HOW-TO:
GIT & GITHUB

Linguagens de Programação II – 2021/2022

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HOW-TO: GIT & GITHUB

Introduction

Why use Git?

- *The most-used Version Control System in the world*
- *As a project evolves, teams contribute with new code*
- *Any code version can be recovered at any given time*
- *Developers can review the project´s history to determine:*
  - *Which changes were made?*
  - *Who made the changes?*
  - *When were the changes made?*
  - *Why were changes needed?*

HOW-TO: GIT & GITHUB

Introduction

What makes Git so relevant?

- *A Version Control System, for accurate tracking of development history*
- *Composed by repositories, collections of project´s files and directories*
- *These repositories can either be set as public or private*
- *Working in repositories keeps projects organized and protected*

HOW-TO: GIT & GITHUB

Introduction

What is GitHub?

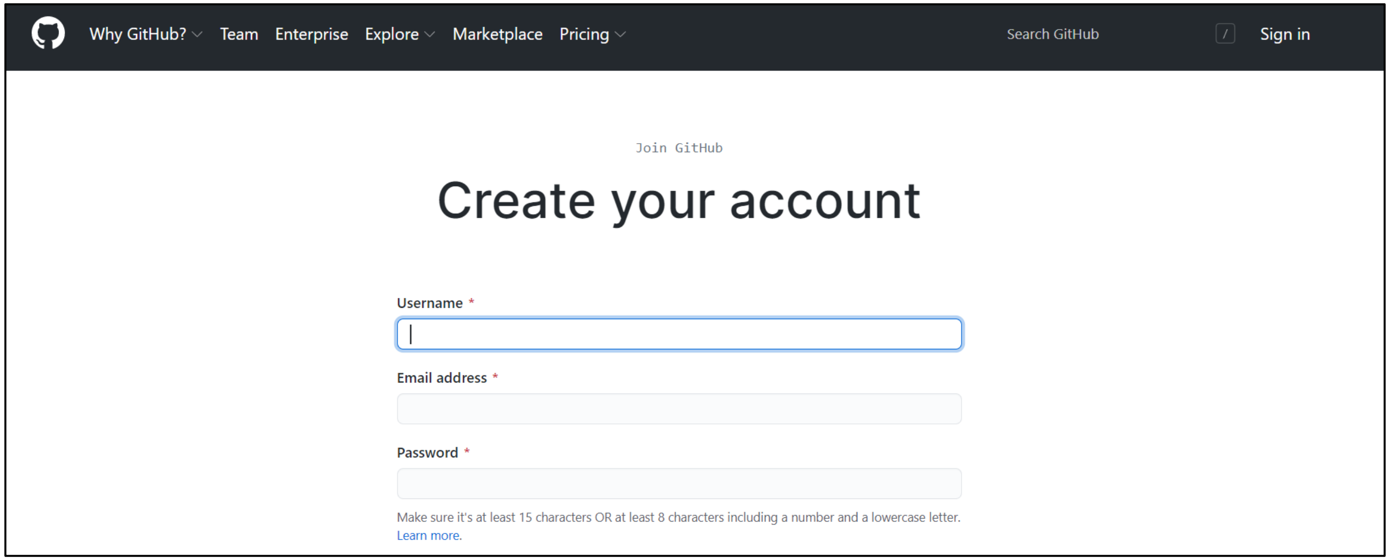
- *A ready-to-use, free code hosting platform for developers*
- *Applicable to Version Control Systems and active collaboration*
- *Simple integration with available development environments*
- *It lets you and others work together, on projects, from anywhere!*

HOW TO SETUP GIT & GITHUB

HOW-TO: GIT & GITHUB

Registration

- Register a new, free user account at GitHub.com



Join GitHub

Create your account

Username *

Email address *

Password *

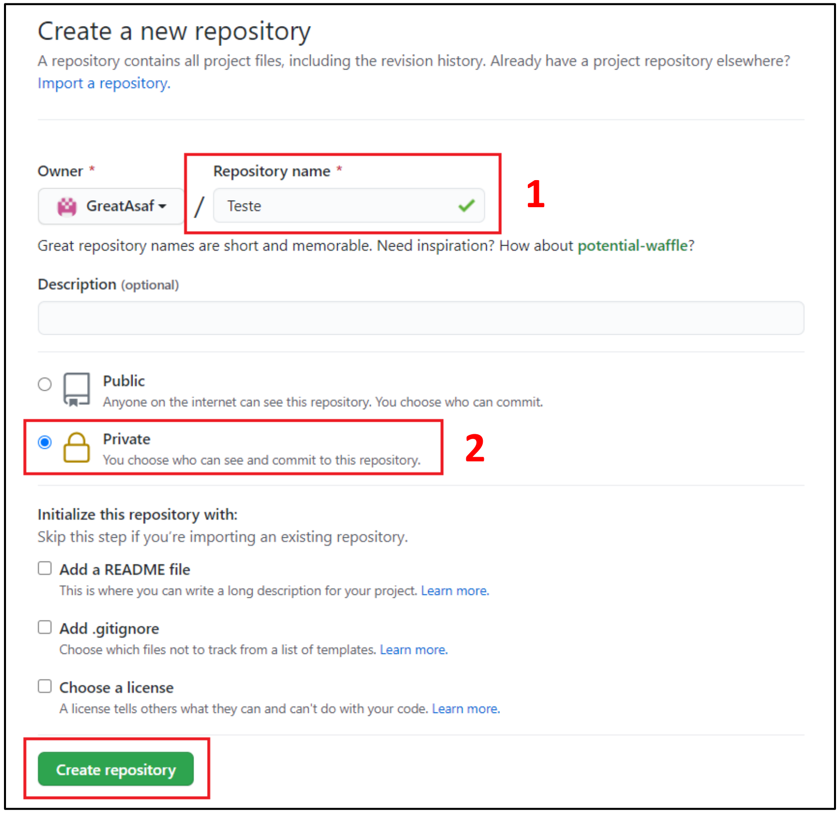
Make sure it's at least 15 characters OR at least 8 characters including a number and a lowercase letter. Learn more.

HOW-TO: GIT & GITHUB

Repository Management

- To create a new repository in GitHub, insert these details:

    1. **Project Name**
    2. **Privacy of Repository**



Create a new repository

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

Owner * GreatAsaf ▾ / Repository name * Teste ✓

1

Great repository names are short and memorable. Need inspiration? How about potential-waffle?

Description (optional)

○ **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.

2

Initialize this repository with:
Skip this step if you're importing an existing repository.

□ **Add a README file**
This is where you can write a long description for your project. Learn more.

□ **Add .gitignore**
Choose which files not to track from a list of templates. Learn more.

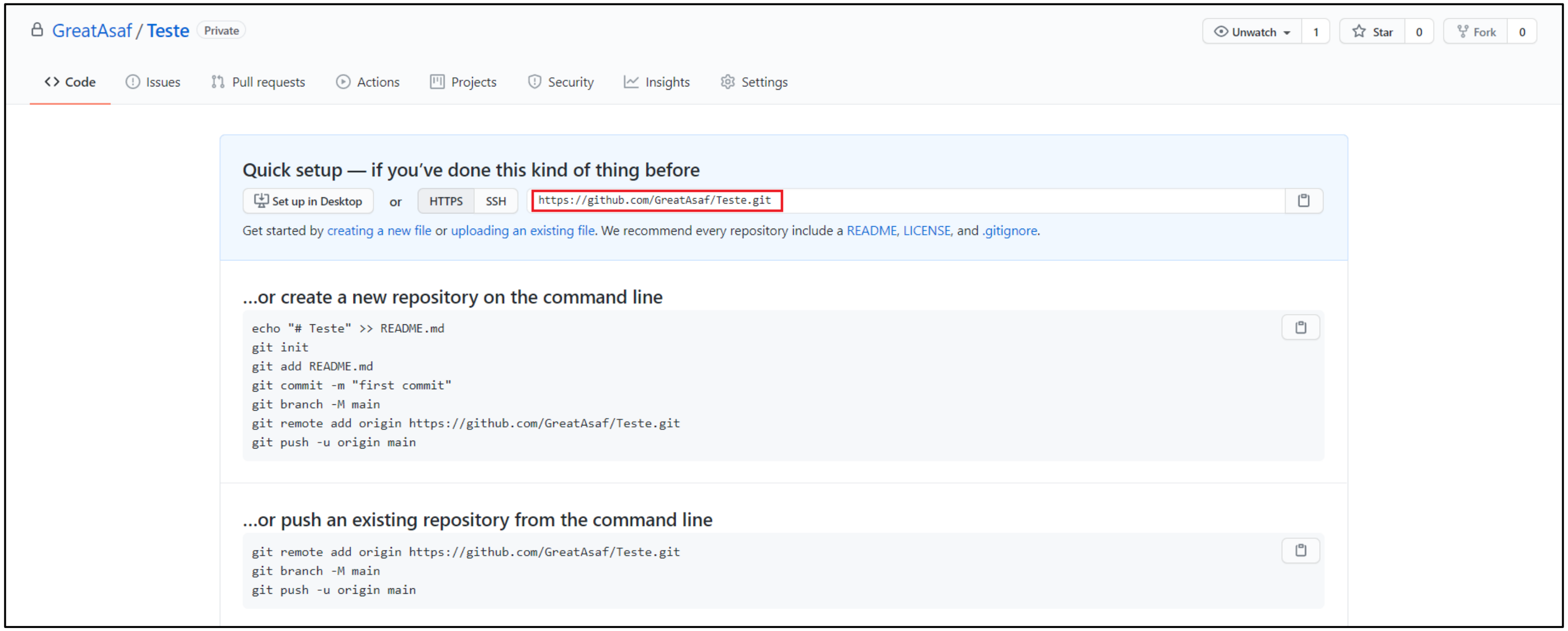
□ **Choose a license**
A license tells others what they can and can't do with your code. Learn more.

