本地与GitHub关联并进行Git管理的两种方法

0.准备工作

> **GitHub连接已有仓库时使用的认证方式是SSH公开密钥**

- **创建一个用于认证的SSH Key并将其添加至GitHub**

1. 首先检查是否已经为计算机生成过SSH密钥，在Git bash命令行下先后输入以下两条命令：`cd ~/.ssh` 然后 `ls` 若没有则显示：

```
$ cd ~/.ssh
bash: cd: /c/Users/zdy/.ssh: No such file or directory
```

或直接一条命令：`cat ~/.ssh/id_rsa.pub`，若没有则显示：

```
$ cat ~/.ssh/id_rsa.pub
cat: /c/Users/zdy/.ssh/id_rsa.pub: No such file or directory
```

2. 若没有生成过，使用下列命令生成：`ssh-keygen -t rsa -C "your_email@example.com"`（邮箱要用GitHub注册的邮箱！！！）

```
Generating public/private rsa key pair.
Enter file in which to save the key (/c/Users/zdy/.ssh/id_rsa):
Created directory '/c/Users/zdy/.ssh'.
```

回车一次输入密码，再次回车确认密码：

```
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
```

最后生成的结果是：

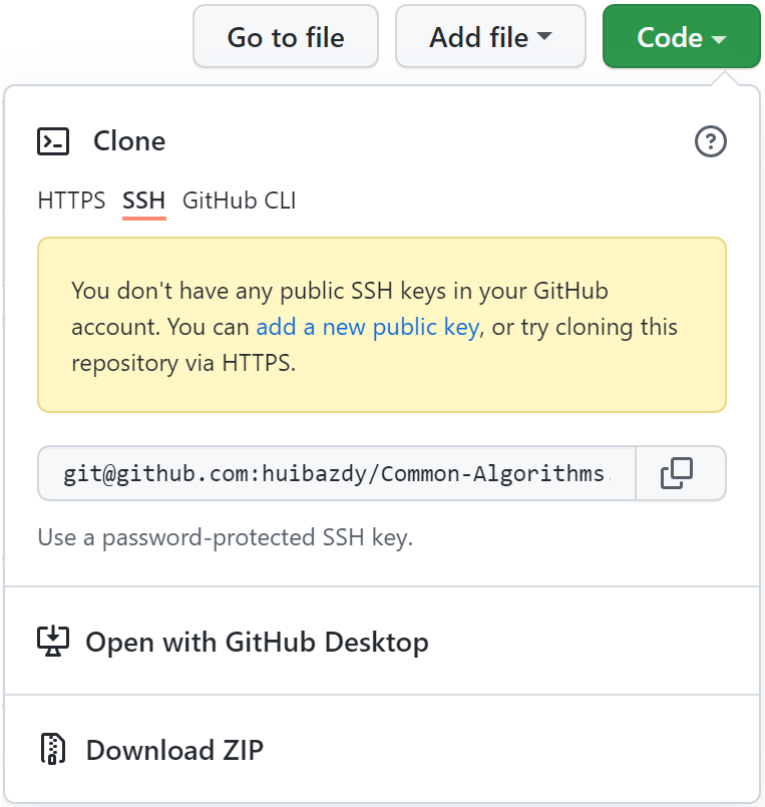
```
Your identification has been saved in /c/Users/zdy/.ssh/id_rsa
Your public key has been saved in /c/Users/zdy/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:A4xQUNSAfii6dSe9fwjTk5/9wq6yWzNxCN7SUetyhLY zhangdaoyuan1@xiaomi.com
The key's randomart image is:
+---[RSA 3072]----+
|  o*=o      .    |
|  .. o.    o .   |
| . .. o . + o    |
|. o .  o = *     |
|.. . . .S.E +    |
|. . o = +o =     |
| o . o + +++     |
|.     . o.+o+    |
|       .+=.o.o.  |
+----[SHA256]-----+
```

