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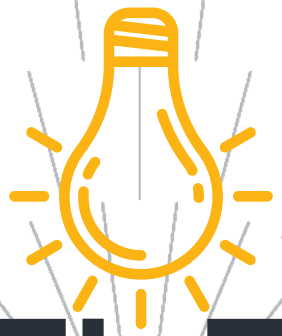

CAT VEHICLE REU 2019

Introduction to project management with Git

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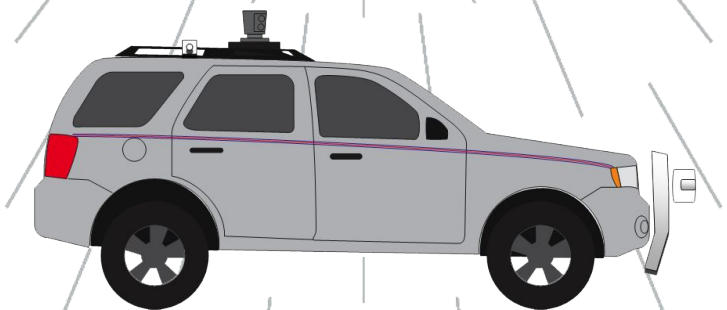


What is version control?

- Records changes to file or set of files with timestamp and remembers what changes you made.
- Helpful when you want to roll back your project to a certain time,
- Or you did something wrong and everything stops working and you wish you had not made those changes
- Or, your computer crashed !

- Also helpful when you are working in team, so that you know who made what changes

Publicly available version control

- Based on Git:
  - GitHub: https://github.com
  - Gitlab: http://gitlab.com
  - Bitbucket: https://bitbucket.org/product/
- Other version control:
  - Subversion
  - Mercurial
- U of A Engineering version contol:
  - Gitlab: http://gitlab.engr.arizona.edu
  - We will use this, you login with your netid and password.

Engr Git

- CAT Vehicle REU group will create projects in their designated group: https://git.engr.arizona.edu/catvehicle2019
- Create separate projects inside the group: probably one for each individual to log and record your daily research journals, papers, etc. that you will read, any summary, code, etc; and one group project that you will be working in collaboration with other team members.

Cloning a sample repo

- **git clone** https://git.engr.arizona.edu/catvehicle2019/git-tutorial
  - This will clone [copy in the language of git] the repository in your local system

Adding your git username

- git config --global user.name <yournet id>
- git config --global user.email <yournetid>@email.arizona.edu

Creating your own repository

- On Website:
  - Choose **new project** option in the gitlab website.
  - Enter the name you want to give.
  - Add description and enable readme that will tell any visitor what this project is about
- In your local system:
  - **git clone** <the name of your repository>

Adding a file to your git project

- Check if there is unversioned files in your git folder on your local system
  - Type **git status**
  - Untracked files means they are unversioned
  - Modified means, you have made some changes to it
  - Too see the difference between current version you have locally and one in the git, type **git diff <name of the file>**
  - To add files: **git add < name of the file>**
  - To add all files: **git add –-all**

Committing your changes

- At this point, you have told the git software that these files are ready to be added
- Now commit these changes to the local database with a descriptive message:
  - **git commit -m "This is my first git commit" <filenames>**
- You can do multiple commits to different files with different commit messages
- It is a good practice to commit with a meaningful message about changes you are going to commit: it will save a lot of trouble in the future! Trust me!

Pushing changes to git server

- **git push -u origin master**
- Here, **master** is the name of the branch you are committing to.
- There can be multiple branches [more on this later].

