

EECS 367 Lab

Git-ing started with Git

Administrative

- Welcome to AutoRob!
- Lots of information on the course website
 - <https://autorob.org>
- Assignment #1: Path Planning
 - Due 11:59pm, Friday, April 21

Lab Takeaways

- Git initialization
- Accessing GitHub Classroom
- Cloning KinEval stencil
- Make a change, commit, and push
- Validate your changes
- Project 1 walkthrough

What is Git?

Git is **version control** software, meaning that it tracks changes to your files (code, papers, ...) as you work on them over time

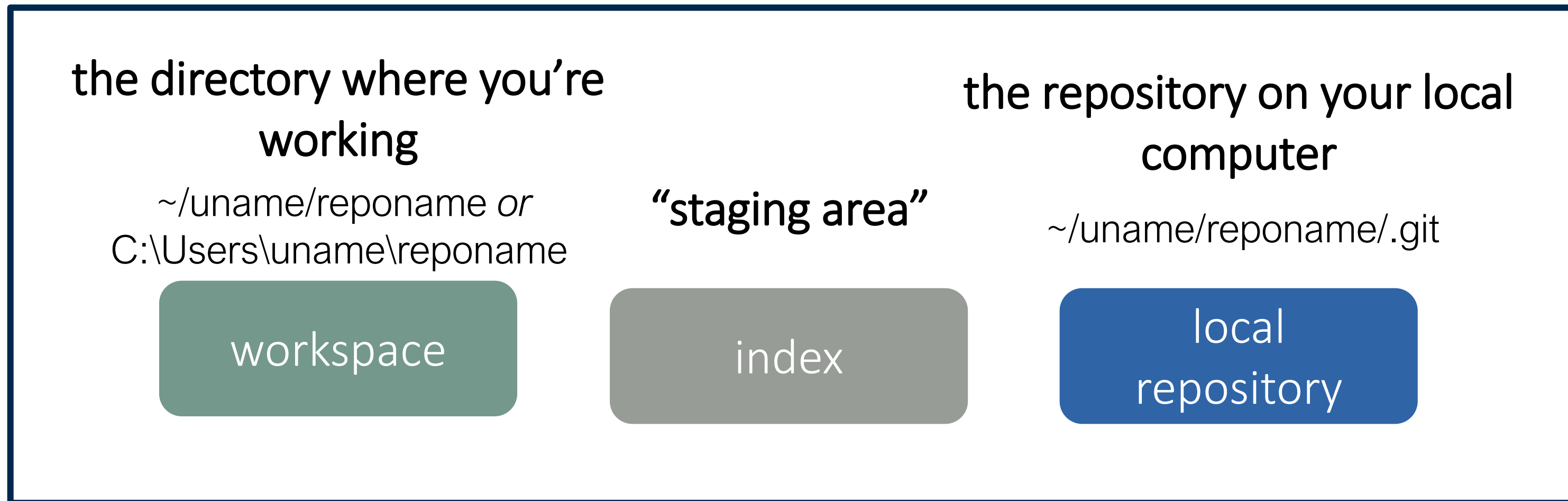
Similar to “track changes” feature in document writing programs, except you must choose which versions to include in the tracking—it is not automatic

Widely used in academia and industry

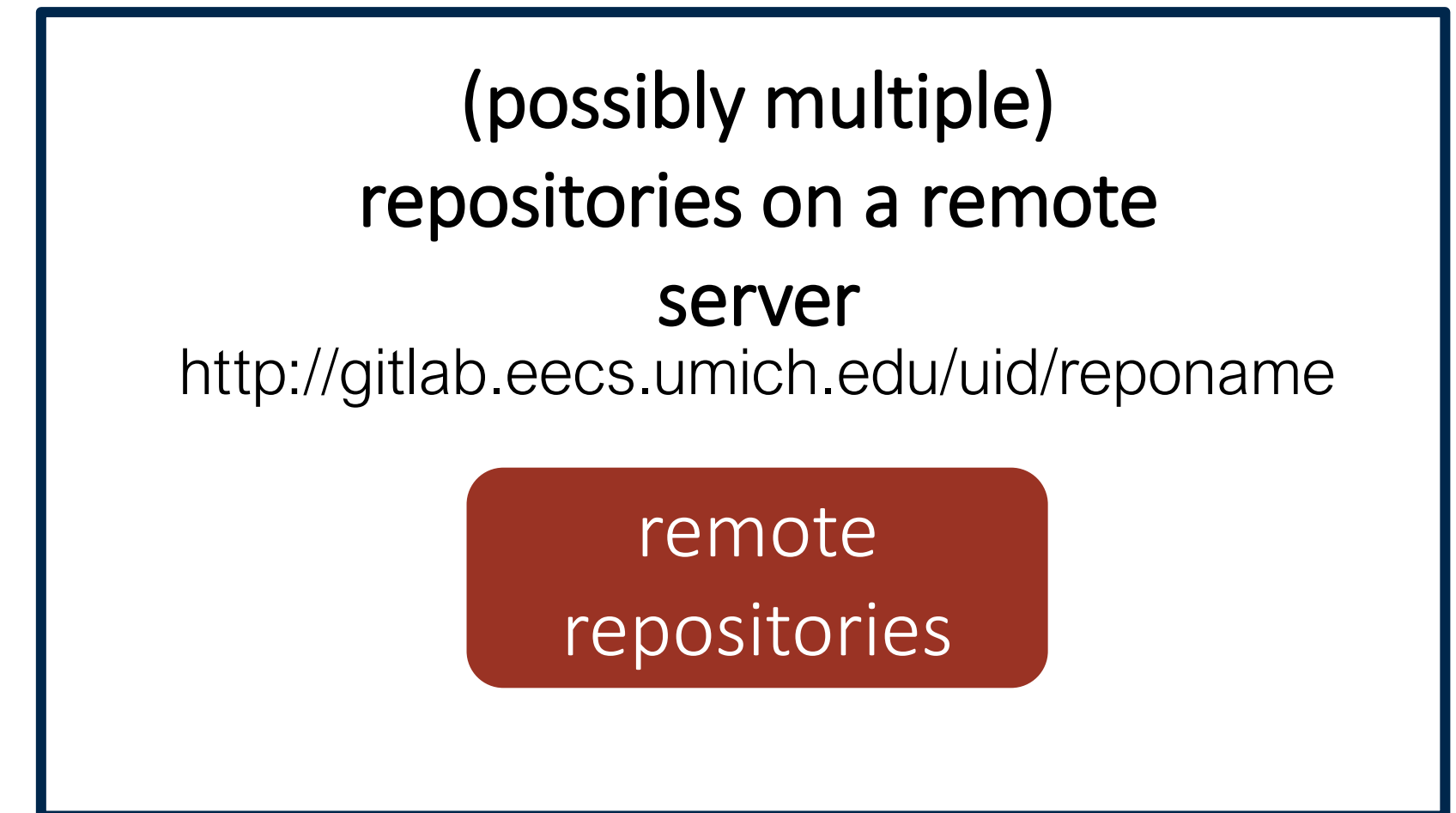
The only way for you to submit your homework for this course!