其中 `id_rsa` 是私有密钥，`id_rsa.pub` 是共有密钥。可以在路径C:\Users\zdy.ssh中看到生成的两个文件

名称	修改日期	类型	大小
id_rsa	2022/3/28 13:54	文件	3 KB
id_rsa.pub	2022/3/28 13:54	Microsoft Publisher...	1 KB

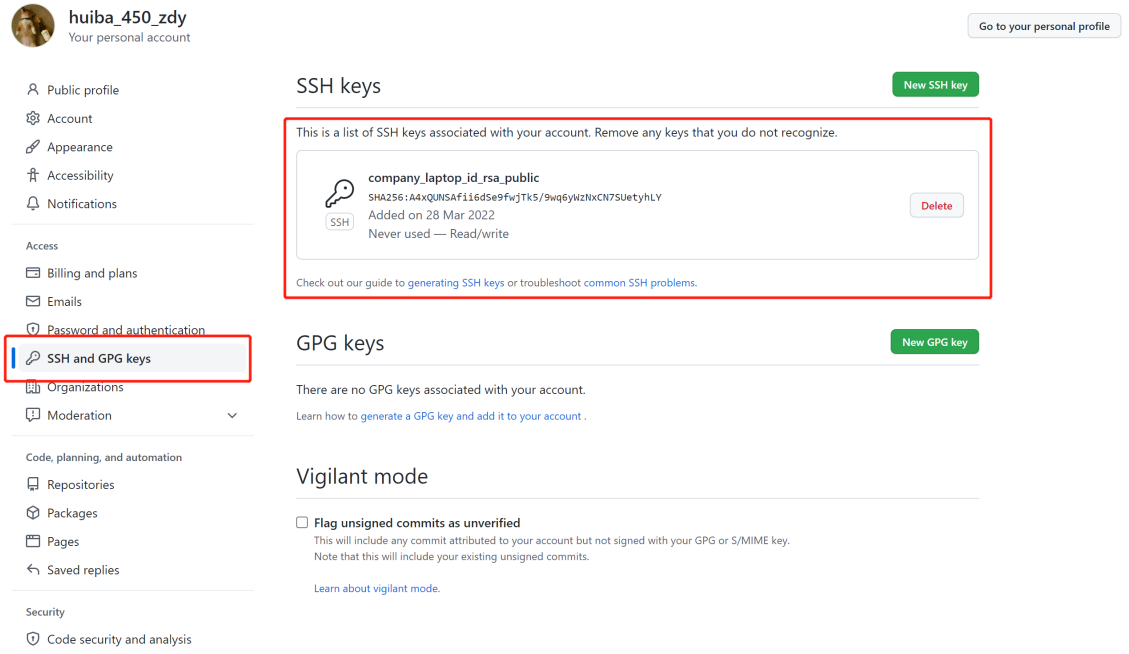
- **在GitHub中添加公有密钥**

  在GitHub中打开一个新建的仓库，找到配置ssh的位置，你会看到要求你添加共有密钥的提示：



  点击提示的添加新的个公开密钥的链接，复制之前生成密钥路径下id_rsa.pub中的文本内容并粘贴至下图2处：（步骤1可以省略，会默认以邮箱名命名该ssh）

  添加结束后可以在个人账户设置页面中看到以下内容：



公钥文件id_rsa.pub中的文本内容可以在Git bash命令行中以命令：`cat ~/.ssh/id_rsa.pub`查看。在添加SSH Key成功后，创建GitHub账号的邮箱中会受到一封已添加新公钥的邮件。

- **完成上述设置后，本地计算机就可以利用私钥与GitHub进行认证通信了，现在进行验证**：

  键入命令`sst -T git@github.com`

```
zdy@SK-20210902RBPT MINGW64 ~ (master)
$ ssh -T git@github.com
The authenticity of host 'github.com (20.205.243.166)' can't be established.
ED25519 key fingerprint is SHA256:+DiY3wvvV6TuJJhbpZisF/zLDA0zPMSvHdkr4UvCOqU.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])?
```

