# Using Visual Studio Code with GitHub in a team

Work as a pair, with one student as StudentA and another as StudentX
Steps for StudentA and StudentX are indicated as A and X respectively
While one student is doing the steps, the other student should see what is being done
If there are an odd number of students in the class, one group can have 3 students
The third student will do steps similar to Student X after all the steps are completed

## Overview of steps that will be done

| Sequence | Student A | Student X |
|---|---|---|
| 1 | Create a folder for the project | |
| 2 | Create a local repository | |
| 3 | Stage changes | |
| 4 | Commit changes | |
| 5 | Publish branch | |
| 6 | View repository on GitHub | |
| 7 | Invite collaborators | |
| 8 | | Accept invite |
| 9 | | Get the project web URL |
| 10 | | Clone the repository |
| 11 | | Create a branch |
| 12 | | Publish the branch |
| 13 | | Make changes, stage changes, commit changes, sync changes |
| 14 | | Checkout main |
| 15 | | Merge branch |
| 16 | Create a branch | |
| 17 | Publish the branch | |
| 18 | Make changes, stage changes, commit changes, sync changes | |
| 19 | Checkout main | |
| 20 | Merge branch | |
| 21 | Resolve conflicts | |
| 22 | Sync changes | |

## Create a folder for the project

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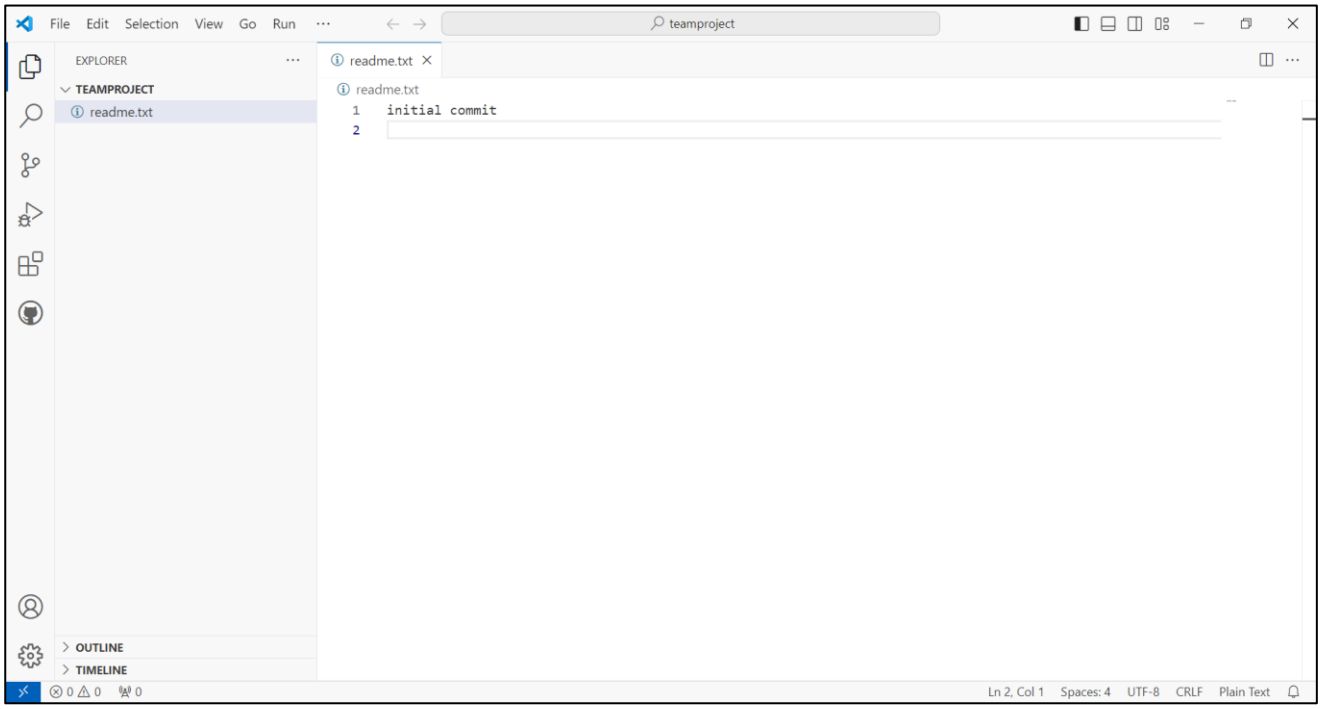
1. Create a folder `teamproject`
   Open the folder in Visual Studio Code
   Add a text file called `readme.txt` with the text `initial commit`

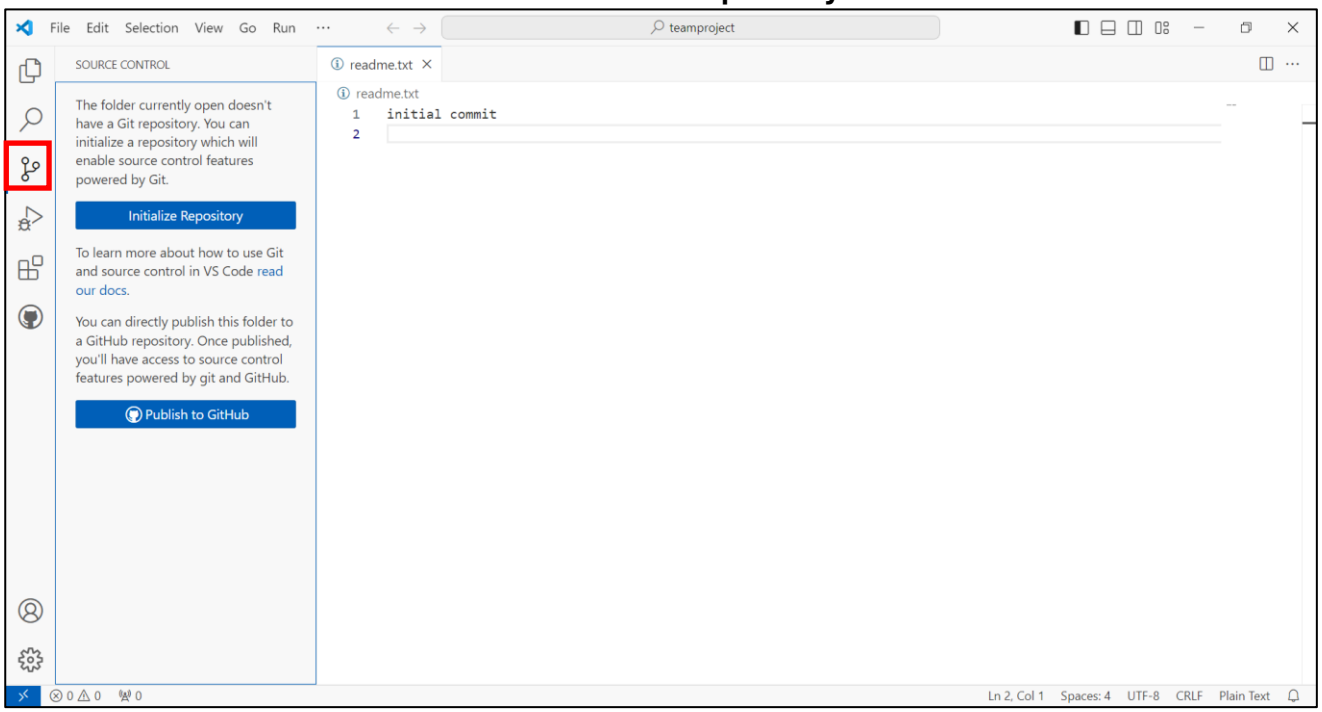



At this point, the project only exists on StudentA's computer

As per normal, you can add folders and source files to your project. For this example, we will work on a single text file, but the same principles apply to other files in your projects.

## Create a local repository

A 2. Click the Source Control button and **Initialize Repository**

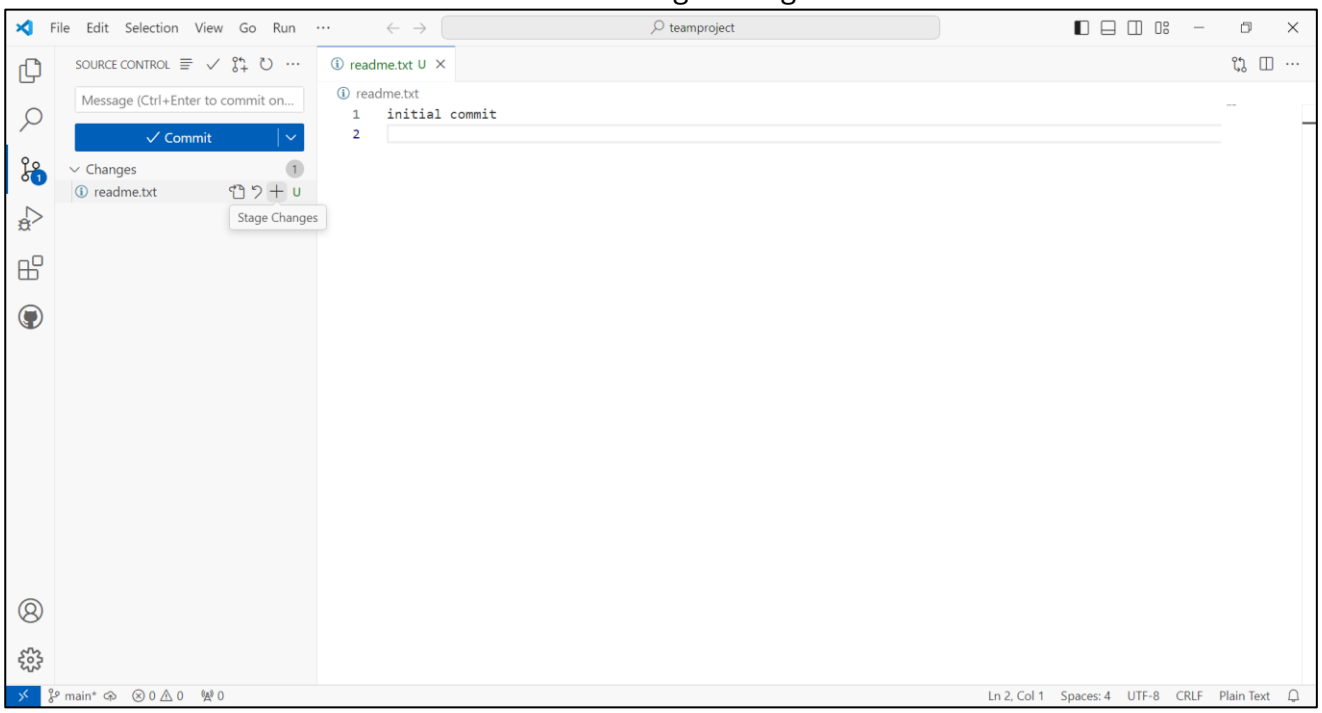



After creating a project, you will need to initialise a **local repository** at the root of your project folder. This will enable version control features for the project.

## Stage changes

The bottom left corner of Visual Studio Code shows that you are working on the main branch of the local repository.

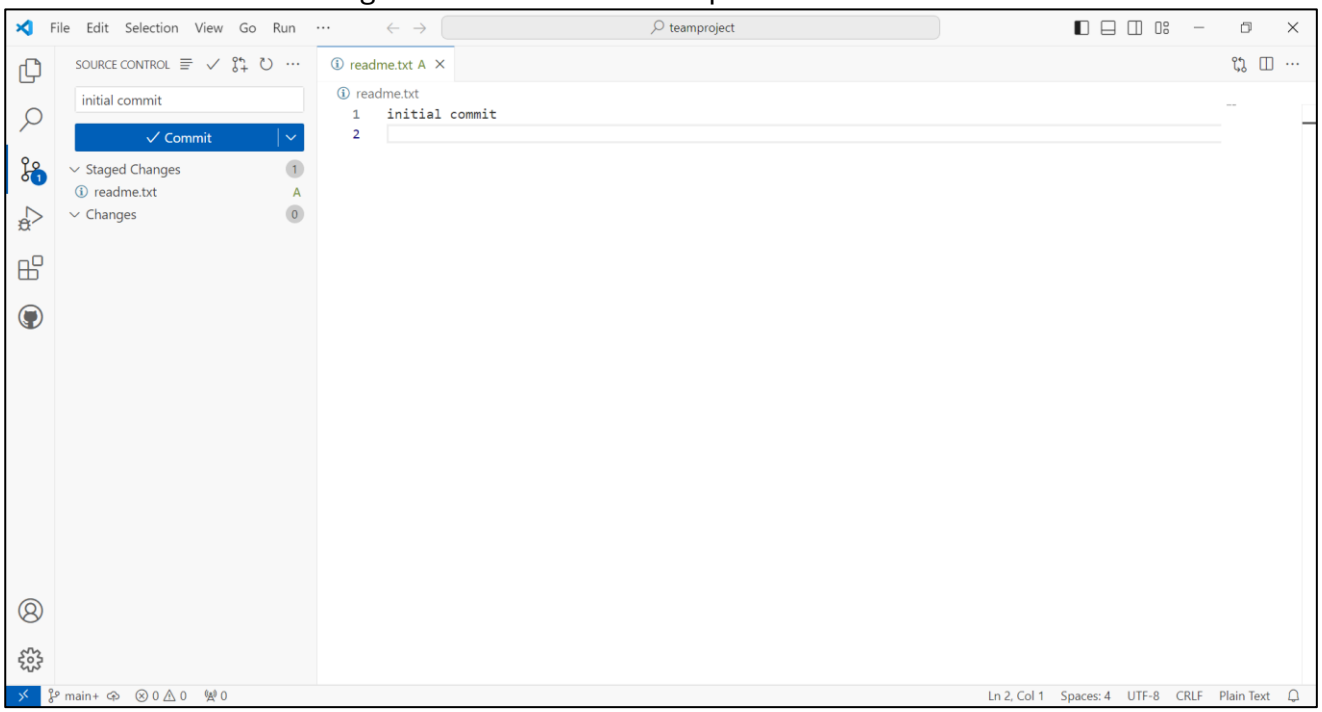
A 3. Click on the **+** button next to `readme.txt` to stage changes for that file




After a file has been created, modified or deleted, you will need to stage it. This prepares the file for committing.

## Commit changes

A 4. Set the commit message as `initial commit` and press **Commit**

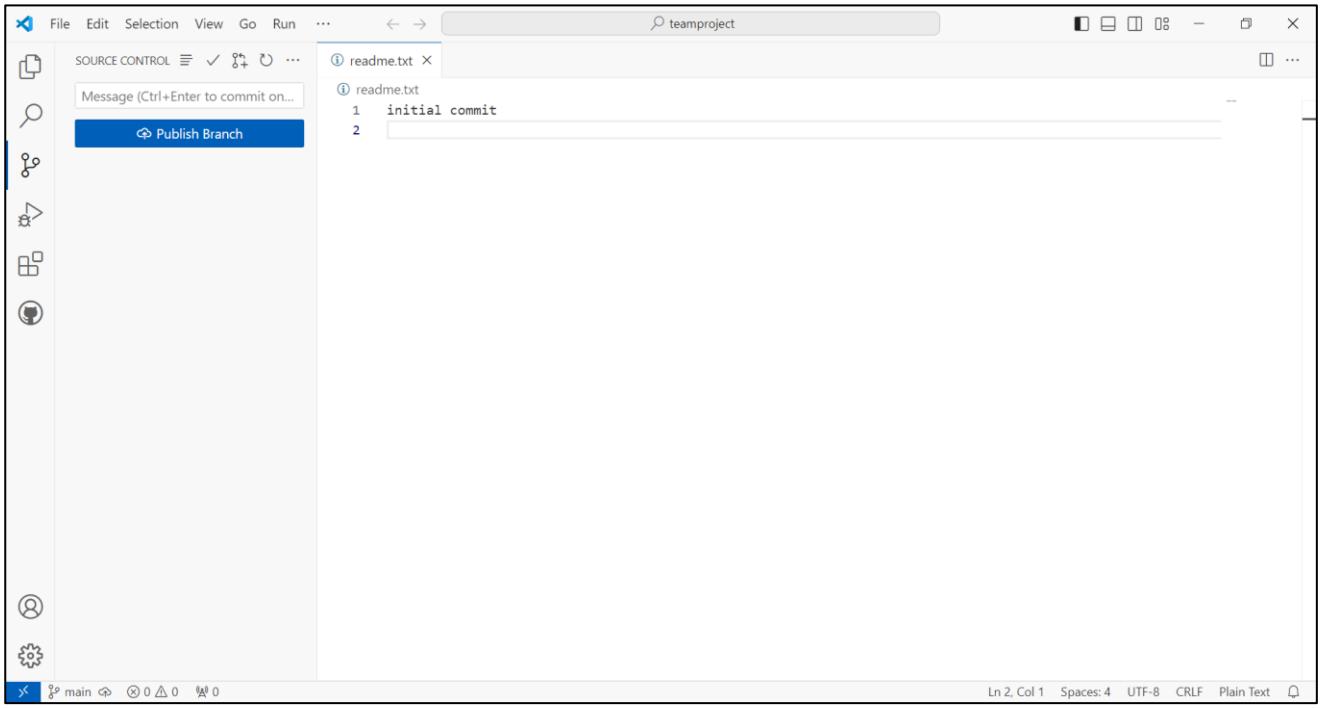



The commit message should be used to provide a meaningful explanation of what was committed.

For example, if you were working on a feature, the commit message should mention the feature that was developed.

## Publish branch

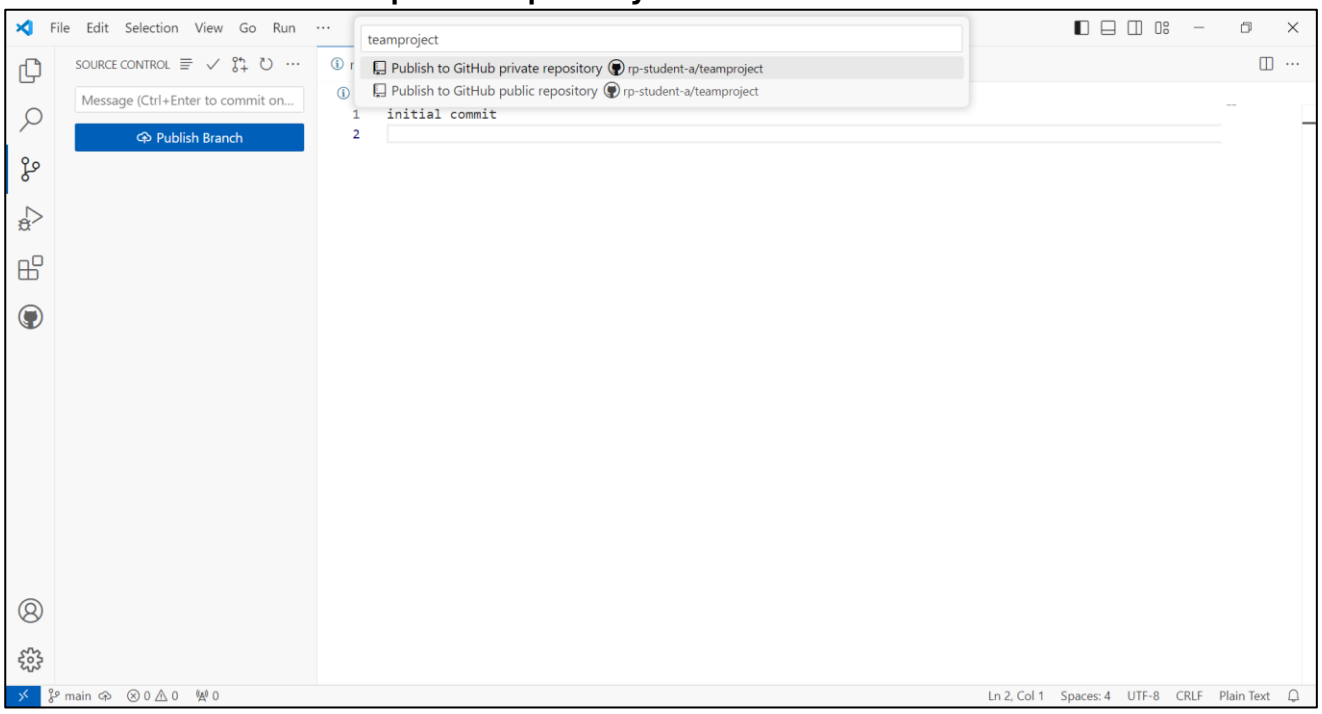
A 5. Click **Publish Branch**




At this point, the repository only exists on Student A's computer.

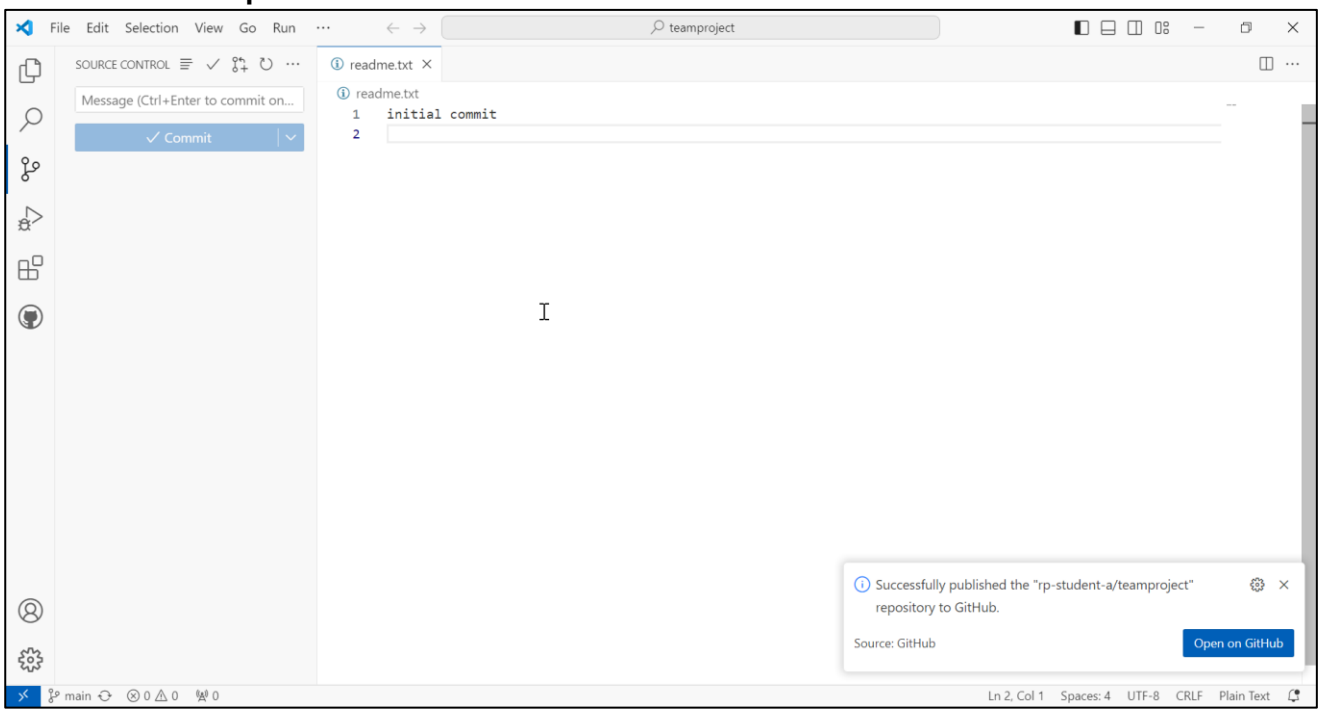
Publish branch will publish the project to the main branch of the **remote repository** on GitHub.

