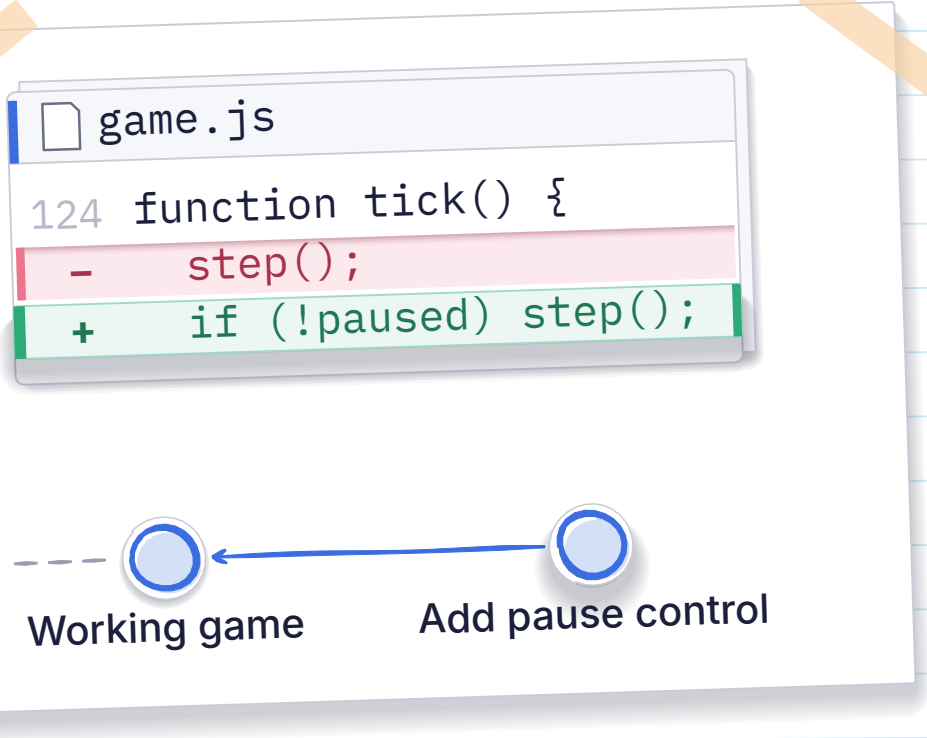
Prof. Aviv Zohar

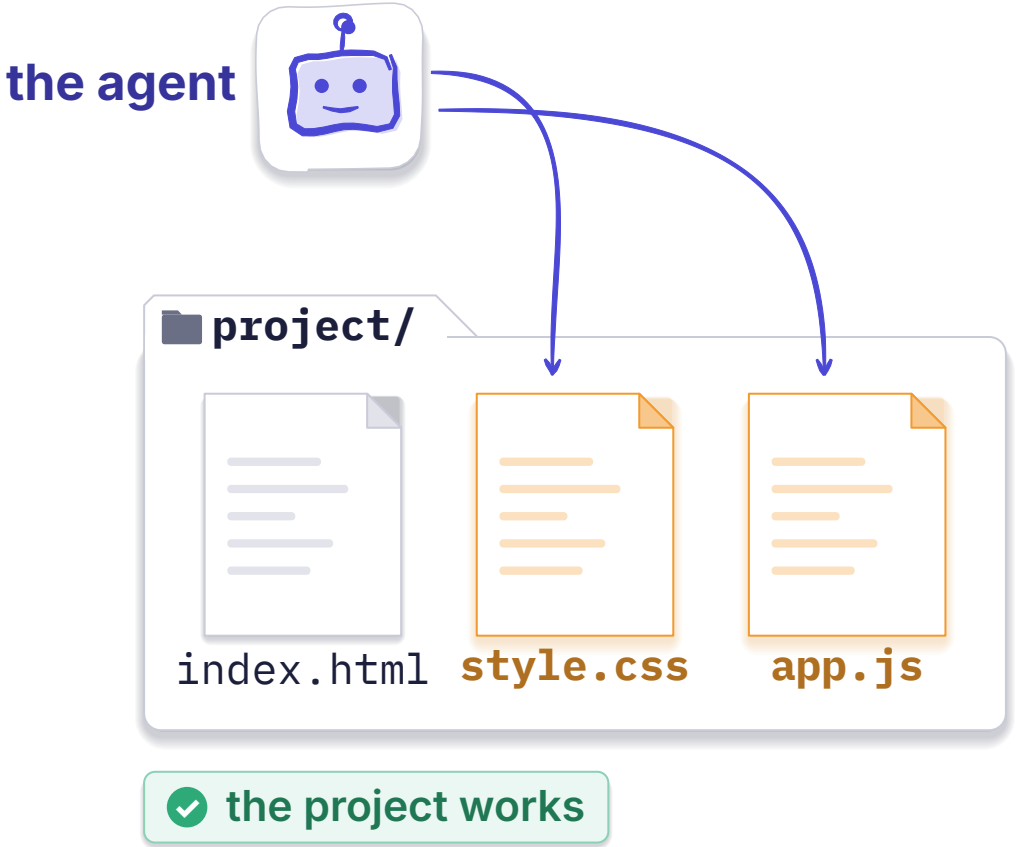
Semester A, 2026–7

Review and save an agent's changes

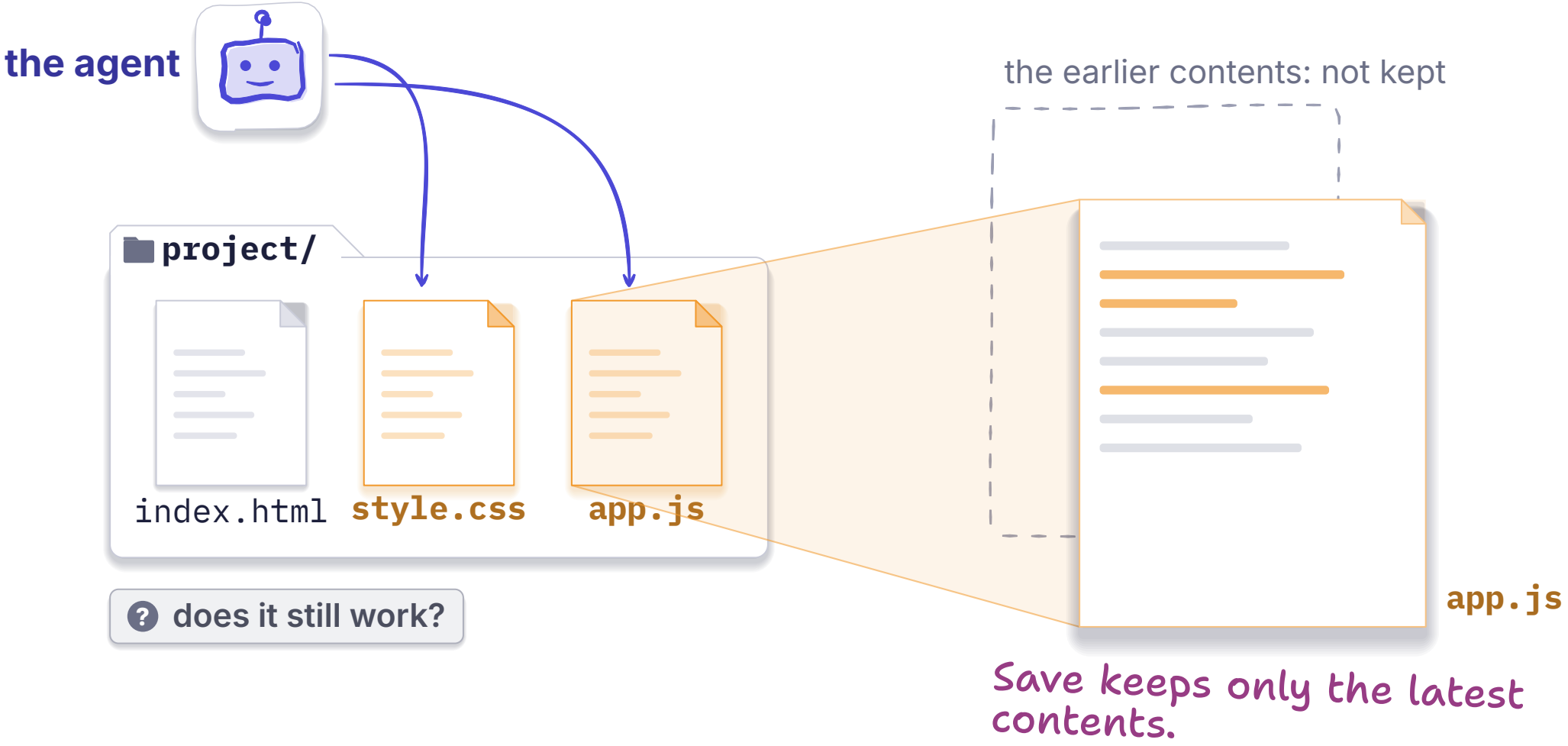
Understand Git, inspect an edit, keep a recoverable version