  输入`yes`并回车，提示警告信息

```
Warning: Permanently added 'github.com' (ED25519) to the list of known hosts.
Enter passphrase for key '/c/Users/zdy/.ssh/id_rsa':
```

  输入之前设置的认证密码并回车，完成连接

```
Hi huibazdy! You've successfully authenticated, but GitHub does not provide shell access.
```

1. 先本地，后GitHub

- **新建一个本地仓库**

```
zdy@SK-20210902RBPT MINGW64 /E/GitHub
$ mkdir LocalTest

zdy@SK-20210902RBPT MINGW64 /E/GitHub
$ cd LocalTest/

zdy@SK-20210902RBPT MINGW64 /E/GitHub/LocalTest
$ pwd
/E/GitHub/LocalTest
```

- **使本地仓库受Git管理**

```
zdy@SK-20210902RBPT MINGW64 /E/GitHub/LocalTest
$ git init
Initialized empty Git repository in E:/GitHub/LocalTest/.git/

zdy@SK-20210902RBPT MINGW64 /E/GitHub/LocalTest (master)
$ git status
On branch master

No commits yet

nothing to commit (create/copy files and use "git add" to track)
```

- **向仓库中添加文件或修改**

```
zdy@SK-20210902RBPT MINGW64 /E/GitHub/LocalTest (master)
$ vim hello.cpp

zdy@SK-20210902RBPT MINGW64 /E/GitHub/LocalTest (master)
$ git status
On branch master

No commits yet

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        hello.cpp

nothing added to commit but untracked files present (use "git add" to track)

zdy@SK-20210902RBPT MINGW64 /E/GitHub/LocalTest (master)
```

- **提交修改到暂存区**

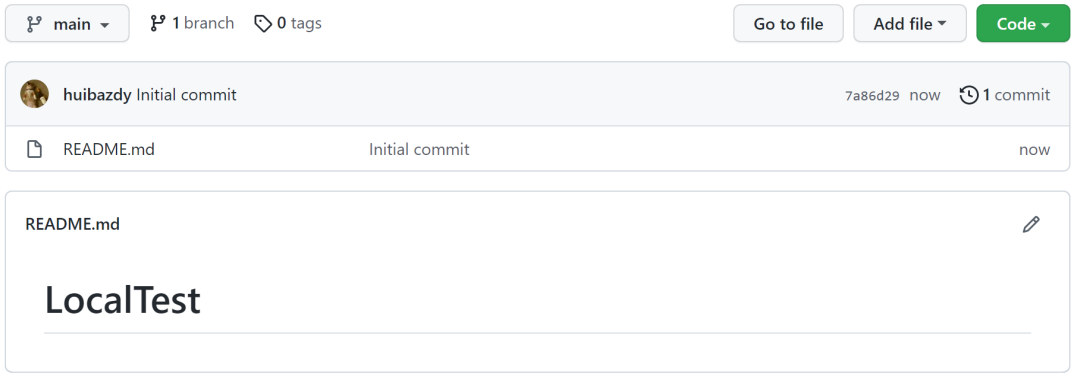
```
zdy@SK-20210902RBPT MINGW64 /E/GitHub/LocalTest (master)
$ git add hello.cpp

zdy@SK-20210902RBPT MINGW64 /E/GitHub/LocalTest (master)
$ git status
On branch master

No commits yet

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)
        new file:   hello.cpp
```

- **提交到本地仓库（此处采取提交简单修改描述的方式）**

```
zdy@SK-20210902RBPT MINGW64 /E/GitHub/LocalTest (master)
$ git commit -m "first commit"
[master (root-commit) a9cb790] first commit
 1 file changed, 8 insertions(+)
 create mode 100644 hello.cpp
```