A 6. Click **Publish to GitHub private repository**



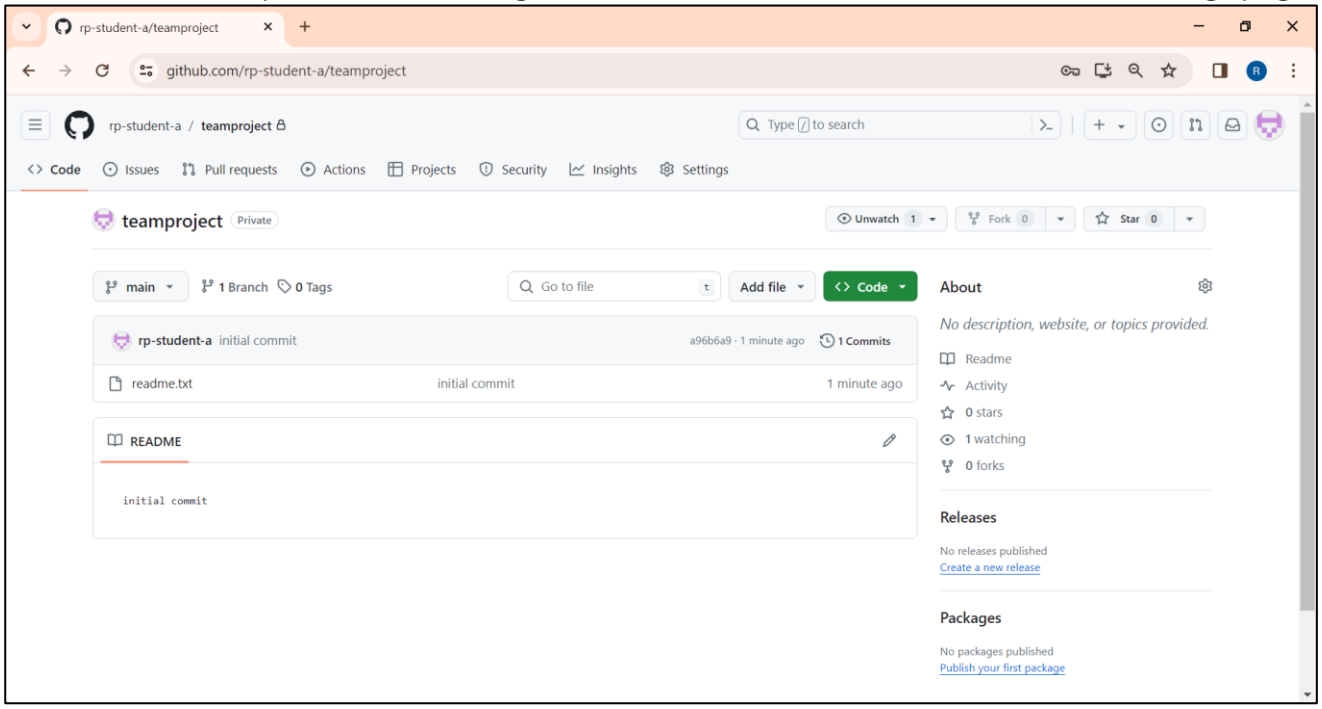

A repository can be **private** or **public**.
**Public repositories** can be viewed by anyone.
**Private repositories** can be viewed by collaborators.

A 7. A dialog should appear to indicate that the repository was successfully published to GitHub. Click on the **Open on GitHub** button to launch GitHub in a browser.



## View repository on GitHub

A 8. The repository has been created on GitHub
Click on **Settings**
For the next step, we will be adding collaborators, which can be done from the Settings page



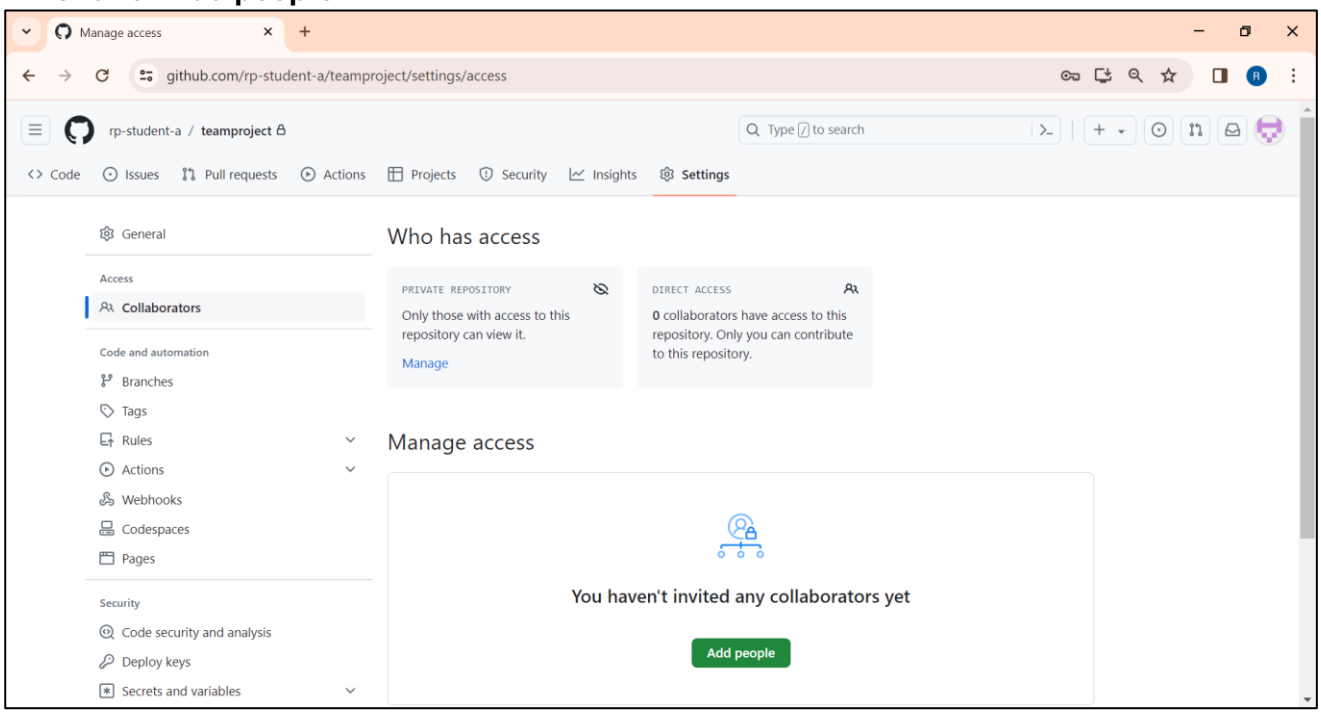

The remote repository can act as a **backup** for your project.
You can **retrieve** the project files that you have published by cloning the repository.

You should publish your projects (e.g. project assignments, final year project) to a **private repository**.

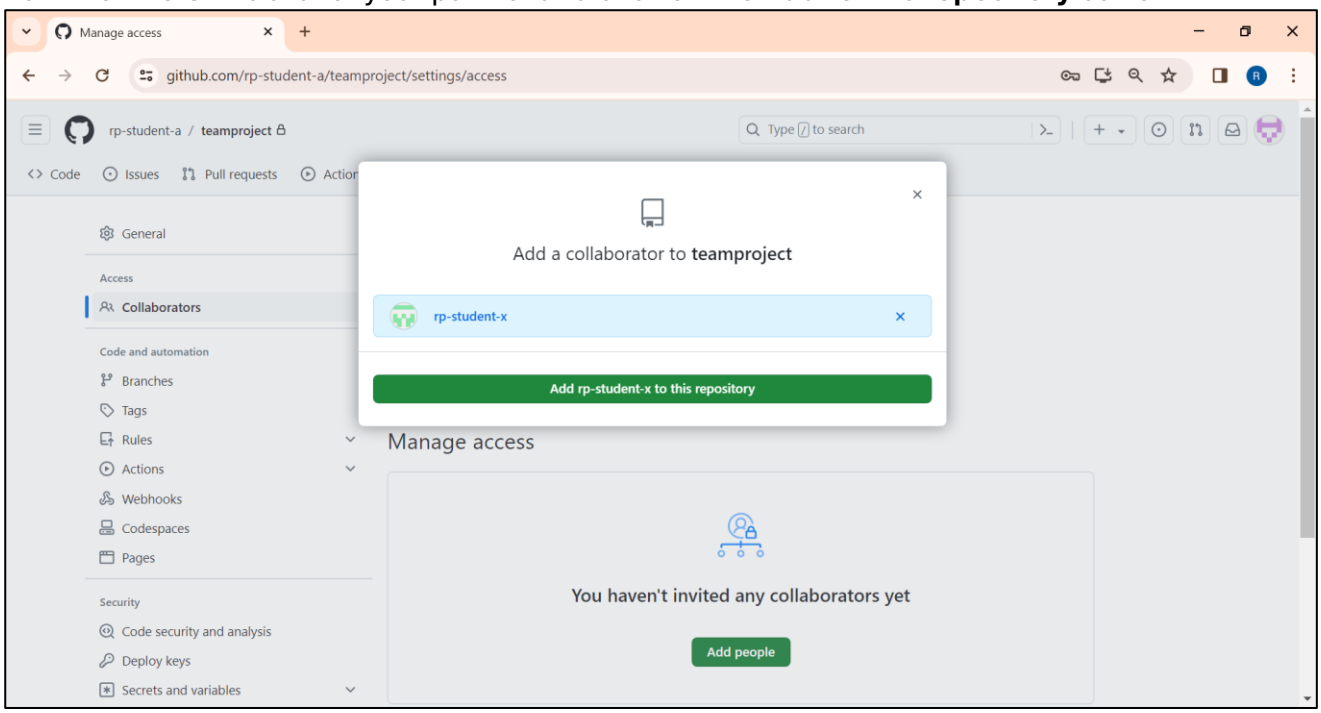
**Do not publish to a public repository** or else anyone will have access to your projects. It is **your responsibility** to ensure that your projects are not accessed by unauthorised people.

## Invite collaborators

A 9. On the **Settings** page, click **Collaborators** from the left panel
Click on **Add people**




A 10. Enter the GitHub id for your partner and click on the **Add to this repository** button



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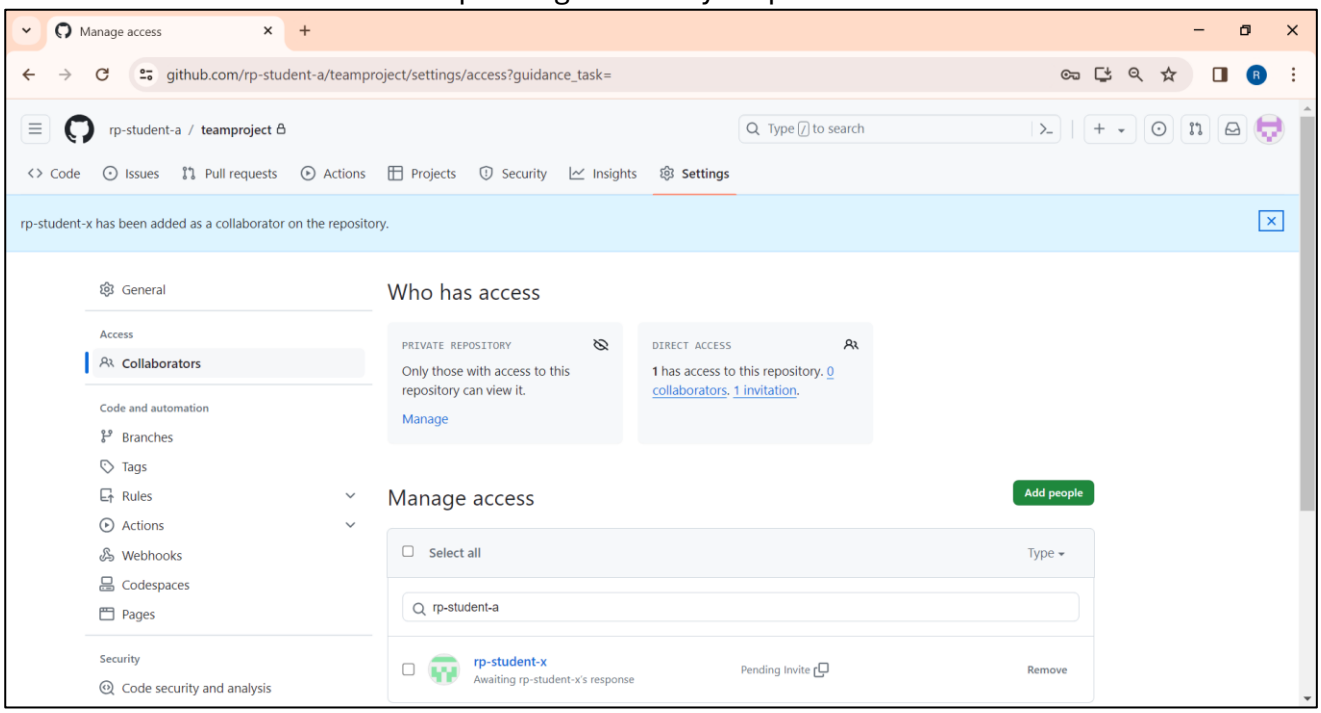
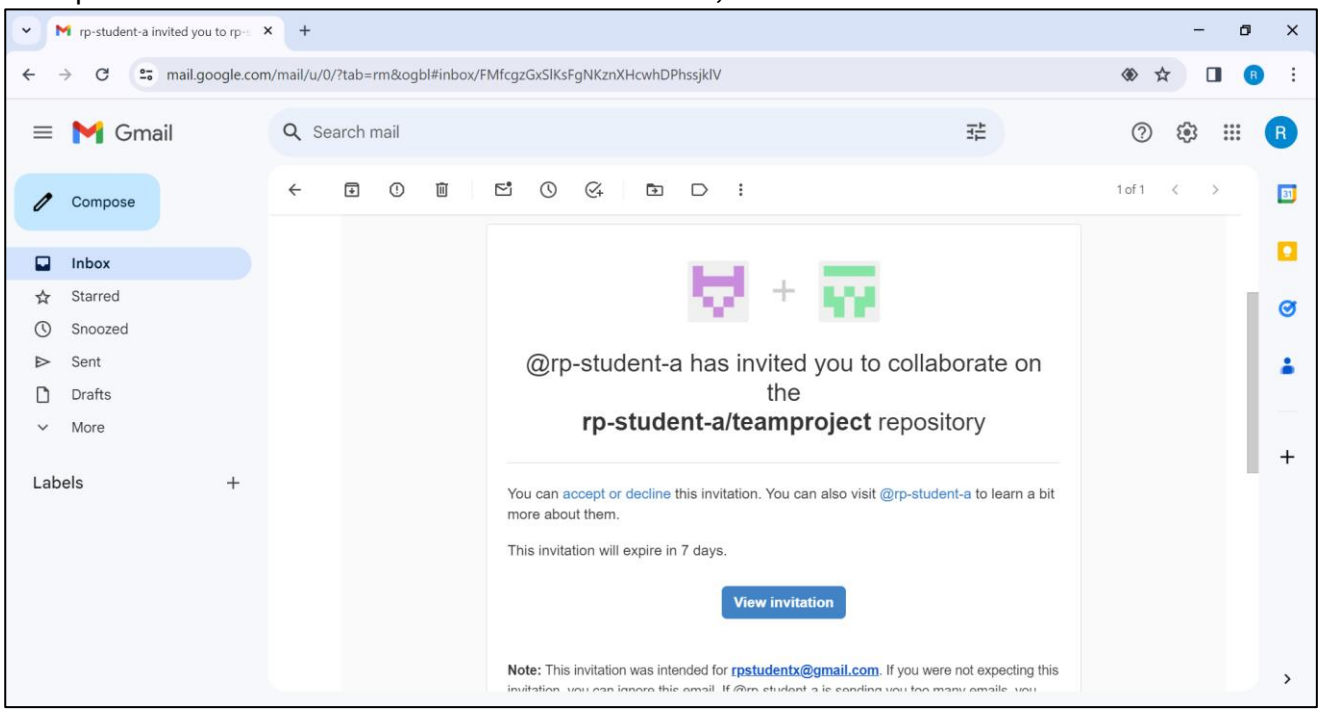
11. You should see that there is a pending invite for your partner

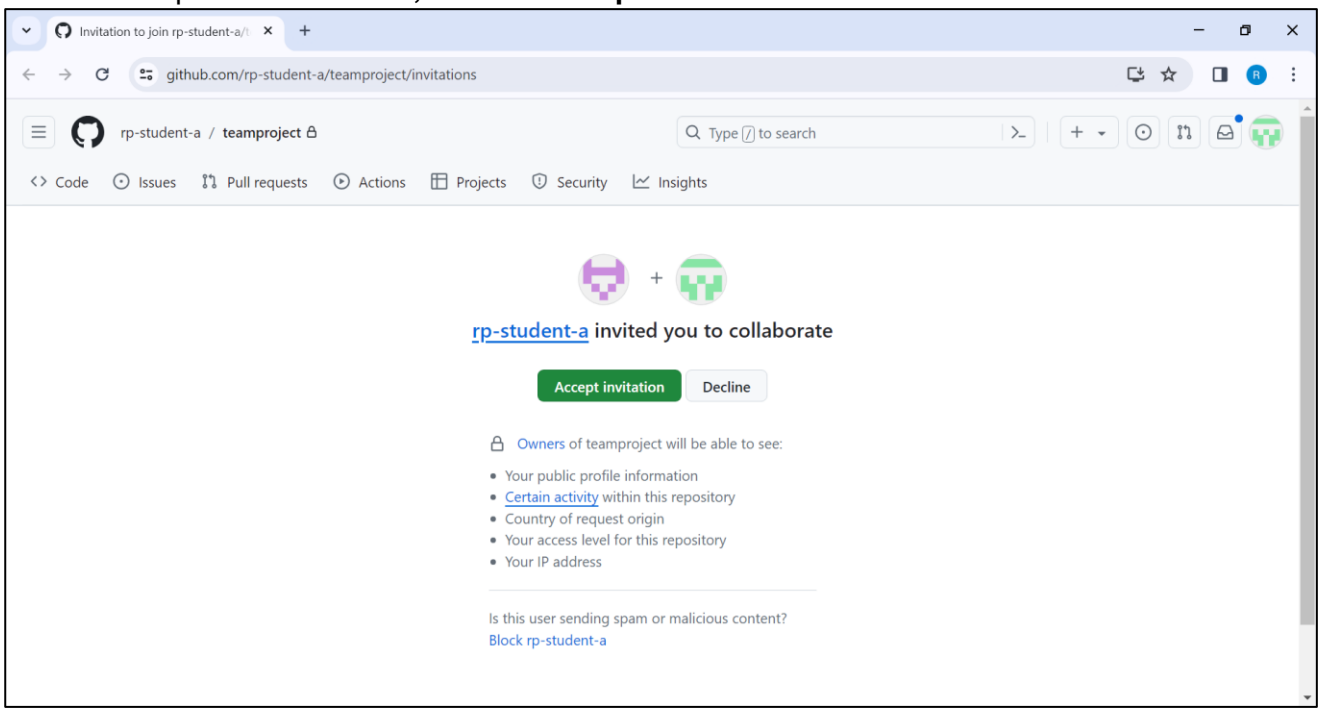


## Accept invite

X 12. Open the email for StudentX to see the invitation, click on **View invitation**

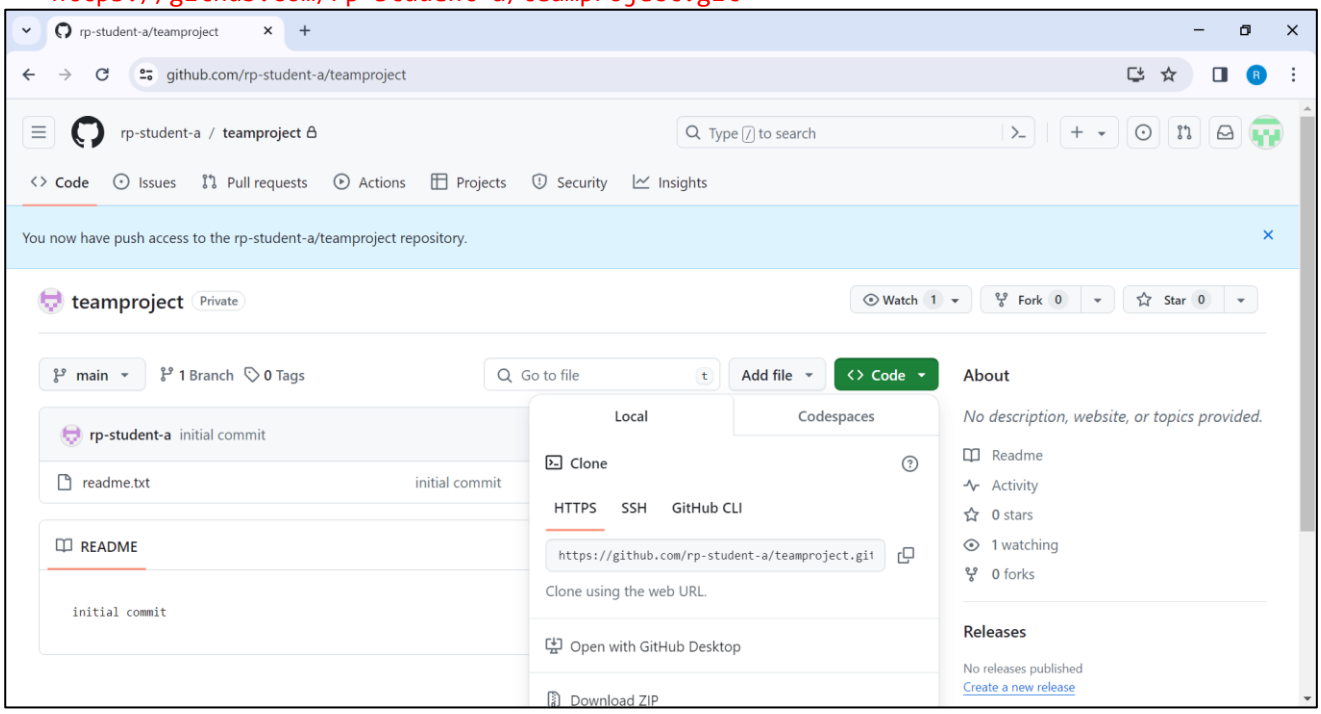



X 13. GitHub opens in a browser, click on **Accept invitation**



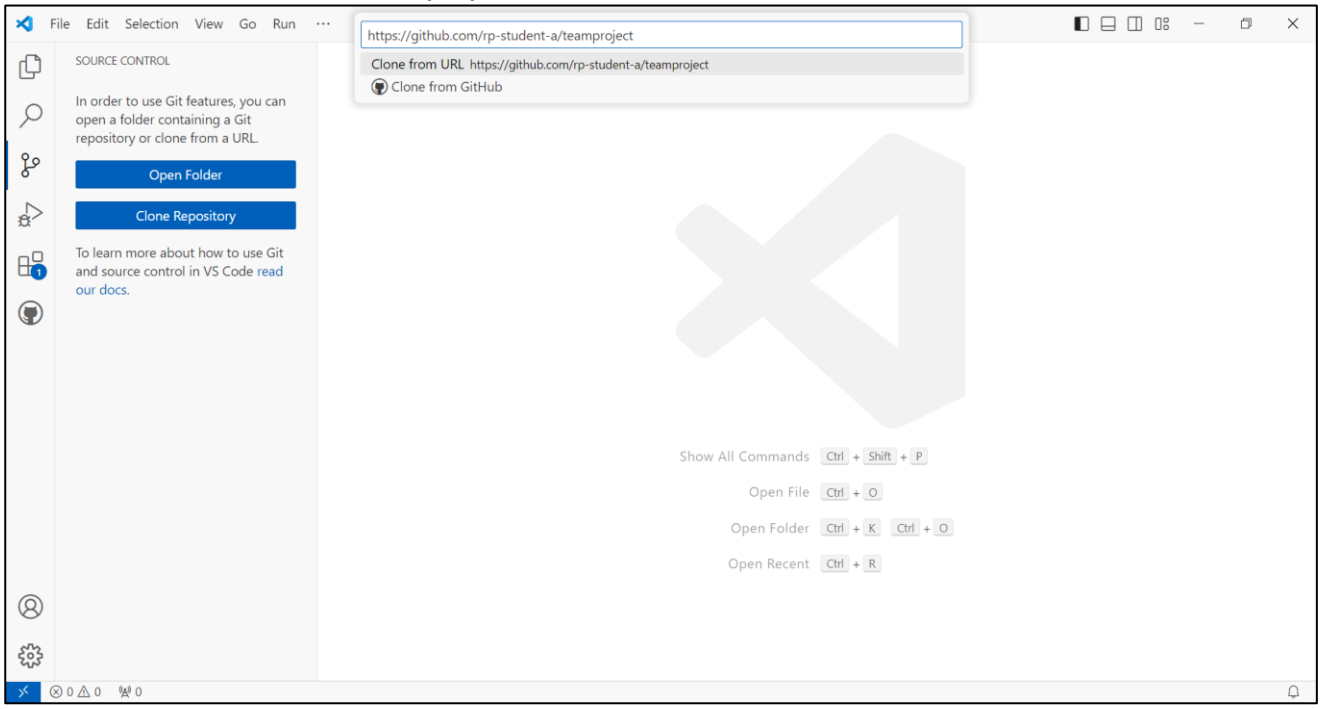
## Get the project web URL

X 14. Click on the **Code** button, then click on the copy button to copy the project web URL
The project web URL in the example below is
`https://github.com/rp-student-a/teamproject.git`

