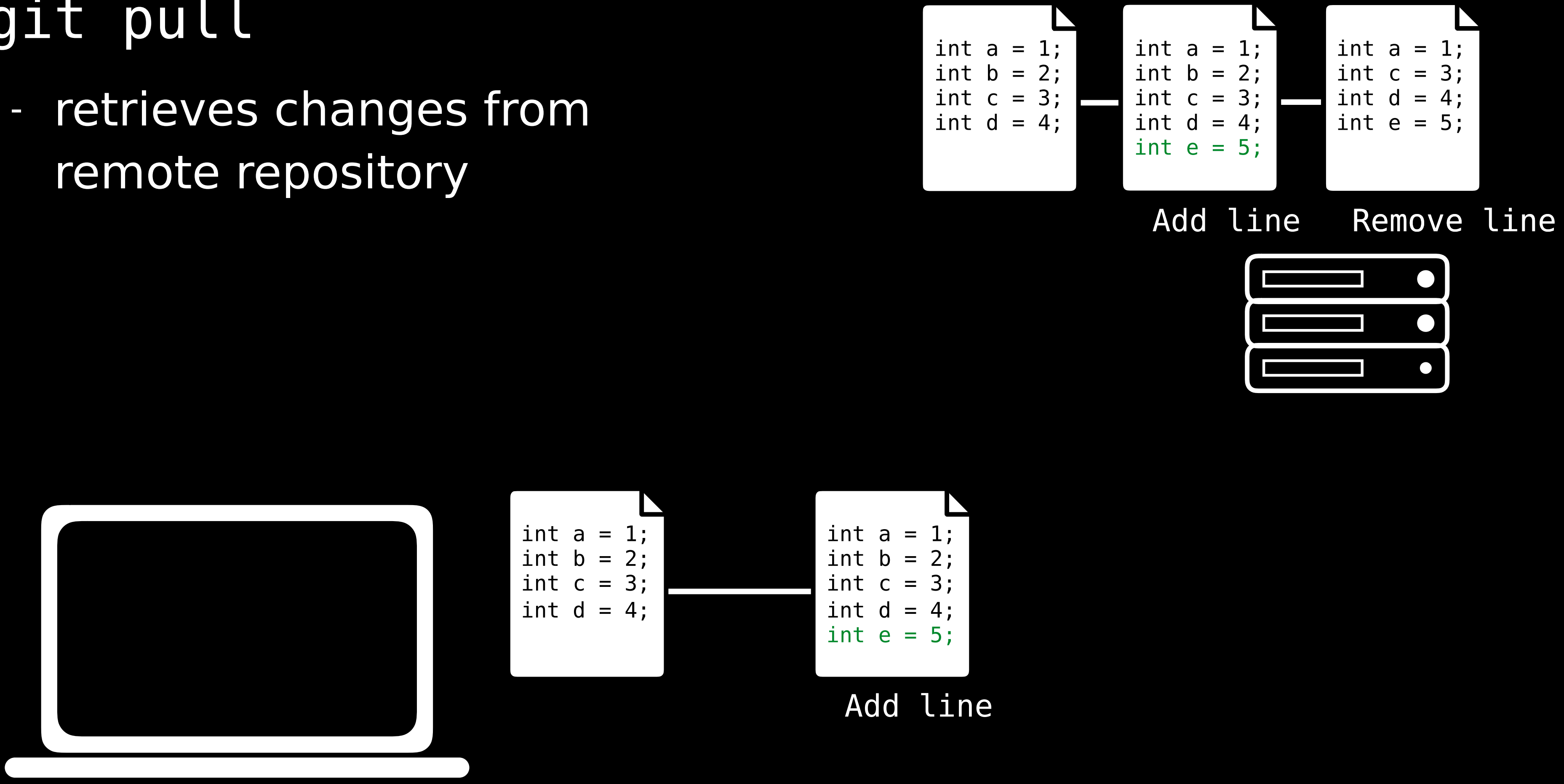
```
git pull
```

git pull

- retrieves changes from remote repository



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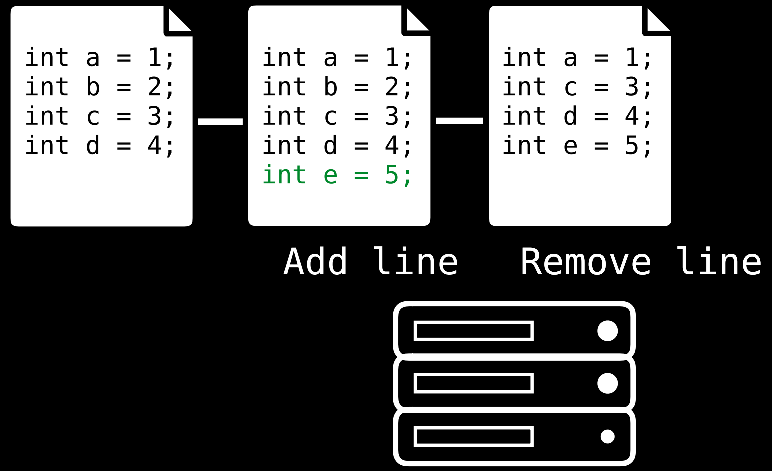
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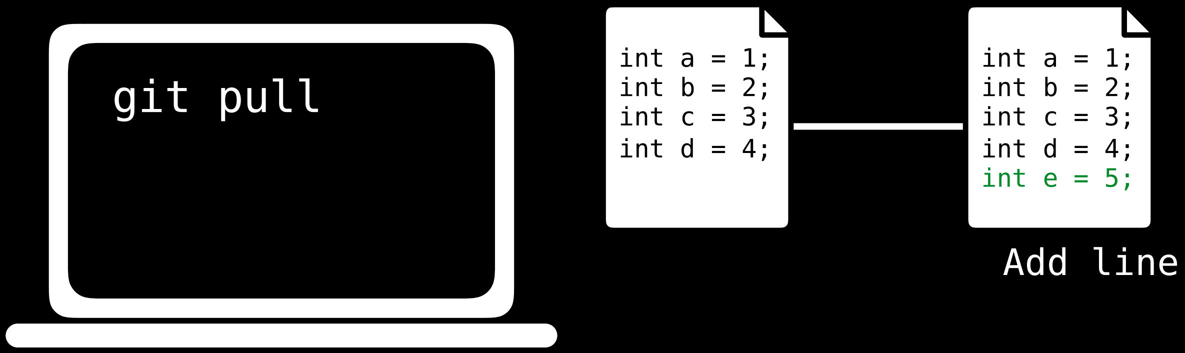
```
git pull
```

