# SE-Assignment-4

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Task:
GitHub and Visual Studio Instructions: Answer the following questions based on your understanding of GitHub and Visual Studio. Provide detailed explanations and examples where appropriate.

### Questions:

**Introduction to GitHub**:
What is GitHub and what are its main functions and features? Explain how you support collaborative software development.

**Solution:**
GitHub is a platform where you can store, share and work together with other users to write code.

Main functions and features:

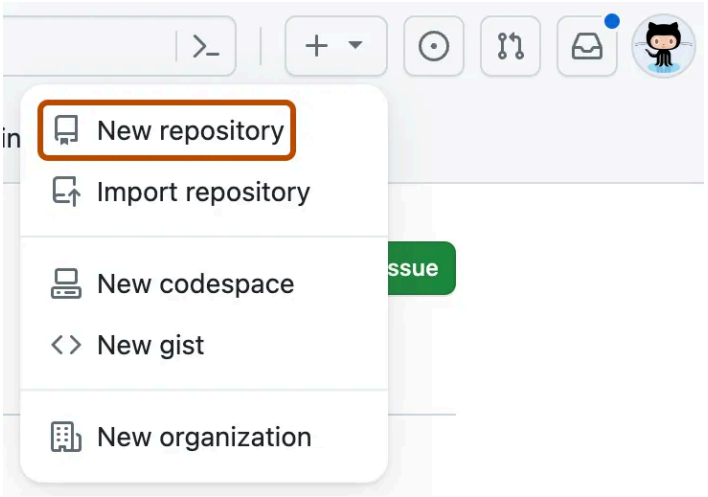
- **Version control**: GitHub uses Git to allow tracking of source code changes over time
- **Repositories**- These are containers for your code and other related files. Projects on GitHub are organized into repositories that can be; public (accessible to anyone) or private (only accessible to specific people).
- **Collaboration**: GitHub makes it easy to collaborate on projects. Users can clone repositories, make changes, and then push them.
- **Branches**: Branches allow developers to work on different features or bug fixes independently. You can create a branch for a new feature, work on it, and then merge it into the main branch once it's complete and reviewed.
- **Actions**: GitHub Actions is a continuous integration and continuous deployment (CI/CD) tool that allows you to automate tasks such as testing, builds, and deployments.
- **GitHub Pages**: This feature allows you to host static websites directly from a GitHub repository. It is useful for creating documentation, blogs or personal websites.
- **A week**: Each repository can have its own wiki, which is a space for additional documentation. This is useful for maintaining manuals, guides and other relevant information related to the project.
- **Security**: GitHub offers various security tools such as dependency scanning, vulnerability alerts, and security policies to protect code and data.

- **Integrations**- GitHub integrates with a wide variety of third-party tools and services, allowing developers to customize their workflow and improve productivity

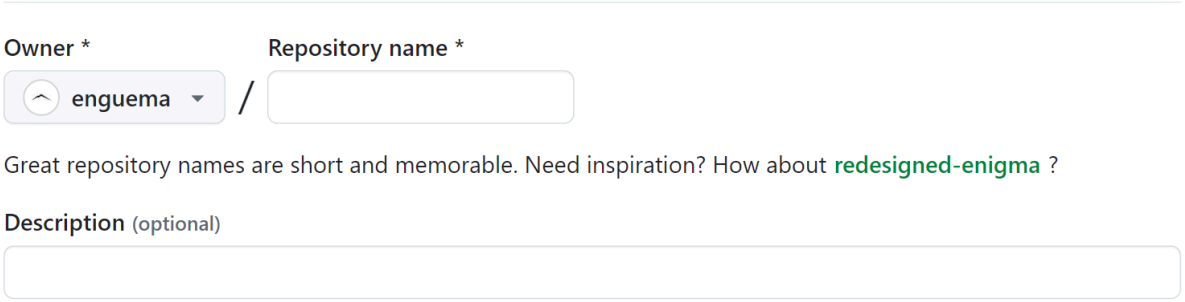
**Repositories on GitHub:**
What is a GitHub repository? Describe how to create a new repository and the essential elements that should be included in it.

**Solution:**
A repository is the most basic element of GitHub. It is a place where you can store the code, files, and revision history of each file. Repositories can have multiple collaborators and can be public or private.
Below we show the process of creating a repository:

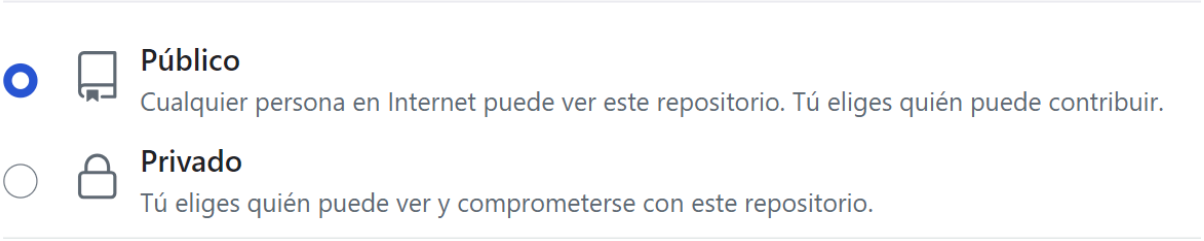
1. In the top right corner of any page, select and then click New Repository.