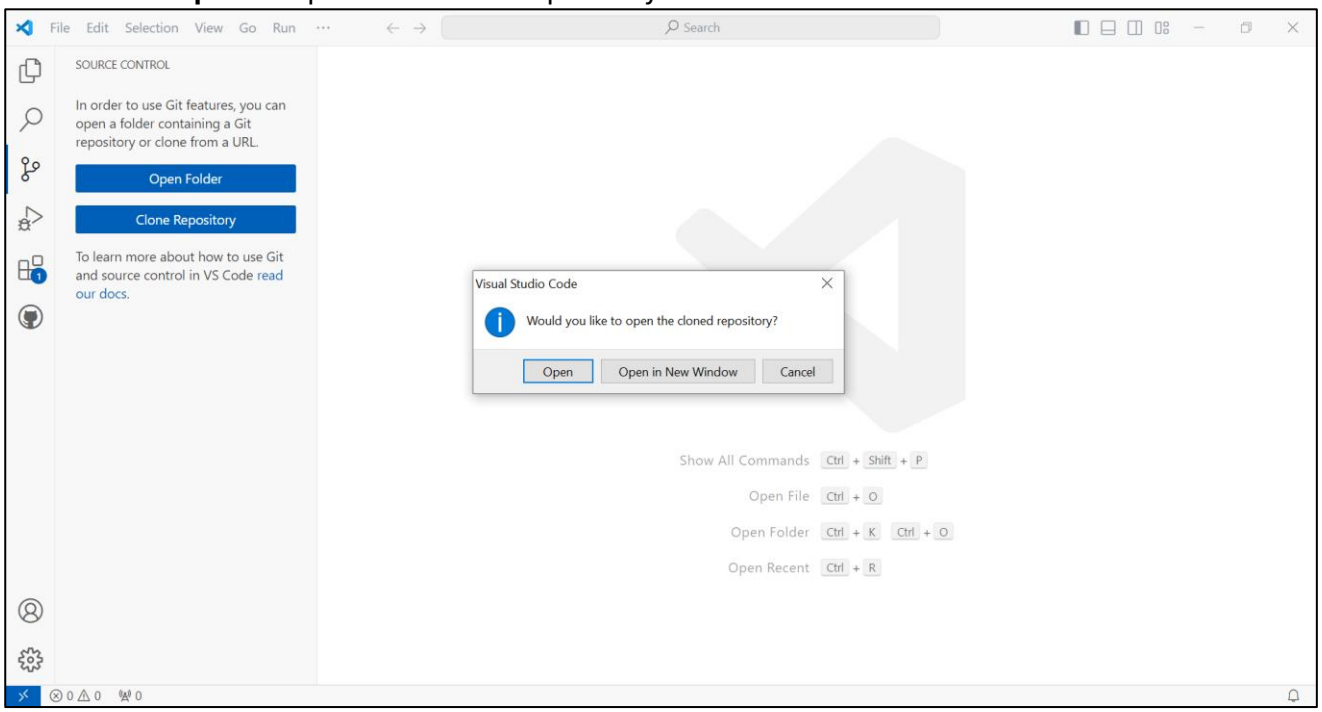


## Clone repository

X 15. Click on the source control button, and **Clone Repository**
Enter the project web URL and click **Clone from URL**
Select a folder to clone the project to



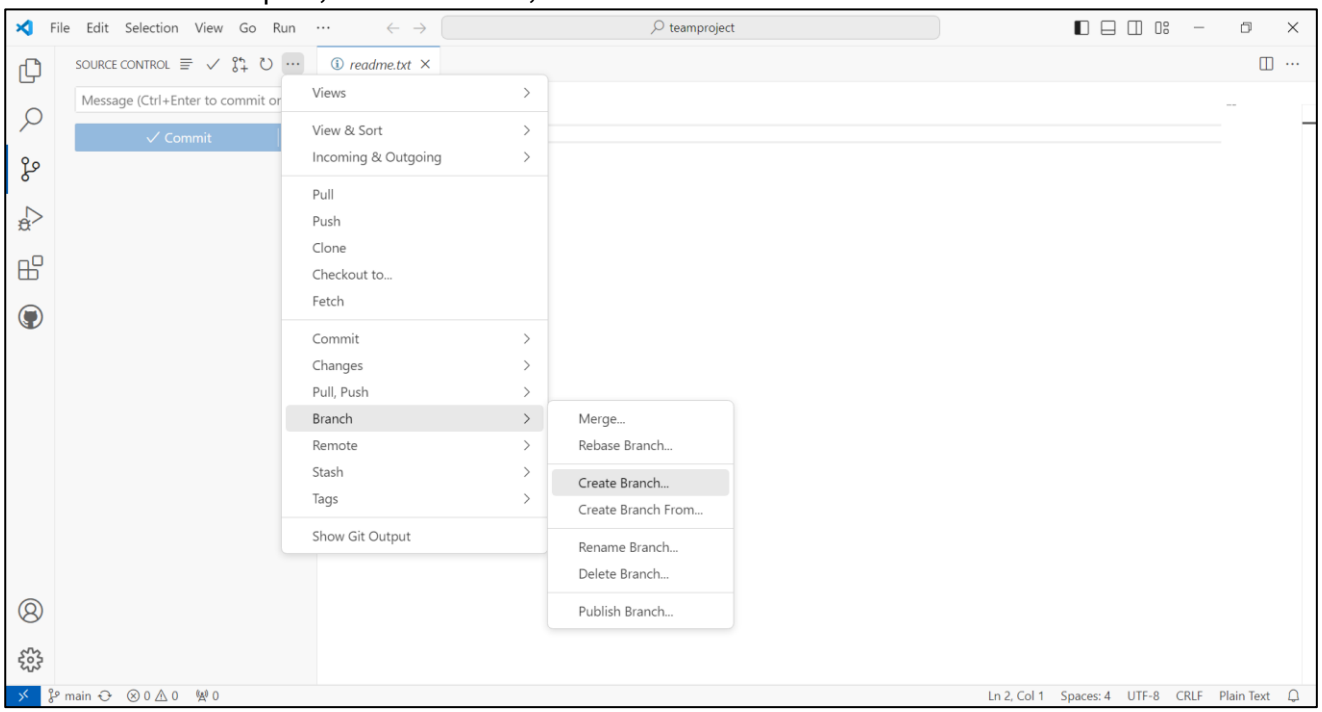

X 16. Click on **Open** to open the cloned repository in Visual Studio Code




At this point, the project also exists on StudentX's computer

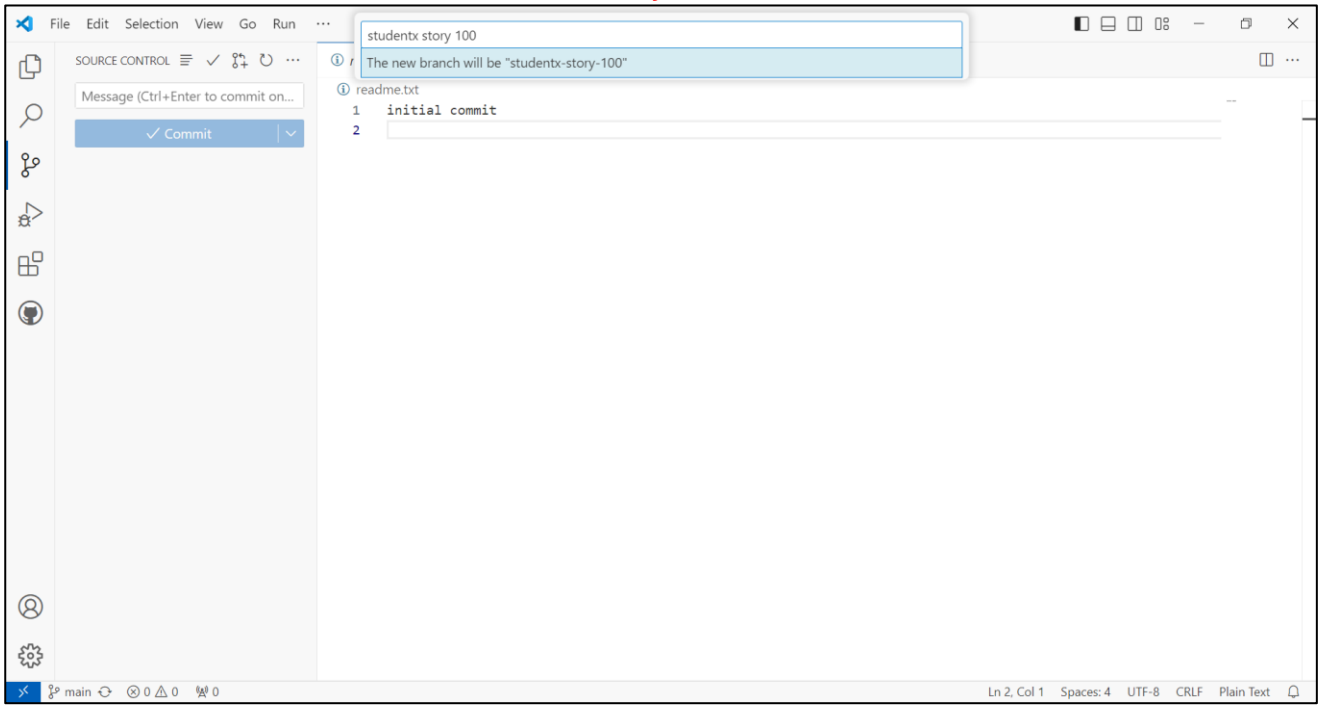
## Create branch

X 17. Click on the ellipsis, select **Branch**, **Create Branch...**




Before you make any changes to the files, create a branch with a meaningful name, for example, the name of the feature or story you are working on.

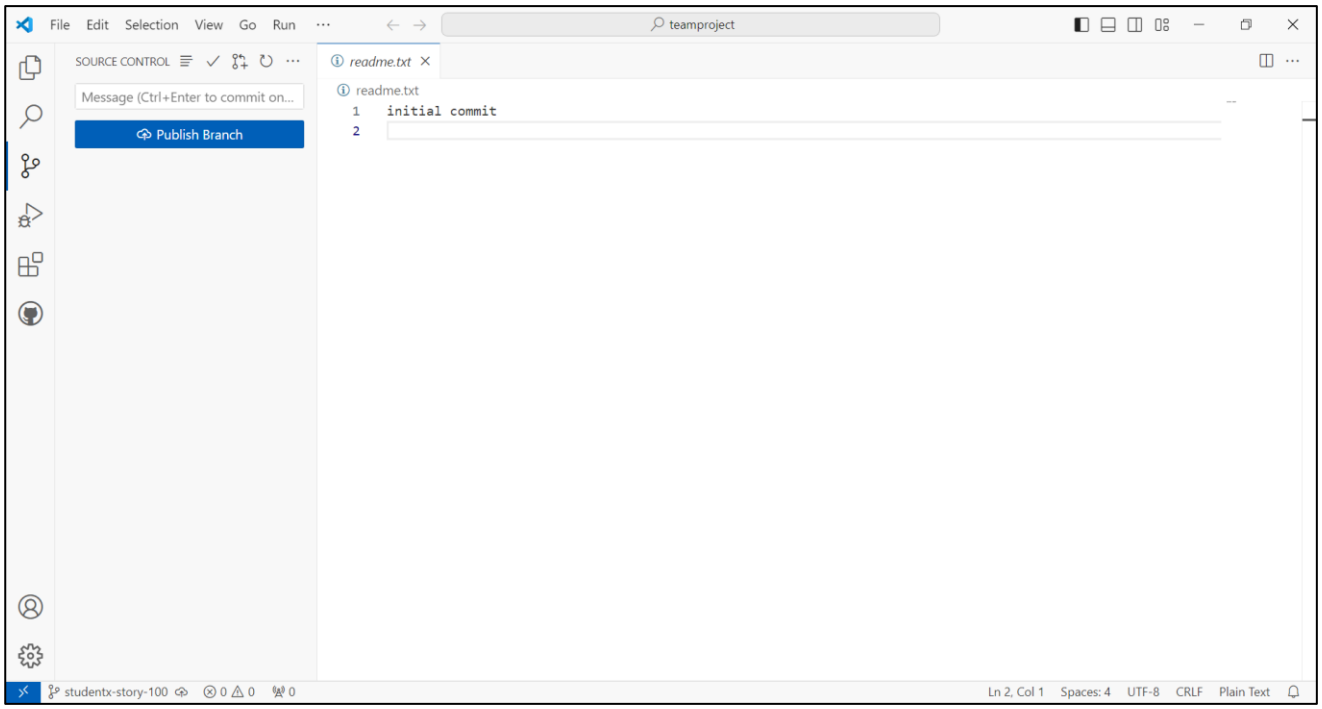
X 18. Enter the branch name as `studentx story 100`
The new branch will be called `studentx-story-100`



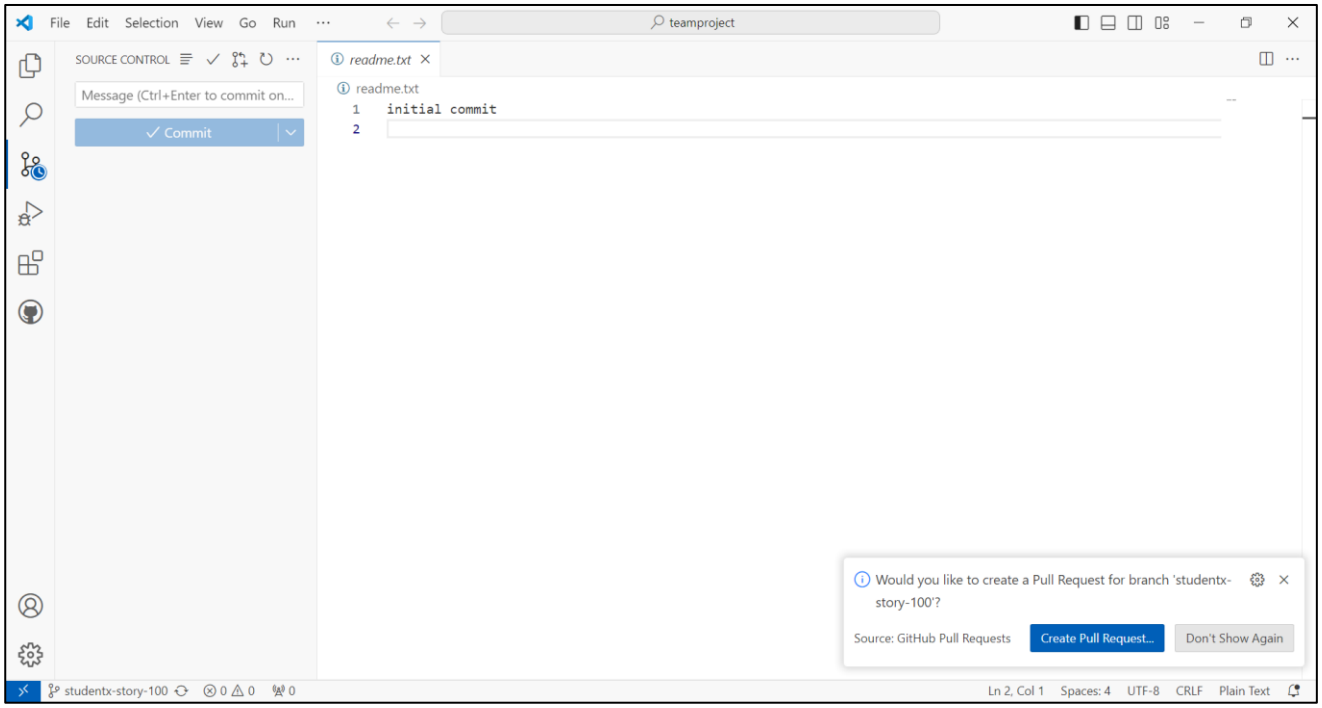

## Publish branch

The bottom left corner in Visual Studio Code shows you are on branch `studentx-story-100`
This branch only exists in the local repository on StudentX's computer
We will need to publish it to the remote repository on GitHub

X 19. Click on **Publish Branch**




X 20. You should see a dialog to **Create Pull Request...**
Ignore it for now, pull requests will not be covered at this stage



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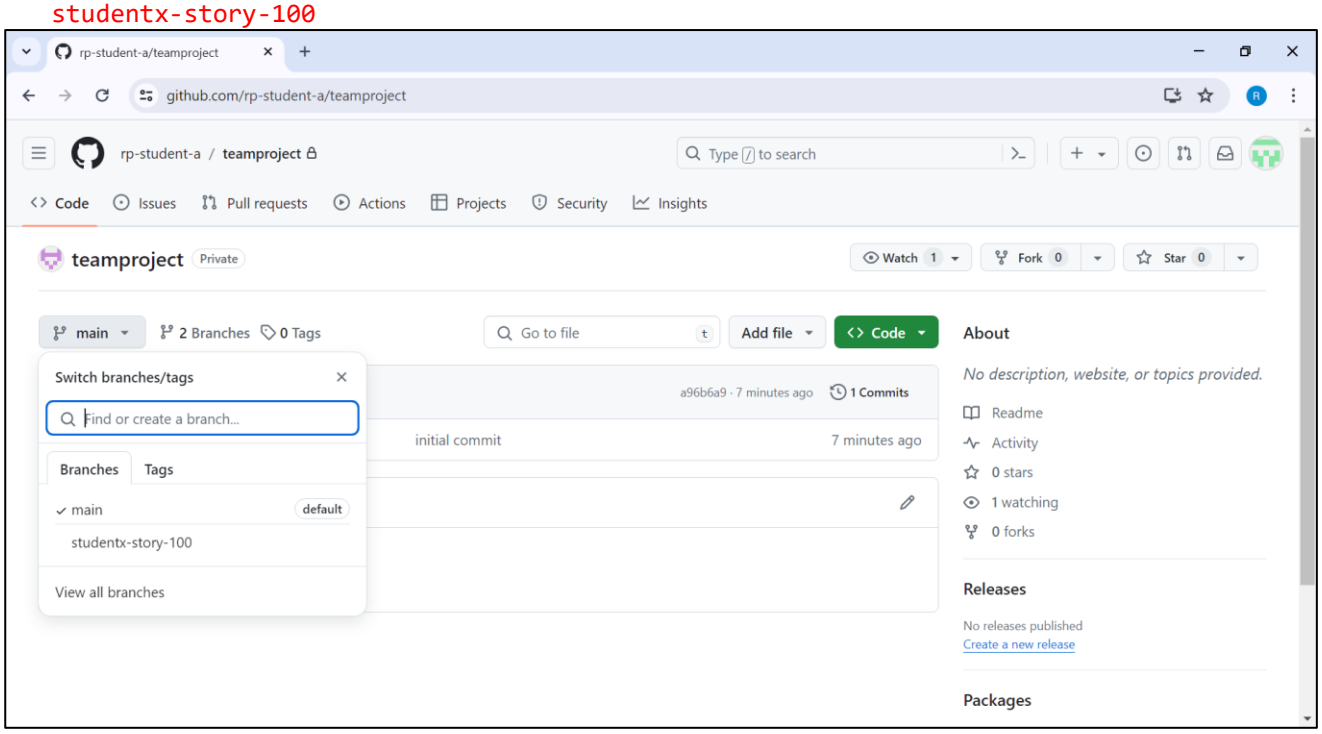
21. View the repository in GitHub in a browser
    Click on the dropdown next to `main`, you should see that there are 2 branches - `main` and `studentx-story-100`

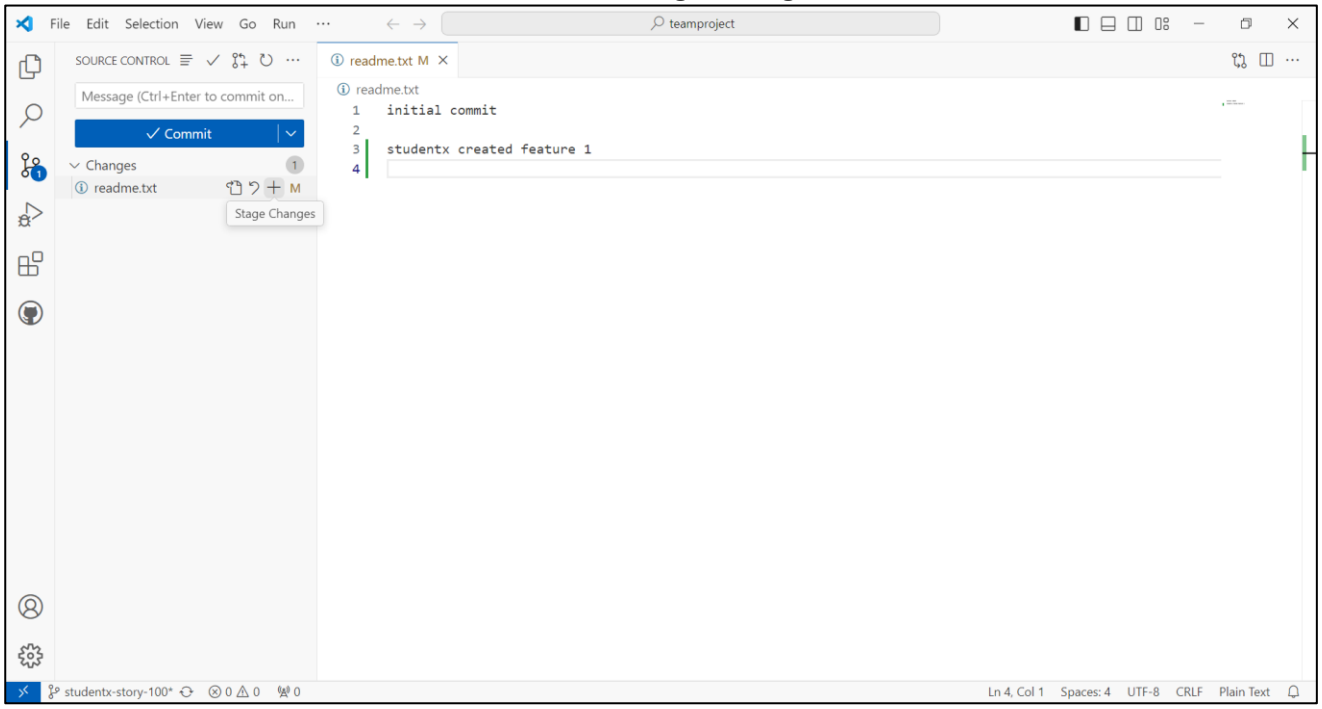



The project from the `main` branch should only contain the stable and fully tested code

