Introduction to branches

INTERMEDIATE GIT

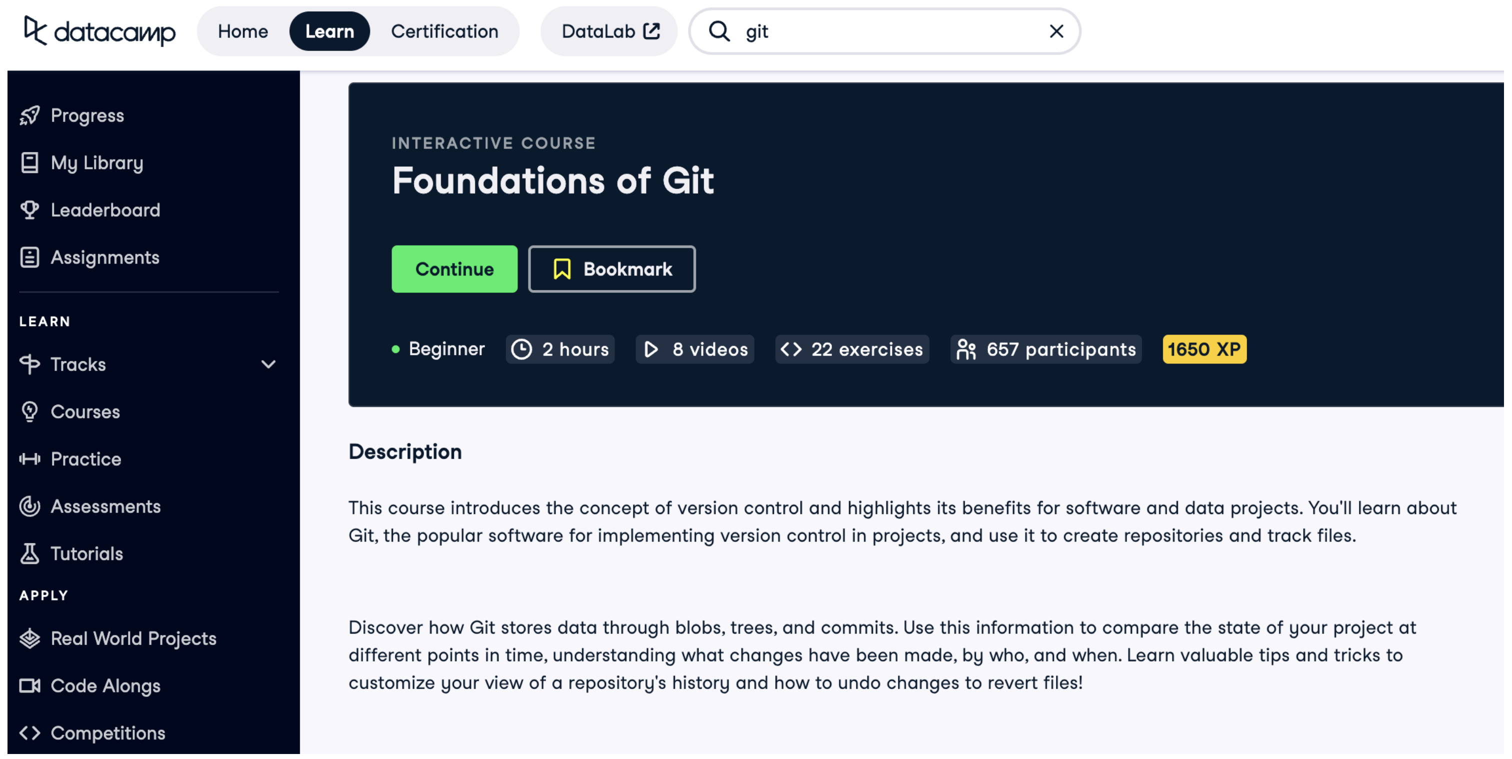
George Boorman
Curriculum Manager, DataCamp

What we will cover

- Branches
- Remotes
- Conflicts

What you should know

- How Git stores data
- How to create repos
- How to make commits
- How to compare versions
- How to revert versions



INTERACTIVE COURSE

Foundations of Git

Beginner · 2 hours · 8 videos · 22 exercises · 657 participants · 1650 XP

Description

This course introduces the concept of version control and highlights its benefits for software and data projects. You'll learn about Git, the popular software for implementing version control in projects, and use it to create repositories and track files.

Discover how Git stores data through blobs, trees, and commits. Use this information to compare the state of your project at different points in time, understanding what changes have been made, by who, and when. Learn valuable tips and tricks to customize your view of a repository's history and how to undo changes to revert files!