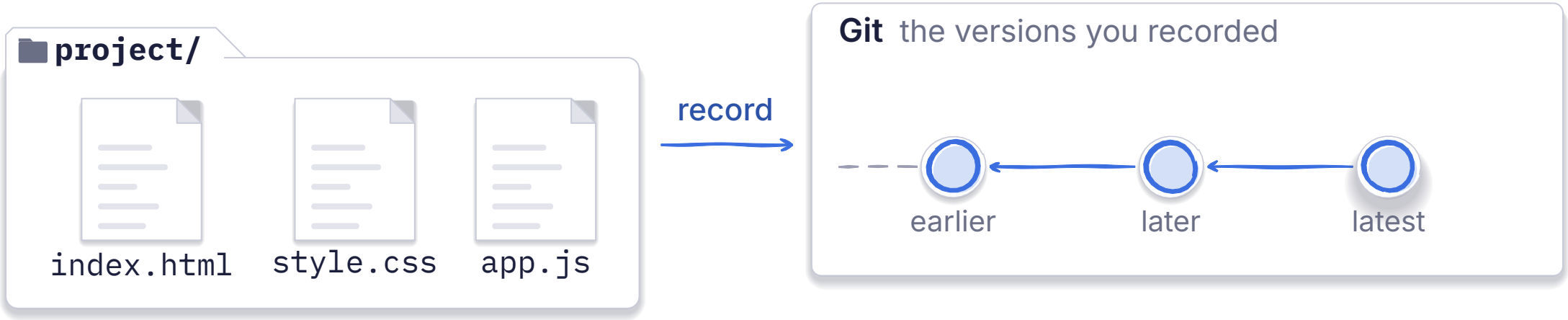
An edit replaces what was in the file



An edit replaces what was in the file

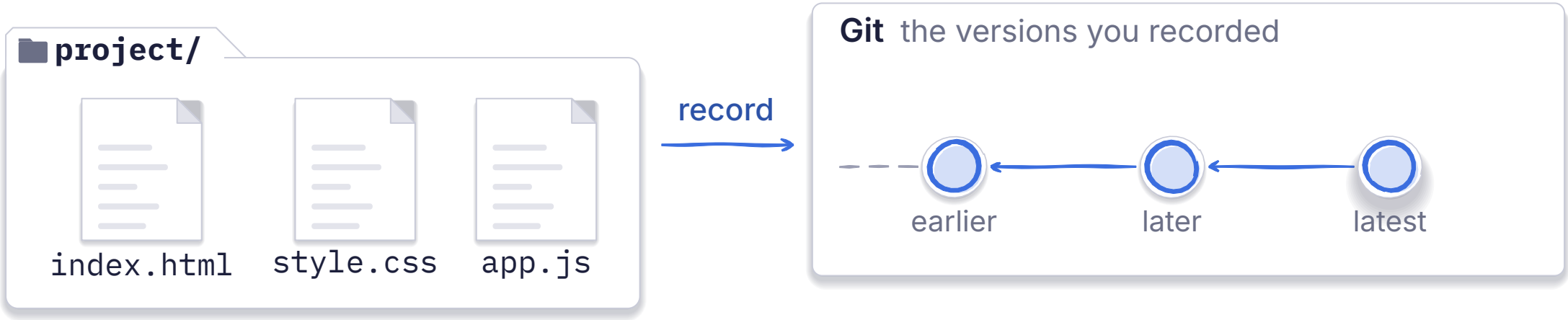


Git keeps the versions you record



You choose which versions to record.

Git keeps the versions you record





Compare the files with an earlier version



Read the lines that changed



Restore recorded contents

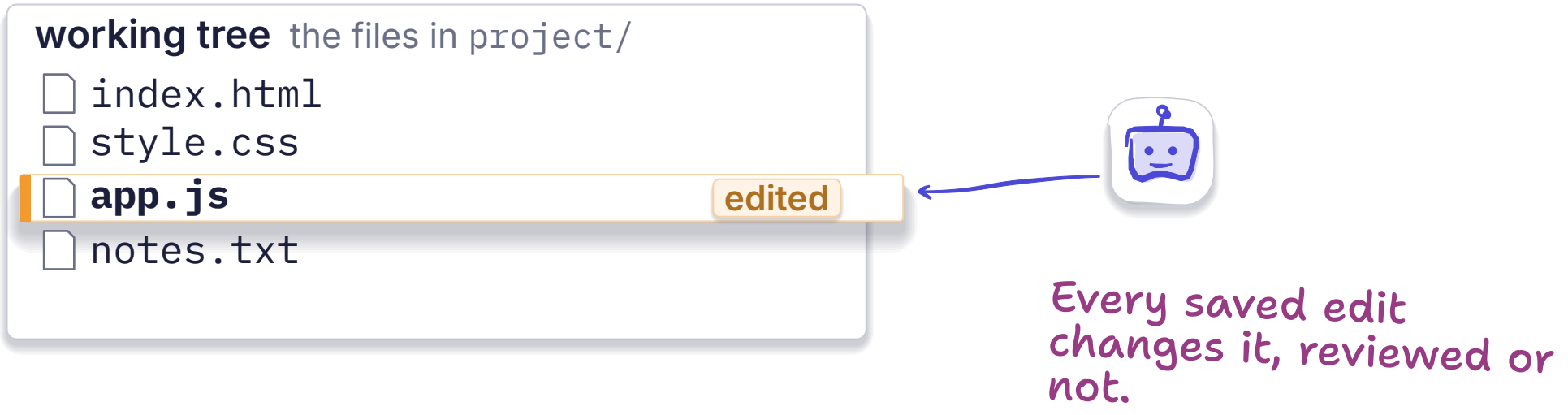
The working tree: the files you edit

working tree the files in `project/`

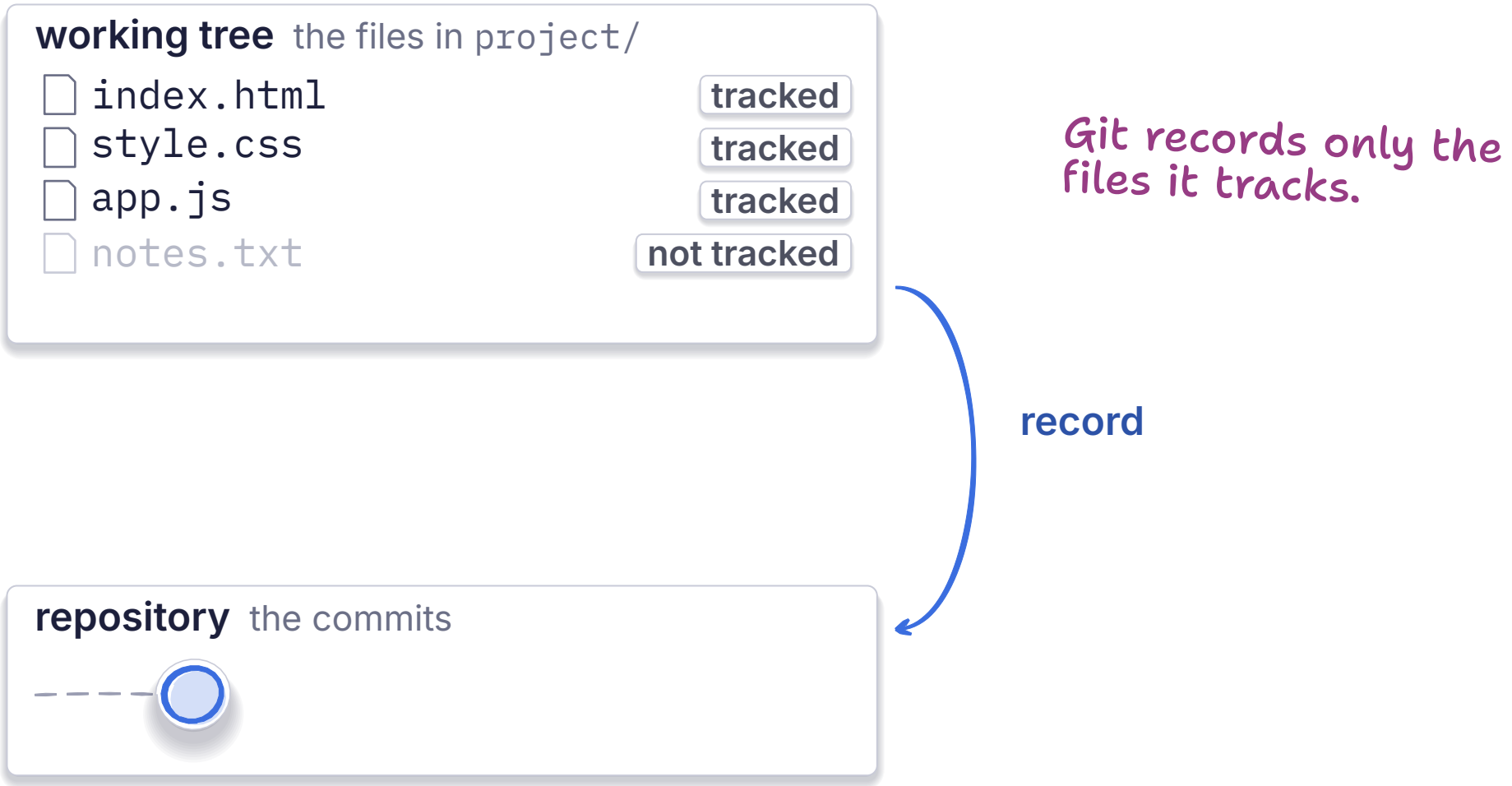
- index.html
- style.css
- app.js
- notes.txt

The files you open, edit and run.