Git Process Overview

your local machine



the cloud



Git Process Overview

your local machine

the directory where you're working

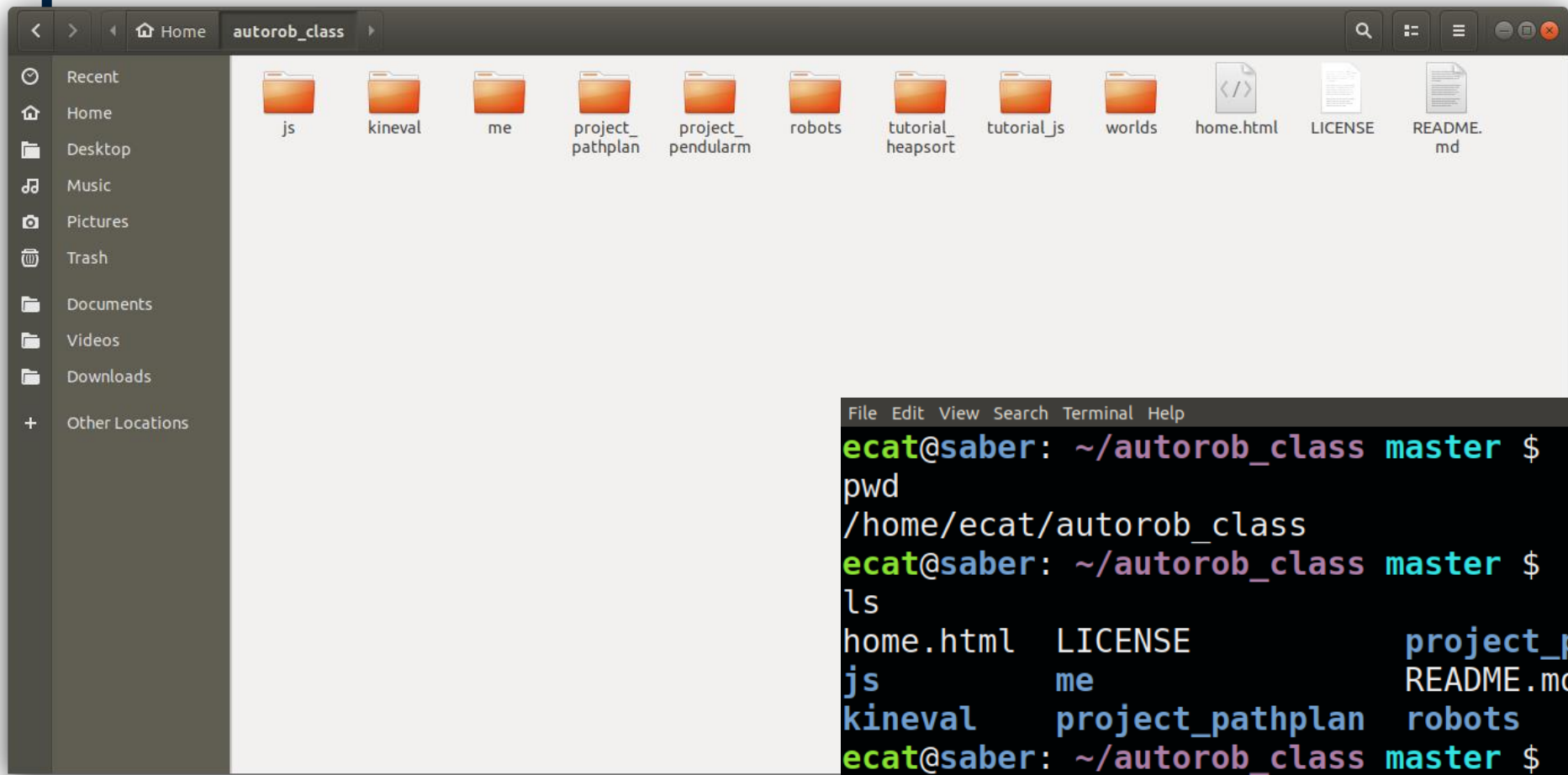
~/uname/reponame or
C:\Users\uname\reponame

“staging area”

the repository on your local computer

~/uname/reponame/.git

local repository

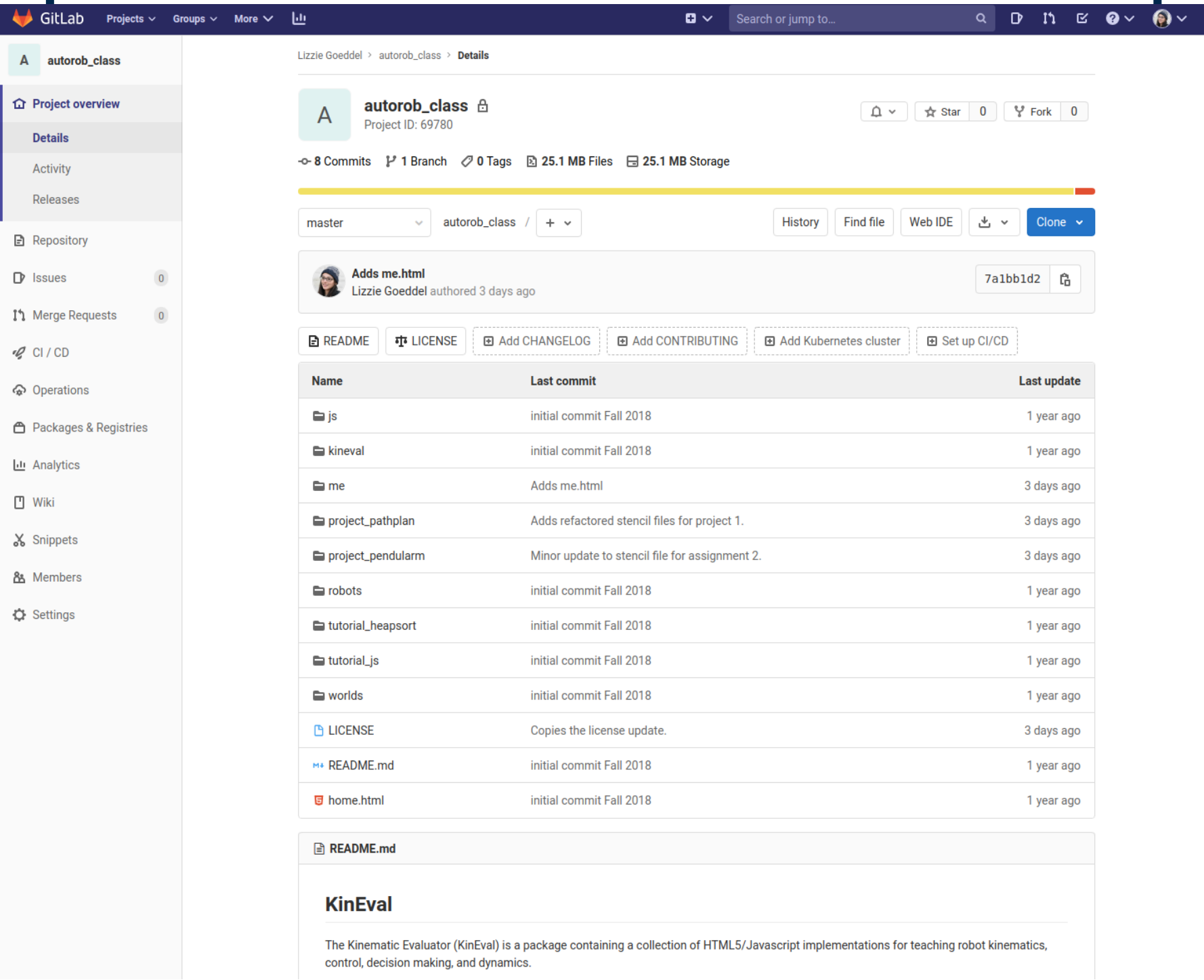


```
File Edit View Search Terminal Help
ecat@saber: ~/autorob_class master $
pwd
/home/ecat/autorob_class
ecat@saber: ~/autorob_class master $
ls
home.html  LICENSE          project_pendularm  tutorial_heapsort
js         me               README.md         tutorial_js
kineval    project_pathplan robots            worlds
ecat@saber: ~/autorob_class master $
```

