Git Concepts
I Wish I knew Years Ago

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Agenda

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- Git Basics
- Using Git in a Team
- Branching and Merge Conflicts
- Merge Commits vs. Rebase Merging vs. Squash Merging
- Tips and Tricks
- Git in VS Code

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How well do you know Git?

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- 🤩 **Never used it** — I have not used Git before, but I am interested!
- 🧐 **Beginner** — I just started learning the basics.
- 👨‍🎓 **Intermediate** — I understand the basics, but I am not familiar with advanced concepts.
- 🕵️ **Expert** — I have a deep understanding of Git.

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Git Basics

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Let’s get setup

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Let’s do this once …

1. Install Git on your PC:
   - https://git-scm.com/downloads
2. Setup your name and email in your Git config:

MINGW64:/c/Users/SanjulaGanepola

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~
$ git config --global user.name "Sanjula Ganepola"

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~
$ git config --global user.email "Sanjula.Ganepola@ibm.com"

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~
$
```


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Setup a new project with Git

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MINGW64:/c/Users/SanjulaGanepola/Desktop/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop
$ mkdir my-awesome-project

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop
$ cd my-awesome-project/

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project
$ touch awesomeness.js

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project
$ git init
Initialized empty Git repository in C:/Users/SanjulaGanepola/Desktop/my-awesome-project/.git/

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ ls .git/
HEAD  config  description  hooks/  info/  objects/  refs/

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$
```


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Where does your code live?

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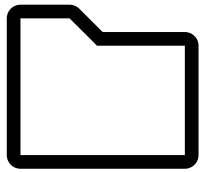

WORKING
DIRECTORY

Where we actively edit local files (our playground)

STAGING
AREA

Temporary location for changes before committing

LOCAL
REPO

Where we store committed changes locally

REMOTE
REPO

A sever (such as GitHub) for sharing and backing up code

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Moving code to the staging area

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WORKING DIRECTORY → STAGING AREA | LOCAL REPO | REMOTE REPO

MINGW64:/c/Users/SanjulaGanepola/Desktop/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ git status
On branch master

No commits yet

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        awesomeness.js

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

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ git add awesomeness.js

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ git status
On branch master

No commits yet

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)
        new file:   awesomeness.js


AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$
```


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Excluding files from being tracked

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WORKING DIRECTORY → STAGING AREA | LOCAL REPO | REMOTE REPO

MINGW64:/c/Users/SanjulaGanepola/Desktop/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ echo MY_API_KEY=NO-ONE-STEAL-THIS > .env

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ git status
On branch master

No commits yet

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)
        new file:   awesomeness.js

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


AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ echo .env > .gitignore

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ echo MY_API_KEY= > .env.sample

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ git status
On branch master

No commits yet

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)
        new file:   awesomeness.js

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        .env.sample
        .gitignore


AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ git add .
warning: in the working copy of '.env.sample', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of '.gitignore', LF will be replaced by CRLF the next time Git touches it

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$
```


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Committing files to the local repository

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MINGW64:/c/Users/SanjulaGanepola/Desktop/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ git commit -s -m "Initial commit"
[master (root-commit) fd28db6] Initial commit
 3 files changed, 2 insertions(+)
 create mode 100644 .env.sample
 create mode 100644 .gitignore
 create mode 100644 awesomeness.js

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ git status
On branch master
nothing to commit, working tree clean

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ git log
commit fd28db67cc90e5299aff7b1fb2c13be535c149f2 (HEAD -> master)
Author: Sanjula Ganepola <Sanjula.Ganepola@ibm.com>
Date:   Tue Apr 1 16:41:49 2025 -0400

    Initial commit

    Signed-off-by: Sanjula Ganepola <Sanjula.Ganepola@ibm.com>

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$
```


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Committing more files

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MINGW64:/c/Users/SanjulaGanepola/Desktop/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ echo "console.log('This code is so cool');" > awesomeness.js

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ git add awesomeness.js
warning: in the working copy of 'awesomeness.js', LF will be replaced by CRLF the next t
ime Git touches it

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ git commit -s -m "Add console log"
[master e7809ee] Add console log
 2 files changed, 1 insertion(+)
 create mode 100644 coolCode.js

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ git log --oneline
e7809ee (HEAD -> master) Add console log
fd28db6 Initial commit

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$
```


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Checking out a specific commit

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MINGW64:/c/Users/SanjulaGanepola/Desktop/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ git checkout fd28db6
Note: switching to 'fd28db6'.

You are in 'detached HEAD' state. You can look around, make experimental
changes and commit them, and you can discard any commits you make in this
state without impacting any branches by switching back to a branch.
```

e7809ee Add console log

awesomeness.js

File Edit View

```
console.log('This code is so cool');
```

Ln 1, Col 1 | 37 characters | 100% | Windows (CRL | UTF-8

fd28db6 Initial commit

awesomeness.js

File Edit View

Ln 1, Col 1 | 0 characters | 100% | Windows (CRL | UTF-8

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Comparing two commits

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MINGW64:/c/Users/SanjulaGanepola/Desktop/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project ((fd28db6...))
$ git switch -
Previous HEAD position was fd28db6 Initial commit
Switched to branch 'master'

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ git diff fd28db6 e7809ee
diff --git a/awesomeness.js b/awesomeness.js
index e69de29..875aae3 100644
--- a/awesomeness.js
+++ b/awesomeness.js
@@ -0,0 +1 @@
+console.log('This code is so cool');
diff --git a/coolCode.js b/coolCode.js
new file mode 100644
index 0000000..e69de29

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$
```


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Creating a remote repository

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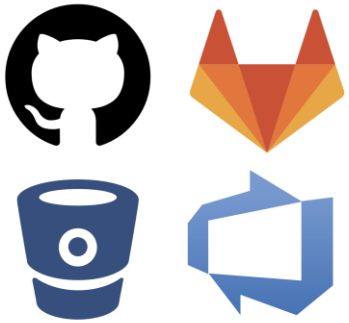

Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere?
Import a repository.

Required fields are marked with an asterisk (*).

Repository template

No template

Start your repository with a template repository's contents.

Owner *

SanjulaGanepola

/

Repository name *

my-awesome-project

my-awesome-project is available.

Great repository names are short and memorable. Need inspiration? How about studious-octo-robot ?

Description (optional)

My million dollar project!

Public
Anyone on the internet can see this repository. You choose who can commit.

Private
You choose who can see and commit to this repository.

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Using the quick setup instructions

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https://github.com/SanjulaGanepola/my-awesome-project

Quick setup — if you've done this kind of thing before

Set up in Desktop or HTTPS SSH https://github.com/SanjulaGanepola/my-awesome-project.git

Get started by creating a new file or uploading an existing file. We recommend every repository include a README, LICENSE, and .gitignore.

...or create a new repository on the command line

```
echo "# my-awesome-project" >> README.md
git init
git add README.md
git commit -m "first commit"
git branch -M main
git remote add origin https://github.com/SanjulaGanepola/my-awesome-project.git
git push -u origin main
```

...or push an existing repository from the command line

```
git remote add origin https://github.com/SanjulaGanepola/my-awesome-project.git
git branch -M main
git push -u origin main
```


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Pushing to the remote repository

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MINGW64:/c/Users/SanjulaGanepola/Desktop/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ git remote add origin https://github.com/SanjulaGanepola/my-awesome-project.git

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (master)
$ git branch -M main

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$ git push -u origin main
Enumerating objects: 8, done.
Counting objects: 100% (8/8), done.
Delta compression using up to 20 threads
Compressing objects: 100% (4/4), done.
Writing objects: 100% (8/8), 591 bytes | 295.00 KiB/s, done.
Total 8 (delta 2), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (2/2), done.
To https://github.com/SanjulaGanepola/my-awesome-project.git
 * [new branch]      main -> main
branch 'main' set up to track 'origin/main'.

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$
```


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Listing the remote repositories

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MINGW64:/c/Users/SanjulaGanepola/Desktop/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$ git remote -v
origin  https://github.com/SanjulaGanepola/my-awesome-project.git (fetch)
origin  https://github.com/SanjulaGanepola/my-awesome-project.git (push)

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$
```


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Viewing the remote repository

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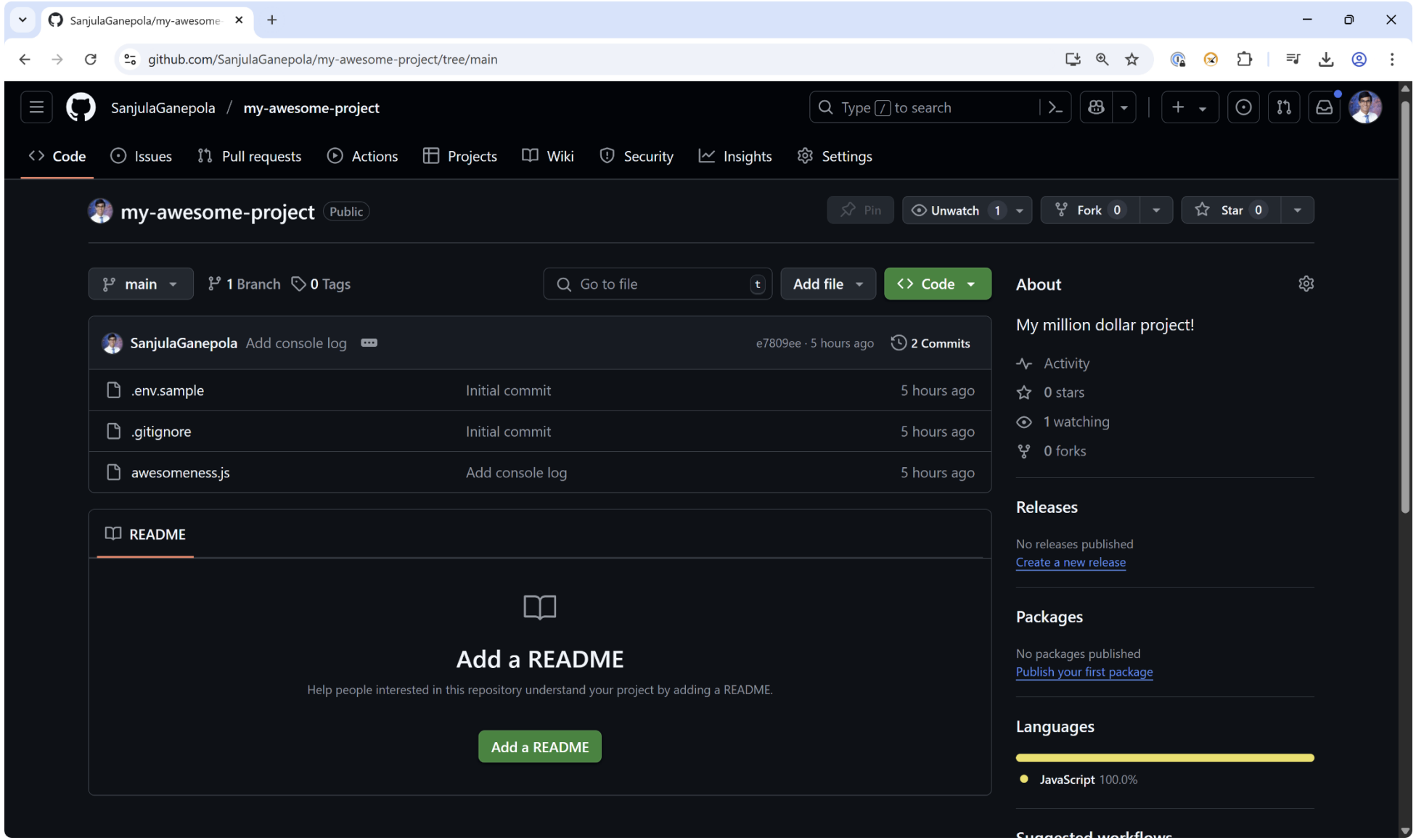

