

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 directory where you're working

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

workspace

the repository on your local computer

~/uname/reponame/.git

local repository

“staging area”

index

the cloud

(possibly multiple)
repositories on a remote server

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

remote repositories

Git Process Overview

your local machine

the directory where you're working

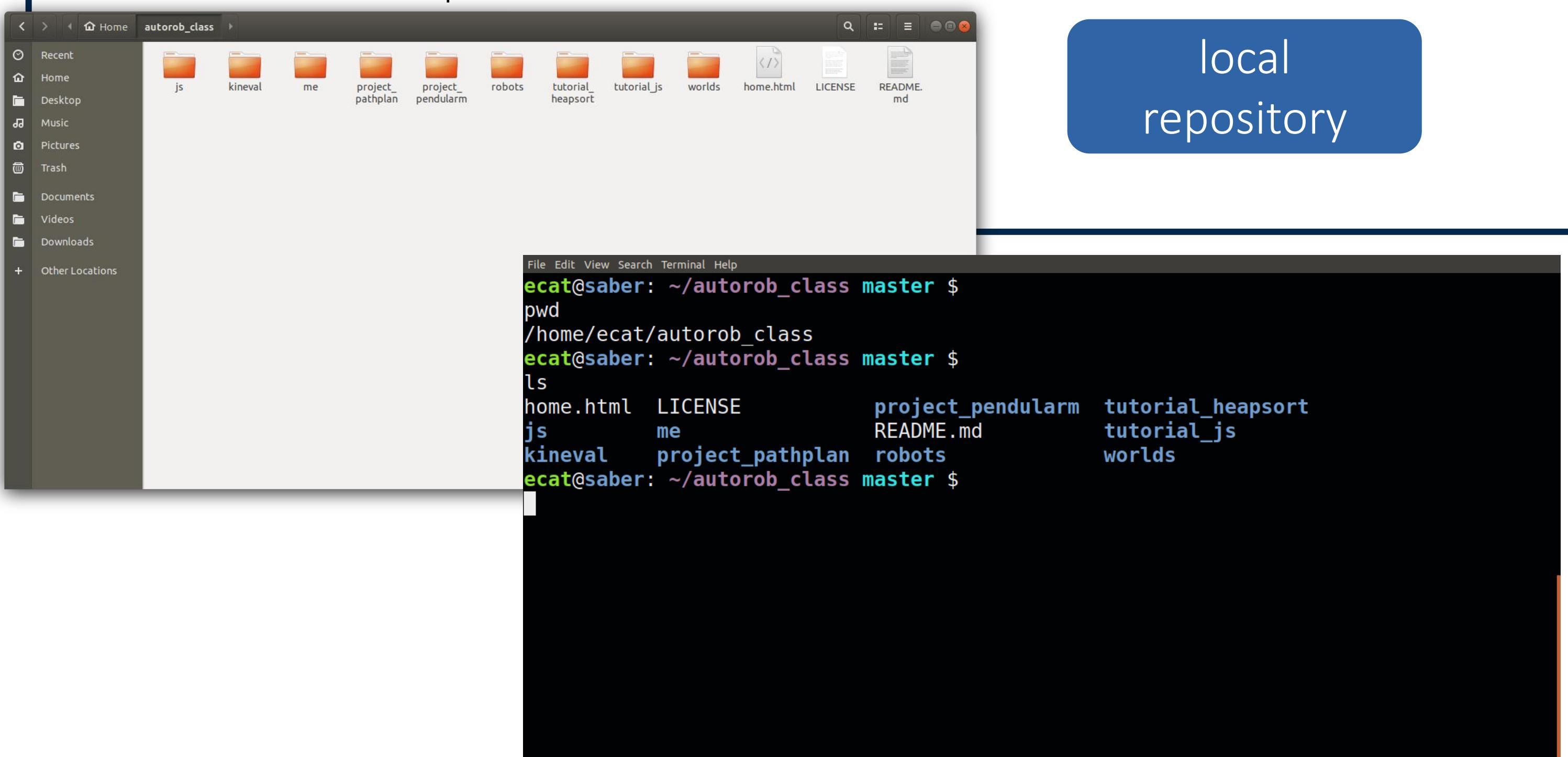
~/uname/reponame or
C:\Users\uname\reponame

“staging area”

the repository on your local computer

~/uname/reponame/.git

local repository



the cloud

(possibly multiple) repositories on a remote server

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

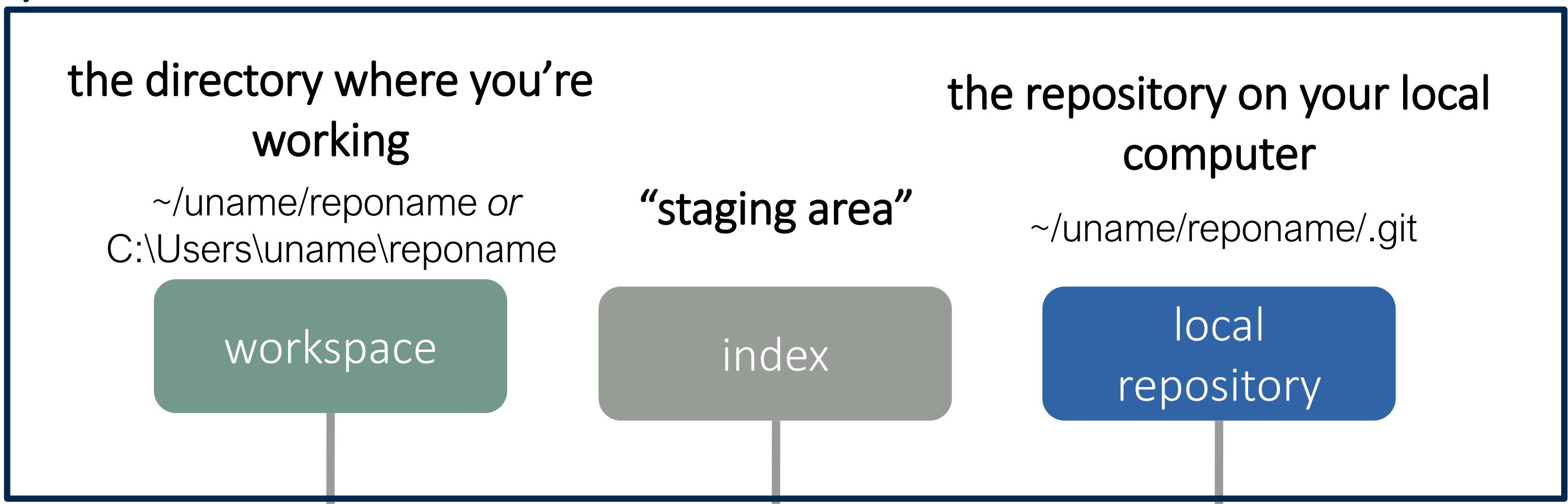
The image shows a GitLab project page for "autorob_class". The sidebar on the left includes links for Project overview, Details, Activity, Releases, Repository, Issues, Merge Requests, CI / CD, Operations, Packages & Registries, Analytics, Wiki, Snippets, Members, and Settings. The main content area shows the project details: Project ID: 69780, 8 Commits, 1 Branch, 0 Tags, 25.1 MB Files, 25.1 MB Storage. A recent commit by Lizzie Goeddel is listed: "Adds me.html" (7a1bb1d2). Below this is a detailed commit history table:

Name	Last commit	Last update
js	initial commit Fall 2018	1 year ago
kineval	initial commit Fall 2018	1 year ago
me	Adds me.html	3 days ago
project_pathplan	Adds refactored stencil files for project 1.	3 days ago
project_pendularm	Minor update to stencil file for assignment 2.	3 days ago
robots	initial commit Fall 2018	1 year ago
tutorial_heapsort	initial commit Fall 2018	1 year ago
tutorial_js	initial commit Fall 2018	1 year ago
worlds	initial commit Fall 2018	1 year ago
LICENSE	Copies the license update.	3 days ago
README.md	initial commit Fall 2018	1 year ago
home.html	initial commit Fall 2018	1 year ago

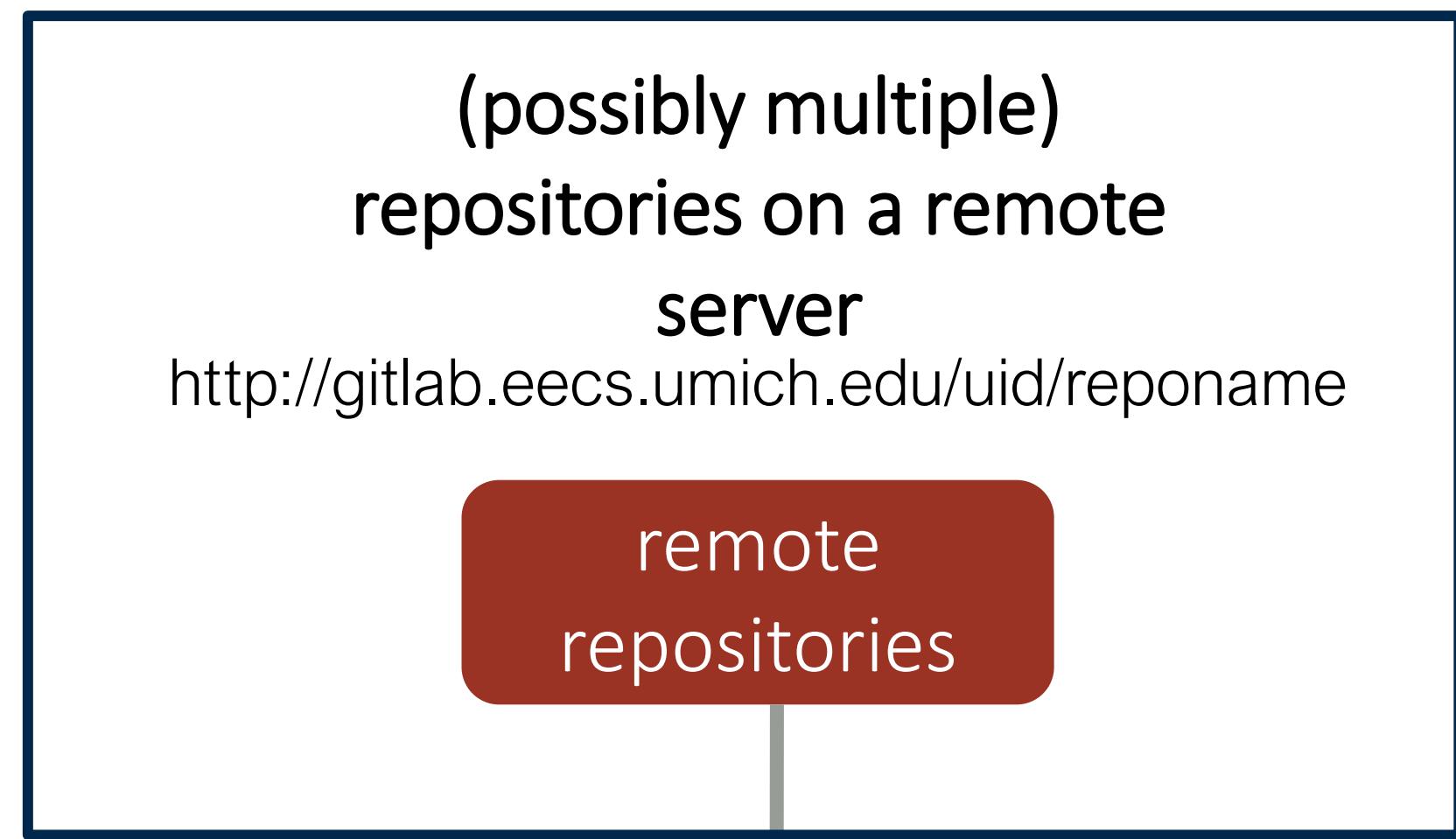
KinEval
The Kinematic Evaluator (KinEval) is a package containing a collection of HTML5/Javascript implementations for teaching robot kinematics, control, decision making, and dynamics.

Git Process Overview

your local machine



the cloud



add

commit

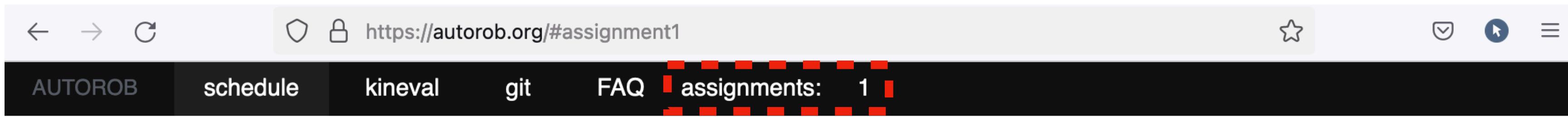
push

pull

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

A screenshot of a web browser window. The address bar shows the URL <https://autorob.org/#assignment1>. The page title is "AUTOROB". The main content area displays an assignment titled "assignments: 1". Below the title, there is a message about project rubric and implementation details. A red dashed box highlights the text "autorob-WN22 GitHub Classroom". A large red arrow points from this highlighted text to a callout box.

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 preceding 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>

GitHub Classroom

[GitHub Education](#)

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 >

GitHub Classroom

[GitHub Education](#)

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](#)).