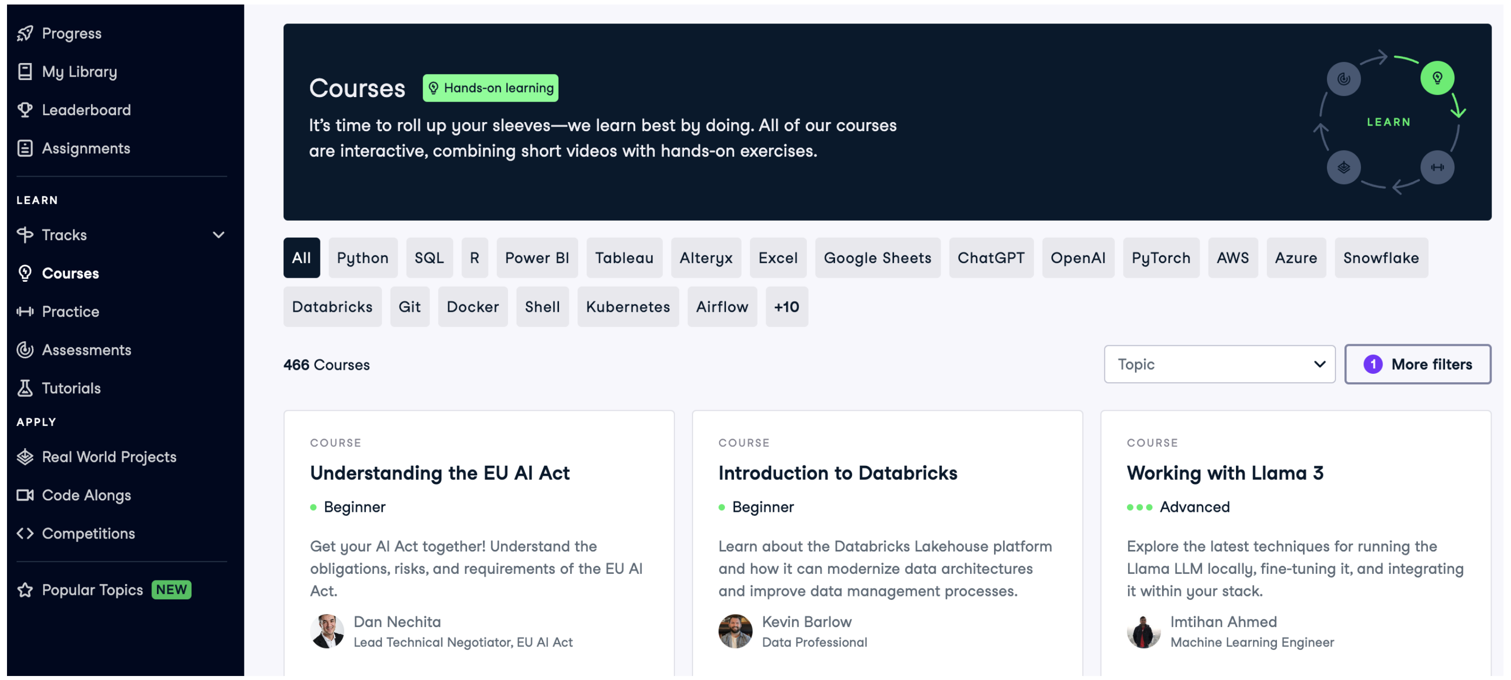
Branches

- Branch = an individual **version** of a repo
- Git uses **branches** to systematically track multiple versions of files

- In each branch:
  - Some files might be the same
  - Others might be different
  - Some may not exist at all

Why use branches?

Live system



Courses Hands-on learning

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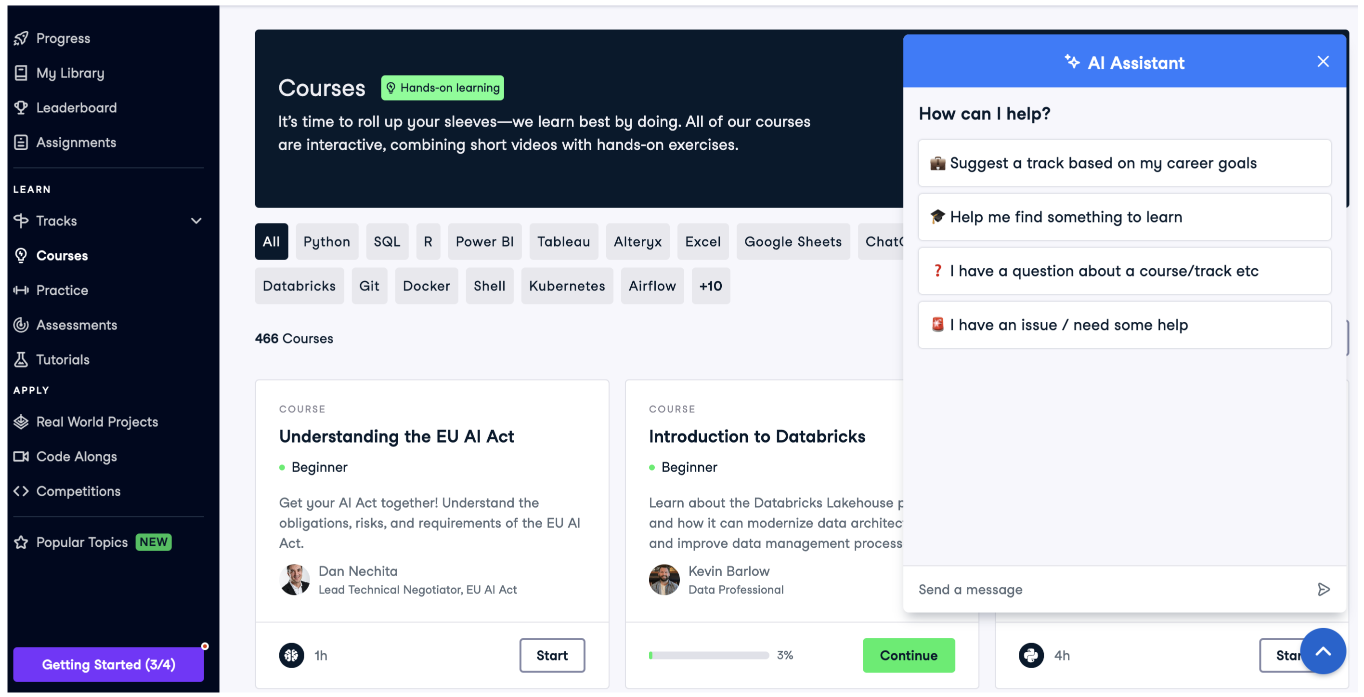
COURSE
Understanding the EU AI Act
Beginner
Get your AI Act together! Understand the obligations, risks, and requirements of the EU AI Act.
Dan Nechita
Lead Technical Negotiator, EU AI Act

