Using Git, RStudio, and QGIS

This course will make heavy use of Git, R and RStudio, and QGIS. Before you begin this assignment, make sure you install them. Basic installation instructions are on Canvas. If you have difficulty with installation, please contact the instructor.

Learning objectives

By the time you complete this assignment, you should:

- Understand the concept of version control
- Be able to use the command line for basic tasks
- Use basic git commands: clone, status, add, commit, log, pull, push, branch
- Use basic Github features: fork, pull request
- Ensure you have QGIS, RStudio, and R installed correctly

Assignment instructions

This assignment will ensure that R, RStudio, git, and QGIS are installed and working on your computer, and give you a cursory introduction to using them. Since the primary goal of the assignment is just to make sure the software is working correctly, feel free to discuss any issues encountered with me or others in the class—I want you to get full credit for this assignment since it lays the technical foundations for future assignments. The learning curve for git is steep, so please don't hesitate to ask for help.

The assignment consists of forking a repository on Github, making a change to it using the git command-line client, pushing that change to Github, and creating a pull request to incorporate that change back into the main repository. In the process, you will briefly use QGIS and RStudio, just enough to ensure they are installed correctly.

Setting up git

If you haven't already, configure git with your name and email address. Run the following at the command line:

```
git config --global user.name "Your Name"
```

```
git config --global user.email "Your Email"
```

Your name and email will be visible to your classmates, and to the public if you ever create or contribute to a public repository on Github. Feel free to use initials, a pseudonym, etc.
If you want to keep your email address private, you can select "keep my email addresses private" in your Github account settings (on Github, click your profile picture in the upper right -

> settings -> emails and choose "keep my email addresses private"), and copy the email address displayed there instead of your actual email address into the command above. The email address will end in @users.noreply.github.com.

Forking and cloning the assignment repository

This assignment will use a git repository which is hosted on Github. It is a private repository within the PLAN 372 Github organization. If you have not requested access to this organization yet, contact the instructor at mwbc@unc.edu with your Github username.

Navigate to the repository page on Github at https://Github.com/unc-plan372-sp23/plan372-hw1 and click the Fork button in the upper right to fork it to your Github account. This will create a "fork" of the repository which you can modify.

Open the command line and go to the directory where you want to save files for this class.

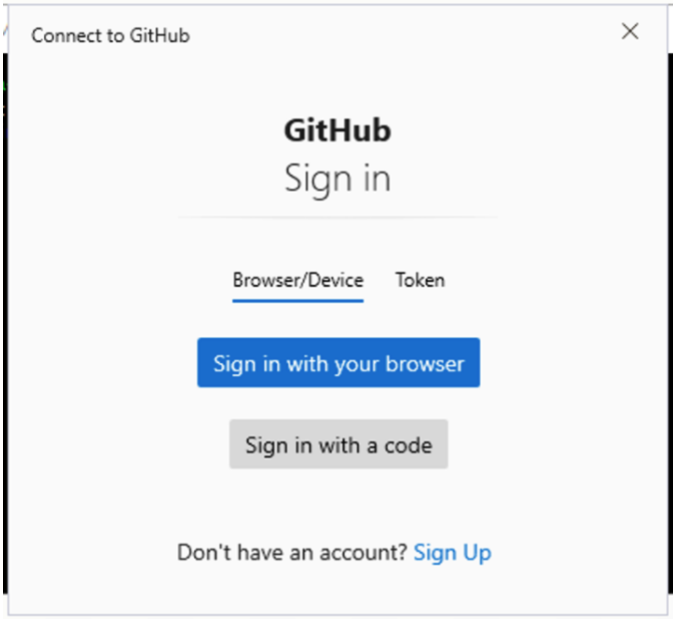
Clone the forked repository by typing

```
git clone https://github.com/YOUR_GITHUB_USERNAME/plan372-hw1
```

This will create a copy of the of the repository on your computer, in a folder called plan372-hw1.

If this is your first time using Github, you will need to authenticate.