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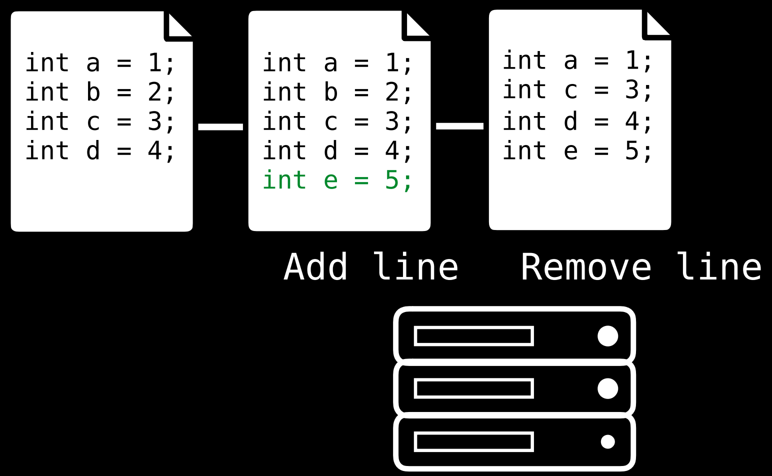

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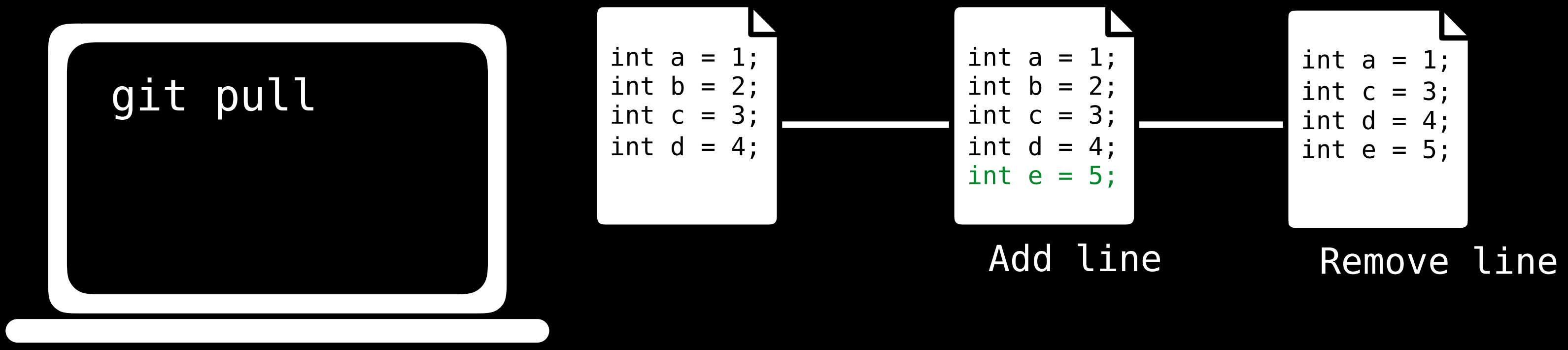

```
git pull
```

```
int a = 1;
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Merge Conflicts

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- when two different commits can't be automatically merged
- need to be resolved

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```
git pull
```