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Using Git in a Team

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Adding collaborators

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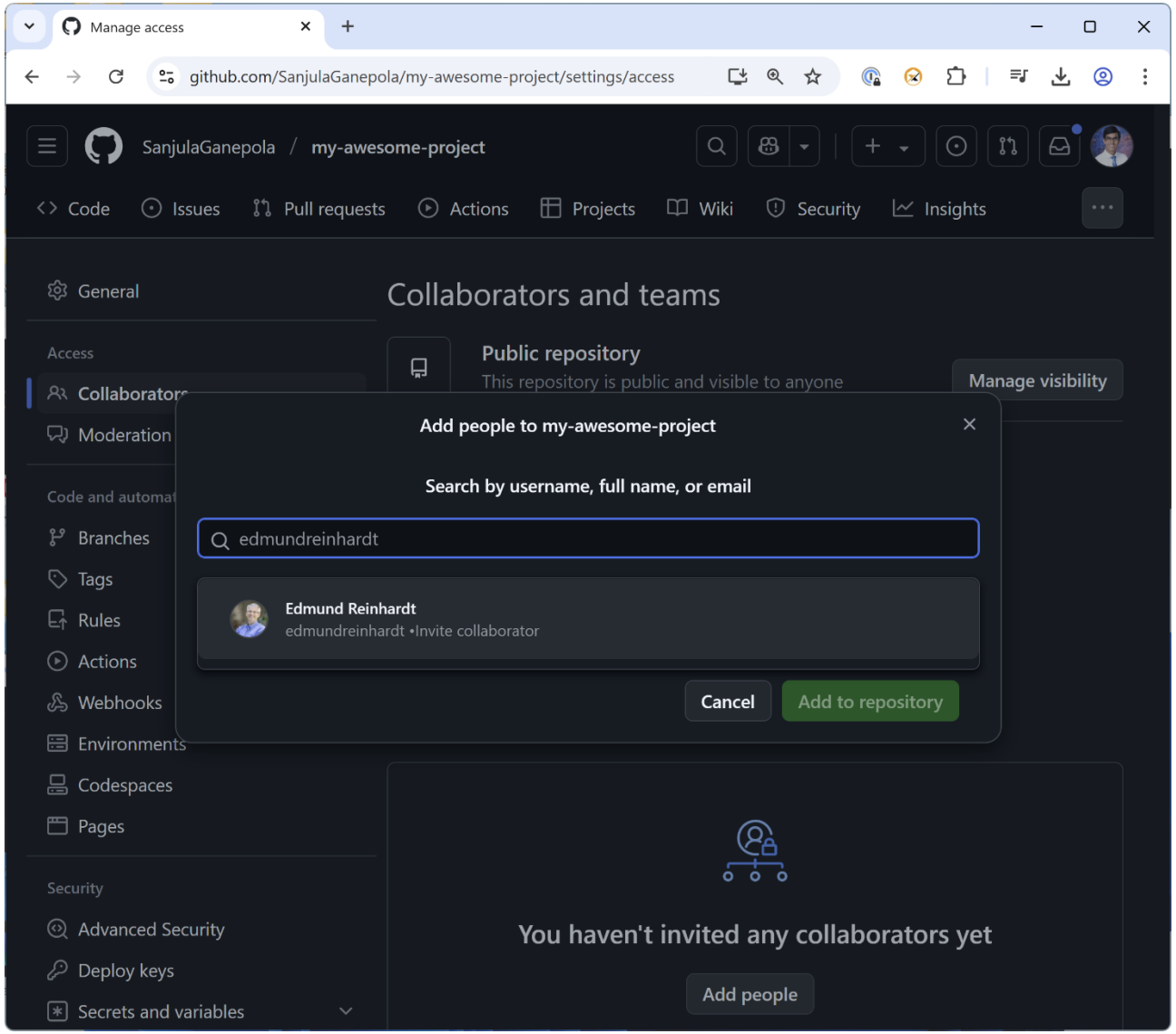

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Cloning the remote repository

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Edmund
(Team Member)

MINGW64:/c/Users/SanjulaGanepola/Desktop/developer2

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2
$ git clone https://github.com/SanjulaGanepola/my-awesome-project.git
Cloning into 'my-awesome-project'...
remote: Enumerating objects: 10, done.
remote: Counting objects: 100% (10/10), done.
remote: Compressing objects: 100% (3/3), done.
remote: Total 10 (delta 3), reused 10 (delta 3), pack-reused 0 (from 0)
Receiving objects: 100% (10/10), done.
Resolving deltas: 100% (3/3), done.

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2
$
```


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Working → Staging → Committing → Pushing

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WORKING DIRECTORY → STAGING AREA → LOCAL REPO → REMOTE REPO

Edmund
(Team Member)

MINGW64:/c/Users/SanjulaGanepola/Desktop/developer2/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ touch helper.js

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git add helper.js

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git commit -s -m "Add helper functions"
[main 6bbc0e6] Add helper functions
 1 file changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 helper.js

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git push
Enumerating objects: 3, done.
Counting objects: 100% (3/3), done.
Delta compression using up to 20 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (2/2), 291 bytes | 291.00 KiB/s, done.
Total 2 (delta 1), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To https://github.com/SanjulaGanepola/my-awesome-project.git
   e7809ee..6bbc0e6  main -> main

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$
```


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Option 1: Fetching and merging from the remote repository

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← *MERGE* ← *FETCH*

Sanjula (Owner)

MINGW64:/c/Users/SanjulaGanepola/Desktop/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$ git fetch
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Compressing objects: 100% (1/1), done.
remote: Total 2 (delta 1), reused 2 (delta 1), pack-reused 0 (from 0)
Unpacking objects: 100% (2/2), 271 bytes | 67.00 KiB/s, done.
From https://github.com/SanjulaGanepola/my-awesome-project
   e7809ee..6bbc0e6  main       -> origin/main

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$ git merge
Updating e7809ee..6bbc0e6
Fast-forward
 helper.js | 0
 1 file changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 helper.js

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$
```


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Option 2: Pulling from the remote repository

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WORKING DIRECTORY	STAGING AREA	LOCAL REPO	REMOTE REPO

PULL

Sanjula
(Owner)

MINGW64:/c/Users/SanjulaGanepola/Desktop/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$ git pull
Already up to date.

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$
```


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Creating a fork

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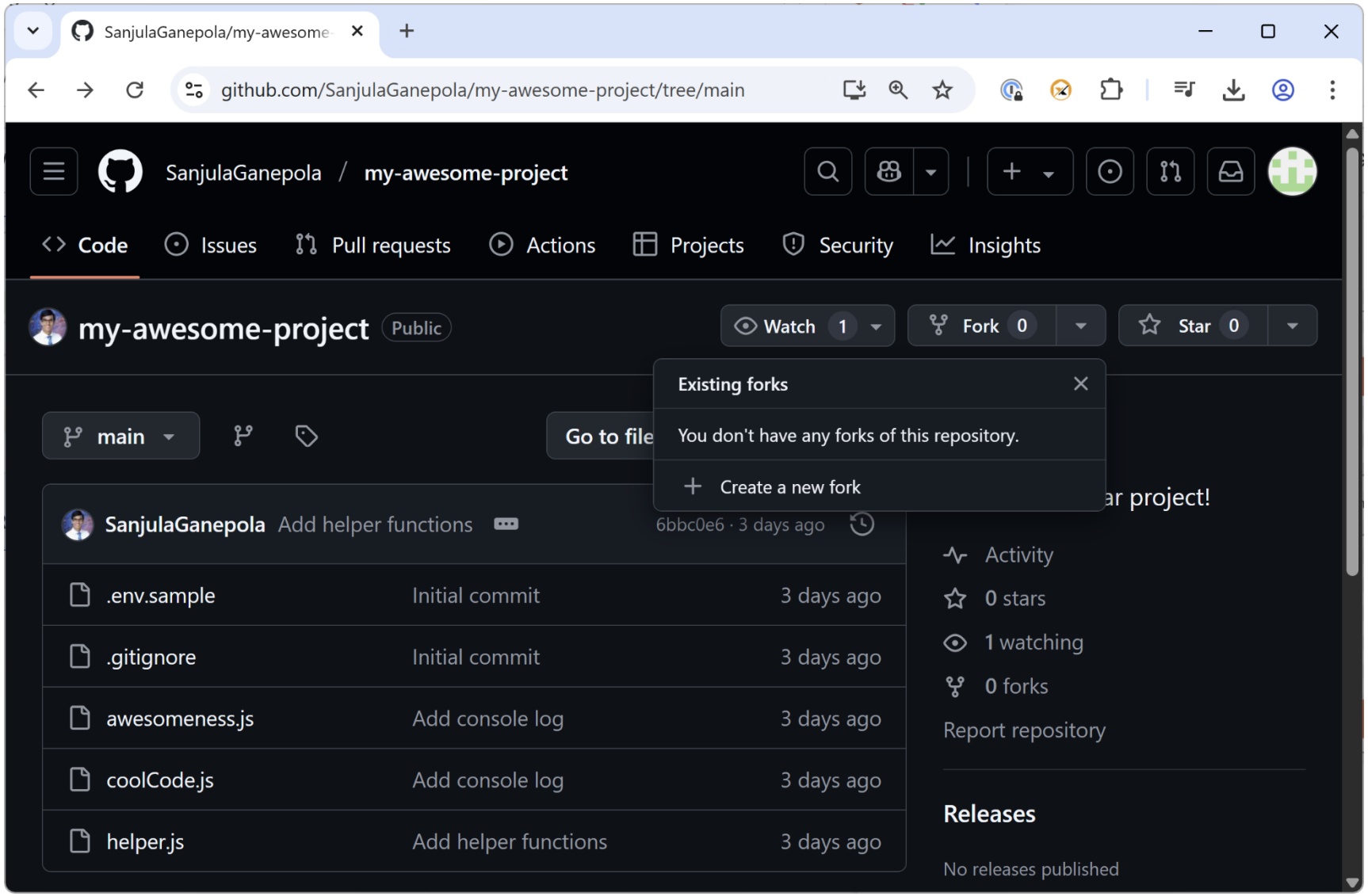
John
(Outside
Collaborator)



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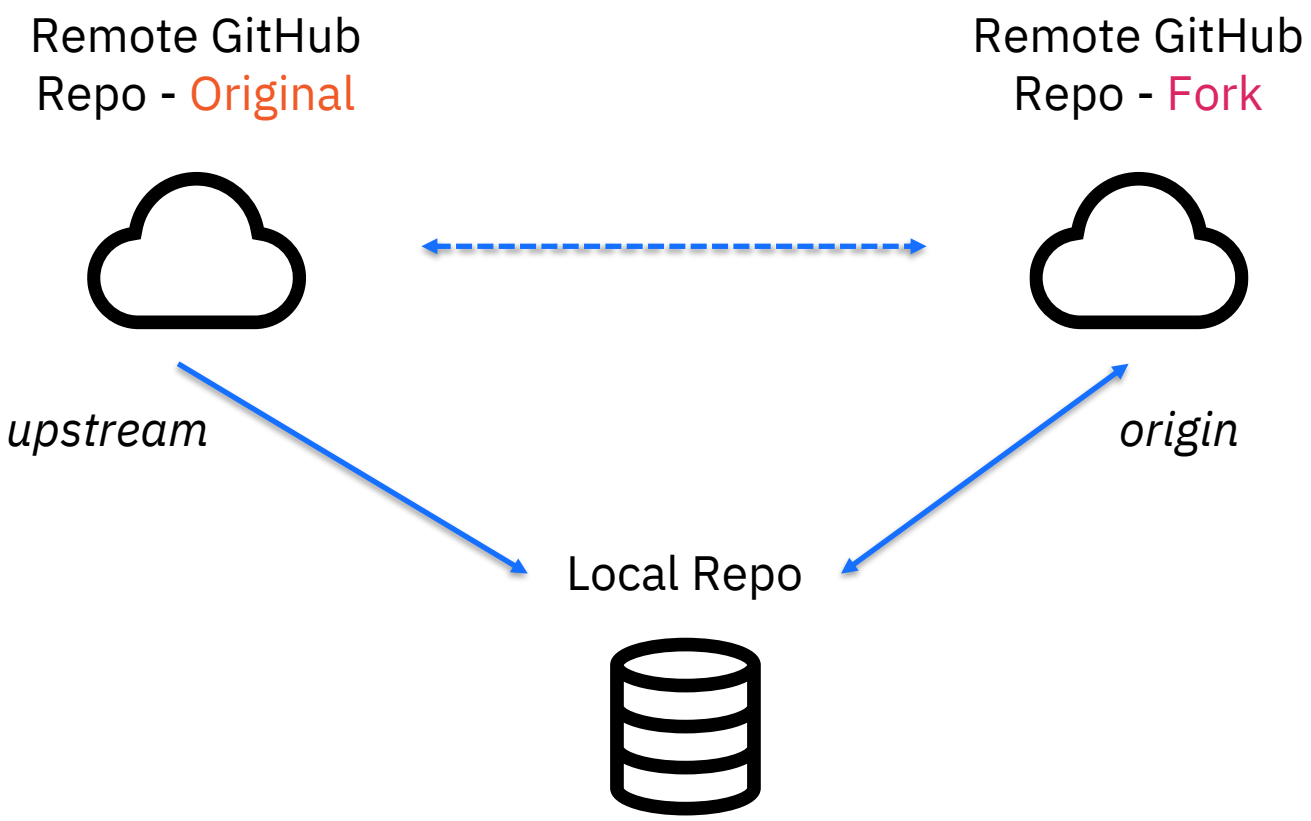
Upstream vs. Origin