COURSE
Introduction to Databricks
Beginner
Learn about the Databricks Lakehouse platform and how it can modernize data architectures and improve data management processes.
Kevin Barlow
Data Professional

COURSE
Working with Llama 3
Advanced
Explore the latest techniques for running the Llama LLM locally, fine-tuning it, and integrating it within your stack.
Imtihan Ahmed
Machine Learning Engineer

- Works as expected
- Default branch = `main`

Feature development



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1h Start

COURSE
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Beginner
Learn about the Databricks Lakehouse p… and how it can modernize data architec… and improve data management process…
Kevin Barlow
Data Professional
3% Continue

4h

AI Assistant

How can I help?

💼 Suggest a track based on my career goals

🎓 Help me find something to learn

❓ I have a question about a course/track etc

🚨 I have an issue / need some help

Send a message

- Might encounter issues during development and testing
- Doesn't affect the live system

Why use branches?

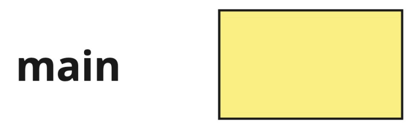
- Multiple developers can work on a project **simultaneously**

- **Compare the state** of a repo **between branches**

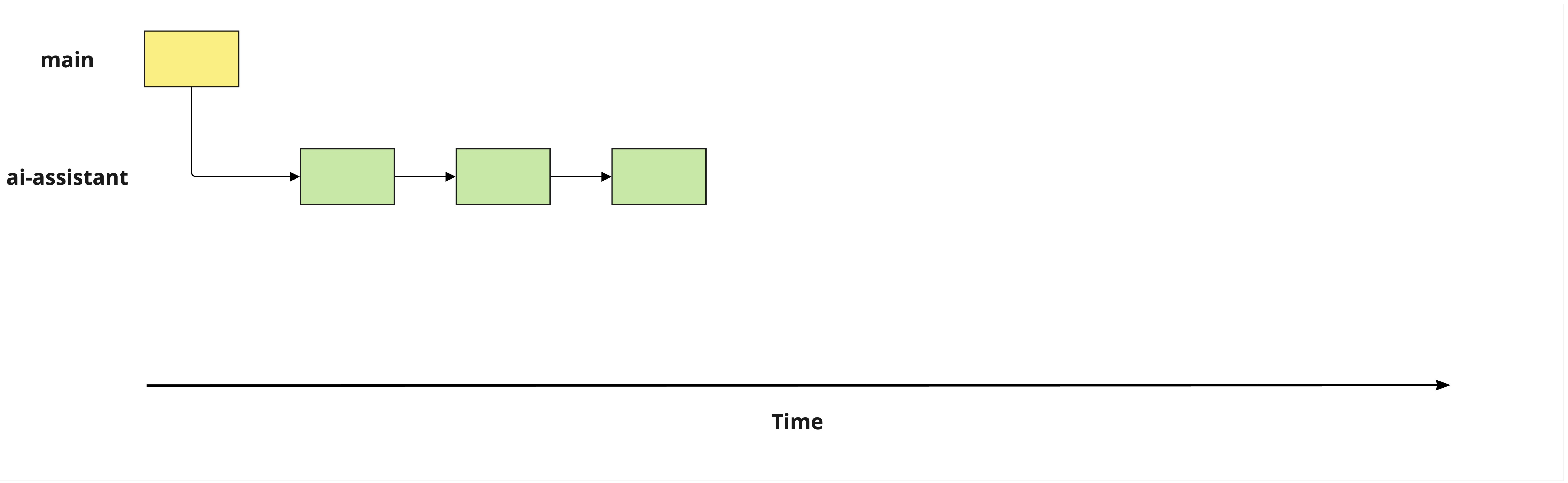
- **Combine contents**, pushing new features to a live system