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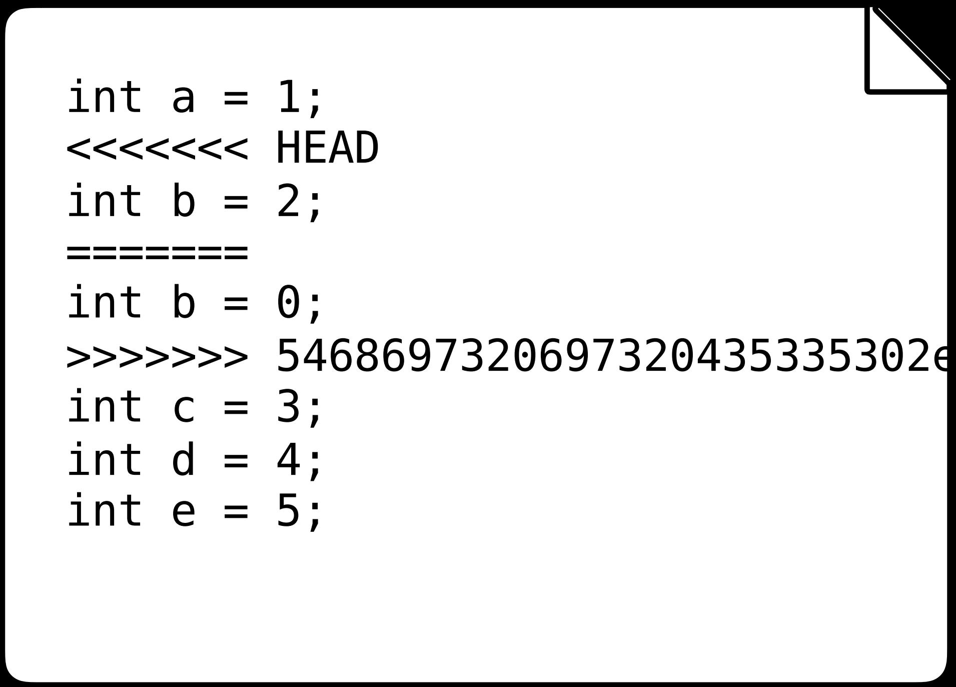
```
git pull
```

```
CONFLICT (content): Merge conflict in foo.c
Automatic merge failed; fix conflicts and then
commit the result.
```

Merge Conflicts

- when two different commits can't be automatically merged
- need to be resolved

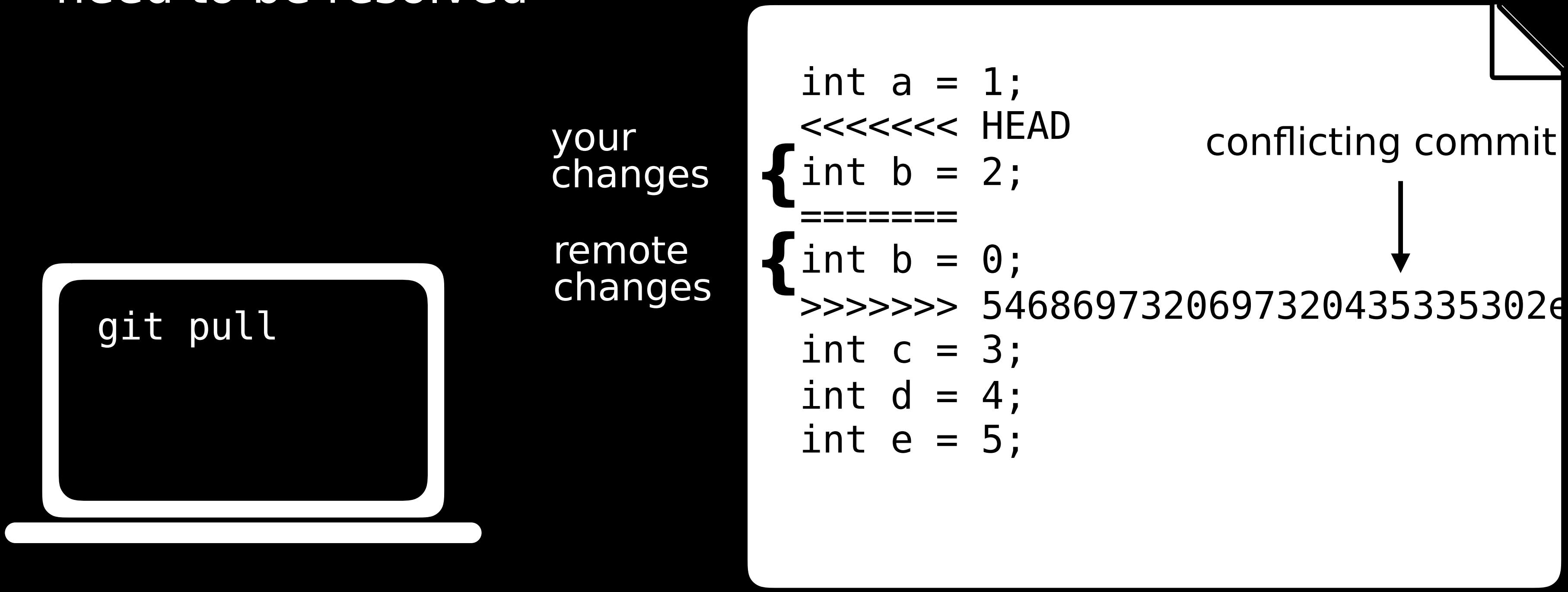
```
git pull
```



```
int a = 1;
<<<<<<< HEAD
int b = 2;
=======
int b = 0;
>>>>>>> 54686973206973204353353O2e
int c = 3;
int d = 4;
int e = 5;
```