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Listing Remote Repositories

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Bob
(Outside
Collaborator)

MINGW64:/c/Users/SanjulaGanepola/Desktop/fork/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/fork/my-awesome-project (main)
$ git remote add upstream https://github.com/SanjulaGanepola/my-awesome-project.git

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/fork/my-awesome-project (main)
$ git remote -v
origin  https://github.com/JohnDoeDemo/my-awesome-project.git (fetch)
origin  https://github.com/JohnDoeDemo/my-awesome-project.git (push)
upstream        https://github.com/SanjulaGanepola/my-awesome-project.git (fetch)
upstream        https://github.com/SanjulaGanepola/my-awesome-project.git (push)

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/fork/my-awesome-project (main)
$
```

Edmund
(Team Member)

MINGW64:/c/Users/SanjulaGanepola/Desktop/developer2/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git remote -v
origin  https://github.com/SanjulaGanepola/my-awesome-project.git (fetch)
origin  https://github.com/SanjulaGanepola/my-awesome-project.git (push)

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$
```

Sanjula
(Owner)

MINGW64:/c/Users/SanjulaGanepola/Desktop/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$ git remote add JohnDoeDemo https://github.com/JohnDoeDemo/my-awesome-project.git

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$ git remote -v
JohnDoeDemo     https://github.com/JohnDoeDemo/my-awesome-project.git (fetch)
JohnDoeDemo     https://github.com/JohnDoeDemo/my-awesome-project.git (push)
origin  https://github.com/SanjulaGanepola/my-awesome-project.git (fetch)
origin  https://github.com/SanjulaGanepola/my-awesome-project.git (push)

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$
```


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Branching and Merge Conflicts

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Branching in Git

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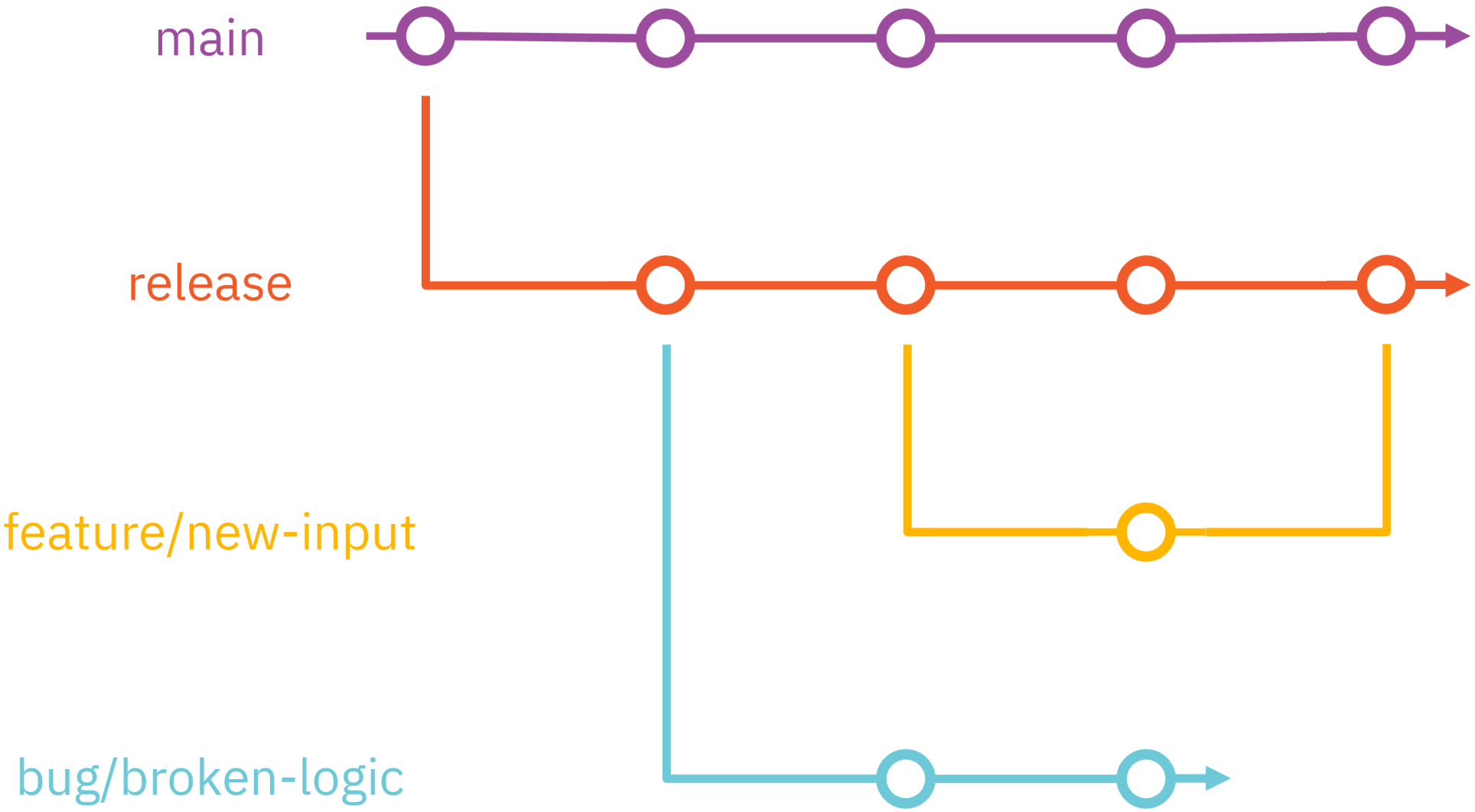

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Creating and checking out a branch

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MINGW64:/c/Users/SanjulaGanepola/Desktop/developer2/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git branch feature/rest-server

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git branch
  feature/rest-server
* main

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git checkout feature/rest-server
Switched to branch 'feature/rest-server'

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (feature/rest-server
)
$
```


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Pushing to the branch

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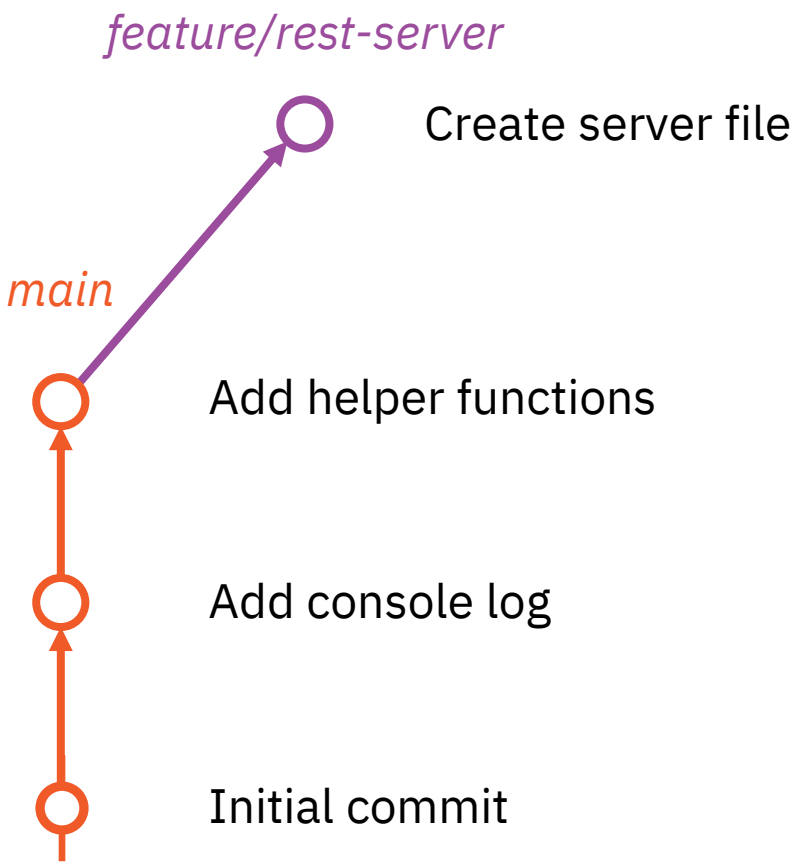
MINGW64:/c/Users/SanjulaGanepola/Desktop/developer2/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (feature/rest-server)
$ echo "console.log('Starting server...');" > server.js

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (feature/rest-server)
$ git add server.js
warning: in the working copy of 'server.js', LF will be replaced by CRLF the next time Git touches it

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (feature/rest-server)
$ git commit -s -m "Create server file"
[feature/rest-server 6c4a7fb] Create server file
 1 file changed, 1 insertion(+)
 create mode 100644 server.js

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (feature/rest-server)
$ git push
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 20 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 330 bytes | 330.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
remote:
remote: Create a pull request for 'feature/rest-server' on GitHub by visiting:
remote:      https://github.com/SanjulaGanepola/my-awesome-project/pull/new/feature/rest-server
remote:
To https://github.com/SanjulaGanepola/my-awesome-project.git
 * [new branch]      feature/rest-server -> feature/rest-server
branch 'feature/rest-server' set up to track 'origin/feature/rest-server'.

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (feature/rest-server)
$ git log --oneline
6c4a7fb (HEAD -> feature/rest-server, origin/feature/rest-server) Create server file
6bbc0e6 (origin/main, origin/HEAD, main) Add helper functions
e7809ee Add console log
fd28db6 Initial commit

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (feature/rest-server)
$
```



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Merging branches

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MINGW64:/c/Users/SanjulaGanepola/Desktop/developer2/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (feature/rest-server)
$ git checkout main
Switched to branch 'main'
Your branch is up to date with 'origin/main'.

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git merge feature/rest-server
Updating 6bbc0e6..6c4a7fb
Fast-forward
 server.js | 1 +
 1 file changed, 1 insertion(+)
 create mode 100644 server.js

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git push
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To https://github.com/SanjulaGanepola/my-awesome-project.git
   6bbc0e6..6c4a7fb  main -> main

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git log --oneline
6c4a7fb (HEAD -> main, origin/main, origin/feature/rest-server, origin/HEAD, feature/rest-server) Create serve
r file
6bbc0e6 Add helper functions
e7809ee Add console log
fd28db6 Initial commit

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$
```


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Fast forward merge vs non-fast forward merge

