

Version Control & Git

Brandon Krakowsky



Version Control Systems

Version Control Systems

- Version control (or source control) is all about managing multiple versions of documents, programs, web sites, etc.
 - Almost all “real” projects use some kind of version control
 - This is essential for team projects, but also very useful for individual projects
- Some well-known version control systems are CVS, Subversion, Mercurial, and Git
 - CVS and Subversion use a “central” repository where users “check out” files, work on them, and then “check them in”
 - Mercurial and Git treat all repositories as equal
- *Distributed* systems like Mercurial and Git are newer and have basically replaced centralized systems like CVS and Subversion



Why Version Control?

- For working by yourself:
 - Gives you a “time machine” for going back to earlier versions of your work
 - Gives you great support for different versions of the same basic project (e.g. web app vs. desktop app)
- For working with others:
 - Greatly simplifies concurrent work and merging changes
- For getting an internship or job:
 - Just about all companies use some kind of version control



Why Git?

- Git is a *distributed* version-control system designed for coordinating work among programmers, but it can be used to track changes in any set of files
- Git has many advantages over earlier systems such as CVS and Subversion
 - More efficient
 - Better workflow
 - Lots of online support
 - Feature-rich IDE plug-ins
 - Etc.
- Git is increasingly the “expected” version control system for development
 - It’s the standard for all different kinds of projects
 - It’s used at all different kinds of companies
- Just Google search “Version Control” and Git is the first result you’ll find



Learning Git

- Git is often used from the command line, but it's also supported by many GUIs
- We'll learn some of the basic git commands using the Eclipse IDE
- There are other GUIs supporting git
 - SmartGit (<https://www.syntevo.com/smartgit/>)
 - The GitHub hosting platform has its own client (<https://desktop.github.com>)
 - TortoiseGit (<https://code.google.com/p/tortoisegit/>)
- We'll also learn how to use GitHub, a very popular code hosting platform for collaboration



Setting Up & Configuring GitHub

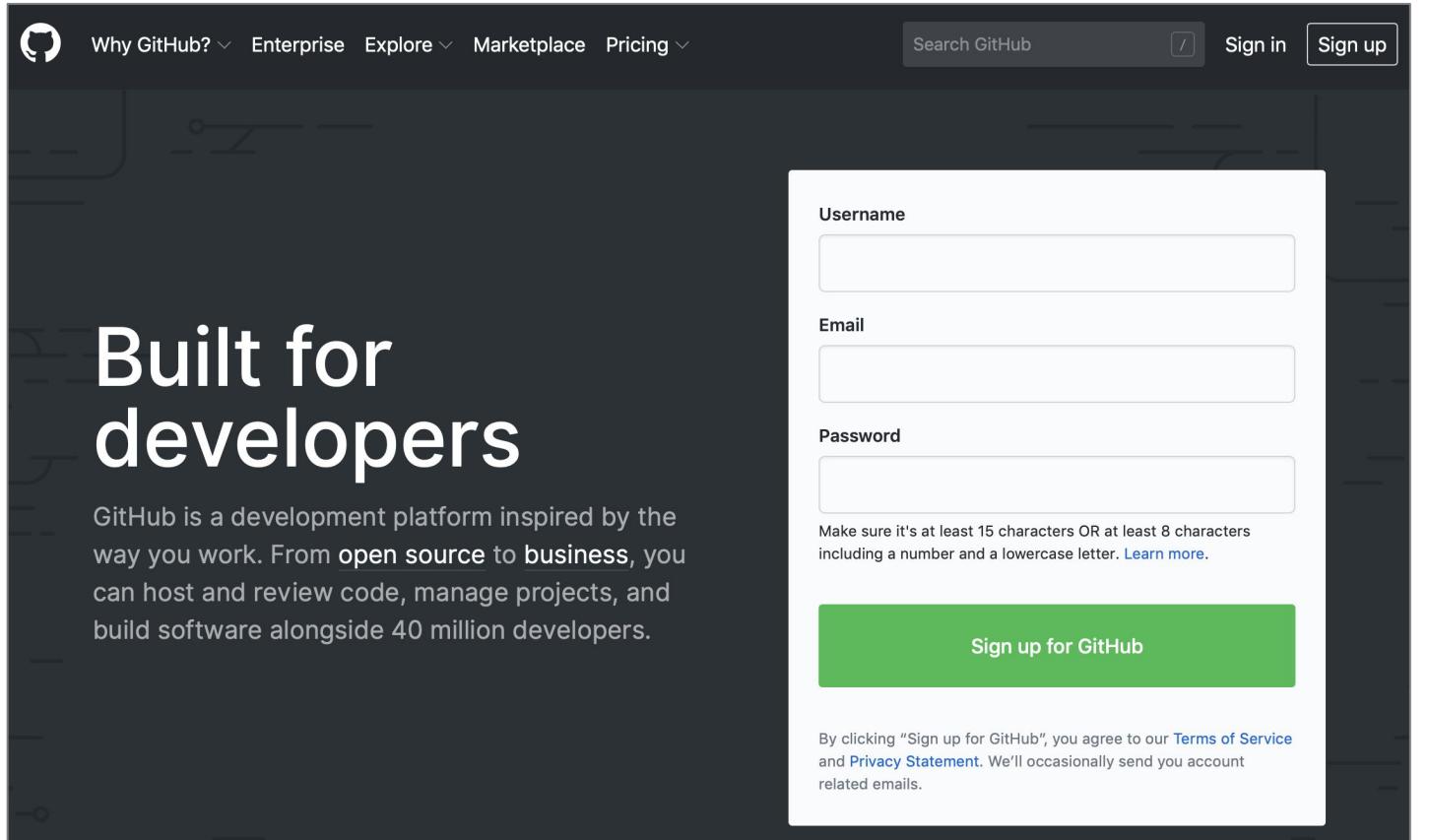
Setting Up a GitHub Account

- GitHub is a code hosting platform for version control and collaboration using Git
 - We'll use it to host *remote* git repositories
- It can be used to host just about any type of project repository, including Python and Java projects
- There are other code hosting platforms using git
 - GitLab (<https://about.gitlab.com>)
 - Bitbucket (<https://bitbucket.org>)



Setting Up a GitHub Account

- To create an account or log in to GitHub, go here: <https://github.com>



Setting Up a GitHub Account

- If you're creating a new account, enter a [username](#), [email address](#), and [password](#)

Join GitHub

Create your account

Username *

 ✓

Email address *

 ✓

Password *

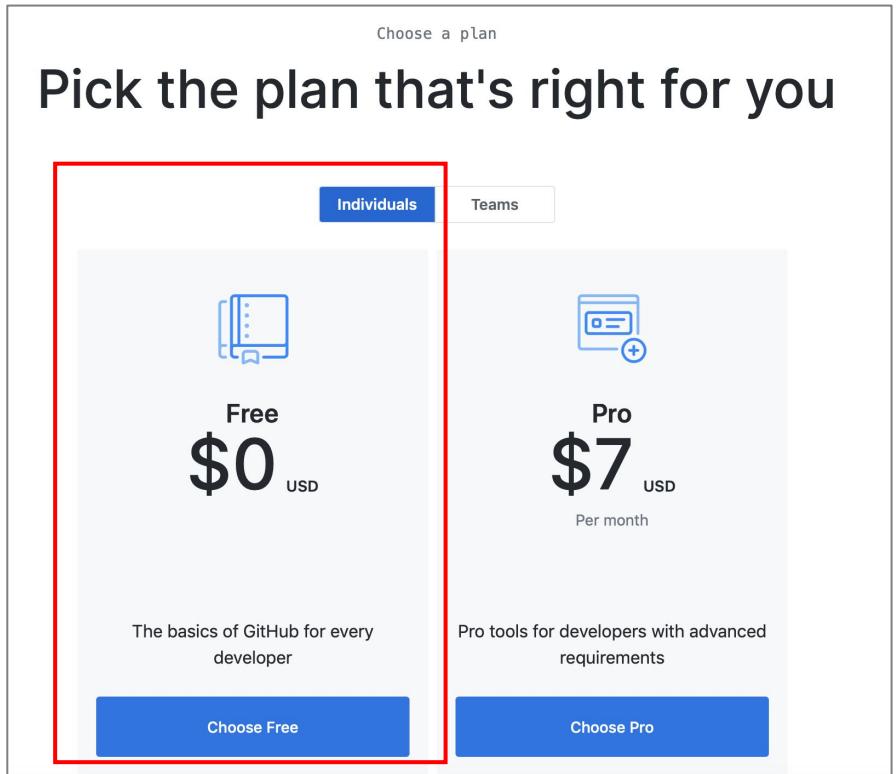
Make sure it's at least 15 characters OR [at least 8 characters including a number and a lowercase letter](#). [Learn more](#).

Email preferences

Send me occasional product updates, announcements, and offers.

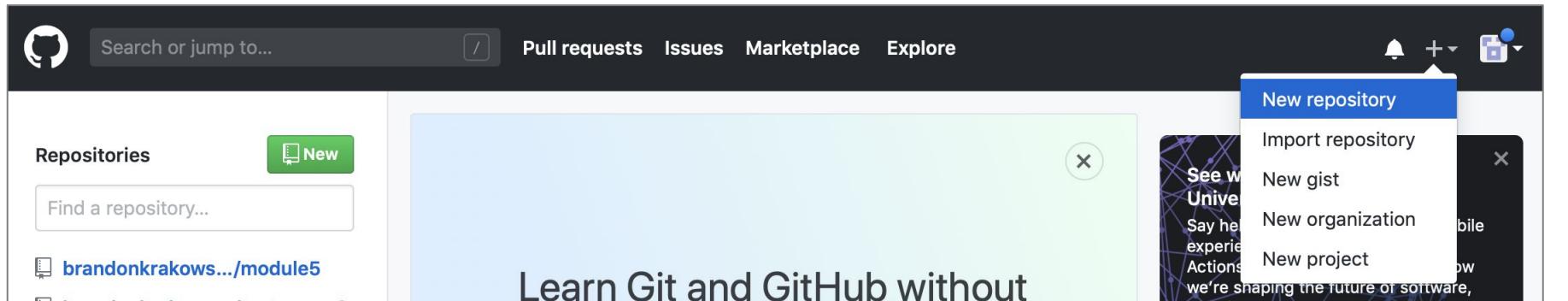
Setting Up a GitHub Account

- As an individual, you can more than likely pick the [Free plan](#)
- Go here (<https://github.com/pricing>) for more information about the Free vs. Pro plan, and the pricing



Creating a Repository

- As a first step, create a repository
 - A repository is usually used to organize a single project
- Repositories can contain folders and files, images, videos, spreadsheets, and data sets – essentially anything your project needs
- In the upper right corner, next to your avatar or identicon, click and then select “New repository”



Ref: <https://guides.github.com/activities/hello-world/>

Creating a Repository

- Name your repository and write a short description

Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository](#).

Owner: brandonkrakowsky / Repository name *: hello-world-git

Great repository names are short and memorable. Need inspiration? How about [automatic-fiesta](#)?

Description (optional): My project's repository

Public: Anyone can see this repository. You choose who can commit.

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

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

Initialize this repository with a README: This will let you immediately clone the repository to your computer.

Add .gitignore: None Add a license: None

Create repository

- Select "Private" so you can choose who can access your repository
- Select "Initialize this repository with a README"
 - A README is a file with information about your project

- Click "Create repository"

Ref: <https://guides.github.com/activities/hello-world/>

Setting Up & Configuring Eclipse

Git Support for Eclipse

- The Eclipse IDE provides support for Git
 - It allows you to easily perform Git commands from within the IDE
- If you want to learn about the usage of the Git command line, there are plenty of resources
 - You can start here (at the main Git website):
<https://git-scm.com/book/en/v2/Getting-Started-The-Command-Line>



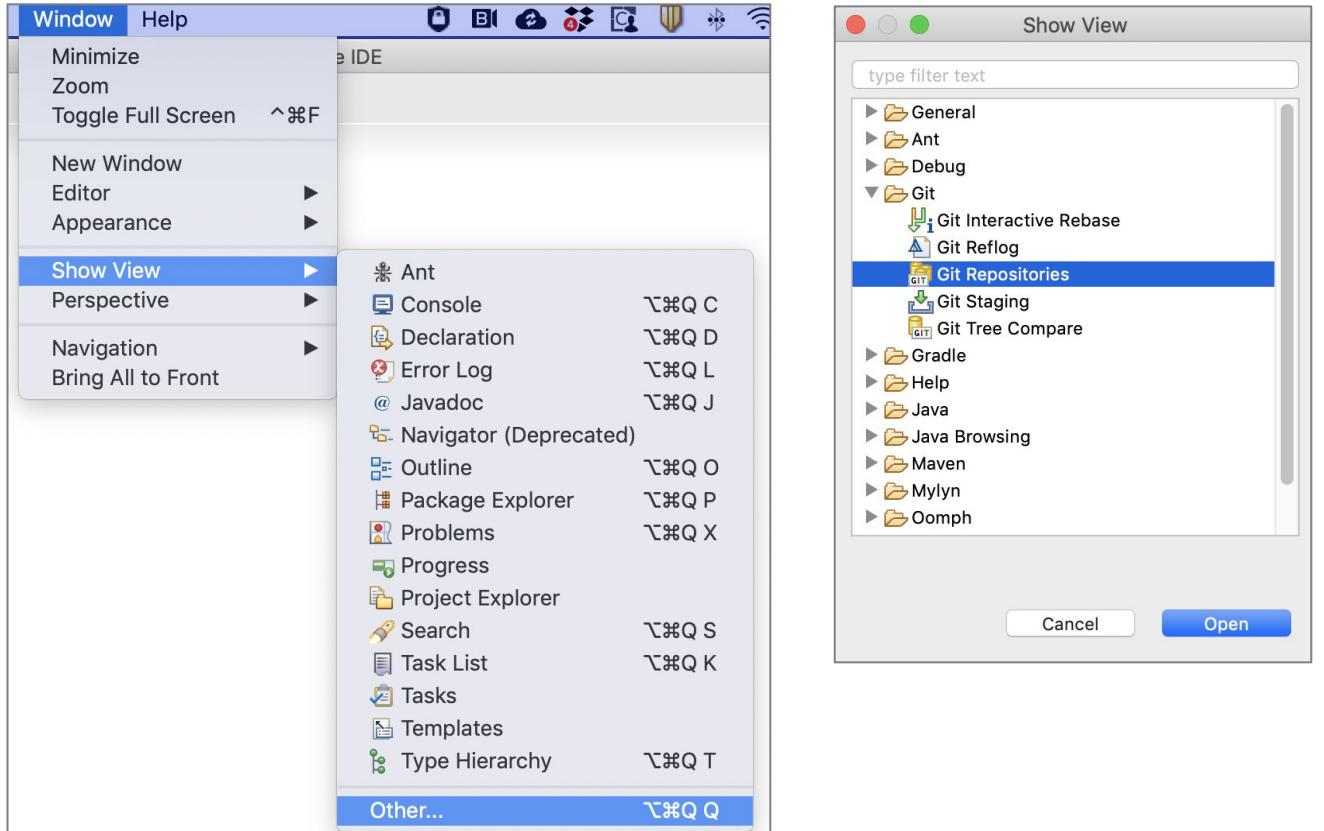
Installation of Git Support in Eclipse

- Most Eclipse IDE distributions from Eclipse.org already contain support for Git
 - In this case no additional installation is required
- If the Git tooling is not available, you can install it via the Eclipse installation manager
 - Go to Help Install New Software...

Ref: <https://www.vogella.com/tutorials/EclipseGit/article.html>

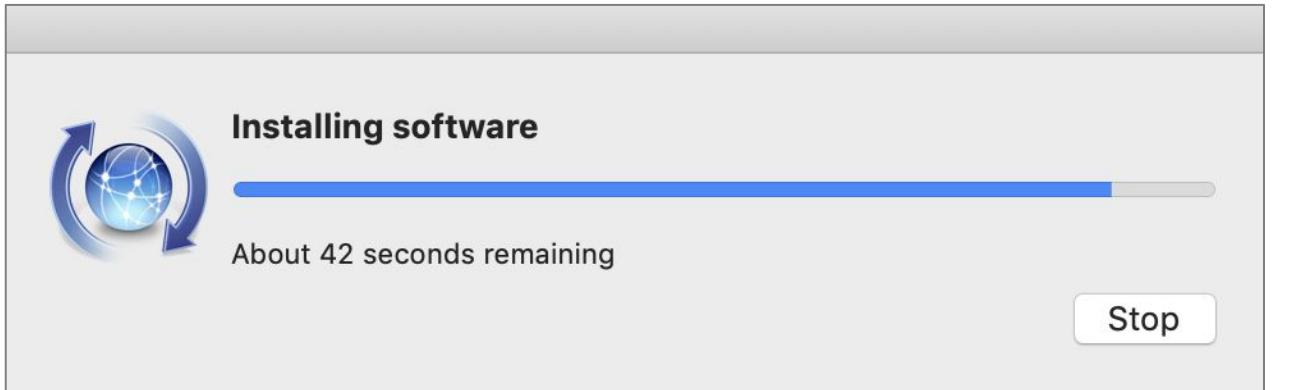
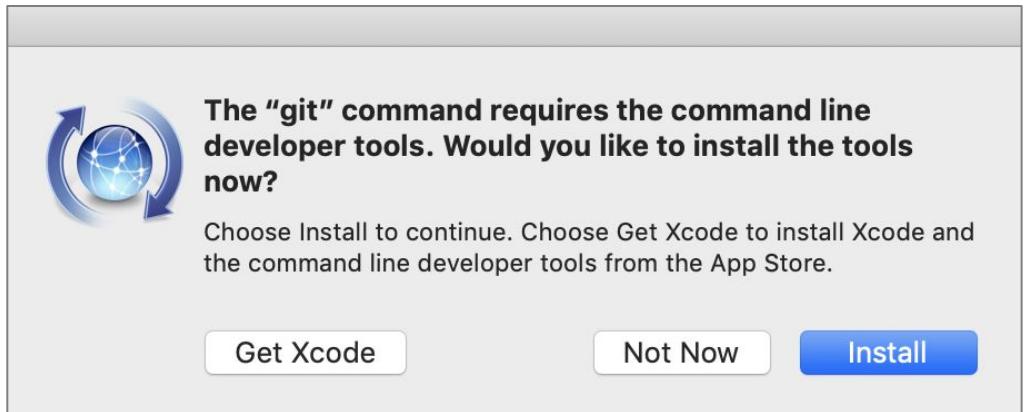
Show the Git View in Eclipse

- Open the “Git Repositories” view in Eclipse by going to Window □ Show View □ Other... □ Git □ Git Repositories



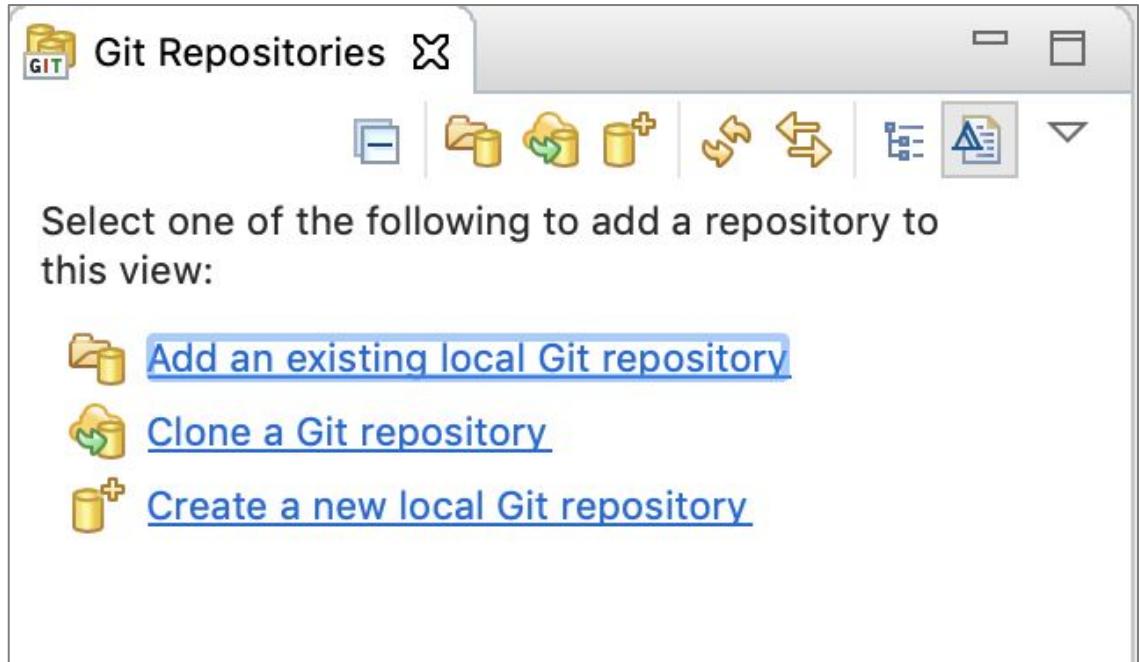
Show the Git View in Eclipse

- You might be prompted to install Xcode and the Git command line tools
 - Click “Install”