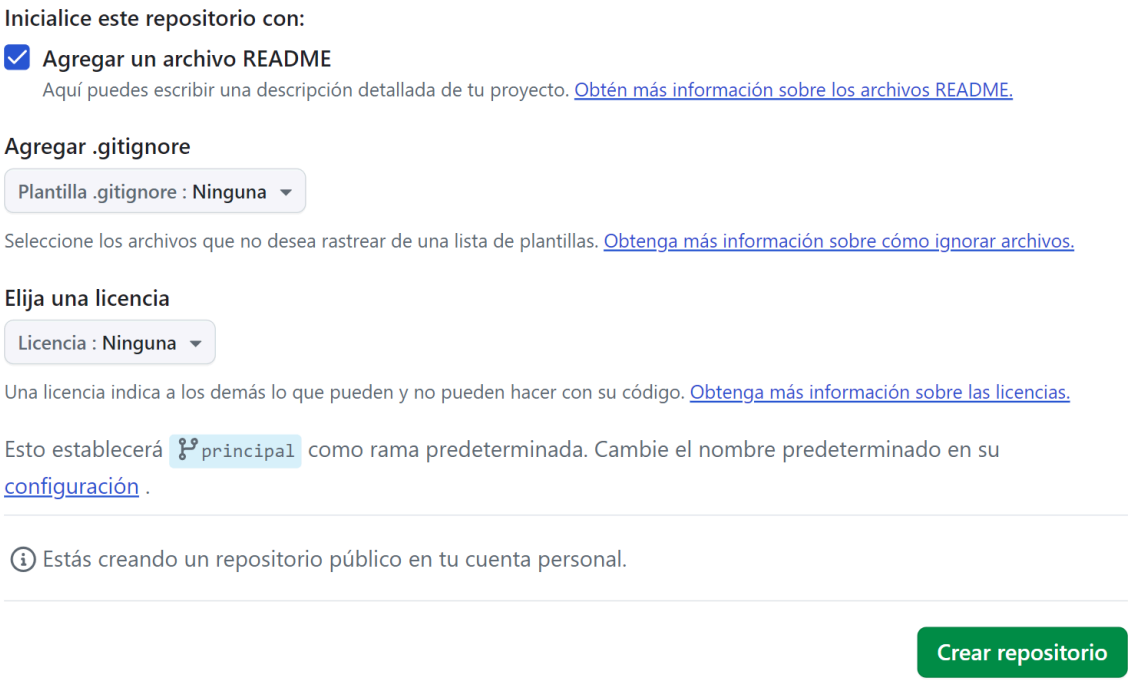

2. Enter a short, easy-to-remember name for the repository.




3. Optionally, you can add a description of the repository. For example, "My first GitHub repository."
4. Choose the visibility of the repository.




5. Select Initialize this repository with a README. And finally click on create repository.




As for the essential elements that must be included when creating a repository, we have:

- **README.md**- Provide clear and useful information about the repository so that users and collaborators can understand and use it effectively.
- **License**- Defines the terms under which your code may be used, modified, and distributed.
- **.gitignore:** Tells Git which files and directories to ignore when a commit is made.

**Version control with Git:**
Explain the concept of version control in the context of Git. How does GitHub improve version control for developers?

**Solution:**
Version control is a system that records changes made to a file or set of files over time so that you can recover specific versions later. And, we can talk about three models of version control system; local, centralized and distributed.

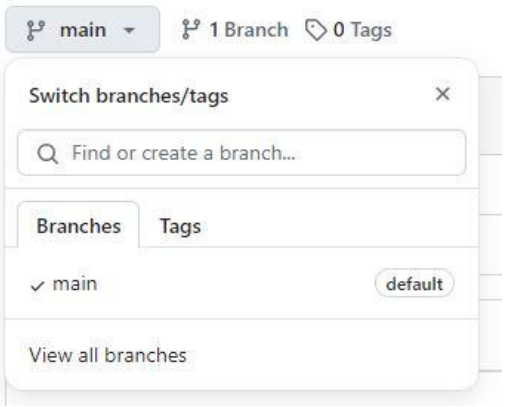
GitHub improves version control through a series of features and tools (described in the first question) that make source code management more efficient, collaborative, and organized.

**Branching and merging on GitHub:**
What are branches in GitHub and why are they important? Describes the process of creating a branch, making changes, and merging it back into the master branch.
**Solution:**
The ramifications They are central to collaboration on GitHub.
The ramifications are important for the following aspects:

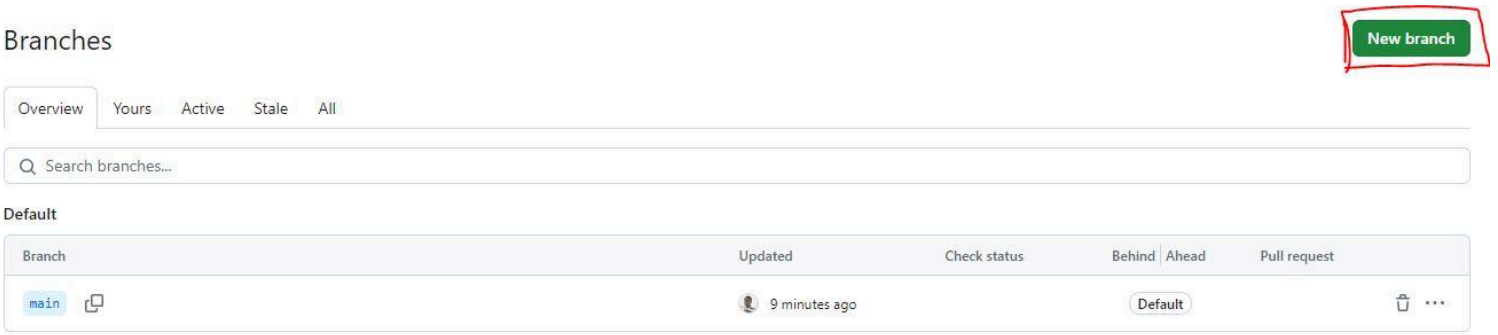
- Parallel development: allows multiple teams to work on different functionalities at the same time without interfering with each other.
- Experimentation: Allows testing without affecting the main code.
- Organization: Helps keep a large, complex project organized by breaking work into smaller, more manageable branches.