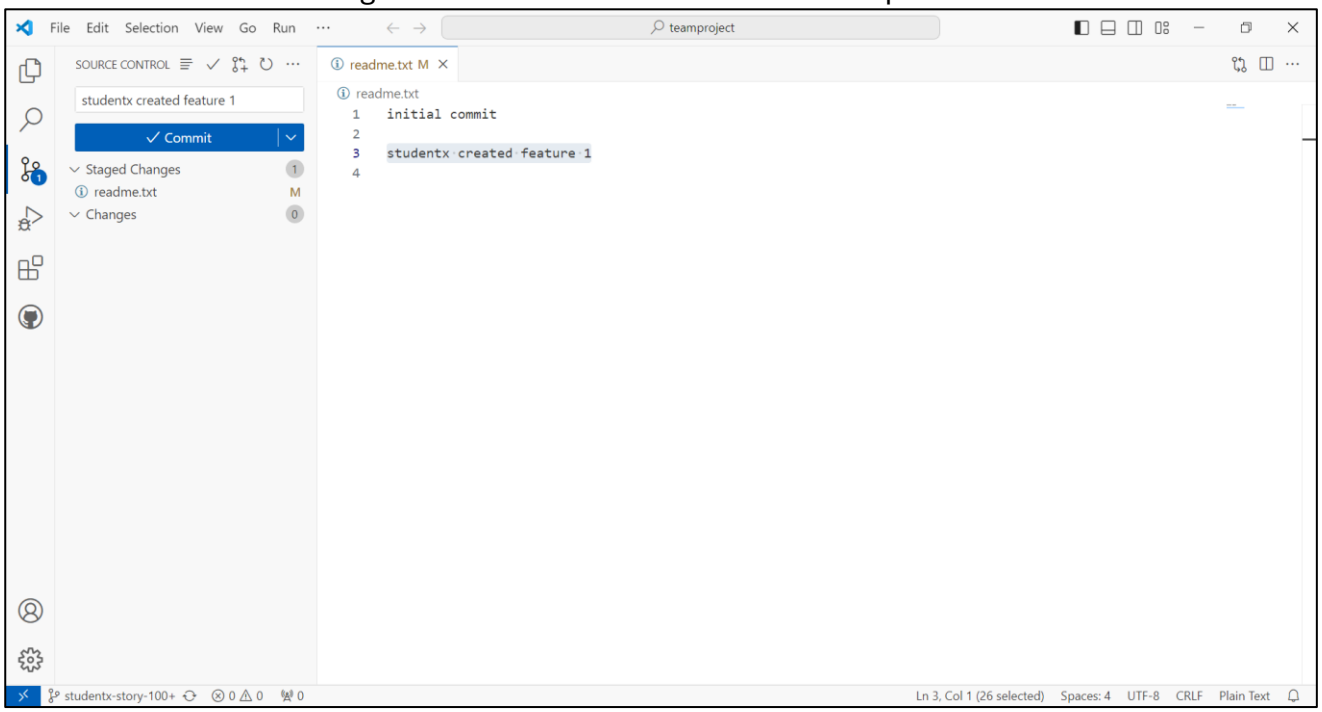
The project from the `studentx-story-100` branch contains the code that StudentX is working on for the feature defined by story 100. Before the feature is completed, this branch may contain code that is only partially complete.

## Make changes, stage changes, commit changes, sync changes

X 22. Modify `readme.txt` by adding the text `studentx created feature 1` on line 3 and add a new line at line 4
Click on the **+** button next to `readme.txt` to stage changes for that file



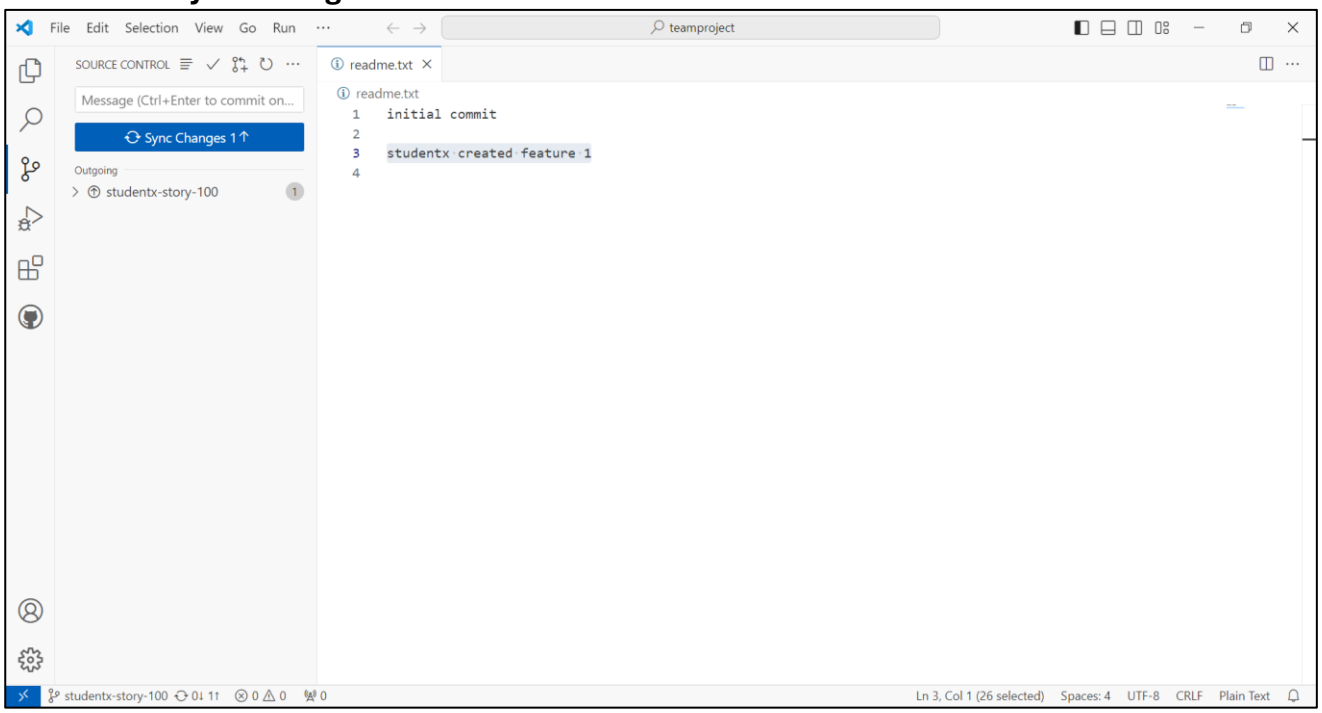

X 23. Set the commit message as `studentx created feature 1` and press **Commit**



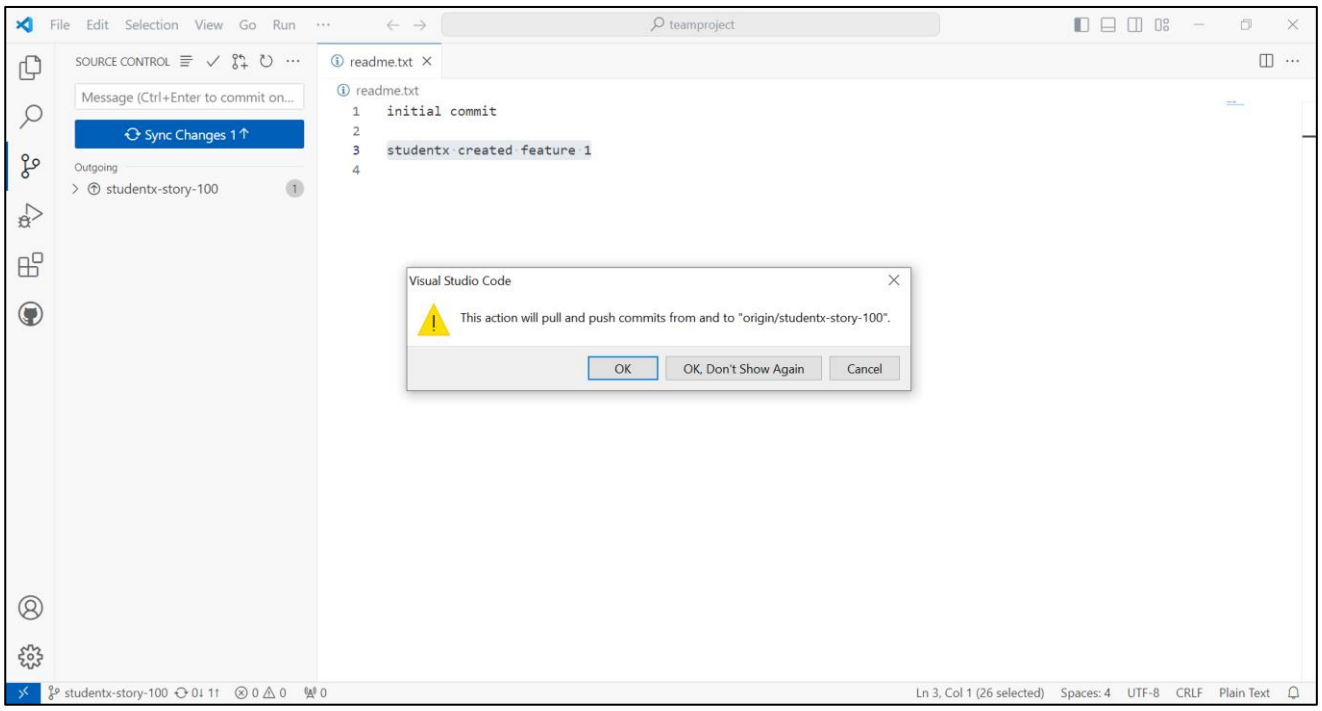

The changes are committed to the local repository

We need to sync the changes in the local repository to the remote repository

X 24. Click on **Sync Changes**




X 25. The dialog informs you that sync changes will pull and push commits from and to `origin/studentx-story-100`
Click **OK**

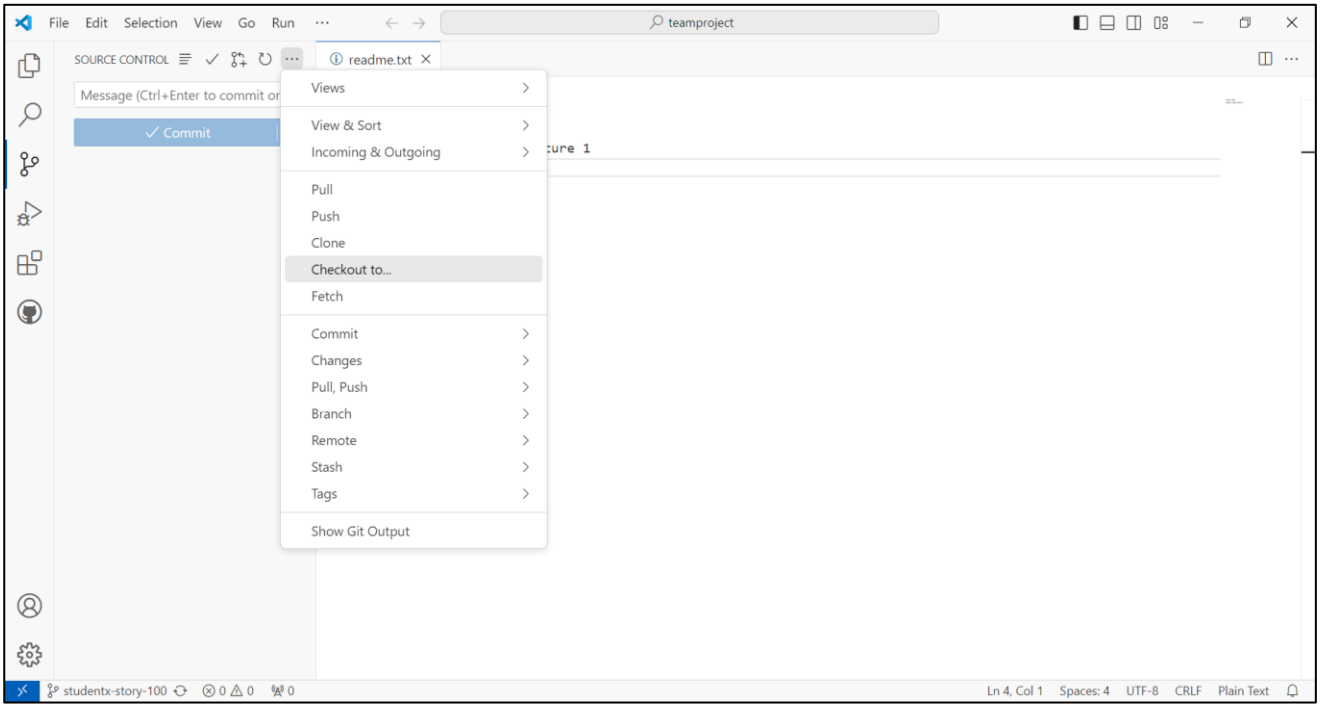



**pull** will pull the changes from the remote repository to the local repository
**push** will push the changes from the local repository to the remote repository

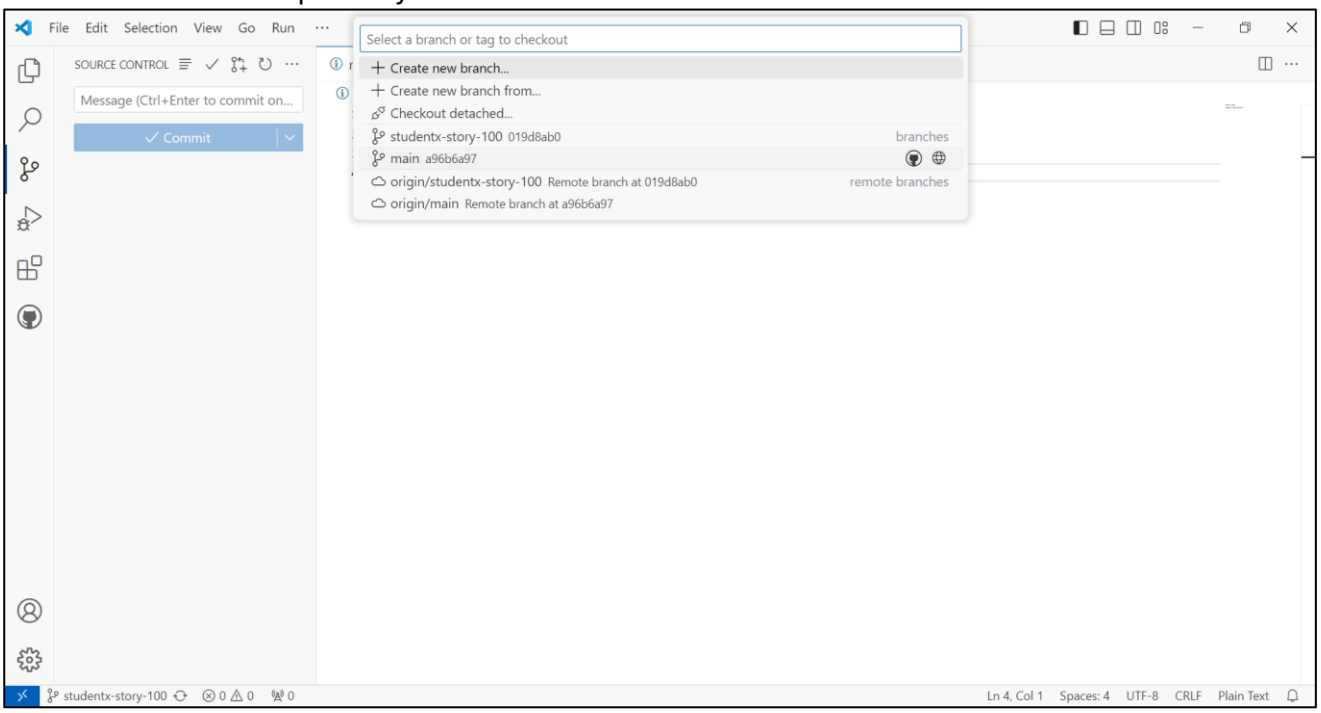
## Checkout main

Once StudentX has completed the feature, it is time to merge the changes to the main branch
There are several steps to this process
1) checkout to the local repository branch main
2) merge from the story branch to the main branch

X 26. Click the ellipsis, select **Checkout to..**



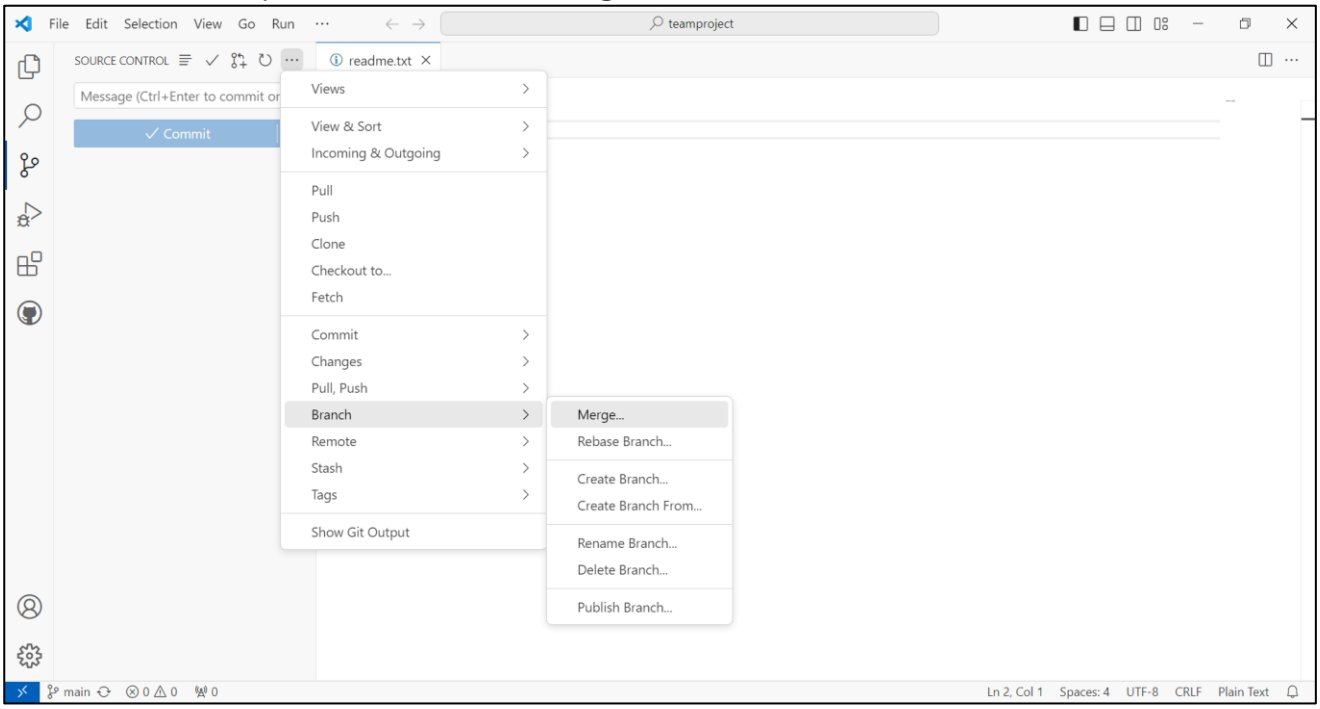

X 27. Select the local repository branch **main**



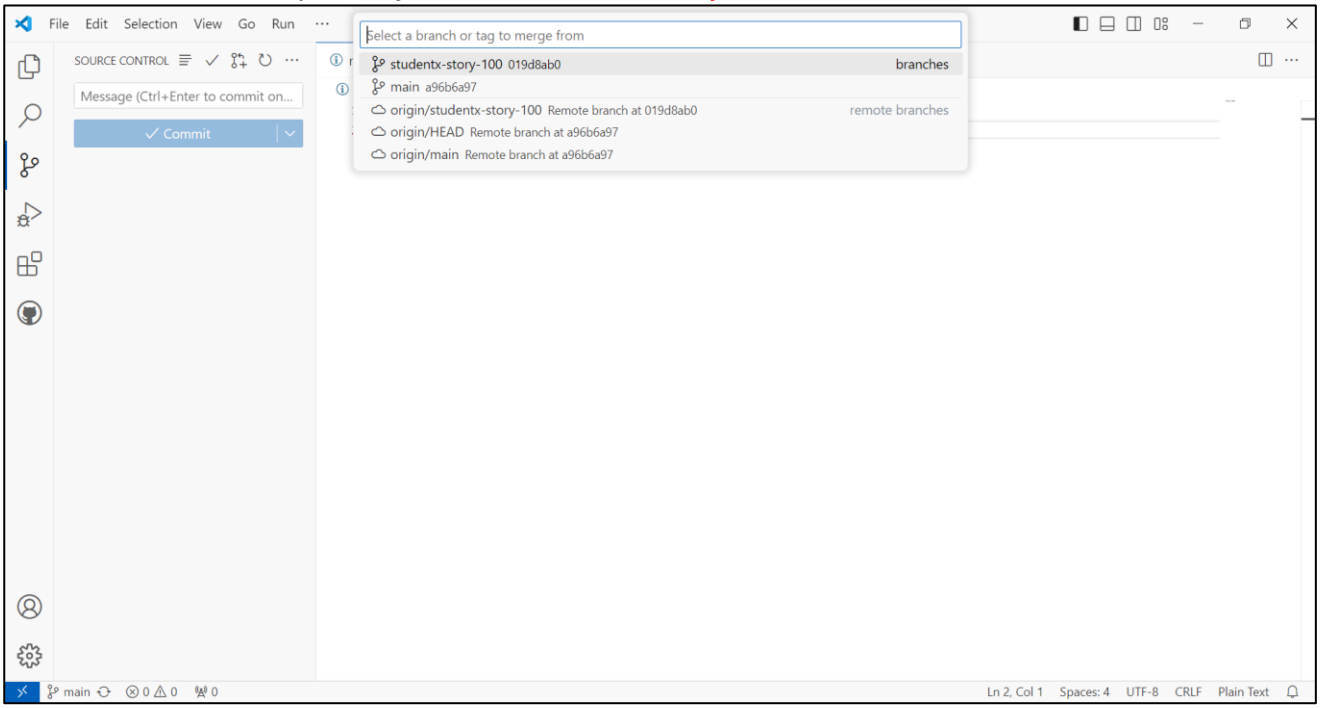
## Merge branch

The bottom left corner in Visual Studio Code shows you are on the local repository branch `main`
We now need to merge from the local repository branch `studentx-story-100` to the local repository branch `main`

