

Module 0 - Intro & GIT



Lesson Objectives:

1. Learn fundamental concepts of ROS.
2. Setup GIT repositories on both the master and the robot.

Agenda:

1. Syllabus review.
2. ROS overview.
3. Setting up GIT repositories.

1 Setting up GIT repositories.

1.1 Create a repo within the GitHub Classroom:

1. Browse to github.com and create a GitHub account if you do not already have one. It is useful if your username is something that identifies you (e.g. bneff1013).
2. **One student per group** do the following on your personal computer:
 - (a) Browse to https://classroom.github.com/a/woMT5_c1.
 - (b) Select "Accept this assignment"
 - (c) You may need to hit refresh, but eventually it will provide you a link to the repository.
 - (d) Browse to your repository.
 - (e) Note the url for your repository (save this link, it is the best way to check if your repo is updated).
 - (f) Go to Settings -> Manage access -> and "Invite teams or people".
 - (g) Provide access to your team member using their GitHub user name.
 - (h) Browse to <https://classroom.github.com/a/58Ey0waM> and repeat steps b-g.

1.2 Enable SSH connection to your GitHub account

1. Open a terminal on your master.
2. The same student as step 1.1.2 do the following:
 - (a) Generate a new SSH key, substituting your GitHub email address:

```
dfec@masterX:~$ ssh-keygen -t ed25519 -C "your_email@example.com"
```
 - (b) When you're prompted to "Enter a file in which to save the key," click enter.
 - (c) At the prompt, type a secure passphrase.
 - (d) Start the ssh-agent in the background and add your SSH private key to the ssh-agent:

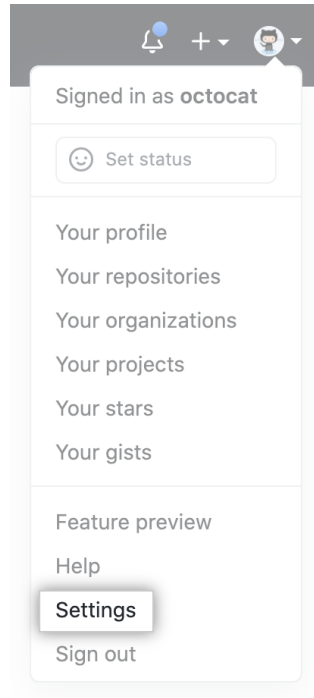
```
dfec@masterX:~$ eval "$(ssh-agent -s)"
dfec@masterX:~$ ssh-add ~/.ssh/id_ed25519
```

- (e) Open the public key:

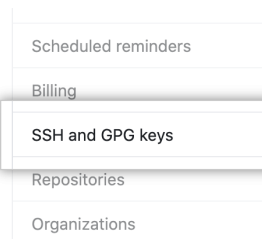
```
dfec@masterX:~$ nano ~/.ssh/id_ed25519.pub
```

- (f) Select the contents of the file (ensure it has your GIT email at the end), right click, and select copy.
- (g) Open a web browser and sign in to your GitHub account.

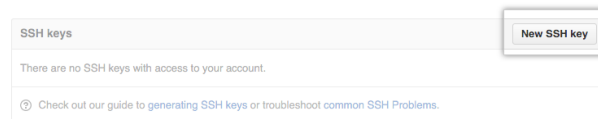
- (h) In the upper-right corner of any page, click your profile photo, then click **Settings**



- (i) In the user settings sidebar, click **SSH and GPG keys**.



- (j) Click **New SSH key**



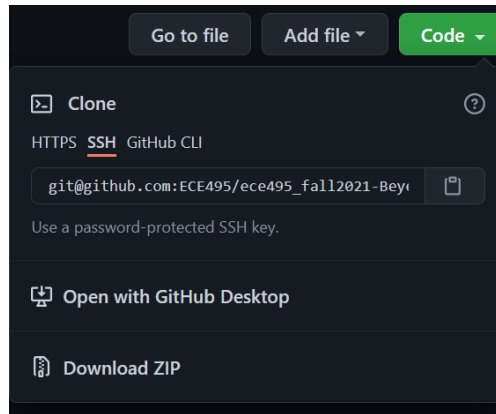
- (k) In the "Title" field, add a descriptive label for the new key, such as "MasterX".
(l) Paste your key into the "Key" field (contents of the .pub file).
(m) Click **Add SSH key**.
(n) If prompted, confirm your GitHub password.
(o) Create a SSH connection to your Robot (password is dfec3141):

```
dfec@masterX:~$ ssh pi@robotX
```

- (p) Repeat steps a-f on your robot and j-n on your master.