The working tree: the files you edit

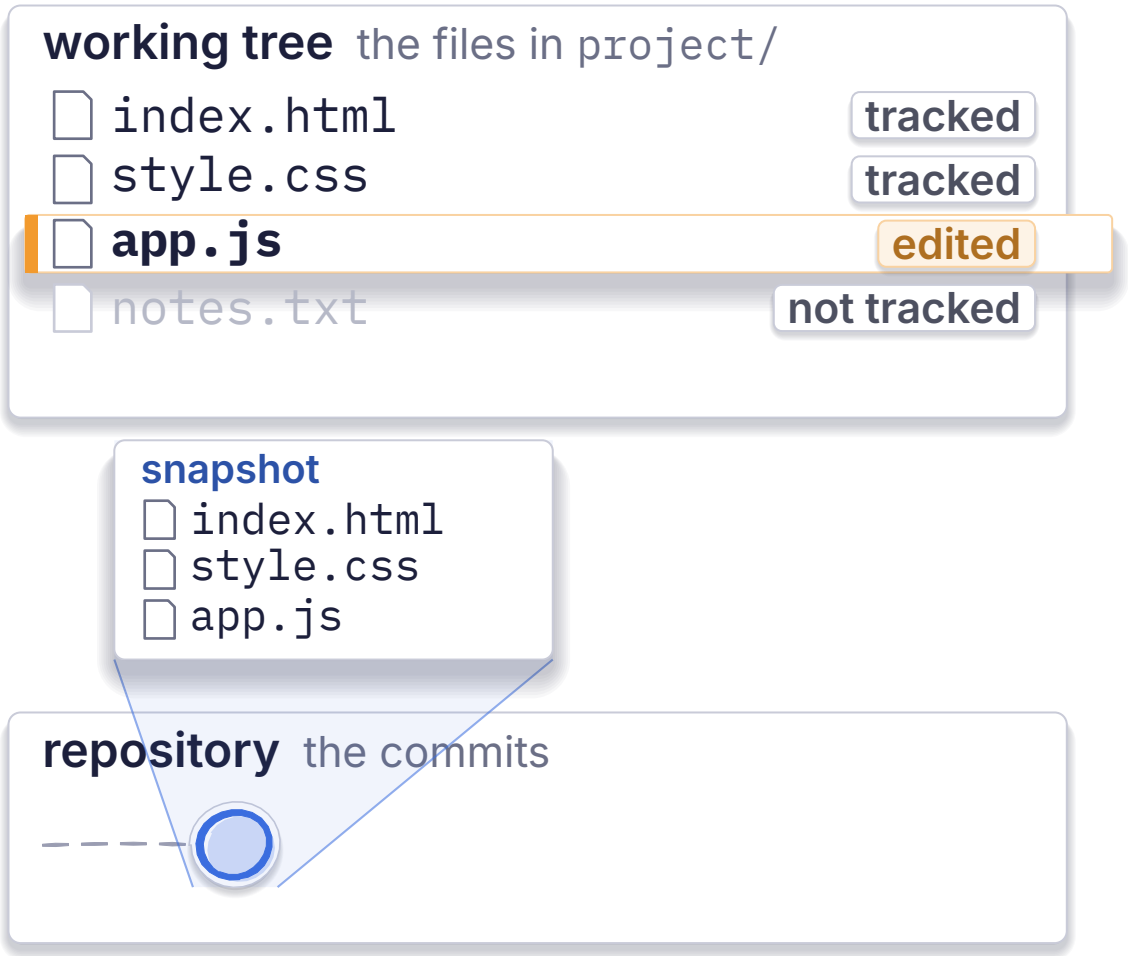


A commit records the tracked files



Git records only the files it tracks.

A commit records the tracked files



Later edits change the working tree.

The commit keeps the files as they were.

The repository keeps the commits

working tree the files in `project/`

- index.html
- style.css
- app.js
- notes.txt

repository the commits



Repository, or repo: the commits and their history.

The repository keeps the commits

working tree the files in `project/`

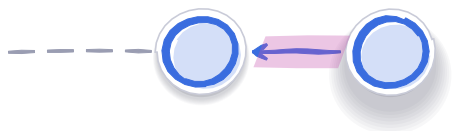
- index.html
- style.css
- app.js
- notes.txt

your computer

a server

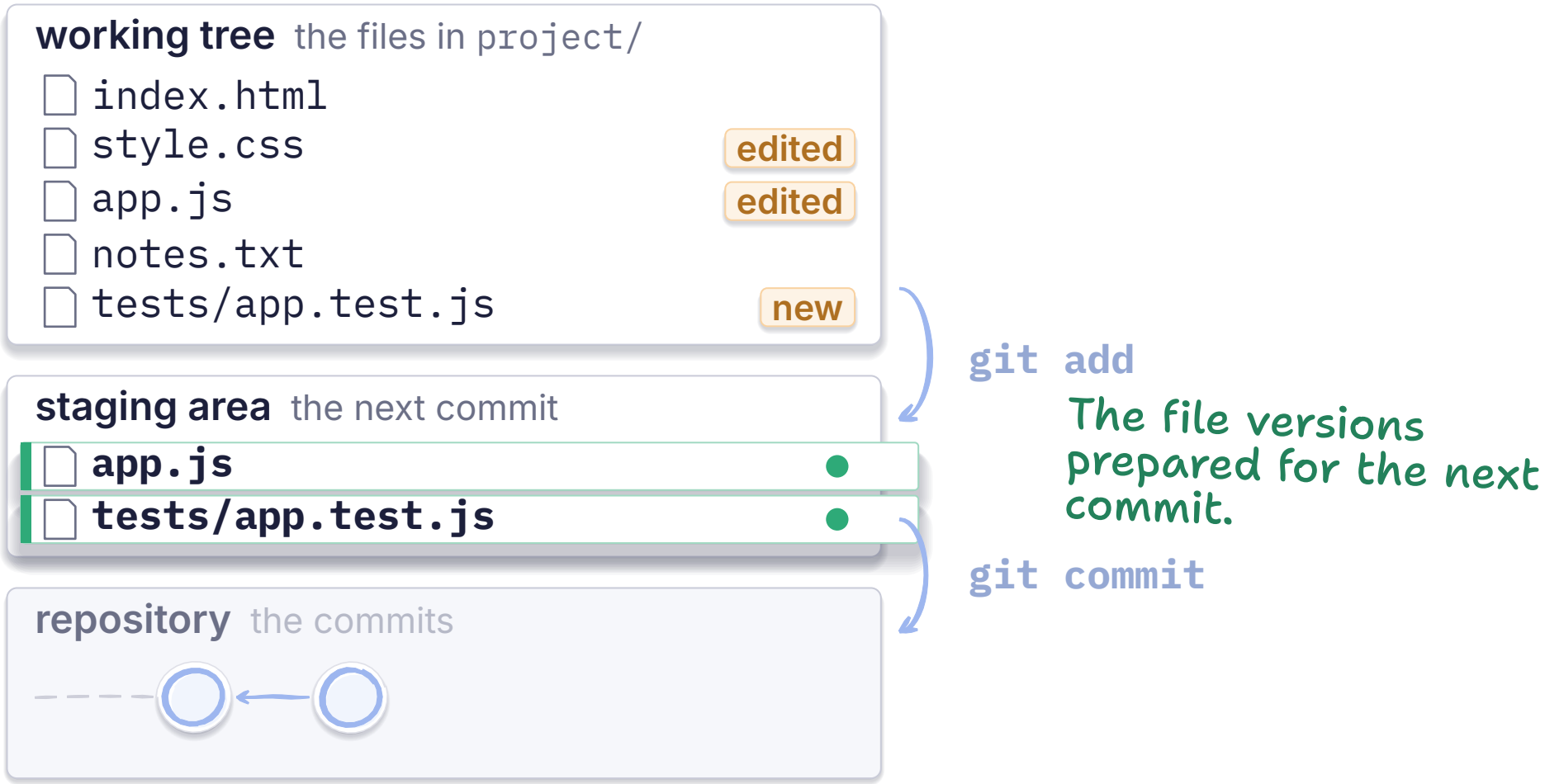
Recording a commit uploads nothing.