- Each branch should have a **specific purpose**

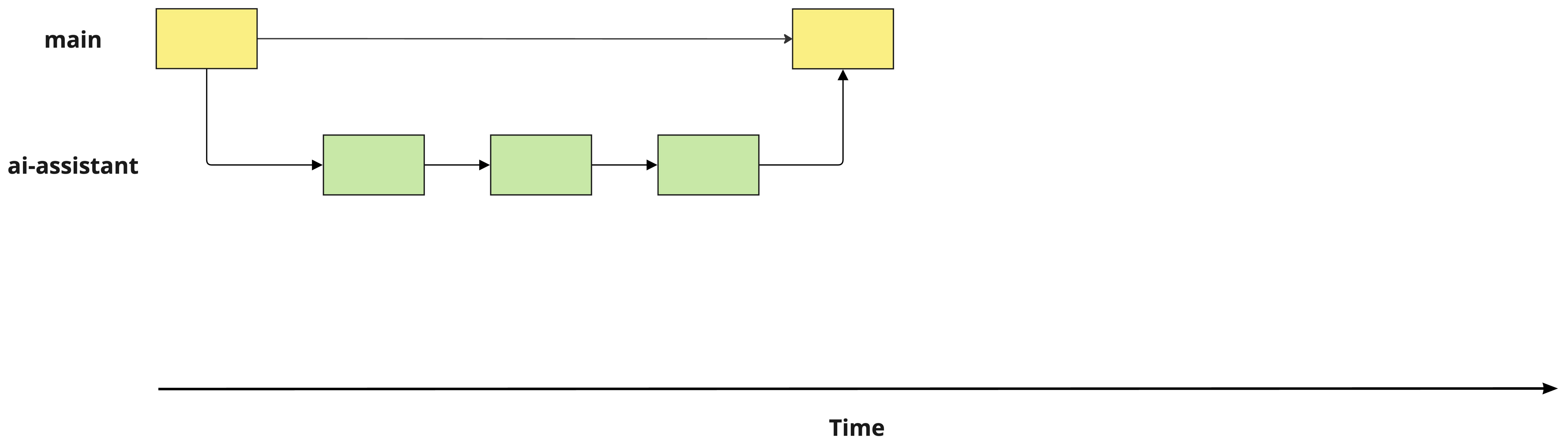
Visualizing branches



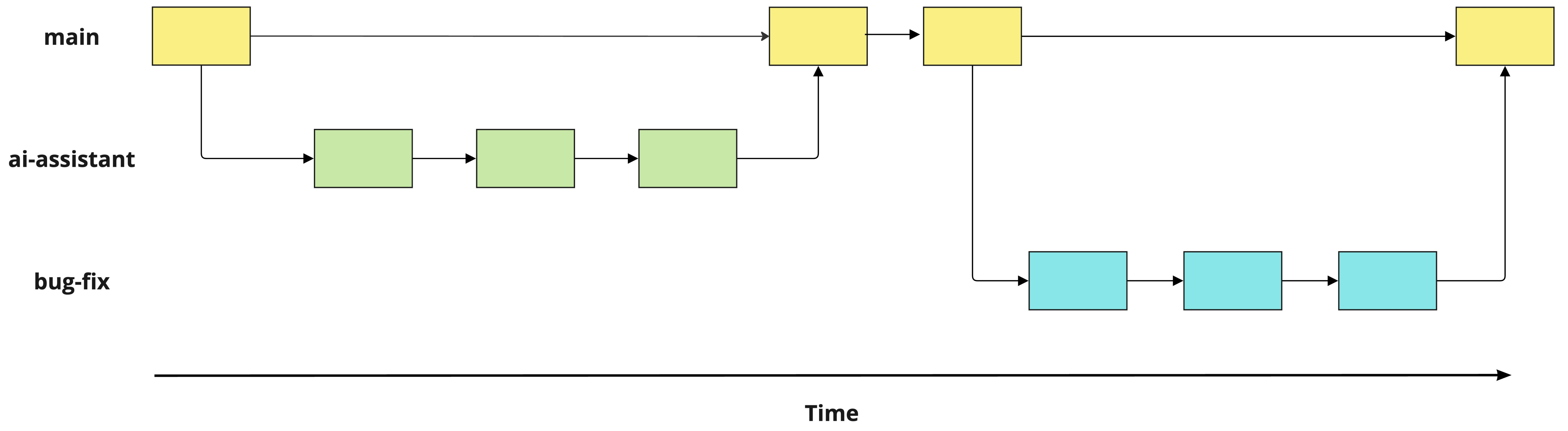
Branching off



Merging back into main



Fixing a bug



Identifying branches

- Listing all branches

```
git branch
```

```
  main
* ai-assistant
```

- `*` = current branch

Switching between branches

```
git switch main
```

```
Switched to branch 'main'
```

Creating a new branch

- Create a new branch called `speed-test`

```
git branch speed-test
```

- Move to the `speed-test` branch

```
git switch speed-test
```

```
Switched to branch 'speed-test'
```

- Create a new branch called `speed-test` **and** switch to it

```
git switch -c speed-test
```

```
Switched to a new branch 'speed-test'
```

Terminology

- Creating a new branch = "branching off"
- Creating `speed-test` from `main` = "branching off `main`"

Let's practice!

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Modifying and comparing branches