Merge Conflicts

- when two different commits can't be automatically merged
- need to be resolved



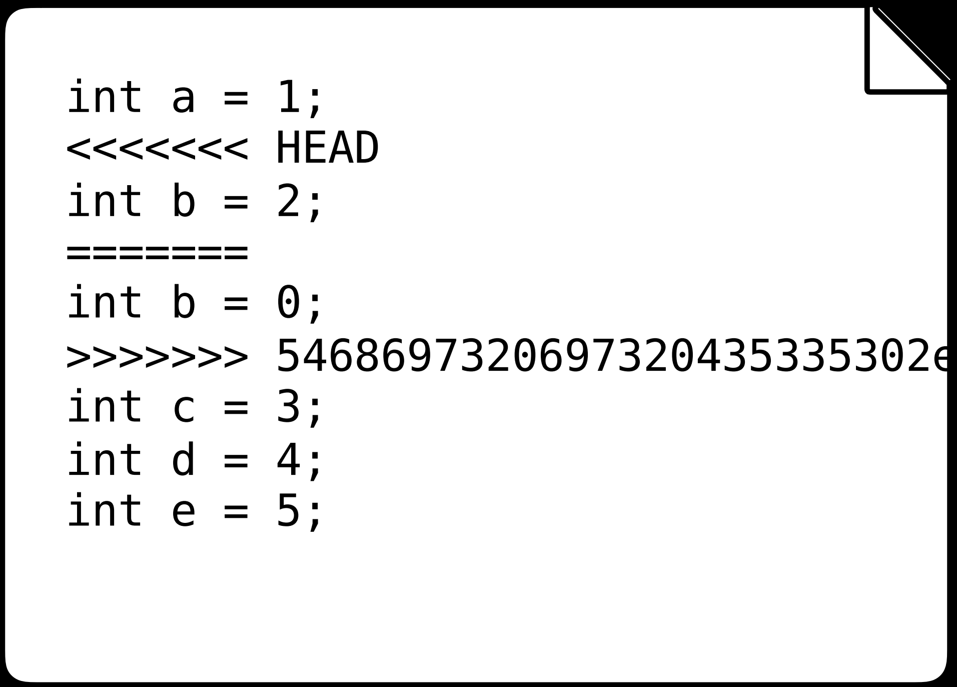
```
git pull
```

```
int a = 1;
<<<<<<< HEAD
int b = 2;
=======
int b = 0;
>>>>>>> 546869732069732043533530 2e
int c = 3;
int d = 4;
int e = 5;
```

Merge Conflicts

- when two different commits can't be automatically merged
- need to be resolved

```
git pull
```

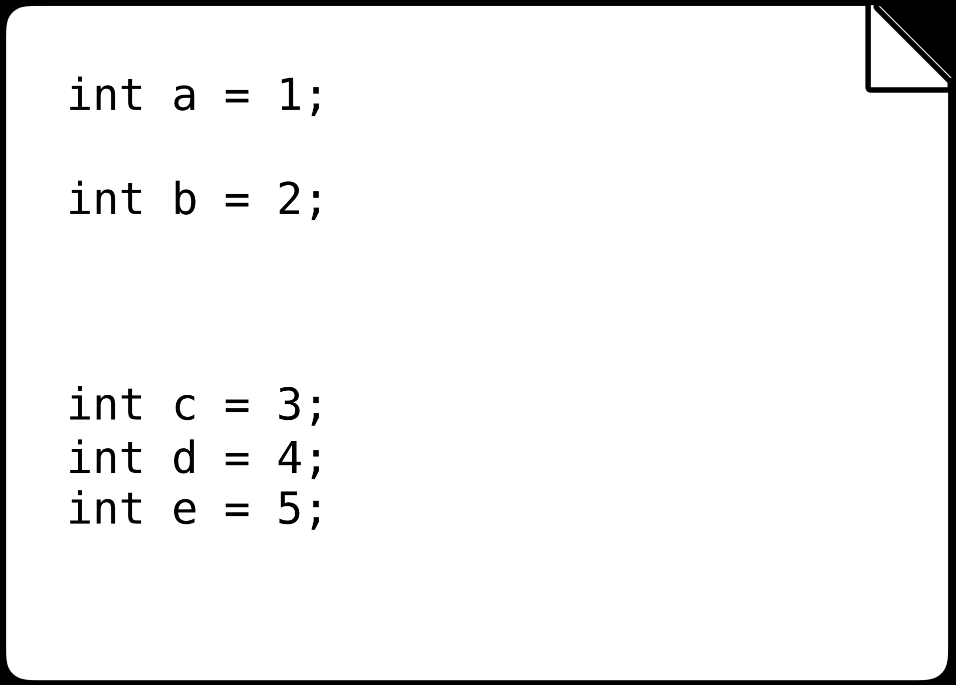


```
int a = 1;
<<<<<<< HEAD
int b = 2;
=======
int b = 0;
>>>>>>> 5468697320697320435335302e
int c = 3;
int d = 4;
int e = 5;
```

Merge Conflicts

- when two different commits can't be automatically merged
- need to be resolved

```
git pull
```