**Branch creation process:**

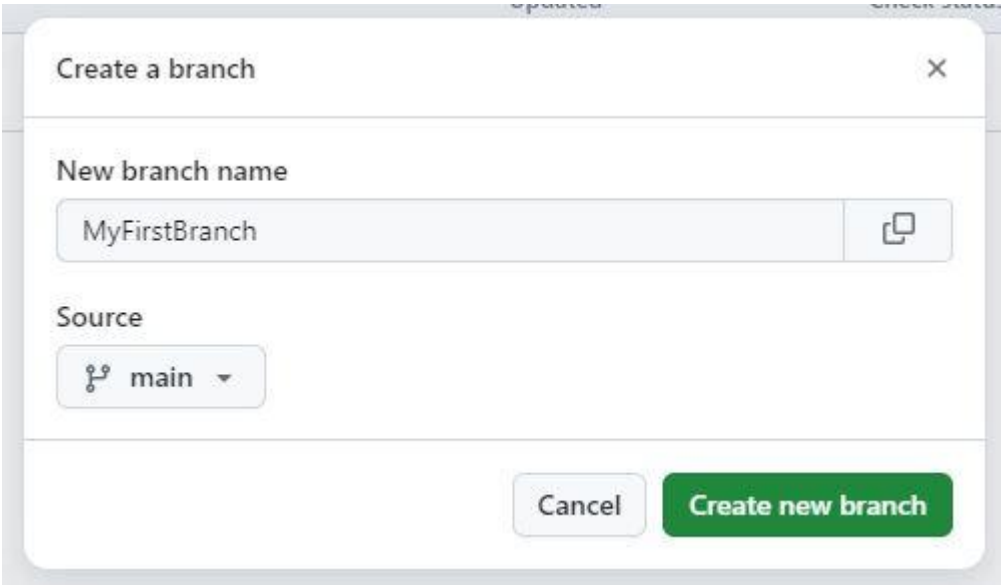
1. We go to the repository.
2. In the file tree view on the left, select the branches drop-down menu, then click view all branches.

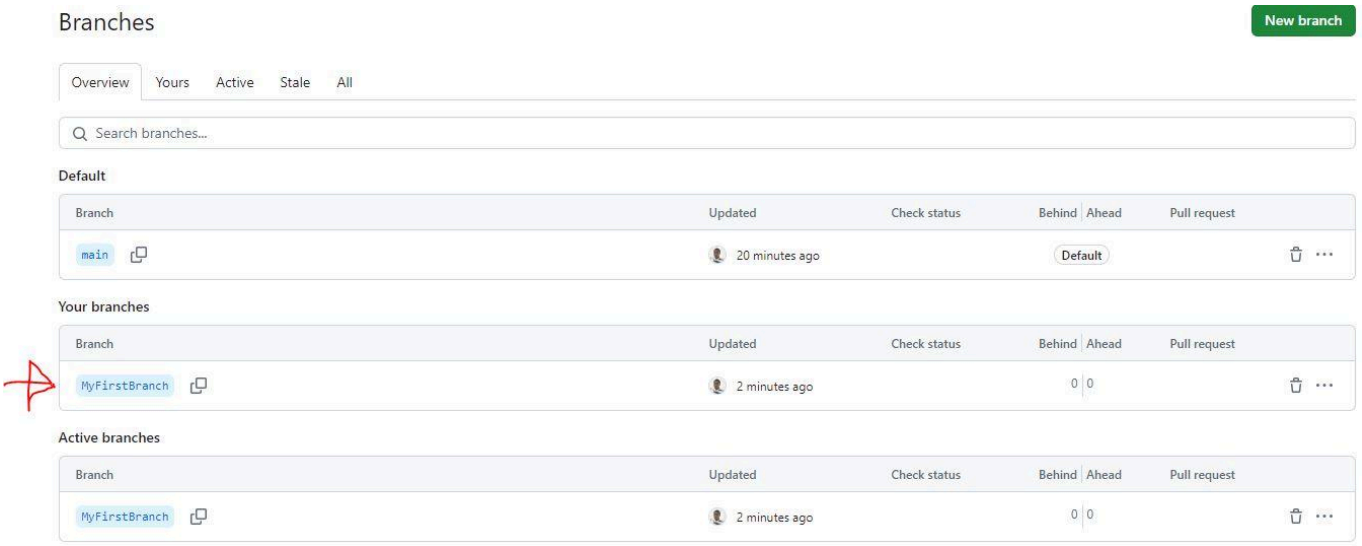



3. Click new branch.




4. We write a name for the new branch and click create new branch.



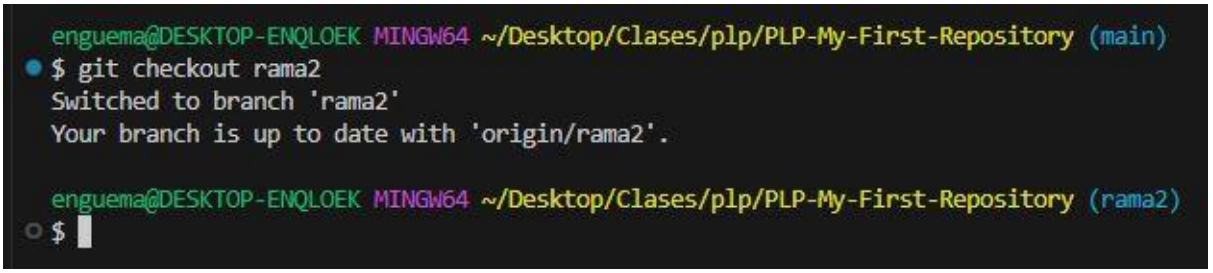




From the CLI it would be:

***git branch rama2:*** With this command we create a new branch named “branch2”.

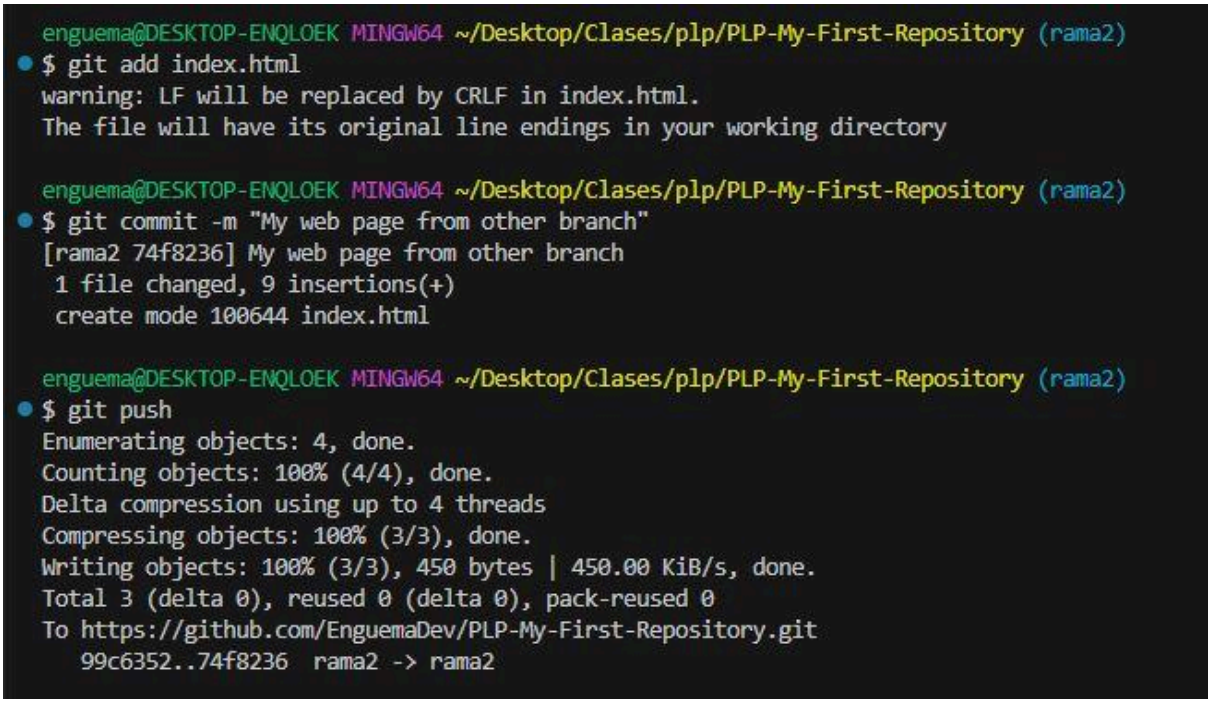
**Making changes to the created branch and merging it with the main branch:**

1. To make changes to the new branch we must first access it as follows:




2. The change I am going to make is to add an “index.html” file


3. Next we add the file, commit and finally upload the changes.

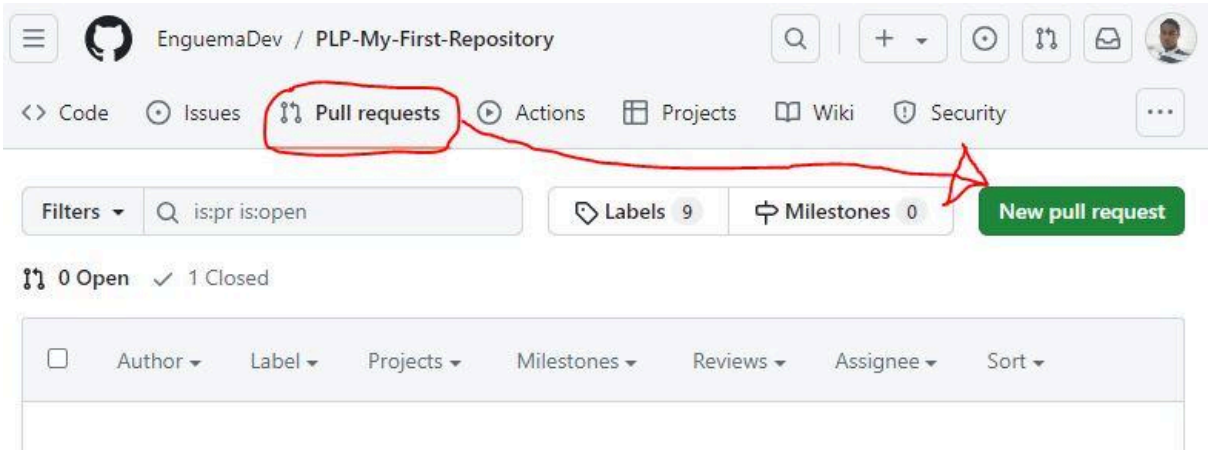



For fusion:
First we move to the main branch and then merge “branch2” with it.