Join the GitHub Student Developer Pack

Verified students receive free GitHub Pro plus thousands of dollars worth of the best real-world tools and training from GitHub Education partners — for free. [Learn more](#)

[Apply](#)

← → C https://github.com/autorob-WN22/kineval-stencil-student ⭐

Search or jump to... / Pull requests Issues Marketplace Explore

Watch 1 Fork 0 Star 0

autorob-WN22 / kineval-stencil-student Private

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_pendulum	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 View license 0 stars 1 watching 0 forks

Releases
No releases published Create a new release

Packages
No packages published

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

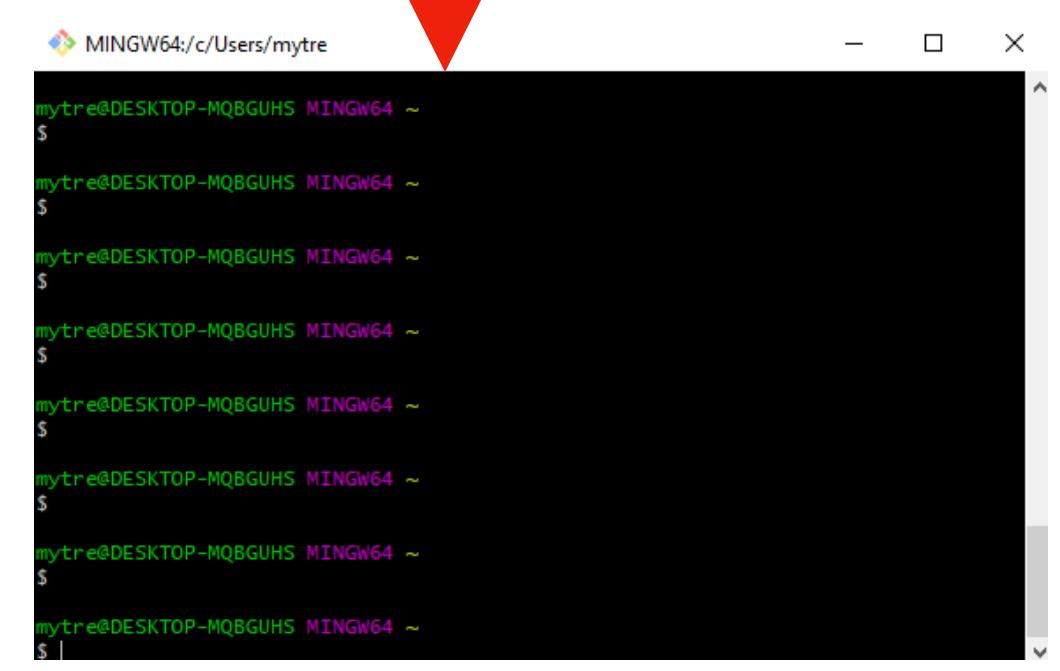
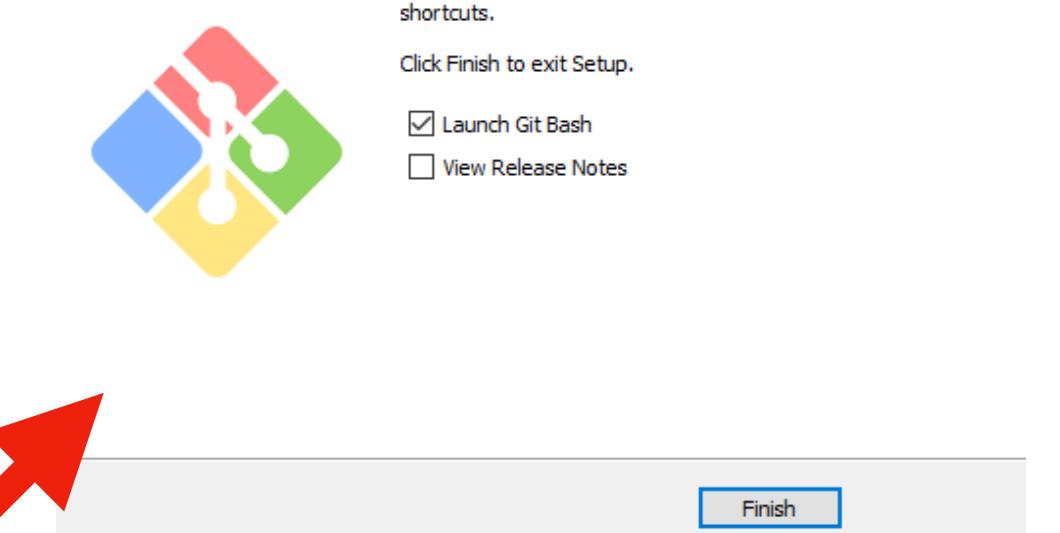
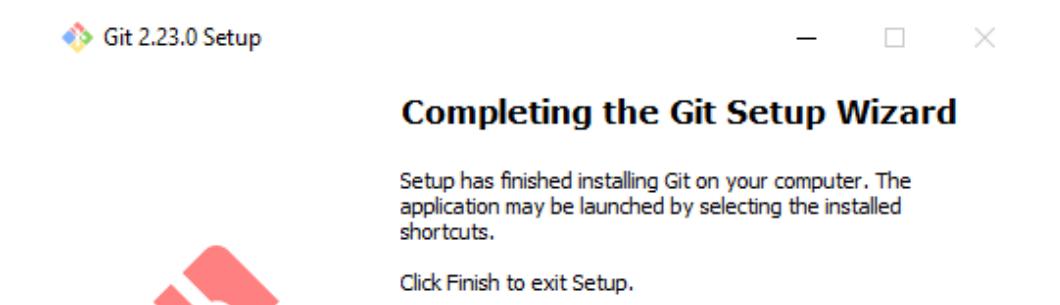
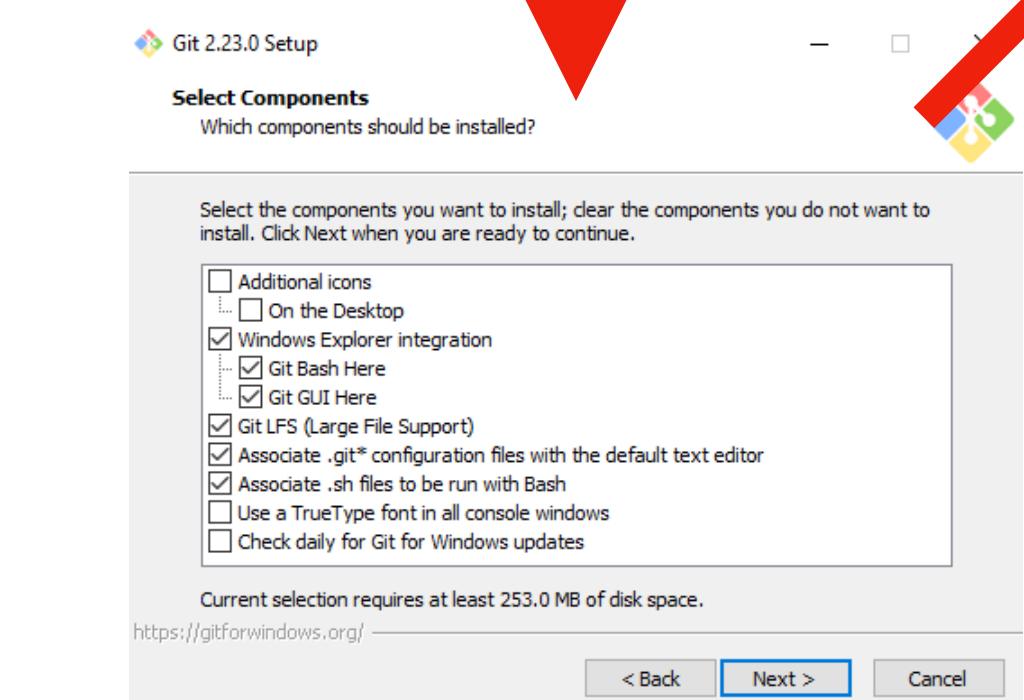
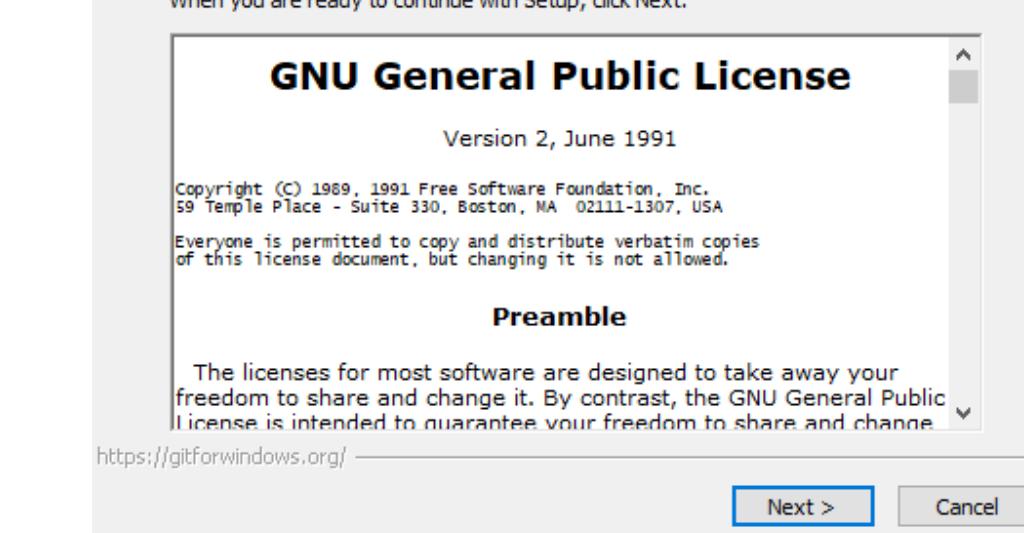
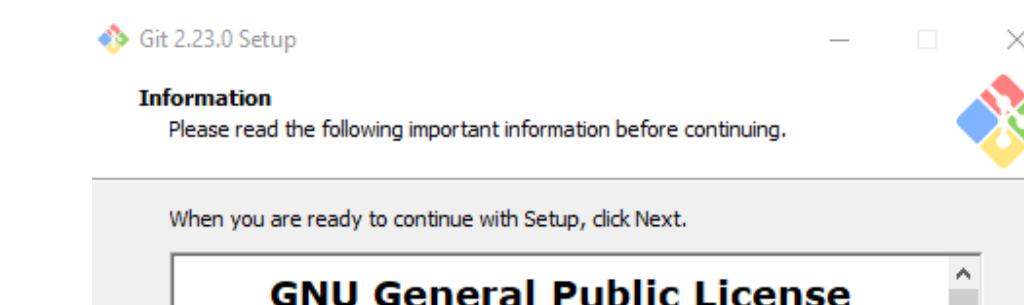
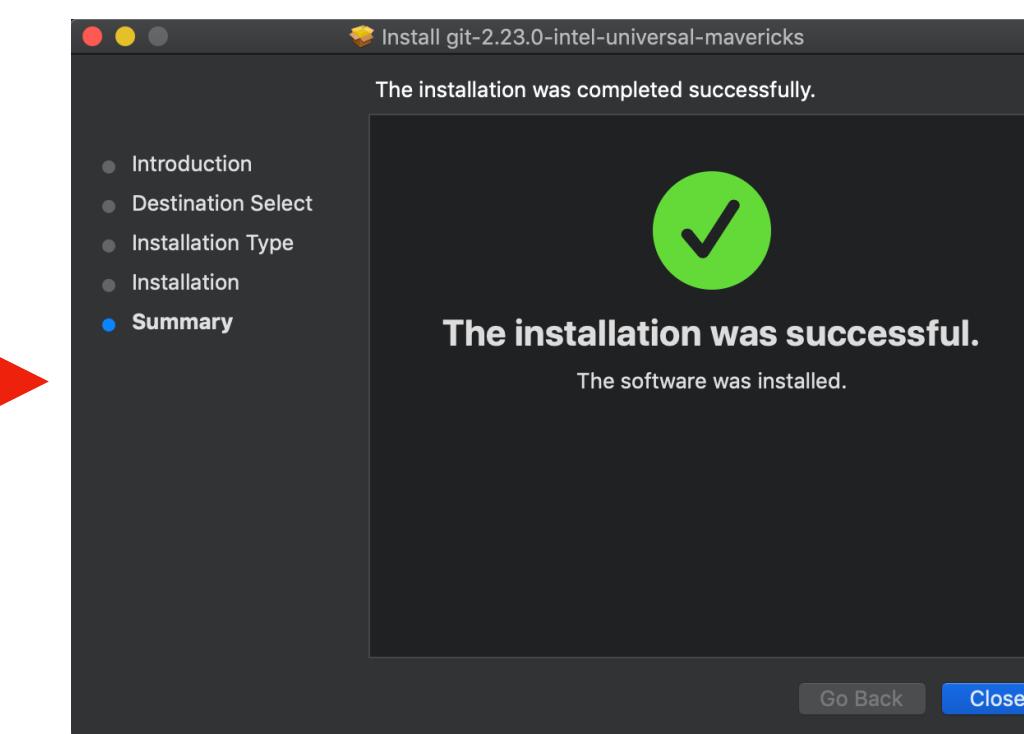
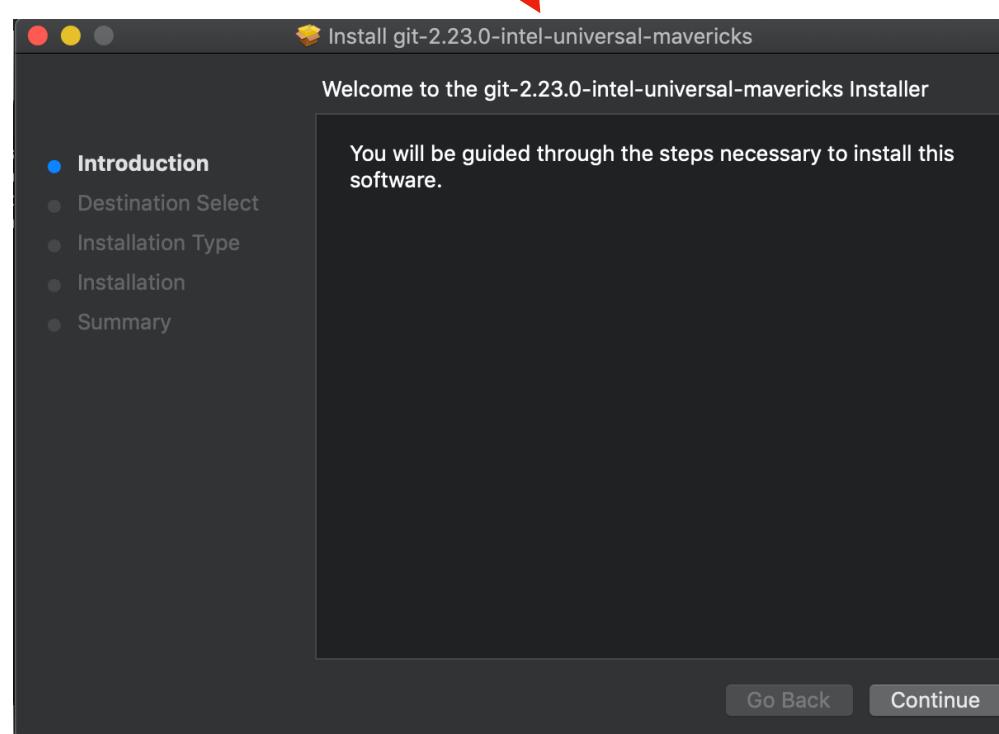
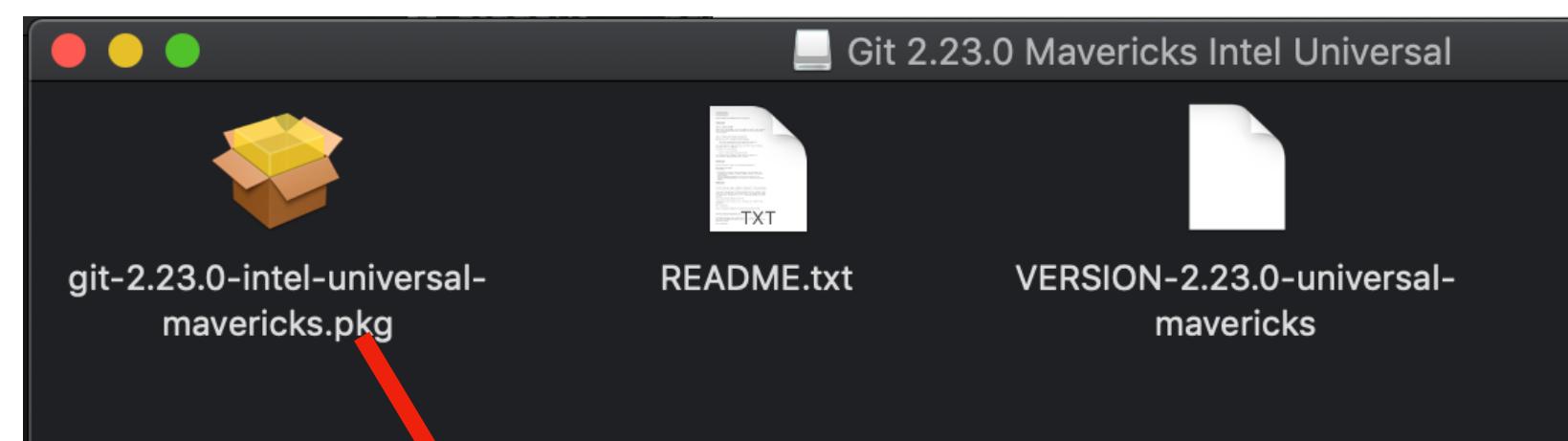
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Cloning KinEval Stencil