HOW-TO: GIT & GITHUB

Repository Management

- Your new repository is created on the highlighted URL

  - **Don´t forget to share the URL with your teachers and project colleagues!**



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

```
https://github.com/GreatAsaf/Teste.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 "# Teste" >> README.md
git init
git add README.md
git commit -m "first commit"
git branch -M main
git remote add origin https://github.com/GreatAsaf/Teste.git
git push -u origin main
```

…or push an existing repository from the command line

```
git remote add origin https://github.com/GreatAsaf/Teste.git
git branch -M main
git push -u origin main
```

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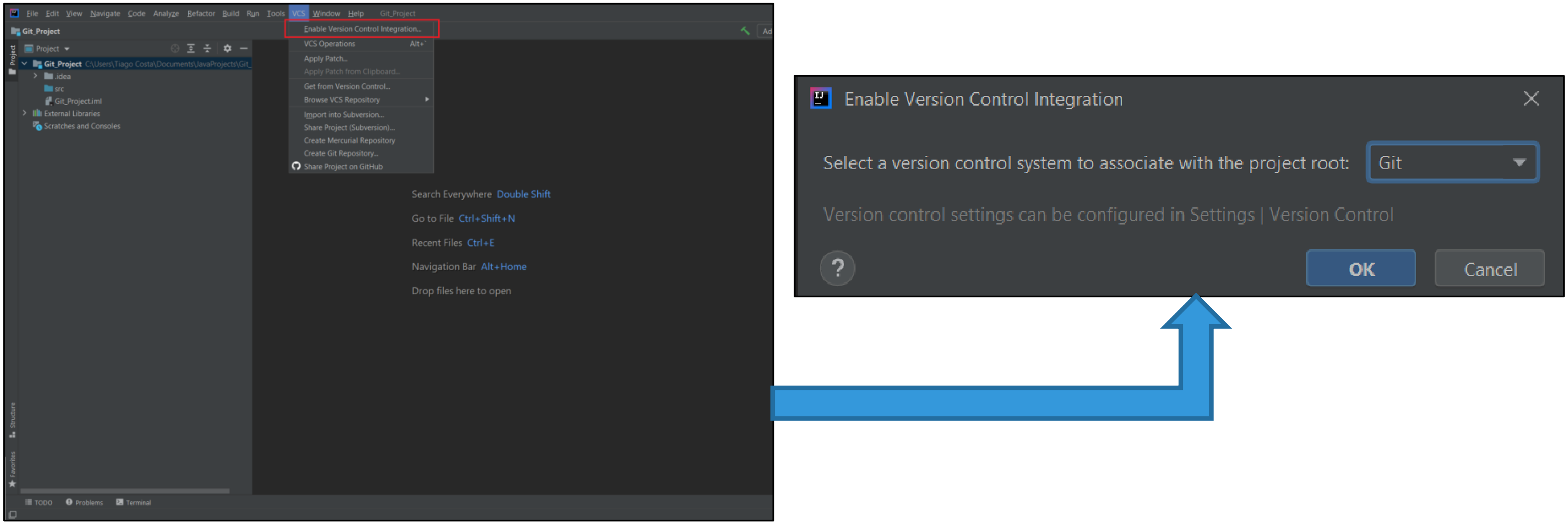
IntelliJ Repository Setup

- Enable Git in your project, through Version Control Integration


File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help Git_Project
Git_Project
Project
Git_Project C:\Users\Tiago Costa\Documents\JavaProjects\Git_
.idea
src
Git_Project.iml
External Libraries
Scratches and Consoles
Enable Version Control Integration...
VCS Operations Alt+`
Apply Patch...
Apply Patch from Clipboard...
Get from Version Control...
Browse VCS Repository
Import into Subversion...
Share Project (Subversion)...
Create Mercurial Repository
Create Git Repository...
Share Project on GitHub
Search Everywhere Double Shift
Go to File Ctrl+Shift+N
Recent Files Ctrl+E
Navigation Bar Alt+Home
Drop files here to open
TODO
Problems
Terminal

Enable Version Control Integration

Select a version control system to associate with the project root: Git

Version control settings can be configured in Settings | Version Control

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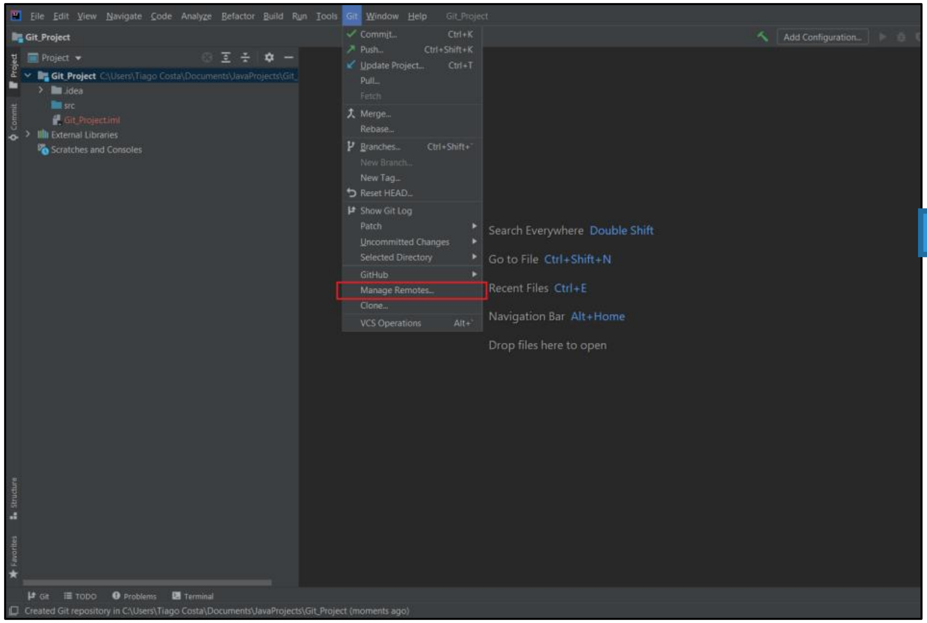
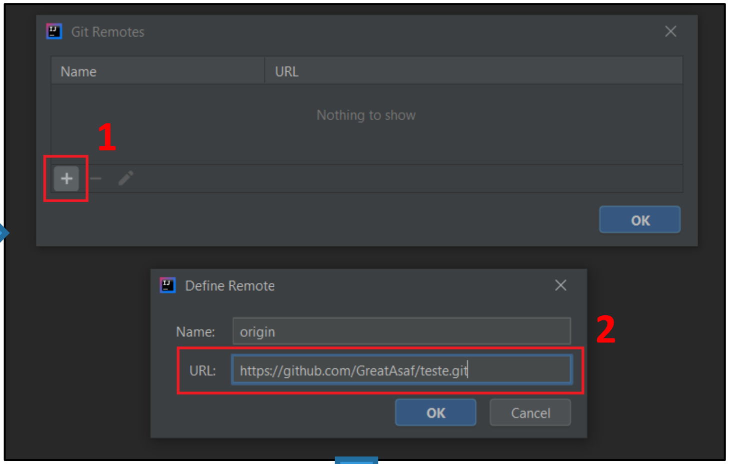
IntelliJ Repository Setup