repository the commits

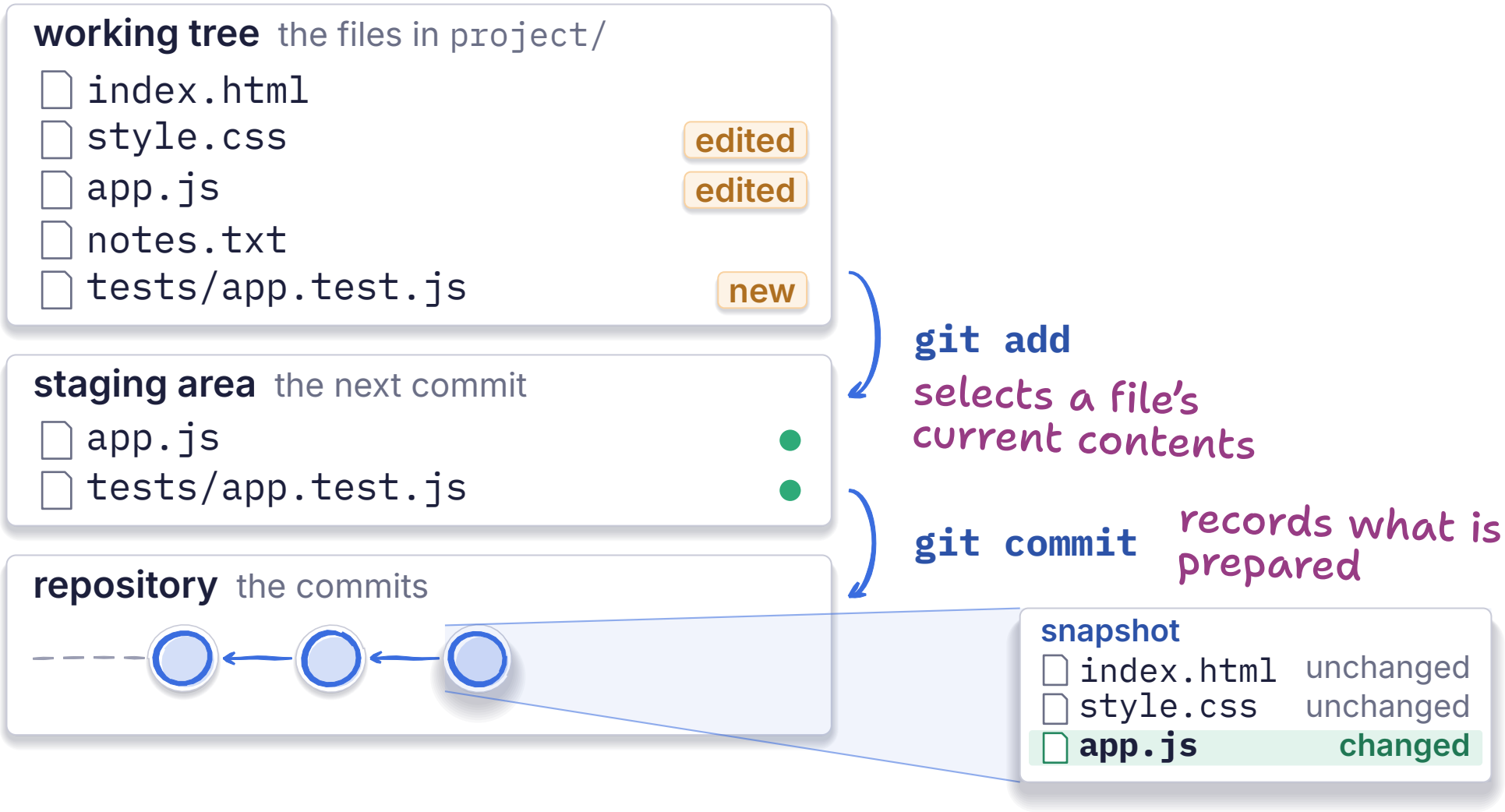


A new commit links back to the one it came from.

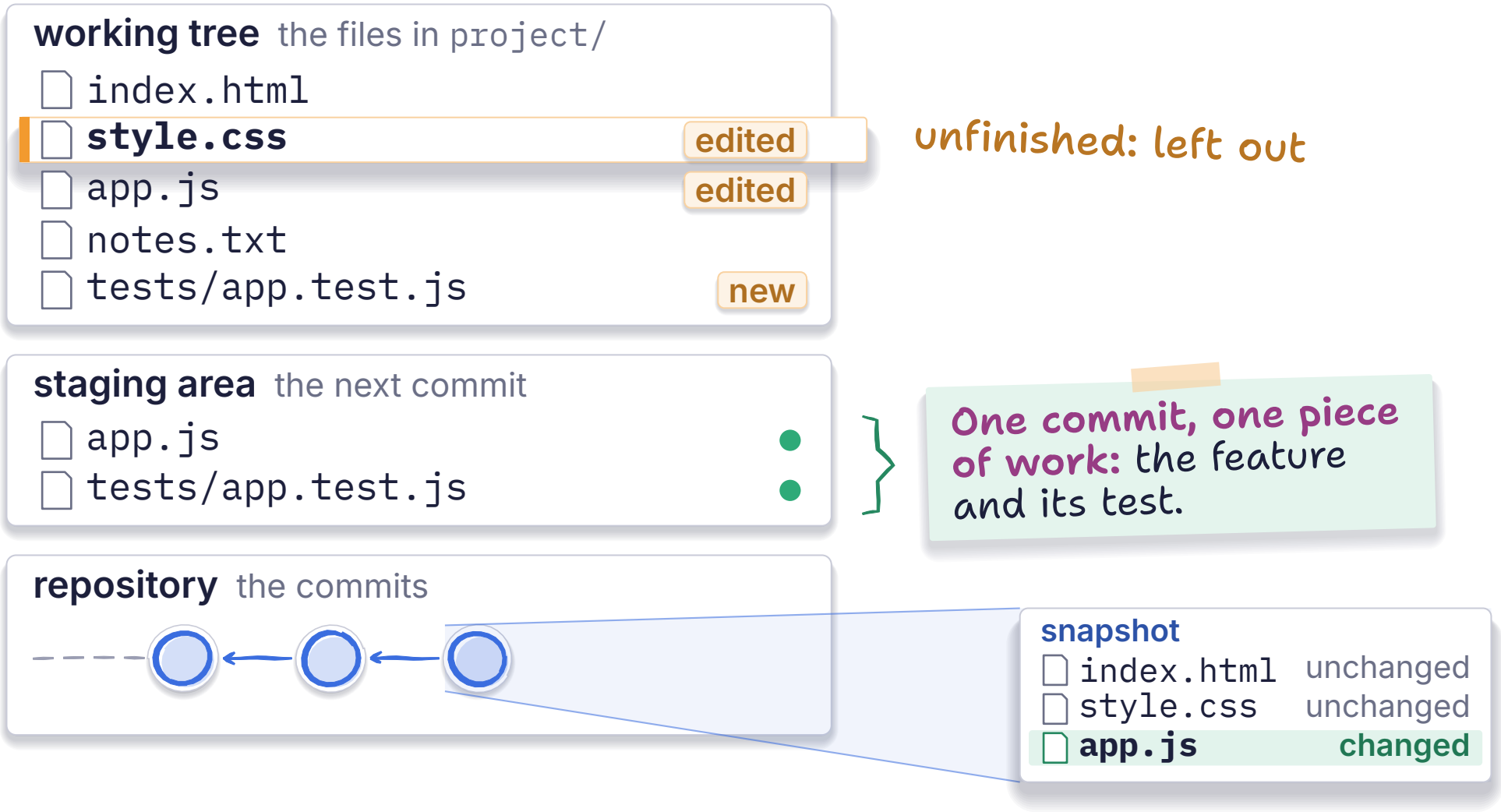
The staging area holds the next commit



The staging area holds the next commit



The staging area holds the next commit



The agent can write the commands. You read them.

agent session `~/project`

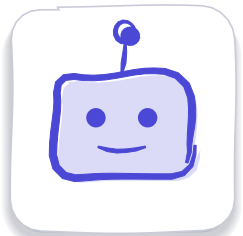
you typed by you

Commit the feature and its test.

tool call asked by the model

Bash

```
git add app.js tests/app.test.js
git commit -m "Add the feature"
```



the agent



you

The agent can write the commands. You read them.

agent session `~/project`

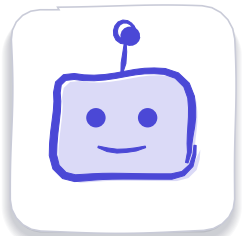
you typed by you

Commit the feature and its test.