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

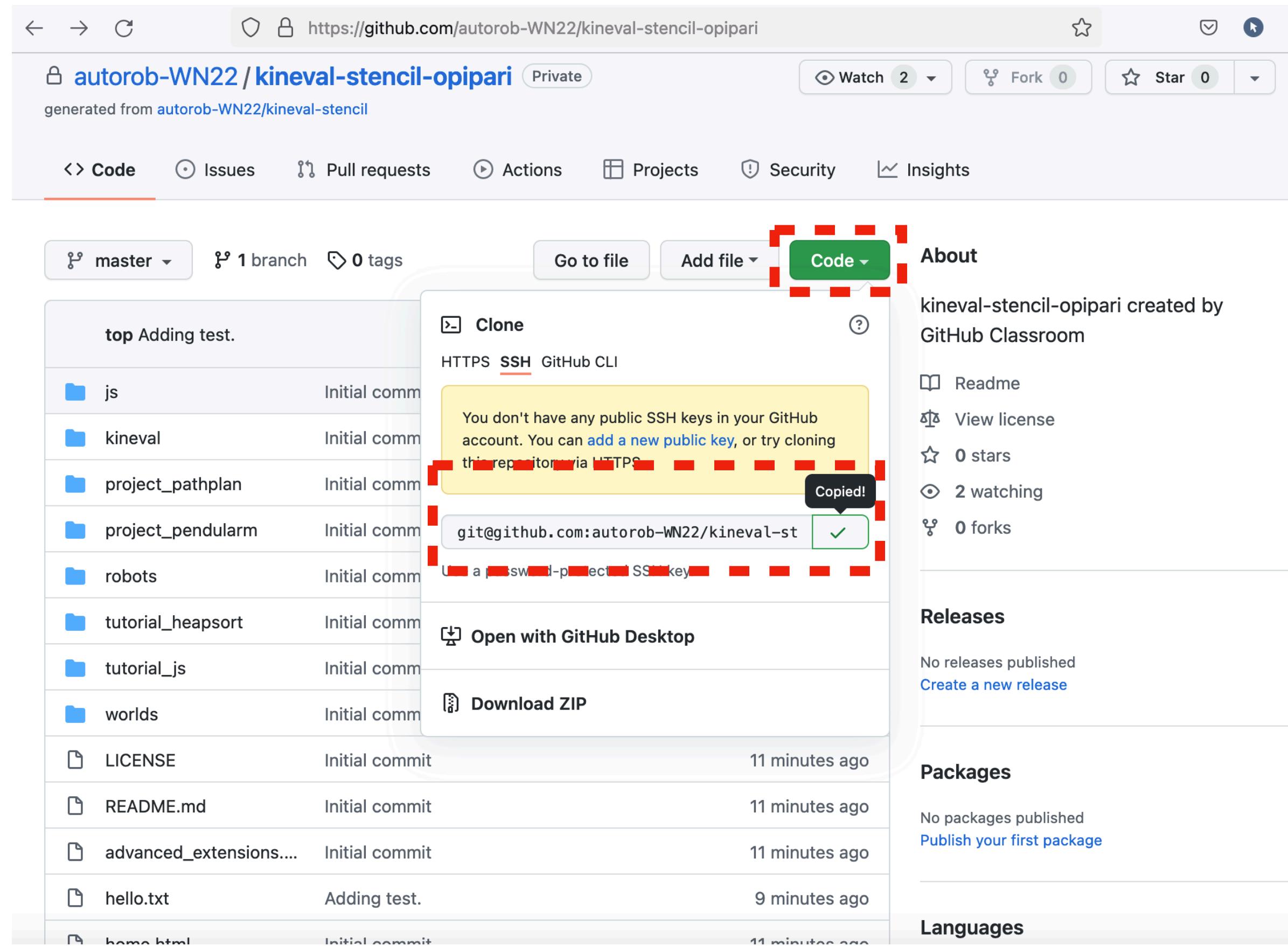
```
[tpos-MacBook-Pro:~ student$ git --version  
git version 2.23.0
```