- To add your repository to the Java project, manage remotes in Git menu



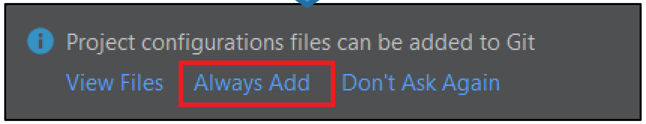
Created Git repository in C:\Users\Tiago Costa\Documents\JavaProjects\Git_Project (moments ago)



Nothing to show

Name: origin

URL: https://github.com/GreatAsaf/teste.git

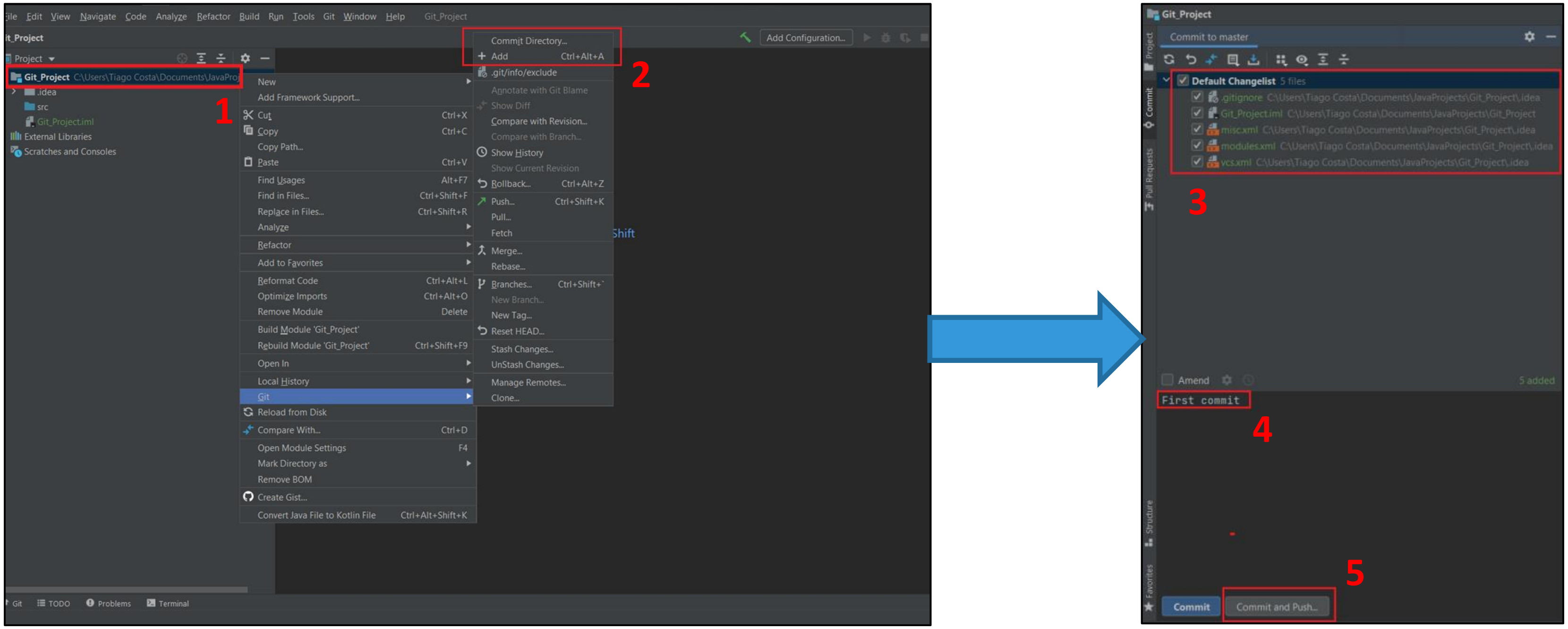

Project configurations files can be added to Git

COMMIT THE FIRST PROJECT UPDATE

HOW-TO: GIT & GITHUB

Your First Project Commit

- To push your first update to the repository, you must:
  - ➢ Add the project directory to Git
  - ➢ Commit the directory (with a explanatory message)



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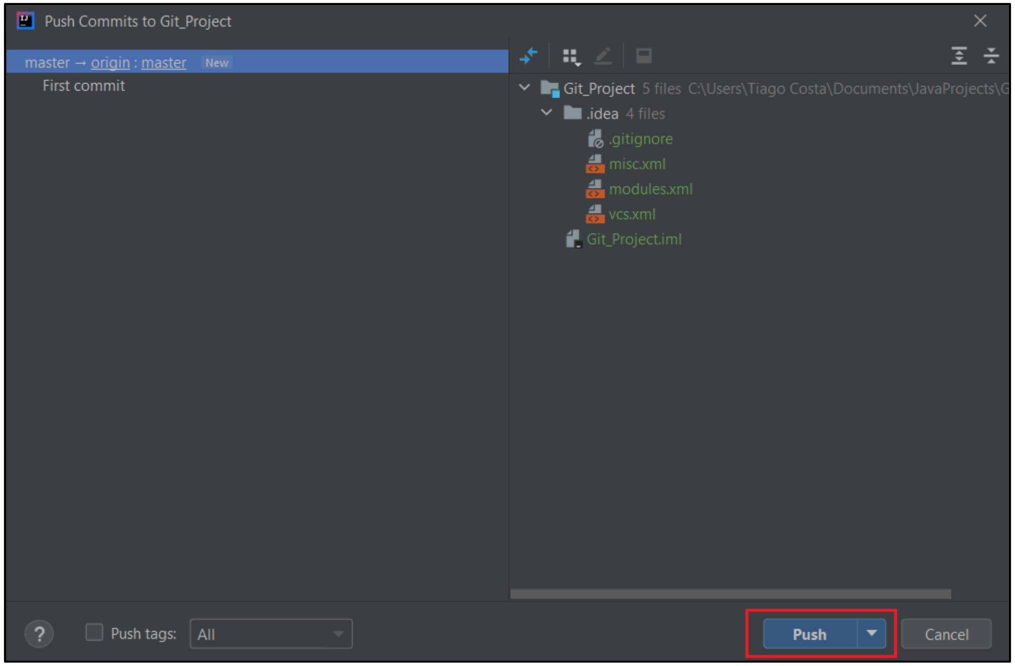
Your First Project Commit

- Finally, **push** the update to your Git repository!



Push Commits to Git_Project

master → origin : master New

First commit

Git_Project 5 files C:\Users\Tiago Costa\Documents\JavaProjects\G

.idea 4 files

.gitignore

misc.xml

modules.xml

vcs.xml

Git_Project.iml

☐ Push tags: All

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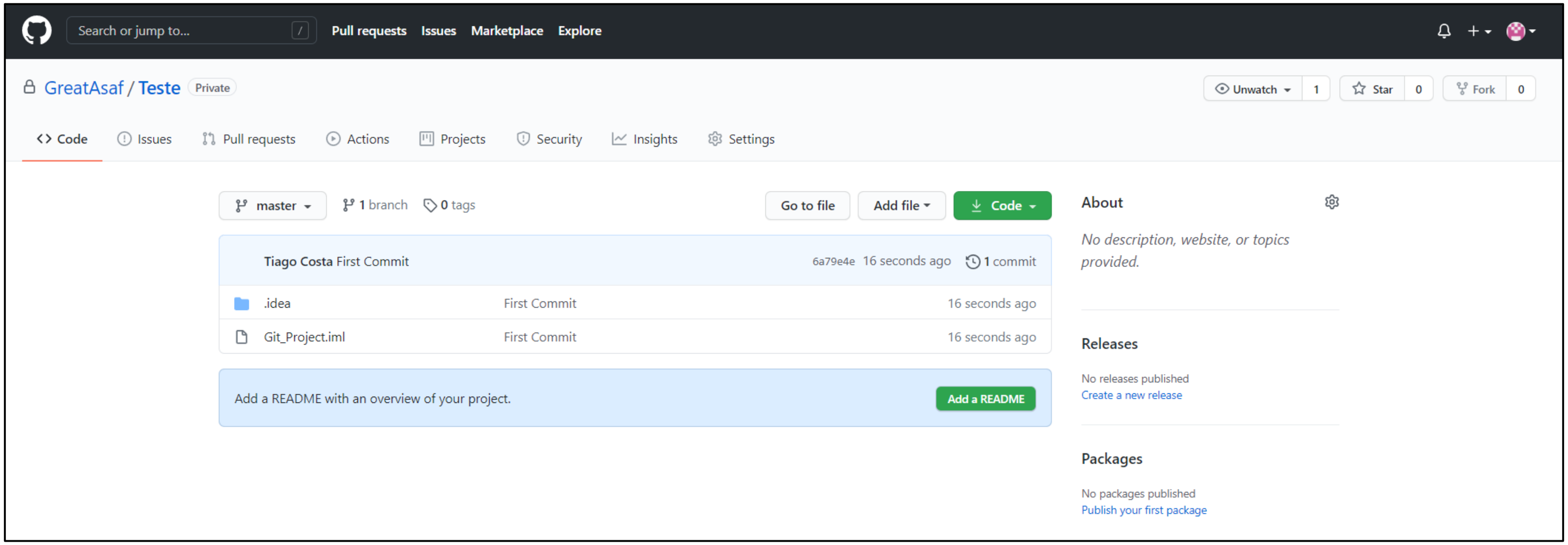
Your First Project Commit

- You have successfully completed your first commit!