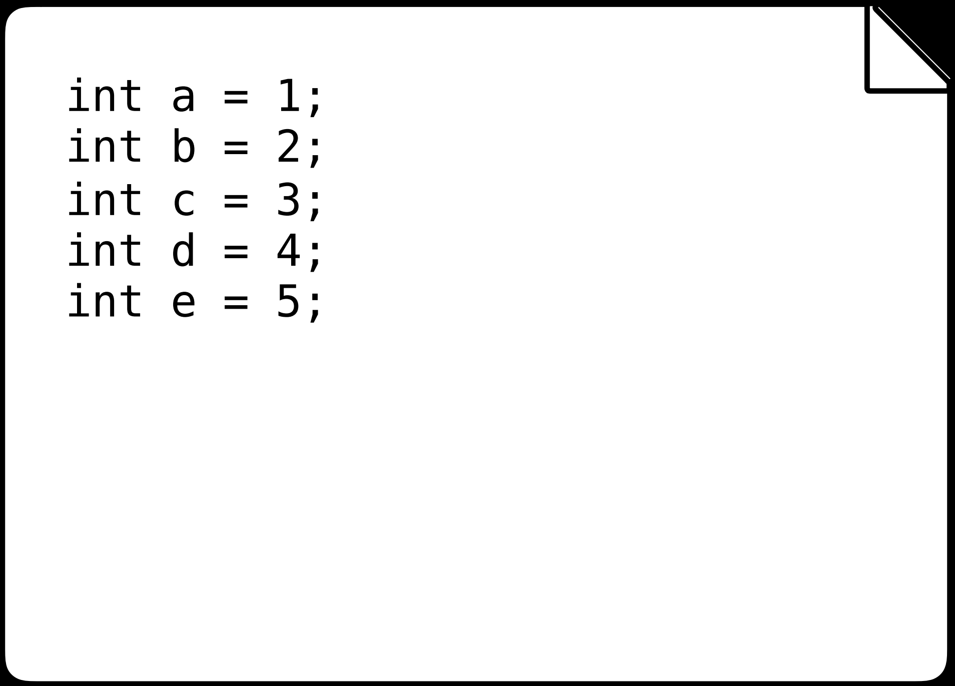


```
int a = 1;

int b = 2;



int c = 3;
int d = 4;
int e = 5;
```

Merge Conflicts

- when two different commits can't be automatically merged
- need to be resolved

```
git pull
```



```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
int e = 5;
```

```
git log
```

`git log`

- shows a history of commits and messages

`git log`

- shows a history of commits and messages

```
git log
```

git log

- shows a history of commits and messages

```
commit 5468697320697320435335302e
Author: Brian Yu <brianyu@college.harvard.edu
Date:   Tue Oct 11 21:09:37 2016 -0400

    Remove a line

commit 4920746f6f6b20435335302e
Author: Brian Yu <brianyu@college.harvard.edu
Date:   Tue Oct 11 21:05:28 2016 -0400

    Add a line
```