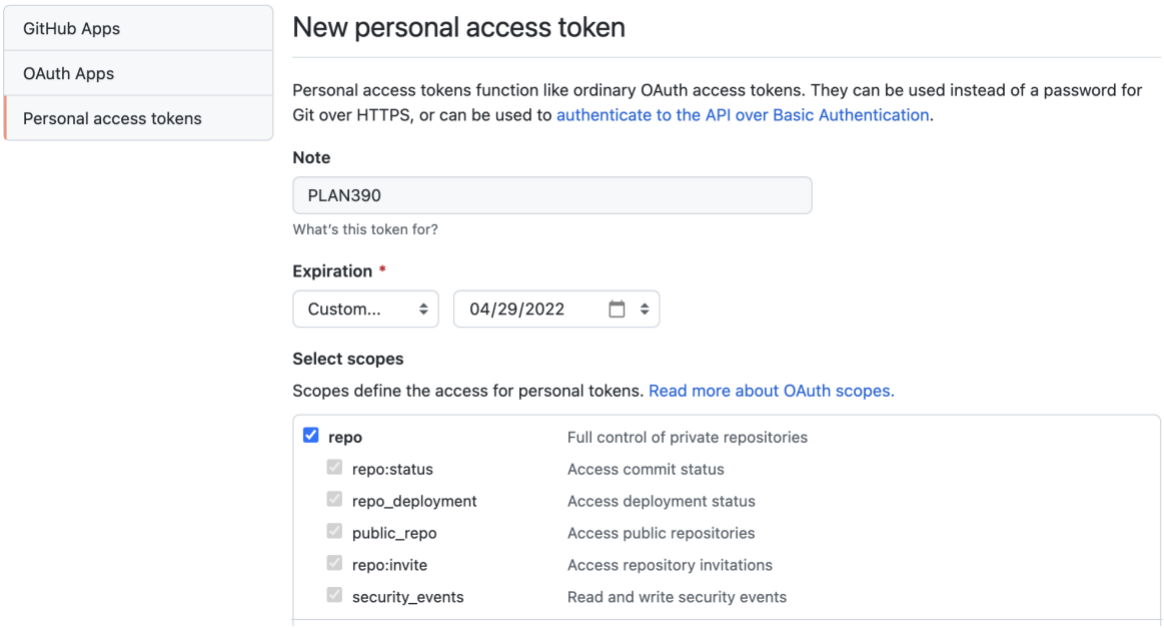
On Windows, you will see this dialog. Click "sign in with your browser" and sign in to Github.



On Mac, you will be prompted for a username and password. Enter your Github username and press enter. Follow the instructions at the link below to generate a "personal access token" to use as a password:

https://docs.github.com/en/authentication/keeping-your-account-and-data-secure/creating-a-personal-access-token

Select the "repo" option when generating the access token, and set an expiration date after the class is over (see screenshot below). Press "Generate token" and copy the displayed token into the command line when it prompts for a password (note: your password will not be displayed when pasted, not even as asterisks). Press enter to submit the password.



Once these steps are done, on either Windows or Mac, return to your command-line. Git will download the repository.

When you clone a repository, git will create a folder containing your copy of the repository, with the same name as the repository. Use the cd command to change your command line's working directory to the folder:

```
cd plan372-hw1
```

You can also access Github over ssh, though this is an advanced topic not covered in this class. If you already have ssh authentication configured for Github, feel free to use it, and replace https://github.com/ with git@github.com: in the clone command.

Creating an introduction for yourself

In the plan372-hw1 folder there is an introductions folder. Make a copy of the file template.txt, rename it to your name, and edit the file to add your name and a short introduction to the file. This will be viewable by your classmates, so don't put in anything you don't want to share. Save the file in the introductions folder alongside the template.

Note: it is possible to create this file through the Github web interface, but if you do that you won't learn to use the command line which you'll need later in the class, so please don't. If you do you won't get credit for any of the git portion of the assignment.