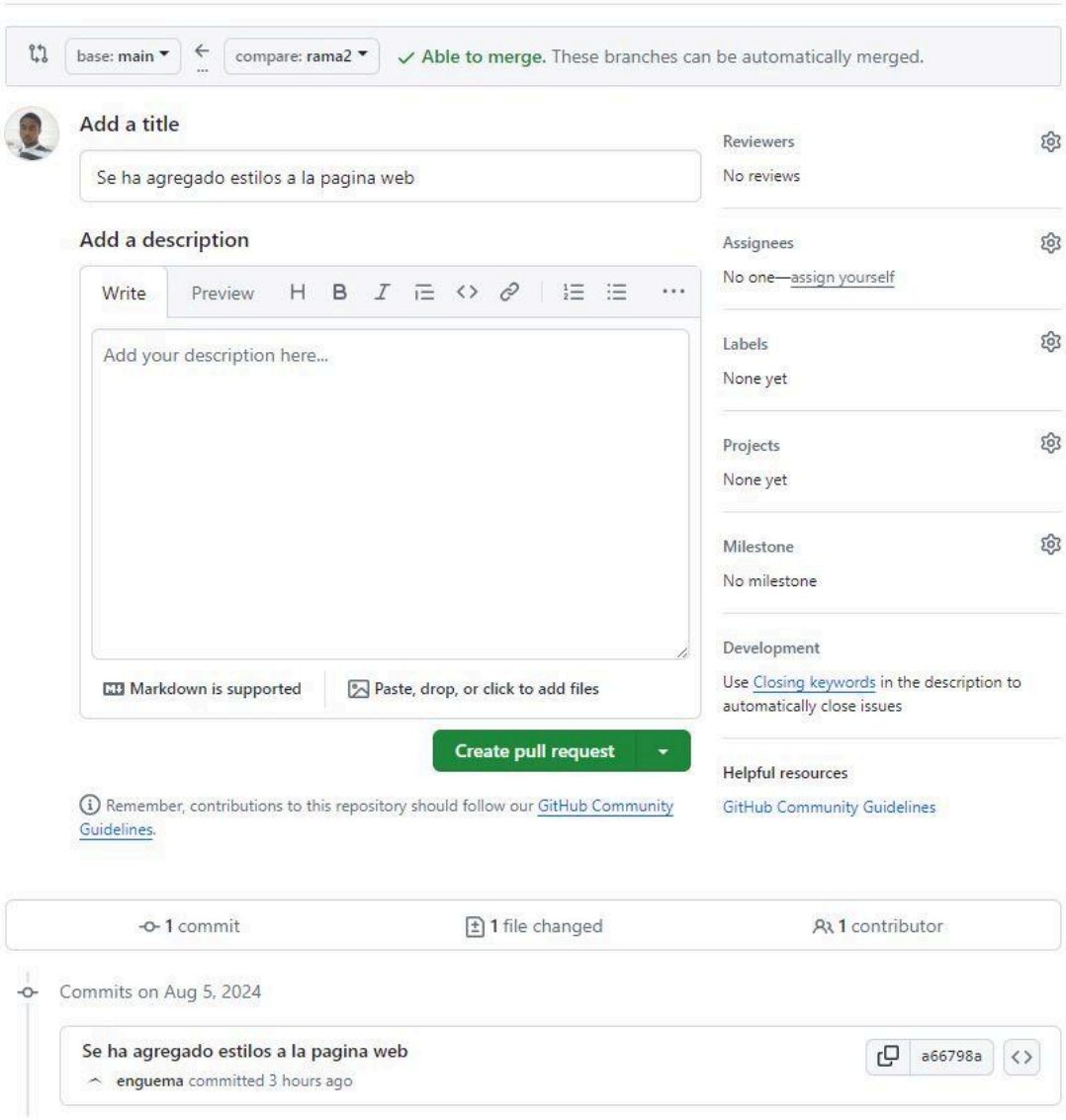
```
enguema@DESKTOP-ENQLOEK MINGW64 ~/Desktop/Clases/plp/PLP-My-First-Repository (rama2)
$ git checkout main
Switched to branch 'main'
<html>
Your branch is up to date with 'origin/main'.

enguema@DESKTOP-ENQLOEK MINGW64 ~/Desktop/Clases/plp/PLP-My-First-Repository (main)
$ git merge rama2
Updating 99c6352..74f8236
Fast-forward
 index.html | 9 +++++++++
 1 file changed, 9 insertions(+)
 create mode 100644 index.html
```

**Pull Requests and Code Reviews:**
What is a pull request on GitHub and how does it facilitate code review and collaboration? Describes the steps to create and review a pull request.
**Solution:**
A pull request on GitHub is a proposal to merge a set of changes from one branch to another. In a pull request, collaborators can review and discuss the set of proposed changes before integrating the changes into the main code base.

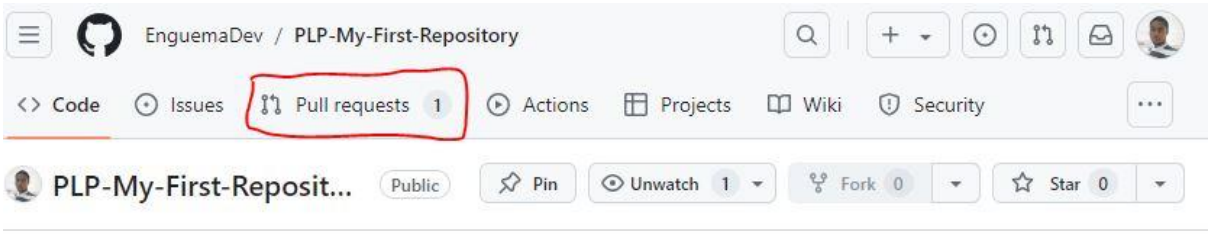
Steps to create:
From our repository we go to the pull requests tab and create a new request “New pull request”



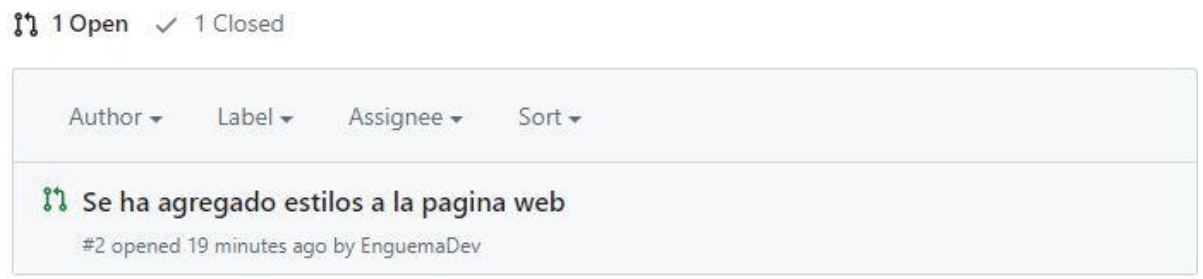

We add a title and a description. Then we click on “create pull request”