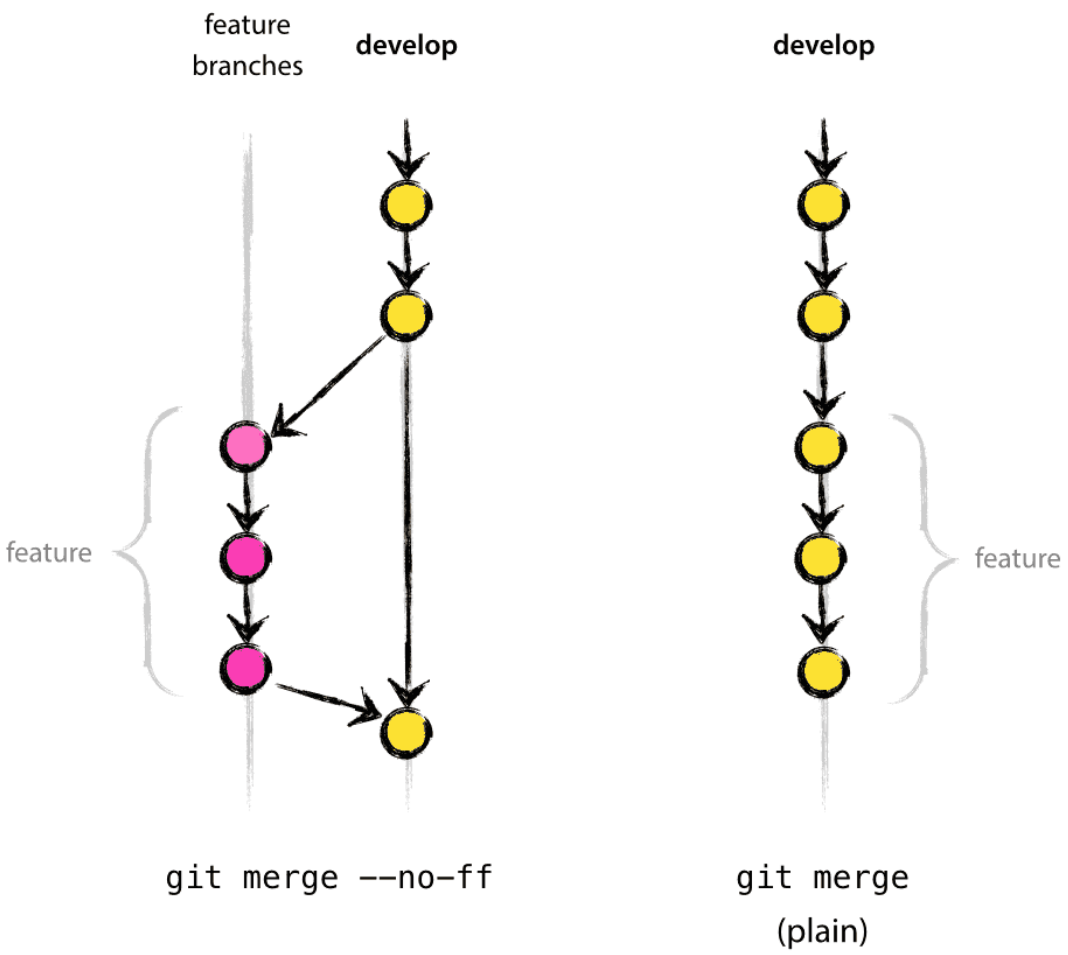

Image from nvie.com/posts/a-successful-git-branching-model/
by Vincent Driessen

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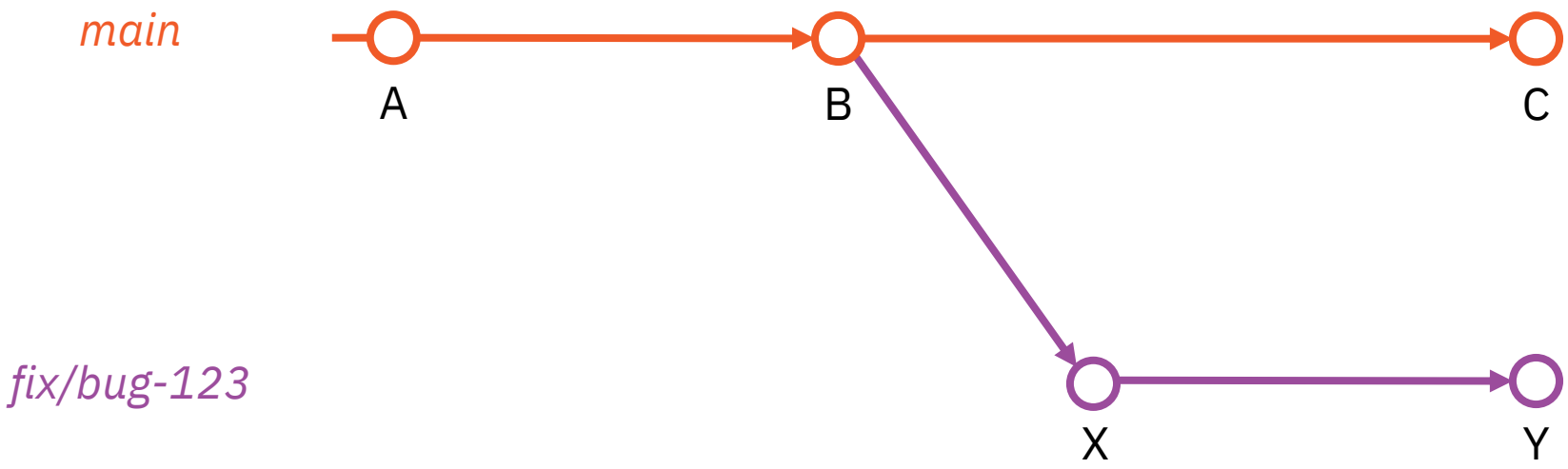
When can merge conflicts happen?



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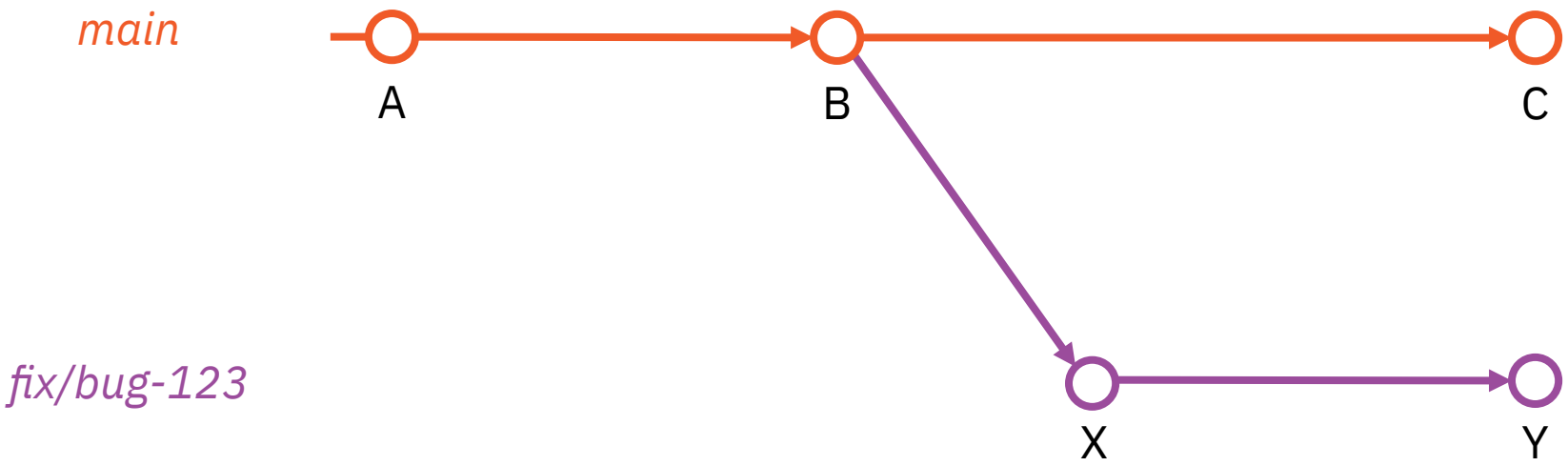
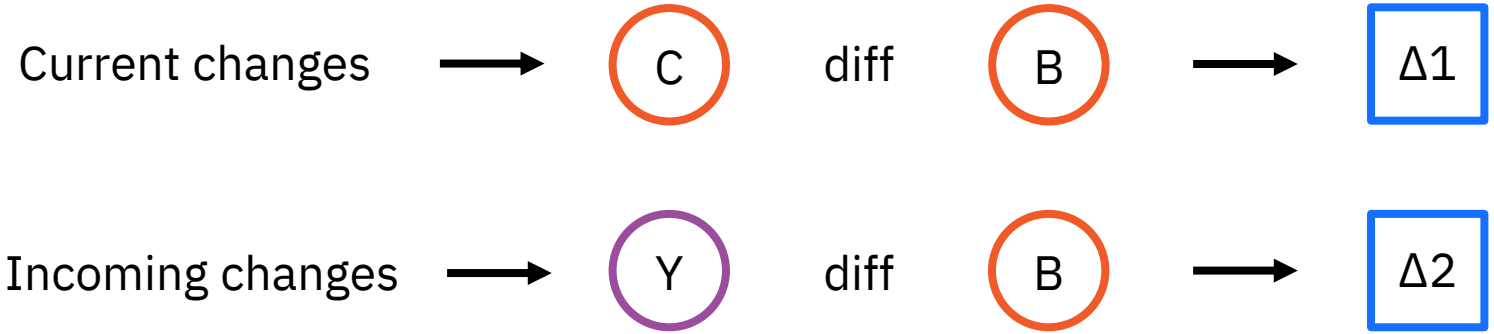
3-way merge





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Scenario 1: No file overlap

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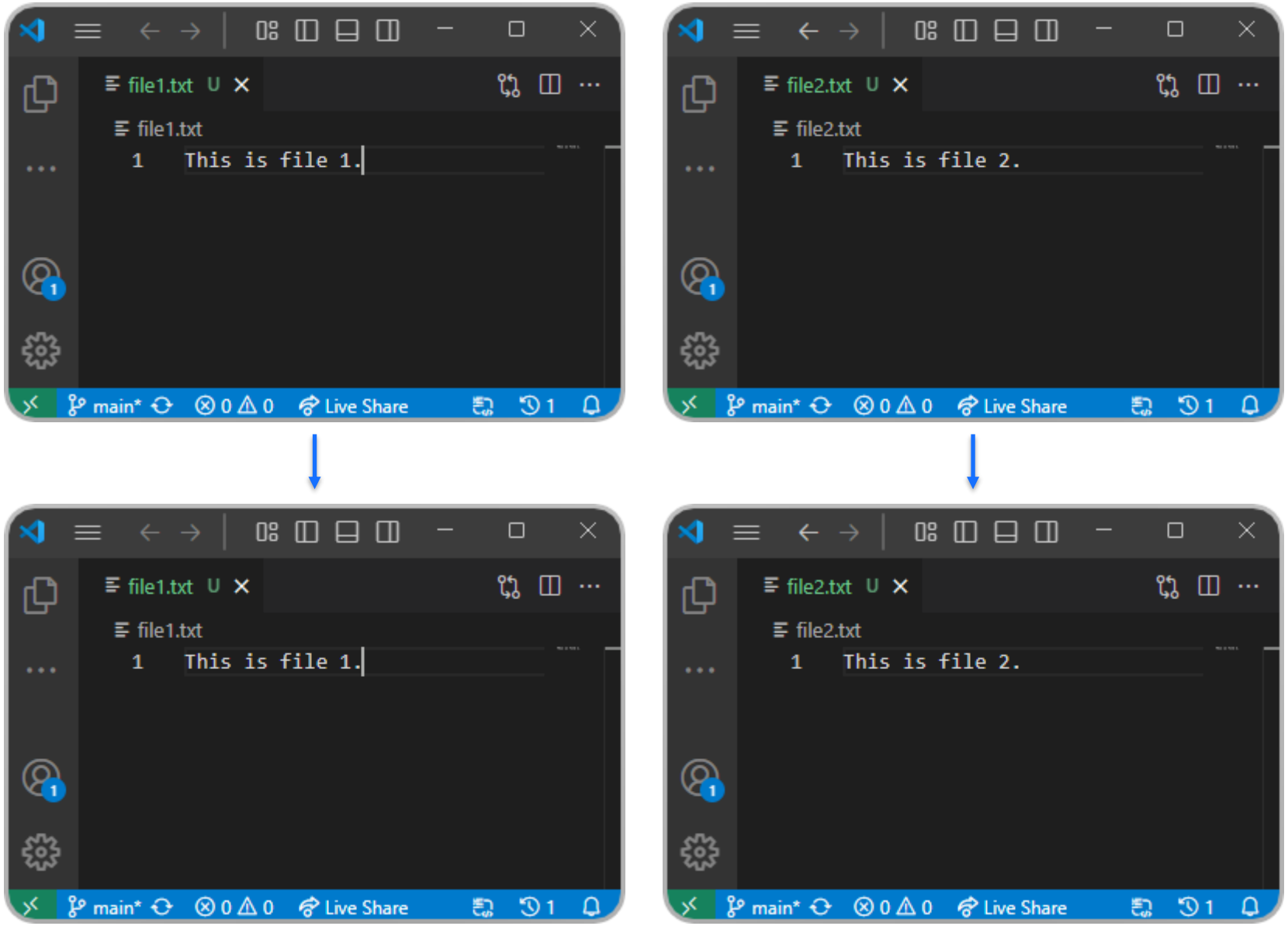