the cloud

(possibly multiple)
repositories on a remote
server

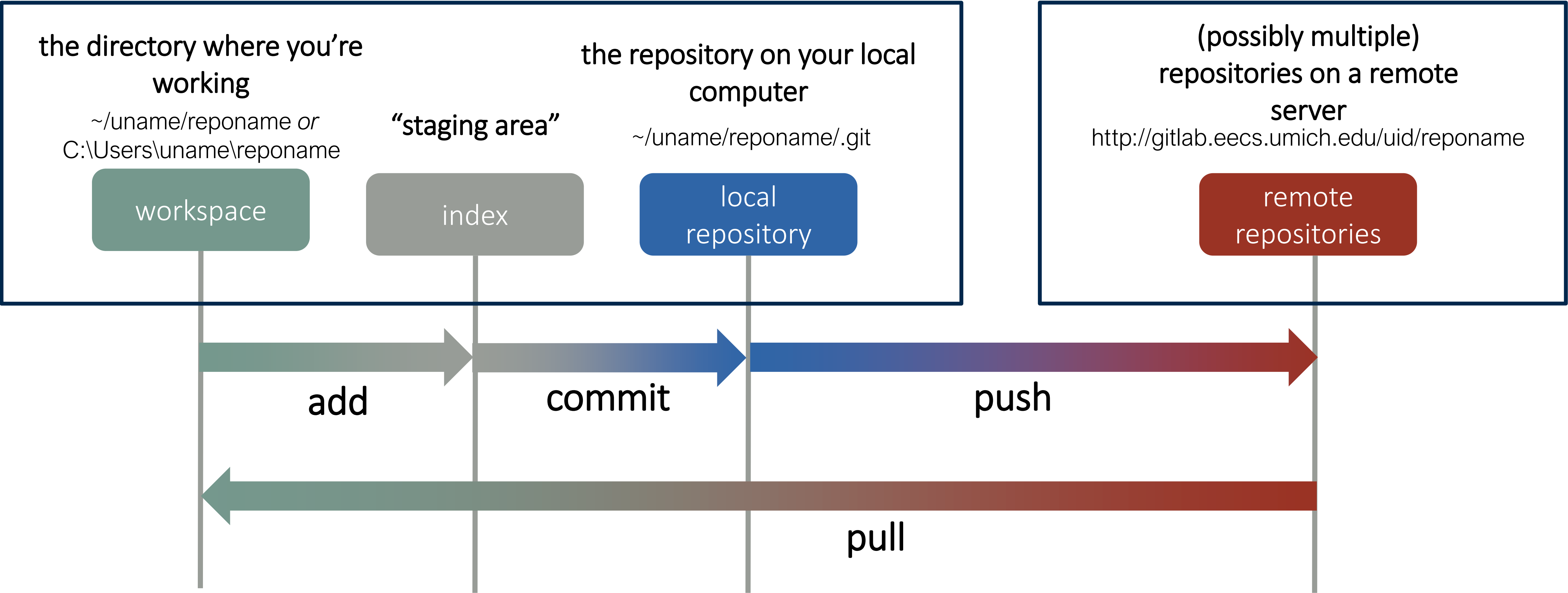
<http://gitlab.eecs.umich.edu/uid/reponame>



Git Process Overview

your local machine

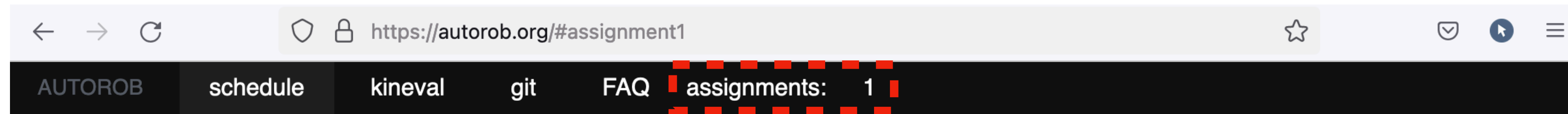
the cloud



Lab Takeaways

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Accessing GitHub Classroom



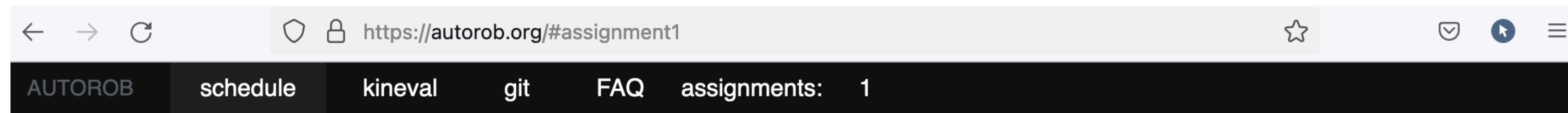
Assignment 1: Path Planning

Due 11:59pm, Friday, January 21, 2022

The objective of the first assignment is to implement a collision-free path planner in JavaScript/HTML5. Path planning is used to allow robots to autonomously navigate in environments from previously constructed maps. A path planner essentially finds a set of waypoints (or setpoints) for the robot to traverse and reach its goal location without collision. As covered in other courses (EECS 467, ROB 550, or EECS 568), such maps can be estimated through methods for [simultaneous localization and mapping](#). Below is an example from [EECS 467](#) where a [robot performs autonomous navigation](#) while simultaneously building an occupancy grid map:



Accessing GitHub Classroom



Points distributions for these features can be found in the [project rubric section](#). More details about each of these features and the implementation process are given below.

Cloning the Stencil Repository

The first step for completing this project is to join our [autorob-WN22 GitHub Classroom](#). By following the preceeding link, your GitHub account will be linked to our 'classroom' and a private clone of the [KinEval stencil repository](#) will be created for you to use. Your private repository will automatically be named `kineval-stencil-<username>`.

After joining the autorob-WN22 classroom, you will be able to clone your private repository for development on your local machine. The appended [git quick start](#) below is provided those unfamiliar with git to perform this clone operation, as well as committing and pushing updates for project submission. **IMPORTANT:** the stencil repository should be cloned and **not forked**.

Throughout the KinEval code stencil, there are markers with the string "STENCIL" for code that needs to be completed for course projects. For this assignment, you will write code where indicated by the "STENCIL" marker in "tutorial_heapsort/heap.js" and "project_pathplan/graph_search.js".

Heap Sort Tutorial

The recommended starting point for this assignment is to complete the heap sort implementation in the "tutorial_heapsort" subdirectory of the stencil repository. In this directory, a code stencil in JavaScript/HTML5 is provided in two files: "heapsort.html" and

Follow link to accept invite

https://classroom.github.com/a/j_-yiHwt

Join the classroom:

autorob-WN22

To join the GitHub Classroom for this course, please select yourself from the list below to associate your GitHub account with your school's identifier (i.e., your name, ID, or email).

Can't find your name? [Skip to the next step →](#)

Identifiers	
Test Student	>



You're ready to go!

You accepted the assignment, **Kinematic Evaluator**.

Your assignment repository has been created:

 <https://github.com/autorob-WN22/kineval-stencil-student>

We've configured the repository associated with this assignment ([update](#)).



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autorob-WN22 / kineval-stencil-student

Private

👁 Watch

1

🔗 Fork

0

★ Star

0

▼

generated from

autorob-WN22/kineval-stencil

<> Code

⌚ Issues

🔗 Pull requests

🎬 Actions

📁 Projects

🛡 Security

📊 Insights

🔗 master ▼

🔗 1 branch

🏷 0 tags

Go to file

Add file ▼

Code ▼

🖥

github-classroom

Initial commit

bb26d54

17 hours ago

🕒 1 commit

📁 js	Initial commit	17 hours ago
📁 kineval	Initial commit	17 hours ago
📁 project_pathplan	Initial commit	17 hours ago
📁 project_pendularm	Initial commit	17 hours ago
📁 robots	Initial commit	17 hours ago
📁 tutorial_heapsort	Initial commit	17 hours ago
📁 tutorial_js	Initial commit	17 hours ago
📁 worlds	Initial commit	17 hours ago
📄 LICENSE	Initial commit	17 hours ago
📄 README.md	Initial commit	17 hours ago