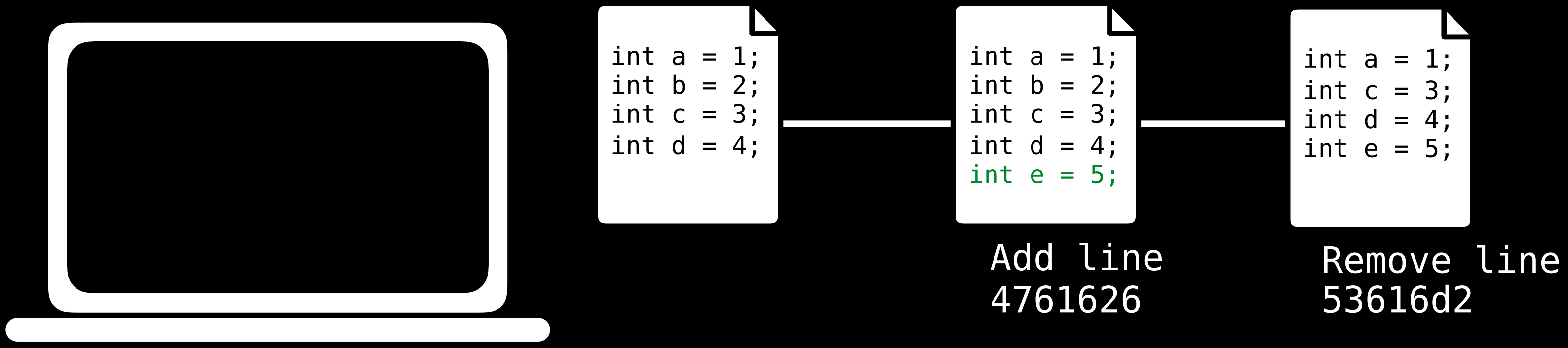
`git reset`

git reset

- `git reset --hard <commit>`

  reverts code back to a previous commit
- `git reset --hard origin/master`

  reverts code back to remote repository version

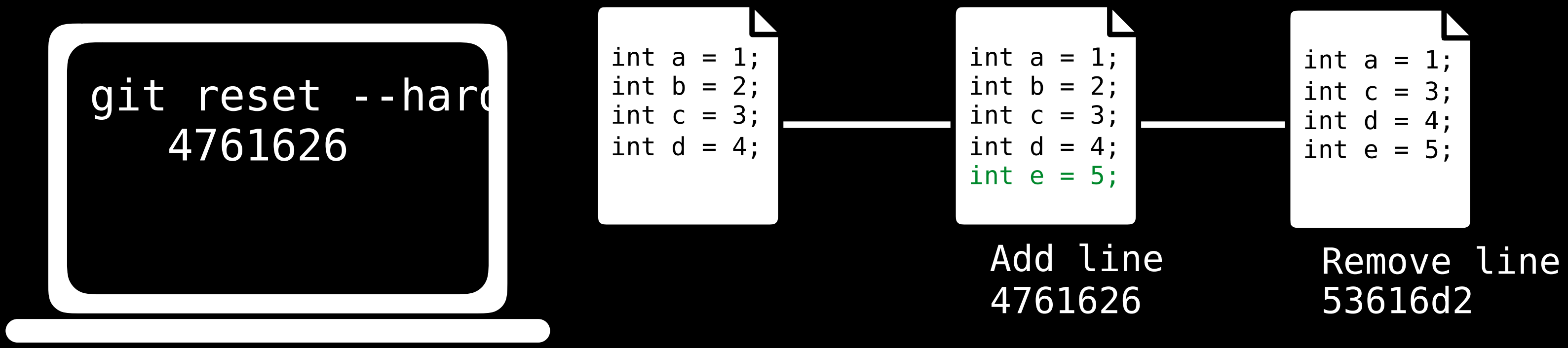


git reset

- `git reset --hard <commit>`

  reverts code back to a previous commit
- `git reset --hard origin/master`

  reverts code back to remote repository version



```
git reset --hard
   4761626
```

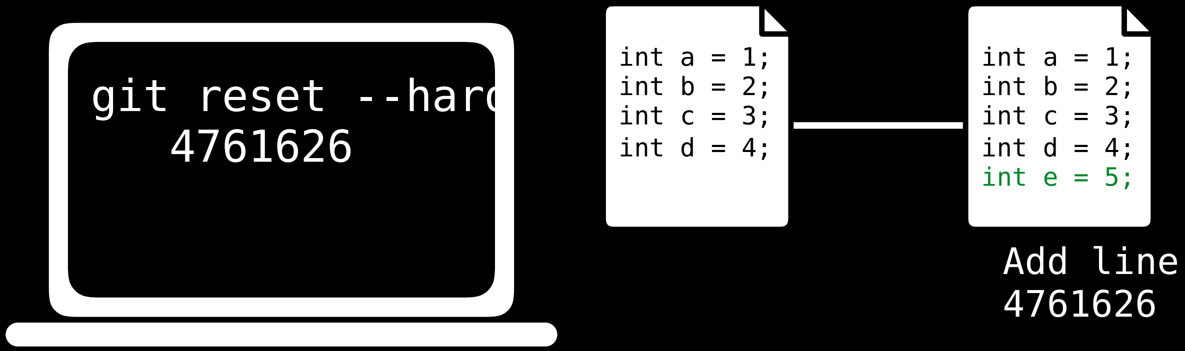
```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
int e = 5;
```

```
int a = 1;
int c = 3;
int d = 4;
int e = 5;
```

git reset

- `git reset --hard <commit>`
  reverts code back to a previous commit
- `git reset --hard origin/master`
  reverts code back to remote repository version



```
git reset --hard
   4761626
```

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
int e = 5;
```

Branching

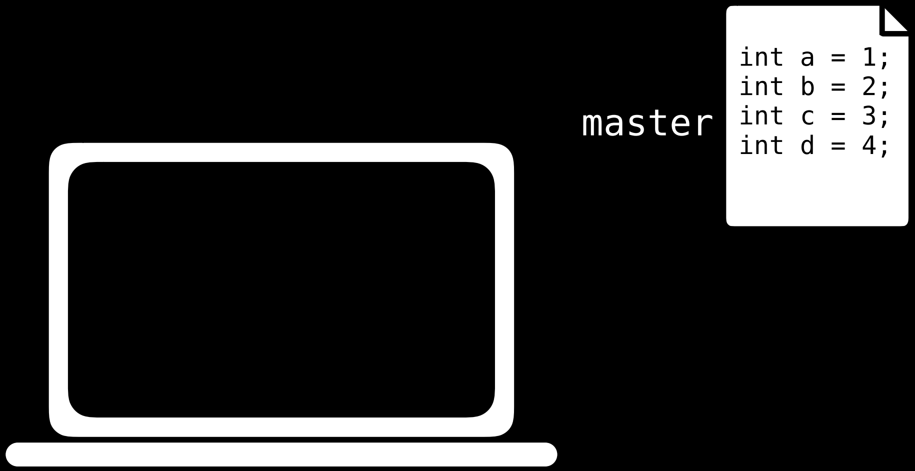
Branching

- Branch is a version of the repository.
- Each branch has its own commit history and current version.

`git branch`

`git branch`

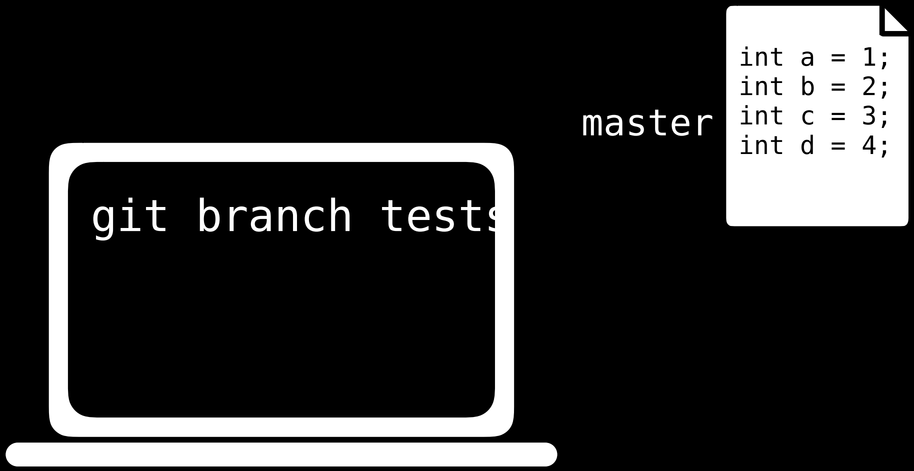
- shows all branches of code
- create a branch with `git branch <branch_name>`
- switch to ("checkout") a new branch with `git checkout <branch_name>`