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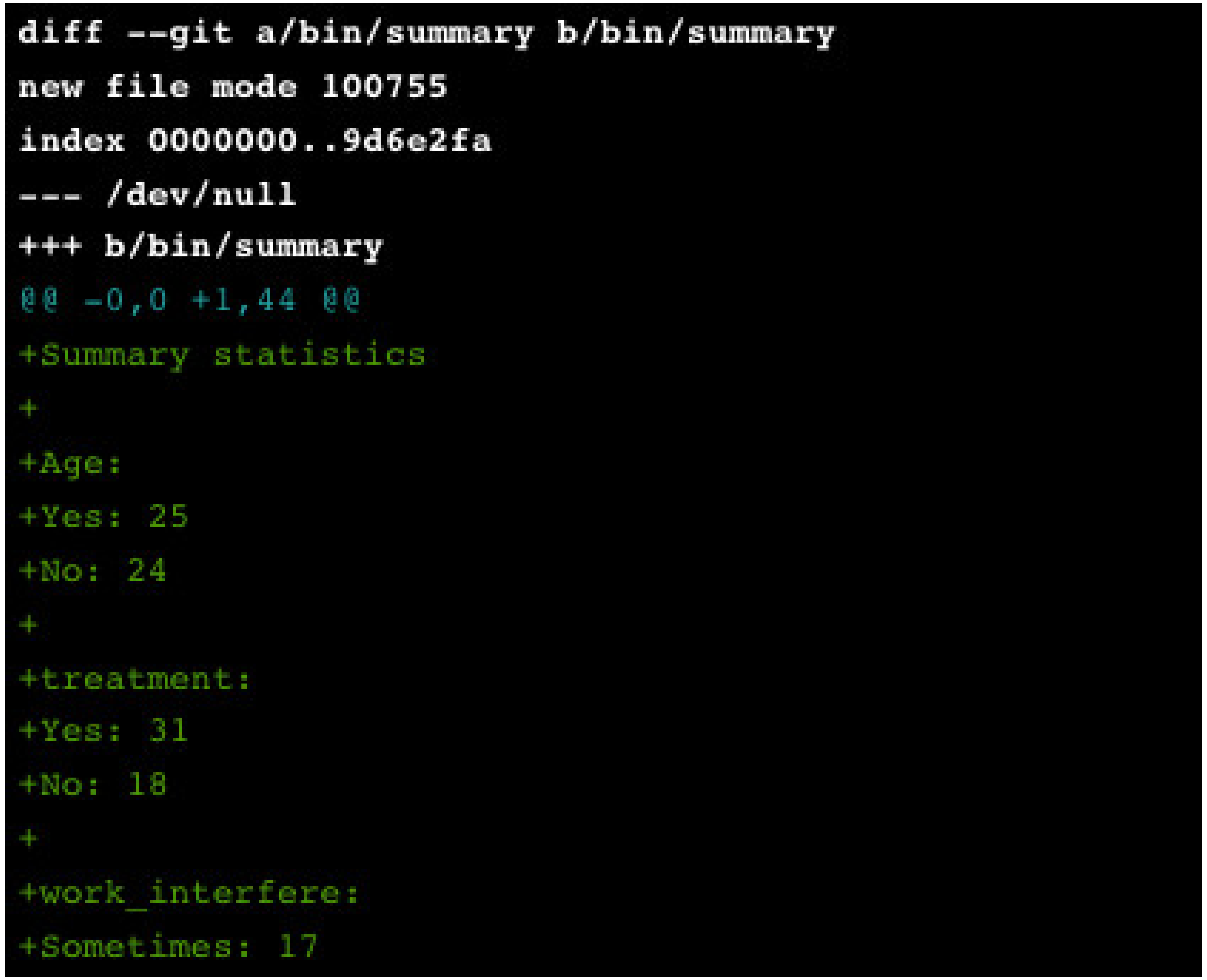
Diff recap

Command	Function
`git diff`	Show changes between all unstaged files and the latest commit
`git diff report.md`	Show changes between an unstaged file and the latest commit
`git diff --staged`	Show changes between all staged files and the latest commit
`git diff --staged report.md`	Show changes between a staged file and the latest commit
`git diff 35f4b4d 186398f`	Show changes between two commits using hashes
`git diff HEAD~1 HEAD~2`	Show changes between two commits using `HEAD` instead of commit hashes

Comparing branches

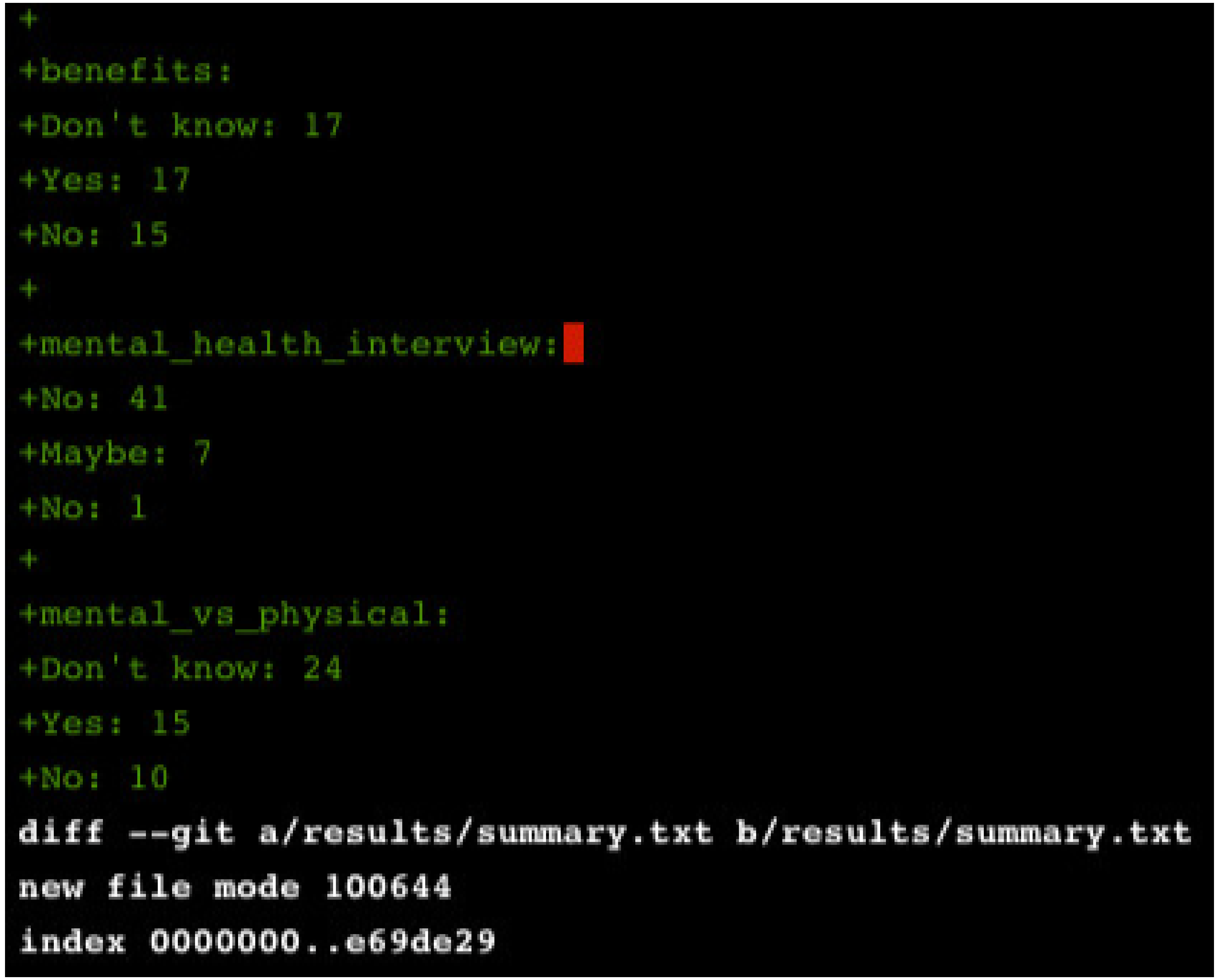
```
git diff main summary-statistics
```

