Introduction to Database Systems

Individual Homework 0

0. Overview Tasks

The purpose of this homework is to help you prepare for upcoming homework on mySQL and some basic tools for your final project. There will be three parts in this homework. First, you need to install Git and practice basic commands of version control via Github. Second, you need to install MySQL on your computer and run the SQL script we provide, then take a screenshot. Third, you are required to modify HTML and send a pull request to the project on Github. Homework details are explained below:

1. Git

Git is a free and open source distributed version control system designed to handle everything from small to very large projects with speed and efficiency. Version control software keeps track of every modification to the code in a special kind of database. If a mistake is made, developers can turn back the clock and compare earlier versions of the code to help fix the mistake while minimizing disruption to all team members. For more details, you can refer to *reference1* or *reference2*.

1.1 Install Git

To install Git on a ubuntu machine:

1. open a terminal
2. enter command `sudo apt-get update`
3. enter command `sudo apt-get install git`

If no error occurs, the Git is successfully installed on your machine. You can verify the installation was successful by typing the following:

4. enter command `git --version`

Then you can configure your Git username and email using the following commands. These details will be associated with any commits that you create, hence we strongly recommend you use the same username and email as Github.

5. enter command `git config --global user.name "your name"`
6. enter command `git config --global user.email "your_email@abc.com"`

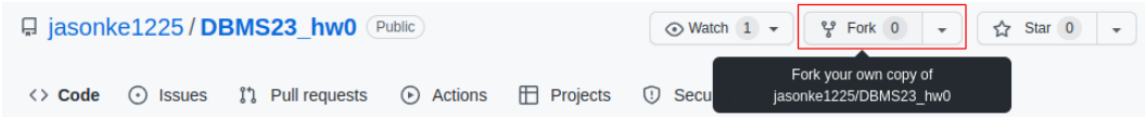
1.2 Sign up to Github

After installing Git on your machine, you then visit *Github* and register an account to do below tasks.

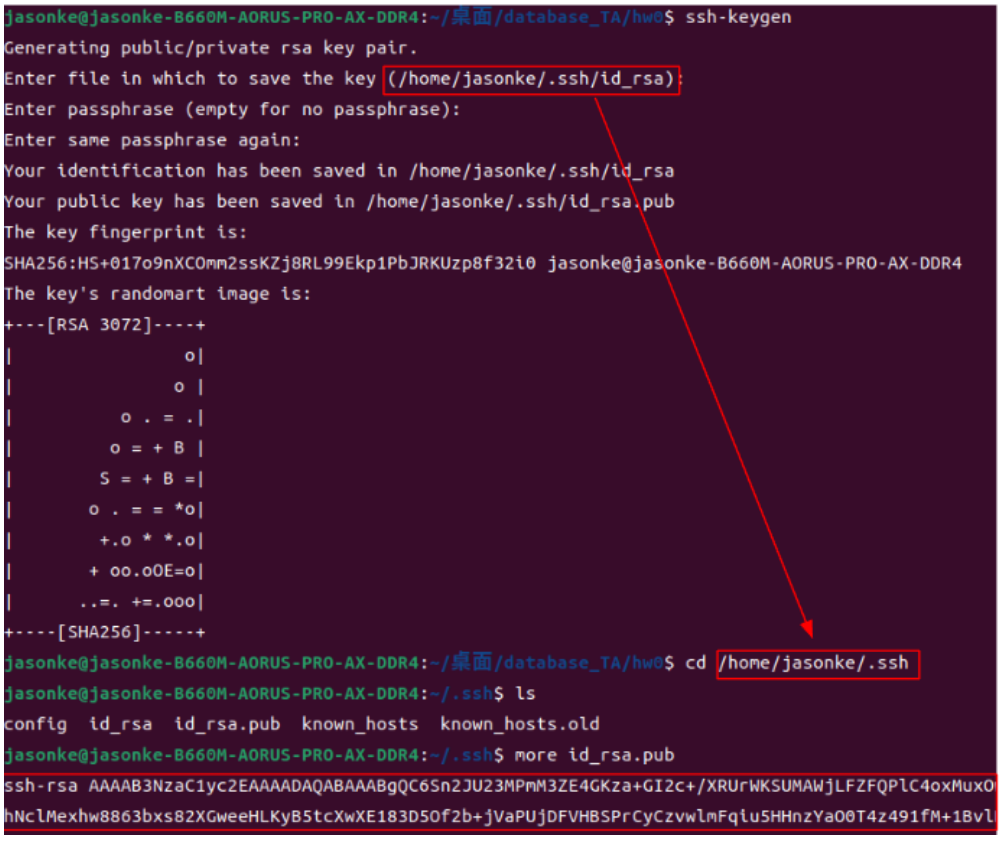
1.3 Fork the project

The repository of the homework is *here*. Follow the instructions to fork the repository and clone to local:

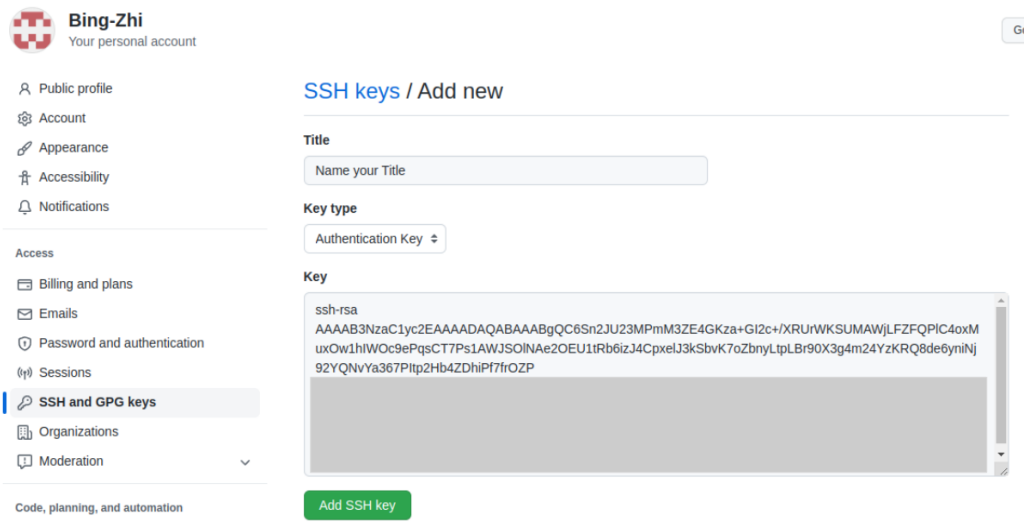
1. click ***fork*** to copy the repository to your own repository



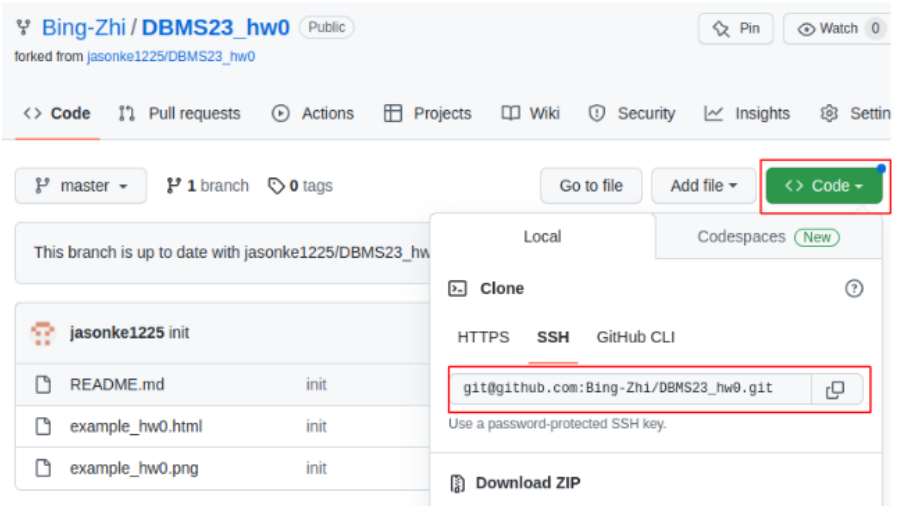
2. open a terminal
3. If you do not have any public SSH keys in your GitHub account, you need to first set the SSH key.
    a. enter command `ssh-keygen`
    b. enter command `cd {your_saved_directory}`
    c. enter command `more id_rsa.pub`



    d. Clone the text in “id_rsa.pub” and paste to SSH Key



4. enter command `git clone {your_forked_SSH_key}`
    a. Note that you **should** change SSH key to your forked repository, do **not** clone the original repository.
    b. Your own SSH-Key can be found by clicking ***Code***.



5. go to the folder and **copy** the example_hw0.html to {student_id}_hw0.html to continue following tasks (section **2** and **3**)

1.4 Send a pull request (PR) to the project

After finishing tasks of MySQL and HTML (section **2** and **3**), you will have two new files which are **{student_id}_hw0.html** and **{student_id}_hw0.png**. You are required to push these two files to your forked repository and send a pull request to the original repository as follows. More details about commands you can refer *here*.