OR



Cloning KinEval Stencil

1) Copy address of remote repository

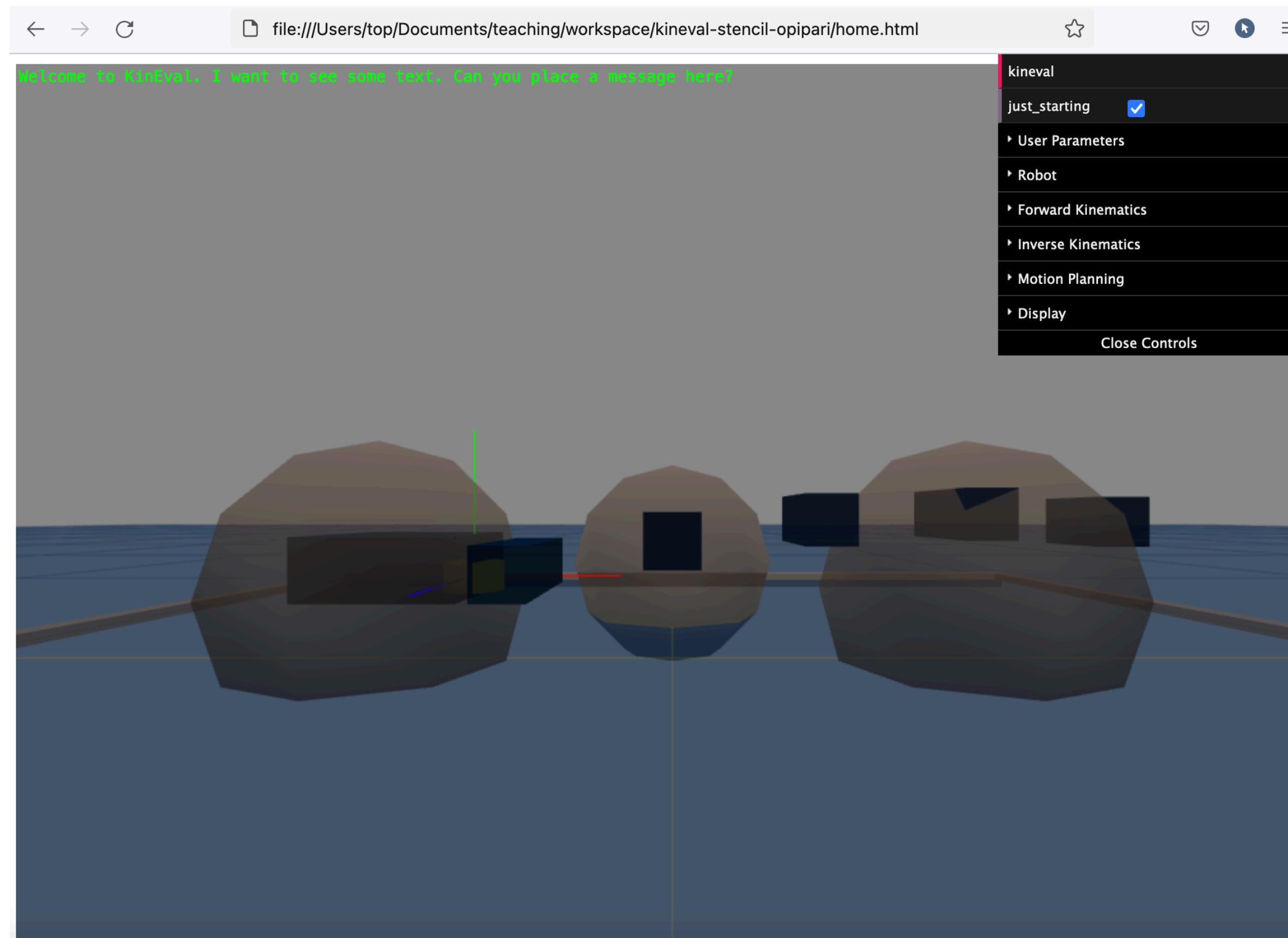


2) Clone repository to your local machine

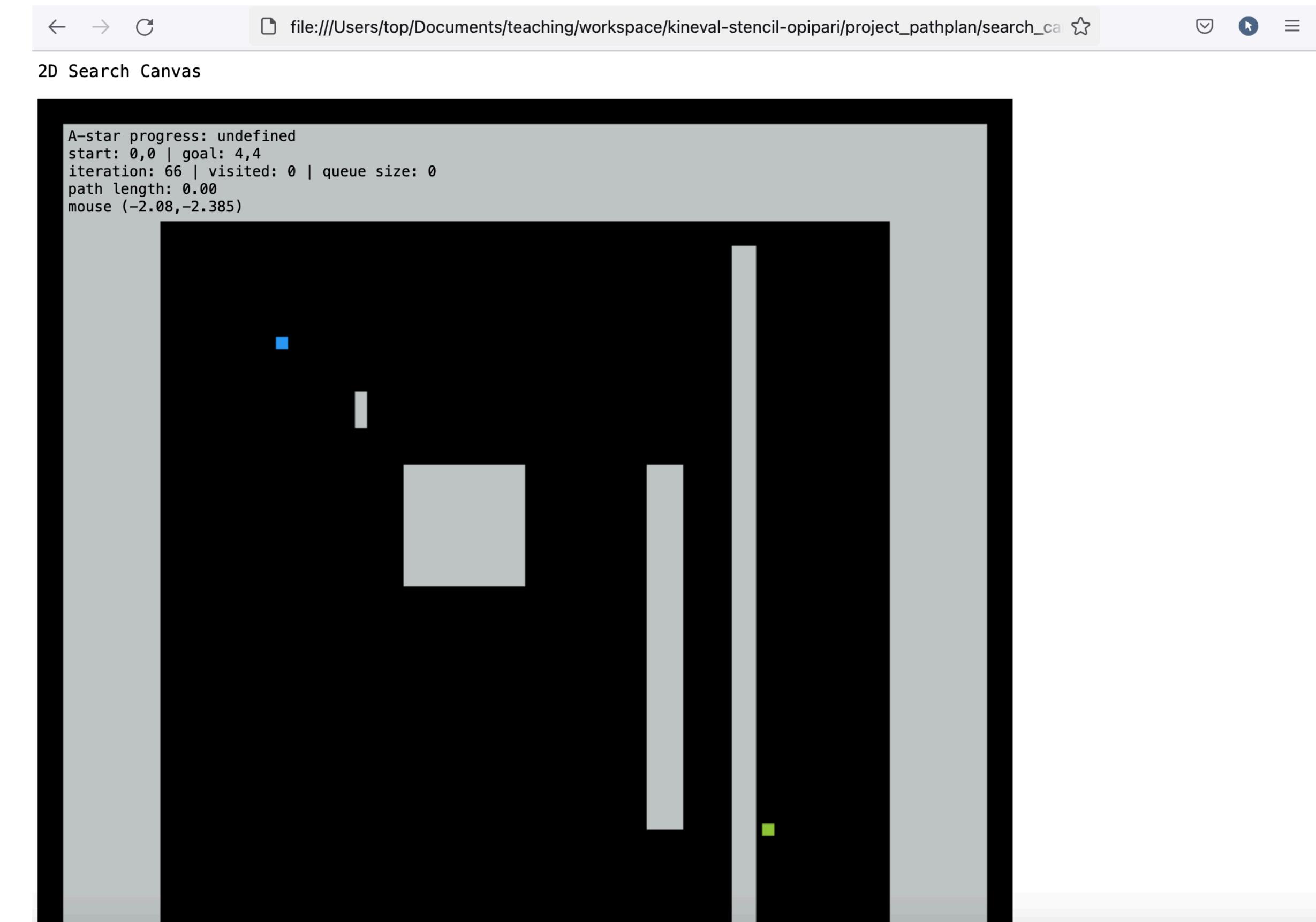
```
[top@0587418125 workspace % git clone git@github.com:autorob-WN22/kineval-stencil-opipari.git
Cloning into 'kineval-stencil-opipari'...
remote: Enumerating objects: 200, done.