Show the Git View in Eclipse

- You should see the “Git Repositories” view in Eclipse



Git User Configuration

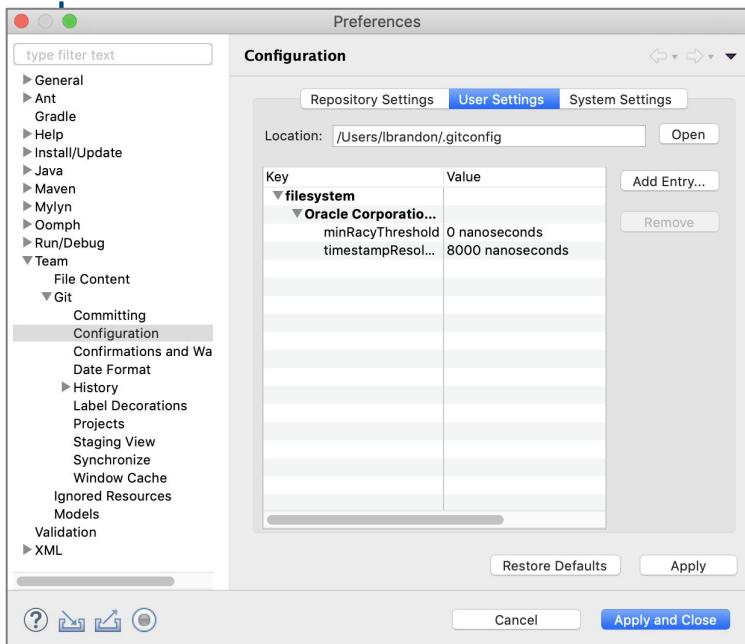
- The Eclipse IDE uses the same configuration files as the Git command line tools
 - This makes it easier to use the Eclipse IDE and the command line for Git, interchangeably



Ref: <https://www.vogella.com/tutorials/EclipseGit/article.html>

Configure Email & User for Git

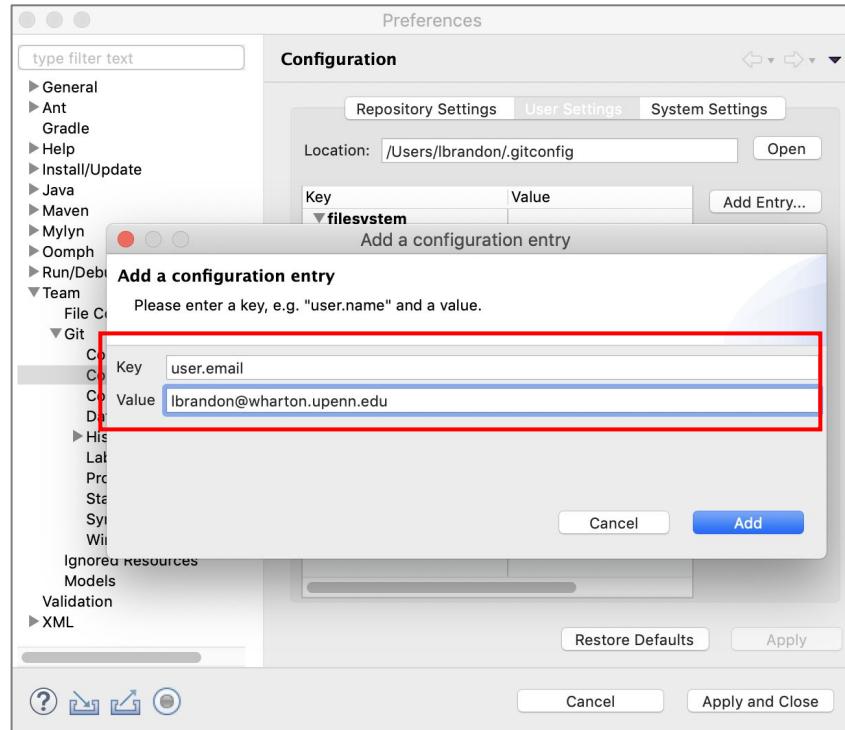
- Select Eclipse □ Preferences □ Team □ Git □ Configuration
- Ensure that your full name and email is available in the user settings
 - Again, the Eclipse IDE uses the same settings as the Git command line, this might already be



Ref: <https://www.vogella.com/tutorials/EclipseGit/article.html>

Configure Email & User for Git

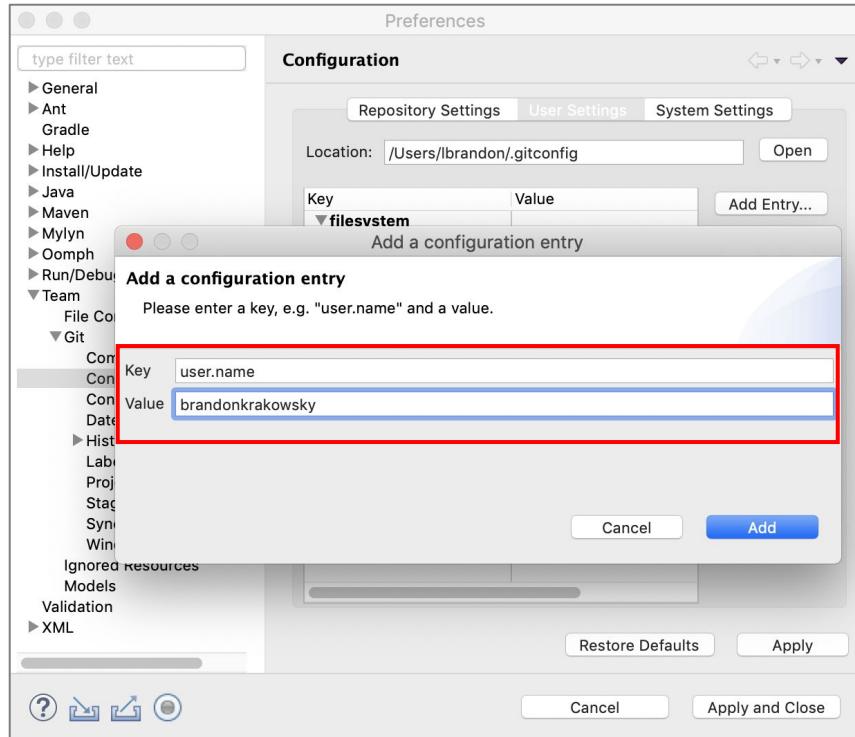
- Press “Add Entry...” to add a `user.email` key
 - This email will be used when making and committing changes to git repositories



Ref: <https://www.vogella.com/tutorials/EclipseGit/article.html>

Configure Email & User for Git

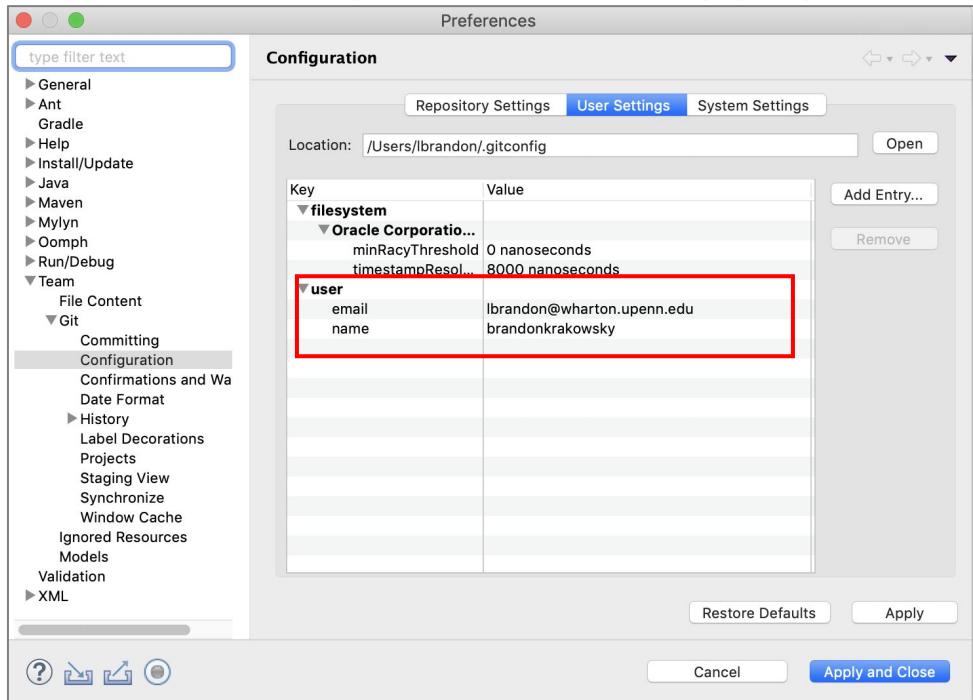
- Press “Add Entry...” again to add a user.name key
 - Again, this username will be used when making and committing changes to git repositories



Ref: <https://www.vogella.com/tutorials/EclipseGit/article.html>

Configure Email & User for Git – .gitconfig

- You'll see the keys added to your .gitconfig
 - The .gitconfig is a hidden file in your Git repository
 - It's commonly used for storing project settings, etc.



Ref: <https://www.vogella.com/tutorials/EclipseGit/article.html>

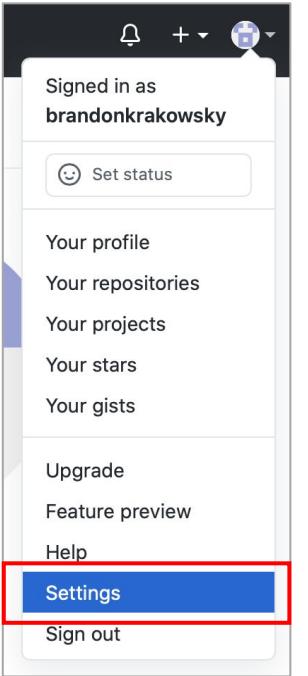
Create Personal Access Token to Authenticate to GitHub

- To work with a remote repository, you need to authenticate to GitHub
 - To do this, you'll need to [create a Personal Access Token \(PAT\)](#)
- First, make sure the email address associated with your account in GitHub is verified

Ref: <https://docs.github.com/en/free-pro-team@latest/github/authenticating-to-github/creating-a-personal-access-token>

Create Personal Access Token to Authenticate to GitHub

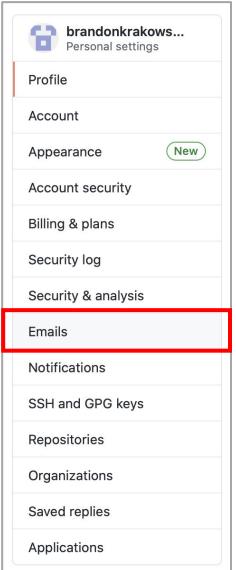
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 - To do this, you'll need to [create a Personal Access Token \(PAT\)](#)
- First, make sure the email address associated with your account in GitHub is verified
- In the upper-right corner of any page, click your profile photo, then click “Settings”



Ref: <https://docs.github.com/en/free-pro-team@latest/github/authenticating-to-github/creating-a-personal-access-token>

Create Personal Access Token to Authenticate to GitHub

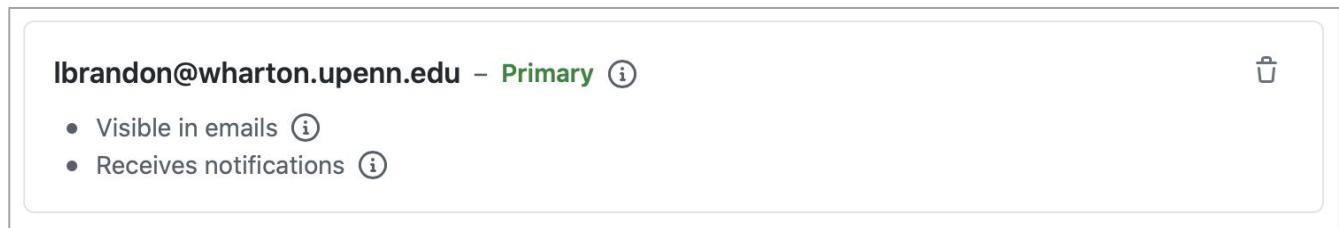
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- In the left sidebar, click “Emails”



Ref: <https://docs.github.com/en/free-pro-team@latest/github/authenticating-to-github/creating-a-personal-access-token>

Create Personal Access Token to Authenticate to GitHub

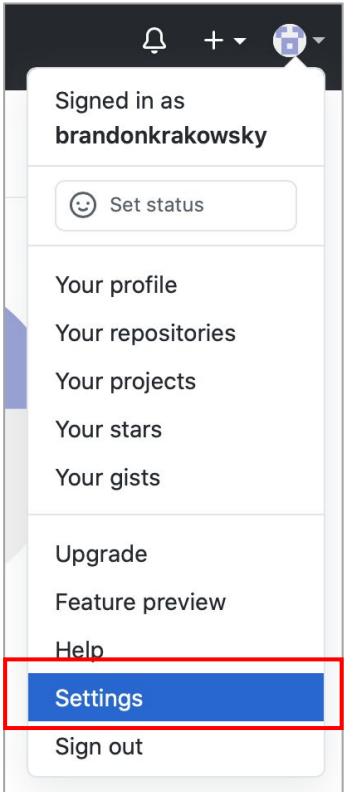
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- First, make sure the email address associated with your account in GitHub is verified
- In the upper-right corner of any page, click your profile photo, then click “Settings”
- In the left sidebar, click “Emails”
- Confirm that your email is verified. If not, resend the GitHub verification email and click the link to confirm.



Ref: <https://docs.github.com/en/free-pro-team@latest/github/authenticating-to-github/creating-a-personal-access-token>

Create Personal Access Token to Authenticate to GitHub

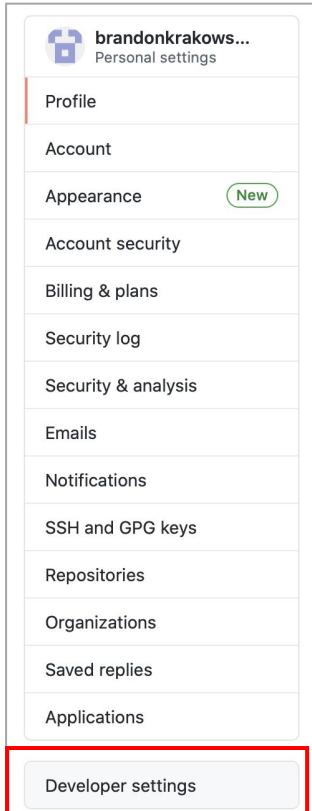
- To create a Personal Access Token (PAT), click “Settings” under your profile photo



Ref: <https://docs.github.com/en/free-pro-team@latest/github/authenticating-to-github/creating-a-personal-access-token>

Authenticate Using a Personal Access Token (PAT)

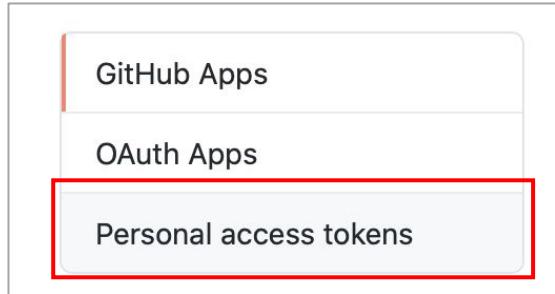
- In the left sidebar, click “Developer settings”



Ref: <https://docs.github.com/en/free-pro-team@latest/github/authenticating-to-github/creating-a-personal-access-token>

Authenticate Using a Personal Access Token (PAT)

- In the left sidebar, click “Personal access tokens”



- Click “Generate new token”

Personal access tokens

Need an API token for scripts or testing? [Generate a personal access token](#) for quick access to the [GitHub API](#).

Personal access tokens function like ordinary OAuth access tokens. They can be used instead of a password for Git over HTTPS, or can be used to [authenticate to the API over Basic Authentication](#).

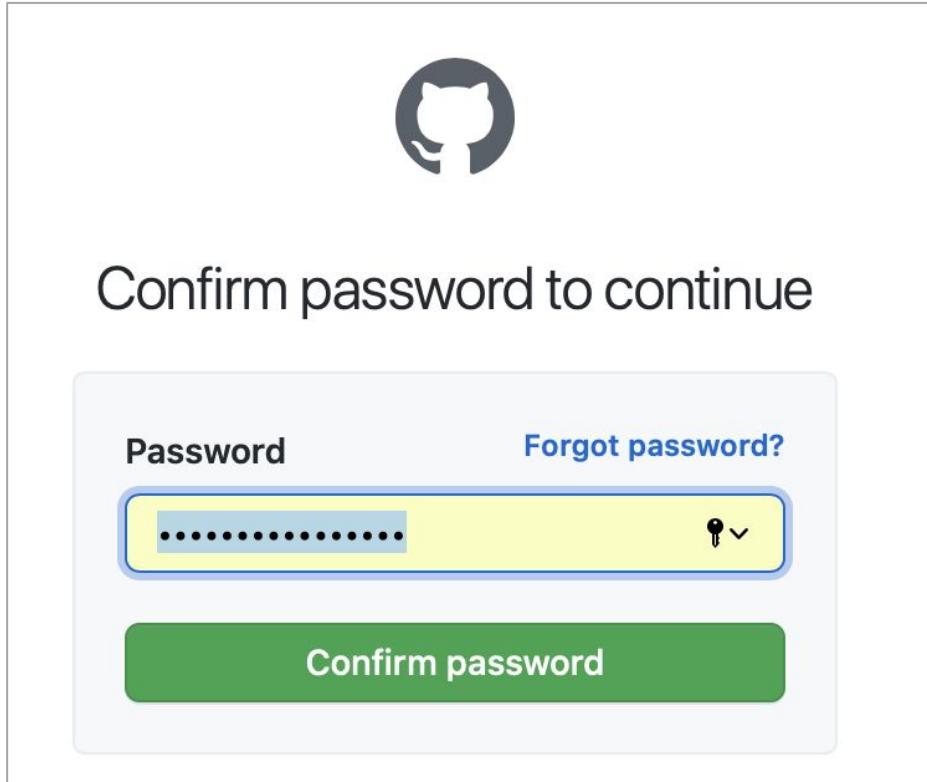
Generate new token

A screenshot of a web page titled "Personal access tokens". The page contains a heading, a paragraph with a link to generate a token, and a descriptive text about what personal access tokens are used for. A red rectangular box highlights the "Generate new token" button at the top right.

Ref: <https://docs.github.com/en/free-pro-team@latest/github/authenticating-to-github/creating-a-personal-access-token>

Authenticate Using a Personal Access Token (PAT)

- If prompted, confirm your password to continue



Ref: <https://docs.github.com/en/free-pro-team@latest/github/authenticating-to-github/creating-a-personal-access-token>

Authenticate Using a Personal Access Token (PAT)

- Give your token a descriptive name

New personal access token

Personal access tokens function like ordinary OAuth access tokens. They can be used instead of a password for Git over HTTPS, or can be used to [authenticate to the API over Basic Authentication](#).