Tiago Costa First Commit 6a79e4e 16 seconds ago 1 commit

.idea	First Commit	16 seconds ago
Git_Project.iml	First Commit	16 seconds ago

Add a README with an overview of your project.

About

No description, website, or topics provided.

Releases

No releases published
Create a new release

Packages

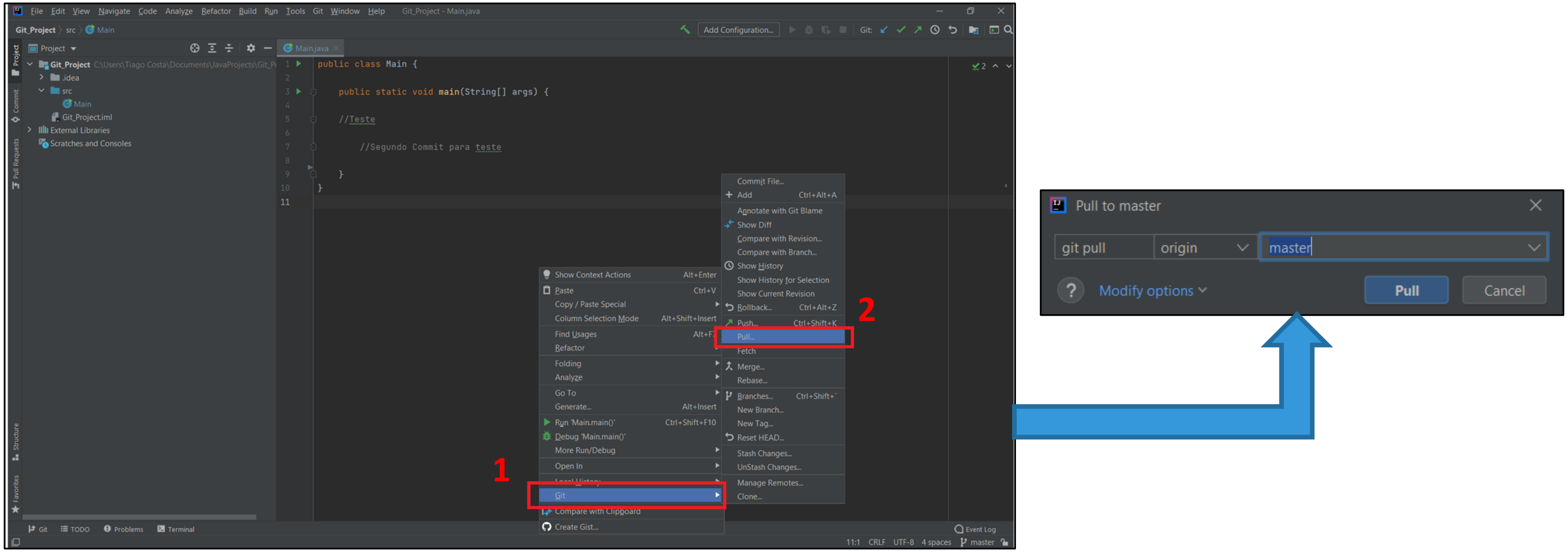
No packages published
Publish your first package

HOW TO PULL A REPOSITORY UPDATE

HOW-TO: GIT & GITHUB

Pulling a Repository Update

- To guarantee that you have the latest code version, pull from Git!



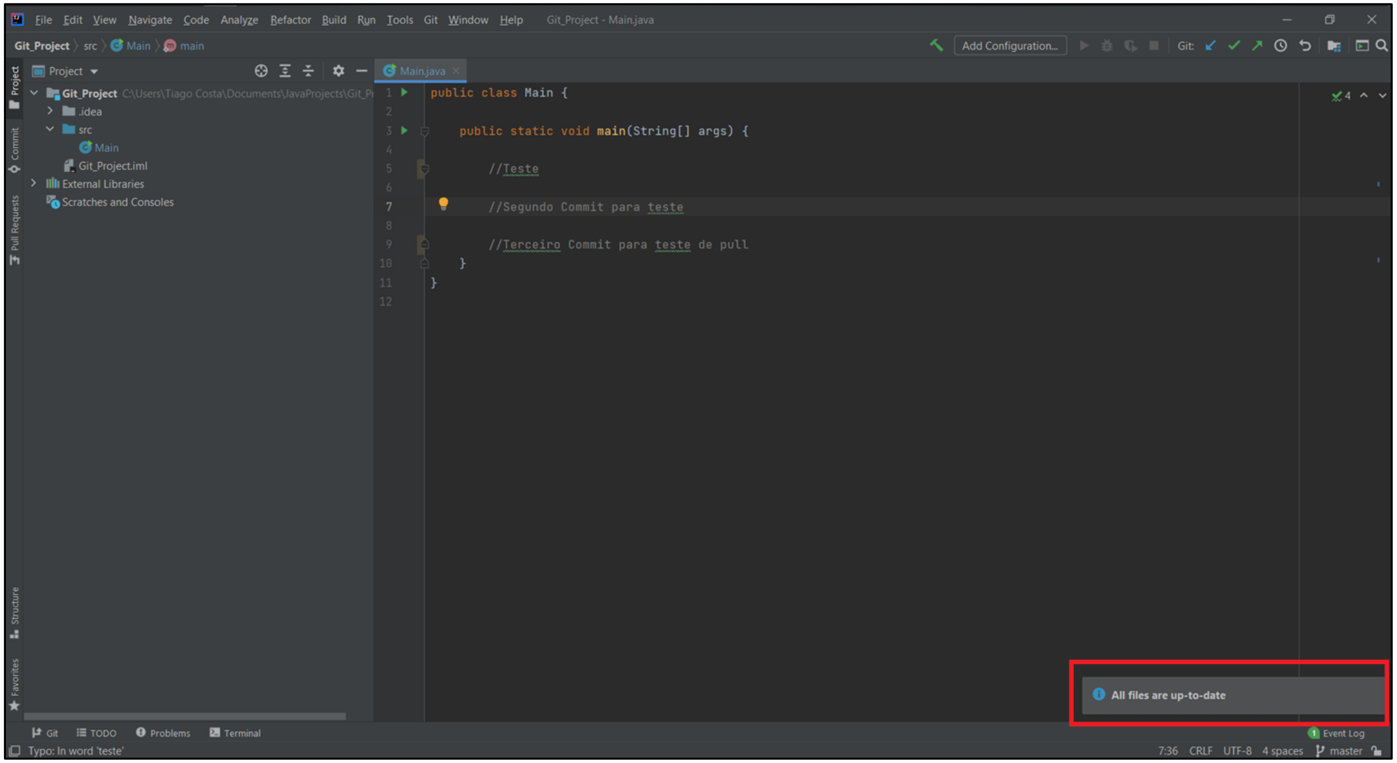
```
public class Main {

    public static void main(String[] args) {

    //Teste

        //Segundo Commit para teste

    }
}
```

git pull | origin | master

HOW-TO: GIT & GITHUB

Pulling a Repository Update

- Before any coding, never forget to update your project!



```java
public class Main {

    public static void main(String[] args) {

        //Teste

        //Segundo Commit para teste

        //Terceiro Commit para teste de pull
    }
}
```

All files are up-to-date

Typo: In word 'teste'