About

kineval-stencil- student created by GitHub Classroom

📖

Readme

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View license

★

0 stars

👁

1 watching

🔗

0 forks

Releases

No releases published

Create a new release

Packages

No packages published

https://forms.gle/uEfkN8aPWaYZ87K3A

Student Workflow Survey - AutoRob

Winter 2022

This survey is being conducted for students of the AutoRob course (<http://autorob.org>) at Michigan (EECS 367, ROB 320) for the Winter 2022 semester. The purpose of this survey is to better understand student perspectives and their working environment as they begin the course. Such insights are especially useful given the constraints of the COVID-19 pandemic. The results of this survey will be used to assign students in the course to study pods, determine necessary accommodations for individual students, and adapt the administration of the course to best serve all students.

topipari@umich.edu (not shared) [Switch account](#)

*** Required**

Last Name or Family Name *

Your answer

First Name *

Your answer

Unique Name (e.g. topipari, oci) *



Lab Takeaways

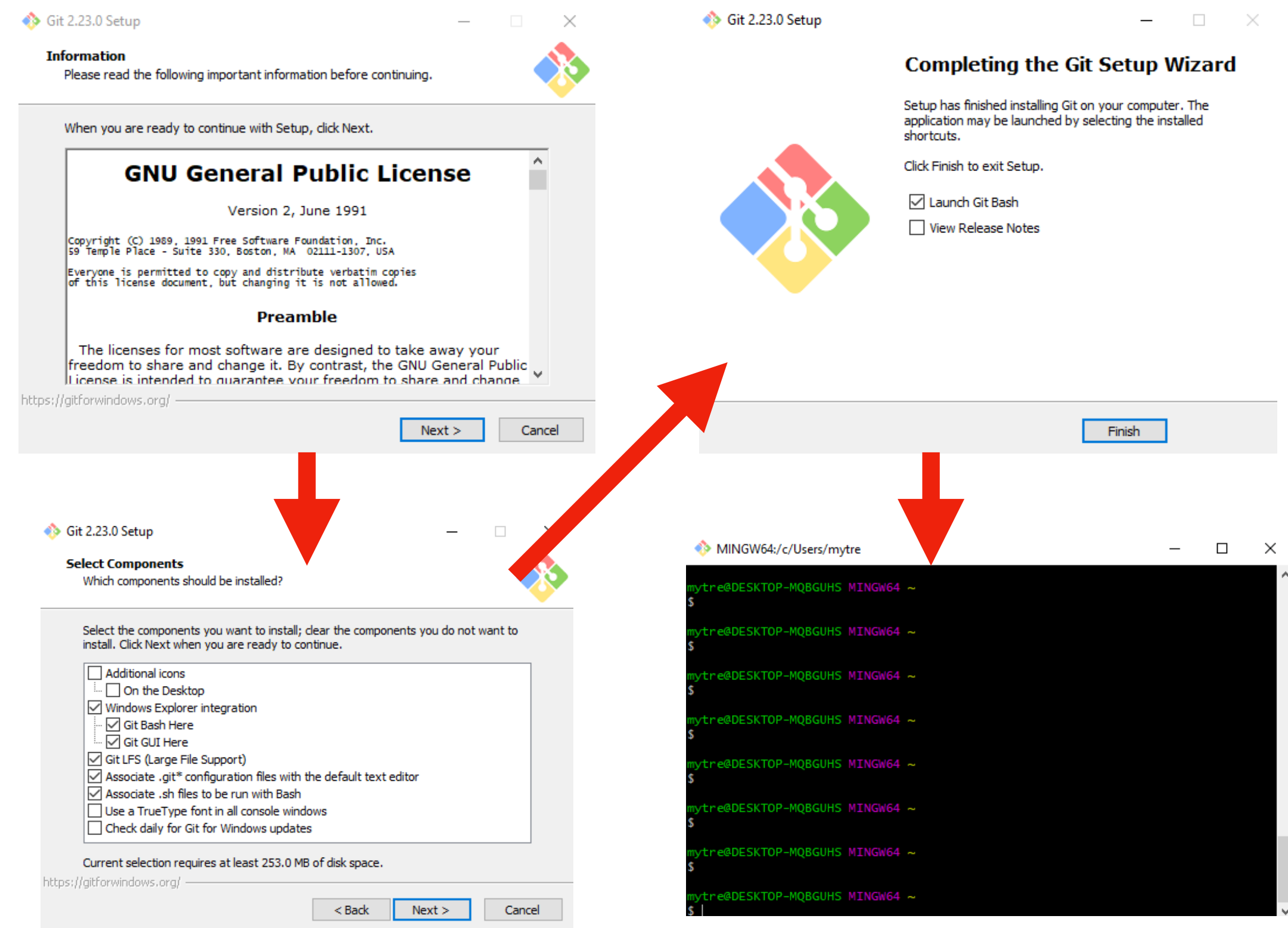
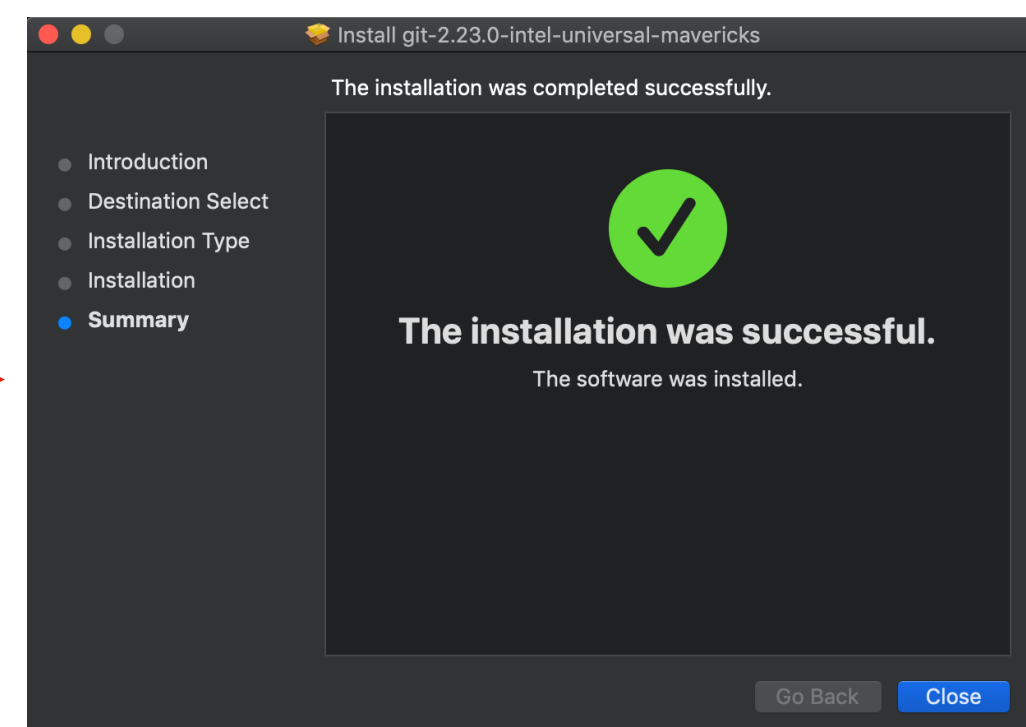
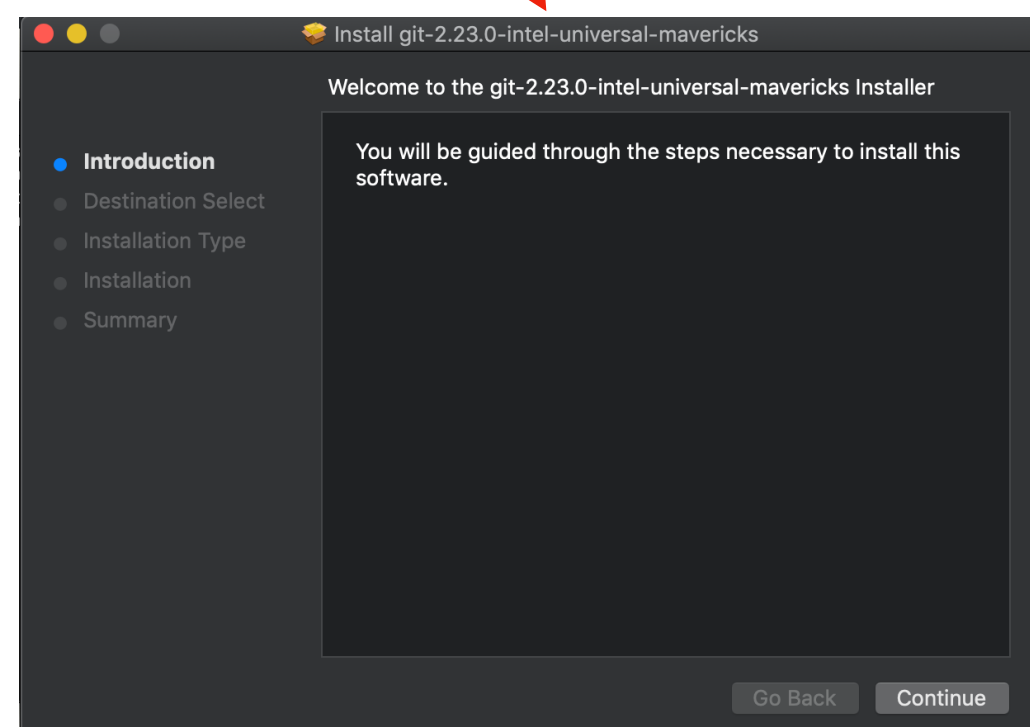
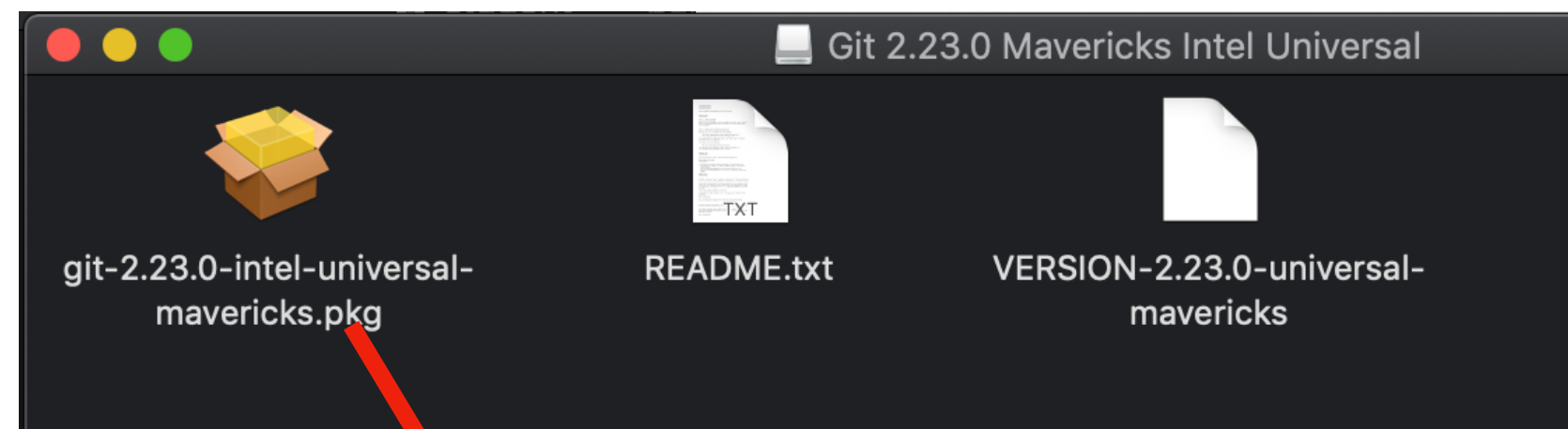
- Git initialization
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Cloning KinEval Stencil