1.3 Clone repository to your master.

1. Open your master GitHub repository and copy your repo address using the SSH mode:



2. Open a terminal and browse to your workspace source folder:

```
dfec@masterX:~$ cd ~/master_ws/src/
```

3. Clone your repo using the username and password used when you generated the SSH key, replacing **USERNAME** with your GitHub username:

```
dfec@masterX:~$ git clone git@github.com:ECE495/ece495_master_spring2022-  
USERNAME.git
```

4. Update your git email address and the last name for you and your team mate.

```
dfec@masterX:~$ git config --global user.email "you@example.com"  
dfec@masterX:~$ git config --global user.name "Lastname1 Lastname2"
```

1.4 Clone repository to your robot.

1. Create a secure shell connection to your robot:

```
dfec@masterX:~$ ssh pi@robotX
```

2. Ensure you are in the ROS robot workspace src directory.

```
pi@robotX:~$ cd robot_ws/src
```

3. Clone the repository:

```
dfec@masterX:~$ git clone git@github.com:ECE495/ece495_robot_spring2022-  
USERNAME.git
```

4. Update your git email address and the last name for you and your team mate.

```
pi@robotX:~$ git config --global user.email "you@example.com"  
pi@robotX:~$ git config --global user.name "Lastname1 Lastname2"
```

Checkpoint. Show the instructor the cloned repositories on the robot and master:

1.5 Repository Management:

****IMPORTANT****: It is vital that you **ALWAYS** pull when you start working on your code on one system and **ALWAYS** push when you are done working on your code on that system.

****MEMORIZE THESE STEPS****:

1. Pull your repo on the master (from ece495_master_spring2022-USERNAME folder):

```
dfec@masterX:~$ git pull
```

2. Complete work on the master. For example, accomplish the following:

- (a) Create a file in your repo (from the ece495_master_spring2022-USERNAME folder)

```
dfec@masterX:~$ touch readme.md
dfec@masterX:~$ nano readme.md
```

- (b) Copy the following to the file completing with your own information:

```
# ECE495 Fundamentals of Robotics
## Master System
This repository stores all code for the master computer

### Team Member 1
Name:
Go by name:
Hometown:
Desired AFSC:
Clubs/IC Sports:
### Team member 2
Name:
Go by name:
Hometown:
Desired AFSC:
Clubs/IC Sports:
```

- (c) Hit 'ctrl+s' then 'ctrl+x' to save and exit the editor.
3. Add the files that will be uploaded to your repository:

```
dfec@masterX:~$ git add -A
```

4. Commit your changes to the repository with a message:

```
dfec@masterX:~$ git commit -m "Completed readme on the master!"
```

5. Push your changes to the repository:

```
dfec@masterX:~$ git push
```

6. Pull your repo on the robot

```
pi@robotX:~$ git pull
```

7. Complete work on the robot. For example, accomplish the following:

- (a) Create a file in your repo (from the `ece495_robot_spring2022-USERNAME` folder)

```
pi@robotX:~$ touch readme.md
pi@robotX:~$ nano readme.md
```

- (b) Copy the following to the file completing with your own information:

```
# ECE495 Fundamentals of Robotics
## Robot System
This repository stores all code for the robot computer

### Team Member 1
Name:
Go by name:
Hometown:
Desired AFSC:
Clubs/IC Sports:
### Team member 2
Name:
Go by name:
Hometown:
Desired AFSC:
Clubs/IC Sports:
```

- (c) Hit 'ctrl+s' then 'ctrl+x' to save and exit the editor.

8. Add the files that will be uploaded to your repository:

```
pi@robotX:~$ git add -A
```

9. Commit your changes to the repository with a message:

```
pi@robotX:~$ git commit -m "Completed readme on the robot!"
```

10. Push your changes to the repository:

```
pi@robotX:~$ git push
```

****BOTTOM LINE**:** Ensure you pull changes, make edits, and push your changes **EVERY TIME** you work on the master or robot!

2 Assignments.

- ✓ If you got your repo set up on both the master and the robot, then you are good to go!

3 Next time.

- Module 1 - ROS