```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

`git branch`

- shows all branches of code
- create a branch with `git branch <branch_name>`
- switch to ("checkout") a new branch with `git checkout <branch_name>`

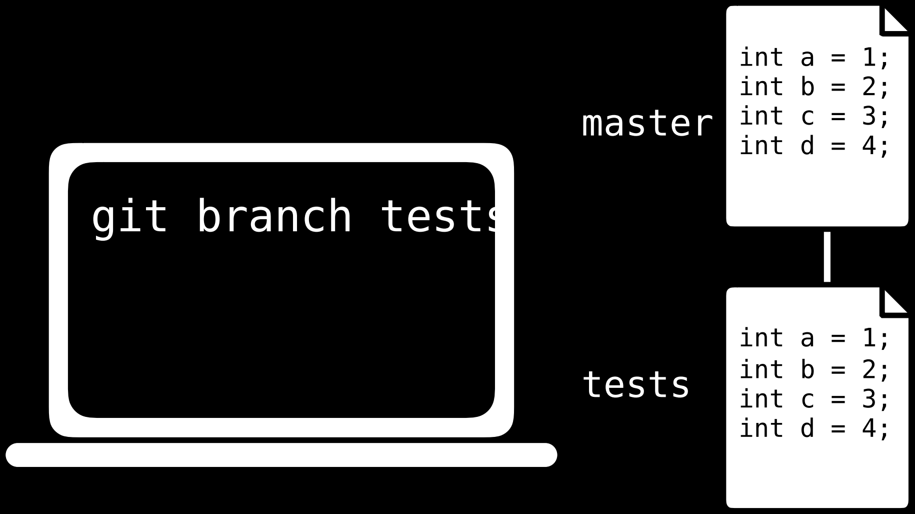


```
git branch tests
```

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

`git branch`

- shows all branches of code
- create a branch with `git branch <branch_name>`
- switch to ("checkout") a new branch with `git checkout <branch_name>`



```
git branch tests
```

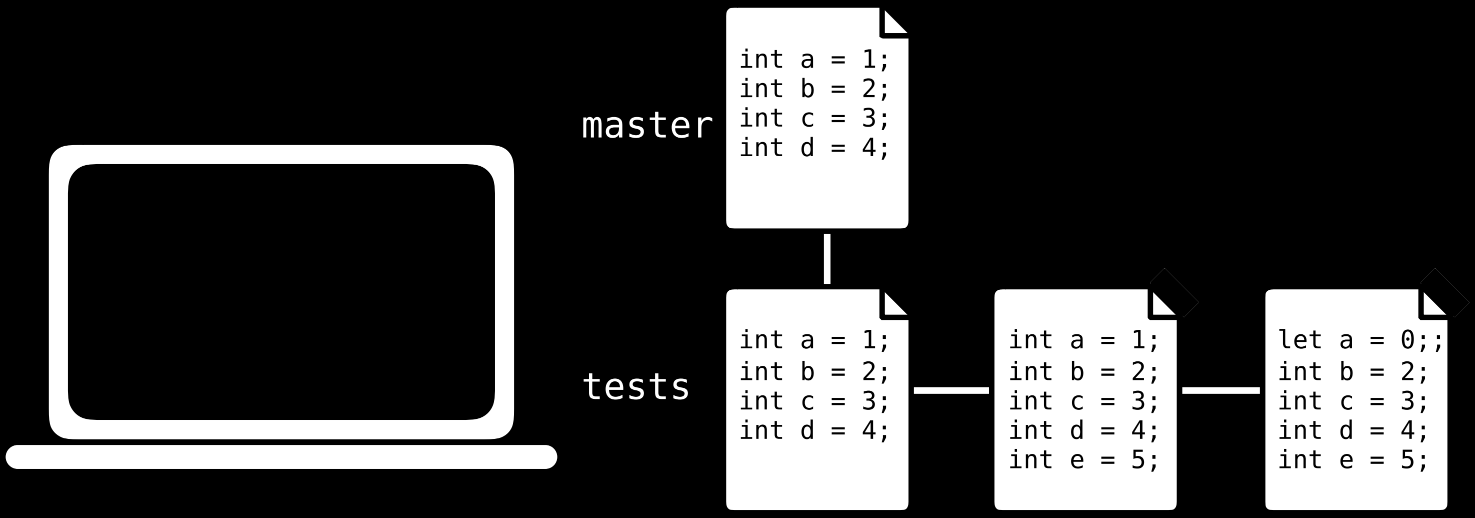
```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

`git merge`

git merge

- `git merge <branch_name>` merges the branch `branch_name` with current branch