0) Install git on your machine: <https://git-scm.com/book/en/v2/Getting-Started-Installing-Git>

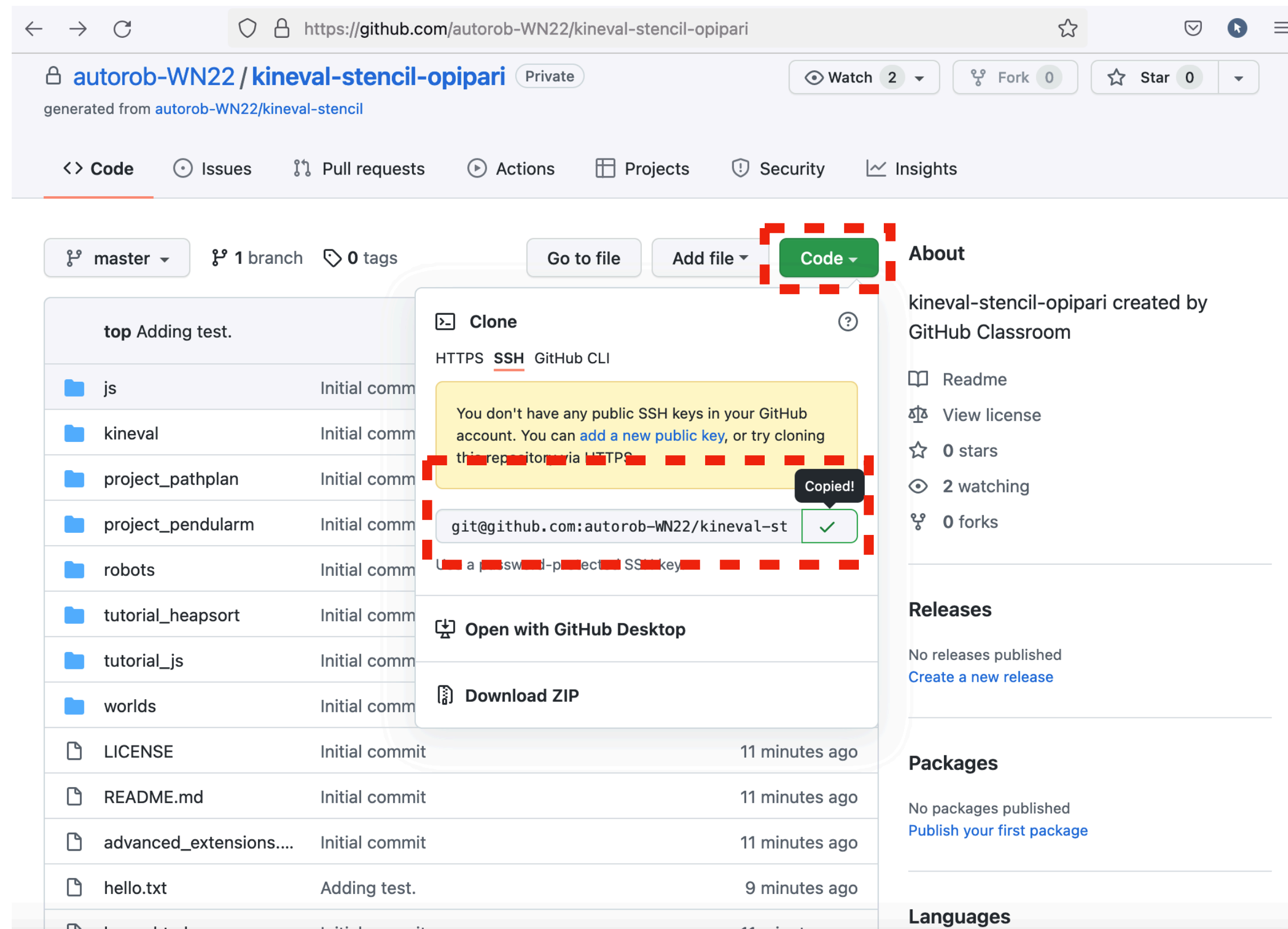
```
[tpos-MacBook-Pro:~ student$ git --version  
git version 2.23.0
```