Testing your QGIS installation

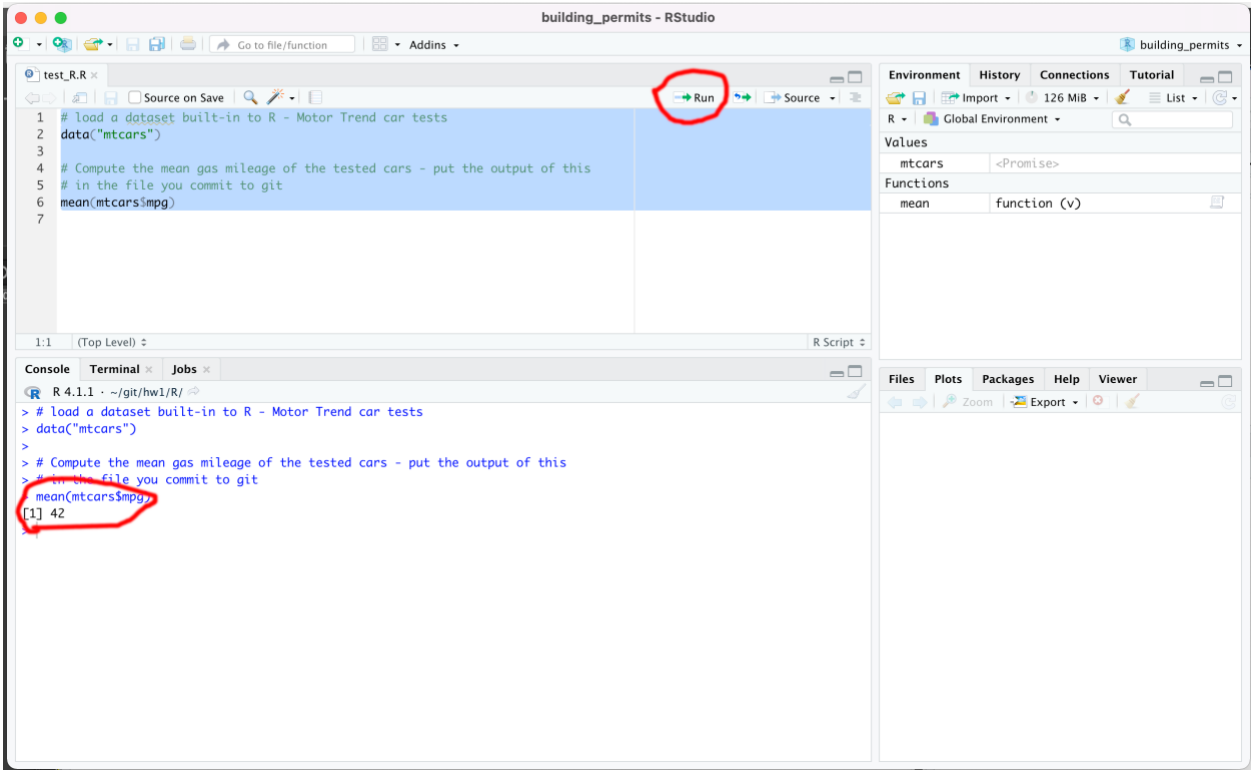
In the plan372-hw1 folder there is a qgis folder. Inside there is a file called qgis-test.qgz. Open it with QGIS; if QGIS is properly installed you will see a map of a residential neighborhood in Phoenix, Arizona.

If QGIS opens, but you don't see a map, the map may be zoomed to the wrong place. Right-click or ctrl-click on "Phoenix street network" under "Layers" on the left-hand side of the QGIS window, and select "Zoom to layer(s)".

In your introduction file, write one of the street names from the map (it doesn't matter which one).

Testing your R and RStudio installation

In the plan372-hw1 folder there is an R folder, with a file test.R inside it. Open this file in RStudio, select the entire contents of the file, and click the "run" button (circled in red in the figure below). This will run the code and print out the average gas mileage of cars in the built-in R data set on cars, and print it out in the console (also circled in red - but the number in the picture is not the answer ☺). Type this number into your introduction file.



Commit your file to git

Use the git add and git commit commands to commit your introduction text file to git.

