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/58EyOwaM` 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:

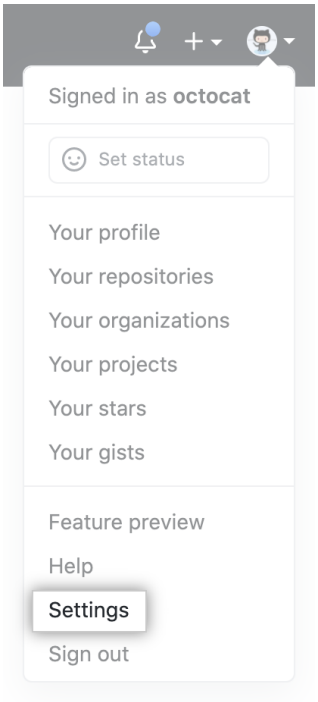
```
dfec@masterX:~$ eval "$(ssh-agent -s)"
dfec@masterX:~$ ssh-add ~/.ssh/id_ed25519
```

   (e) Open the public key:

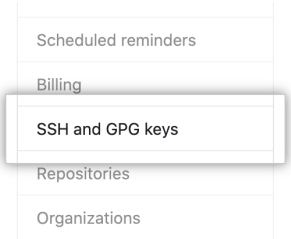
```
dfec@masterX:~$ nano ~/.ssh/id_ed25519.pub
```

   (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.

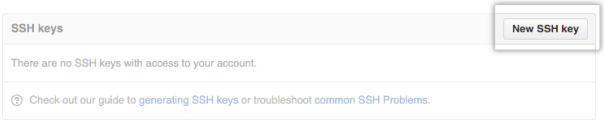
(h) In the upper-right corner of any page, click your profile photo, then click **Settings**



(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.

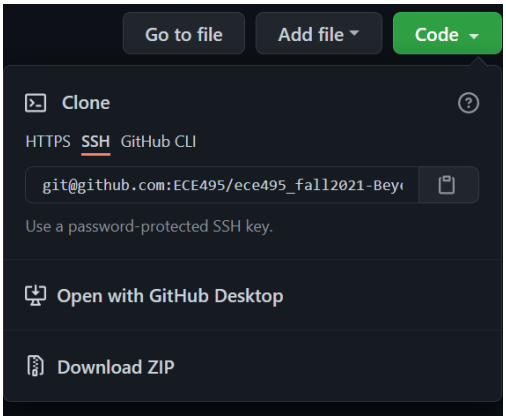
(o) Create a SSH connection to your Robot (password is dfec3141):

```
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 your master code
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 lab2 code on the master and it works
    great!"
```
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 your robot code
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 lab2 updates on the robot and it works
    great!"
```
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