git diff output



```
diff --git a/bin/summary b/bin/summary
new file mode 100755
index 0000000..9d6e2fa
--- /dev/null
+++ b/bin/summary
@@ -0,0 +1,44 @@
+Summary statistics
+
+Age:
+Yes: 25
+No: 24
+
+treatment:
+Yes: 31
+No: 18
+
+work_interfere:
+Sometimes: 17
```

git diff output



```
+
+benefits:
+Don't know: 17
+Yes: 17
+No: 15
+
+mental_health_interview: 
+No: 41
+Maybe: 7
+No: 1
+
+mental_vs_physical:
+Don't know: 24
+Yes: 15
+No: 10
diff --git a/results/summary.txt b/results/summary.txt
new file mode 100644
index 0000000..e69de29
```

Navigating large git outputs

- Can produce large outputs!
- Press `space` to progress through and `q` to exit

Modifying branches

```
git branch
```

```
  main
* feature_dev
```

- `feature_dev`
- Need another branch for a second new feature being developed
- Solution - rename `feature_dev`
- Renaming a branch

```
git branch -m
```

Renaming a branch

```
git branch
```

```
  main
* feature_dev
```

- `feature_dev`
- Need another branch for a second new feature being developed
- Solution - rename `feature_dev`
- Renaming a branch

```
git branch -m feature_dev chatbot
```

Checking our branches

```
git branch
```

```
  main
* chatbot
```

Deleting a branch

- Large projects can have many branches
- Delete branches once we are finished with them
- Delete the `chatbot` branch with `-d` flag

```
git branch -d chatbot
```

```
Deleted branch chatbot (was 3edb989).
```

Deleting a branch that hasn't been merged

- If `chatbot` hasn't been merged to `main`, `git branch -d chatbot` will produce an error

```
error: The branch 'chatbot' is not fully merged.
If you are sure you want to delete it, run 'git branch -D chatbot'.
```

- Delete with `-D` flag

```
git branch -D chatbot
```

```
Deleted branch chatbot (was 3edb989).
```

- Difficult, but not impossible, to recover deleted branches
- Be sure we don't need the branch any more before deleting!

Summary

Command	Function
`git diff main chatbot`	Compare the state of the `main` and `chatbot` branches
`git branch`	List all branches
`git branch -m old_name new_name`	Rename branch called `old_name` to `new_name`
`git branch -d chatbot`	Delete `chatbot` branch, which **has** been merged
`git branch -D chatbot`	Delete `chatbot` branch, which **has not** been merged

Let's practice!

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Merging branches

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The purpose of branches

- Each branch should have a particular purpose
  - Developing a new feature
  - Debugging an error
- Once the task is complete, we incorporate the changes into production
  - Typically the `main` branch - "ground truth"

Source and destination

- When merging two branches:
  - the last commits from each branch are called **parent commits**
  - `source` —the branch we want to merge **from**
  - `destination` —the branch we want to merge **into**
- When merging `ai-assistant` into `main` :
  - `ai-assistant` = `source`
  - `main` = `destination`

Merging branches

- Move to the destination branch:

```
git switch main
```

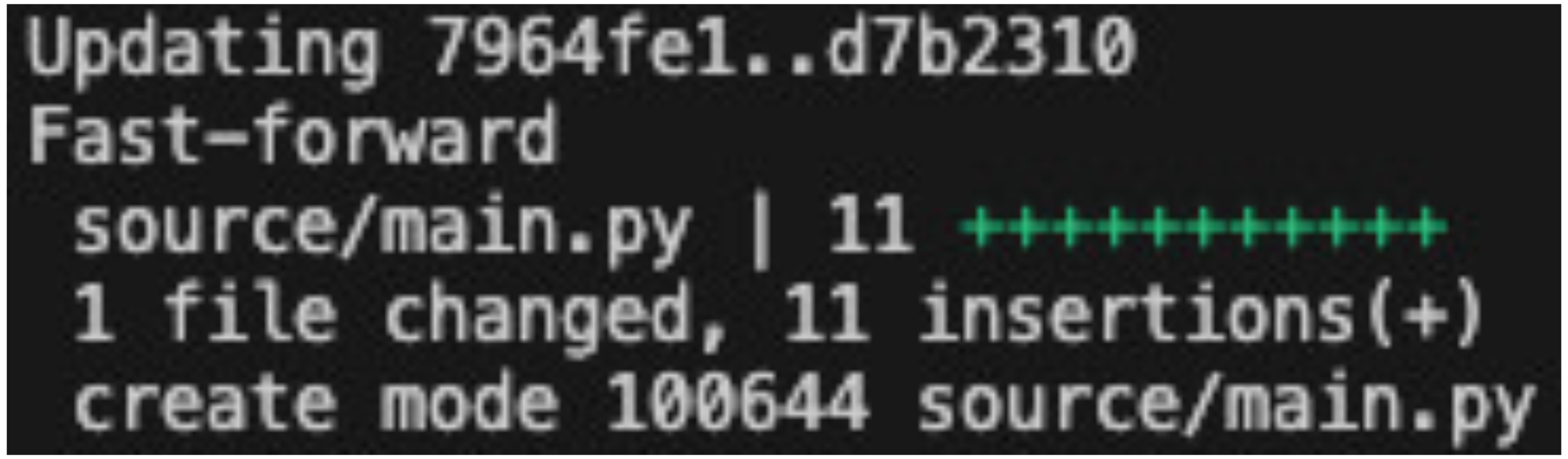
- `git merge source`
- From `main` , to merge `ai-assistant` into `main` :

```
git merge ai-assistant
```