OR



Cloning KinEval Stencil

1) Copy address of remote repository



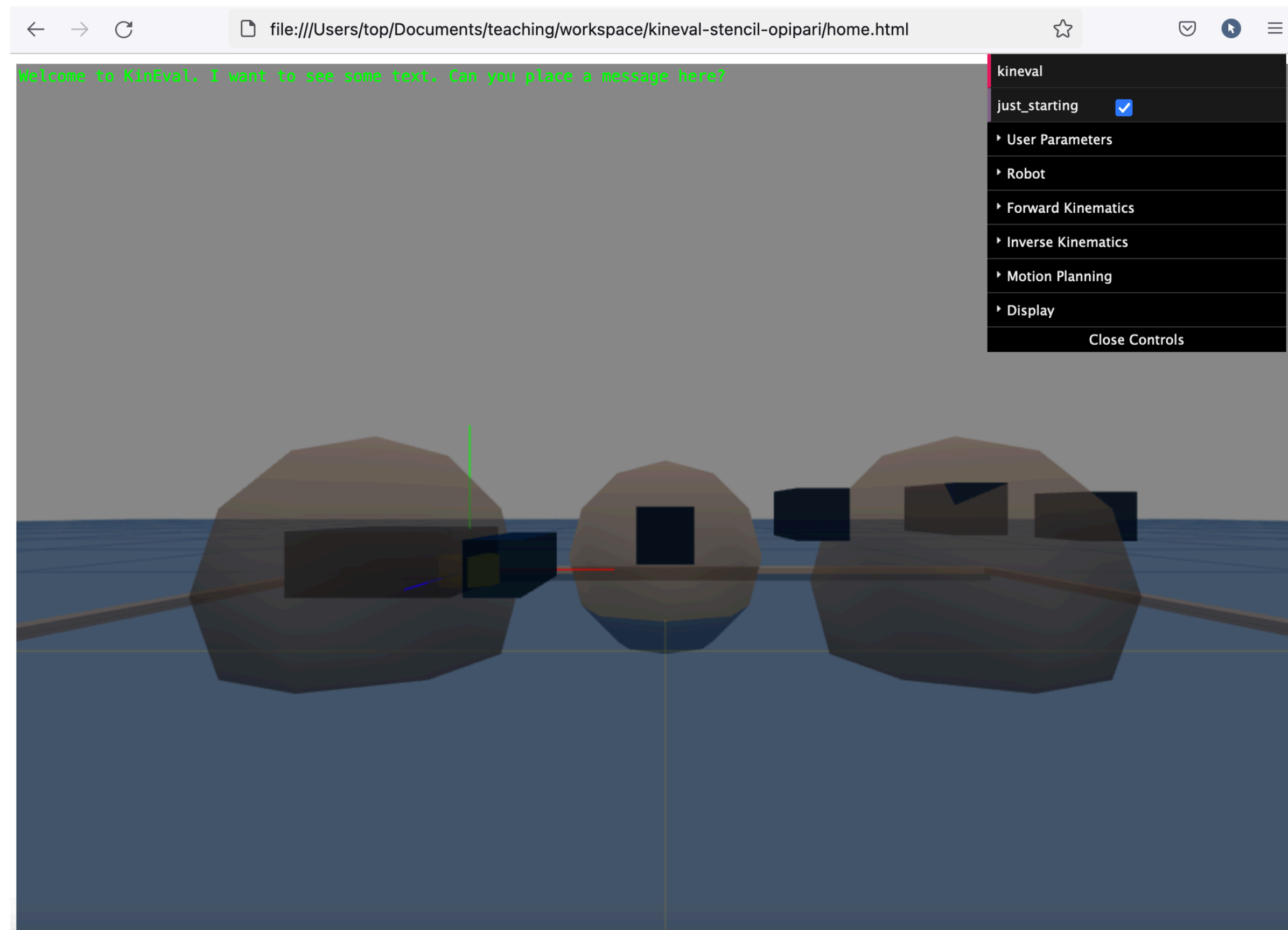
2) Clone repository to your local machine

```
kineval-stencil-opipari — zsh — 93x24

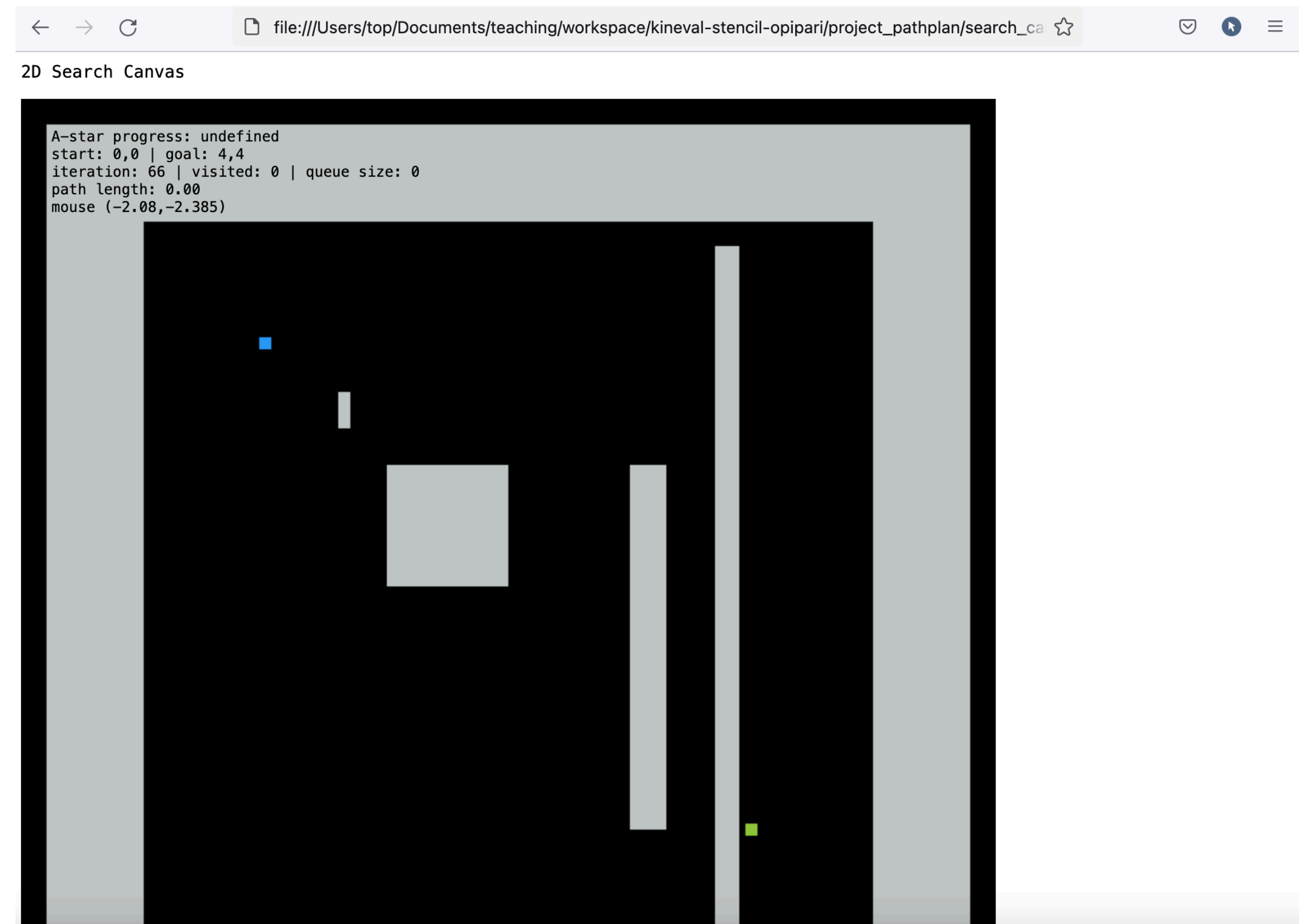
top@0587418125 workspace % git clone git@github.com:autorob-WN22/kineval-stencil-opipari.git
Cloning into 'kineval-stencil-opipari'...
remote: Enumerating objects: 200, done.
remote: Counting objects: 100% (200/200), done.
remote: Compressing objects: 100% (186/186), done.
remote: Total 200 (delta 14), reused 188 (delta 13), pack-reused 0
Receiving objects: 100% (200/200), 24.93 MiB | 9.36 MiB/s, done.
Resolving deltas: 100% (14/14), done.
Updating files: 100% (176/176), done.
top@0587418125 workspace % ls
kineval-stencil-opipari
top@0587418125 workspace % cd kineval-stencil-opipari
top@0587418125 kineval-stencil-opipari % ls
LICENSE                               project_pathplan
README.md                             project_pendularm
advanced_extensions.html               robots
home.html                             tutorial_heapsort
js                                     tutorial_js
kineval                               worlds
top@0587418125 kineval-stencil-opipari %
```