Note

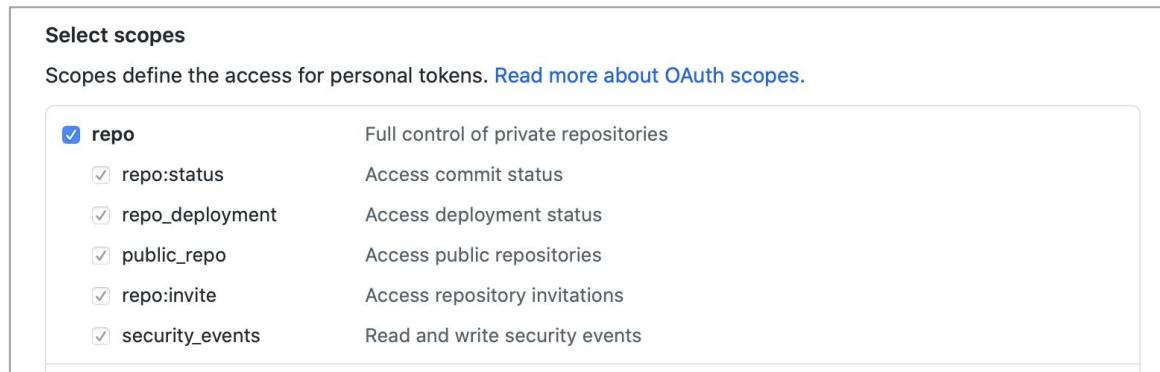
My Eclipse Workspace|

What's this token for?

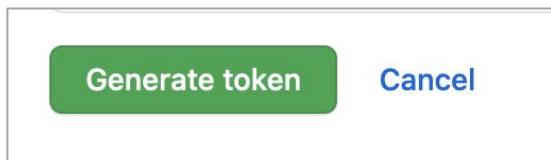
Ref: <https://docs.github.com/en/free-pro-team@latest/github/authenticating-to-github/creating-a-personal-access-token>

Authenticate Using a Personal Access Token (PAT)

- Select the scopes, or permissions, you'd like to grant this token. To use your token to access repositories, select **repo**.



- Click “Generate token”



Ref: <https://docs.github.com/en/free-pro-team@latest/github/authenticating-to-github/creating-a-personal-access-token>

Authenticate Using a Personal Access Token (PAT)

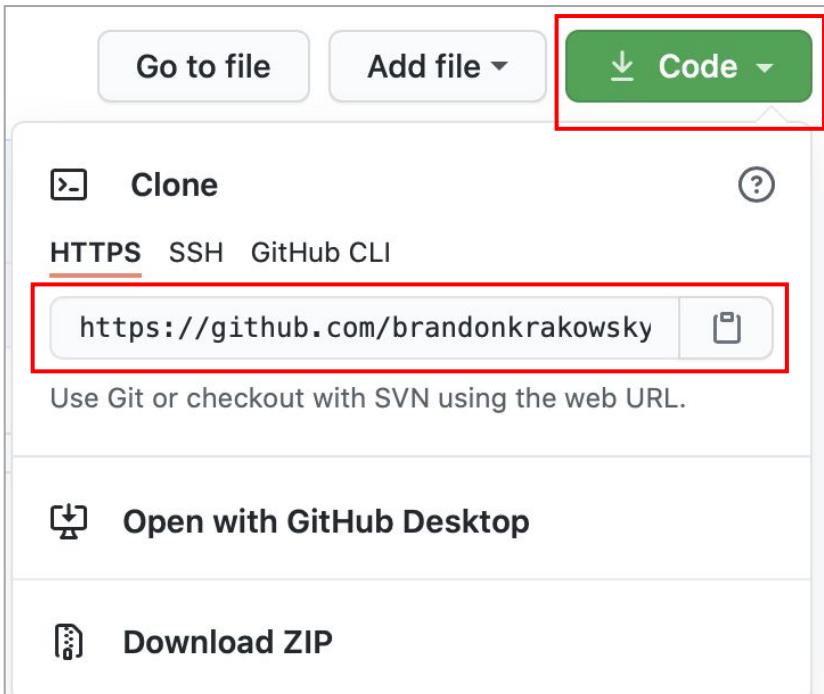
- Copy your token

The screenshot shows the GitHub 'Personal access tokens' page. At the top, there are two buttons: 'Generate new token' and 'Revoke all'. Below them, a message reads: 'Tokens you have generated that can be used to access the [GitHub API](#).'. A blue callout box contains the instruction: 'Make sure to copy your new personal access token now. You won't be able to see it again!'. Below this, a token card is displayed with a green checkmark icon, a copy icon, and a 'Delete' button. A note at the bottom states: 'Personal access tokens function like ordinary OAuth access tokens. They can be used instead of a password for Git over HTTPS, or can be used to [authenticate to the API](#) over Basic Authentication.'

Ref: <https://docs.github.com/en/free-pro-team@latest/github/authenticating-to-github/creating-a-personal-access-token>

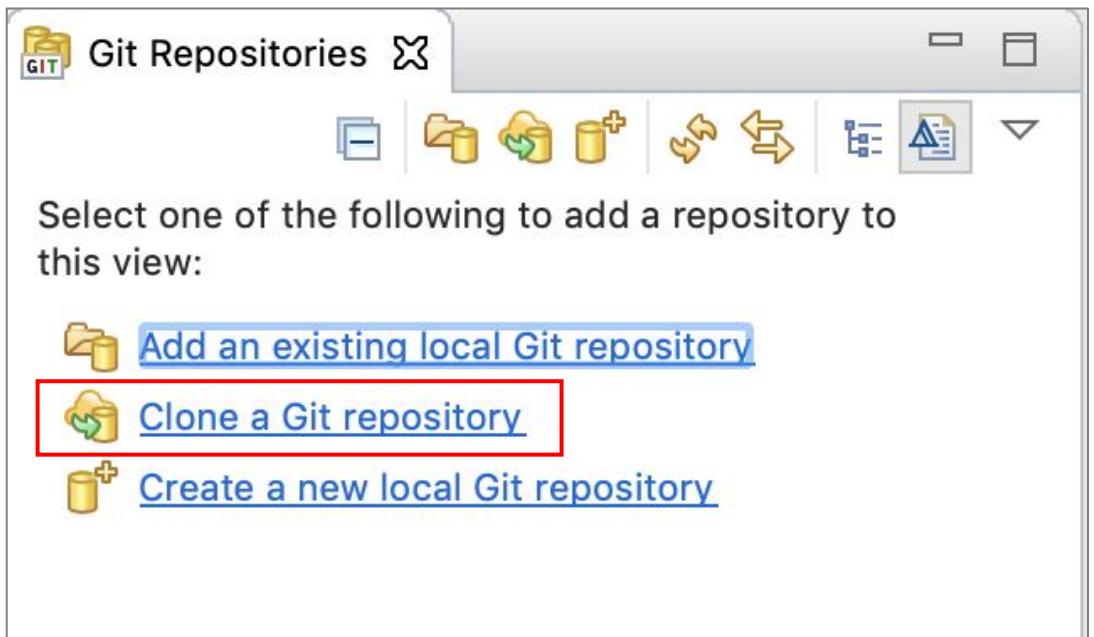
Cloning a Repository from GitHub

- To work with a remote repository, [clone](#) it to your local machine
- In GitHub, go to your project's repository and click the “Code” button
- To [clone with HTTPS](#), copy the given web URL



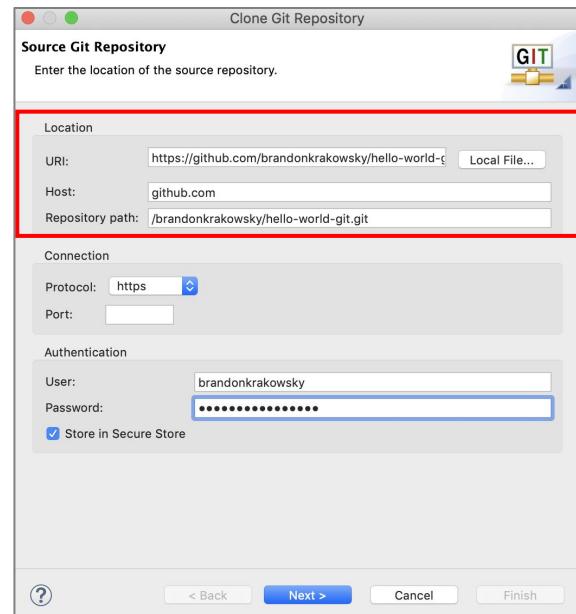
Cloning a Repository in Eclipse

- To clone a remote repository and add it to the “Git Repositories” view, click the “Clone a Git repository” link
- You can also click the “Clone a Git Repository” button



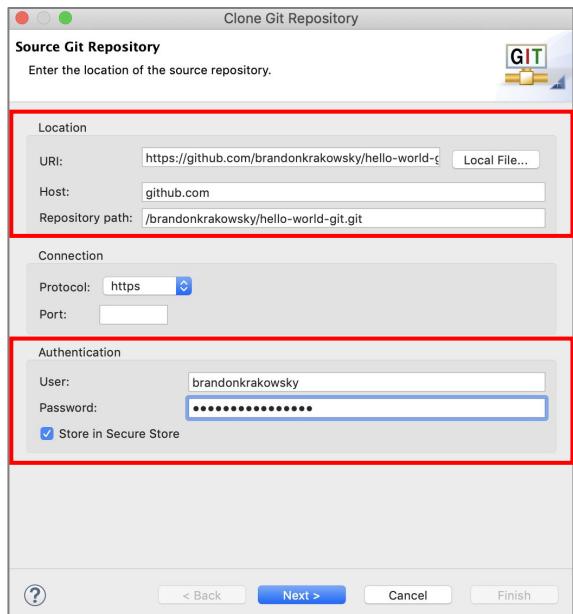
Cloning a Repository in Eclipse

- Paste the web URL for the remote git repository into the Location URI field
 - This should automatically populate other Location fields



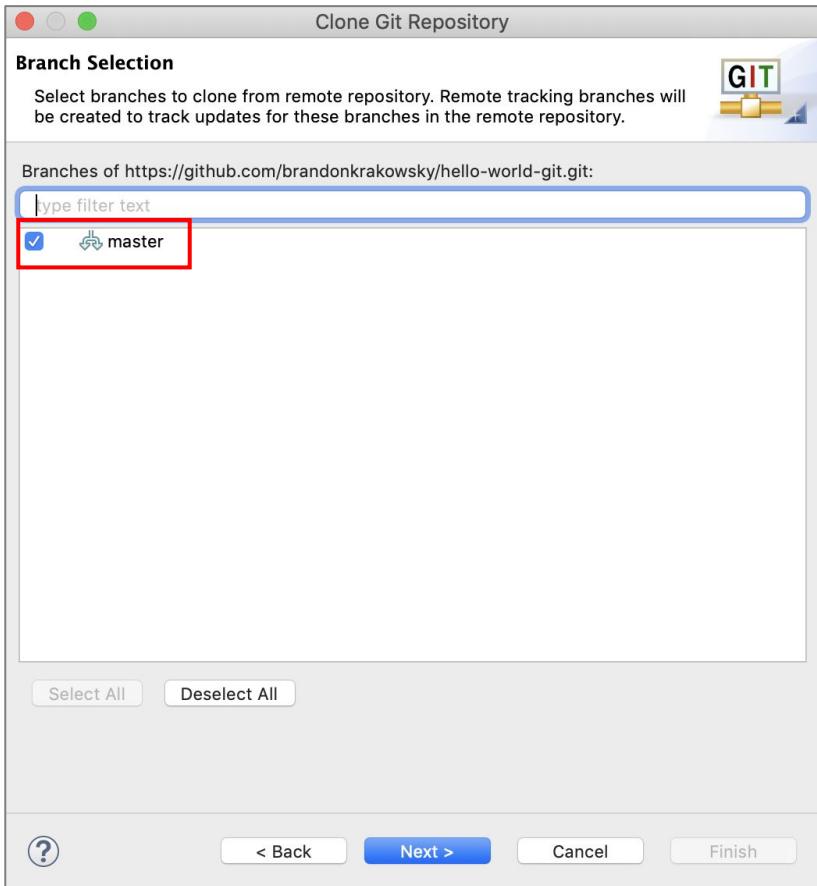
Cloning a Repository in Eclipse

- Paste the web URL for the remote git repository into the Location URI field
 - This should automatically populate other Location fields
- Enter the Authentication User and Personal Access Token (PAT) associated with your GitHub account
 - Optionally select the “Store in Secure Store” option



Cloning a Repository in Eclipse

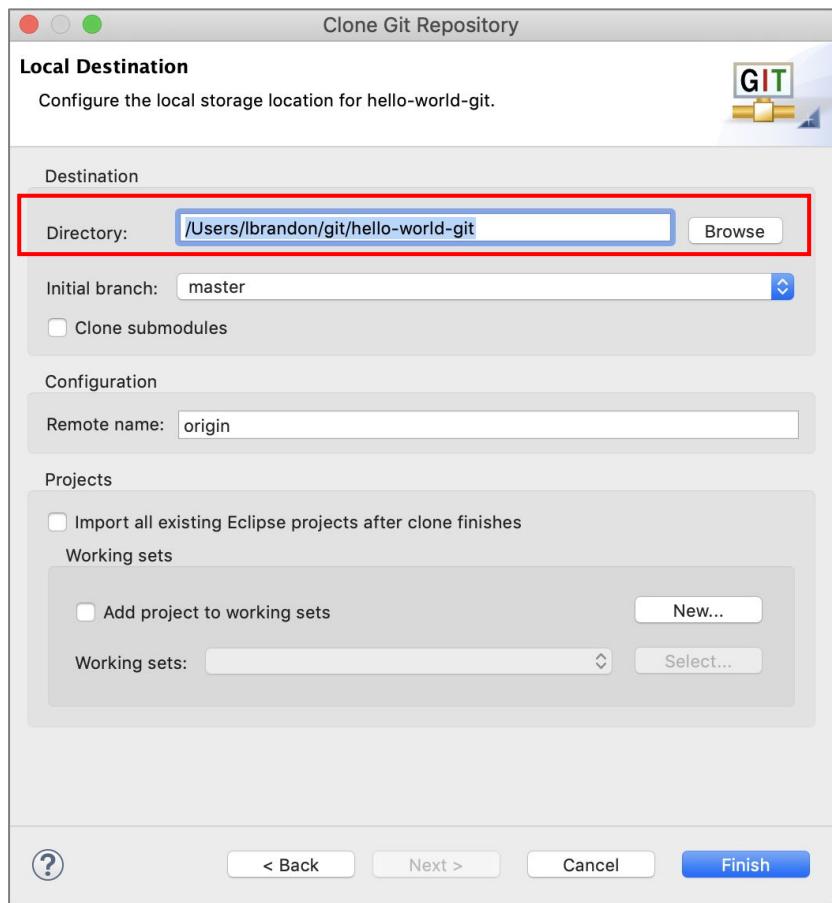
- Select the default master branch



- Branching is the way to work on different versions of a repository at one time
- By default your repository has one branch named master which is considered to be the definitive branch

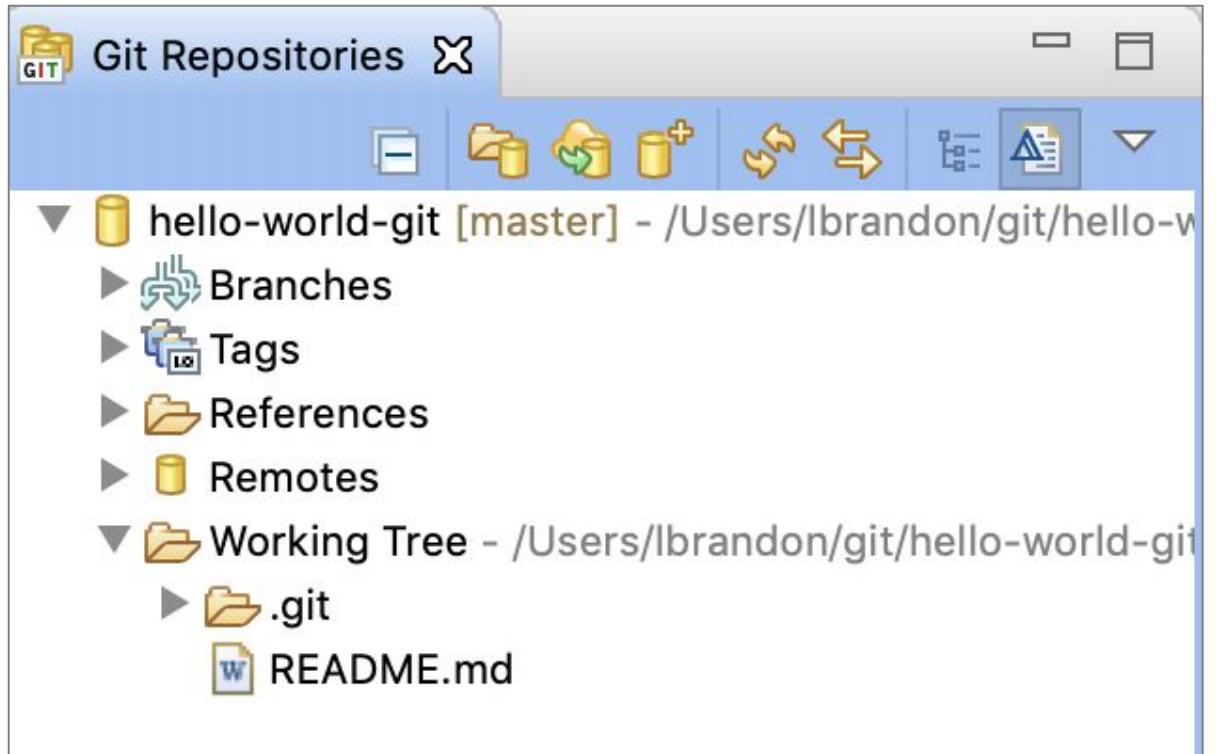
Cloning a Repository in Eclipse

- Configure the local storage location for the remote git repository



Cloning a Repository in Eclipse

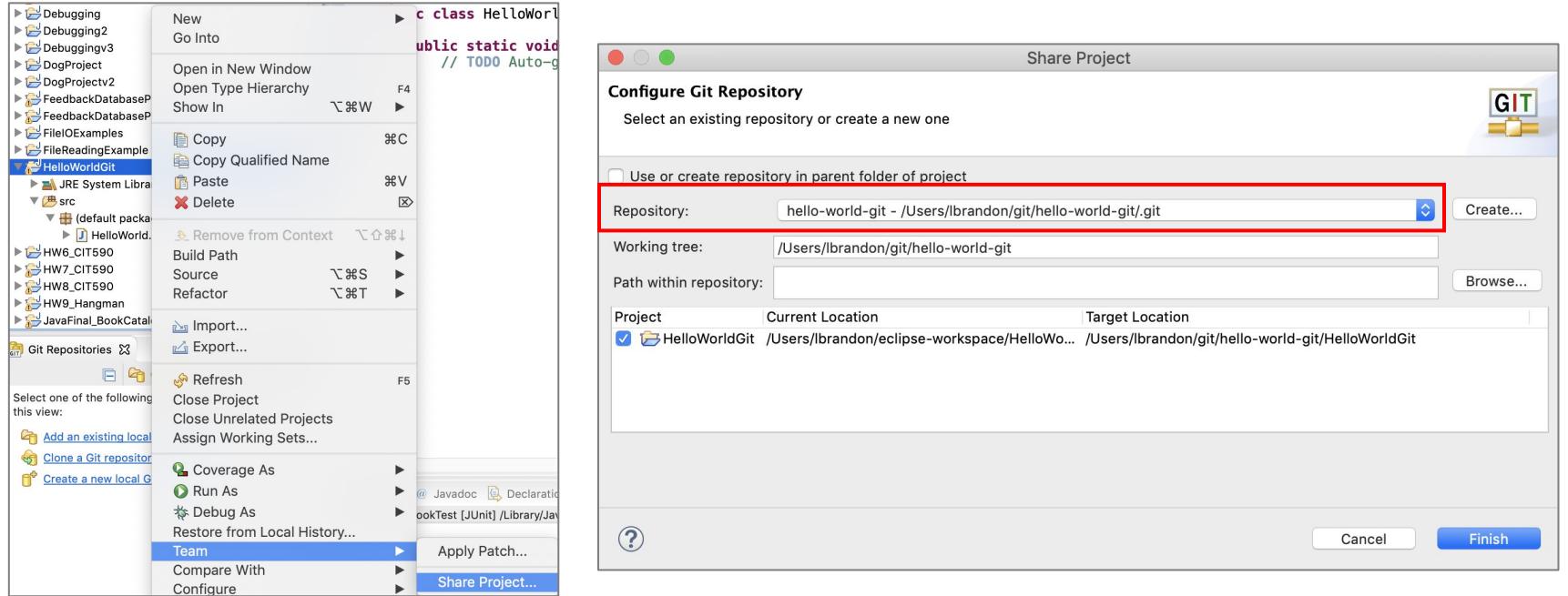
- You'll see the newly cloned local repository in the “Git Repositories” view