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Scenario 2: No line overlap

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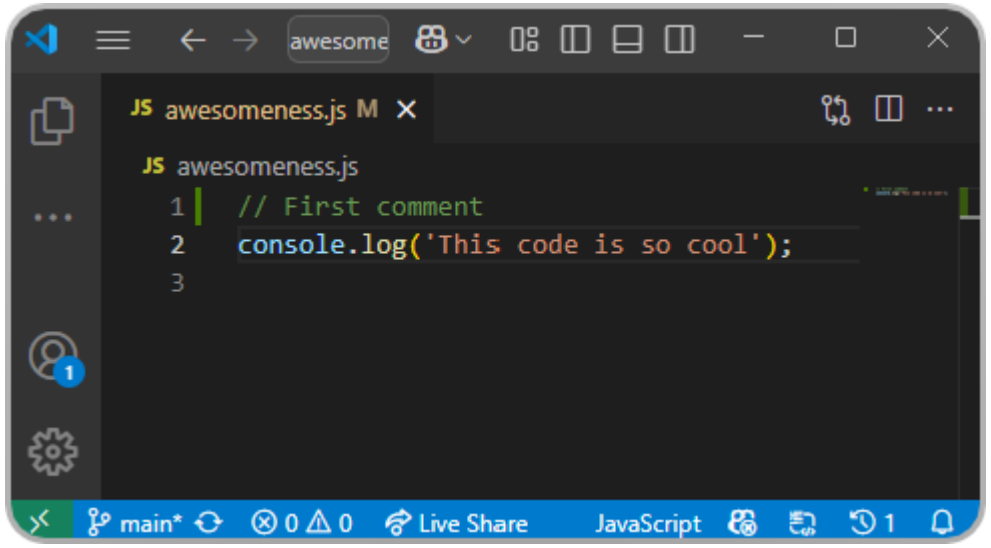

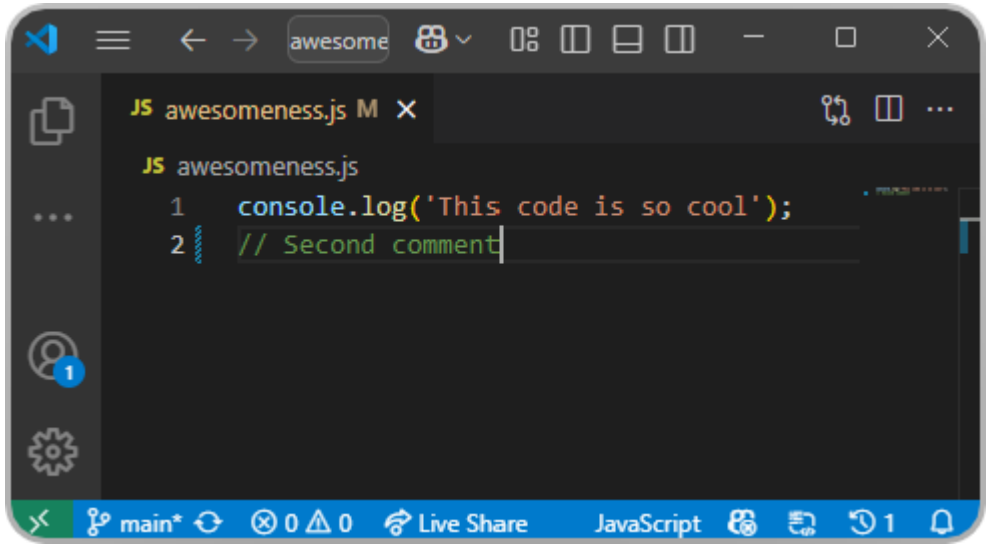

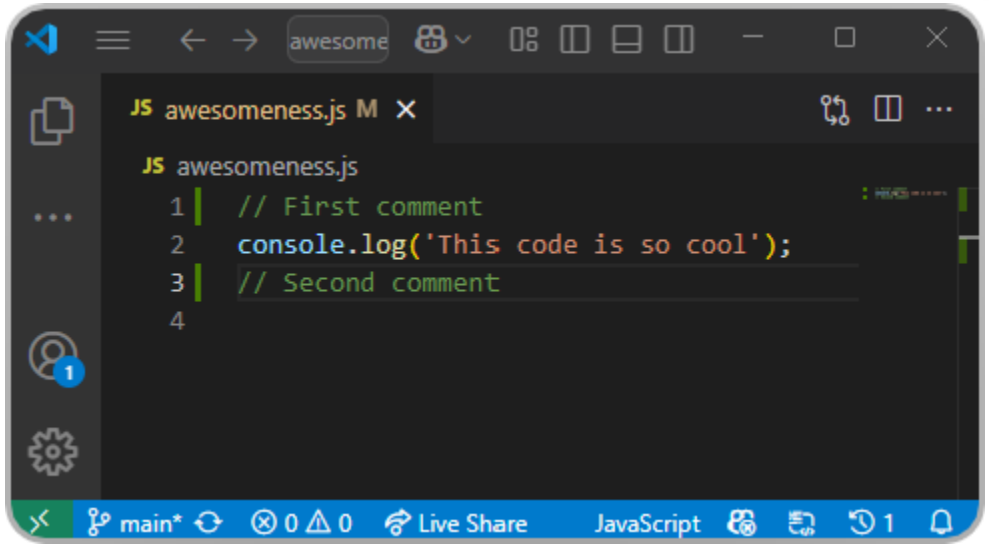

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Scenario 3: Line overlap

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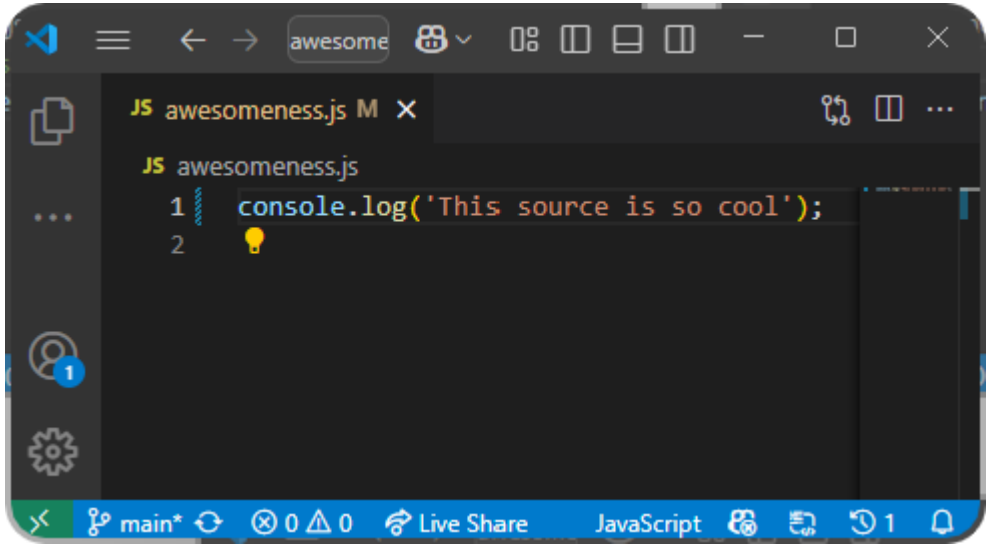