tool call asked by the model

Bash

```
git add app.js tests/app.test.js
git commit -m "Add the feature"
```



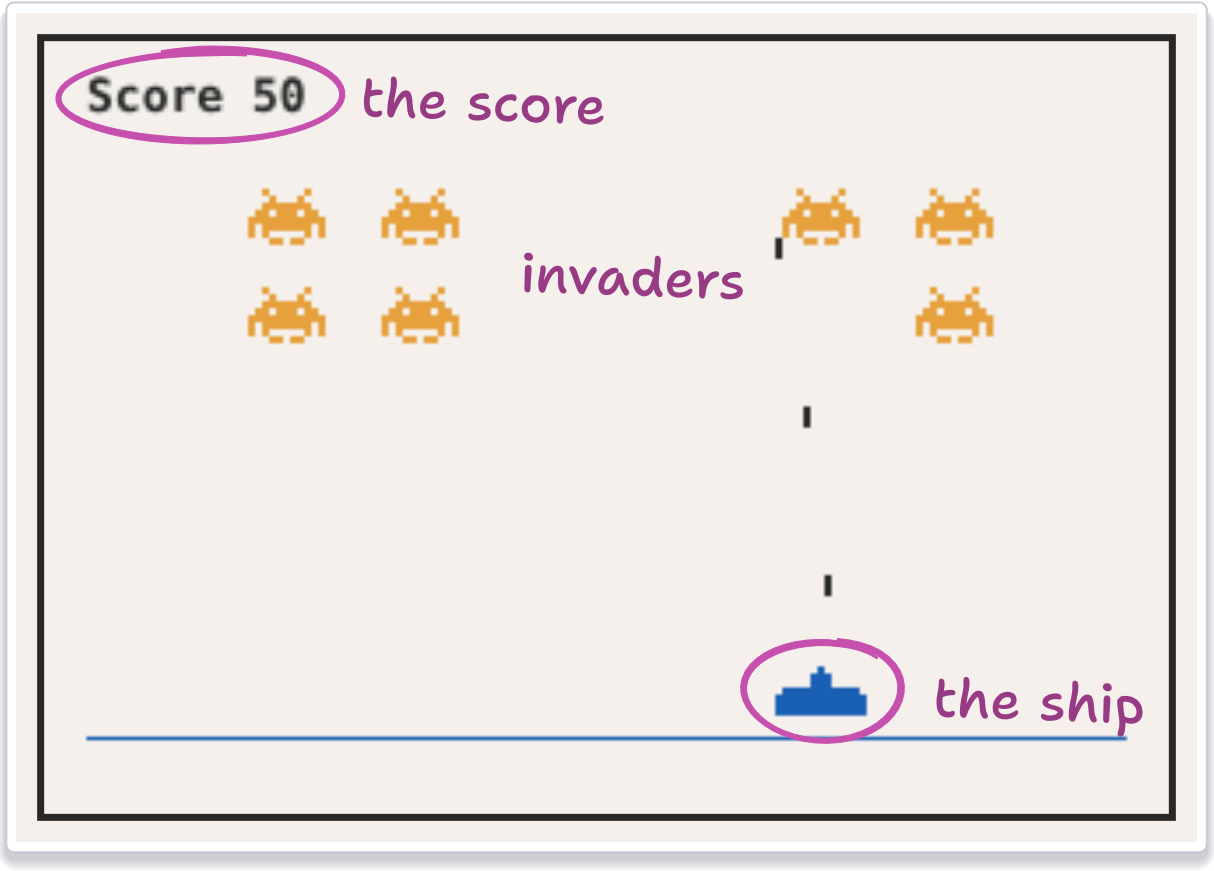
the agent



you

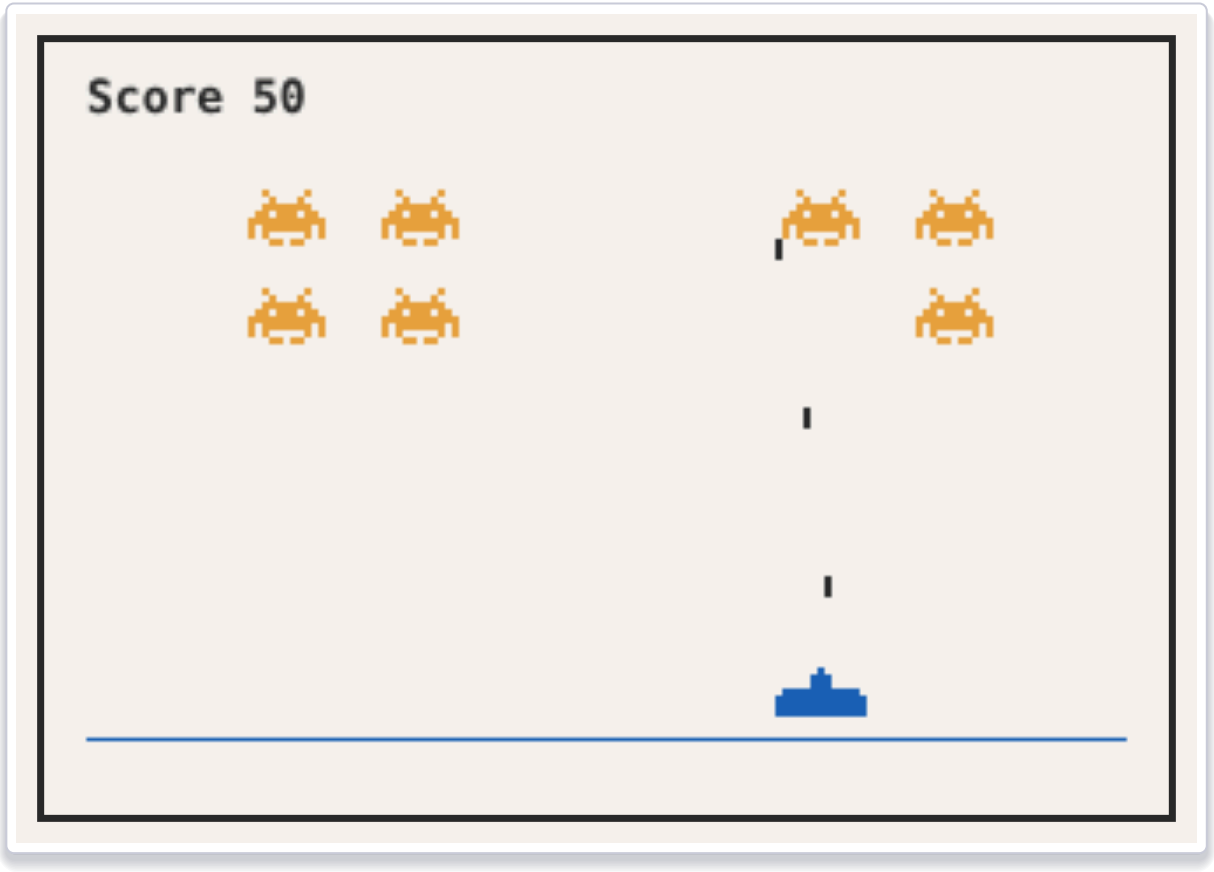
Git's documentation

Our example: a small browser game



screenshot · the game before we add pause

Our example: a small browser game



screenshot · the game before we add pause

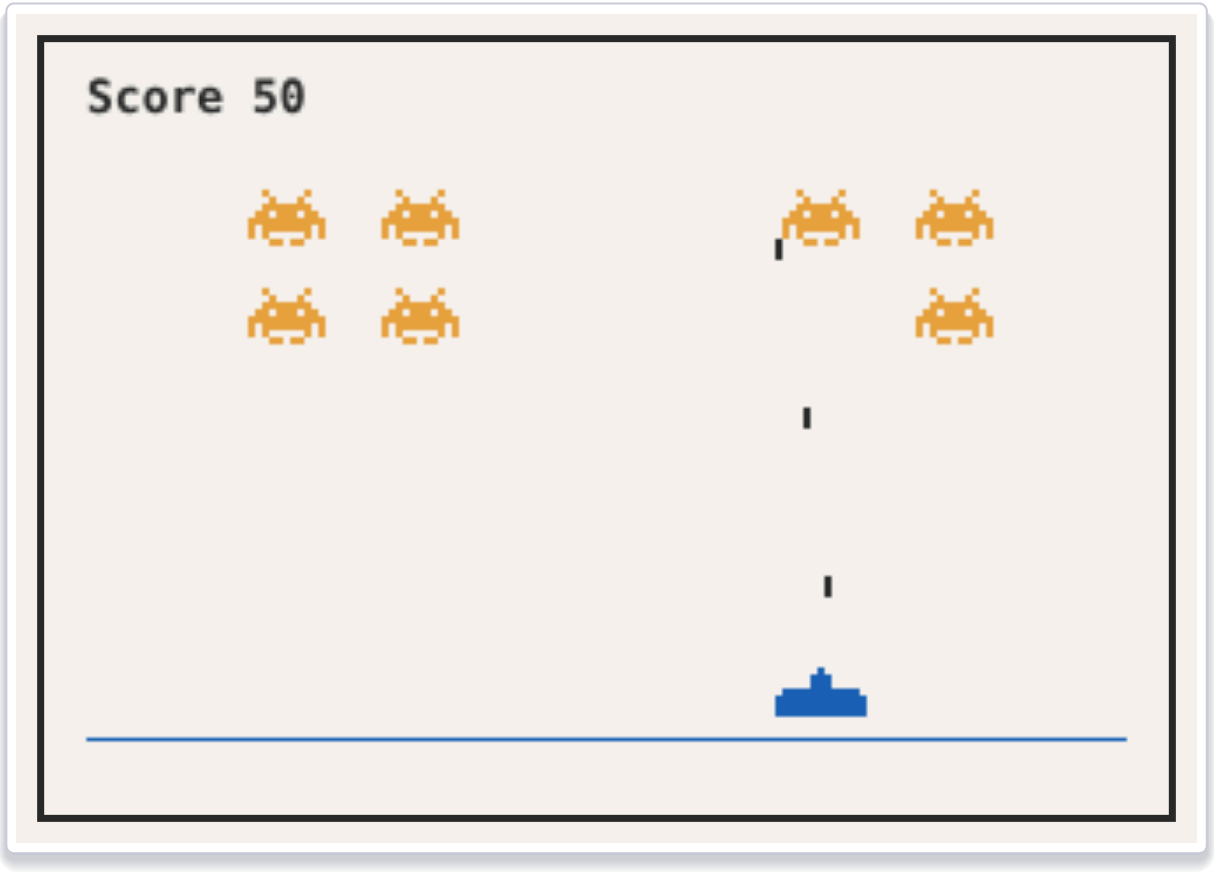
game/

index.html
the web page

game.js
movement, hits and the score

theme.css
colours and appearance

Our example: a small browser game



screenshot · the game before we add pause

game/

index.html
the web page

game.js
movement, hits and the score

theme.css
colours and appearance

the game works

already uses Git

The feature: P pauses the action and the score, P again resumes them.

Save the working game before asking for a change

agent session ~/game

you typed by you

Check the game and commit the current work before adding pause.

A starting version to compare the agent's changes with.

working tree game/

- index.html
- game.js — edited
- theme.css

staging area the next commit

nothing staged

repository the commits

not recorded yet

Save the working game before asking for a change

agent session ~/game

you typed by you

Check the game and commit the current work before adding pause.

checked, and selected for the commit

working tree game/

- index.html
- game.js
- theme.css

staging area the next commit

- **game.js**

repository the commits

not recorded yet

Record the starting version

agent session ~/game

tool call asked by the model

```
Bash git commit -m "Working game"
```

tool result run by the harness

```
[main e34b63d] Working game
```

The starting game is now a commit in the repository.

working tree game/

- index.html
- game.js
- theme.css

staging area the next commit

nothing staged

repository the commits



Working game
e34b63d

The message describes the saved work

agent session ~/game

tool call asked by the model

```
Bash git commit -m "Working game"
```

tool result run by the harness

```
[main e34b63d] Working game
```

-m gives the commit its message: what the work is.

working tree game/

- index.html
- game.js
- theme.css

staging area the next commit

nothing staged

repository the commits