Adding an Eclipse Project to Git

Adding an Eclipse Project to the Local Repository

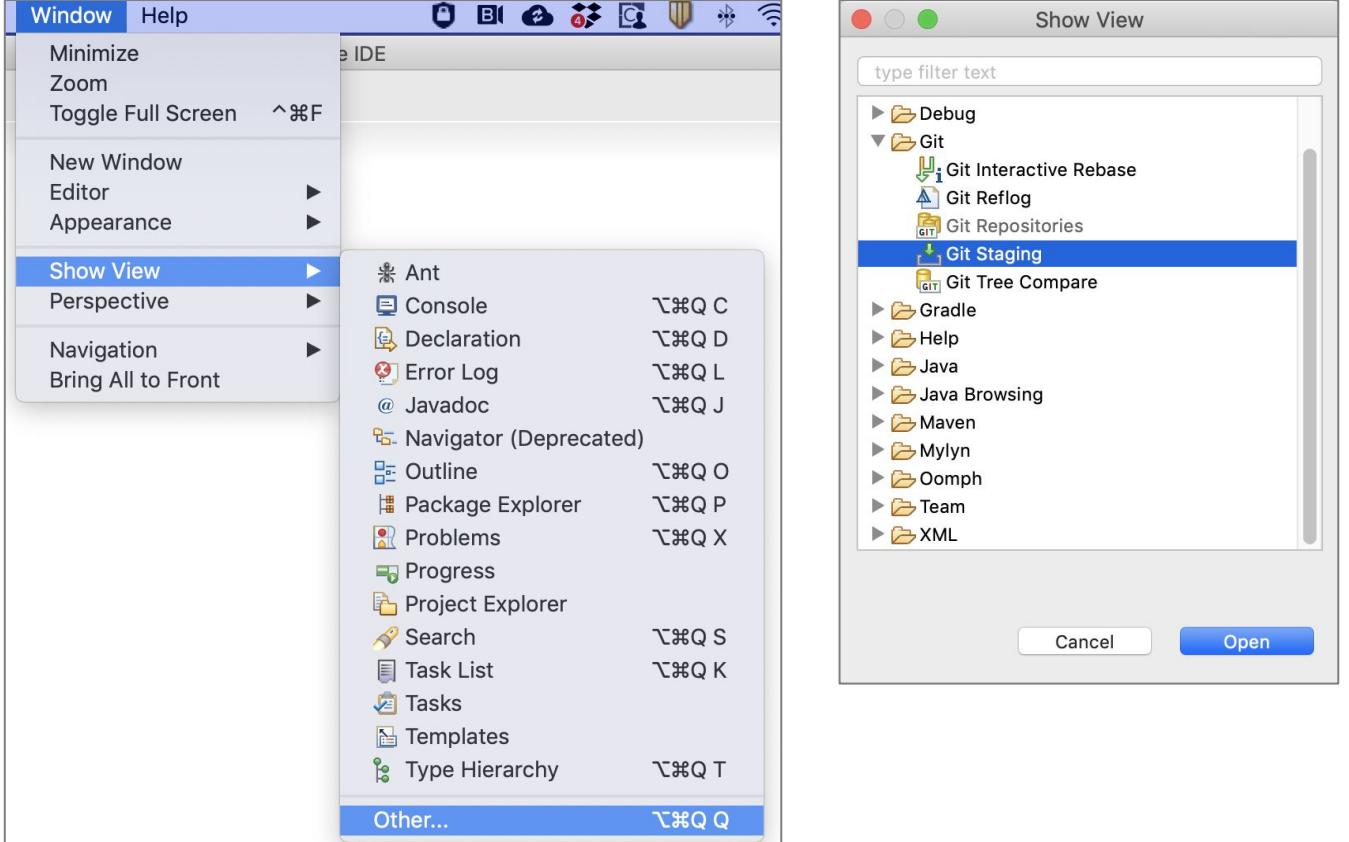
- Create a new Java Project, add a file, and put the entire project under version control
- Right click on the project and go to Team □ Share Project



- Select your existing local git repository from the drop-down and click “Finish”

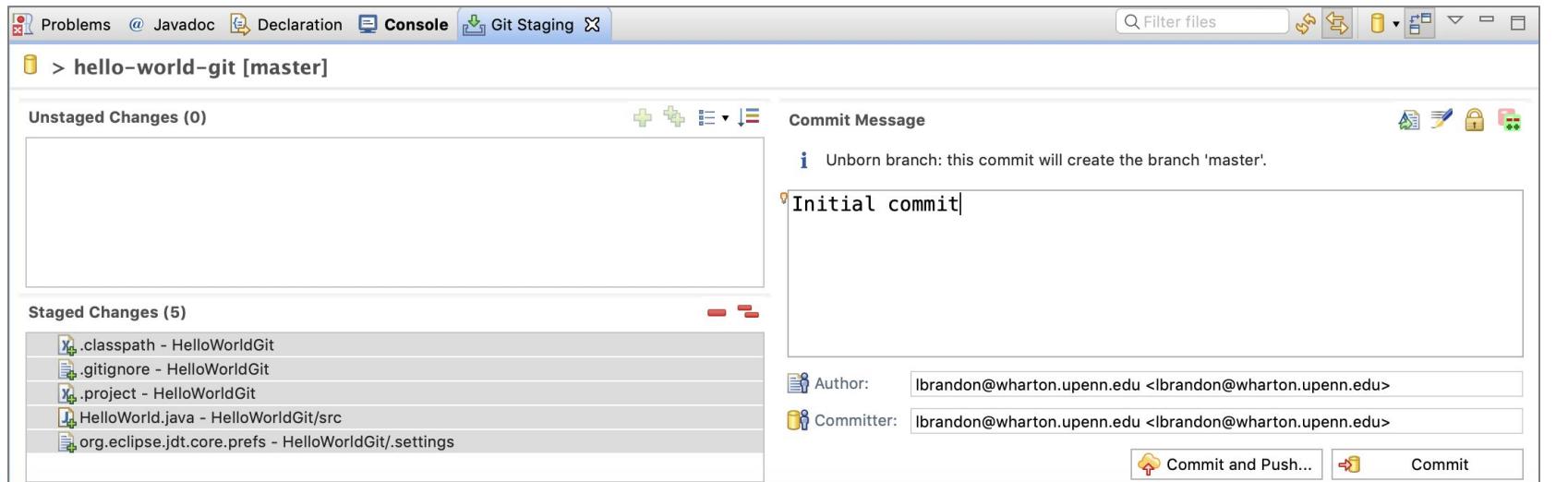
Making Initial Git Commit via the Git Staging View

- Open the “Git Staging” view in Eclipse by going to Window □ Show View □ Other... □ Git □ Git Staging



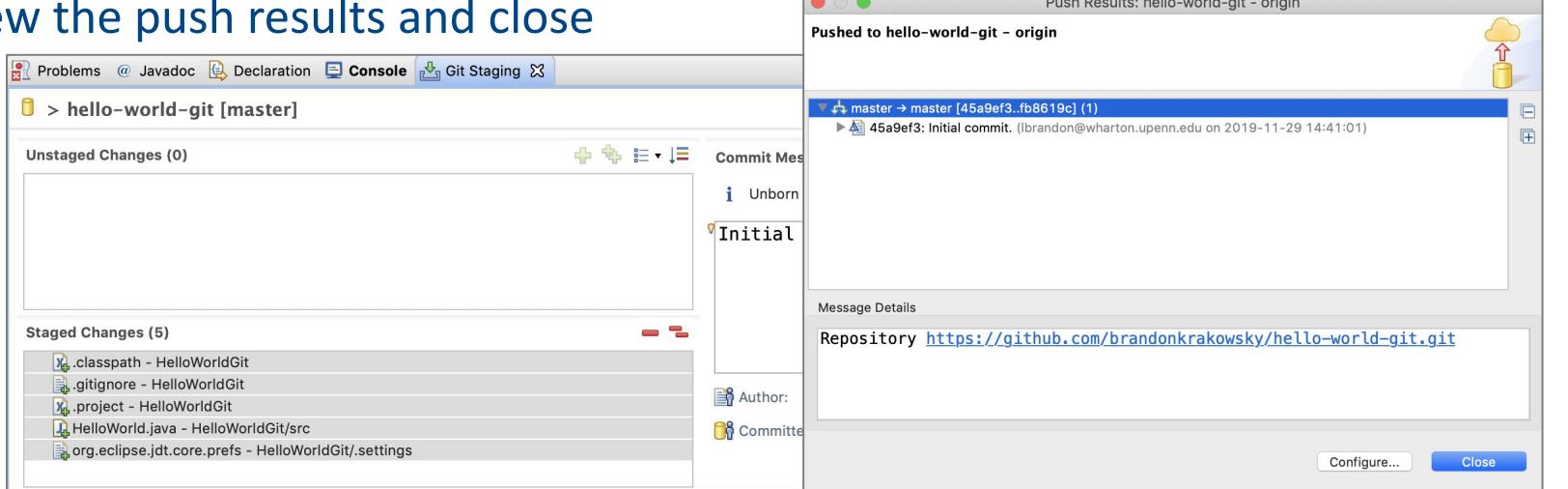
Making Initial Git Commit

- Drag all of the files into the “Staged Changes” area, type a meaningful commit message, and press “Commit and Push”
 - A **commit** is when you tell git that a change (or addition) you have made is ready to be included in the project
 - **Push** is when you upload the changes to the remote repository
 - The commit **message** should state specifically what you have done



Making Initial Git Commit

- Drag all of the files into the “Staged Changes” area, type a meaningful commit message, and press “Commit and Push”
 - A **commit** is when you tell git that a change (or addition) you have made is ready to be included in the project
 - **Push** is when you upload the changes to the remote repository
 - The commit **message** should state specifically what you have done
- Review the push results and close



Viewing Changes in GitHub

- In GitHub, refresh your project's repository and note the initial commit and project files

The screenshot shows a GitHub repository page for 'brandonkrakowsky / hello-world-git'. The repository is private. At the top, there are buttons for Unwatch (1), Star (0), Fork (0), and Settings. Below the header, there are links for Code, Issues (0), Pull requests (0), Actions, Projects (0), Security, Insights, and Settings. The main area is titled 'My project's repository' and includes a 'Manage topics' link and an 'Edit' button. It displays statistics: 2 commits, 1 branch, 0 packages, and 0 releases. Below these are buttons for Branch: master, New pull request, Create new file, Upload files, Find file, and Clone or download. A red box highlights the commit list, which shows three entries: 'Initial commit.' by 'brandonkrakowsky' (latest commit 45a9ef3, 2 minutes ago), 'Initial commit.' by 'HelloWorldGit' (2 minutes ago), and 'Initial commit' by 'README.md' (3 days ago). The 'README.md' entry has a green edit icon next to it. Below the commit list is a preview of the 'README.md' file content, which contains the text 'hello-world-git'. The footer of the page also says 'My project's repository'.

File/Commit	Author	Message	Time
Initial commit.	brandonkrakowsky	Initial commit.	Latest commit 45a9ef3 2 minutes ago
Initial commit.	HelloWorldGit	Initial commit.	2 minutes ago
Initial commit	README.md	Initial commit	3 days ago

Viewing Changes in GitHub

- Navigate through the folder structure and view the files

The screenshot shows two views of a GitHub repository. The main view is for the repository `brandonkrakowsky / hello-world-git`, which is private. It has 1 watch, 0 stars, and 0 forks. The code tab is selected. The branch is master, and the path is `hello-world-git / HelloWorldGit / src /`. A commit titled "Initial commit." by `brandonkrakowsky` is shown, containing the file `HelloWorld.java`. The detailed view on the right shows the same commit and file content. The commit message is "Initial commit." and it was made 5 minutes ago with 1 contributor. The file `HelloWorld.java` has 9 lines (5 sloc) and 114 Bytes. The code content is:

```
1 public class HelloWorld {  
2     public static void main(String[] args) {  
3         // TODO Auto-generated method stub  
4     }  
5 }  
6  
7 }  
8  
9 }
```

Making a Change & Committing It

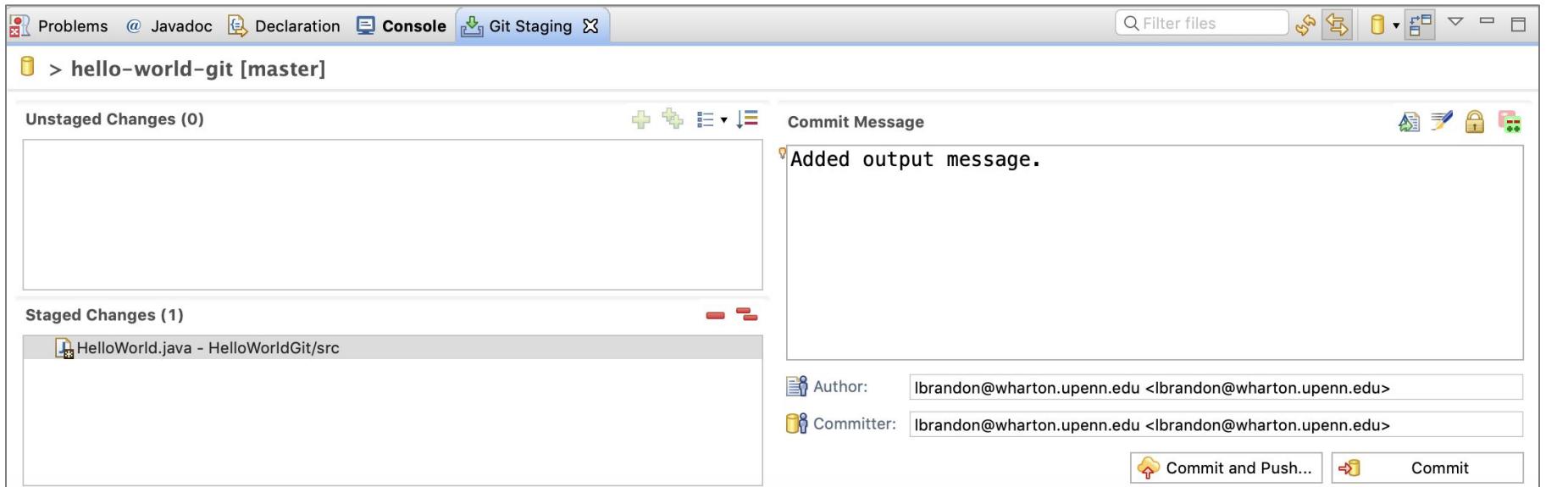
- Make a change to your project
 - Any change will suffice, add a `System.out.println` statement



```
J HelloWorld.java X
1
2 /**
3  * Hello World project! Under version control via Git.
4  * @author lbrandon
5  *
6 */
7 public class HelloWorld {
8
9     public static void main(String[] args) {
10
11         System.out.println("Hello World project under version control!");
12     }
13 }
14
```

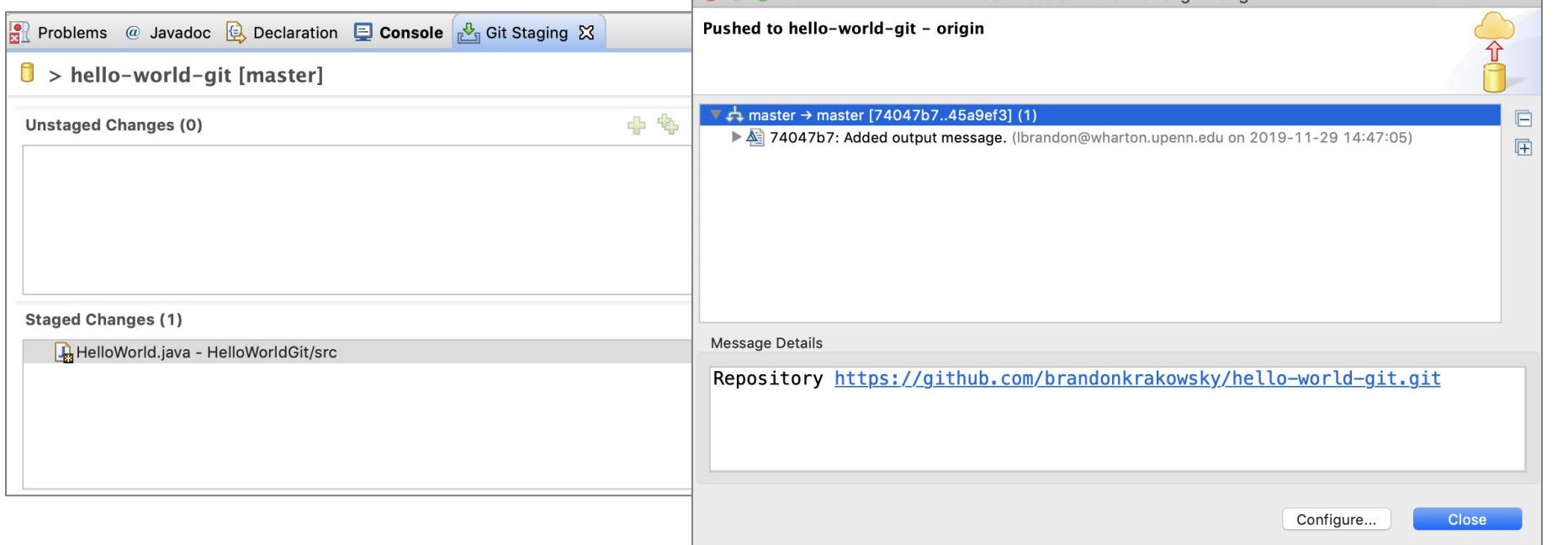
Making a Change & Committing It

- Drag the updated file into the “Staged Changes” area, type a meaningful commit message, and press “Commit and Push”
 - Again, this will upload your file and changes to the remote git repository