- From another branch: `git merge source destination`

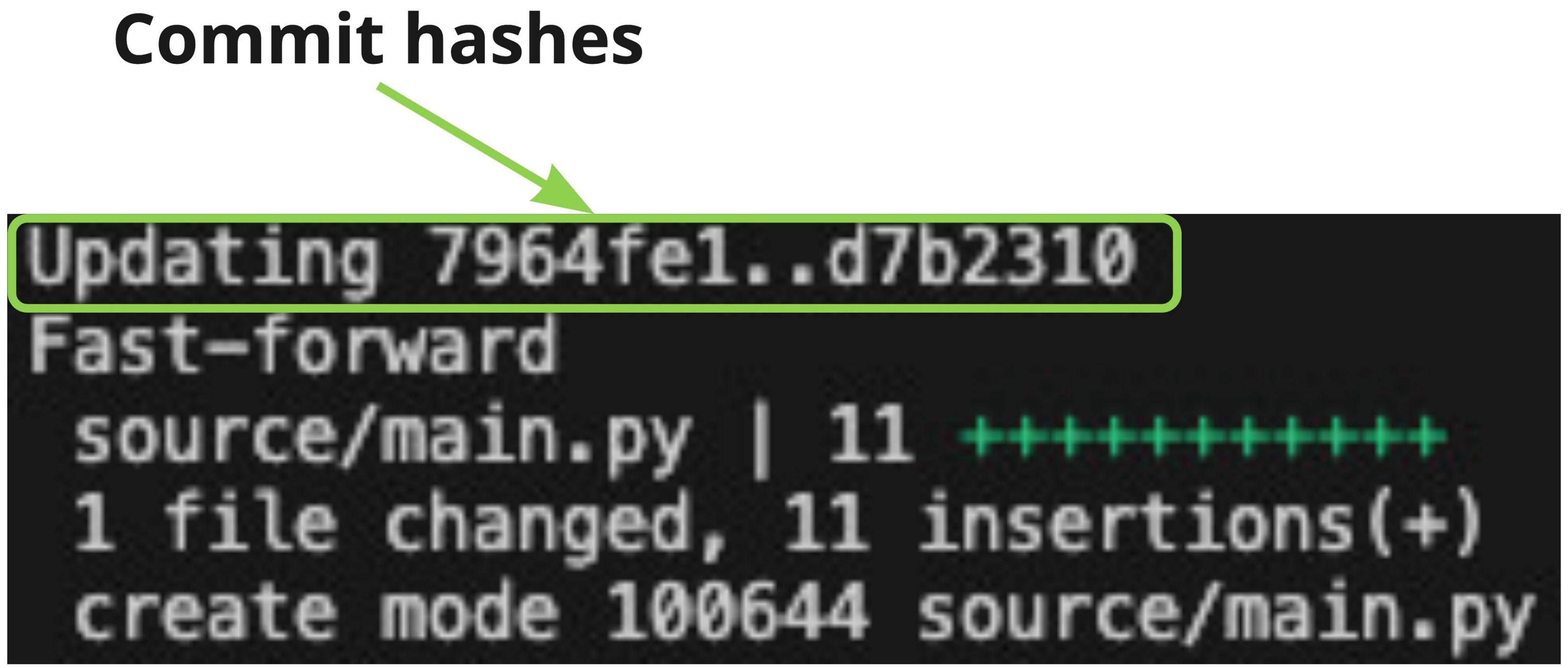
```
git merge ai-assistant main
```

Git merge output



```
Updating 7964fe1..d7b2310
Fast-forward
 source/main.py | 11 +++++++++++
 1 file changed, 11 insertions(+)
 create mode 100644 source/main.py
```

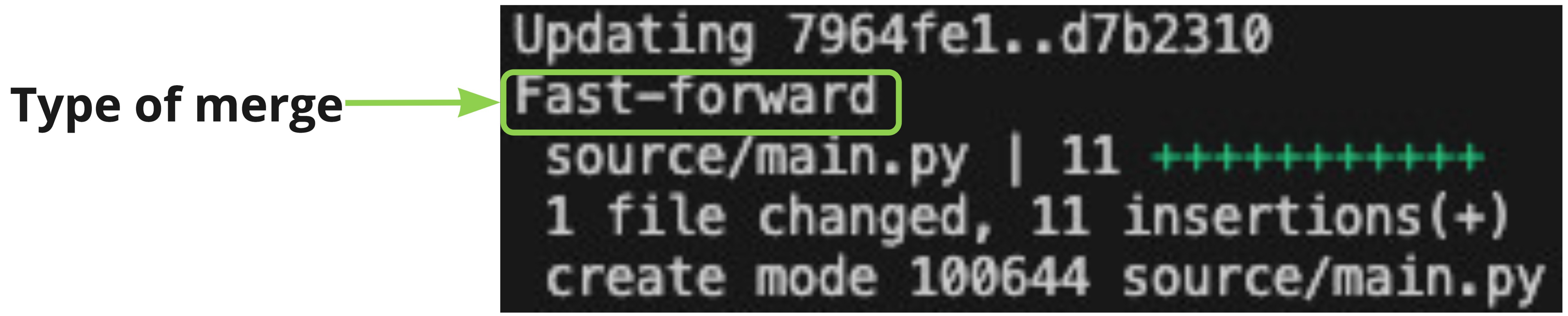
Git merge output



```
Updating 7964fe1..d7b2310
Fast-forward
 source/main.py | 11 +++++++++++
 1 file changed, 11 insertions(+)
 create mode 100644 source/main.py
```