7:36 CRLF UTF-8 4 spaces master

MERGING CONFLICTING CODE

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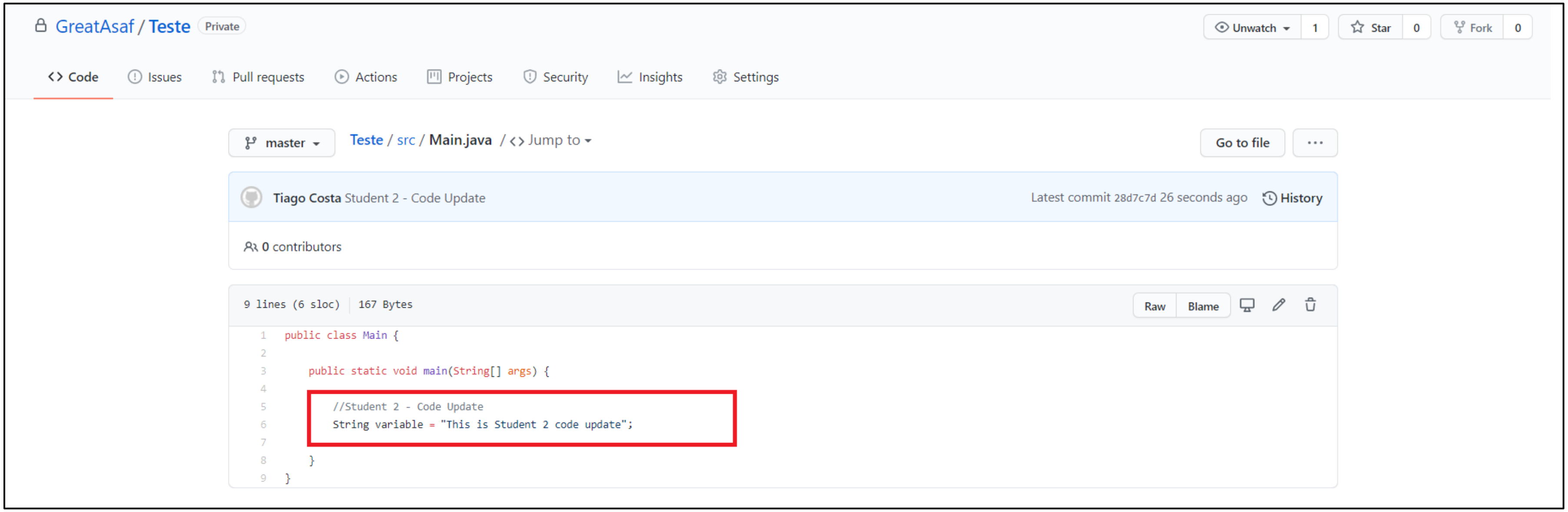
Merging Conflicting Code

- What if Student 2 pushed a project update…



Tiago Costa Student 2 - Code Update

Latest commit 28d7c7d 26 seconds ago

0 contributors

9 lines (6 sloc) | 167 Bytes

```java
public class Main {

    public static void main(String[] args) {

        //Student 2 - Code Update
        String variable = "This is Student 2 code update";

    }
}
```

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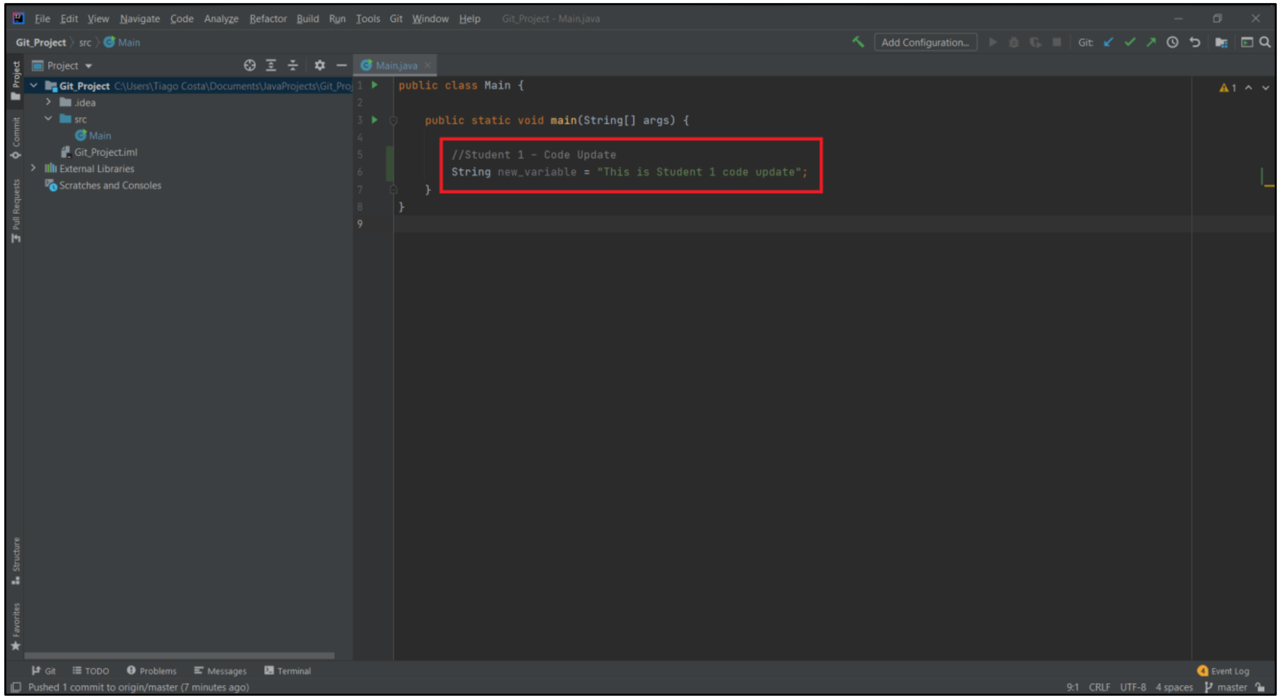
Merging Conflicting Code

- …but Student 1 did not update his local project…



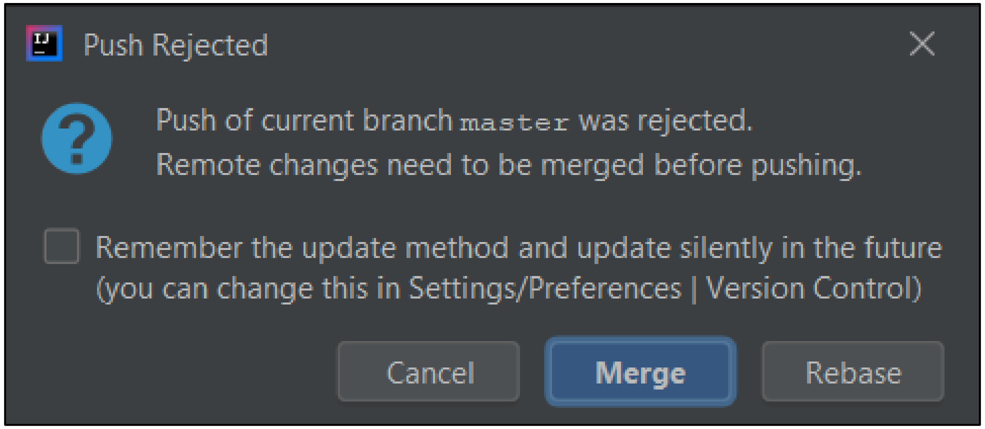
```java
public class Main {

    public static void main(String[] args) {

        //Student 1 - Code Update
        String new_variable = "This is Student 1 code update";
    }
}
```

Pushed 1 commit to origin/master (7 minutes ago)

HOW-TO: GIT & GITHUB

Merging Conflicting Code

- ...this is what Student 1 will get when he tries to push an update!



Push Rejected

Push of current branch `master` was rejected.
Remote changes need to be merged before pushing.

□ Remember the update method and update silently in the future (you can change this in Settings/Preferences | Version Control)

Merge is required to synchronize your code with the repository!