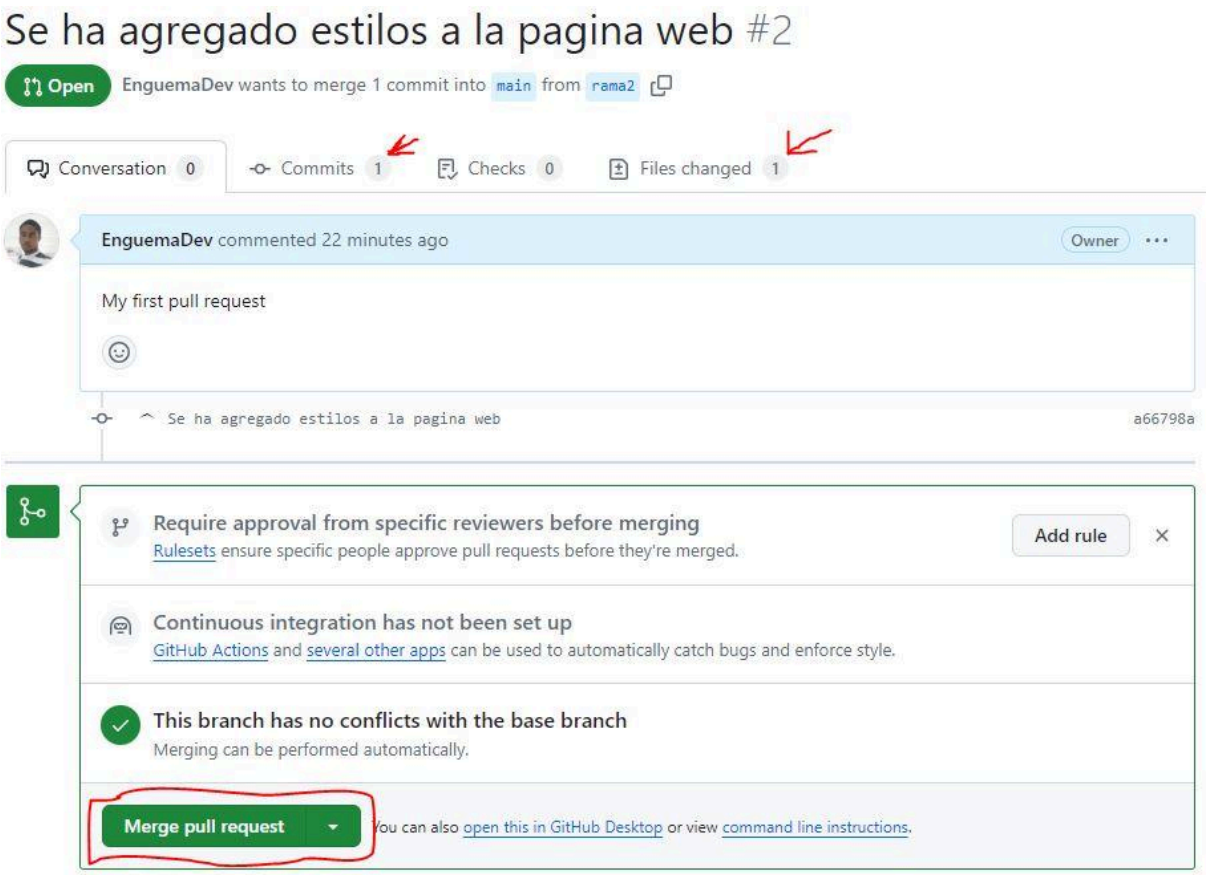

Review of a join request:
From the “pull request” tab we can see the number of available requests.




To review the incorporation requests, we go to the tab indicated above where all the requests made to the main branch will be shown.




Where we select the only request made.



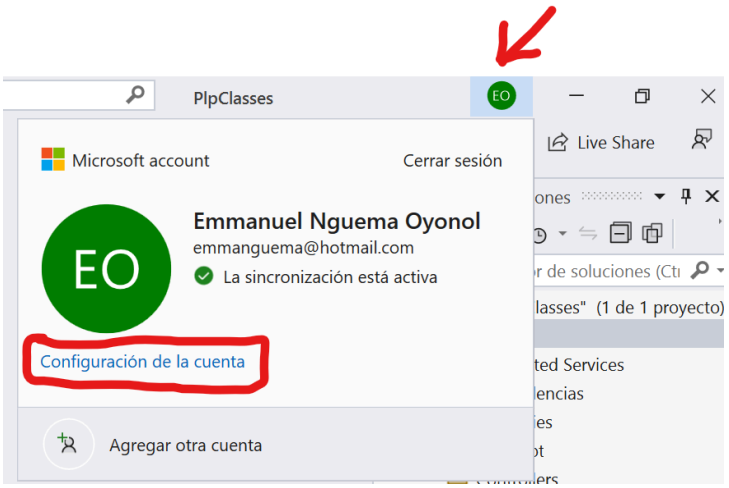

**GitHub Actions:**
Explain what GitHub Actions are and how they can be used to automate workflows. Provide an example of a simple CI/CD pipeline using GitHub Actions.
**Solution:**
GitHub Actions is a continuous integration and deployment (CI/DC) platform that allows you to automate your build, test, and deployment roadmap.
In GitHub Action you can configure workflows so that they are triggered when an event occurs in the repository or manually, these workflows are defined using a YAML file that is verified in your repository.