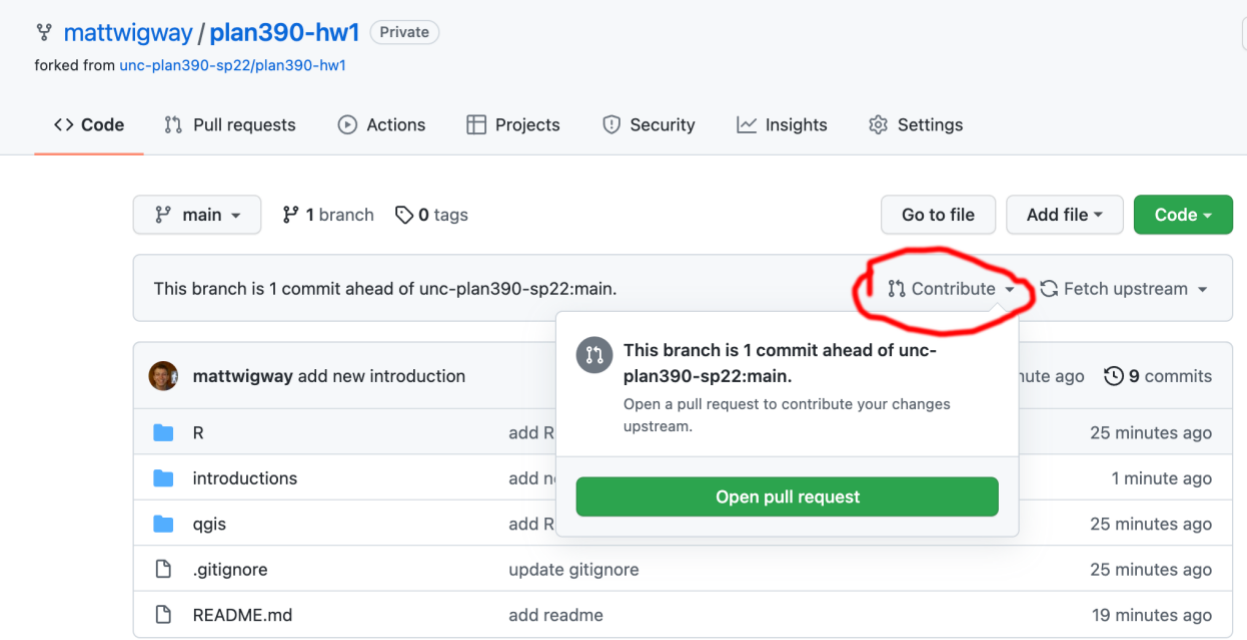
Push your changes to your fork

Use the git push command to upload your changes back to your fork of the plan372-hw1 repository.

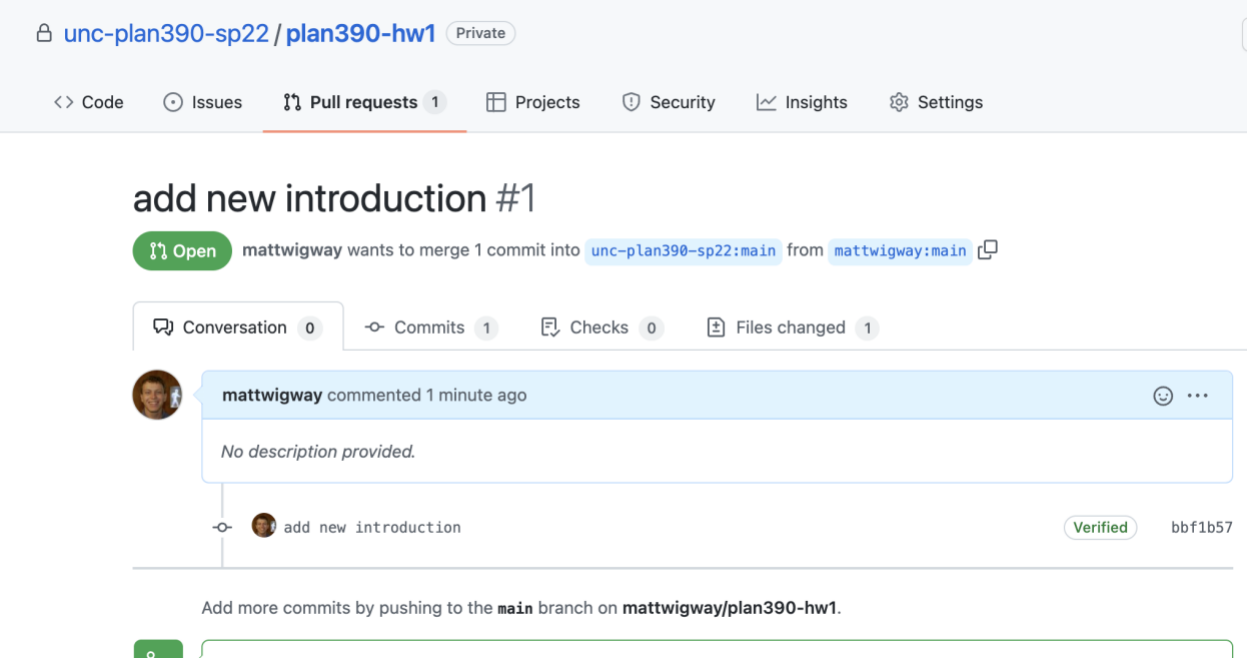
Create a pull request

On the Github website, navigate to your fork of the hw1 repository (https://github.com/YOUR_USERNAME/plan372-hw1). Create a pull request to merge your changes back into the original repository.

On the Github page of your fork, you will see a message that your branch/fork is 1 commit ahead of unc-plan372-sp23:main - this is the commit you just created. Click on "Contribute," then "Open pull request." If you don't see the message, make sure that you are looking at the Github page for your fork (your_username/plan372-hw1, not unc-plan372-sp23/plan372-hw1), and that you have committed and pushed your changes.



On the page that appears, click "Create pull request." Github will then ask you for a name and a description. You can leave these at their default values, and click "Create pull request" to finalize your submission. You will know the pull request is submitted when you see the page below, with a number assigned to your pull request (#1 in this example).



You don't need to turn anything in—the pull request is your assignment submission.

Grading

This assignment is worth 5% of your overall grade. The point breakdown is below

Pull request created	1 point
Introduction file added with your name and introduction	1 point
Introduction file is in the correct directory	1 point
Street name from QGIS is correct	1 point
Average miles per gallon from R is correct	1 point
Total	5 points