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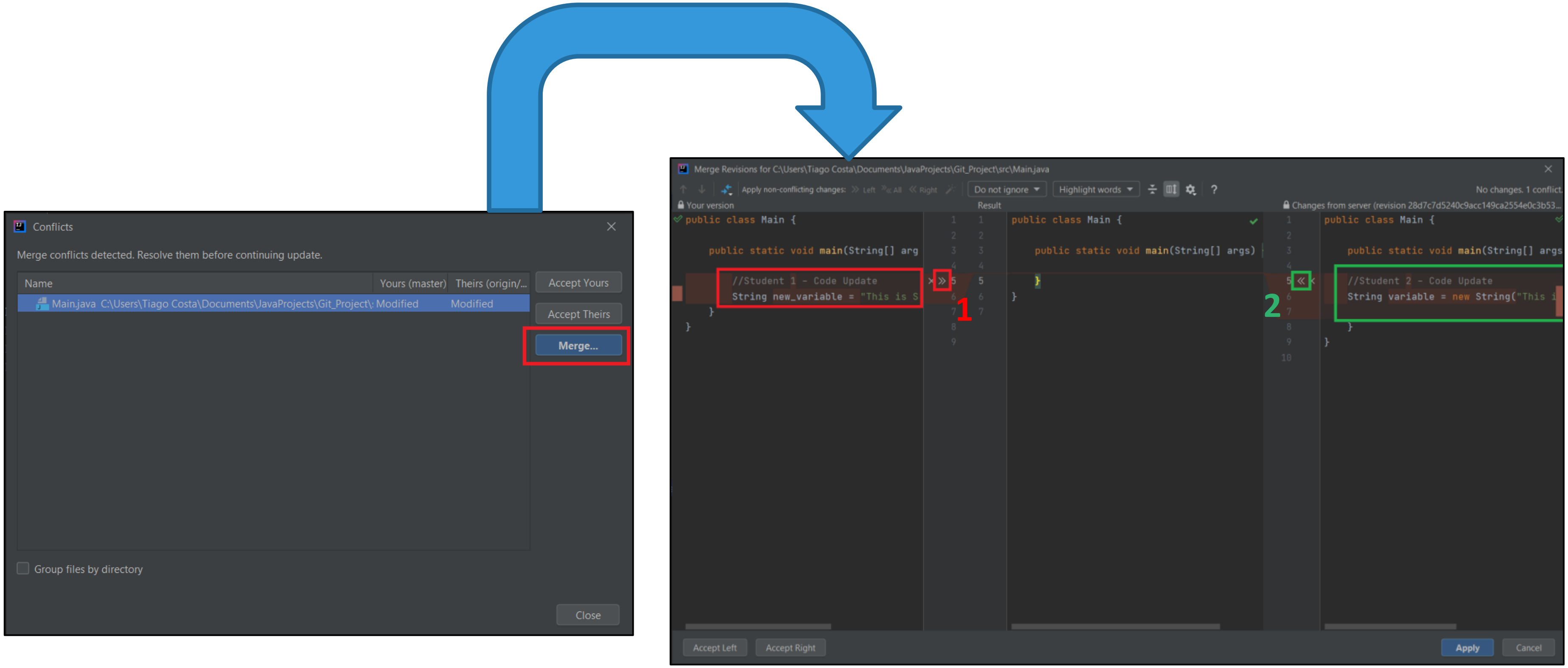
Merging Conflicting Code

- Merge the code with the latest update on the repository



Conflicts

Merge conflicts detected. Resolve them before continuing update.

Name	Yours (master)	Theirs (origin/...
Main.java C:\Users\Tiago Costa\Documents\JavaProjects\Git_Project\	Modified	Modified

Accept Yours
Accept Theirs
Merge...
□ Group files by directory
Close

Merge Revisions for C:\Users\Tiago Costa\Documents\JavaProjects\Git_Project\src\Main.java

Apply non-conflicting changes: Left All Right
Do not ignore
Highlight words
?

No changes. 1 conflict.

Your version

```
public class Main {

    public static void main(String[] arg

        //Student 1 - Code Update
        String new_variable = "This is S
    }
}
```

Result

```
public class Main {

    public static void main(String[] args)

    }
}
```

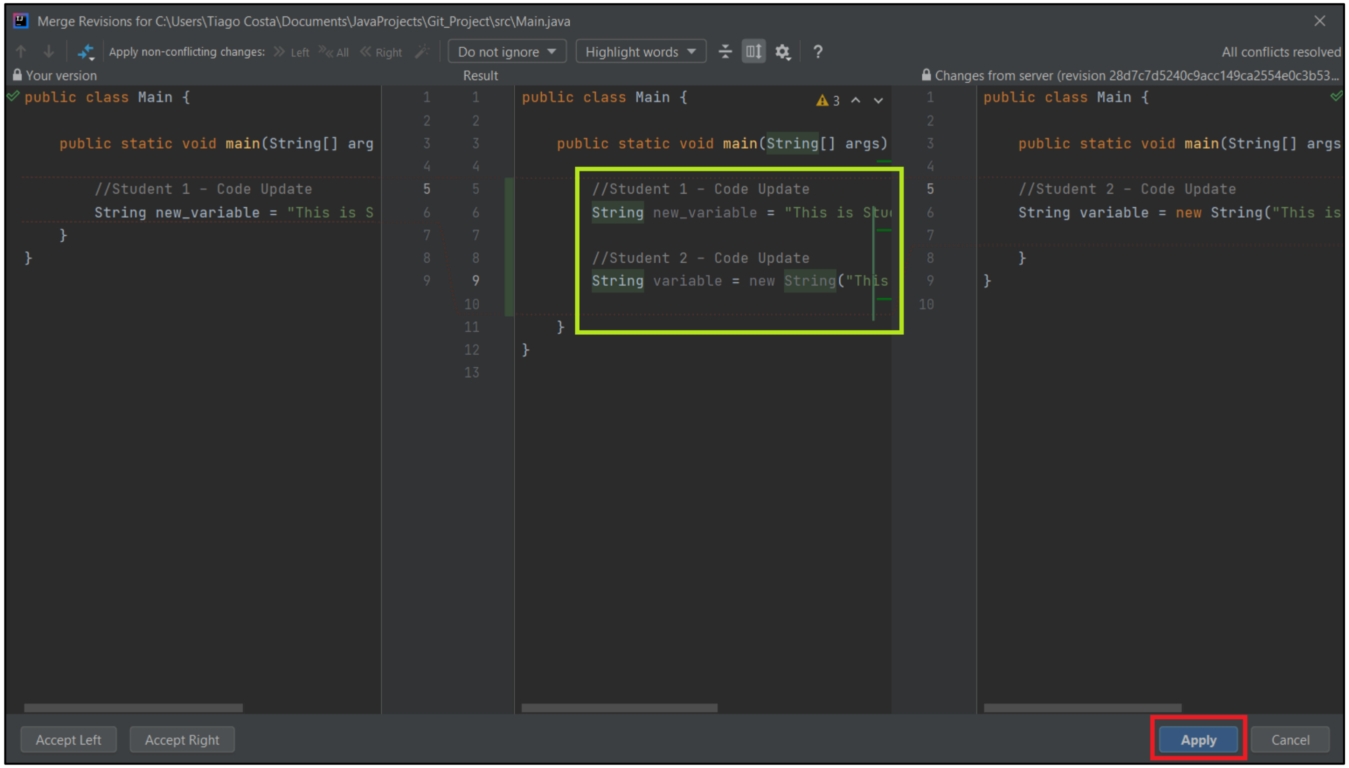
Changes from server (revision 28d7c7d5240c9acc149ca2554e0c3b53...

```
public class Main {

    public static void main(String[] args

        //Student 2 - Code Update
        String variable = new String("This i
    }
}
```

HOW-TO: GIT & GITHUB

Merging Conflicting Code

- Code is successfully merged…



Merge Revisions for C:\Users\Tiago Costa\Documents\JavaProjects\Git_Project\src\Main.java

Your version

```
public class Main {

    public static void main(String[] arg

        //Student 1 - Code Update
        String new_variable = "This is S
    }
}
```

Result

```
public class Main {

    public static void main(String[] args)

        //Student 1 - Code Update
        String new_variable = "This is Stu

        //Student 2 - Code Update
        String variable = new String("This

    }
}
```