Working game
e34b63d

The identifier names this exact commit

agent session ~/game

tool call asked by the model

```
Bash git commit -m "Working game"
```

tool result run by the harness

```
[main e34b63d] Working game
```

The identifier names this exact commit.

working tree game/

- index.html
- game.js
- theme.css

staging area the next commit

nothing staged

repository the commits



Check that the starting work is recorded

agent session ~/game

tool call asked by the model

```
Bash git status
```

tool result run by the harness

```
On branch main
nothing to commit, working tree clean
```

Clean: no changes to record. The tracked files match the commit.

working tree game/

- index.html
- game.js
- theme.css

staging area the next commit

nothing staged

repository the commits



Working game
e34b63d

The agent adds a pause control

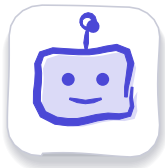
agent session ~/game

you typed by you

Make P pause and resume the game. Keep the score unchanged while paused.

Before anything is committed, we look at the changes ourselves.

edits the files



working tree game/

- index.html
- game.js
- theme.css

staging area the next commit

nothing staged

repository the commits

Working game
e34b63d

The agent adds a pause control



screenshot · running



screenshot · paused

The files changed. The commit did not.

agent session ~/game

you typed by you

Make P pause and resume the game. Keep the score unchanged while paused.

tool call asked by the model

Bash `git status --short`

tool result run by the harness

```
 M game.js
?? tests/game.test.js
```

working tree game/

- index.html
- **game.js** M
- theme.css
- **tests/game.test.js** ??

staging area the next commit

nothing staged

repository the commits



Working game
e34b63d

M modified: a tracked file that changed

?? untracked: new, not tracked yet

The files changed. The commit did not.

agent session ~/game

you typed by you

Make P pause and resume the game. Keep the score unchanged while paused.

tool call asked by the model

```
Bash git status --short
```

tool result run by the harness

```
 M game.js
?? tests/game.test.js
```

Inspect the new file too.

The saved commit has not changed.

working tree game/

- index.html
- game.js M
- theme.css
- tests/game.test.js ??