- **推送到远程仓库（此处指的是GitHub）**

1. 在GitHub上创建一个同名仓库作为本地仓库的远程仓库（最好不要勾选with a README）



2. 添加远程仓库——`git remote add`

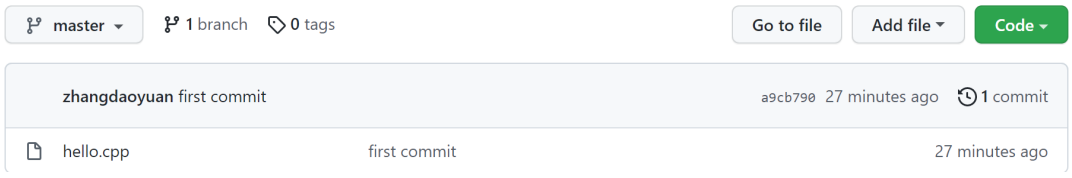
```
zdy@SK-20210902RBPT MINGW64 /E/GitHub/LocalTest (master)
$ git remote add origin git@github.com:huibazdy/LocalTest.git
```

3. 推送至远程仓库——`git push`

   第一次由于远程仓库为空，需要在`git push`后加上`-u`参数。其他分支也需要加上这个参数。

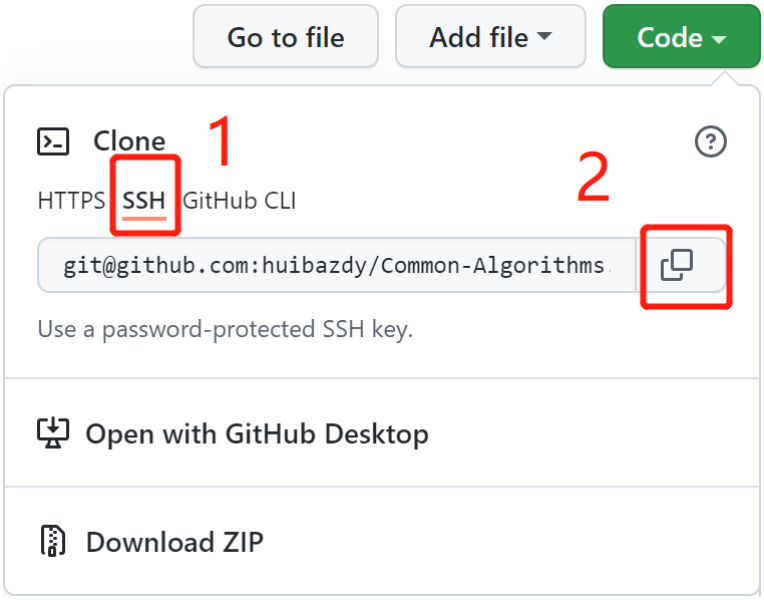
```
zdy@SK-20210902RBPT MINGW64 /E/GitHub/LocalTest (master)
$ git push -u origin master
Enter passphrase for key '/c/Users/zdy/.ssh/id_rsa':
Enumerating objects: 3, done.
Counting objects: 100% (3/3), done.
Delta compression using up to 8 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 297 bytes | 297.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
remote:
remote: Create a pull request for 'master' on GitHub by visiting:
remote:      https://github.com/huibazdy/LocalTest/pull/new/master
remote:
To github.com:huibazdy/LocalTest.git
 * [new branch]      master -> master
Branch 'master' set up to track remote branch 'master' from 'origin'.
```

   之后可以在仓库中看到添加的hello.cpp文件：



2. 先GitHub，后本地

- **在新建的仓库后复制仓库的ssh链接**



- **在Git bash命令行中切换到想要保存仓库的路径下，使用`git clone`命令克隆这个仓库到本地**

```
zdy@SK-20210902RBPT MINGW64 /E/GitHub
$ git clone git@github.com:huibazdy/Common-Algorithms.git
Cloning into 'Common-Algorithms'...
Enter passphrase for key '/c/Users/zdy/.ssh/id_rsa':
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
Receiving objects: 100% (3/3), done.
```