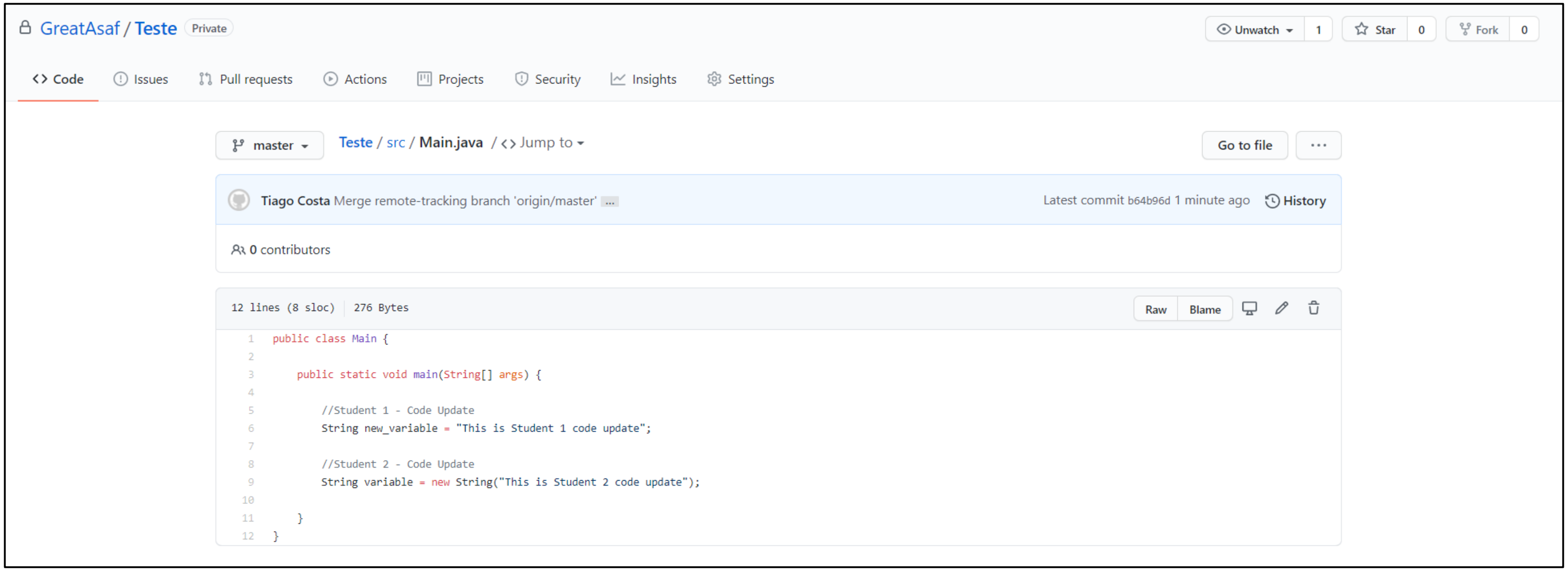
Changes from server (revision 28d7c7d5240c9acc149ca2554e0c3b53…

```
public class Main {

    public static void main(String[] args

        //Student 2 - Code Update
        String variable = new String("This is

    }
}
```

HOW-TO: GIT & GITHUB

Merging Conflicting Code

- …and the push is completed without any issue!



Tiago Costa Merge remote-tracking branch 'origin/master' …

Latest commit b64b96d 1 minute ago

0 contributors

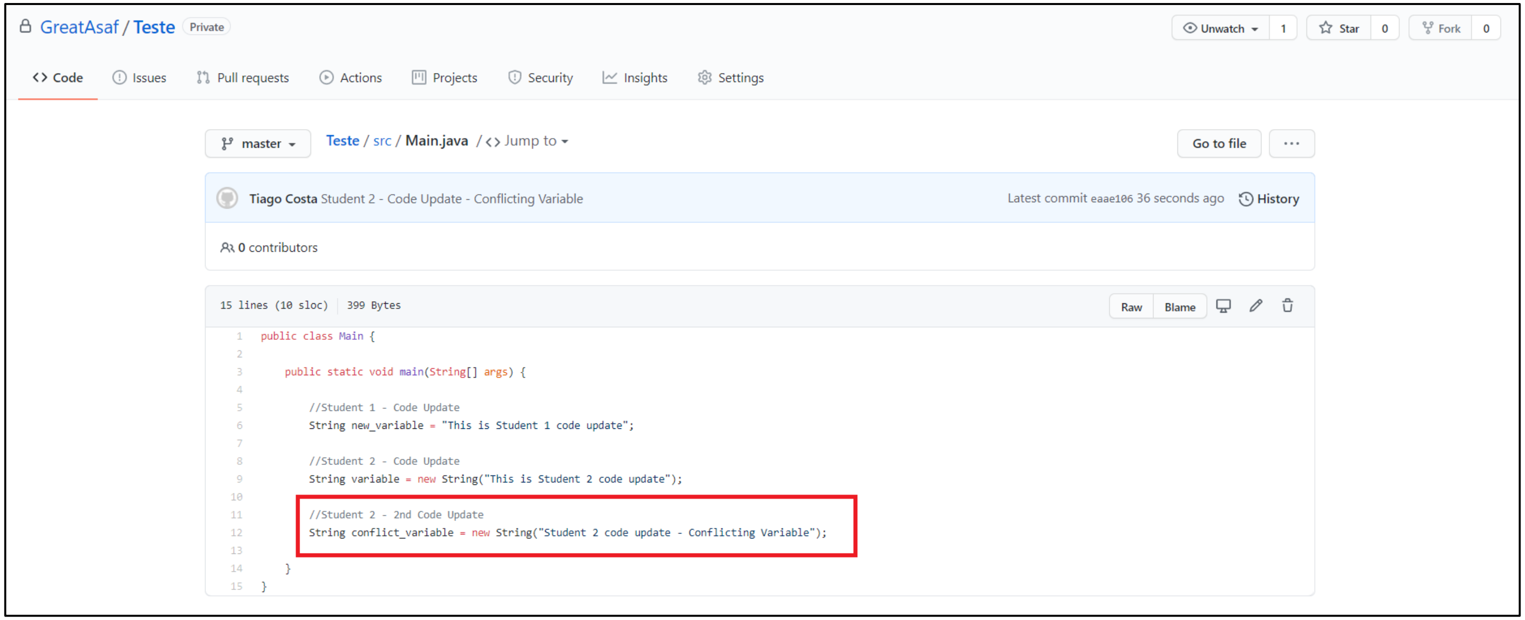
12 lines (8 sloc) | 276 Bytes

```java
public class Main {

    public static void main(String[] args) {

        //Student 1 - Code Update
        String new_variable = "This is Student 1 code update";

        //Student 2 - Code Update
        String variable = new String("This is Student 2 code update");

    }
}
```

HOW-TO: GIT & GITHUB

Merging Conflicting Code

- What would happen if Student 2 declared the same variable…



Tiago Costa Student 2 - Code Update - Conflicting Variable

Latest commit eaae106 36 seconds ago

0 contributors

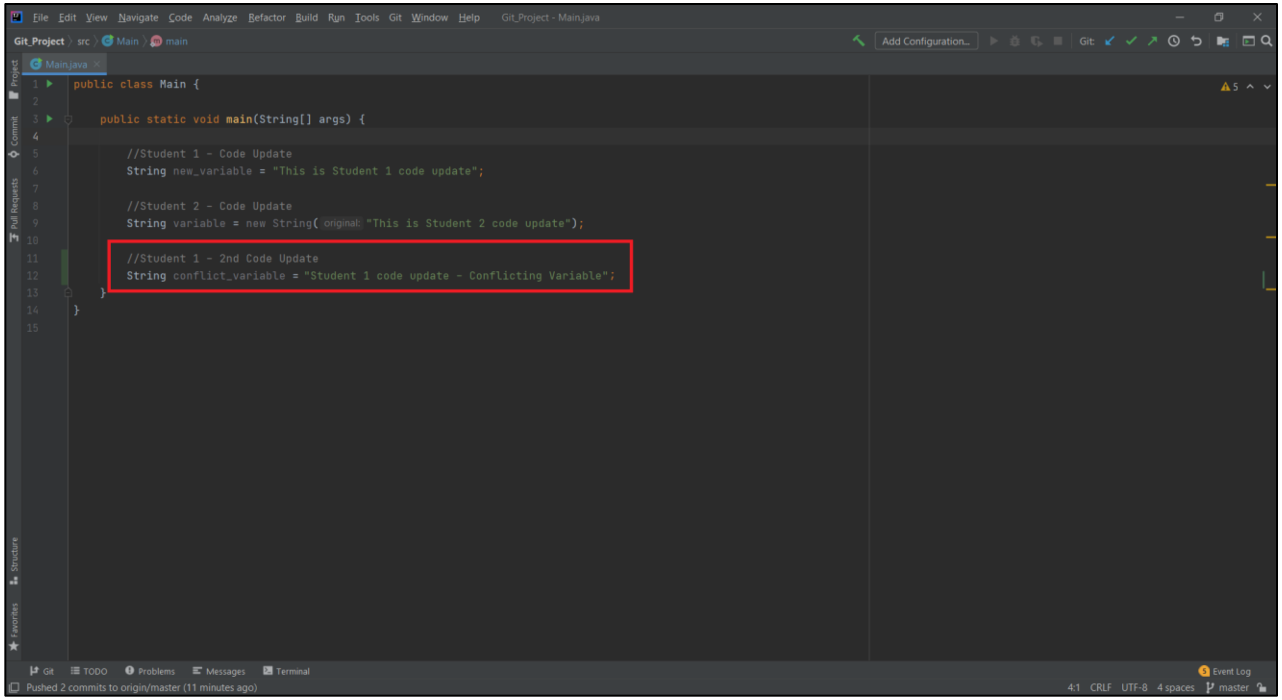
15 lines (10 sloc) | 399 Bytes

```java
public class Main {

    public static void main(String[] args) {

        //Student 1 - Code Update
        String new_variable = "This is Student 1 code update";

        //Student 2 - Code Update
        String variable = new String("This is Student 2 code update");

        //Student 2 - 2nd Code Update
        String conflict_variable = new String("Student 2 code update - Conflicting Variable");

    }
}
```