- Parent commits

Git merge output



```
Updating 7964fe1..d7b2310
Fast-forward
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 1 file changed, 11 insertions(+)
 create mode 100644 source/main.py
```
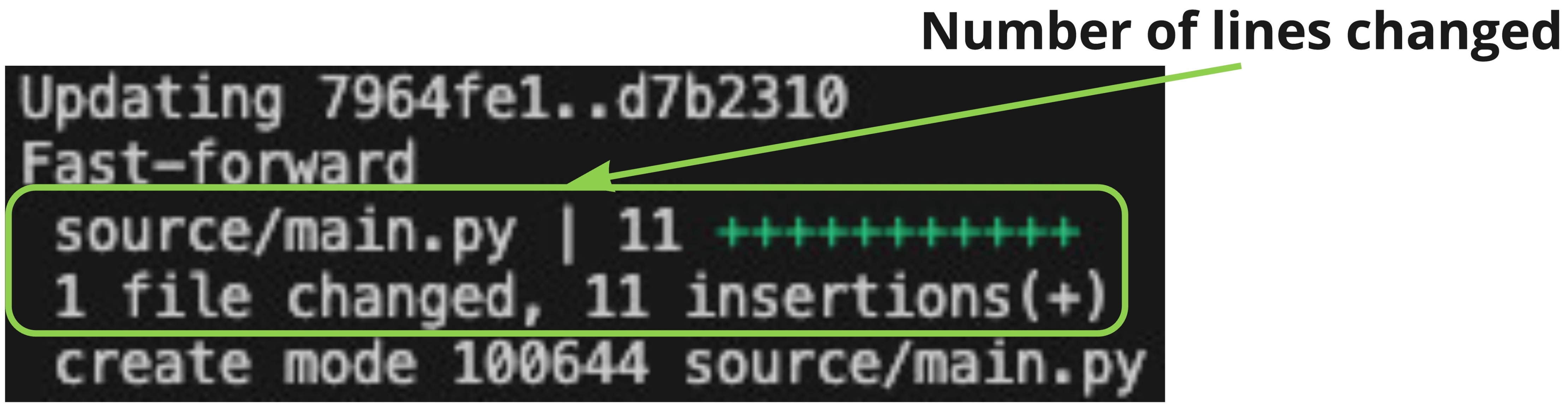

- Linear commit history: branched off `main` to create `ai-assistant`
- Fast-forward: point `main` to the last commit in the `ai-assistant` branch

Git merge output



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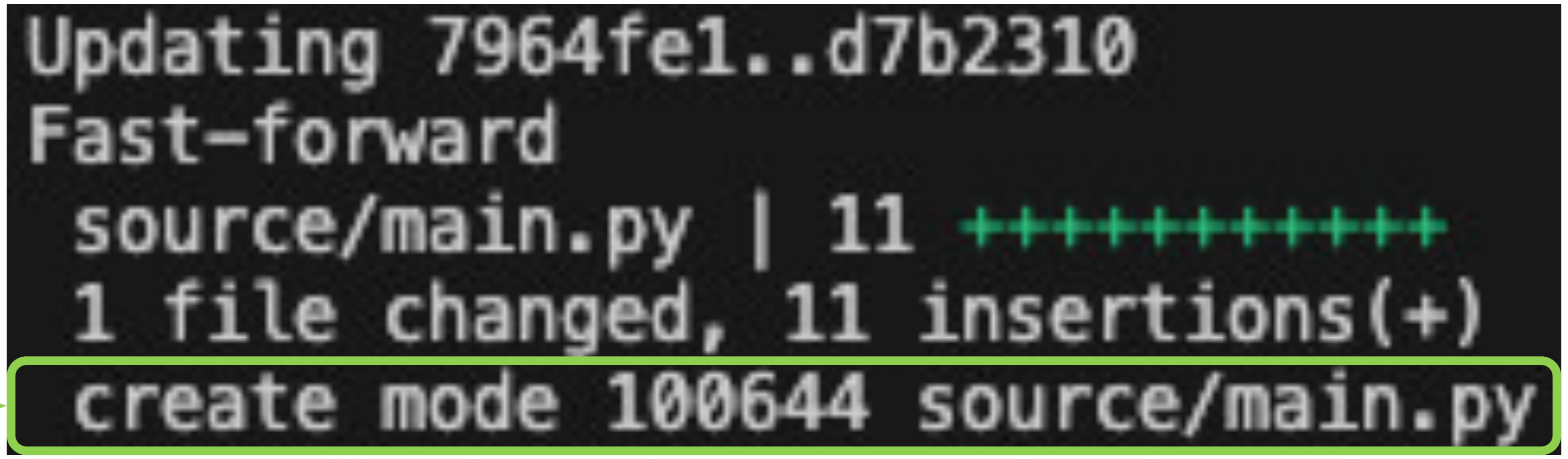
Git merge output



```
Updating 7964fe1..d7b2310
Fast-forward
 source/main.py | 11 +++++++++++
 1 file changed, 11 insertions(+)
 create mode 100644 source/main.py
```

Files modified

Let's practice!

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