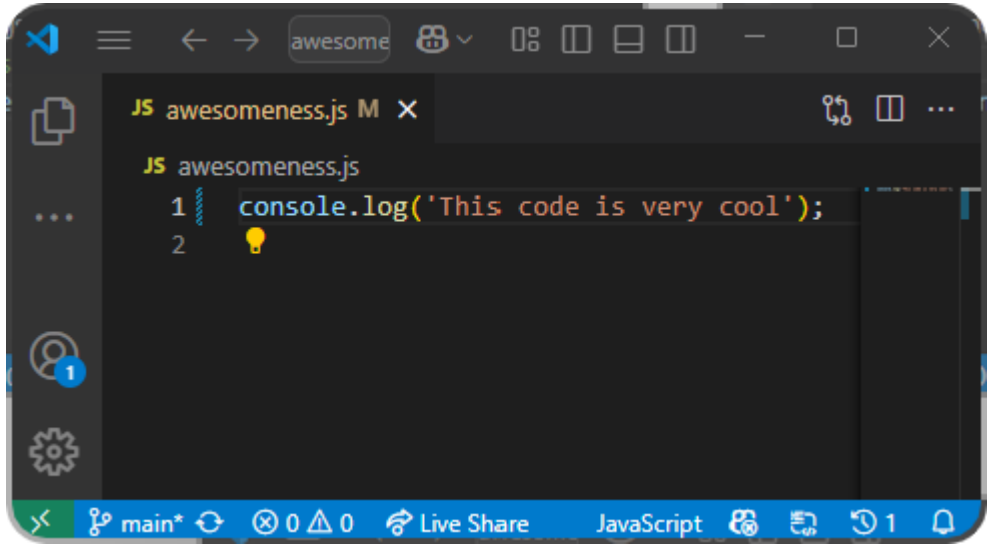

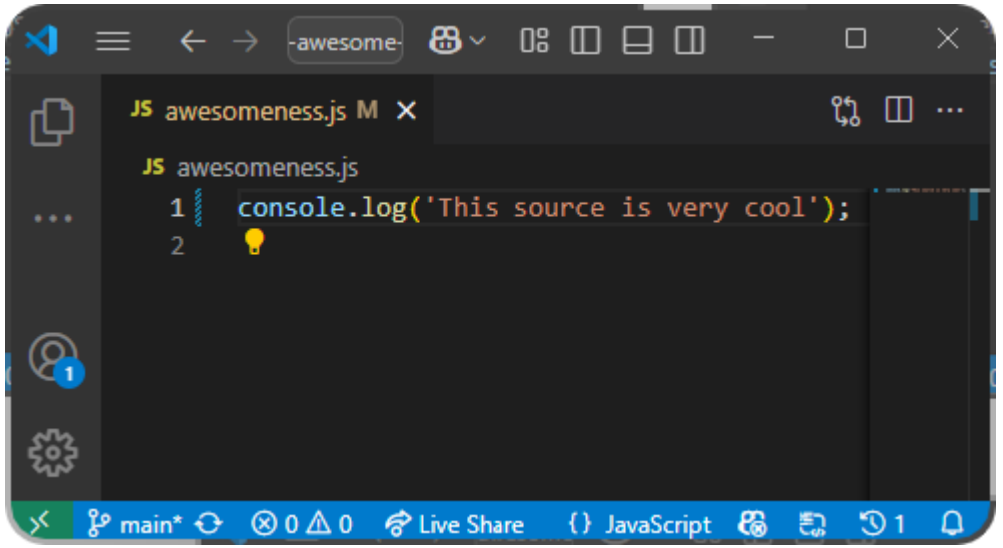

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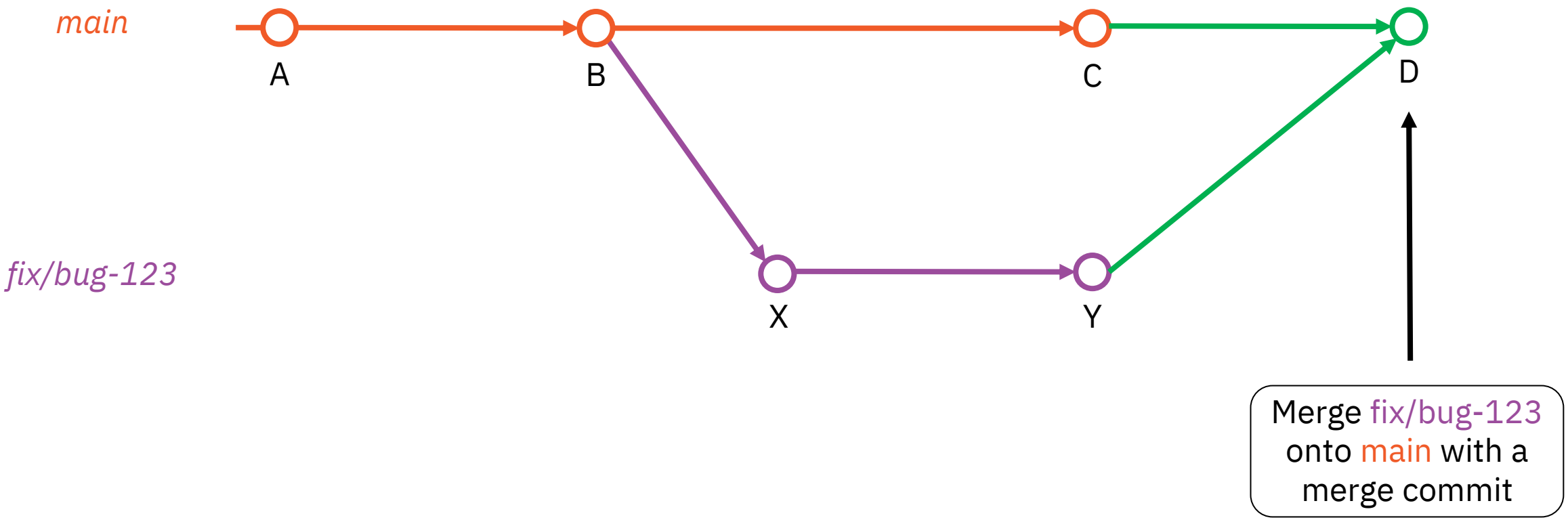
Merge commit



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Merge commits vs. Rebase merging vs. Squash merging

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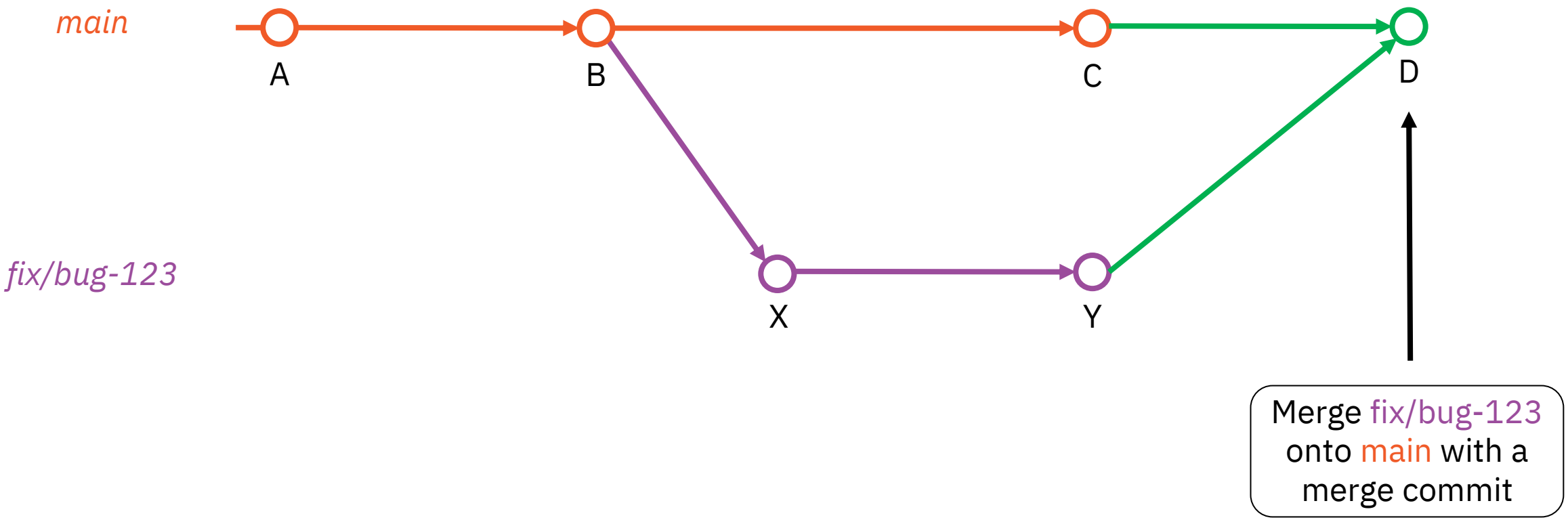
Merge commits



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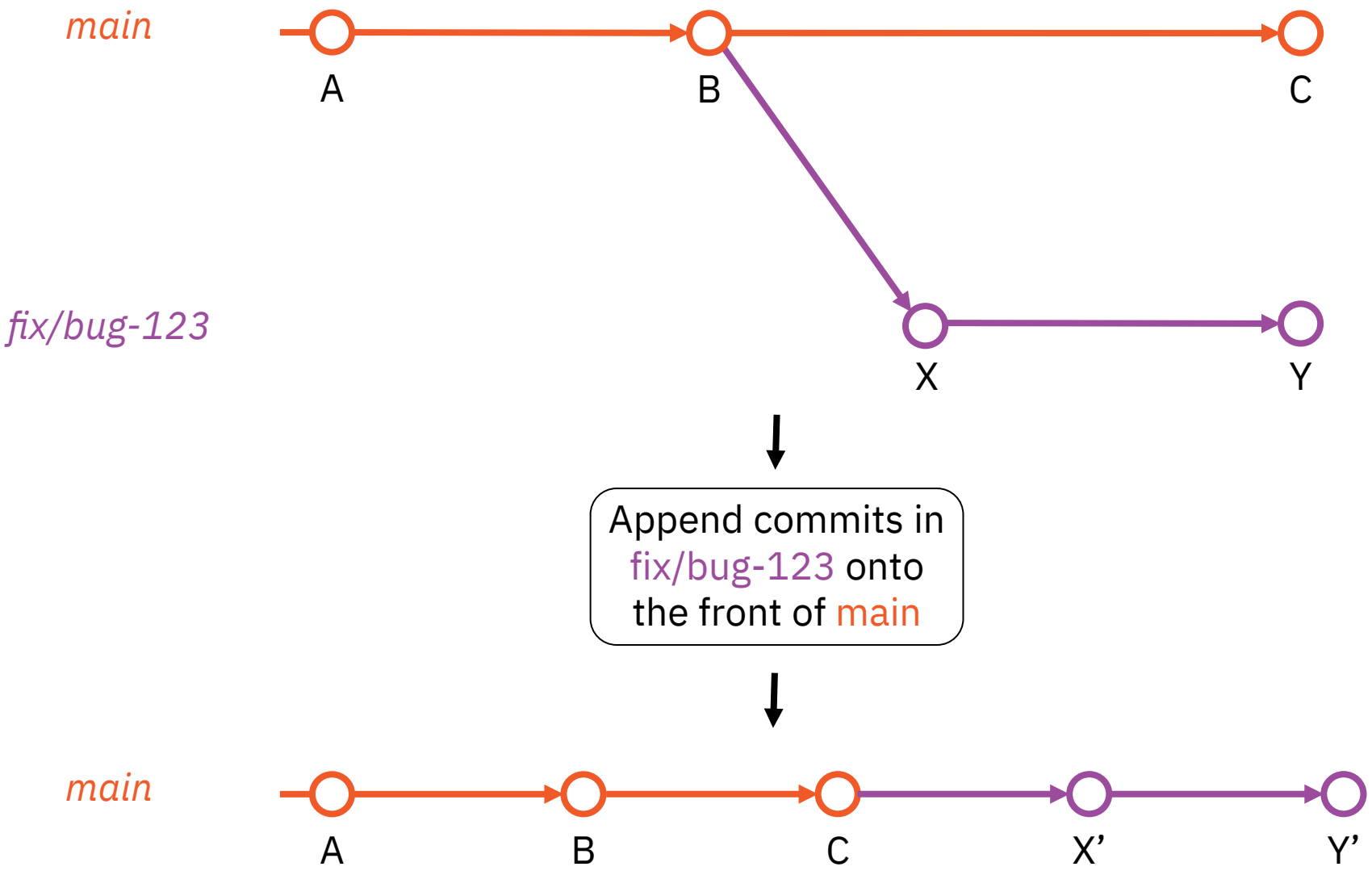
Rebase merging



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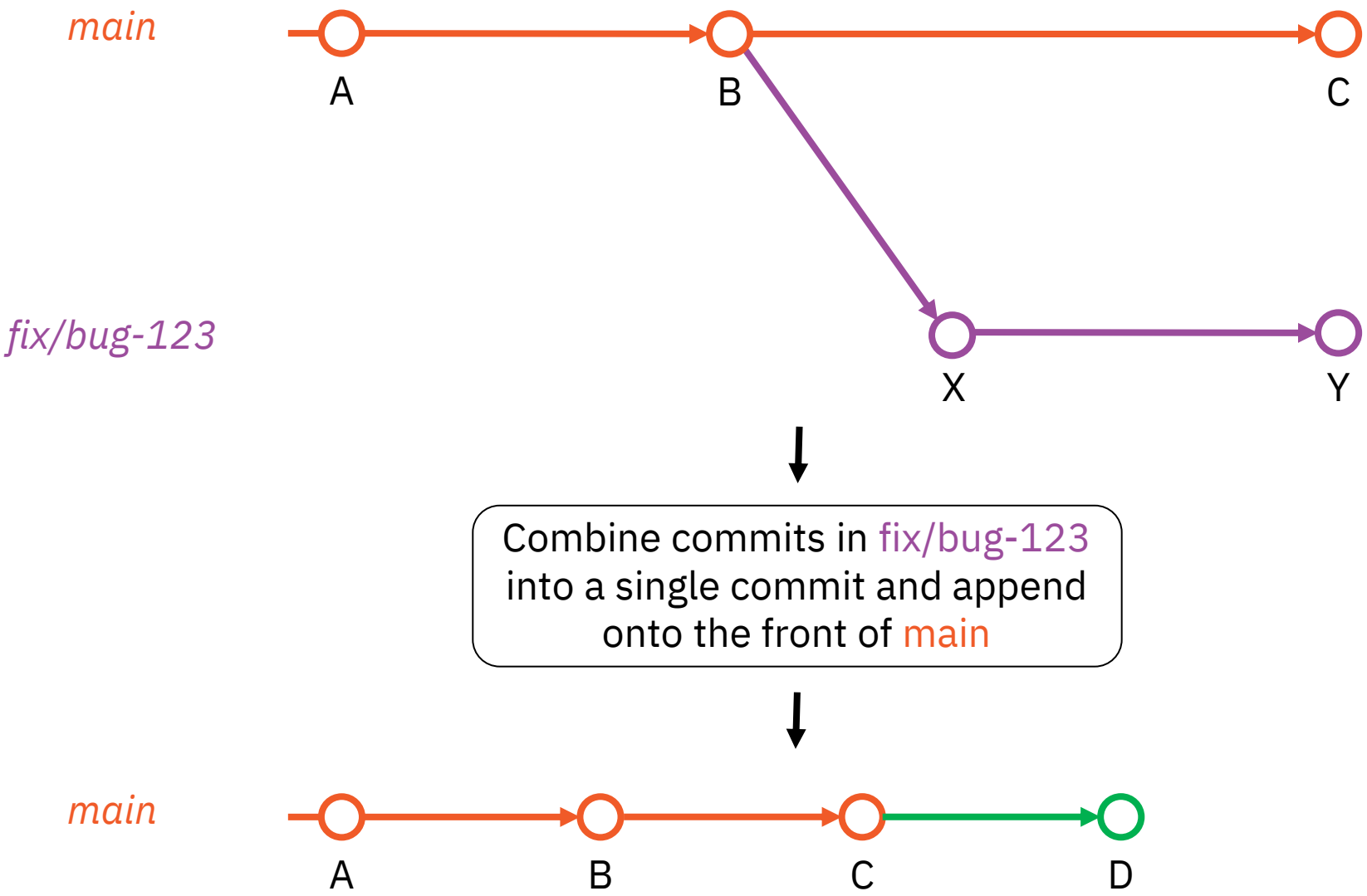
Squash merging



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Pull request settings

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Pull Requests

When merging pull requests, you can allow any combination of merge commits, squashing, or rebasing. At least one option must be enabled. If you have linear history requirement enabled on any protected branch, you must enable squashing or rebasing.