Example of a simple CI/CD pipeline using GitHub Action:

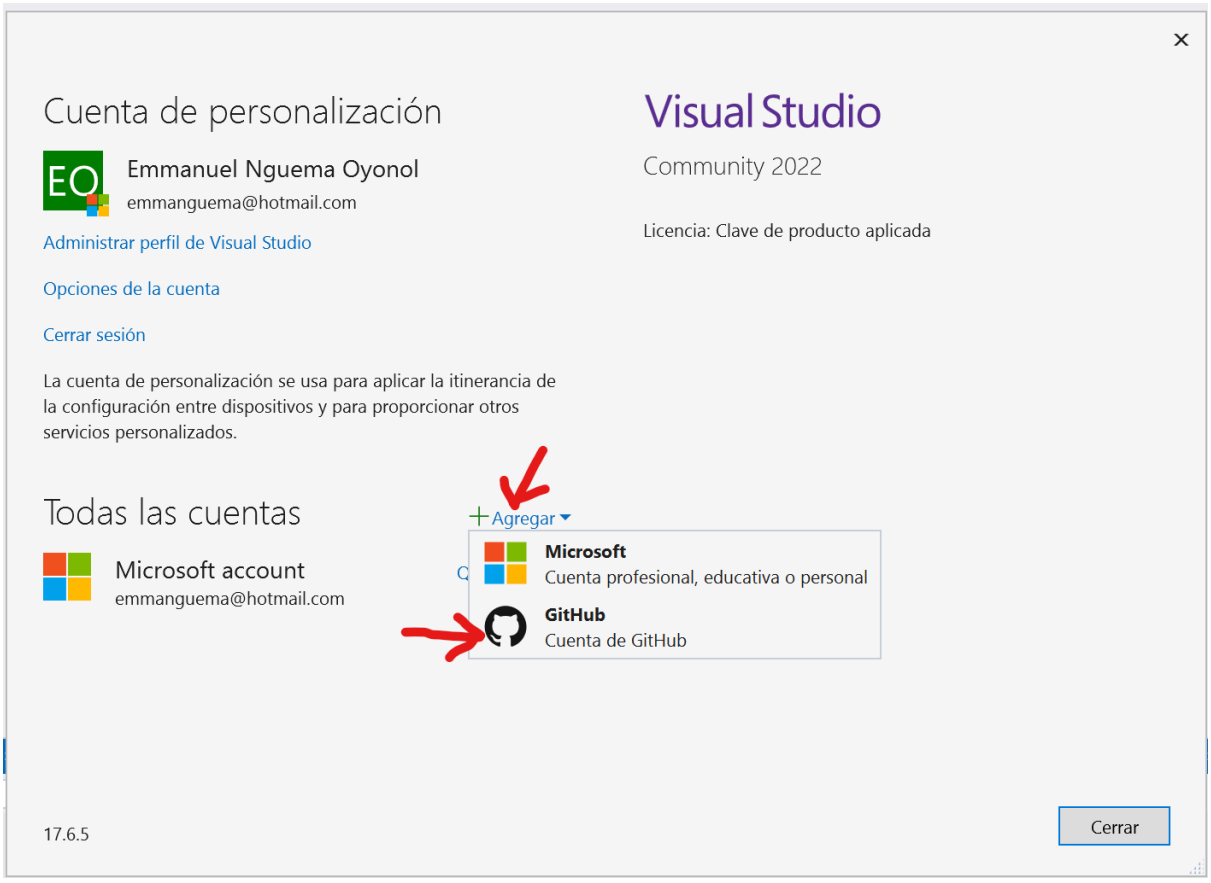
**Introduction to Visual Studio:**
What is Visual Studio and what are its key features? How is it different from Visual Studio Code?
**Solution:**
Visual Studio is a complete integrated development environment (IDE) that can be used to write, edit, debug, and compile code; It is an effective development tool that allows you to complete the entire development cycle in one place.
The main difference between vs code and visual studio is that; vs code is a code editor while Visual Studio is an integrated development environment (IDE).

**By integrating GitHub with Visual Studio:**
Describe the steps to integrate a GitHub repository with Visual Studio. How does this integration improve your development workflow?
**Solution**:
To integrate a GitHub repository to Visual Studio we simply must link our GitHub account to Visual Studio as I show you below:

1. With Visual Studio open, we go to:




The “account settings” option takes us to the next screen where we will add our GitHub account. To do this, if it is the first time, we will be redirected to GitHub to authenticate. After successful authentication our account will be added.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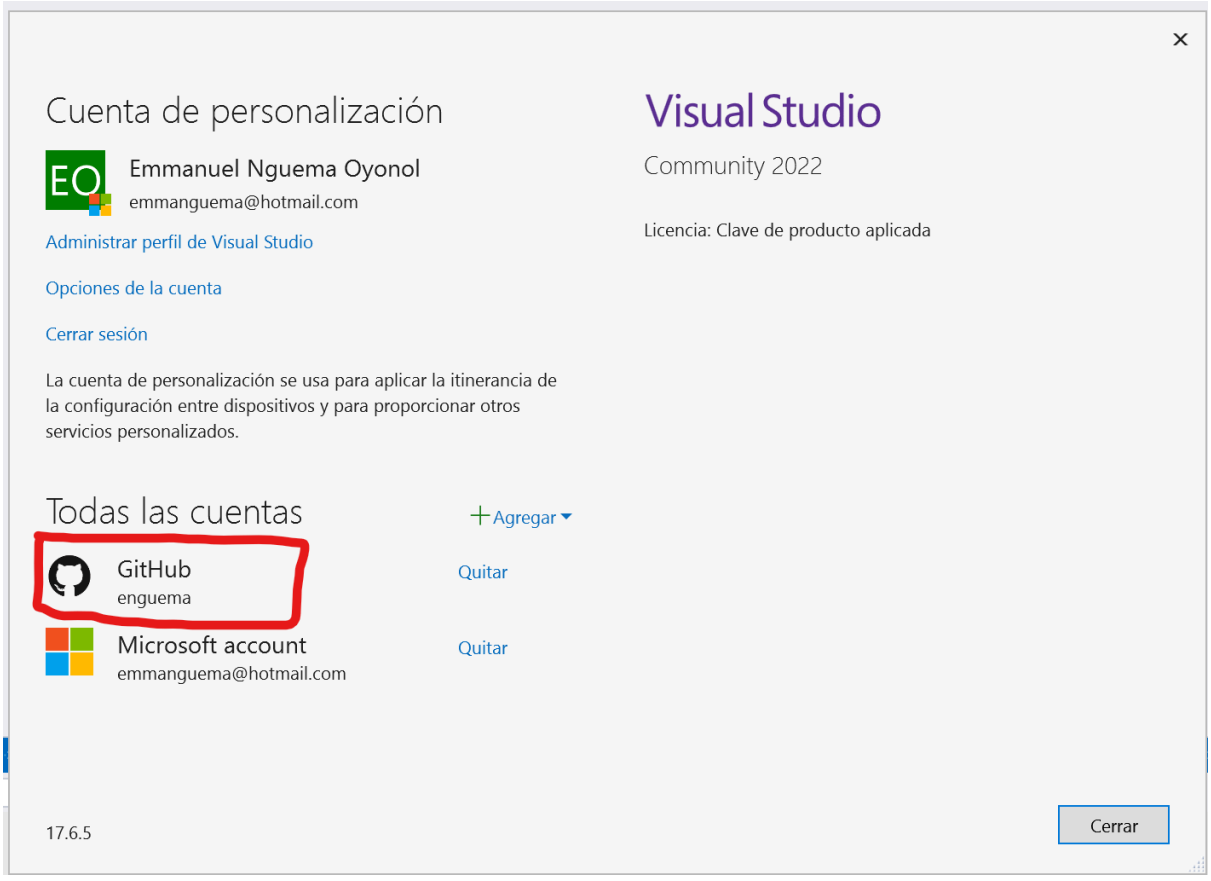
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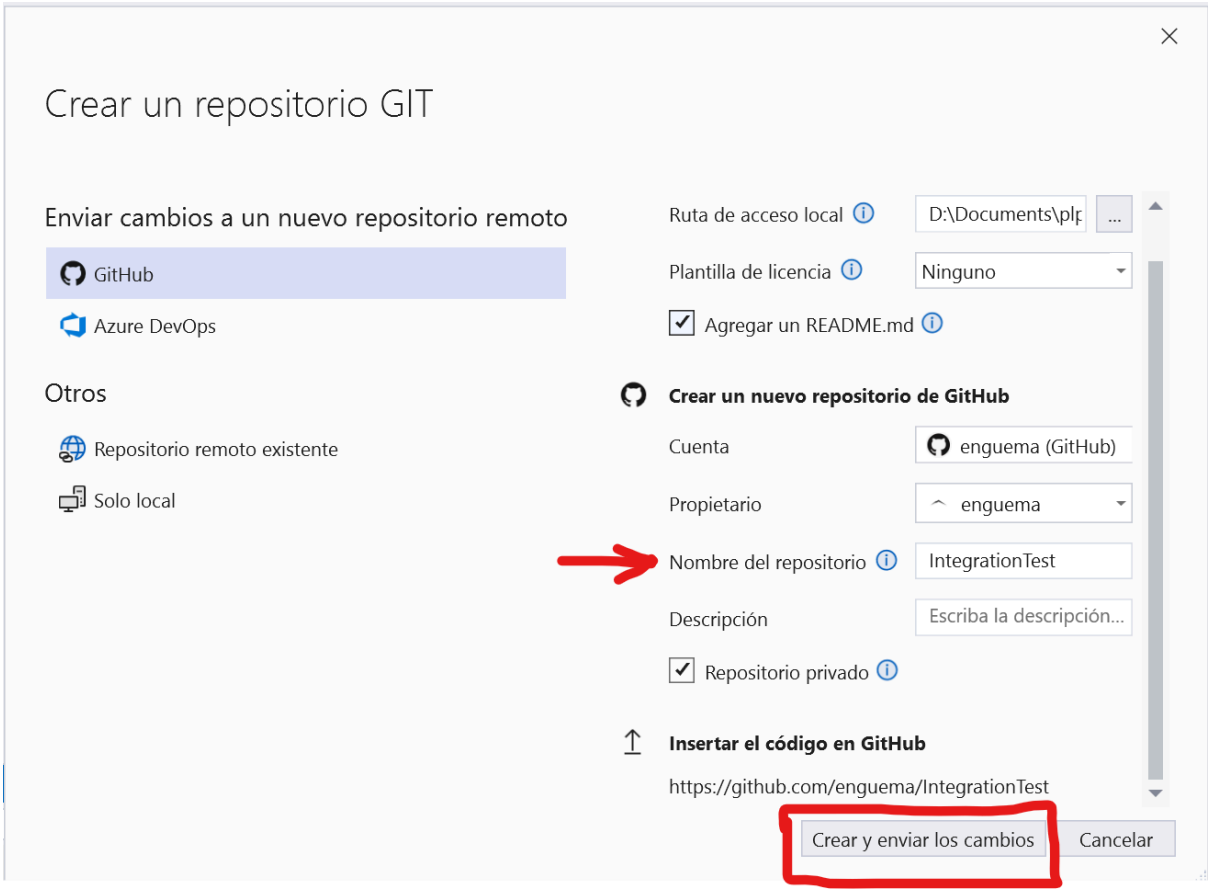
After linking our GitHub account to Visual Studio we can now integrate our repository that we are going to create next.




This integration helps in efficiency because all operations regarding the repository can now be done from Visual Studio without having to go to another external tool.

**Debugging in Visual Studio:**
Explain the debugging tools available in Visual Studio. How can developers use these tools to identify and fix problems in their code?
**Solution:**
Among the main debugging tools in Visual Studio are:

- Breakpoints.
- Execution window
- Local variables window: Displays the current value of the variables in the current scope.
- Call stack window

## sources used:


*https://docs.github.com/es*
*https://git-scm.com/book/en/v2*
*https://visualstudio.microsoft.com/es/vs/github/*