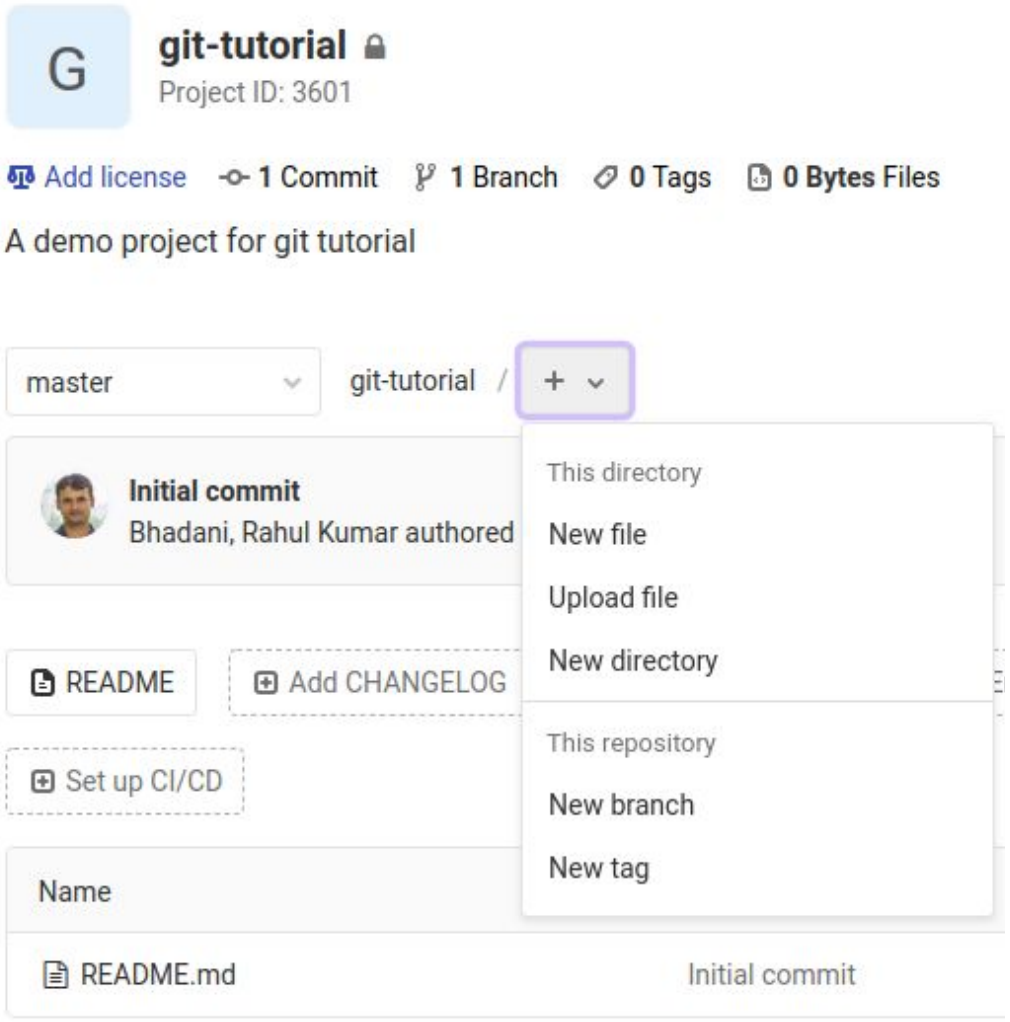
Retrieving changes from git

- You are working in a team and your teammates made some commit and pushed to git. You want to retrieve that changes before you commit.
- **git pull**
- Always pull to check to see if there is some update in the repo you before push.

Teach git some exception rules

- There are certain files we don't need to commit to the git server
  - E.g. executables, log files, auto-generated files, intermediate files, etc. created during compile time
- You will specify those in .gitignore
  - In your project folder, create a new file .gitignore [if it doesn't exist]
    - **touch .gitignore**
    - **gedit .gitignore**
    - ***.log**
    - **save**
  - This will teach git not to add any file ending with **.log**.
  - You can do this for a lot of other type of files

Working with branches



- Branches are useful when we want to create different versions:
  - E.g version 1.01, beta version, etc.
- You can create a new branch from existing branch
- To clone a specific branch:
  - git clone -b <name of branch> <repo address>
- To switch a branch:
  - git checkout <name of branch>

Reverting changes

- There will be a point where you find out that you didn't like changes you made to a file for some reason and you want to revert back to what is there in git repo on server
  - **git checkout** <name of file>
- Be careful with **git checkout** as once you execute this, you will lose any changes you made to that file.

Deleting a file from a git

- **git rm** <name of the file>
- This will delete the file locally as well as from git.
- You are yet to commit and push this deletion request to the server
- If you change your mind before committing:
  - **git checkout** <name of the file>

Retrieve a particular version of a file

- **git checkout c27bod33 <fileName>**
- Here c27bod33 is the history number [or revision number], it can be anything for you. Check history to know which version you want to checkout

That's it folks.

You will learn more as you move forward with the project