Cloning KinEval Stencil

View “home.html”



View “project_pathplan/search_canvas.html”



Lab Takeaways

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Make a Change, Commit and Push

1) Create “me/me.html” using a text editor with your name added to the file

2) Add “me/me.html” to your local repository

```
cd <your repository directory>
```

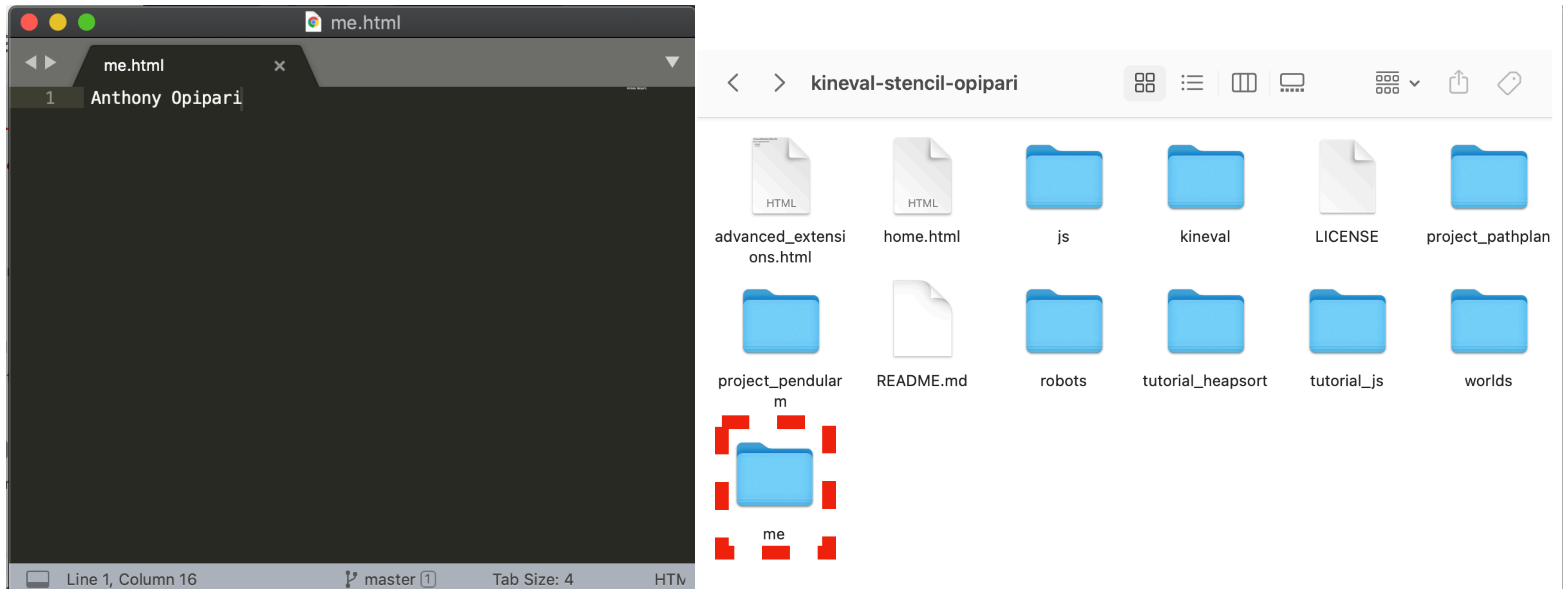
```
git add me/me.html
```

3) Commit and push “me.html” to your remote repository

```
git commit -a -m “created my html file”
```

```
git push
```


1) Create “me.html” using a text editor with your name added to the file

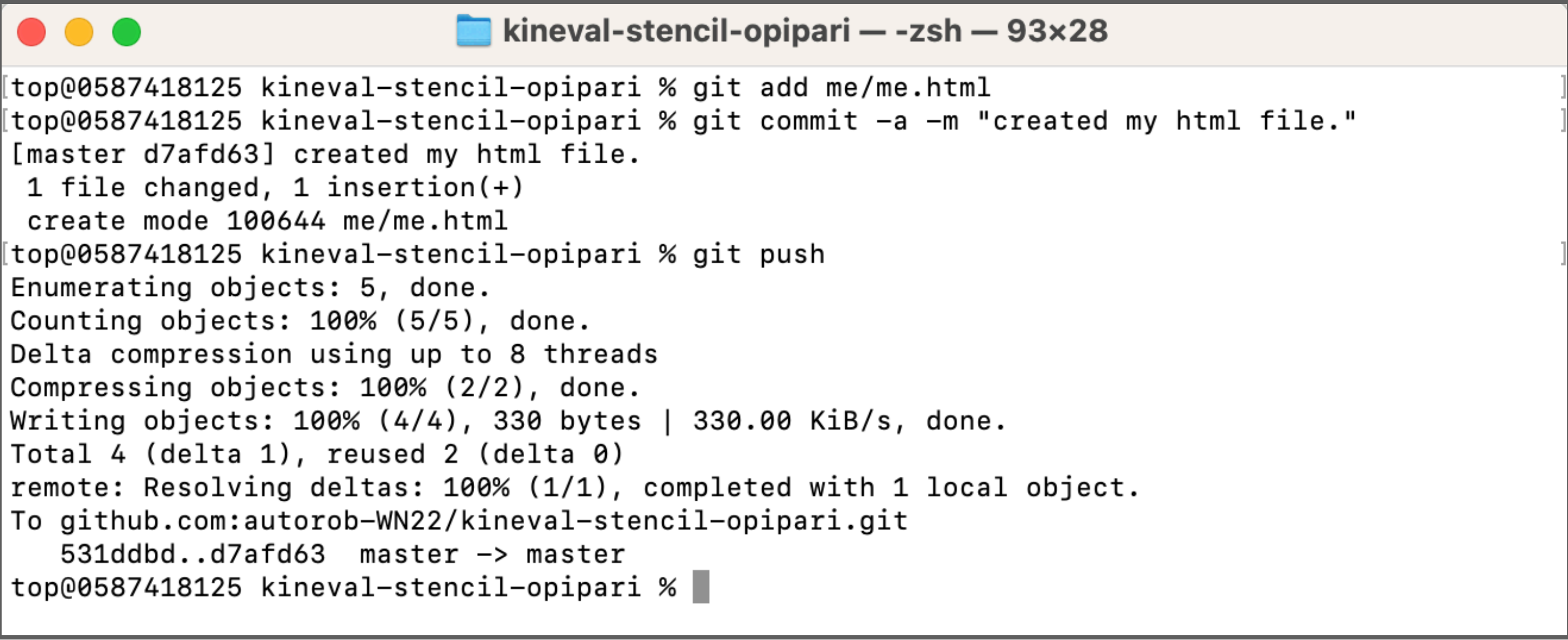


2) Add “me/me.html” to your local repository

```
cd <your repository directory>  
git add me/me.html
```