remote: Counting objects: 100% (200/200), done.
remote: Compressing objects: 100% (186/186), done.
remote: Total 200 (delta 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

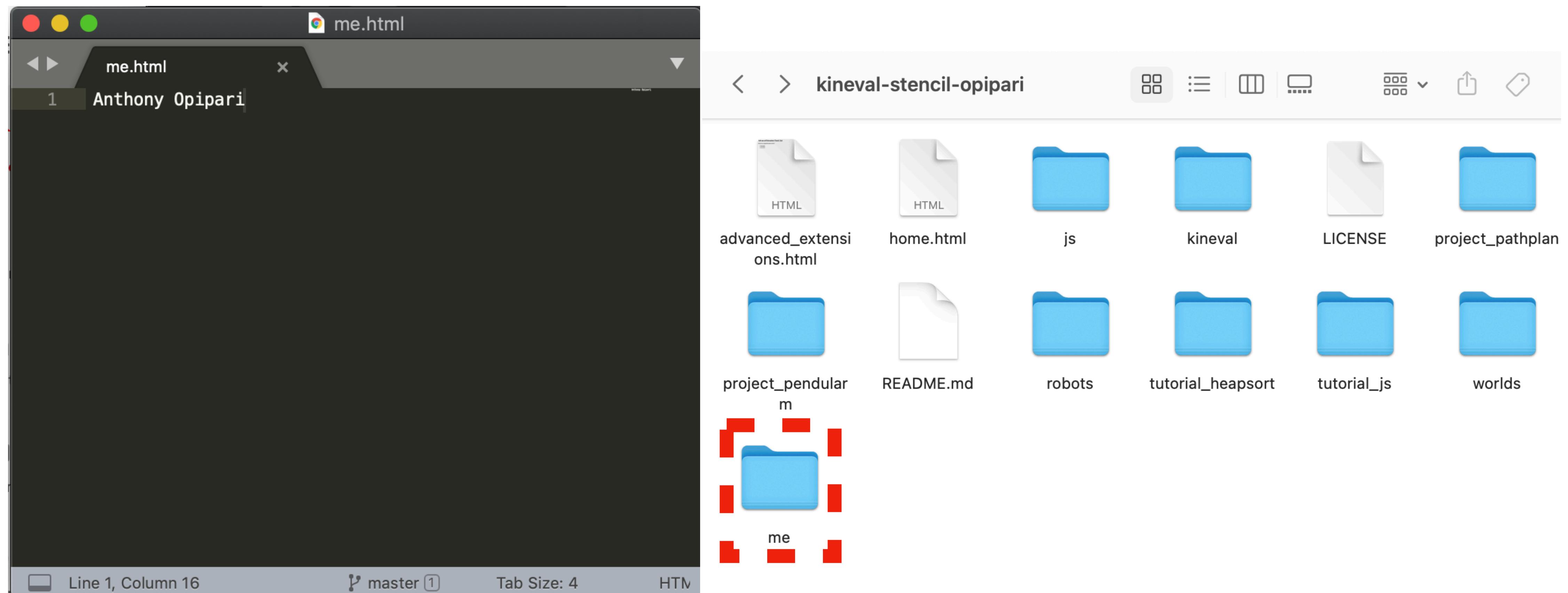
- 1) Create “me/me.html” using a text editor with your name added to the file
- 2) Add “me/me.html” to your local repository