- [x] **Allow merge commits**
  Add all commits from the head branch to the base branch with a merge commit.

  Default commit message
  Presented when merging a pull request with merge.

  Default message

- [x] **Allow squash merging**
  Combine all commits from the head branch into a single commit in the base branch.

  Default commit message
  Presented when merging a pull request with squash.

  Default message

- [x] **Allow rebase merging**
  Add all commits from the head branch onto the base branch individually.

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Pull request merge options

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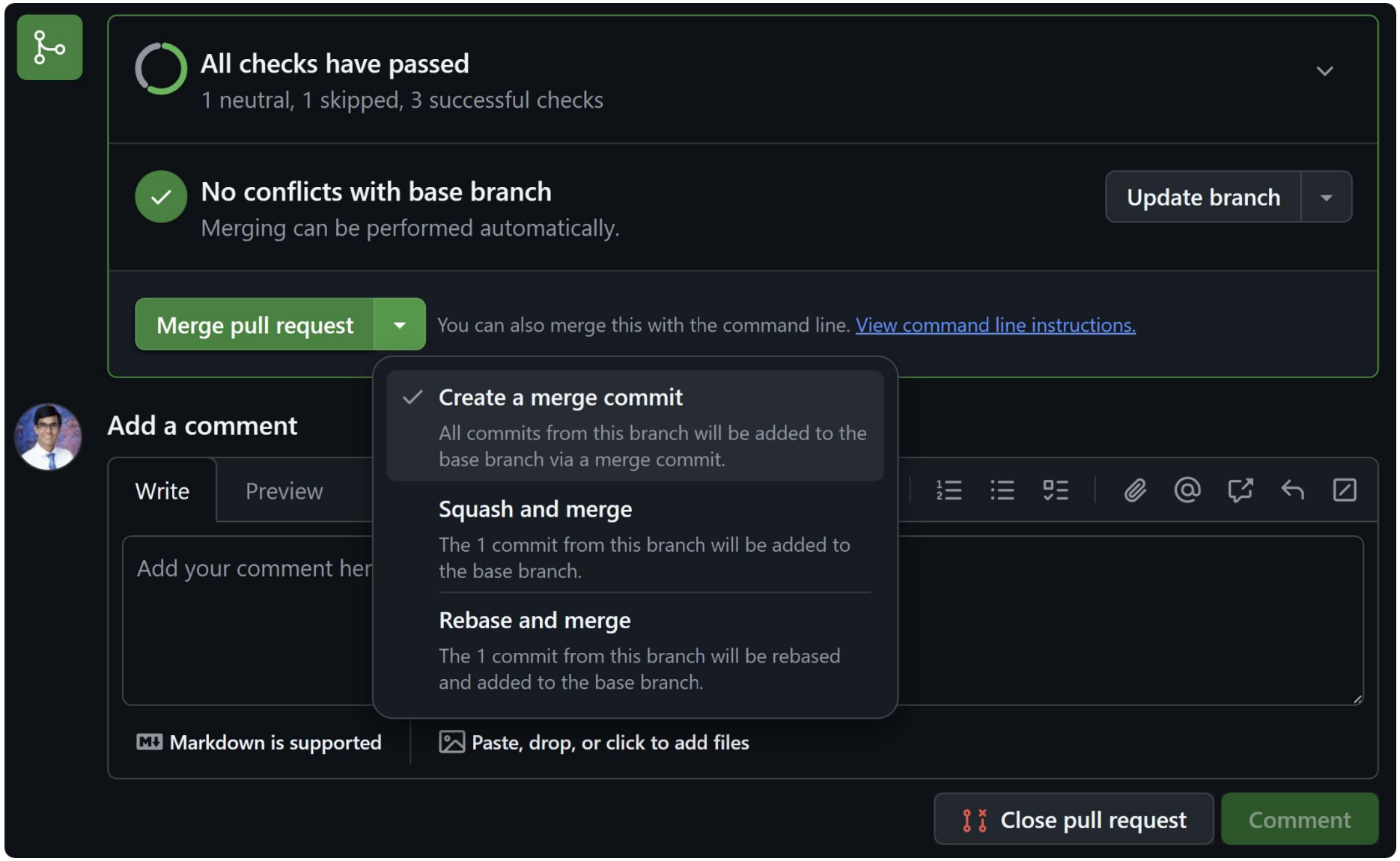

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Tips and Tricks

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Stashing changes temporarily

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MINGW64:/c/Users/SanjulaGanepola/Desktop/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$ echo "console.log('My second log')" >> awesomeness.js

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$ git stash
warning: in the working copy of 'awesomeness.js', LF will be replaced by CRLF the next time Git touches i
Saved working directory and index state WIP on main: e7809ee Add console log

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$ git stash list
stash@{0}: WIP on main: e7809ee Add console log

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$ git stash pop
On branch main
Your branch is up to date with 'origin/main'.

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   awesomeness.js

no changes added to commit (use "git add" and/or "git commit -a")
Dropped refs/stash@{0} (bb9499bf426fe6d52133190d089c741e4820a17a)

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/my-awesome-project (main)
$
```


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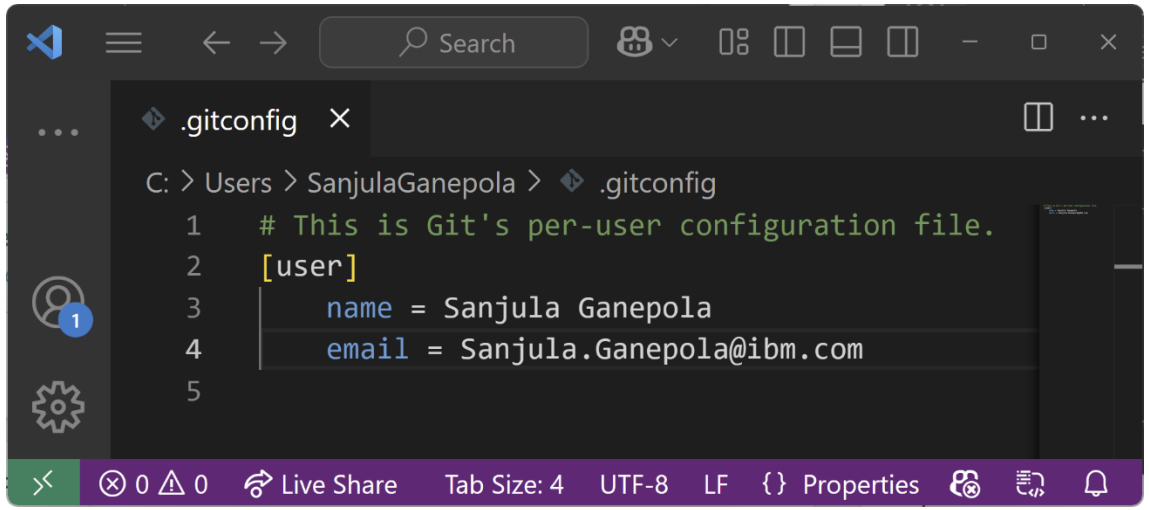
Git Configs

- Scopes of configuration
  - System: System-wide configuration
    - `C:\Program Files\Git\etc\gitconfig`
    - `/etc/gitconfig`
  - Global: User specific configuration
    - `C:\Users\<user>\.gitconfig`
    - `/home/<user>/.gitconfig`
  - Local: Repository specific configuration
    - `<git_repo>/.git/config`



- Git Config Docs: https://git-scm.com/docs/git-config

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Without auto setup remote branch config

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MINGW64:/c/Users/SanjulaGanepola/Desktop/developer2/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git checkout -b feature/ui-buttons
Switched to a new branch 'feature/ui-buttons'

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (feature/ui-buttons)
$ git push
fatal: The current branch feature/ui-buttons has no upstream branch.
To push the current branch and set the remote as upstream, use

    git push --set-upstream origin feature/ui-buttons

To have this happen automatically for branches without a tracking
upstream, see 'push.autoSetupRemote' in 'git help config'.


AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (feature/ui-buttons)
$ git push --set-upstream origin feature/ui-buttons
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'feature/ui-buttons' on GitHub by visiting:
remote:      https://github.com/SanjulaGanepola/my-awesome-project/pull/new/feature/ui-buttons
remote:
To https://github.com/SanjulaGanepola/my-awesome-project.git
 * [new branch]      feature/ui-buttons -> feature/ui-buttons
branch 'feature/ui-buttons' set up to track 'origin/feature/ui-buttons'.

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (feature/ui-buttons)
$
```


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With auto setup remote branch config

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MINGW64:/c/Users/SanjulaGanepola/Desktop/developer2/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (feature/ui-text-boxes)
$ git config --global --bool push.autoSetupRemote true

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (feature/ui-text-boxes)
$ git push
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'feature/ui-text-boxes' on GitHub by visiting:
remote:      https://github.com/SanjulaGanepola/my-awesome-project/pull/new/feature/ui-text-boxes
remote:
To https://github.com/SanjulaGanepola/my-awesome-project.git
 * [new branch]      feature/ui-text-boxes -> feature/ui-text-boxes
branch 'feature/ui-text-boxes' set up to track 'origin/feature/ui-text-boxes'.

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (feature/ui-text-boxes)
$
```

Search

.gitconfig

C: > Users > SanjulaGanepola > .gitconfig

```
# This is Git's per-user configuration file.
[user]
    name = Sanjula Ganepola
    email = Sanjula.Ganepola@ibm.com
[push]
    autoSetupRemote = true
```

0 0 Live Share UTF-8 LF {} Properties

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Alias to undo commits

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MINGW64:/c/Users/SanjulaGanepola/Desktop/developer2/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git config --global alias.undo 'reset --soft HEAD^'

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ touch README.md

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git add README.md

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git commit -s -m "Add README"
[main ad11aed] Add README
 1 file changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 README.md

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git status
On branch main
Your branch is ahead of 'origin/main' by 1 commit.
  (use "git push" to publish your local commits)

nothing to commit, working tree clean

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git undo

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git status
On branch main
Your branch is up to date with 'origin/main'.

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        new file:   README.md


AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$
```

.gitconfig

C: > Users > SanjulaGanepola > .gitconfig

```
# This is Git's per-user configuration file.
[user]
    name = Sanjula Ganepola
    email = Sanjula.Ganepola@ibm.com
[push]
    autoSetupRemote = true
[alias]
    undo = reset --soft HEAD^
```


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Alias to search all commits for a message

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MINGW64:/c/Users/SanjulaGanepola/Desktop/developer2/my-awesome-project

```
AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git config --global alias.searchCommits '!f() { git log --all --grep="$1" --oneline; }; f'

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$ git searchCommits "Add"
6bbc0e6 Add helper functions
e7809ee Add console log

AzureAD+SanjulaGanepola@IBM-PW0AC6C8 MINGW64 ~/Desktop/developer2/my-awesome-project (main)
$
```

.gitconfig

C: > Users > SanjulaGanepola > .gitconfig

```
# This is Git's per-user configuration file.
[user]
    name = Sanjula Ganepola
    email = Sanjula.Ganepola@ibm.com
[push]
    autoSetupRemote = true
[alias]
    undo = reset --soft HEAD^
    searchCommits = "!f() { git log --all --grep=\"$1\" --oneline; }; f"
```

0 0 Live Share Ln 1, Col 1 Tab Size: 4 UTF-8 LF {} Properties

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Git Large File Storage (LFS)

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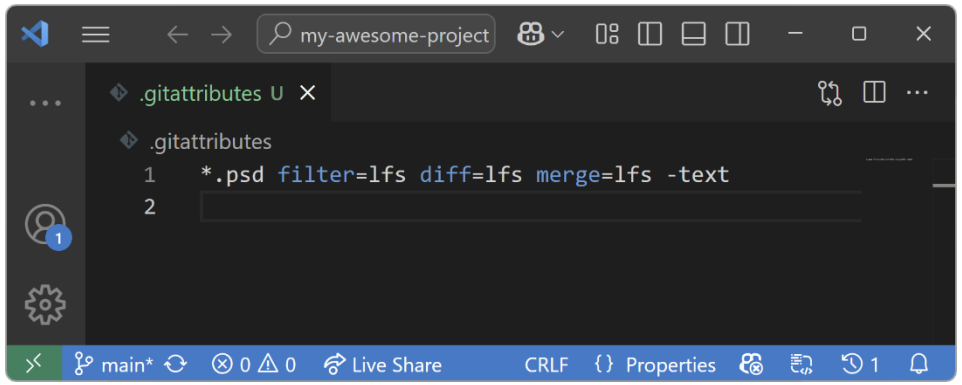
Open-source Git extension for versioning large files!