HOW-TO: GIT & GITHUB

Merging Conflicting Code

- …as Student 1?



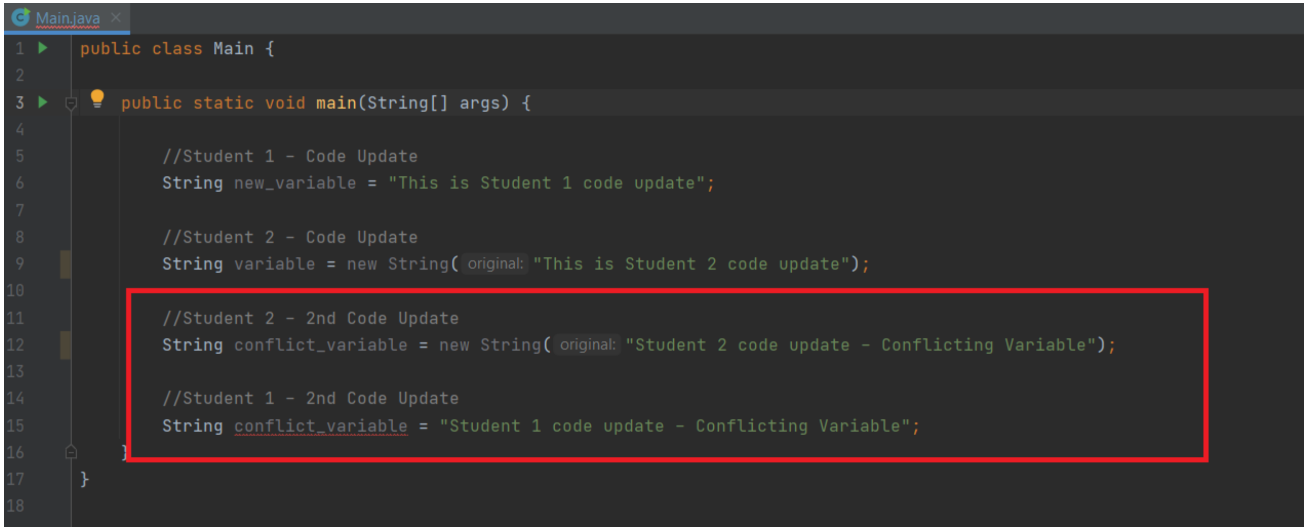
```java
public class Main {

    public static void main(String[] args) {

        //Student 1 - Code Update
        String new_variable = "This is Student 1 code update";

        //Student 2 - Code Update
        String variable = new String( original: "This is Student 2 code update");

        //Student 1 - 2nd Code Update
        String conflict_variable = "Student 1 code update - Conflicting Variable";
    }
}
```

Pushed 2 commits to origin/master (11 minutes ago)

HOW-TO: GIT & GITHUB

Merging Conflicting Code

- Merging problems would occur again!



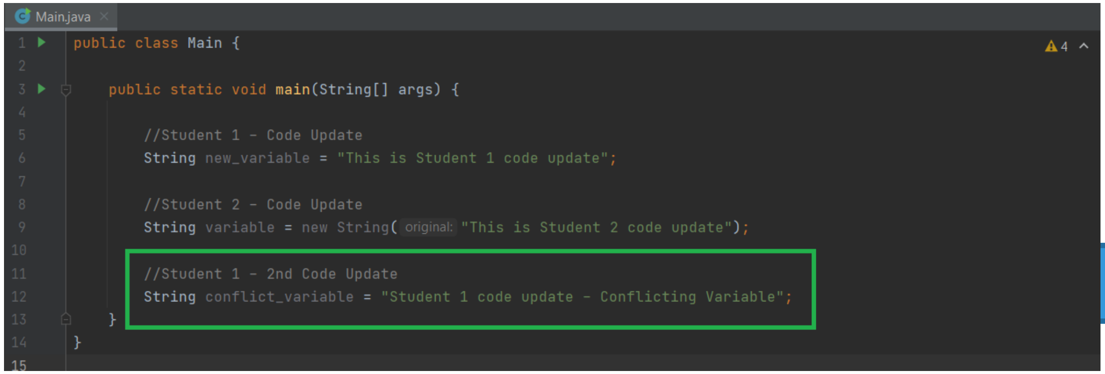
```
public class Main {

    public static void main(String[] args) {

        //Student 1 - Code Update
        String new_variable = "This is Student 1 code update";

        //Student 2 - Code Update
        String variable = new String( original: "This is Student 2 code update");

        //Student 2 - 2nd Code Update
        String conflict_variable = new String( original: "Student 2 code update - Conflicting Variable");

        //Student 1 - 2nd Code Update
        String conflict_variable = "Student 1 code update - Conflicting Variable";
    }
}
```

One of the variable declarations has to be removed!

HOW-TO: GIT & GITHUB

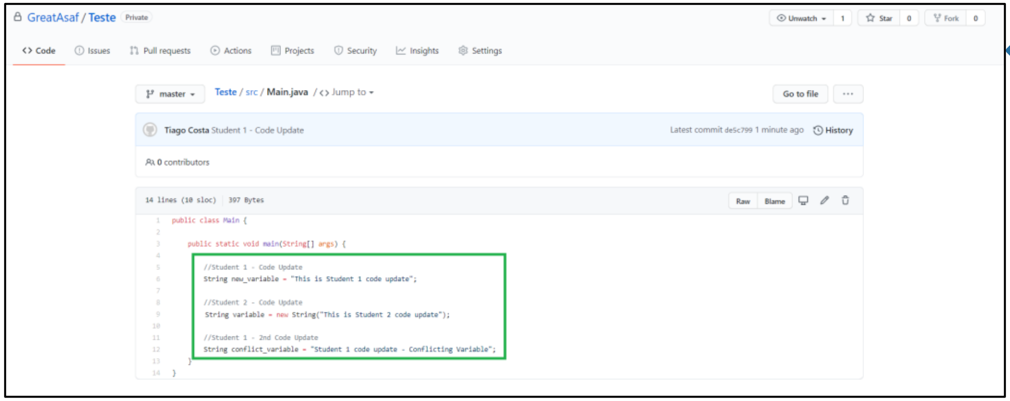
Merging Conflicting Code

- Remove one variable declaration, commit and push the new code update!



Main.java

```
public class Main {

    public static void main(String[] args) {

        //Student 1 - Code Update
        String new_variable = "This is Student 1 code update";

        //Student 2 - Code Update
        String variable = new String( original: "This is Student 2 code update");

        //Student 1 - 2nd Code Update
        String conflict_variable = "Student 1 code update - Conflicting Variable";
    }
}
```



GreatAsaf / Teste Private

Teste / src / Main.java / <> Jump to ▾

Tiago Costa Student 1 - Code Update

Latest commit de5c799 1 minute ago History

0 contributors

14 lines (10 sloc) | 397 Bytes

```
public class Main {

    public static void main(String[] args) {

        //Student 1 - Code Update
        String new_variable = "This is Student 1 code update";

        //Student 2 - Code Update
        String variable = new String("This is Student 2 code update");

        //Student 1 - 2nd Code Update
        String conflict_variable = "Student 1 code update - Conflicting Variable";
    }
}
```

Questions?