staging area the next commit

nothing staged

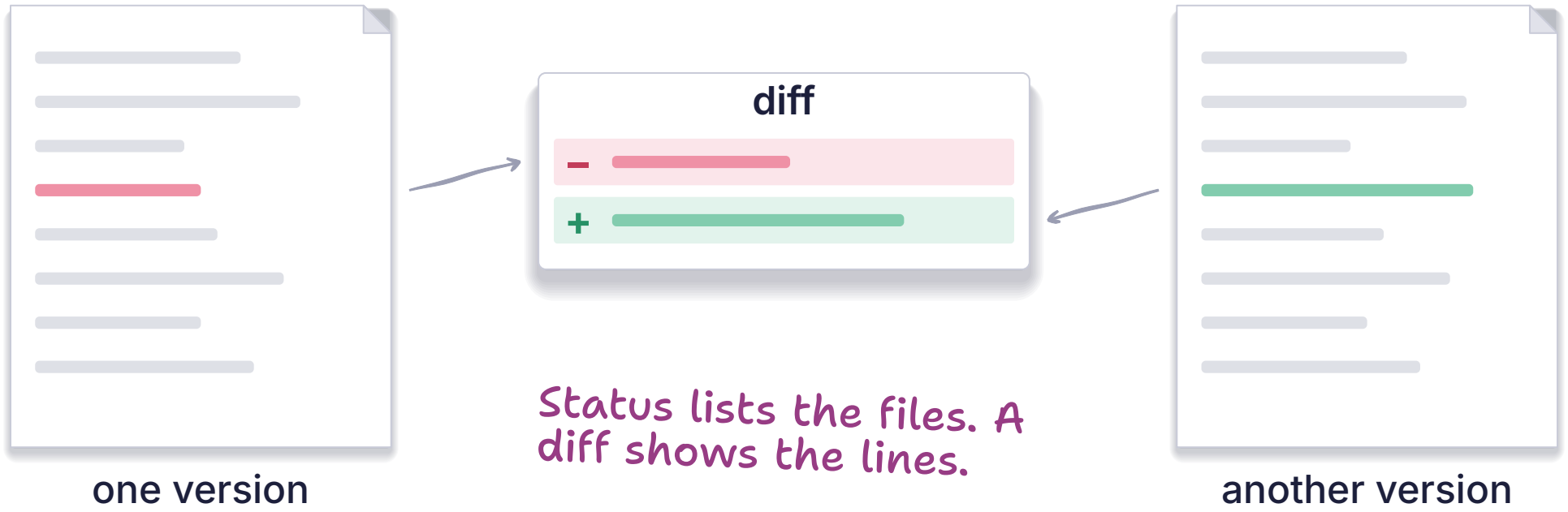
repository the commits



Working game
e34b63d

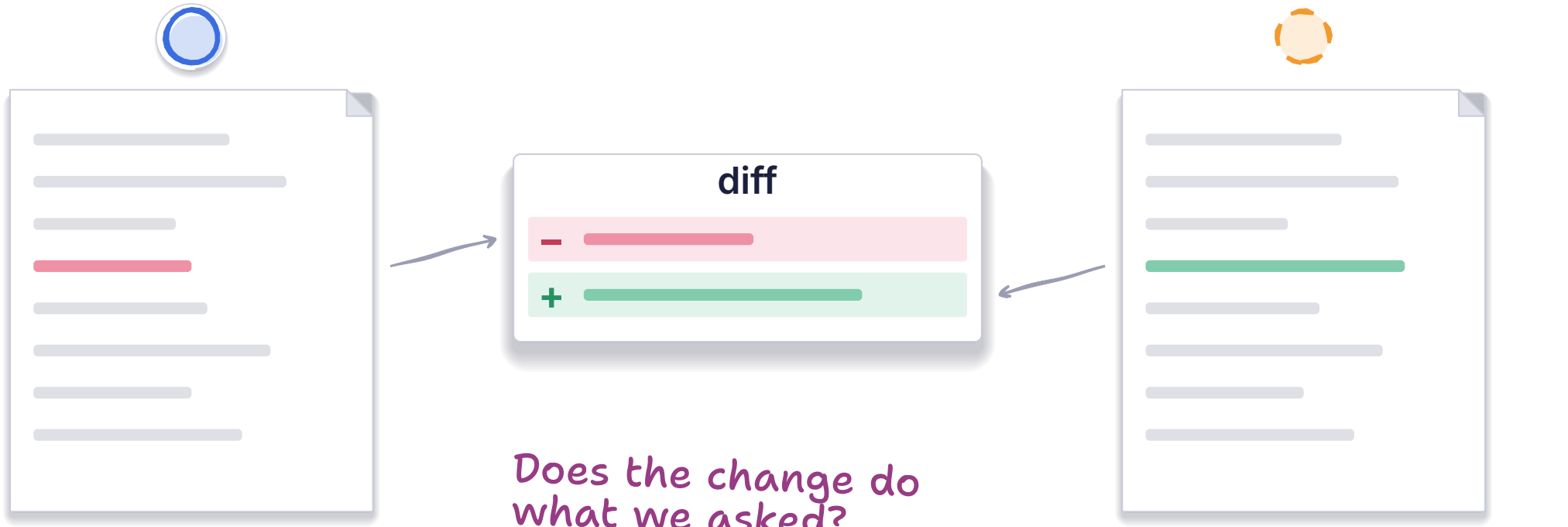
edits, not committed

A diff compares two versions



Status lists the files. A diff shows the lines.

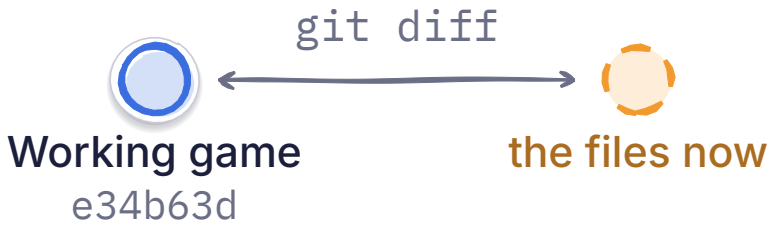
A diff compares two versions



Read the diff yourself

```shell
~/game $ git diff e34b63d
```

you type this one



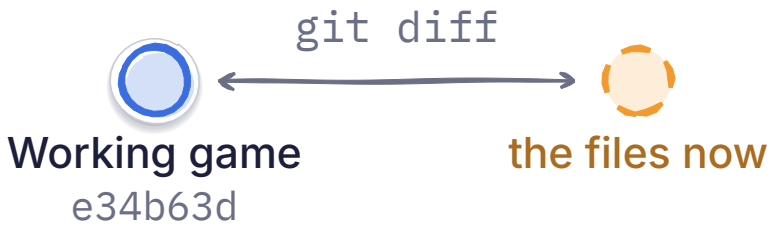
Read the diff yourself

shell

```
~/game $ git diff e34b63d
```

you type this one

Use your own starting commit's id. This one is our example's.



Read the diff yourself

shell

```
~/game $ git diff e34b63d
```

you type this one

game.js — an excerpt

```
124 function tick() {
  -     step();
  +     if (!paused) step();
126   render();
127 }
```

- a removed line
+ an added line



Read the diff yourself

shell

```
~/game $ git diff e34b63d
```

you type this one

game.js — an excerpt

```
124 function tick() {
-     step();
+     if (!paused) step();
126   render();
127 }
```

One replacement: the game advances only when pause is off.



Read the diff yourself

shell

```
~/game $ git diff e34b63d
```

you type this one

game.js — an excerpt

```
124 function tick() {
  -     step();
  +     if (!paused) step();
126     render();
127 }
```

Unchanged, and correct: paused, the game is still drawn.



The new test file is not in the diff

> **you** typed by you
>
> Make P pause and resume the game. Keep the score unchanged while paused.

tests/game.test.js ??

```
 9 test("the score advances while the game runs", () => {
   ⋮
15 test("the score does not advance while paused", () => {
   ⋮
```

Not in the diff: `git diff` compares only the files Git tracks. Open it separately.

The new test file is not in the diff

you typed by you

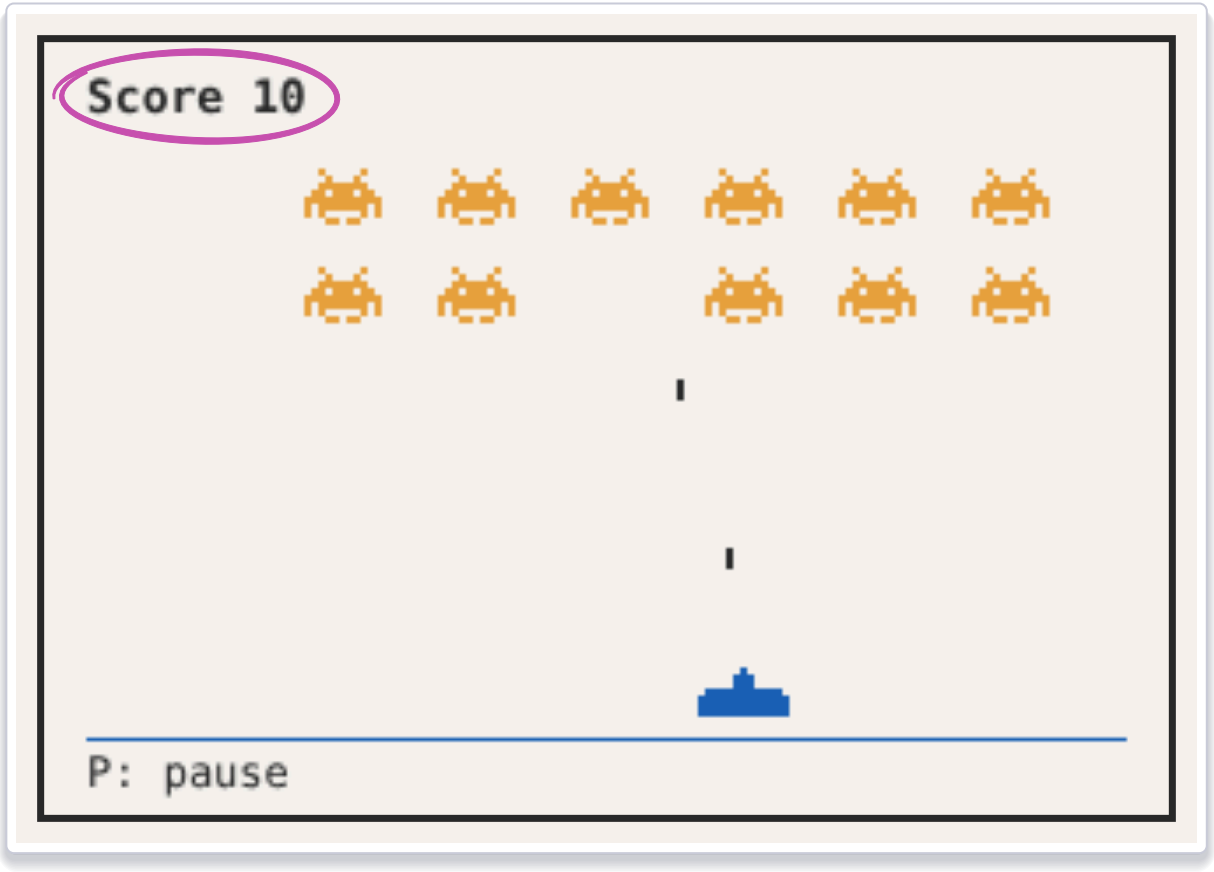
Make P pause and resume the game. Keep the score unchanged while paused.

tests/game.test.js ??

```
 9 test("the score advances while the game runs", () => {
15 test("the score does not advance while paused", () => {
```

It checks what we asked for.

Try the feature before you accept it



screenshot · paused

try it by hand

- **P** the game and the score stop
- **P** press again: the game resumes

Run the tests

agent session ~/game

tool call asked by the model

```
Bash node --test
```

tool result run by the harness

```
✓ the score advances while the game runs
✓ the score does not advance while paused
✓ the invaders move while the game runs
✓ a new game starts with no score
ℹ tests 4
ℹ pass 4
ℹ fail 0
```



the project's tests

The four tests include the new pause test.