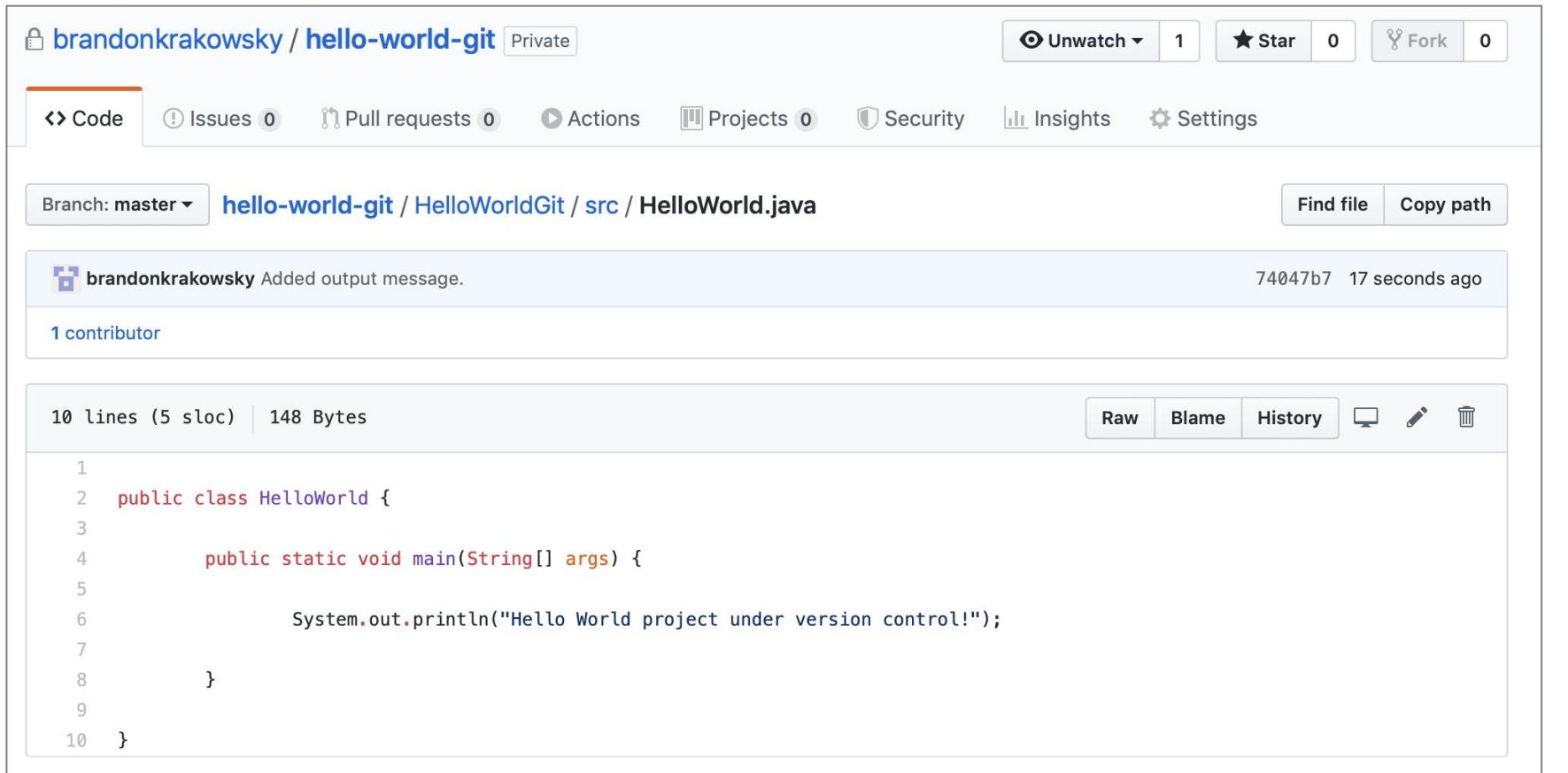
Making a Change & Committing It

- Drag the updated file into the “Staged Changes” area, type a meaningful commit message, and press “Commit and Push”
 - Again, this will upload your file and changes to the remote git repository
- Review the push results and close



Viewing Changes in GitHub

- Refresh the file in GitHub to see the changes



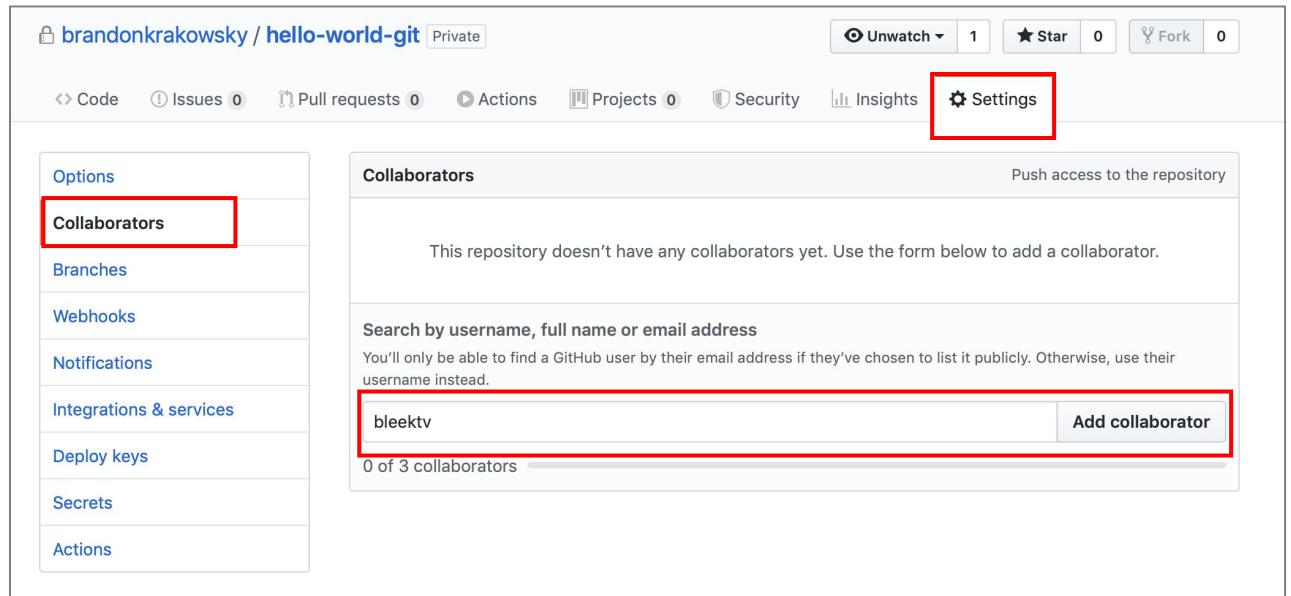
A screenshot of a GitHub repository page for 'brandonkrakowsky / hello-world-git'. The repository is private. The 'Code' tab is selected. The branch is 'master'. The file path is 'HelloWorldGit / src / HelloWorld.java'. A recent commit by 'brandonkrakowsky' is shown, adding the message 'Added output message.' at 74047b7 17 seconds ago. One contributor is listed. The code editor shows the following Java code:

```
1 public class HelloWorld {  
2     public static void main(String[] args) {  
3         System.out.println("Hello World project under version control!");  
4     }  
5 }  
6  
7 }  
8  
9 }  
10 }
```

Setting Up & Configuring a Collaborator

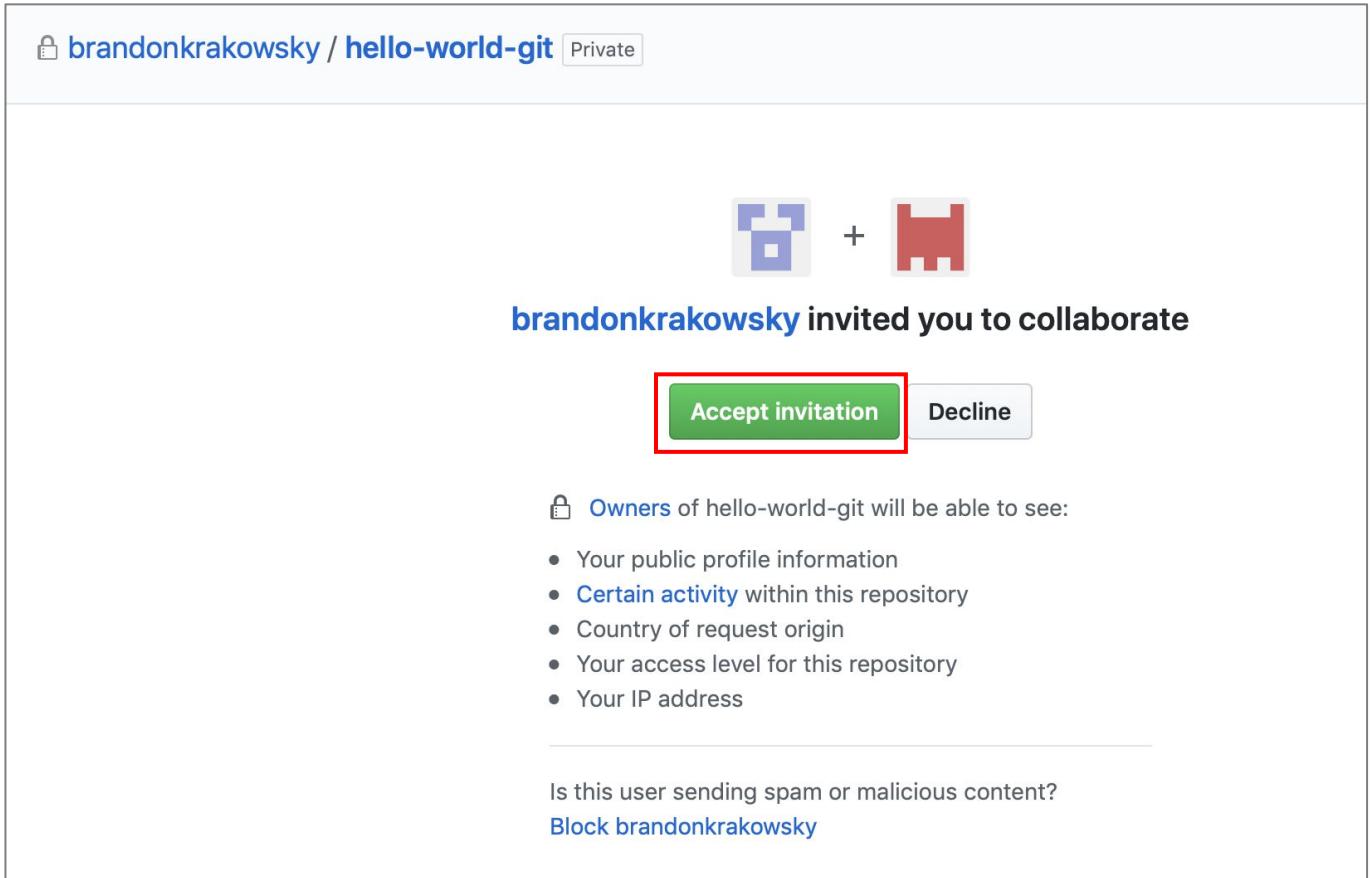
Adding a Collaborator to a Repository

- As a repository owner, you can add a collaborator to a project repository
 - This gives them push access to the repository
- In GitHub, go to your project's repository, and go to Settings □ Collaborators, then add a collaborator
 - The GitHub user will receive an invitation via email



Accepting an Invitation to a Repository

- The invited collaborator should accept the invitation to gain push access



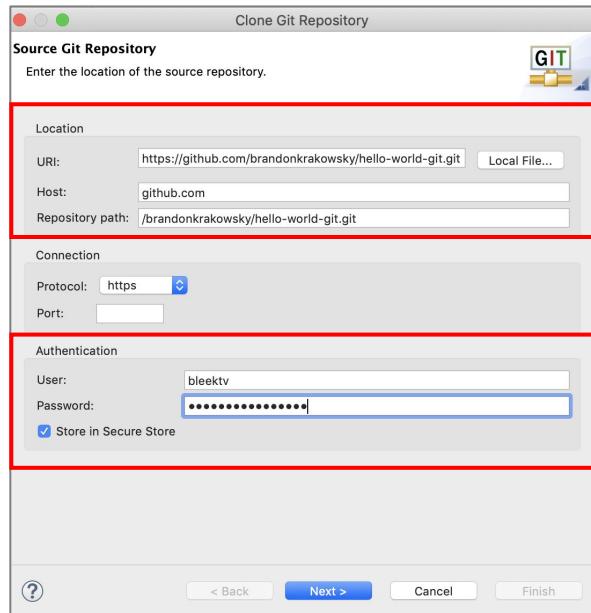
Configure Git in Eclipse (Collaborator)

- Assuming an Eclipse IDE is being used, the collaborator will need to:
 - Set up and configure Git in Eclipse
 - Open the “Git Repositories” and “Git Staging” views
 - Configure the git `user.email` and `user.name`



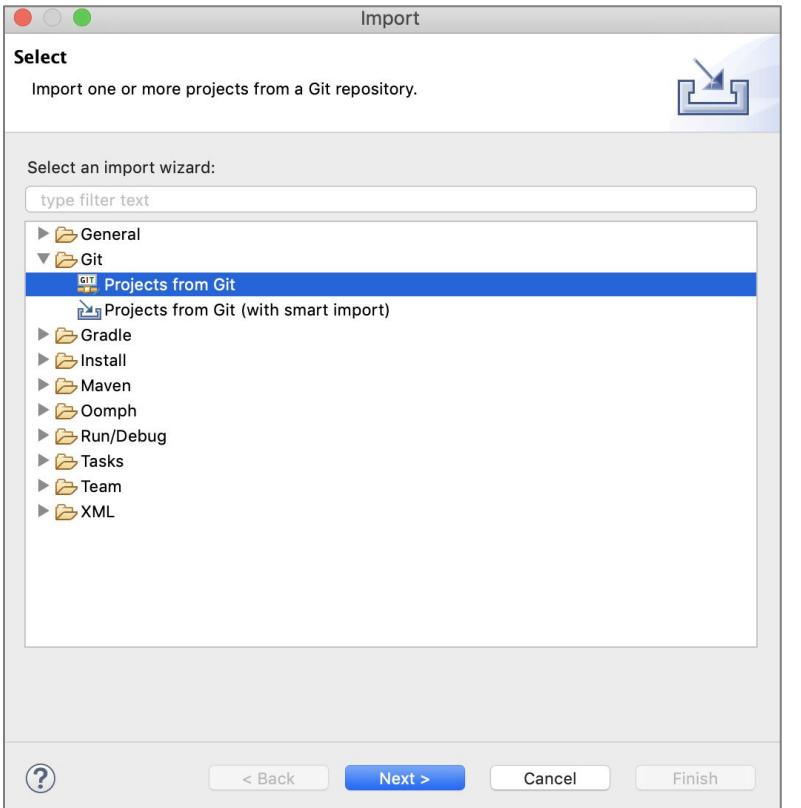
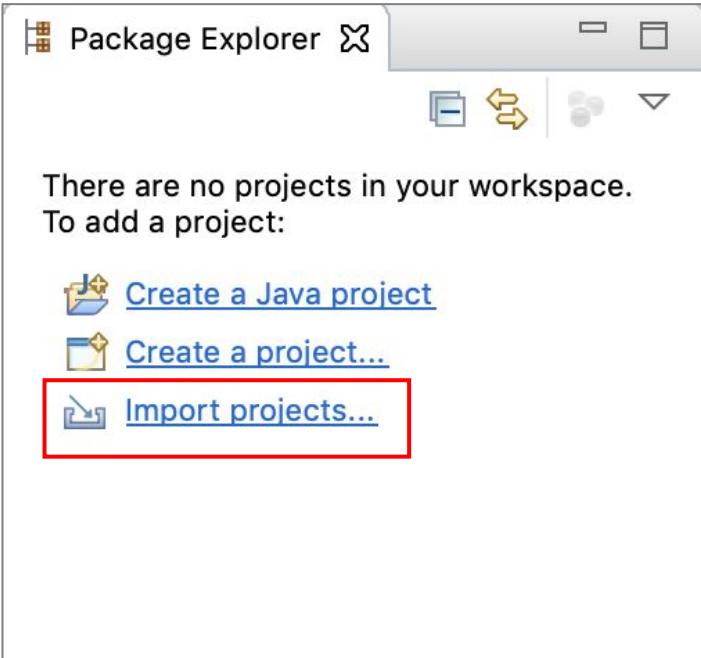
Cloning the Repository from GitHub (Collaborator)

- Then clone the same remote repository from GitHub
- First, make sure you've verified your email and set up a **Personal Access Token (PAT)** as a collaborator
- Then use the correct GitHub account username and personal access token



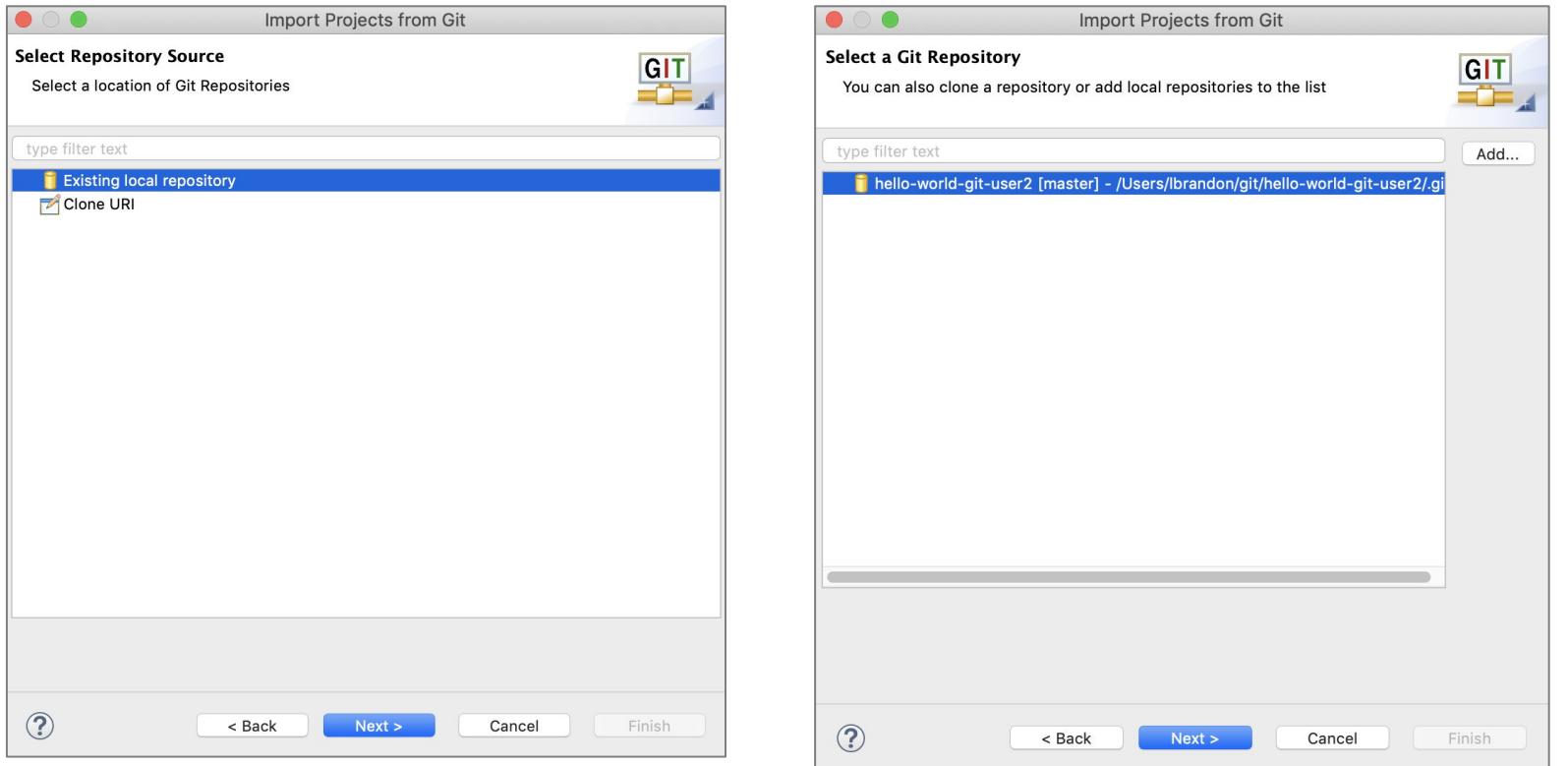
Importing the Eclipse Project from Git (Collaborator)

- The collaborator will then need to import the project into Eclipse
- Go to Import projects ... Git Projects from Git