```
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

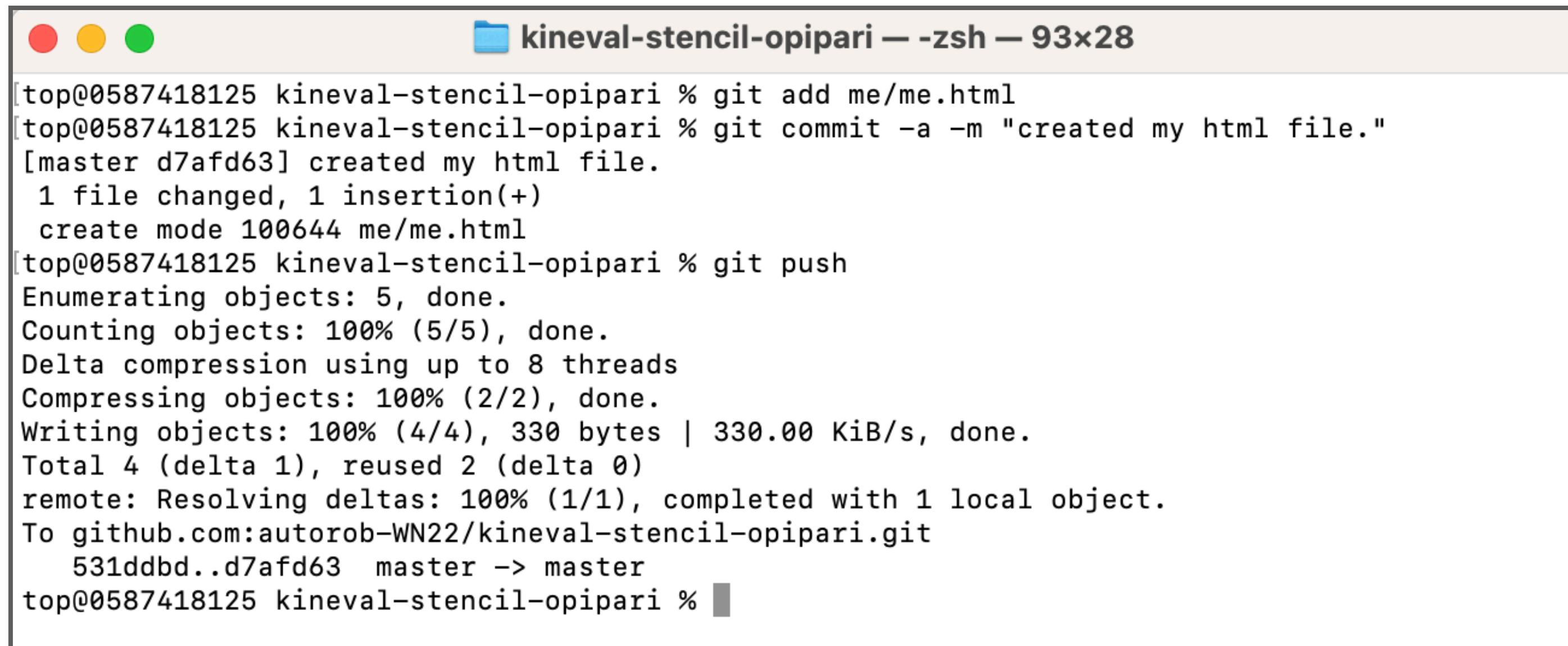


2) Add “me/me.html” to your local repository

```
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
```



```
[top@0587418125 kineval-stencil-opipari % git add me/me.html
[top@0587418125 kineval-stencil-opipari % git commit -a -m "created my html file."
[master d7af63] 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..d7af63 master -> master
top@0587418125 kineval-stencil-opipari % ]]
```

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Validate Changes

The screenshot shows a GitHub repository page for 'kineval-stencil-opipari'. The 'Code' tab is selected. The commit history for the 'master' branch is displayed, showing 7 commits. A red box highlights the first commit message: 'opipari created my html file.' with a timestamp of '2 minutes ago'. The repository was created by GitHub Classroom. It has 0 stars, 2 watching, and 0 forks. There are no releases or packages published.

Check webpage for remote repository to see changes online

Commit	Message	Time Ago
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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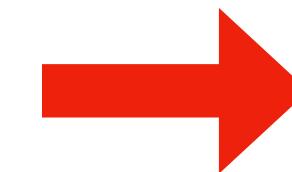
Project 1 Walkthrough

The following project features are planned for AutoRob this semester. Students are expected to complete all features.

Points	Feature
4	Assignment 1: 2D Path Planning
4	Heap implementation
8	A-star search
4	Assignment 2: Pendulum
4	Euler integrator
4	Velocity Verlet integrator
4	PID control
2	Assignment 3: Forward Kinematics
2	Core matrix routines
8	FK transforms
2	Joint selection/rendering
6	Assignment 4: Dance Controller
2	Quaternion joint rotation
2	Interactive base control
2	Pose setpoint controller
2	Dance FSM
6	Assignment 5: Inverse Kinematics
3	Manipulator Jacobian
3	Gradient descent with Jacobian transpose
3	Jacobian pseudoinverse

Project 1 Walkthrough

Recommended starting point for project 1



The screenshot shows a GitHub repository page for 'kineval-stencil-opipari'. The 'Code' tab is selected. The commit history lists 7 commits:

Commit	Message	Date
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](#)

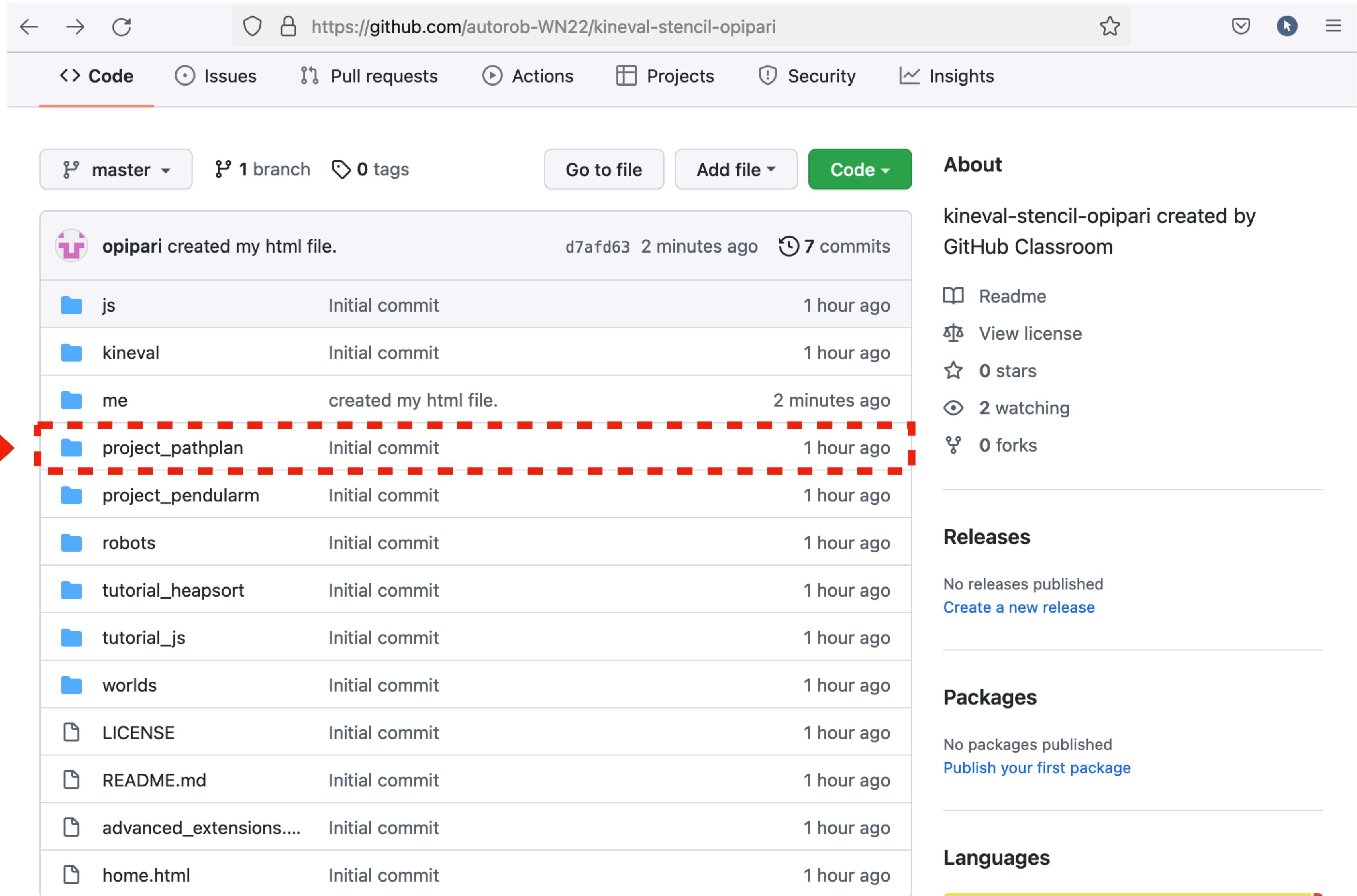
Packages

No packages published [Publish your first package](#)

Languages

Project 1 Walkthrough

Graded component of project 1



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. d7af6d3 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_pendulum 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

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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

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`