```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

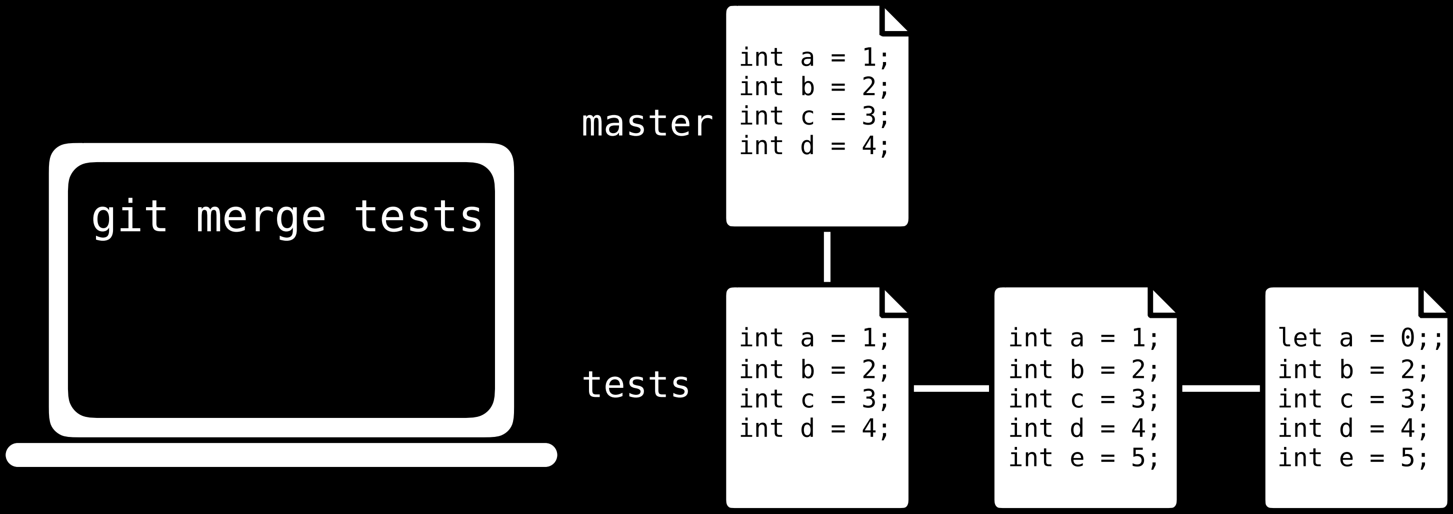
```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
int e = 5;
```

```
let a = 0;;
int b = 2;
int c = 3;
int d = 4;
int e = 5;
```

git merge

- `git merge <branch_name>` merges the branch `branch_name` with current branch


```
git merge tests
```

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

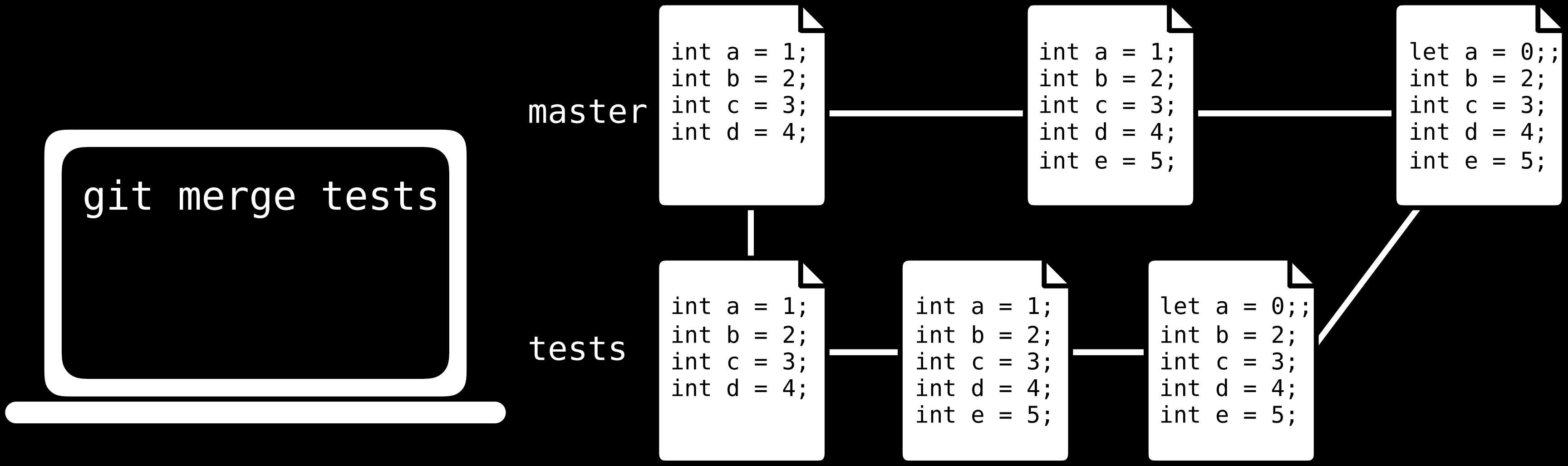
```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
int e = 5;
```

```
let a = 0;;
int b = 2;
int c = 3;
int d = 4;
int e = 5;
```

`git merge`

- `git merge <branch_name>` merges the branch `branch_name` with current branch



```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
int e = 5;
```

```
let a = 0;;
int b = 2;
int c = 3;
int d = 4;
int e = 5;
```

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
```

```
int a = 1;
int b = 2;
int c = 3;
int d = 4;
int e = 5;
```

```
let a = 0;;
int b = 2;
int c = 3;
int d = 4;
int e = 5;
```

Pull Requests

Git

- Keeps track of changes to code.
- Synchronizes code between different people.
- Test changes to code without losing the original.
- Revert back to old versions of code.