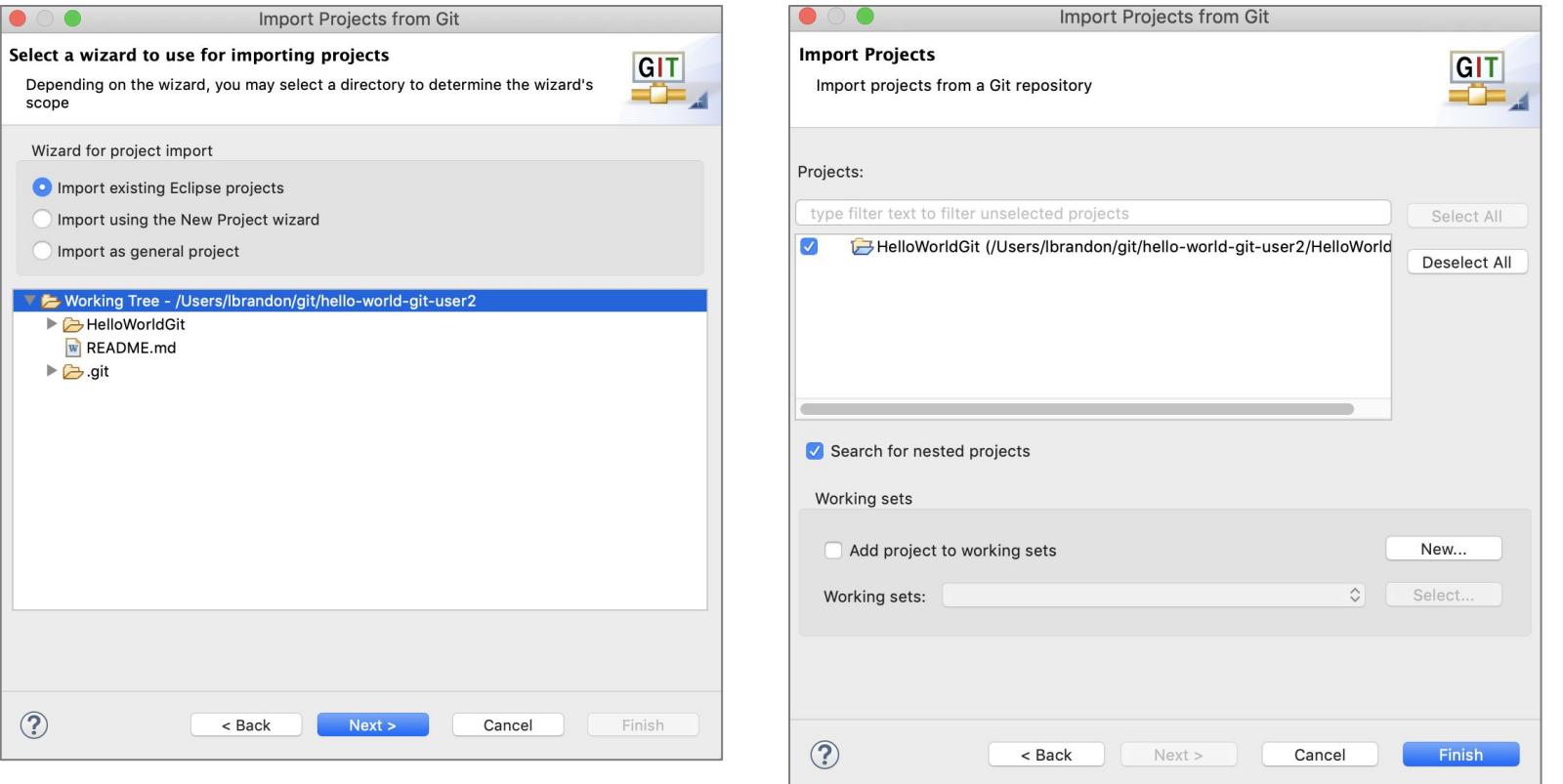
Importing the Eclipse Project from Git (Collaborator)

- Select “Existing local repository” and click “Next”
- Then select the correct local git repository and click “Next”



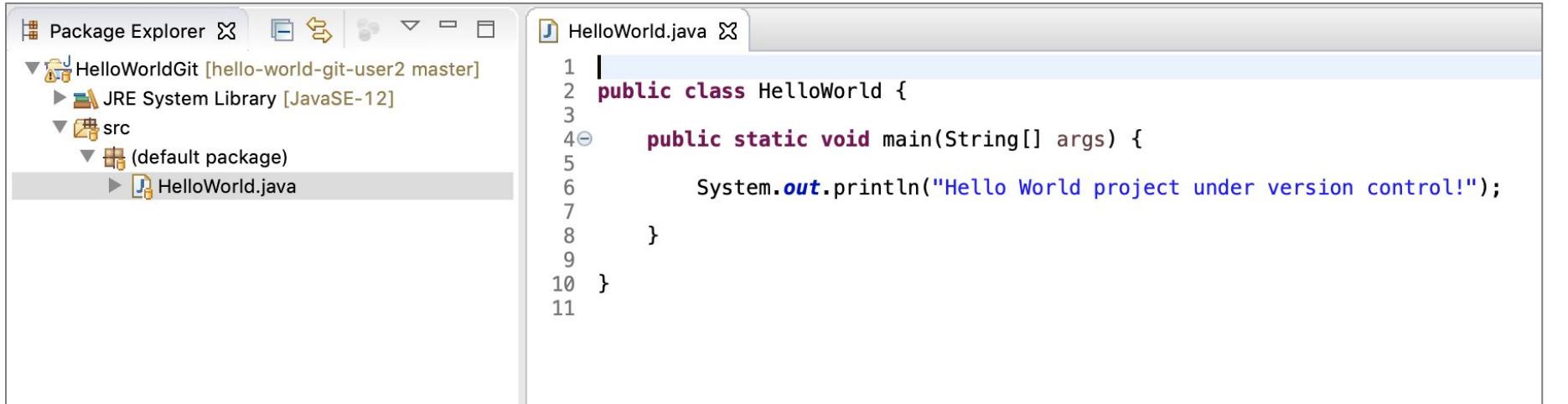
Importing the Eclipse Project from Git (Collaborator)

- Select “Import existing Eclipse projects” and click “Next”
- Then select the correct Eclipse project and click “Finish”



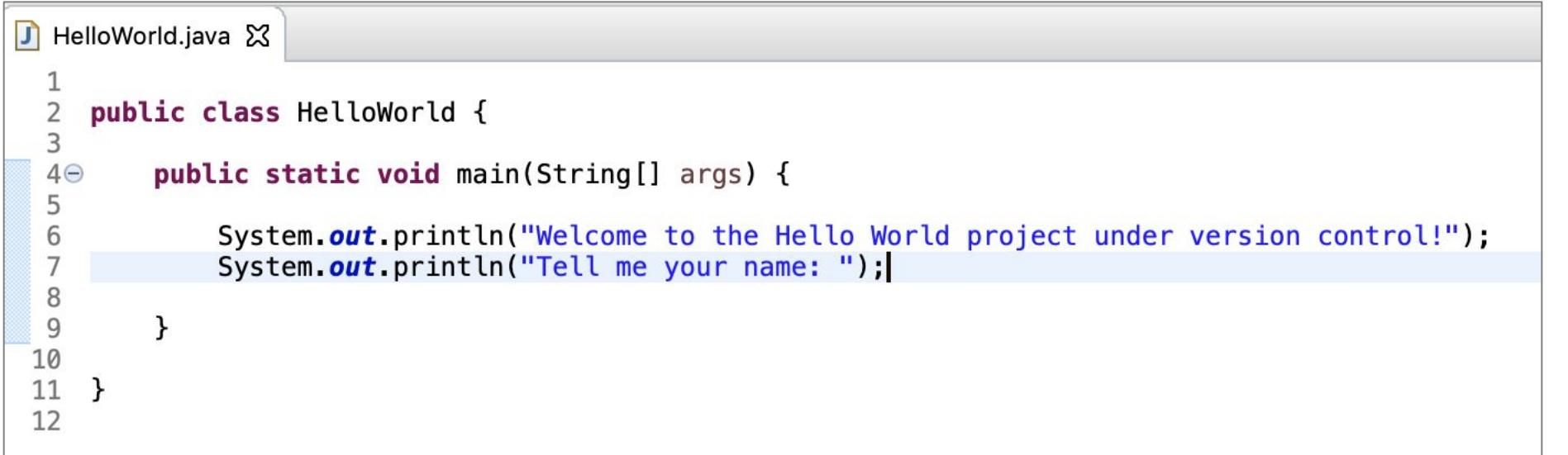
Importing the Eclipse Project from Git (Collaborator)

- You'll see the Eclipse project in the Package Explorer



Making a Change & Committing It (Collaborator)

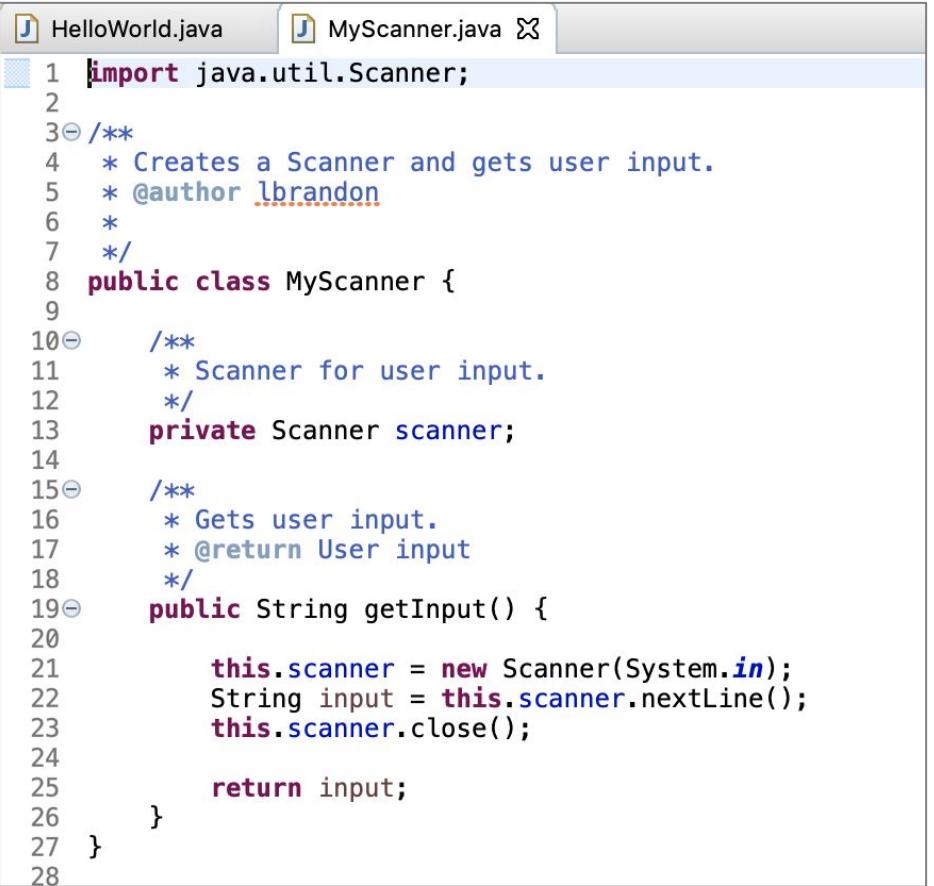
- Make a change to a file in the project



```
1 public class HelloWorld {
2
3     public static void main(String[] args) {
4         System.out.println("Welcome to the Hello World project under version control!");
5         System.out.println("Tell me your name: ");
6     }
7
8 }
9
10
11 }
12 }
```

Making a Change & Committing It (Collaborator)

- Add a file to the project



```
1 import java.util.Scanner;
2
3 /**
4  * Creates a Scanner and gets user input.
5  * @author lbrandon
6  *
7 */
8 public class MyScanner {
9
10    /**
11     * Scanner for user input.
12     */
13    private Scanner scanner;
14
15    /**
16     * Gets user input.
17     * @return User input
18     */
19    public String getInput() {
20
21        this.scanner = new Scanner(System.in);
22        String input = this.scanner.nextLine();
23        this.scanner.close();
24
25        return input;
26    }
27}
28
```

Making a Change & Committing It (Collaborator)

- Make another change to a file in the project



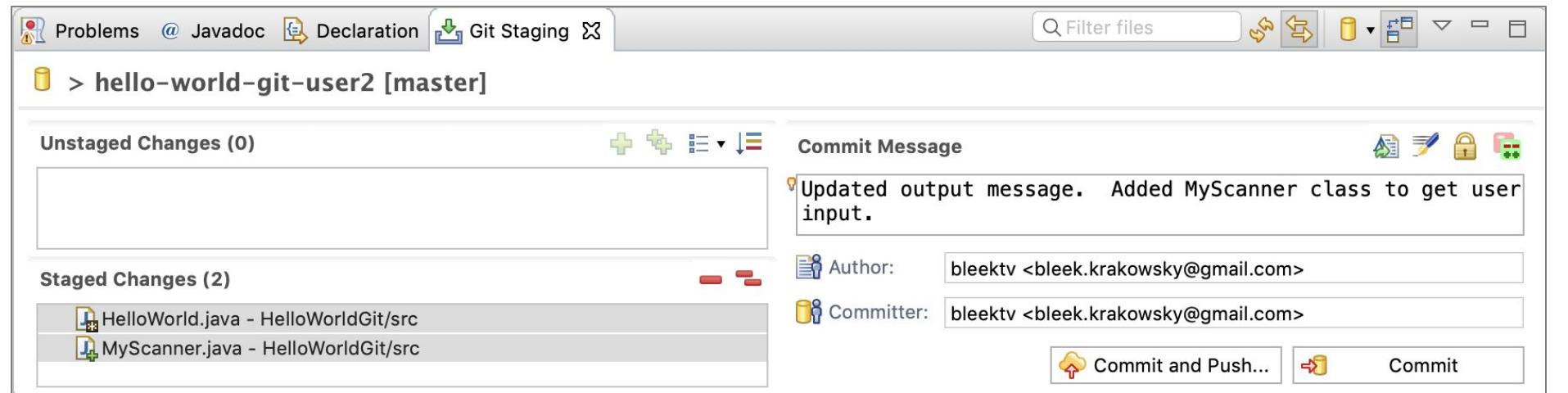
The screenshot shows a Java code editor with two tabs: "HelloWorld.java" and "MyScanner.java". The "HelloWorld.java" tab is active, displaying the following code:

```
1 public class HelloWorld {
2     public static void main(String[] args) {
3         System.out.println("Welcome to the Hello World project under version control!");
4         System.out.println("Tell me your name: ");
5
6         MyScanner myScanner = new MyScanner();
7         String input = myScanner.getInput();
8         System.out.println("Hello " + input + "!");
9
10    }
11
12 }
13
14
15 }
16 }
```

The code includes several print statements using `System.out.println()`. The line `System.out.println("Welcome to the Hello World project under version control!");` is highlighted in blue, indicating it is the current line being edited.

Making a Change & Committing It (Collaborator)

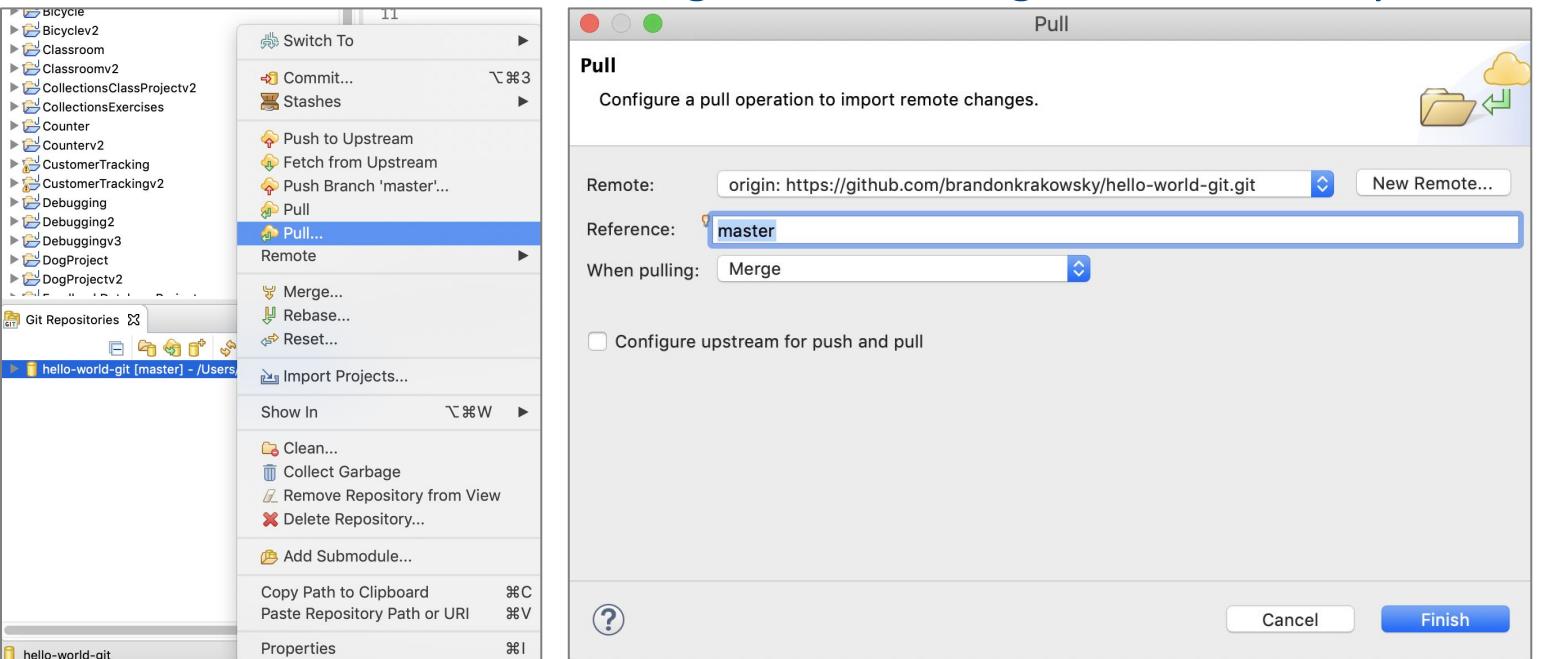
- Drag the updated file and new file into the “Staged Changes” area, type a meaningful commit message, and press “Commit and Push”



Pulling & Merging Changes

Pulling & Merging Changes (Repository Owner)

- Always make sure you are up-to-date before starting to work!
- To pull in the latest changes from the remote repository, right-click on the local git repository and select Pull ...
- Pull from the master branch and changes will be merged automatically



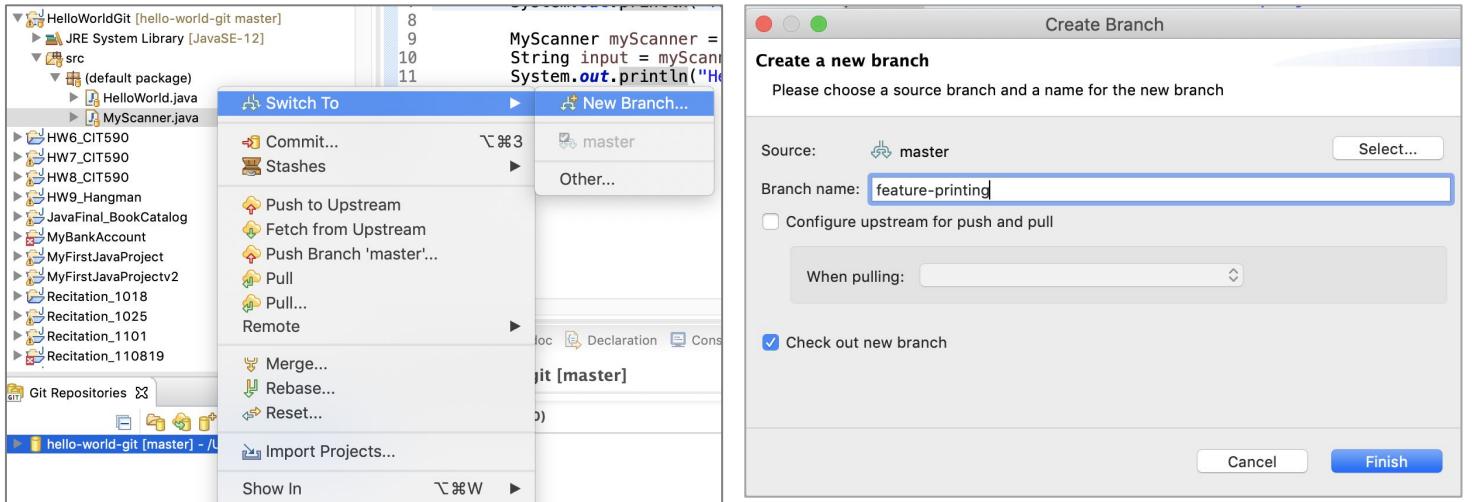
Branching

- Branching is the way to work on different versions of a repository at one time
- By default your repository has one branch named **master** which is considered to be the definitive branch
- We use branches to develop features, fix bugs, or safely experiment and make edits before committing them to **master**
- When you create a **branch** off the **master** branch, you're making a copy, or **snapshot**, of **master** as it was at that point in time