↪ Git LFS handles large files by storing references to the file in the repository, but not the actual file itself.

1. **Install**: Run `git lfs install` on your PC.

2. **Track File Types**: Run `git lfs track "*.psd"`



3. **Track .gitattributes:** `git add .gitattributes`

4. **Use Git as normal!**

Git LFS Docs: https://git-lfs.com/

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Git in VS Code

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Viewing changes and in-editor diff

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File Edit Selection View Go Run ibmi-company_system

SOURCE CONTROL

REPOSITORIES

ibmi-c... fix/sa

CHANGES

Message (Ctrl+Enter to commi...

✓ Commit

Changes

account.table qddssrc

employee.table qddssrc

~~popdept.sql qddssrc~~

constants.rpgleinc qrpgleref

depts.pgm.sqlrpgle qrpglesrc

mypgm.pgm.rpgle qrpglesrc

View & Sort

Pull

Push

Clone

Checkout to...

Fetch

Commit

Changes

Pull, Push

Branch

Remote

Stash

Tags

Show Git Output

GRAPH

employee.table (Working Tree) M

qddssrc > employee.table

```
3   3  CREATE OR REPLACE TABLE EMPLOYEE
4   4      (EMPNO       CHAR(6)         NOT NULL,
           FIRSTNME     VARCHAR(12)     NOT NULL,
           MIDINIT      CHAR(1)         NOT NULL,
           LASTNAME     VARCHAR(15)     NOT NULL,
           WORKDEPT     CHAR(3)                 ,
           PHONENO      CHAR(4)                 ,
           HIREDATE     DATE                    ,
           JOB          CHAR(8)                 ,
           JOB          CHAR(9)                 ,
           EDLEVEL      SMALLINT        NOT NULL,
           SEX          CHAR(1)                 ,
           BIRTHDATE    DATE                    ,
           SALARY       DECIMAL(9,2)            ,
           BONUS        DECIMAL(9,2)            ,
           COMM         DECIMAL(9,2)            ,
           PRIMARY KEY (EMPNO));

           move circular reference
           TER TABLE EMPLOYEE
               ADD FOREIGN KEY RED (WORKDEPT)
               REFERENCES DEPARTMENT
               ON DELETE SET NULL;

26  25  ALTER TABLE EMPLOYEE
27  26      ADD CONSTRAINT NUMBER
28   -      CHECK (PHONENO >= '0000' AND PHONENO <= '9998');
    27+     CHECK (PHONENO >= '0001' AND PHONENO <= '9998');
29  28
30  29  -- CREATE UNIQUE INDEX XEMP1
31  30  --        ON EMPLOYEE (EMPNO);
32  31
33  32  -- CREATE INDEX XEMP2
34  33  --        ON EMPLOYEE (WORKDEPT);
```

fix/sample-demo* 0 1 Project: ibmi-company_system Live Share aecspades (2 years ago) Ln 19, Col 1 Spaces: 6 UTF-8 CRLF {} sql 1

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Viewing Git history as a graph

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File Edit Selection View ··· vscode-ibmi-projectexplorer

SOURCE CONTROL

REPOSITORIES

vscode-ibmi-projectexplorer Git main

CHANGES

GRAPH Auto

Bump to v2.12.1... Sanjula
Merge pull request #644 from IBM/dependabot/npm_and_yar...
Bump typescript from 5.6.3 to 5.7.3... dependabot[bot]
Merge pull request #645 from IBM/dependabot/npm_and_yar...
Bump ignore from 5.3.1 to 7.0.3... dependabot[bot]
Merge pull request #649 from IBM/dependabot/npm_and_y...
Bump esbuild and esbuild-loader... dependabot[bot]
Merge pull request #632 from IBM/dependabot/npm_and...
Bump webpack from 5.95.0 to 5.97.1... dependabot[bot]
Merge pull request #648 from IBM/revert-646-dependabo...
Revert "Bump @typescript-eslint/eslint-plugin from 7.16.0 t...
Bump @typescript-eslint/eslint-plugin from 7.16.0 to 8.21.0 ...
Merge pull request #647 from IBM/dependabot/npm_and_y...
Bump @types/node from 22.7.7 to 22.10.7... dependabot[bot]
Merge pull request #634 from IBM/feature/build-object-c...
Update image... Sanjula
Rename to build object... Sanjula
Document new action... Sanjula
Add build object command to project explorer and source...
Merge pull request #617 from IBM/docs/update-migrate-...

Sanjula Ganepola, 1 month ago (February 11, 2025 at 6:11 PM)
Merge pull request #632 from IBM/dependabot/npm_and_yarn/webpack-5.97.1
Bump webpack from 5.95.0 to 5.97.1
2 files changed, 280 insertions(+), 256 deletions(-)
0eb3699 Open on GitHub

Go to File Ctrl + P
Open Chat Ctrl + Alt + I
Find in Files Ctrl + Shift + F
Start Debugging F5

main 0 0 Live Share

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Viewing pull requests

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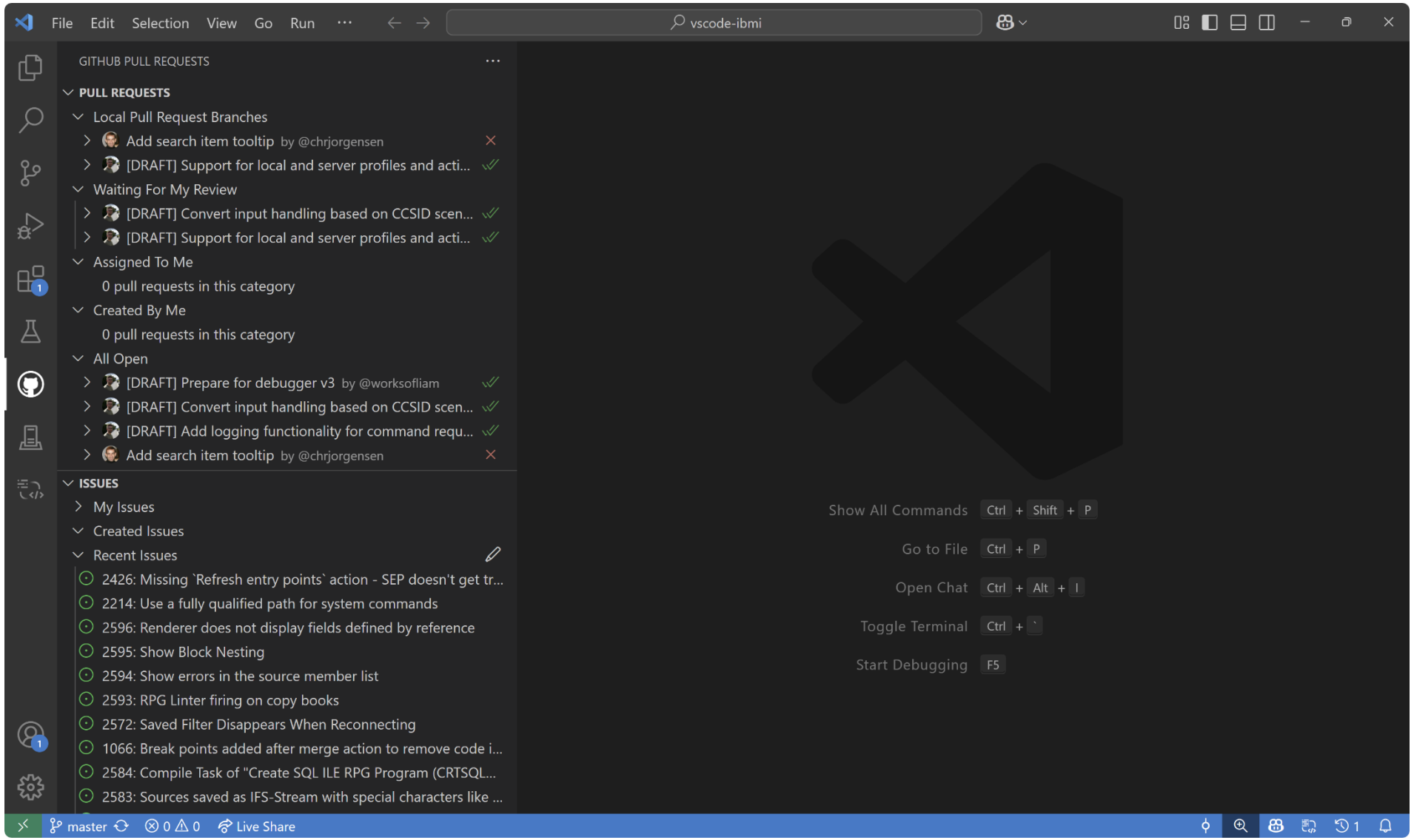
https://marketplace.visualstudio.com/items?itemName=GitHub.vscode-pull-request-github



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Viewing changes in pull requests

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GITHUB PULL REQUEST

CHANGES IN PULL REQUEST #2556

Convert input handling based on CCSID scenarios

- Files
  - src/api
    - tests
      - suites
        - encoding.test.ts M
        - setup.ts M
        - CompileTools.ts M
        - IBMi.ts M
        - IBMiContent.ts M
        - Search.ts M
        - Tools.ts M
- Commits

REVIEW PULL REQUEST #2556

Leave a comment

Approve | Comment | Request Changes

This branch has conflicts that must be resolved.

Checkout 'master'

Changes in Pull Request #2556 (7 files)

TS CompileTools.ts src\api

146 hidden lines | {} CompileTools > runCommand

```
147 147   command: [
148 148     ...options.noLibList? [] : buildLiblistCommands(connection, ileSet
149 149     ...commands.map(command =>
150 —         `${`system "${IBMi.escapeForShell(command)}"`}`,
    150+      `${`system "${IBMi.escapeForShell(connection.sysNameInAmerican(c
151 151     )
152 152   ].join(` && `),
153 153   directory: cwd,
```

36 hidden lines

TS IBMi.ts src\api

17 hidden lines

```
18 18 import { EventEmitter } from 'stream';
19 19 import { ConnectionConfig } from './configuration/config/types';
20 20 import { EditorPath } from '../typings';
   21+
   22+ export interface VariantInfo {
   23+   american: string,
   24+   local: string,
   25+   qsysNameRegex?: RegExp
   26+ };
21 27
22 28 export interface MemberParts extends IBMiMember {
23 29   basename: string
```

100 hidden lines | IBMi

```
124 130
125 131   remoteFeatures: { [name: string]: string | undefined };
126 132
127 —     variantChars: {
128 —       american: string,
129 —       local: string,
```

fix/convert_basis_by_basis ⊗ 0 ⚠ 0 Live Share Pull Request #2556

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Any Questions?

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Important Links

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Installation

- https://git-scm.com/downloads
- https://git-lfs.com/
- https://marketplace.visualstudio.com/items?itemName=GitHub.vscode-pull-request-github

Documentation

- https://git-scm.com/docs

Recommended Git Tutorials

- https://www.youtube.com/watch?v=-iWaarLI7zI
- https://www.youtube.com/watch?v=e9lnsKot_SQ
- https://www.youtube.com/watch?v=0chZFIZLR_0&t=66s

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