X 28. Click on the ellipsis, select **Branch**, **Merge..**




X 29. Select the local repository branch `studentx-story-100`



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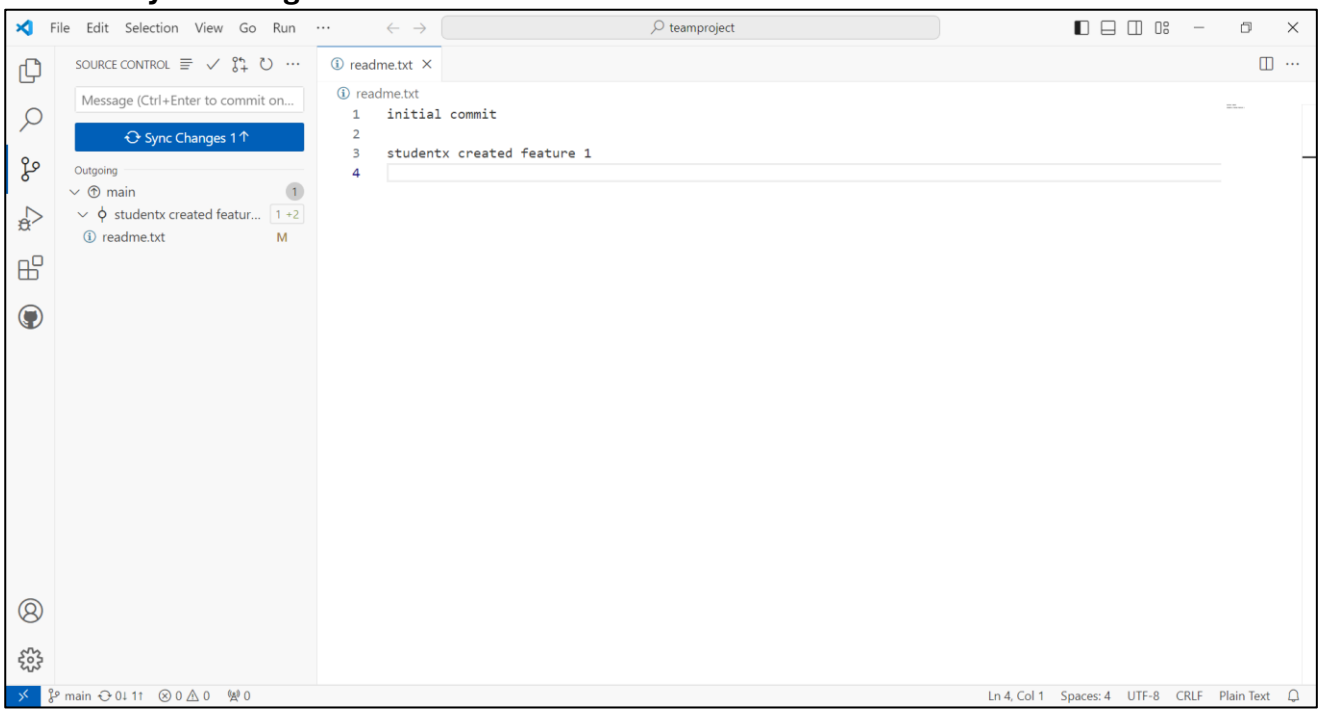
30. Click **Sync Changes**

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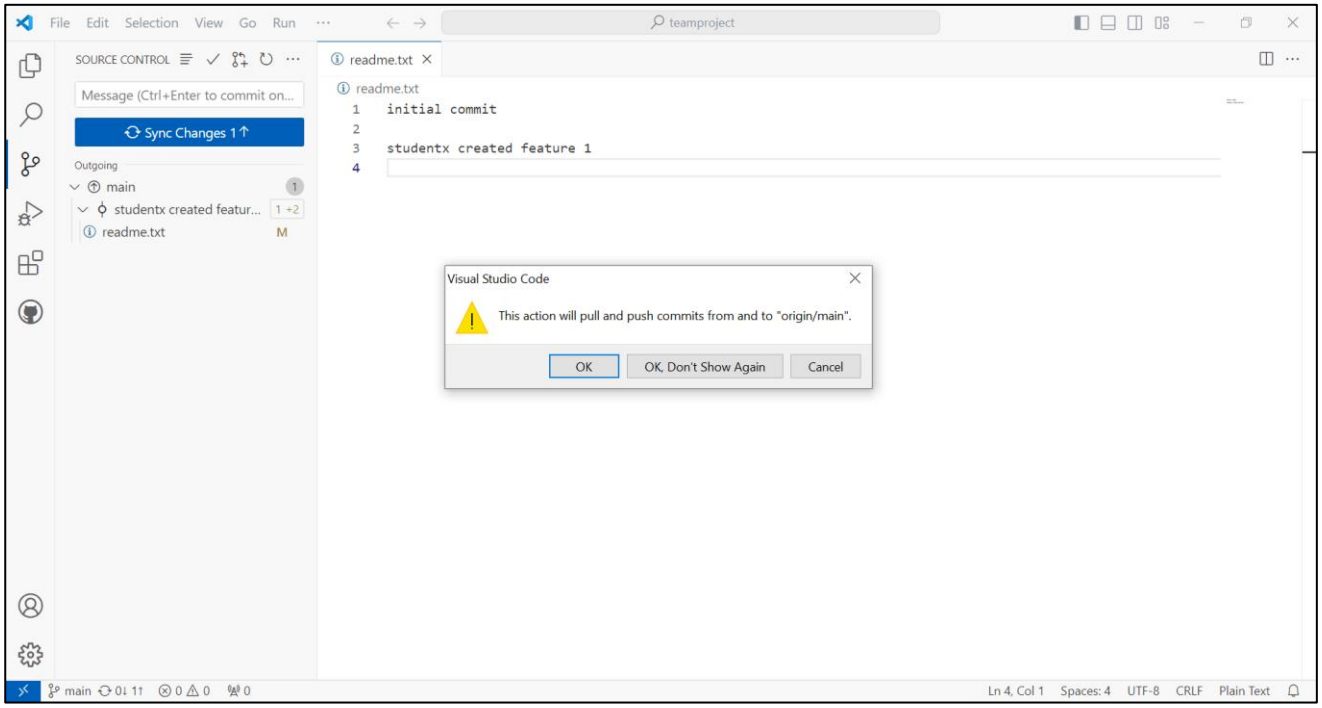
31. The dialog informs you that sync changes will pull and push commits from and to `origin/main`
Click **OK**



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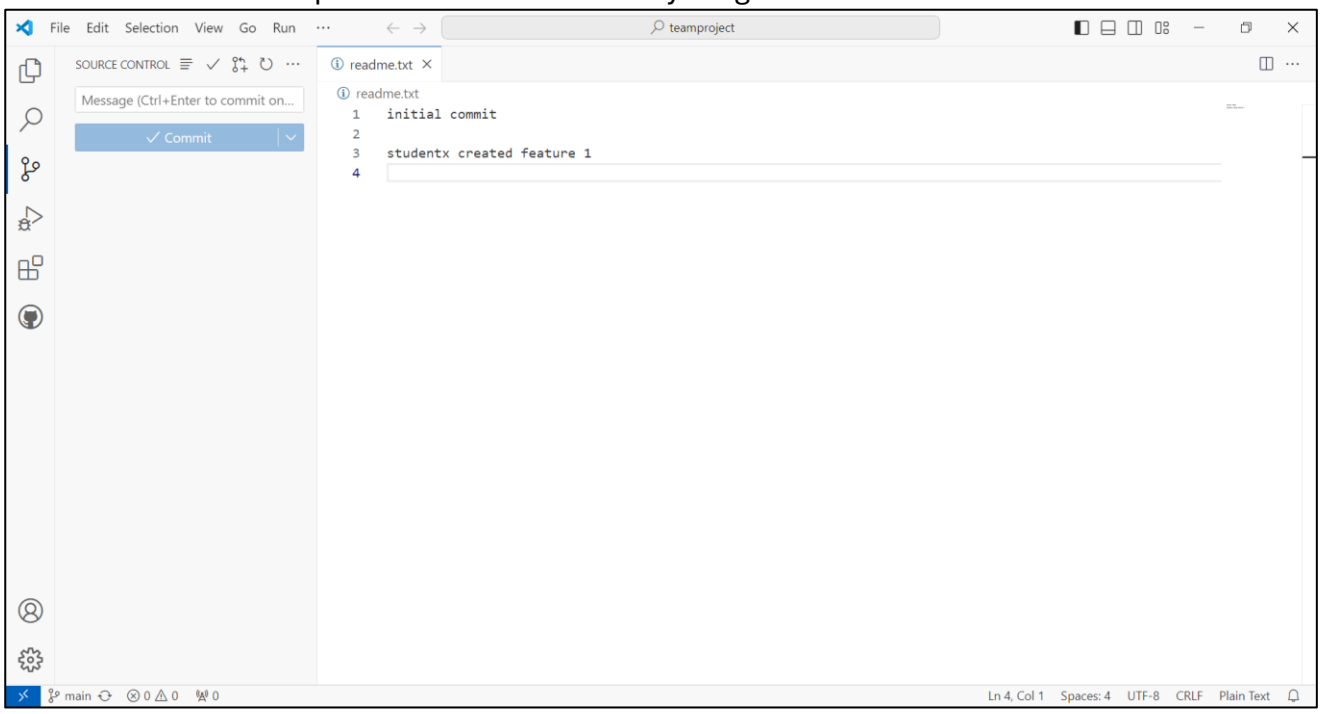
32. The source control panel should not show anything of note

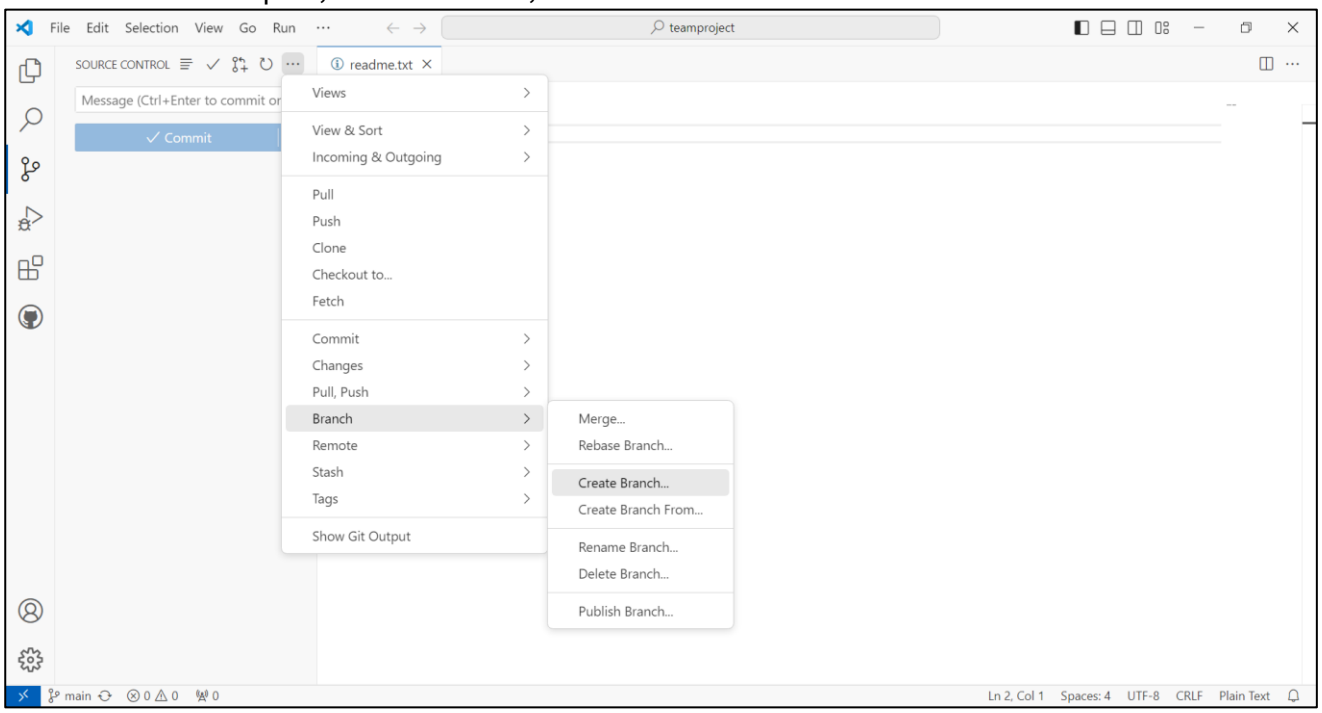



At this point, StudentX's local repository branch `main` is in sync with the remote repository branch `main`

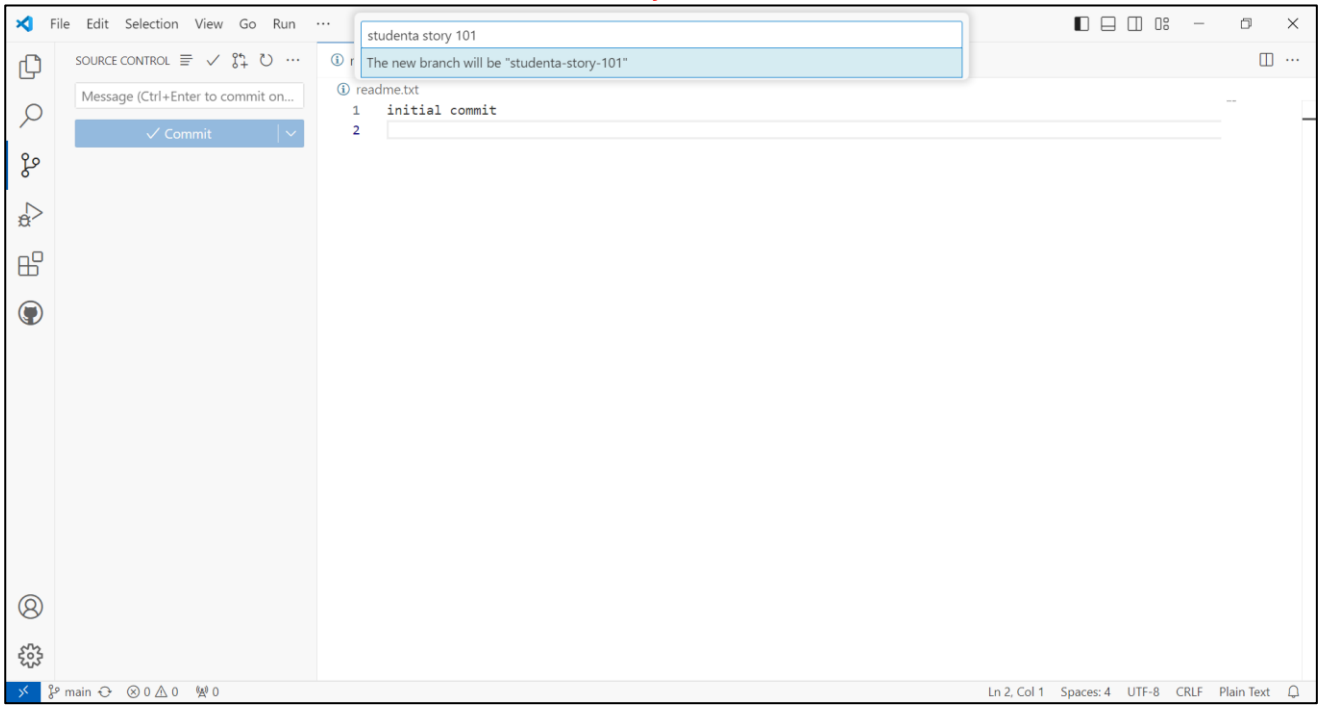
## Create branch

The next few steps to create branch, publish branch, make changes, stage changes, commit changes, sync changes are the same as what StudentX did

A 33. Click on the ellipsis, select **Branch**, **Create Branch...**

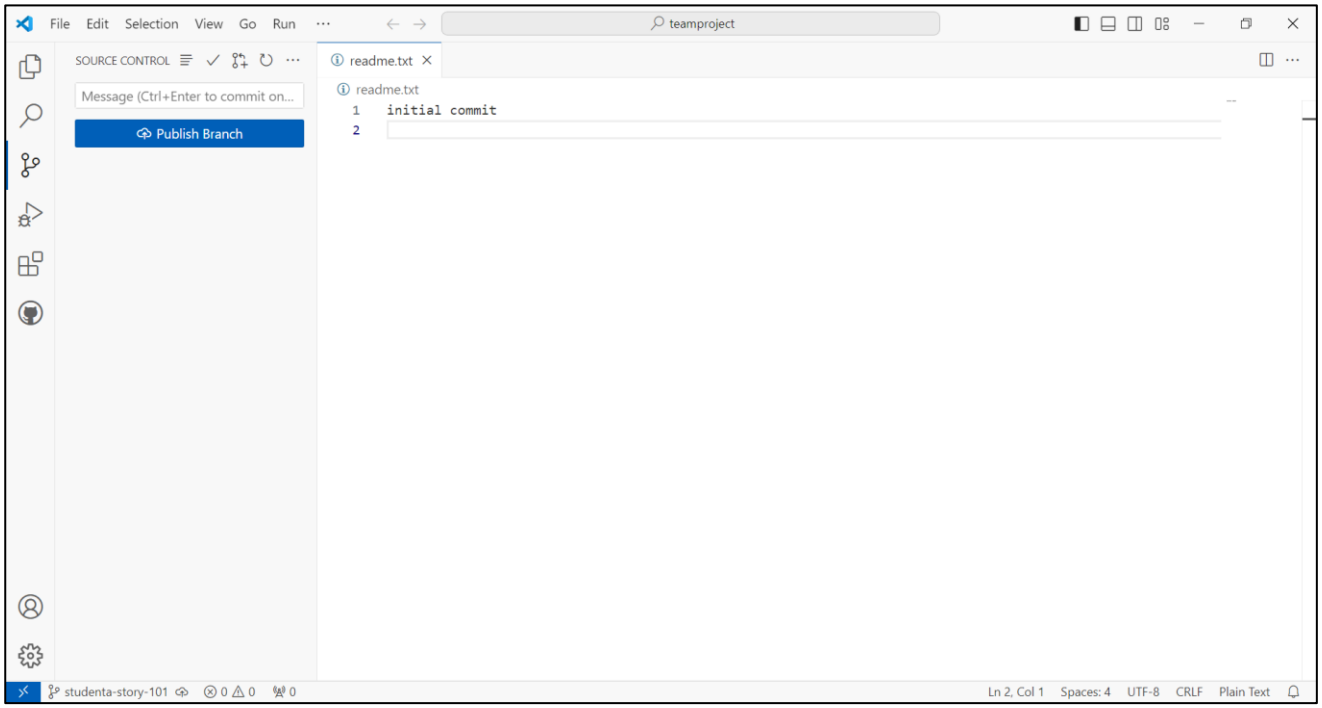



A 34. Enter the branch name as `studenta story 101`
The new branch will be called `studenta-story-101`