Ref: <https://guides.github.com/activities/hello-world/>

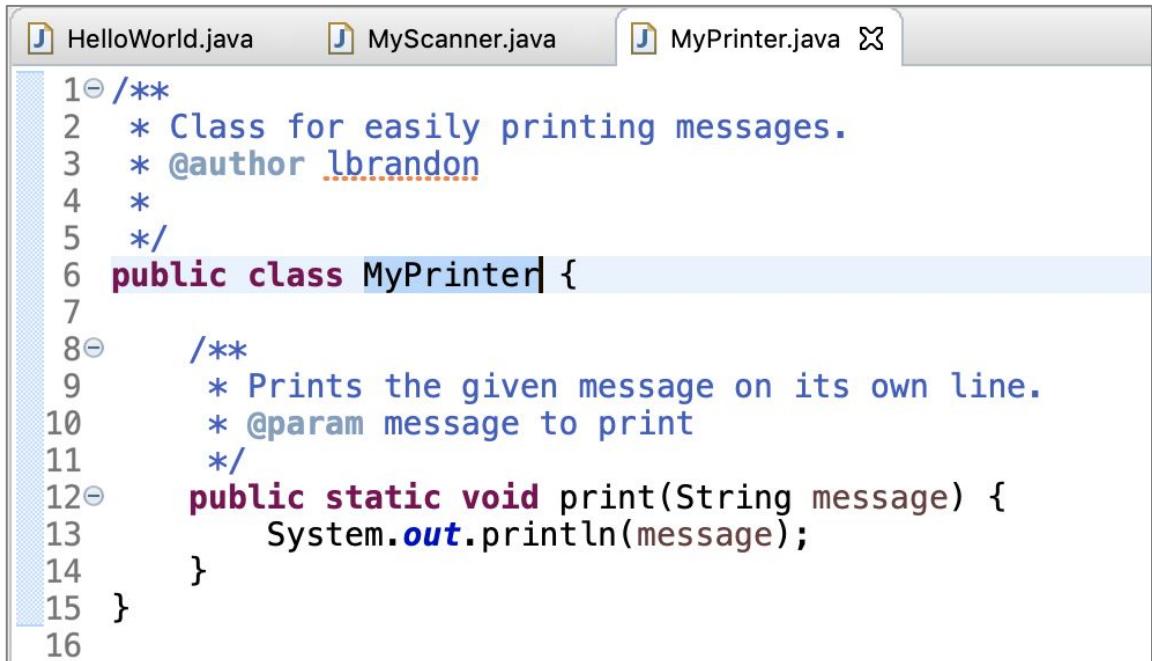
Creating a Branch (Repository Owner)

- Branching allows each developer to branch out from the original code base and isolate their work from others
 - It also helps Git to easily merge versions later on
- For example, you can create a branch to work on a particular feature ...
- Right-click on the local git repository and go to Switch To ▾ New Branch...
- Give your branch a name and click “Finish”



Work Inside of a Branch (Repository Owner)

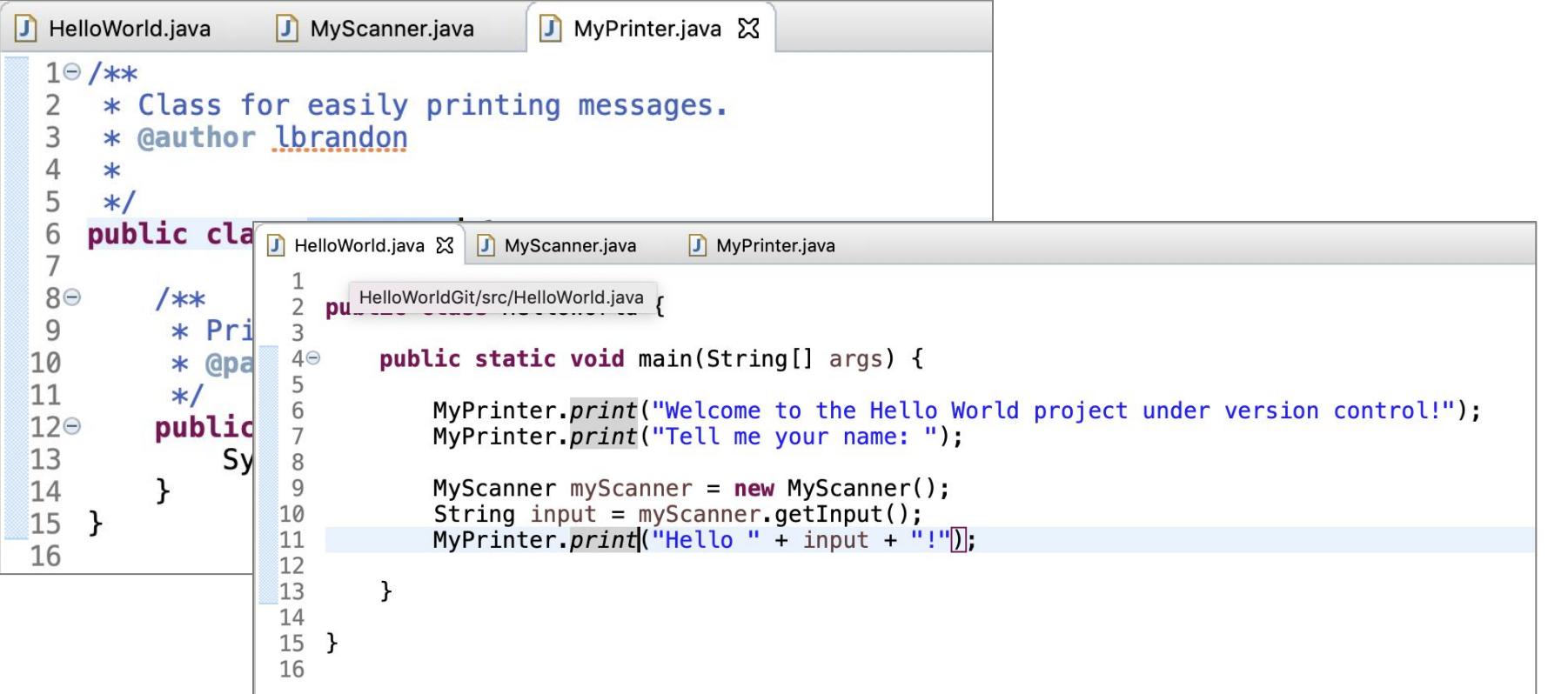
- Add a new file



```
1⊖ /**
2  * Class for easily printing messages.
3  * @author lbrandon
4  *
5  */
6 public class MyPrinter {
7
8⊖     /**
9      * Prints the given message on its own line.
10     * @param message to print
11     */
12⊖     public static void print(String message) {
13         System.out.println(message);
14     }
15 }
16
```

Work Inside of a Branch (Repository Owner)

- Add a new file
- Update code in an existing file

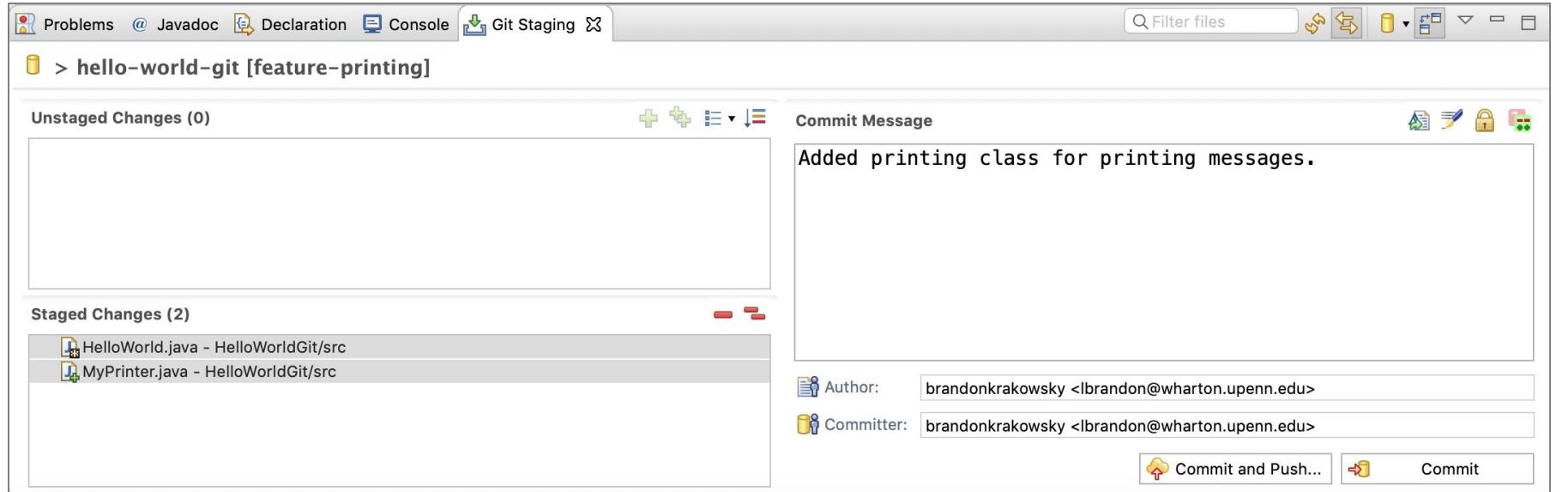


```
1 /**
2  * Class for easily printing messages.
3  * @author lbrandon
4  *
5 */
6 public class HelloWorld {
7
8     /**
9      * Prints a message to the console.
10     * @param name The name to print.
11     */
12    public void print(String name) {
13        System.out.println("Hello " + name);
14    }
15 }
16
```

```
1 package HelloWorldGit;
2
3 import MyScanner;
4 import MyPrinter;
5
6 public class HelloWorld {
7
8     /**
9      * Prints a message to the console.
10     * @param name The name to print.
11     */
12    public void print(String name) {
13        MyPrinter.print("Welcome to the Hello World project under version control!");
14        MyPrinter.print("Tell me your name: ");
15
16        MyScanner myScanner = new MyScanner();
17        String input = myScanner.getInput();
18        MyPrinter.print("Hello " + input + "!");
19    }
20 }
```

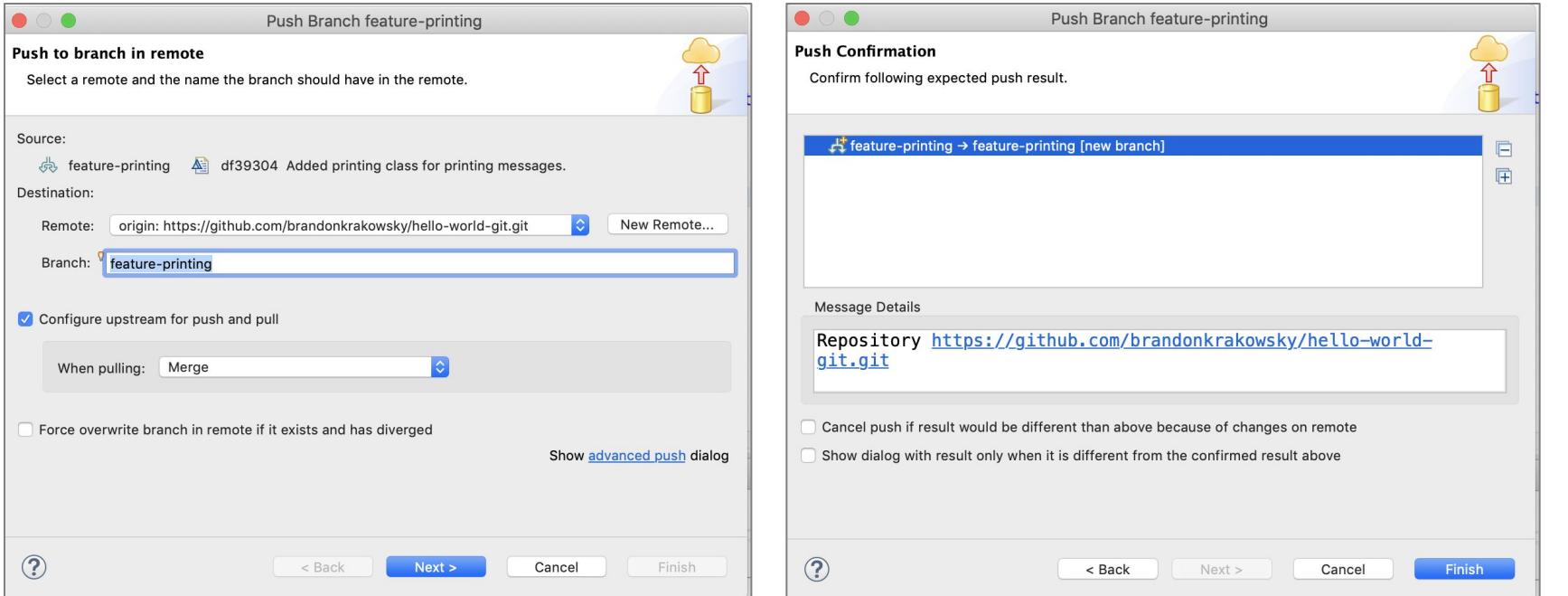
Commit & Push the Branch (Repository Owner)

- Drag the updated file and new file into the “Staged Changes” area, type a meaningful commit message, and press “Commit and Push”
 - This pushes the changes in the current branch to the remote repository



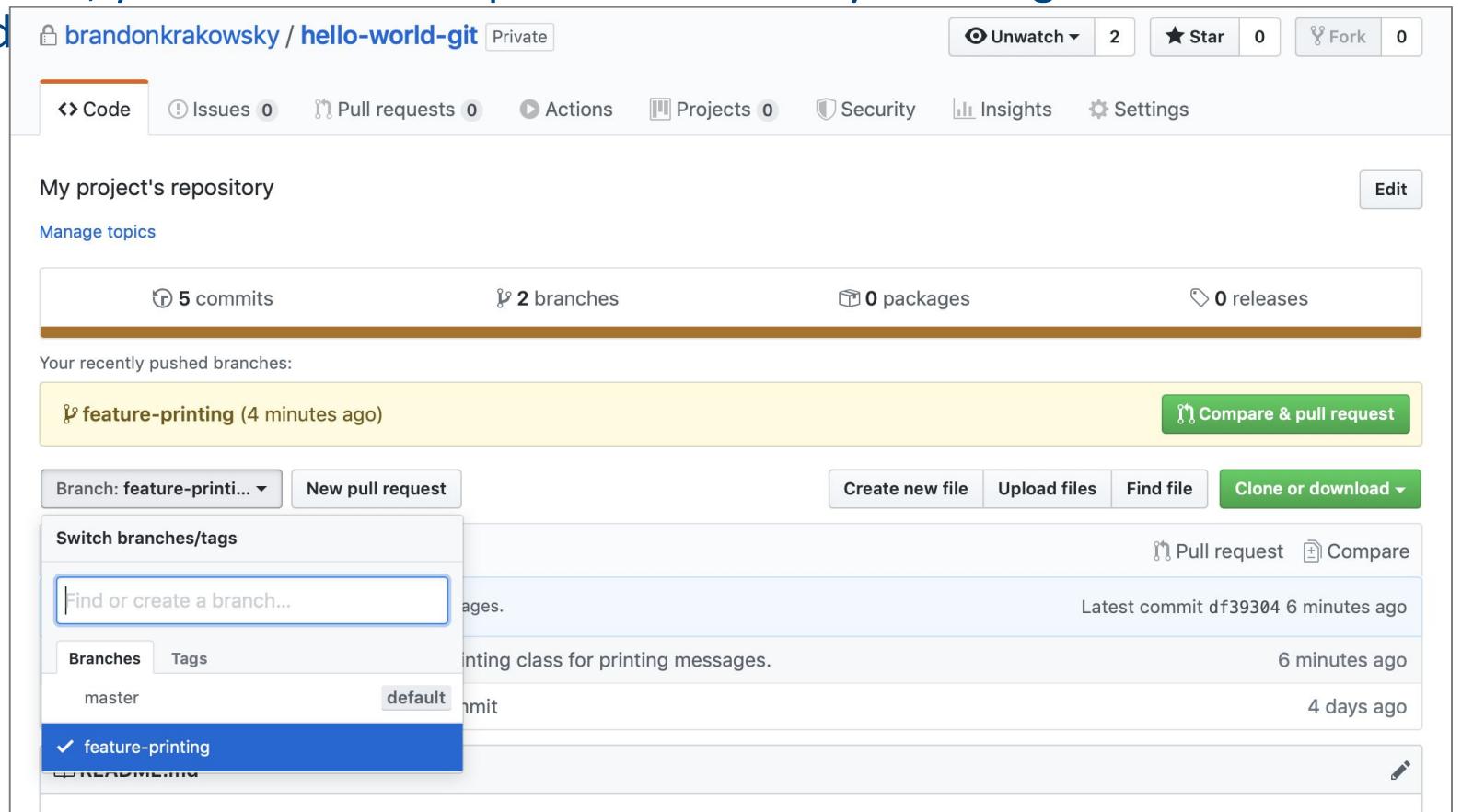
Commit & Push the Branch (Repository Owner)

- Confirm the branch details and click “Next”
- Review the push confirmation and click “Finish”



Commit & Push the Branch (Repository Owner)

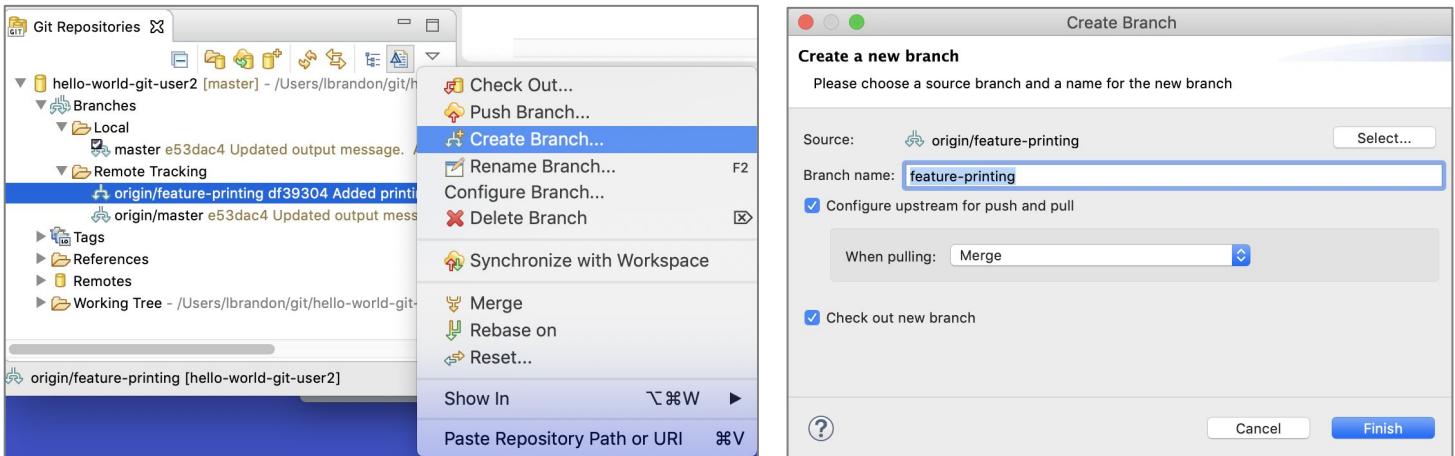
- On GitHub, you can switch to specific branches by selecting the branch from the Branch drop-down menu.