Run the tests

agent session ~/game

tool call asked by the model

```
Bash node --test
```

tool result run by the harness

```
✓ the score advances while the game runs
✓ the score does not advance while paused
✓ the invaders move while the game runs
✓ a new game starts with no score
ℹ tests 4
ℹ pass 4
ℹ fail 0
```



the project's tests

✓ pass 4 · fail 0

If one failed, ask the agent to correct it before committing.

Commit the reviewed work

agent session ~/game

you typed by you

Commit the pause feature and its test.

Reviewed and tested: the feature and its test belong together.



Commit the reviewed work

agent session ~/game

you typed by you

Commit the pause feature and its test.

tool call asked by the model

Bash

```
git add game.js tests/game.test.js
```

A added: the new test is now tracked too.

Nothing is committed yet.

working tree game/

- index.html
- game.js
- theme.css
- tests/game.test.js

staging area the next commit

- **game.js** M
- **tests/game.test.js** A

repository the commits



Working game
e34b63d

Staging selects a file's contents at that moment

agent session ~/game

you typed by you

Commit the pause feature and its test.

tool call asked by the model

Bash

```
git add game.js tests/game.test.js
```

Suppose we edit `game.js` again after staging it.

ⓐ the working tree has the later edit

ⓑ the staged version: the contents at `git add`

working tree game/

- index.html
- **game.js** ⓐ M
- theme.css
- tests/game.test.js

staging area the next commit

- game.js ⓑ M
- tests/game.test.js A

repository the commits



Working game
e34b63d

Staging selects a file's contents at that moment

agent session ~/game

you typed by you

Commit the pause feature and its test.

tool call asked by the model

Bash

```
git add game.js tests/game.test.js
```

Suppose we edit `game.js` again after staging it.

ⓐ the working tree has the later edit

ⓑ the staged version: the contents at `git add`

To include it: run `git add` again.



Commit the reviewed work

agent session ~/game

tool call asked by the model

Bash

```
git add game.js tests/game.test.js
```

tool call asked by the model

Bash

```
git commit -m "Add pause control"
```

tool result run by the harness

```
[main 686e1c5] Add pause control
```

The staged changes, and every unchanged tracked file, in one new snapshot.

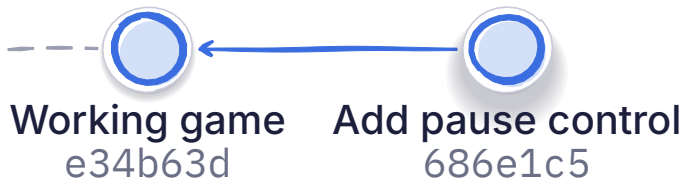
working tree game/

- index.html
- game.js
- theme.css
- tests/game.test.js

staging area the next commit

nothing staged

repository the commits



Commit the reviewed work

agent session ~/game

tool call asked by the model

Bash

```
git add game.js tests/game.test.js
```

tool call asked by the model

Bash

```
git commit -m "Add pause control"
```

tool result run by the harness

```
[main 686e1c5] Add pause control
```

Add pause control follows Working game.
Both versions stay available.

working tree game/

- index.html
- game.js
- theme.css
- tests/game.test.js

staging area the next commit

nothing staged

repository the commits



Working game
e34b63d

Add pause control
686e1c5

Some files stay out of the history

generated build output

local settings, secrets



Some files stay out of the history

.gitignore

```
1 dist/
2 .env
3 node_modules/
```

git add leaves these files out.

working tree game/

- index.html
- game.js
- theme.css
- .gitignore
- tests/game.test.js
- **dist/** ignored
- **.env** ignored

Some files stay out of the history

.gitignore

```
1 dist/
2 .env
3 node_modules/
4 game.js
```

Too late for a tracked file: it stays in the commits.



An edit breaks pause

Suppose the next edit breaks pause. It is not committed.



An edit breaks pause

game.js — the diff

```
124 function tick() {
  -     if (!paused) step();
  +     step();
126     render();
```

pass 3 · fail 1

✖ the score does not advance while paused

working tree game/

- index.html
- **game.js** M
- theme.css
- tests/game.test.js

staging area the next commit

nothing staged

repository the commits



Working game e34b63d — Add pause control 686e1c5

Put one file back from a commit

agent session ~/game

you typed by you

This edit broke pause, and it is not committed.
Restore game.js from the pause commit.

agent written by the model

That replaces the current edits in game.js.
Restoring it now.

working tree game/

- index.html
- game.js **M**
- theme.css
- tests/game.test.js

staging area the next commit

nothing staged

repository the commits



Working game e34b63d

Add pause control 686e1c5

Put one file back from a commit

agent session ~/game

you typed by you

This edit broke pause, and it is not committed.
Restore game.js from the pause commit.

agent written by the model

That replaces the current edits in game.js.
Restoring it now.

tool call asked by the model

Bash

```
git restore --source=686e1c5 -- game.js
```

working tree game/

- index.html
- **game.js** M
- theme.css
- tests/game.test.js

staging area the next commit

nothing staged

repository the commits



Working game e34b63d

Add pause control 686e1c5

Put one file back from a commit

agent session ~/game

you typed by you

This edit broke pause, and it is not committed.
Restore game.js from the pause commit.

agent written by the model

That replaces the current edits in game.js.
Restoring it now.

tool call asked by the model

Bash

```
git restore --source=686e1c5 -- game.js
```

working tree game/

- index.html
- game.js
- theme.css
- tests/game.test.js

staging area the next commit

nothing staged

repository the commits



pass 4 · fail 0

The commits have not changed.

Put one file back from a commit

agent session ~/game

you typed by you

This edit broke pause, and it is not committed.
Restore game.js from the pause commit.

agent written by the model

That replaces the current edits in game.js.
Restoring it now.

tool call asked by the model

Bash

```
git restore --source=686e1c5 -- game.js
```

Git cannot recover work it never saved.

working tree game/

- index.html
- game.js
- theme.css
- tests/game.test.js

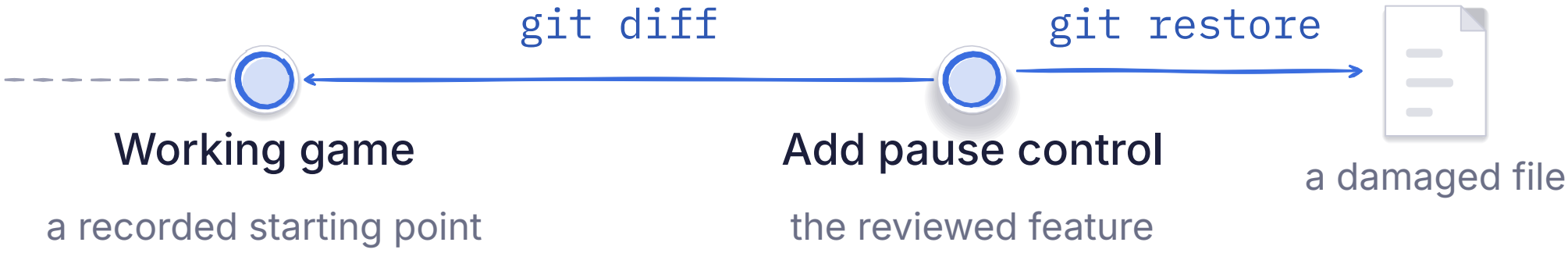
staging area the next commit

nothing staged

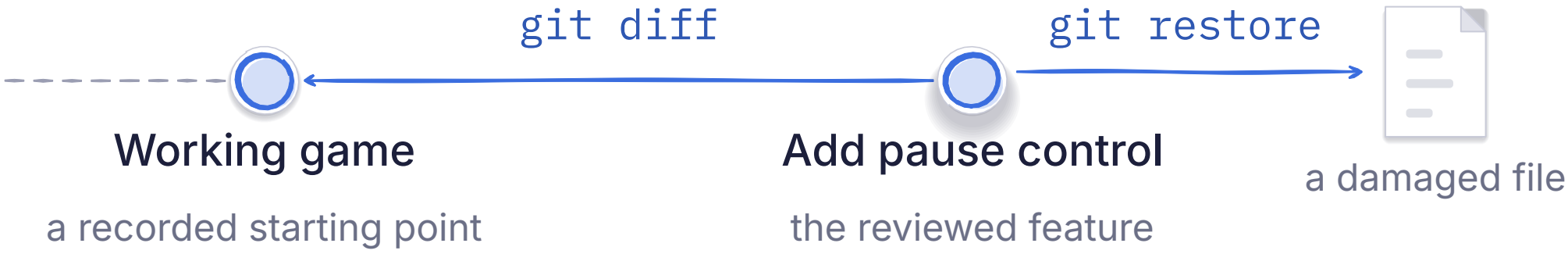
repository the commits

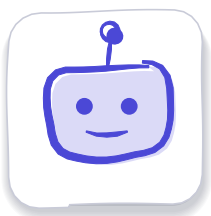


The agent runs the commands. You decide what to keep.



The agent runs the commands. You decide what to keep.





the syntax



which version, and what belongs

See you in the next video.