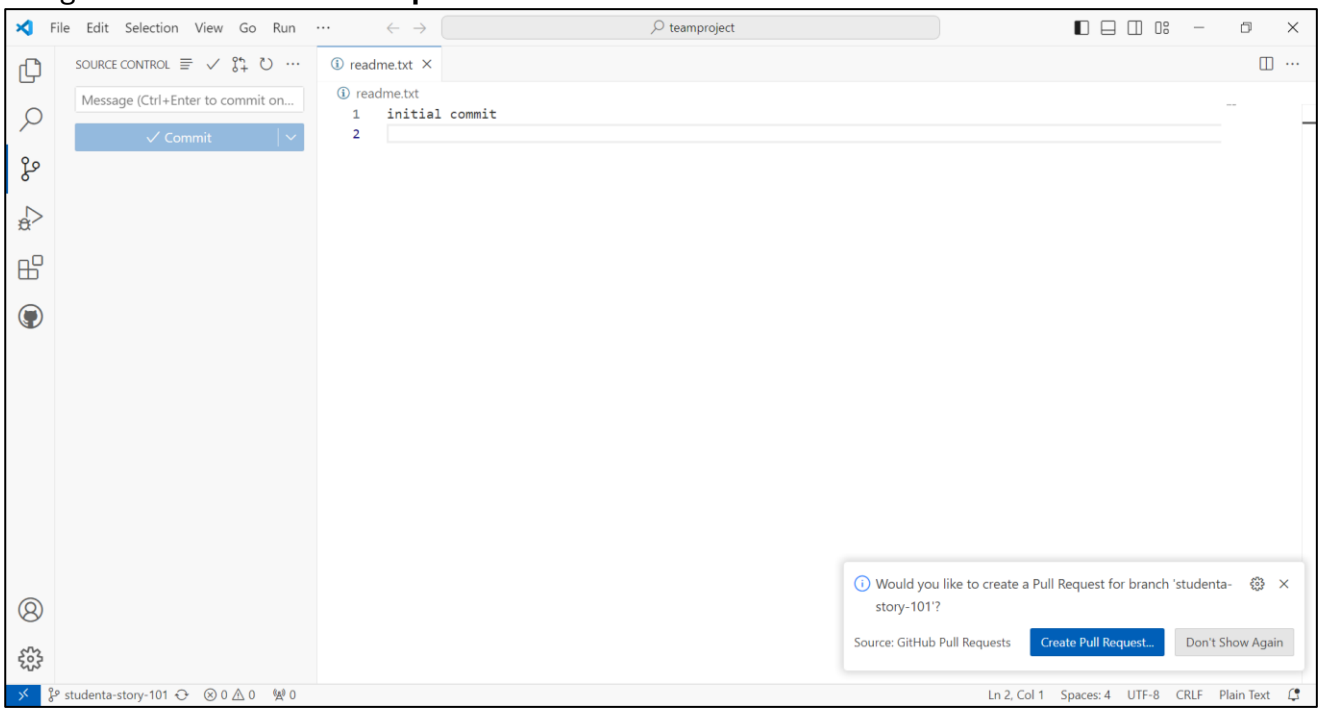


## Publish branch

A 35. Click **Publish Branch**




A 36. Ignore the **Create Pull Request...** button



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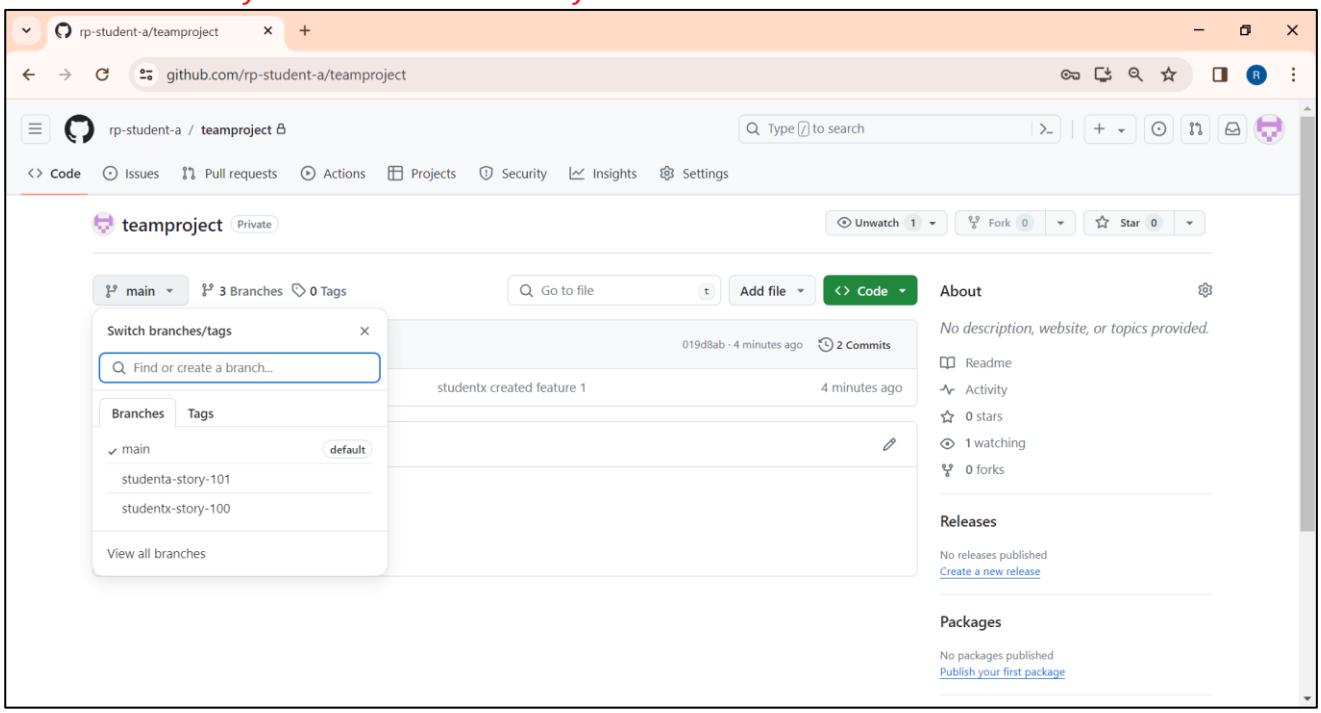
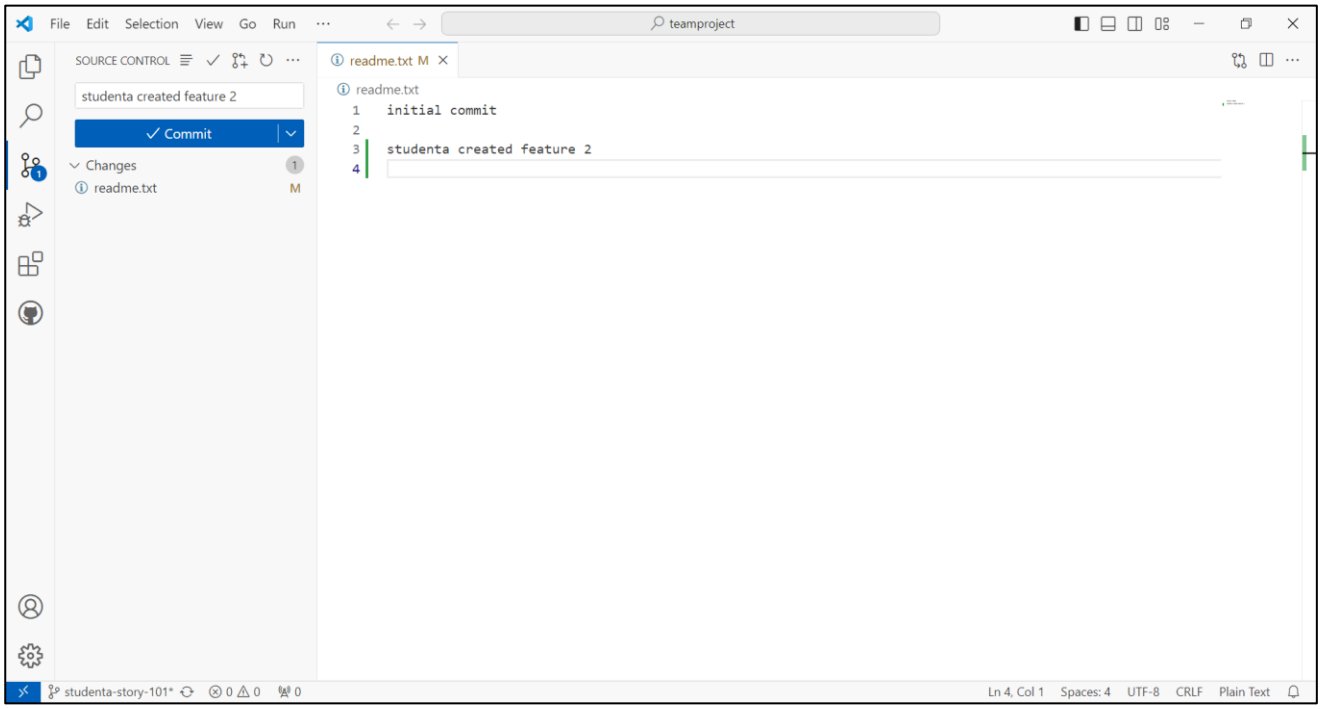
37. View the repository in GitHub in a browser
    Click on the dropdown next to `main`, you should see that there are 3 branches - `main`, `studentx-story-100` and `studenta-story-101`



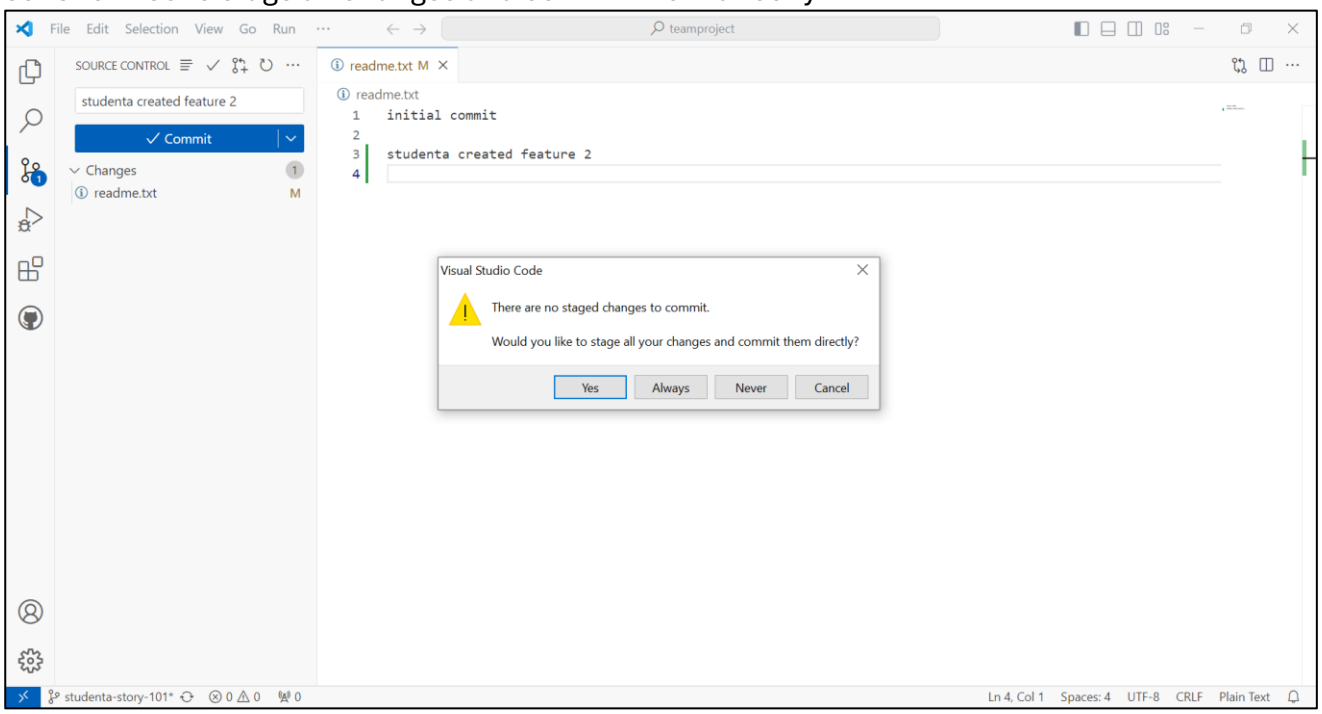
## Make changes, stage changes, commit changes, sync changes

A 38. Modify `readme.txt` by adding the text `studenta created feature 2` on line 3 and add a new line at line 4
Set the commit message as `studenta created feature 2`
Click **Commit**

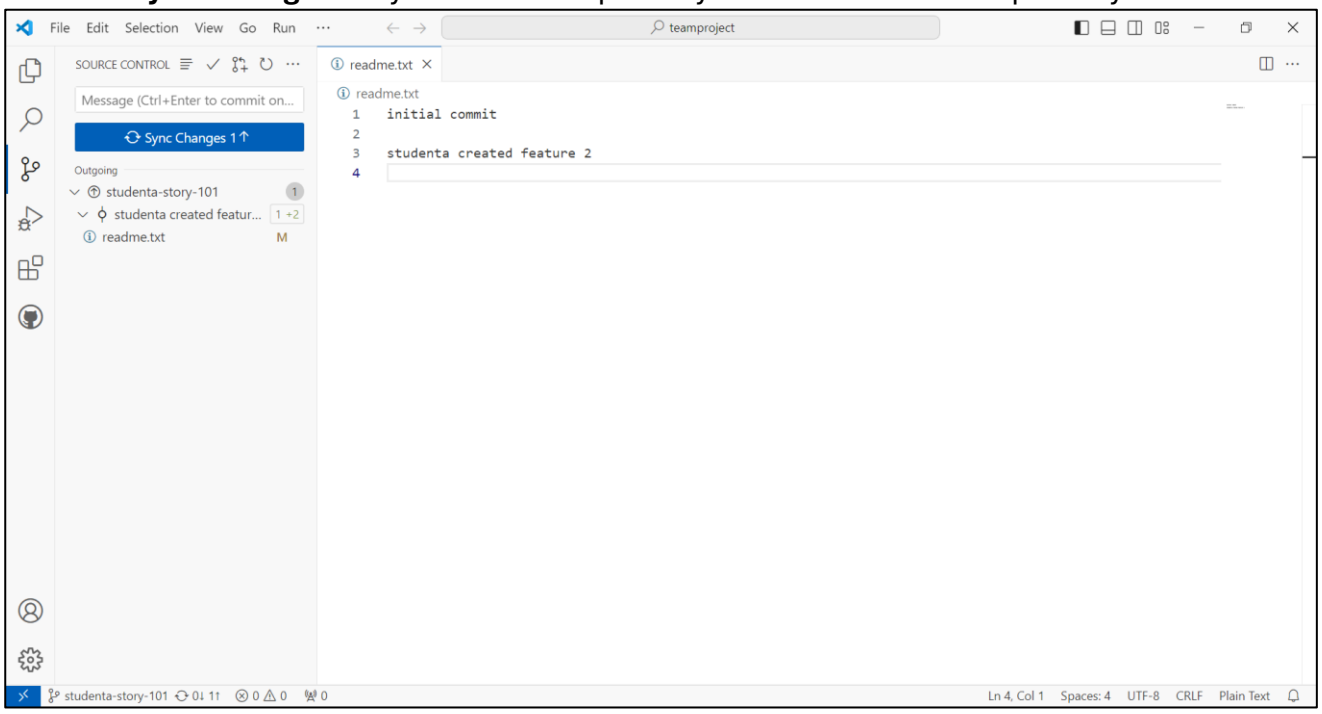



If you try to commit before staging changes, Visual Studio Code will ask if you want to stage **all** changes. Only do so if you are certain that you want to stage all changes

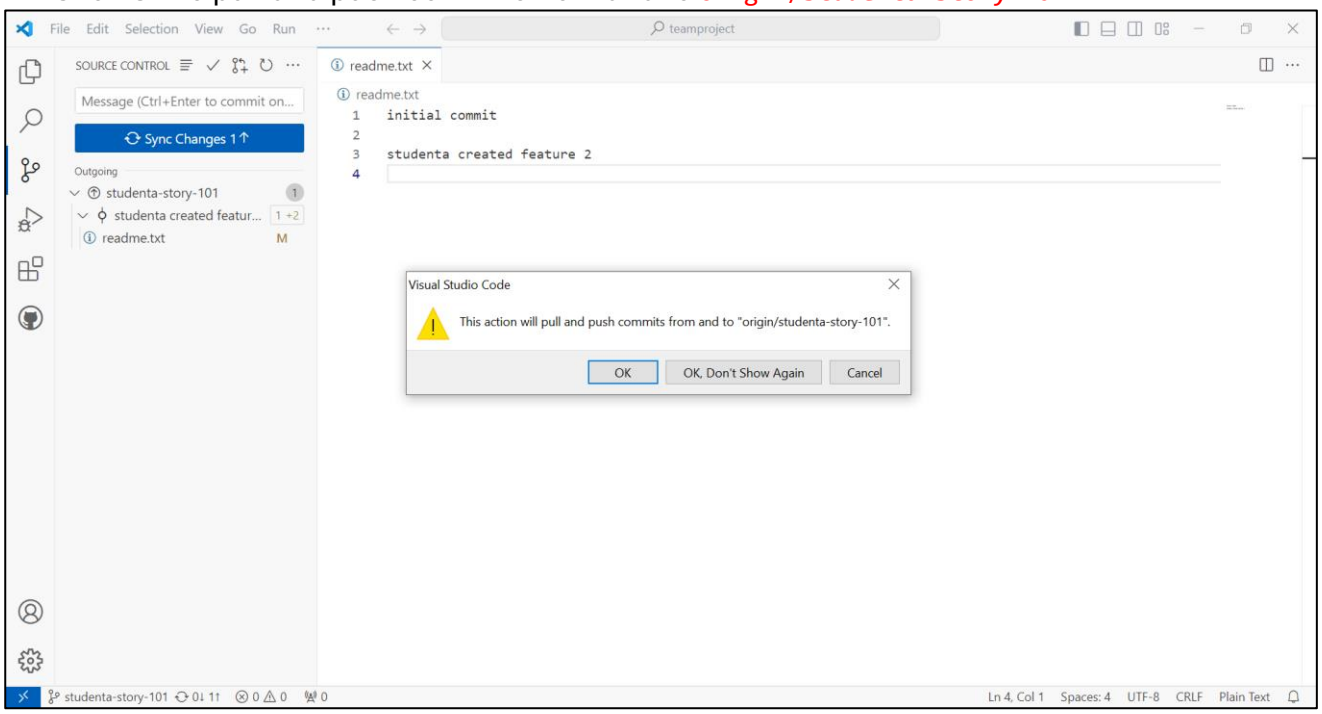
A 39. Click **Yes** to stage all changes and commit them directly



A 40. Click **Sync Changes** to sync the local repository branch and remote repository branch




A 41. Click **OK** to pull and push commits from and to `origin/studenta-story-101`



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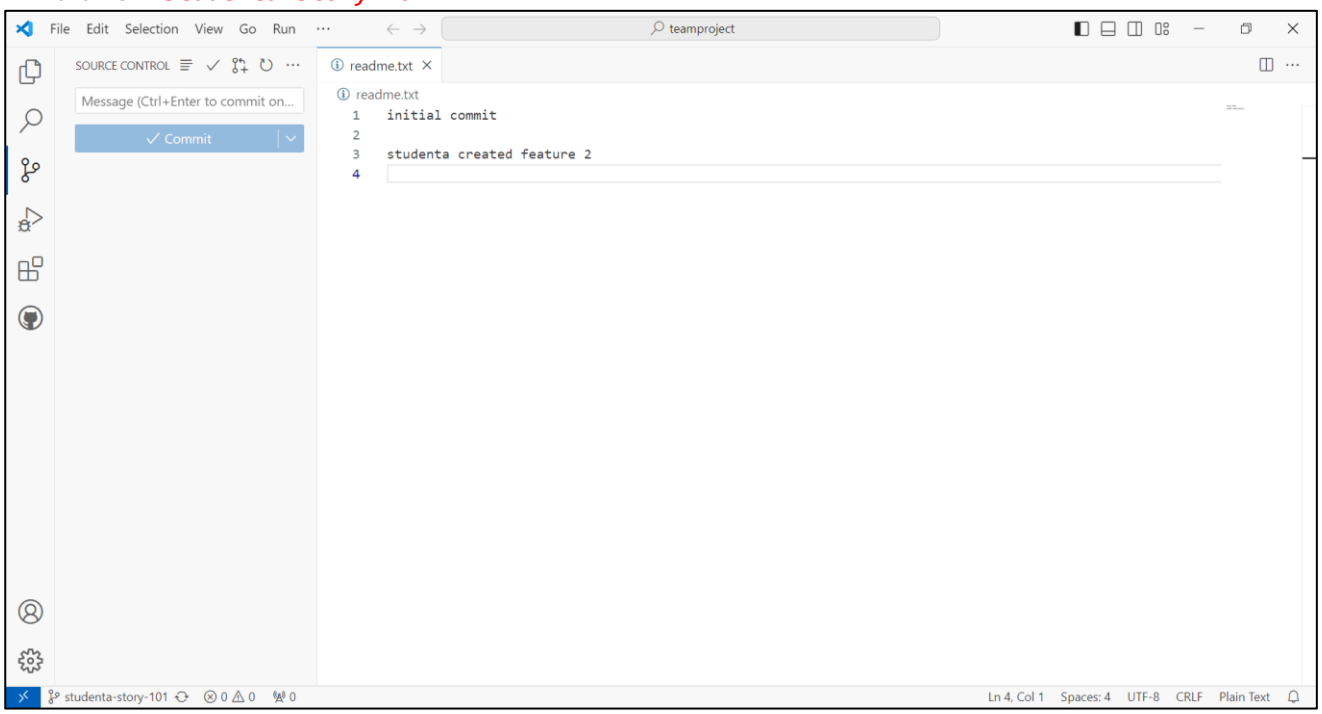
42. The remote repository branch `studenta-story-101` is now in sync with the local repository branch `studenta-story-101`

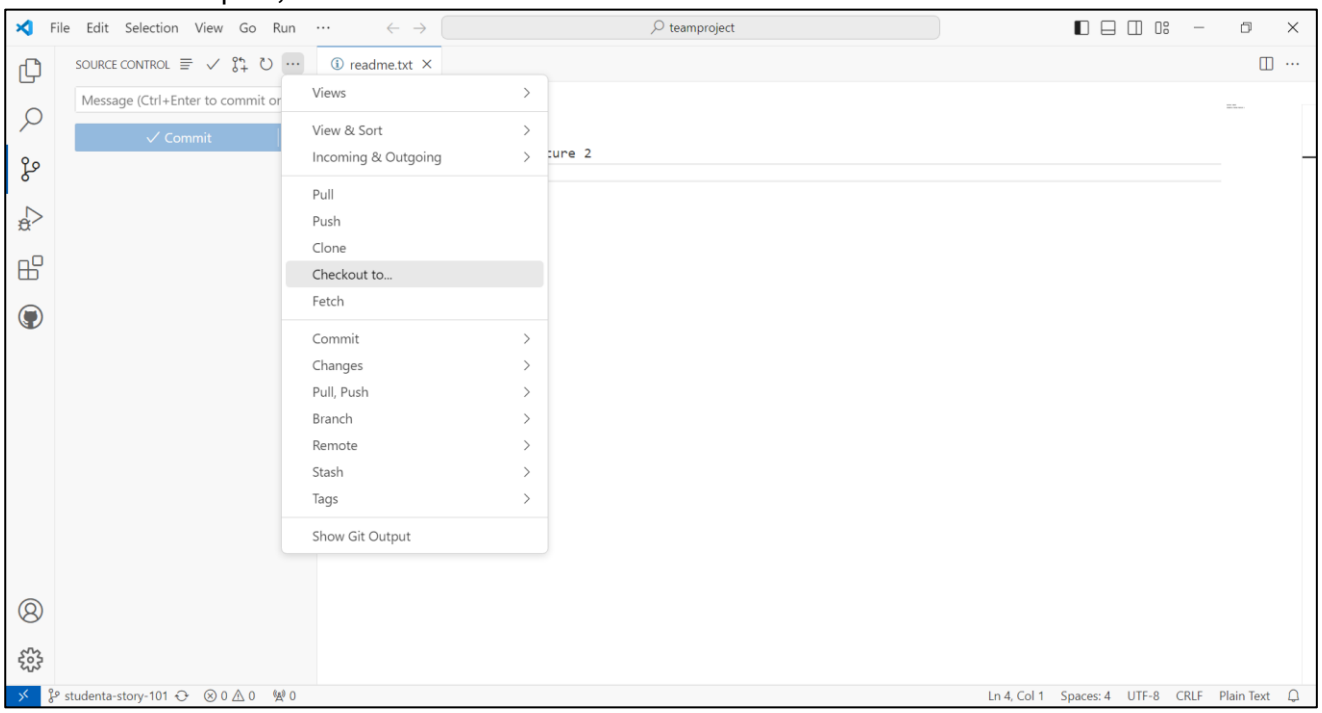



Note that at this point, the local repository branch `main` is out of sync with the remote repository branch `main`
In the local repository branch `main`, line 3 says `studenta created feature 2`
In the remote repository branch `main`, line 3 says `studentx created feature 1`

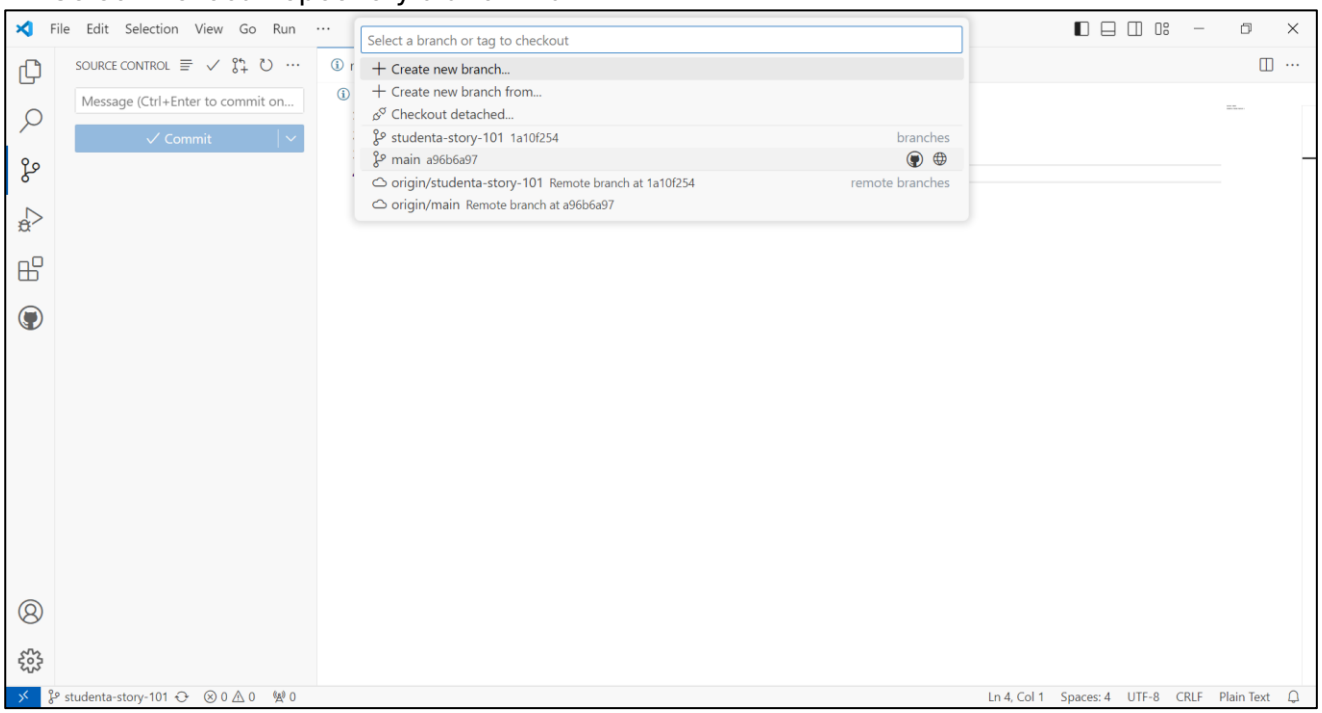
## Checkout main

The next few steps to checkout main and merge branch are the same as what StudentX did
However, there will be a conflict we need to resolve when doing the merge branch

