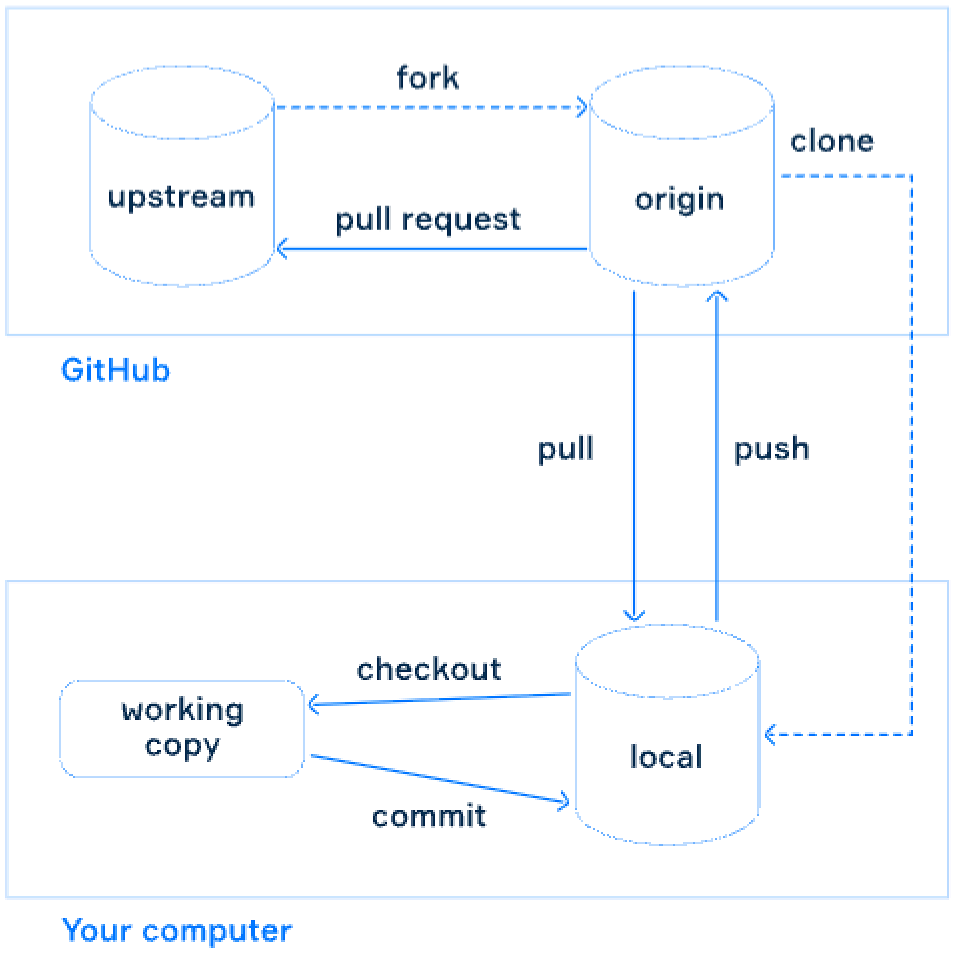
The model of work

Imagine that you have a repository hosted on GitHub with a project that you are going to develop. It may be a forked repository or an original one, the point is that you have full access to it.

The standard approach to work with a project is to have a local copy of the repository and commit your changes to this copy rather than to a remote repo hosted on GitHub through the web interface. This local repository has full version history of the project that can be useful when working without an internet connection. After you've changed something in the local repo, you can push your changes to the remote repository to make them visible to other developers.

The picture below shows the model of how to work with GitHub.



First, consider the block related to GitHub. There are two repositories:

- **upstream** is an original repo of the project that you have forked;
- **origin** is your fork (copy) on GitHub to which you have full access.

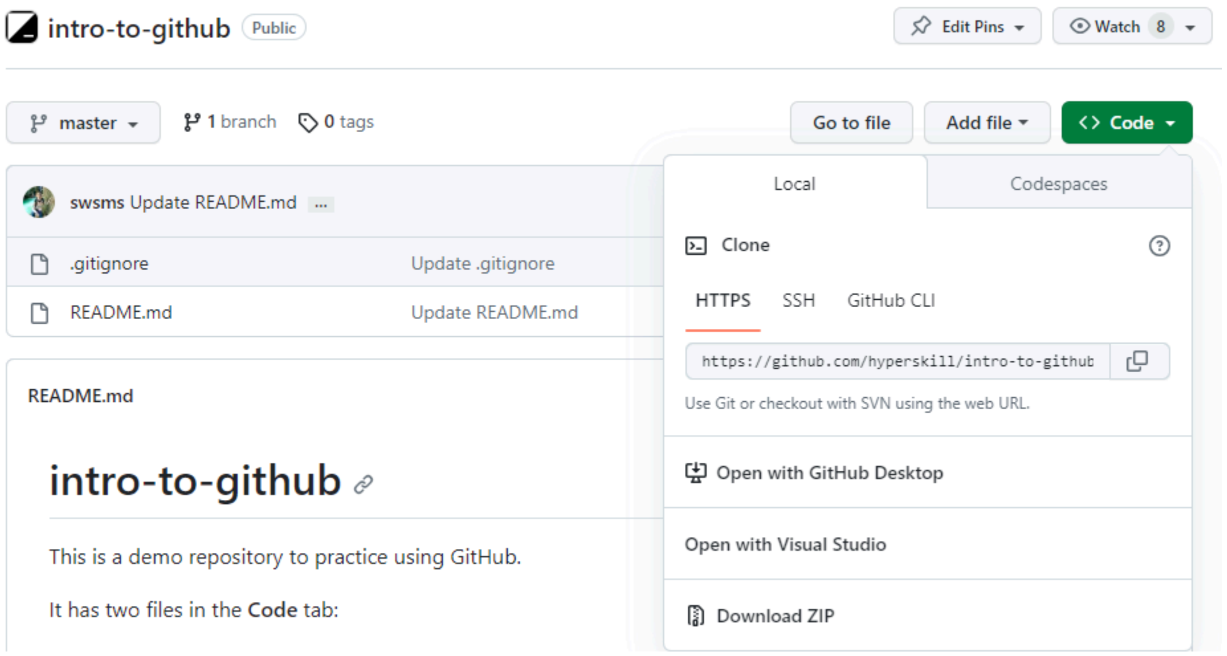
To implement changes from your fork to the original repo of the project, you need to make a pull request as we did before.