3) Commit and push “me.html” to your remote repository

```
git commit -a -m “created my html file”  
git push
```

A terminal window titled "kineval-stencil-opipari — -zsh — 93x28" with standard macOS window controls (red, yellow, green buttons). The terminal displays the execution of git commands: 'git add me/me.html', 'git commit -a -m "created my html file."', and 'git push'. The output shows the commit process, including file changes, object enumeration, compression, and pushing to the remote repository 'github.com:autorob-WN22/kineval-stencil-opipari.git'. The final output shows the master branch being updated from d7afd63 to 531ddbd.

```
kineval-stencil-opipari — -zsh — 93x28  
[top@0587418125 kineval-stencil-opipari % git add me/me.html  
[top@0587418125 kineval-stencil-opipari % git commit -a -m "created my html file."  
[master d7afd63] created my html file.  
 1 file changed, 1 insertion(+)  
 create mode 100644 me/me.html  
[top@0587418125 kineval-stencil-opipari % git push  
Enumerating objects: 5, done.  
Counting objects: 100% (5/5), done.  
Delta compression using up to 8 threads  
Compressing objects: 100% (2/2), done.  
Writing objects: 100% (4/4), 330 bytes | 330.00 KiB/s, done.  
Total 4 (delta 1), reused 2 (delta 0)  
remote: Resolving deltas: 100% (1/1), completed with 1 local object.  
To github.com:autorob-WN22/kineval-stencil-opipari.git  
 531ddbd..d7afd63 master -> master  
top@0587418125 kineval-stencil-opipari %
```

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Validate Changes

Check webpage for remote repository to see changes online

← → ↺

https://github.com/autorob-WN22/kineval-stencil-opipari

☆

🔒

👤

☰

<> Code

🕒 Issues

🔗 Pull requests

🎬 Actions

📁 Projects

🛡️ Security

📊 Insights

🔗 master ▾

🔗 1 branch

🏷️ 0 tags

Go to file

Add file ▾

Code ▾

👤 opipari created my html file.

d7afd63 2 minutes ago ⌚ 7 commits

📁 js	Initial commit	1 hour ago
📁 kineval	Initial commit	1 hour ago
📁 me	created my html file.	2 minutes ago
📁 project_pathplan	Initial commit	1 hour ago
📁 project_pendularm	Initial commit	1 hour ago
📁 robots	Initial commit	1 hour ago
📁 tutorial_heapsort	Initial commit	1 hour ago
📁 tutorial_js	Initial commit	1 hour ago
📁 worlds	Initial commit	1 hour ago
📄 LICENSE	Initial commit	1 hour ago
📄 README.md	Initial commit	1 hour ago
📄 advanced_extensions....	Initial commit	1 hour ago
📄 home.html	Initial commit	1 hour ago

About

kineval-stencil-opipari created by GitHub Classroom

📖 Readme

📄 View license

☆ 0 stars

👁️ 2 watching

🔗 0 forks

Releases

No releases published

[Create a new release](#)

Packages

No packages published

[Publish your first package](#)

Languages

Lab Takeaways

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Project 1 Walkthrough

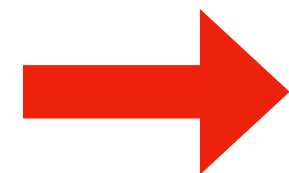
← → ↻		🔒 https://autorob.org/#schedule		☆	📧	🖱️	☰
AUTOROB		schedule	kineval	git	FAQ	assignments:	1
Project Rubrics (tentative and subject to change)							
The following project features are planned for AutoRob this semester. Students are expected to complete all features.							
Points		Feature					
		Assignment 1: 2D Path Planning					
4		Heap implementation					
8		A-star search					
		Assignment 2: Pendularm					
4		Euler integrator					
4		Velocity Verlet integrator					
4		PID control					
		Assignment 3: Forward Kinematics					
2		Core matrix routines					
8		FK transforms					
2		Joint selection/rendering					
		Assignment 4: Dance Controller					
6		Quaternion joint rotation					
2		Interactive base control					
2		Pose setpoint controller					
2		Dance FSM					
		Assignment 5: Inverse Kinematics					
6		Manipulator Jacobian					
3		Gradient descent with Jacobian transpose					
3		Jacobian pseudoinverse					

Project 1 Walkthrough

The screenshot shows the GitHub repository page for 'kineval-stencil-opipari'. The repository is created by 'opipari' and contains 7 commits. The file list includes folders like 'js', 'kineval', 'me', 'project_pathplan', 'project_pendularm', 'robots', 'tutorial_heapsort', 'tutorial_js', 'worlds' and files like 'LICENSE', 'README.md', 'advanced_extensions....', and 'home.html'. The 'tutorial_heapsort' folder is highlighted with a red dashed box. On the right, there are sections for 'About', 'Releases', 'Packages', and 'Languages'.

File/Folder	Commit Message	Time
js	Initial commit	1 hour ago
kineval	Initial commit	1 hour ago
me	created my html file.	2 minutes ago
project_pathplan	Initial commit	1 hour ago
project_pendularm	Initial commit	1 hour ago
robots	Initial commit	1 hour ago
tutorial_heapsort	Initial commit	1 hour ago
tutorial_js	Initial commit	1 hour ago
worlds	Initial commit	1 hour ago
LICENSE	Initial commit	1 hour ago
README.md	Initial commit	1 hour ago
advanced_extensions....	Initial commit	1 hour ago
home.html	Initial commit	1 hour ago

Recommended starting
point for project 1



Project 1 Walkthrough

The screenshot shows a GitHub repository page for 'kineval-stencil-opipari'. The repository is created by 'opipari' and contains 7 commits. The commit history is as follows:

Commit	Message	Time
d7afd63	created my html file.	2 minutes ago
Initial commit	Initial commit	1 hour ago
Initial commit	Initial commit	1 hour ago
Initial commit	Initial commit	1 hour ago
Initial commit	Initial commit	1 hour ago
Initial commit	Initial commit	1 hour ago
Initial commit	Initial commit	1 hour ago

The repository contains the following files and folders:

- js
- kineval
- me
- project_pathplan
- project_pendularm
- robots
- tutorial_heapsort
- tutorial_js
- worlds
- LICENSE
- README.md
- advanced_extensions....
- home.html

The 'project_pathplan' folder is highlighted with a red dashed box. A red arrow points from the text 'Graded component of project 1' to this folder.

About
kineval-stencil-opipari created by GitHub Classroom
Readme
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Releases
No releases published
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Packages
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Languages

Graded component of project 1

Basic Git Commands

`git init`

start a new, blank repository in your working directory

`git clone <repo address>`

copy an existing repository from the cloud into your working directory

Basic Git Commands

`git add <filename>`

add a file to the index, a.k.a. “stage” it

`git commit -m “message”`

save all of the edits to the files currently in the index as a “commit”

`git push`

push local changes to the default remote repository

`git push <remote> <branch>`

push local changes to a specific remote repository

Basic Git Commands

`git status`

list which files in the workspace have been modified
and which have been added to the index

Basic Git Commands

```
git remote -v
```

lists the addresses of your remote repositories

```
git remote add <name> <address>
```

adds a new remote

```
git remote rename <old-name> <new-name>
```

renames an existing remote

Git Resources: Tutorials

1. Course website

- https://autorob.org/#git_tutorial

2. Pro Git book

- <https://git-scm.com/book/en/v2>

3. Learn git branching

- <https://learngitbranching.js.org>

4. Visual git reference

- <https://marklodato.github.io/visual-git-guide/index-en.html>

Git Resources: SSH Keys

1. GitHub Setup

- <https://docs.github.com/en/enterprise-server@3.0/authentication/connecting-to-github-with-ssh/adding-a-new-ssh-key-to-your-github-account>
- SSH keys allow for passwordless authentication
 - push/pull access without 'logging in'

Git Resources: Your Computer

```
git --help and git <command> -h
```