A 43. Click the ellipsis, select **Checkout to..**

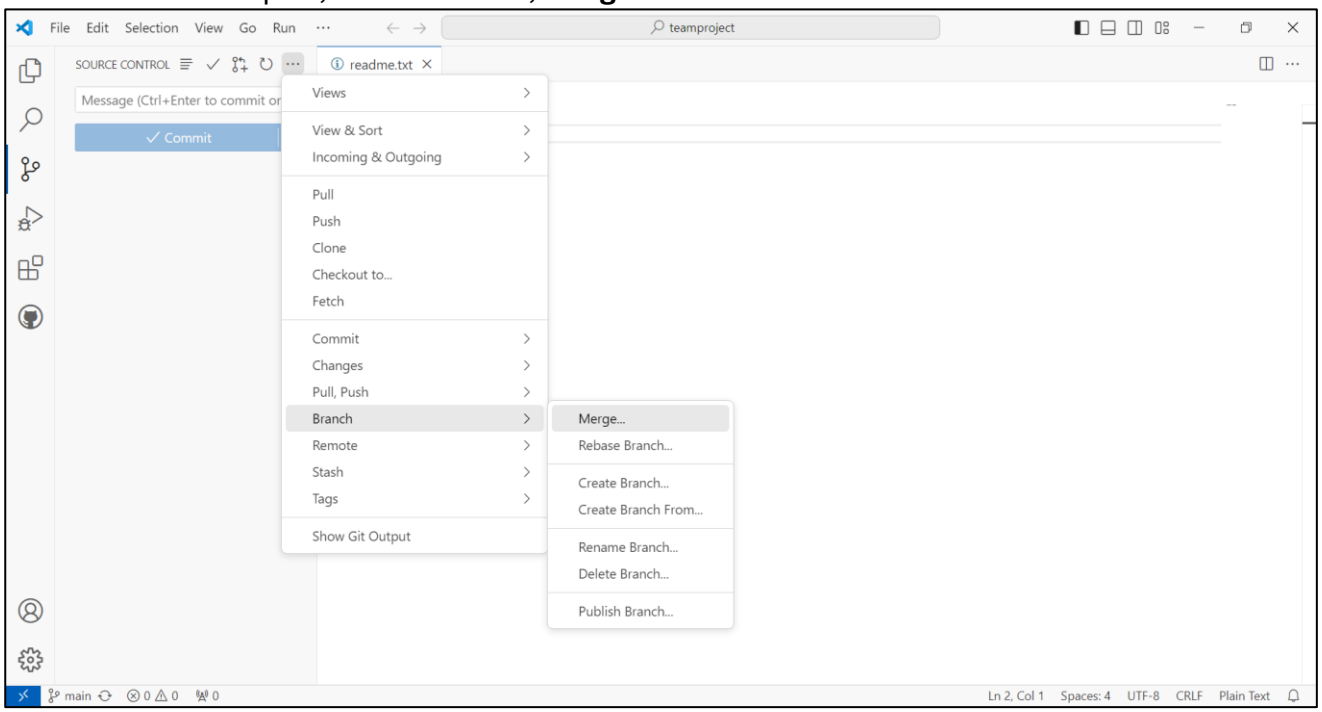



A 44. Select the local repository branch **main**

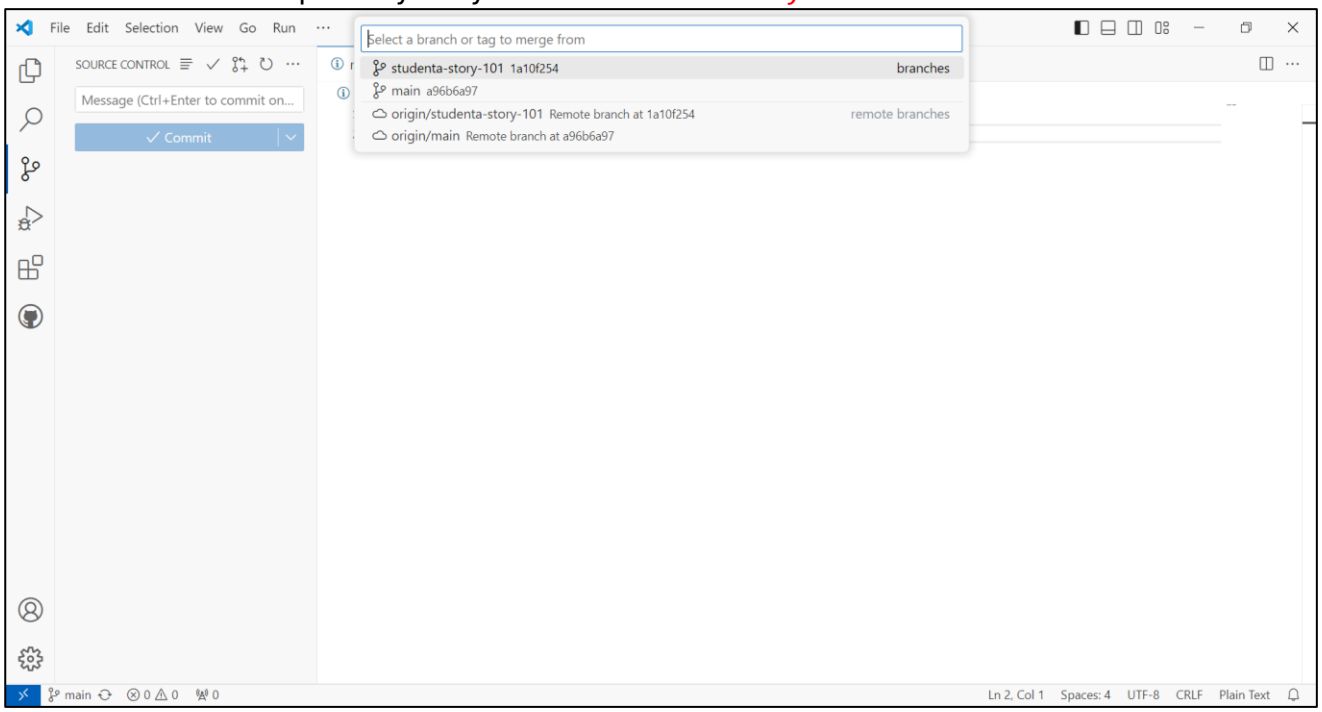


## Merge branch

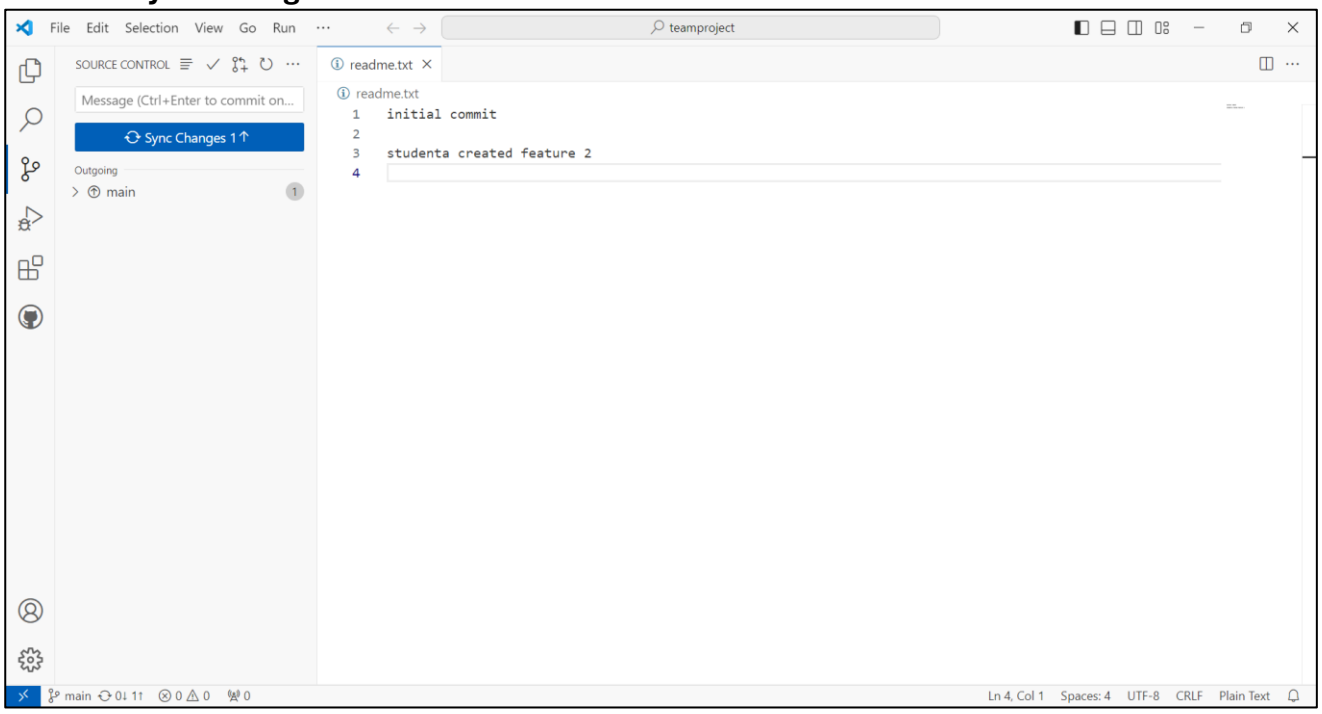
A 45. Click on the ellipsis, select **Branch**, **Merge..**



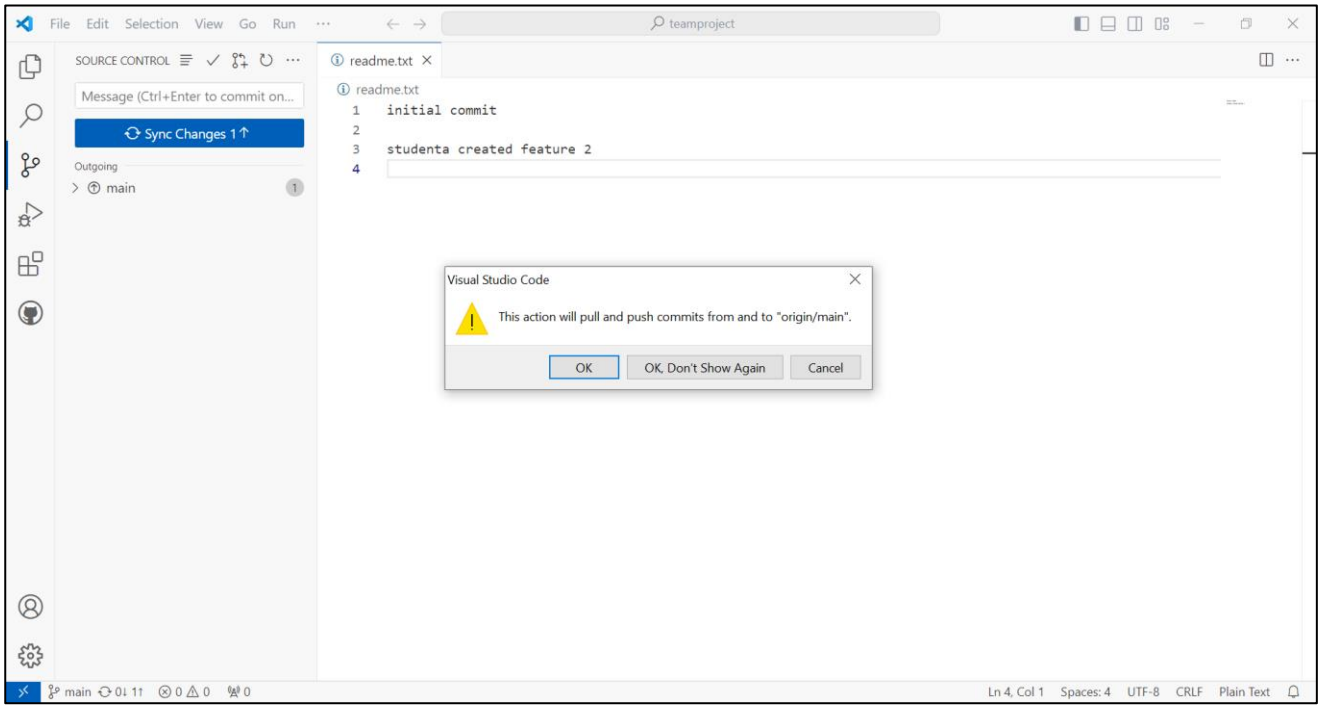

A 46. Select the local repository story branch `studenta-story-101`



A 47. Click **Sync Changes**

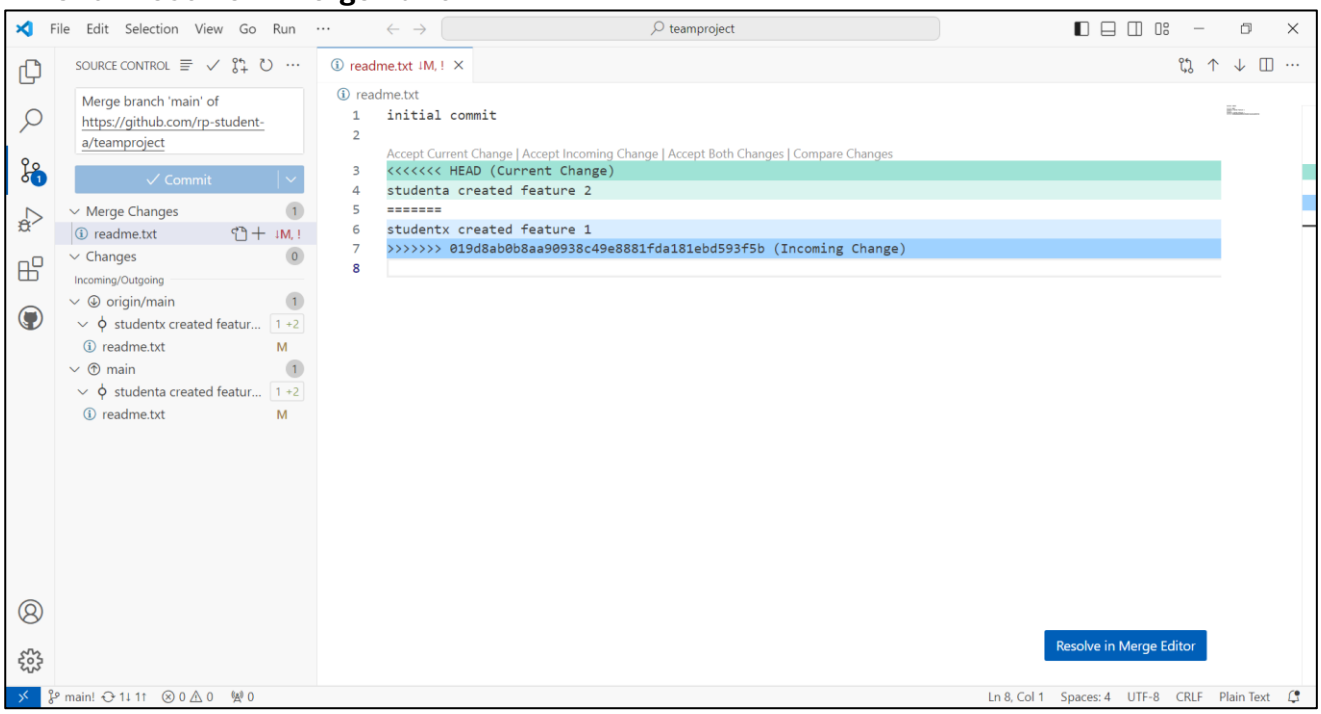



A 48. Click **OK**

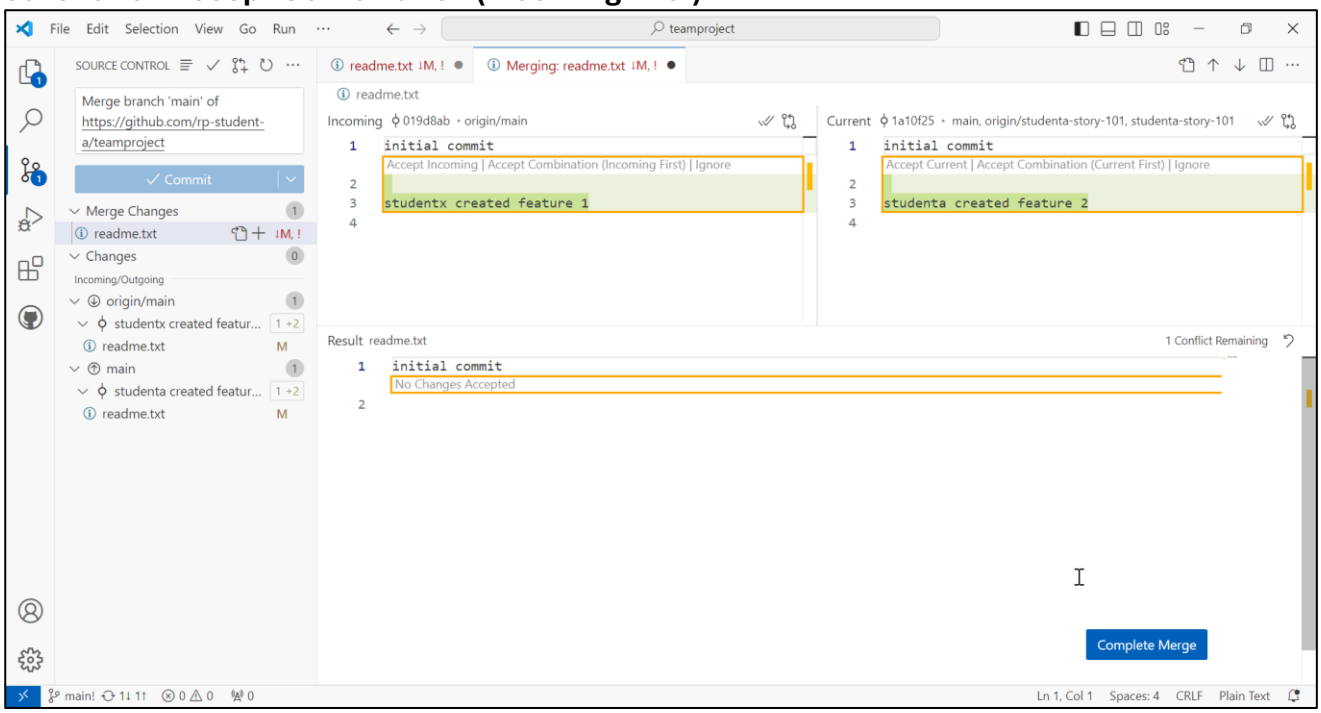


## Resolve conflicts

A 49. There is a conflict when trying to merge `readme.txt`
Click **Resolve in Merge Editor**



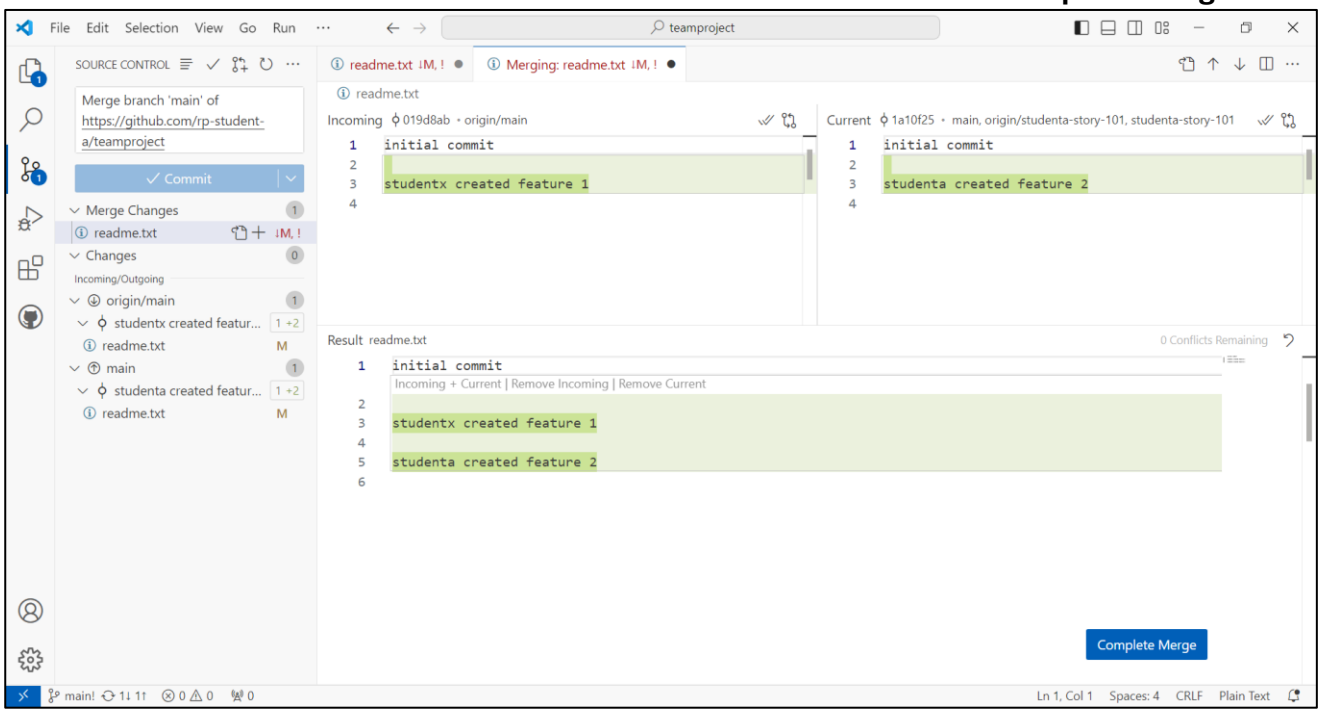

A 50. Click on **Accept Combination (Incoming First)**



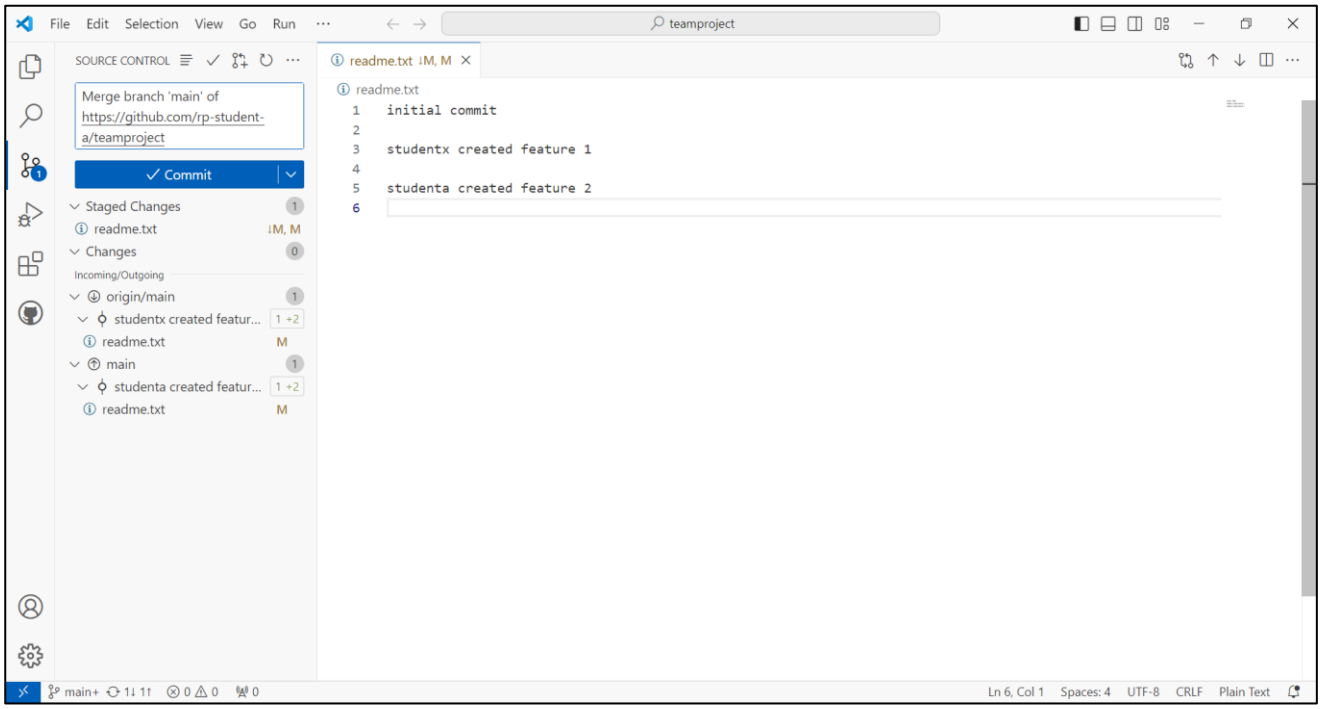

There are several options for how to resolve the merge - accept incoming, accept current, accept combination, ignore, etc, or you can manually edit the contents of the file in the bottom panel