If you want to make small changes in your repo (fork), you can use the web interface of GitHub. However, this approach is not convenient when developing programs, because you often need to run and debug them locally.

The standard way is to create a local clone of a remote repository and work with it locally, pushing changes to the remote repo from time to time.

Cloning a repo

Now you need to clone your fork (origin) of our educational repository on your computer. Click the green <> *Code* button. There are multiple ways that you can use to continue working on your copy of the repository. The first option provides the repository URL that you can use for cloning:



```
https://github.com/hyperskill/intro-to-github
```

Use Git or checkout with SVN using the web URL.

README.md

intro-to-github

This is a demo repository to practice using GitHub.

It has two files in the **Code** tab:

Click the *copy icon* to copy the link to the clipboard. Then, open your command line or terminal and navigate to the directory where you want to copy the repository. Then write

`git clone`

and insert the address:

```
$ git clone https://github.com/hyperskill/intro-to-github.git
```

Feel free to explore the other ways such as using the GitHub CLI to clone the repo or download the code as a .zip file. You can also switch to the

Codespaces

 tab to work with a clone of the repo in a cloud-based development environment.

Now, you have a local repository of the project.

Note

that you can switch to the SSH protocol instead of HTTPS (SSL) to clone a repo. We will not consider it here, but you may learn how to do this and do it if you're interested (e.g. developers often prefer SSH in practice).

Creating branch locally

Navigate to the directory of the repository and take a look at the content. The local repo includes all the files, branches, and commits history like the remote repository. Type this command to verify the state of your repo:

```
$ git status
```

```
On branch master

Your branch is up-to-date with 'origin/master'.
```

Now your working copy is actually on the *master* branch of your local repo. And it is similar to the origin (fork) *master* branch. To make changes in your repo, first, you should create a branch to protect your *master* branch. Type the command below:

```
$ git branch edit-readme
```

After this command is executed, a new branch *edit-readme* is created, but you are still on the *master* branch. You may check it using status just like in the previous example.

To get another branch, use

```
checkout
```

with the branch name:

```
$ git checkout edit-readme
```

Now you are on the branch that you've created.

```
$ git status
```

```
On branch edit-readme

nothing to commit, working tree clean
```

We are ready to make some changes on a new branch.

Modifying content

The basic workflow looks like this:

- Modify the files in your working copy.
- Select and stage changes you want to be a part of your next commit.
- Perform a commit that includes your changes.

Let's make some changes then! Open the *README.md* file and write a few lines in it. Then check the status of the repo again and you will see that the file has been changed. Now, stage these changes using

```
add
```

:

```
$ git add README.md
```

You can commit these changes to your local repo with a descriptive comment:

```
$ git commit -m "Add information about local repository in
readme file"
```

You can make as many commits as you need. Changes can be different: adding new files, deleting, or modifying existing ones. Do not forget to stage them using

`add`

before

`commit`

.

Pull and push

It is important to remember that

`commit`

adds changes only to your local repository. If you want to propagate them to the origin repository on GitHub, you need to use

`push`

.

For the first time, you need to push your local branch as well because it does not exist in the remote repo.

```
$ git push --set-upstream origin edit-readme
```

The next time it will be easier:

```
$ git push
```

To get changes made by someone else, use

`pull`

:

```
$ git pull
```

A nice thing to do is to execute pull periodically, especially before pushing, to prevent possible conflicts when someone else has changed the files in the repository in the same branch.

After pushing your branch with changes, you may find it on GitHub and create a *Pull Request* to the original (upstream) repo as we did it before.

There is another problem that we have not considered yet: someone may change the original repository while you are working in your fork and you need to synchronize your local and remote repositories with these changes. We will take a closer look at this problem in other topics.

Conclusion

For now, you need to remember what a local repository is and how to change files locally, and then propagate the changes to a remote repository hosted on GitHub. Although working with the command line with Git might seem difficult for beginners, don't worry. We will learn later how to perform the same commands in an easier way using a convenient user interface.

An original project repository you have forked is called upstream

Your fork on GitHub you have full access to is called origin

Why may you need to work with a repo locally? to change large projects and debug them

Explain the result

Suppose, you have a repository hosted on GitHub and cloned a project to your local computer.

You are in the project directory.

```
git branch fix-a-bug
```

```
git checkout fix-a-bug
```

```
git status
```

```
git add .
```

```
git commit -m "fix a bug"
```