Pulling & Merging Branches

Pulling a Branch (Collaborator)

- To pull in the latest changes from the remote repository, right-click on the local git repository and select “Pull ...”
 - Pull from the master branch and changes will be merged automatically
- To pull in the latest changes for another branch, select the branch name under “Remote Tracking”, right-click and select “Create Branch...”
 - This will create a local branch based on the remote one
- Confirm the details of the new branch, then click “Finish”



Pulling a Branch (Collaborator)

- This will switch you to the new branch and you'll see the updated files in your Eclipse project

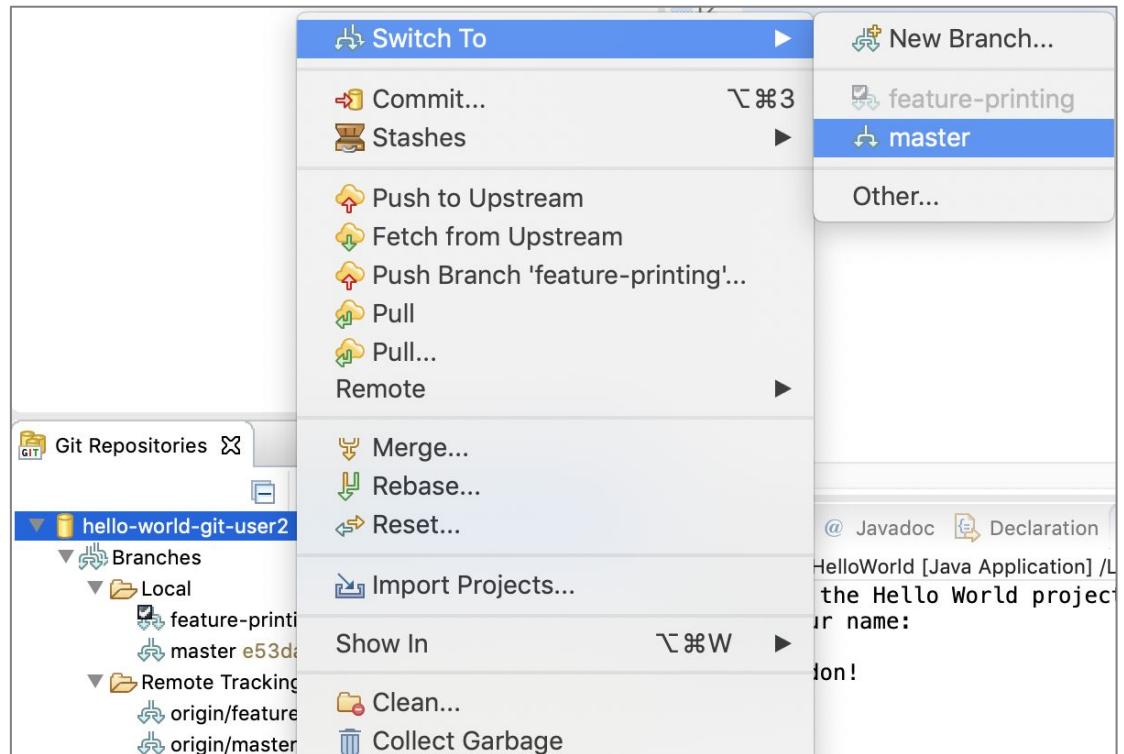


The screenshot shows the Eclipse IDE interface. On the left, the Package Explorer view displays a project named "HelloWorldGit" with a "src" folder containing three files: "HelloWorld.java", "MyPrinter.java", and "MyScanner.java". On the right, the main editor window shows the code for "HelloWorld.java". The code is as follows:

```
1 public class HelloWorld {
2     public static void main(String[] args) {
3         MyPrinter.print("Welcome to the Hello World project under version control!");
4         MyPrinter.print("Tell me your name: ");
5
6         MyScanner myScanner = new MyScanner();
7         String input = myScanner.getInput();
8         MyPrinter.print("Hello " + input + "!");
9
10    }
11
12 }
13
14
15
16 }
```

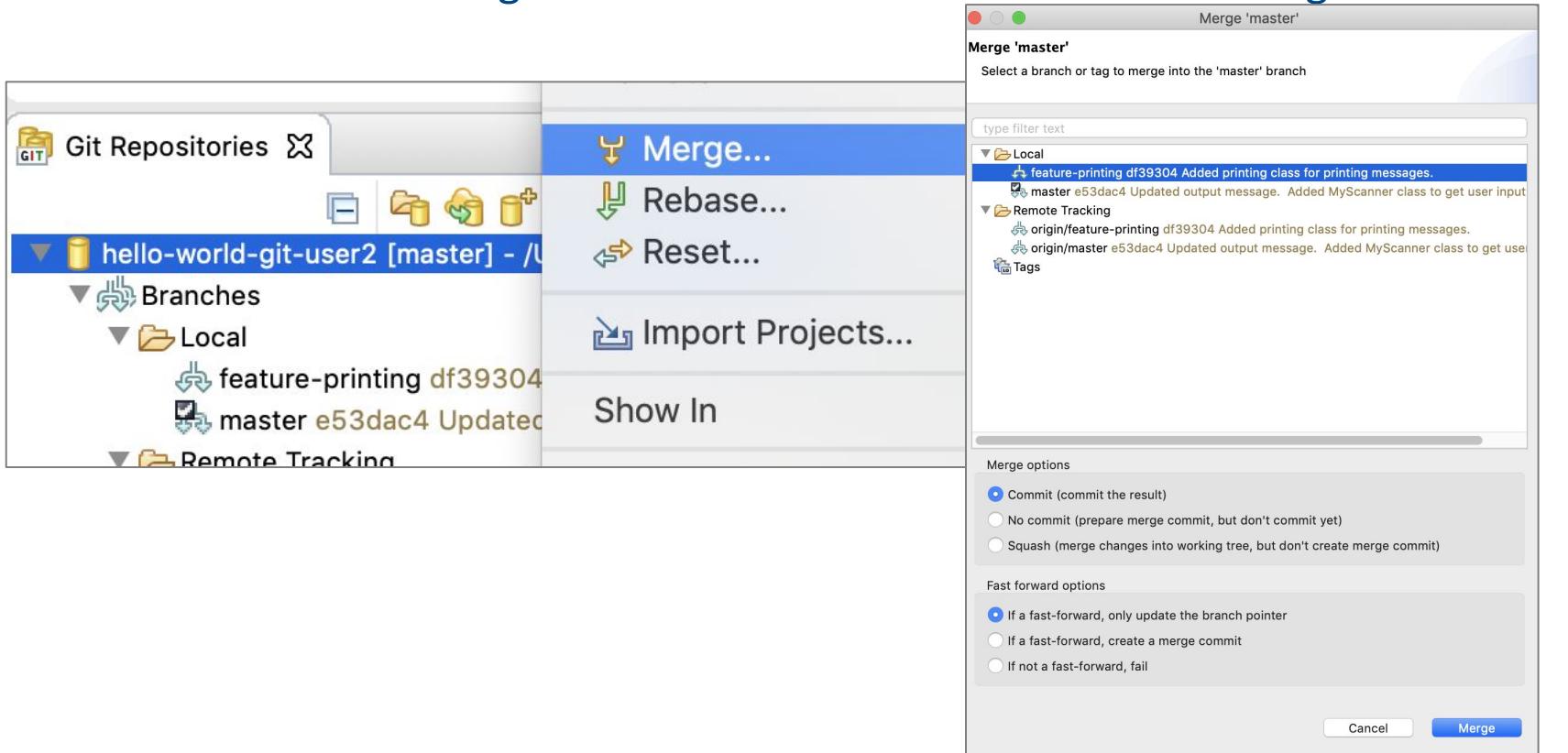
Switching to a Branch (Collaborator)

- To merge the new branch with the master branch, switch back to the master branch
- Right-click on the git repository and select “Switch To” □ “master”



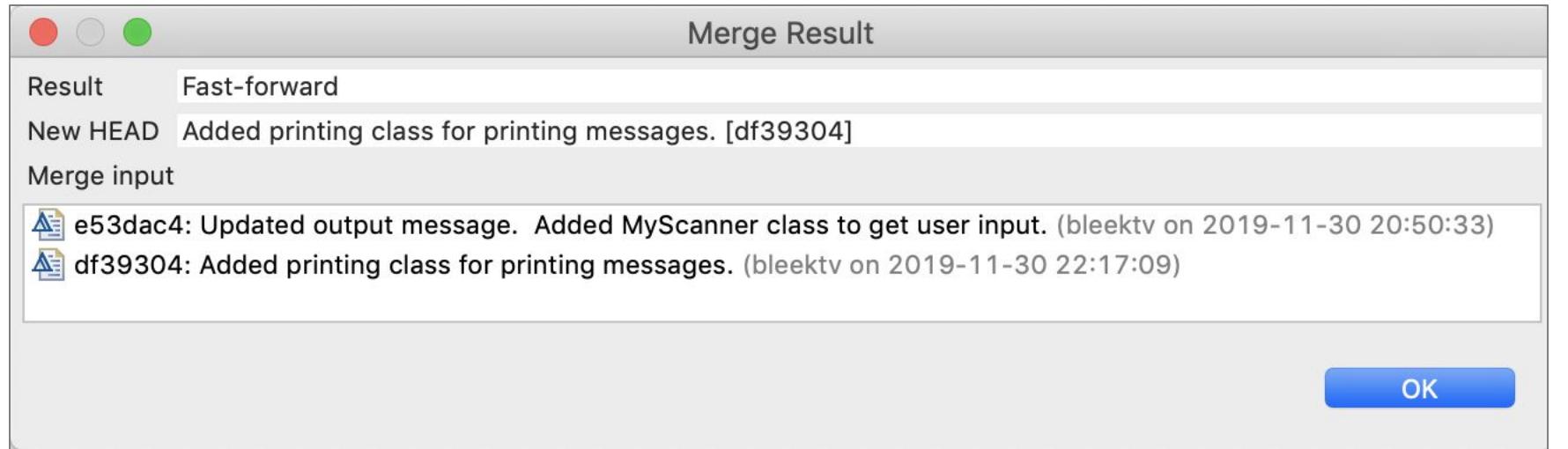
Merging a Branch (Collaborator)

- Right-click on the git repository and select “Merge...”
- Select the local branch to merge into the master branch and click “Merge”



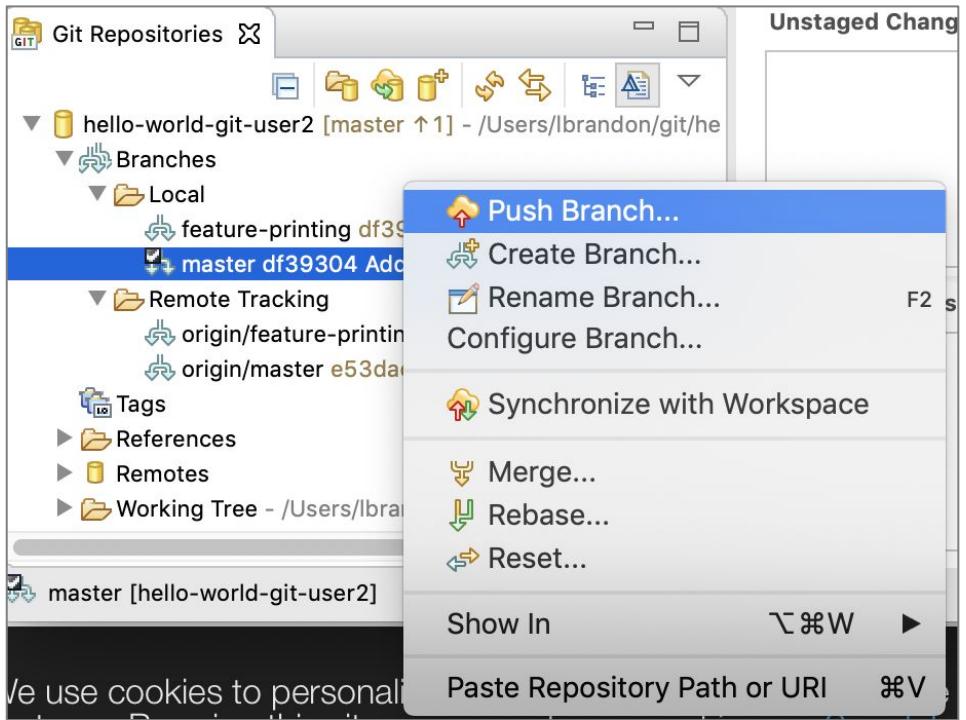
Merging a Branch (Collaborator)

- Confirm the merge result and click “OK”



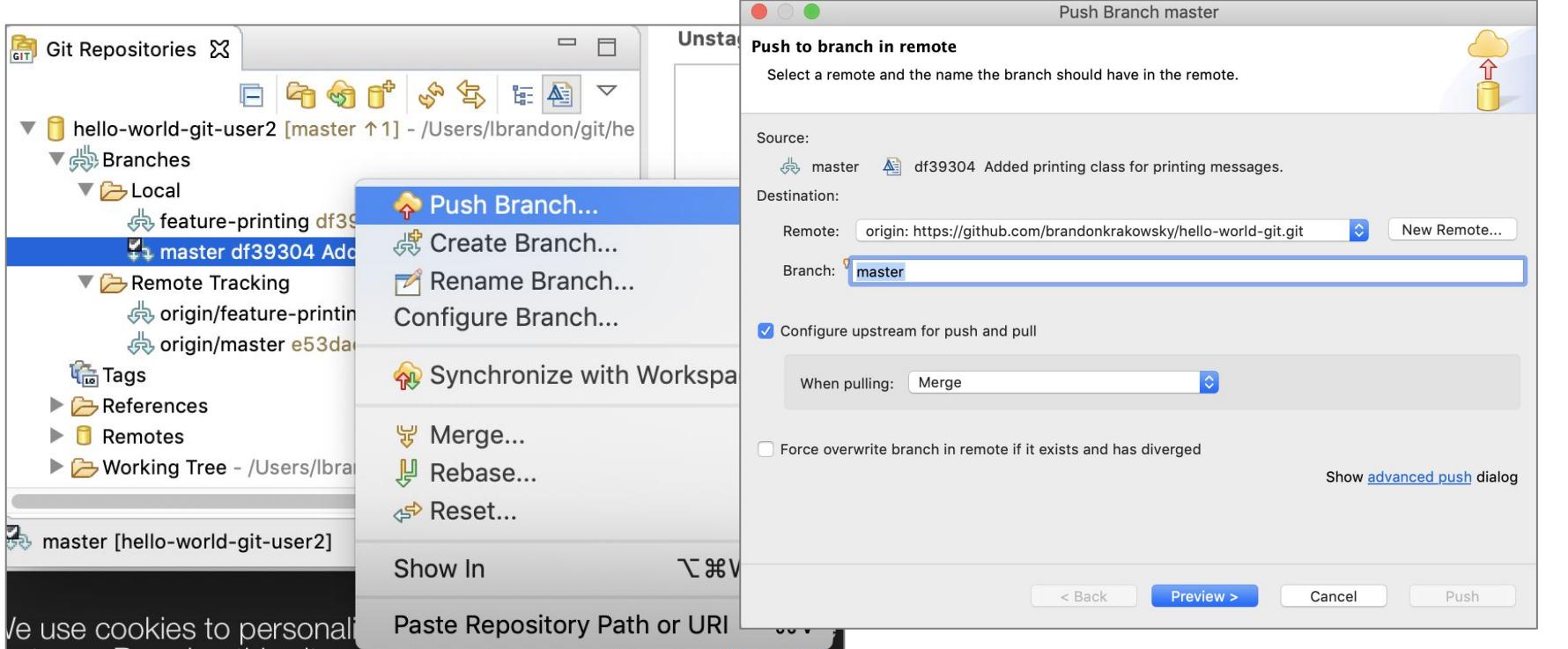
Pushing a Branch (Collaborator)

- Push the updated master branch to the remote repository
- Right-click on the local master branch under Local and select “Push Branch”



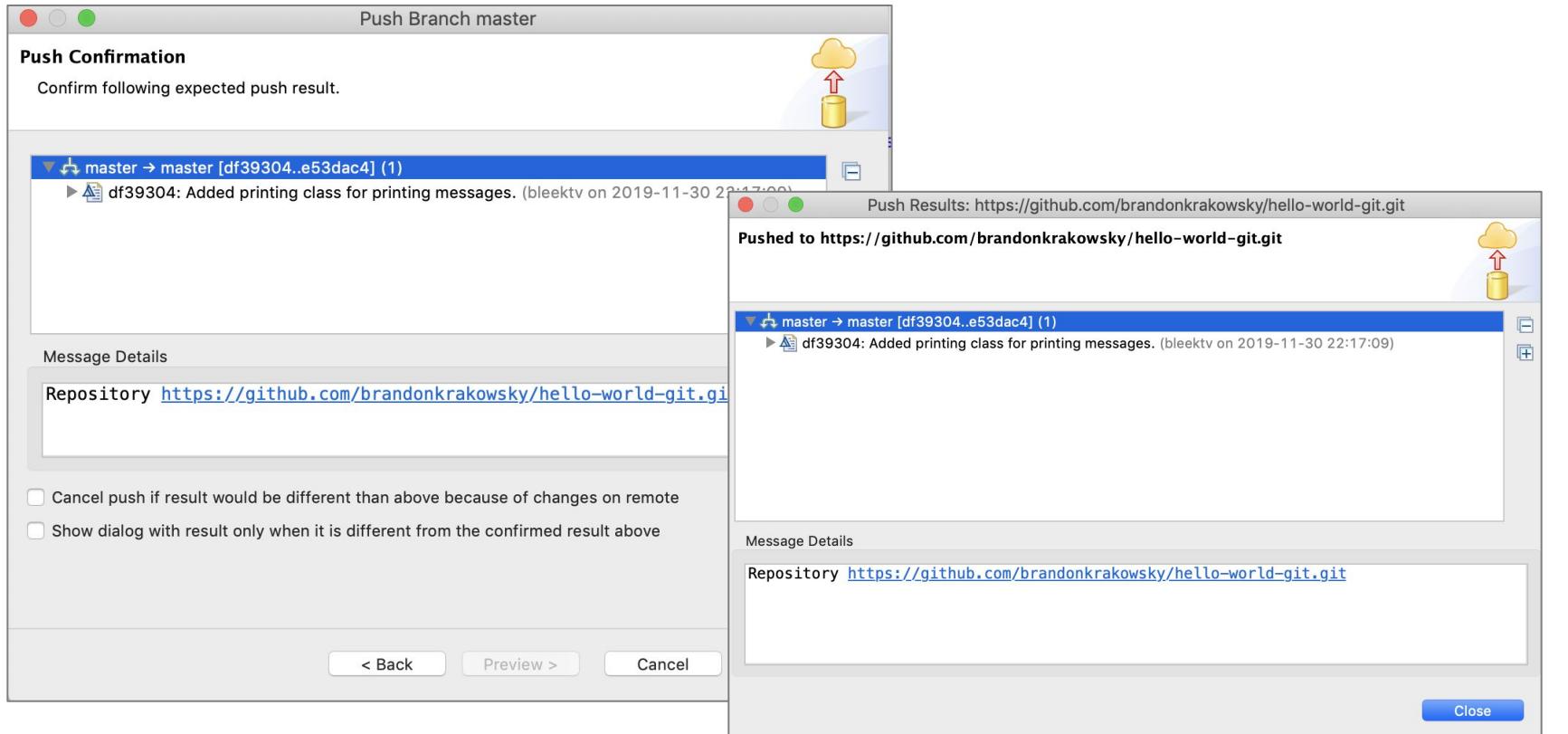
Pushing a Branch (Collaborator)

- Push the updated master branch to the remote repository
- Right-click on the local master branch under Local and select “Push Branch”
- Confirm the details of the master branch and click “Preview”



Pushing a Branch (Collaborator)

- Confirm the push confirmation and click “Push”
- Review the push results and click “Close”



Where to Go From Here

- Create a GitHub (or other web-based version control system) account
- Upload your coding projects to individual (private) repositories
- Start using Git for your day to day coding
- Learn more about Git!
 - Forking: Making a copy of a remote repository to another (GitHub) account
 - Pull requests: Notifying collaborators that you have completed a feature branch and it's ready to be merged
 - Resolving merge conflicts: Merging branches that have competing commits. You need to decide which changes to incorporate in the final merge.
 - Checking out commits: Going to a specific version of your project
 - Adding .gitconfig to each project: Having separate user configuration/credentials for each project in your local git



For Reference: Git for Python

- Using Git for Python
 - PyCharm has a Git Integration plugin
 - Make sure it's enabled in Settings/Preferences
 - More info: <https://www.jetbrains.com/help/pycharm/using-git-integration.html>
 - Of course, you can always use Git from the command line!
- If you want to learn more about the Git command line
 - <https://git-scm.com/book/en/v2/Getting-Started-The-Command-Line>