When merging files with conflicts, talk to the person who did the previous merge for that file to understand the changes and what the final merged version should contain

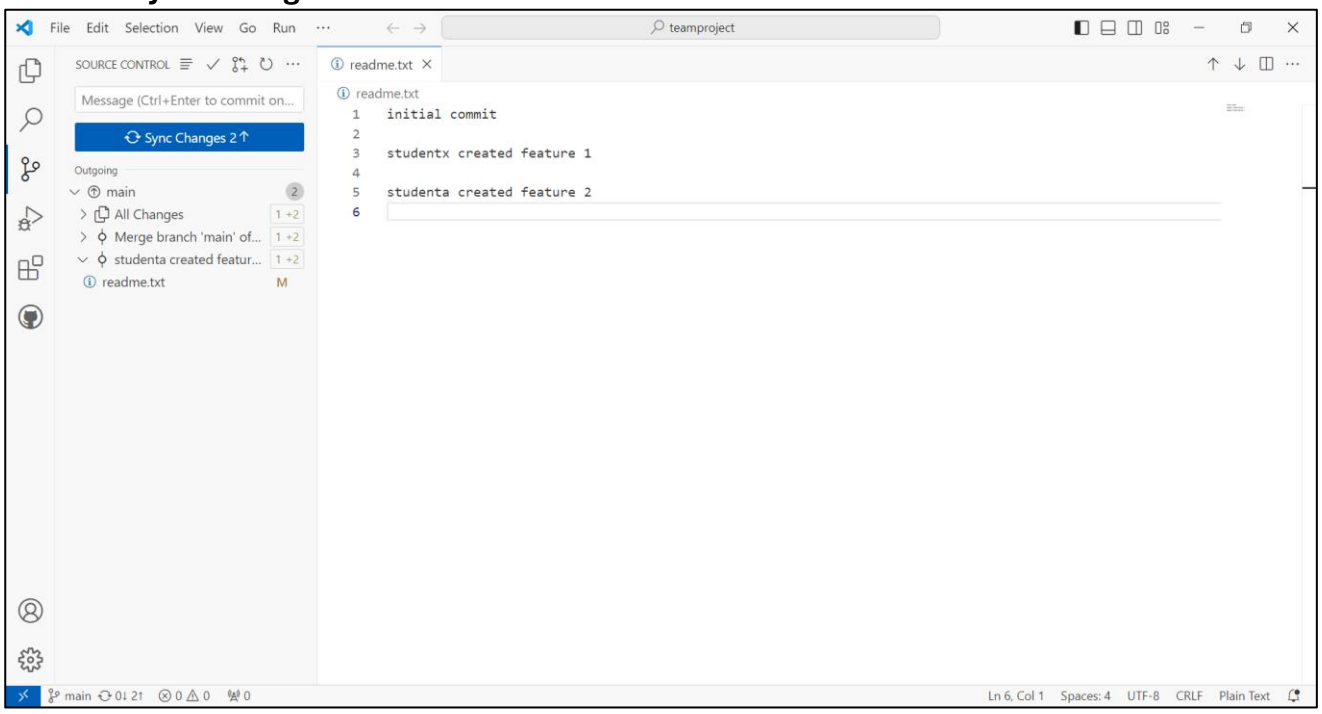
A 51. Check that the resultant `readme.txt` looks as shown below then click **Complete Merge**



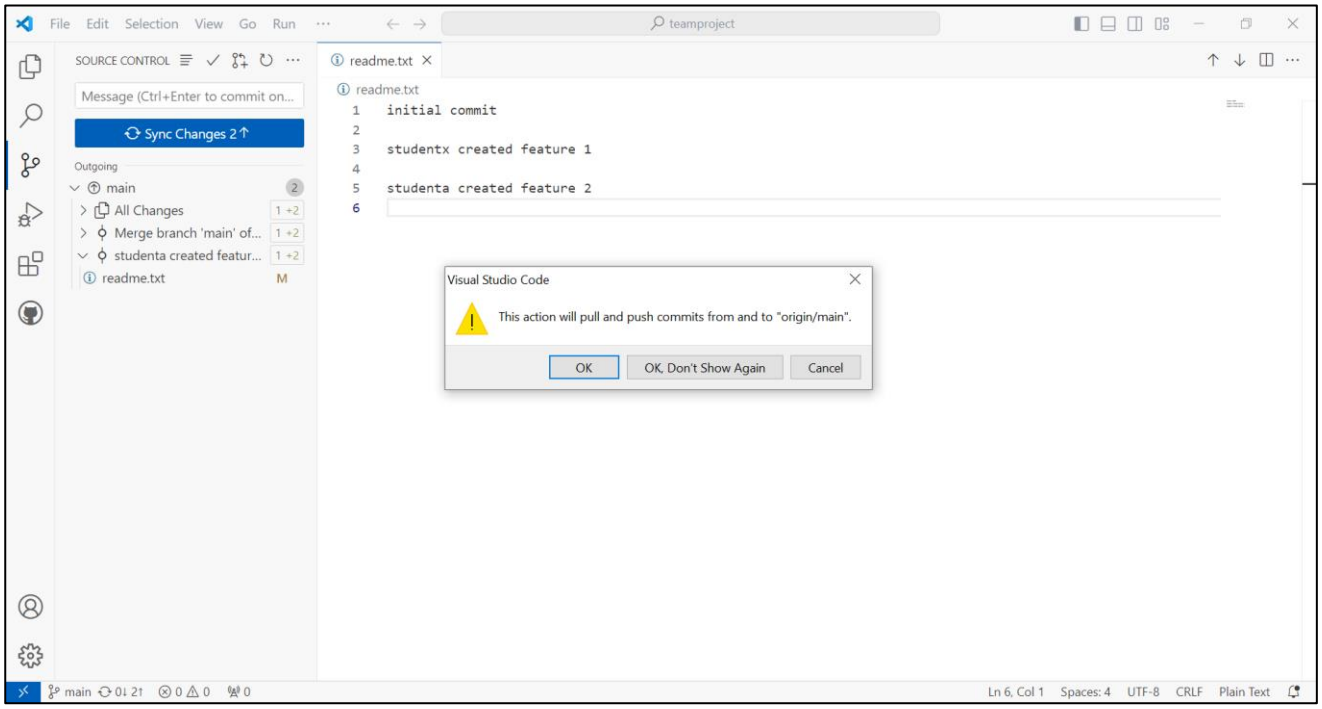

A 52. Click **Commit**



A 53. Click **Sync Changes**




A 54. Click **OK**



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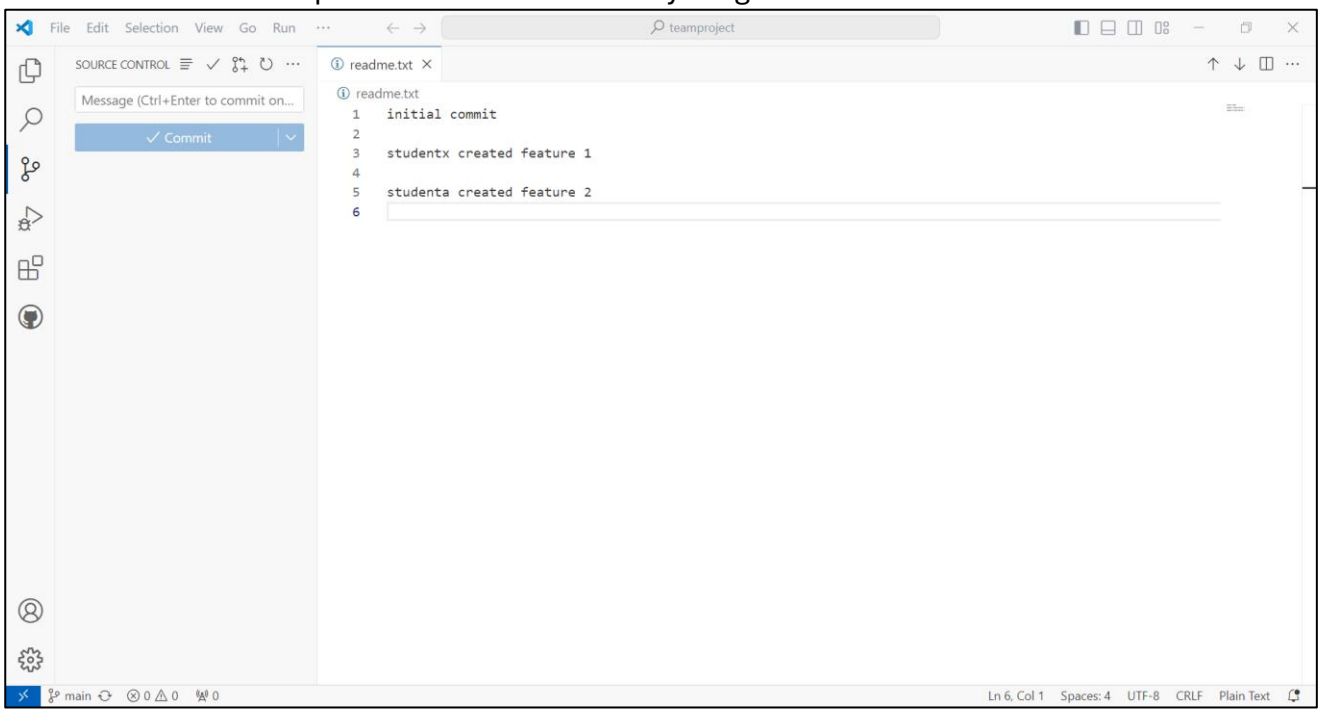
55. The source control panel should not show anything of note

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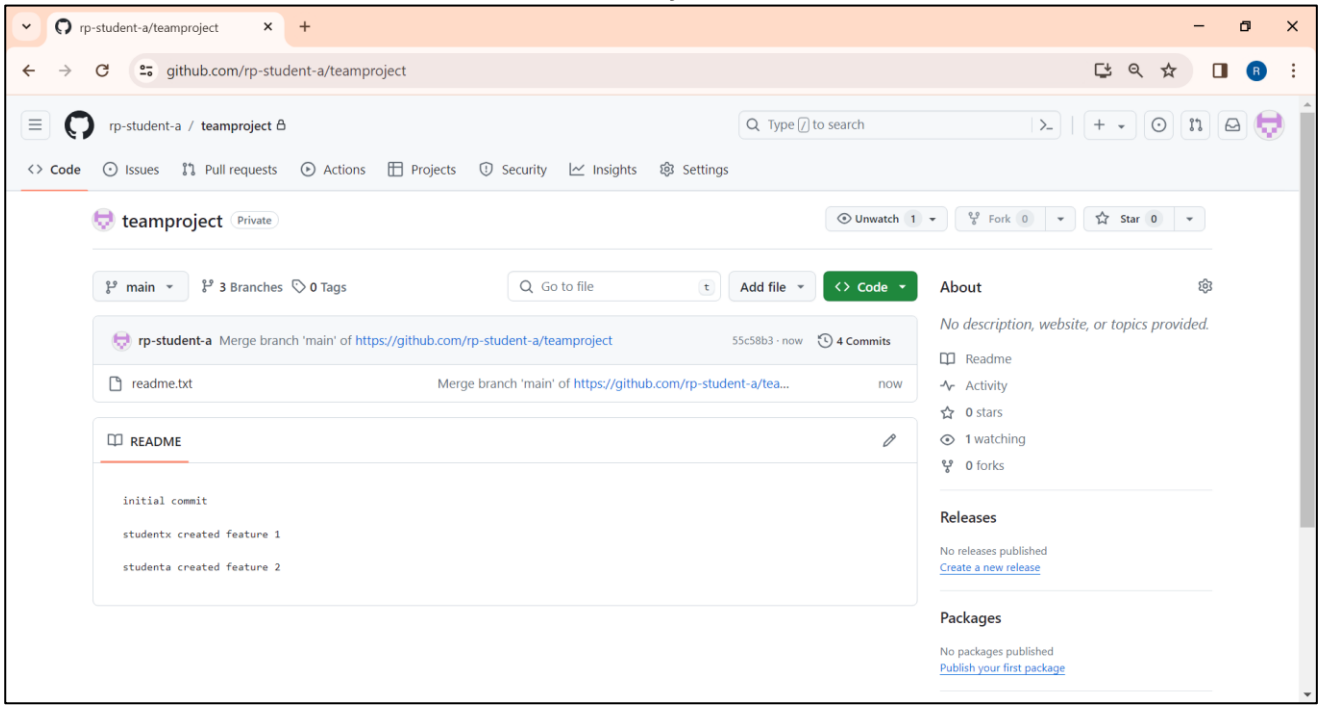
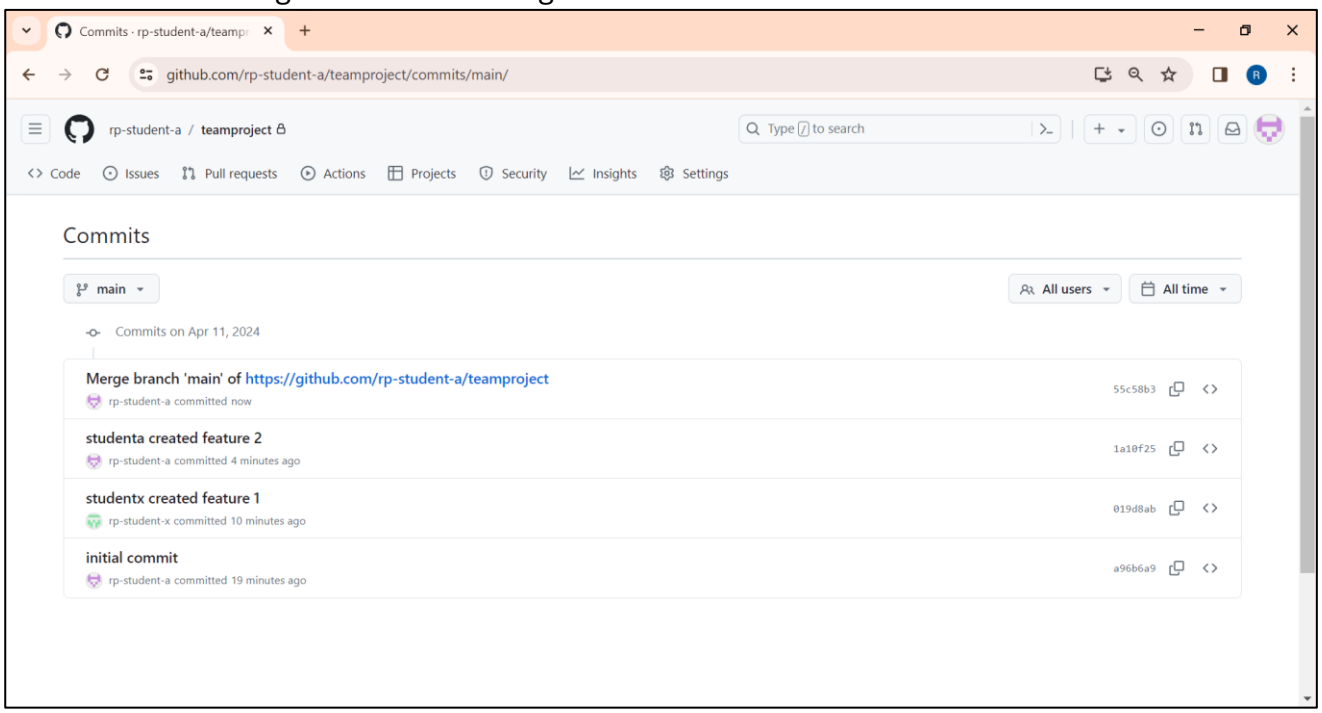
56. Check the project in GitHub in a web browser
Click on **4 Commits** to see the commit history

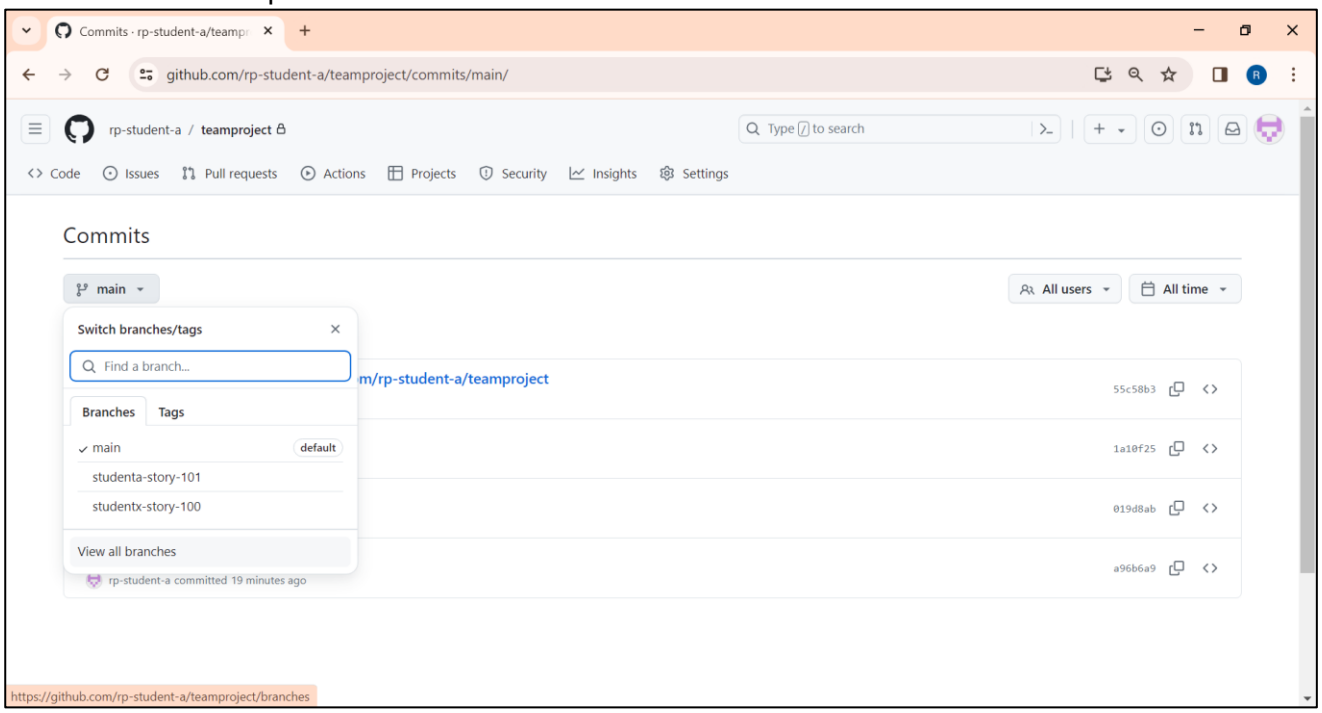


A 57. Check the project in GitHub in a web browser

The commit messages are shown here and describe the reason for the commit, hence the need for meaningful commit message




A 58. Click on the dropdown next to main to see all the branches. Click **View all branches**



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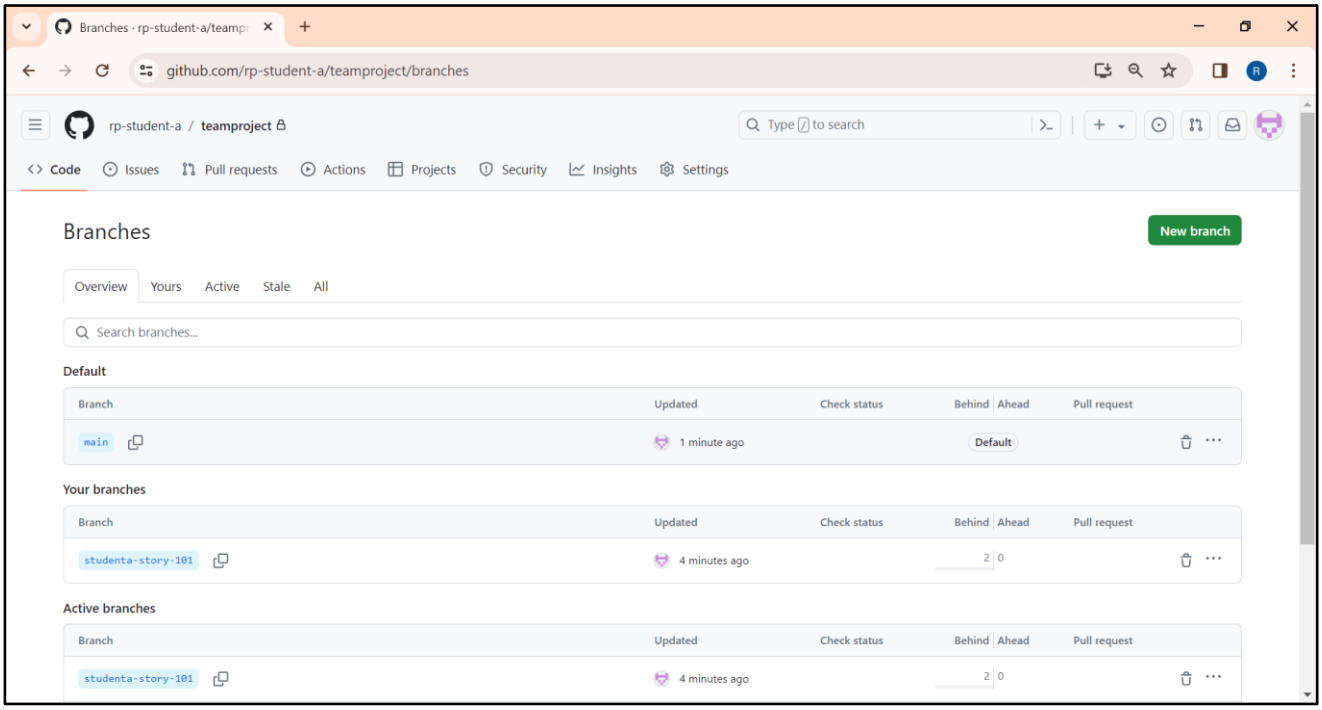
59. On this page, you can see the branches for this repository. A best practice once the code from a branch has been committed to main is to delete the branch. The commit history for that branch would still exists in the main branch.




**End of exercise**