- **在路径下查看克隆下来的仓库**

- **切换到仓库路径下，用`git status`查看仓库状态**

```
zdy@SK-20210902RBPT MINGW64 /E/GitHub
$ cd Common-Algorithms/

zdy@SK-20210902RBPT MINGW64 /E/GitHub/Common-Algorithms (main)
$ git status
On branch main
Your branch is up to date with 'origin/main'.

nothing to commit, working tree clean
```

- **在仓库路径下用vim新建一个hello.c文件，并再次查看仓库状态可以看到仓库存在Untracked files**

```
zdy@SK-20210902RBPT MINGW64 /E/GitHub/Common-Algorithms (main)
$ git status
On branch main
Your branch is up to date with 'origin/main'.

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        hello.c

nothing added to commit but untracked files present (use "git add" to track)
```

- **提交相关修改（此时的修改是新建的文件hello.c）到仓库Common-Algorithms中**

1. `gir add` ——提交到暂存区
2. `git commit` ——提交到本地仓库（使文件变得可追踪）

```
zdy@SK-20210902RBPT MINGW64 /E/GitHub/Common-Algorithms (main)
$ git add hello.c

zdy@SK-20210902RBPT MINGW64 /E/GitHub/Common-Algorithms (main)
$ git commit
```

3. 在提交后，弹出的vim页面编辑该次提交的详细修改信息，保存并退出

```
first commit

this is the first commit.
# Please enter the commit message for your changes. Lines starting
# with '#' will be ignored, and an empty message aborts the commit.
#
# On branch main
# Your branch is up to date with 'origin/main'.
#
# Changes to be committed:
#       new file:   hello.c
#
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
E:/GitHub/Common-Algorithms/.git/COMMIT_EDITMSG[+] [unix] (15:26 28/03/2022)         3,25 All
:wq
```

```
zdy@SK-20210902RBPT MINGW64 /E/GitHub/Common-Algorithms (main)
$ git commit
[main 0ad0a41] first commit
 1 file changed, 7 insertions(+)
 create mode 100644 hello.c
```

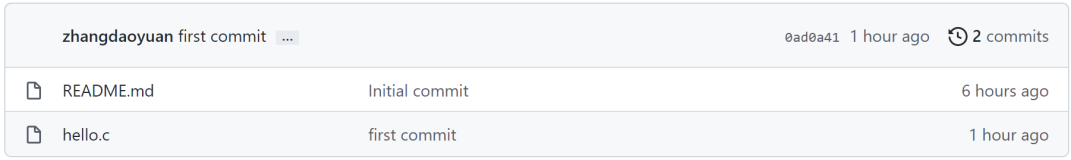
4. `git log` ——查看仓库提交历史

```
zdy@SK-20210902RBPT MINGW64 /E/GitHub/Common-Algorithms (main)
$ git log
commit 0ad0a4150a88a486c5972a1cfd6cfa27b15e5bf6 (HEAD -> main)
Author: zhangdaoyuan <zhangdaoyuan1@xiaomi.com>
Date:   Mon Mar 28 15:26:34 2022 +0800

    first commit

    this is the first commit.

commit 83d2e793482d12ed693f9788e6aa2e7d41f05682 (origin/main, origin/HEAD)
Author: huiba_450_zdy <57480678+huibazdy@users.noreply.github.com>
Date:   Mon Mar 28 11:18:29 2022 +0800

    Initial commit
```

5. `git push` ——推到远程仓库（此处指的是GitHub）

```
zdy@SK-20210902RBPT MINGW64 /E/GitHub/Common-Algorithms (main)
$ git push
Enter passphrase for key '/c/Users/zdy/.ssh/id_rsa':
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 8 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 355 bytes | 355.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:huibazdy/Common-Algorithms.git
   83d2e79..0ad0a41  main -> main
```

可以观察到GitHub仓库中增加了hello.c文件：



3. 用到的Git命令小结

- `git init`
- `git add`
- `git commit`
- `git status`
- `git remote add`
- `git push`
- `git log`

4. 其他常用Git命令

- `git branch`
- `git checkout`
- `git rm`
- `git reset`