1. open a terminal

2. enter command `git status`
3. enter command `git add {student_id}_hw0.html {student_id}_hw0.png`
4. enter command `git commit -m "{student_id}'s commit"`
5. enter command `git push --set-upstream origin master`

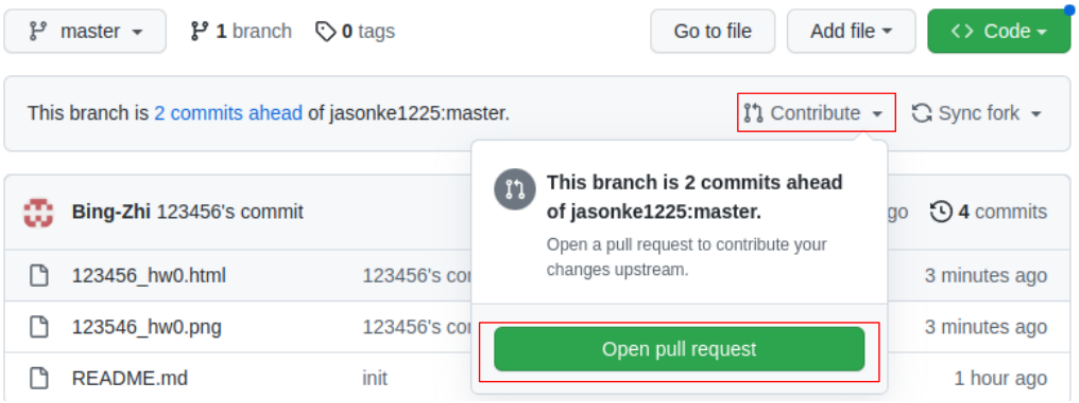
```
jasonke@jasonke-B660M-AORUS-PRO-AX-DDR4:~/桌面/database_TA/hw0/DBMS23_hw0$ git status
位於分支 master
您的分支領先 'origin/master' 共 1 個提交。
  （使用 "git push" 來發布您的本機提交）

未追蹤的檔案:
  （使用 "git add <檔案>..." 以包含要提交的內容）
        123456_hw0.html
        123546_hw0.png

提交為空，但是存在尚未追蹤的檔案（使用 "git add" 建立追蹤）
jasonke@jasonke-B660M-AORUS-PRO-AX-DDR4:~/桌面/database_TA/hw0/DBMS23_hw0$ git add 123456_hw0.html 123546_hw0.png
jasonke@jasonke-B660M-AORUS-PRO-AX-DDR4:~/桌面/database_TA/hw0/DBMS23_hw0$ git commit -m "123456's commit"
[master cbe5333] 123456's commit
 2 files changed, 34 insertions(+)
 create mode 100644 123456_hw0.html
 create mode 100644 123546_hw0.png
jasonke@jasonke-B660M-AORUS-PRO-AX-DDR4:~/桌面/database_TA/hw0/DBMS23_hw0$ git push --set-upstream origin master
枚舉物件: 5, 完成.
物件計數中: 100% (5/5), 完成.
使用 20 個執行緒進行壓縮
壓縮物件中: 100% (3/3), 完成.
寫入物件中: 100% (4/4), 535 位元組 | 535.00 KiB/s, 完成.
總共 4 (差異 0)，復用 0 (差異 0)，重用包 0
To github.com:Bing-Zhi/DBMS23_hw0.git
   783d449..cbe5333  master -> master
分支 'master' 設定為追蹤來自 'origin' 的遠端分支 'master'。
```

After uploading requested files, do following steps to open a pull request:

1. open your repository on Github and click ***Pull request***



2. click ***Create pull request***. You will see a pull request forum to fill the requested information
3. Fill **Results from {student_id}** in the title and click ***Create pull request***
4. After creating a pull request, this homework is finished.

2. MySQL

2.1 Install MySQL

We strongly suggest you to install MySQL **8.0.32** on a linux machine (e.g. Ubuntu **22.04**), which will be the environment we use to grade your all homeworks. (If you do not have a linux machine, try to create a virtual machine on your computer.) You **can** install MySQL with other operating systems though, as long as the result is correct. We provide instruction on installing MySQL on a ubuntu machine here, feel free to ask in the homework discussion channel if you have any problem installing MySQL.

To install MySQL on a ubuntu machine:

1. open a terminal
2. enter command `sudo apt-get update`
3. enter command `sudo apt-get install mysql-server`

If no error occurs, the MySQL server is successfully installed on your machine. You can now enter the MySQL shell. By default, the root user of MySQL has no password.

4. enter command `sudo mysql -u root -p`
5. you will then be asked to enter password (you may need to enter the sudo password first), just press enter to enter the MySQL shell

```
jasonke@jasonke-B660M-AORUS-PRO-AX-DDR4:~$ sudo mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.32-0buntu0.22.04.1 (Ubuntu)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
```

   You are now in the MySQL shell.
6. check version is **8.0.32**, enter command `SELECT VERSION();`

2.2 Create a database and load file

Now create a new database for testing:

1. enter command `CREATE DATABASE hw0;`

2. change to the database you just created, enter command `USE hw0;`
3. run the SQL script provided, enter command `SOURCE create_table.sql`, make sure the .sql file and .csv files are under the directory you start the MySQL shell (there may be some warnings, no worries), you can get the .sql file and .csv files on New E3.
    a. When "ERROR 3948 (42000): Loading local data is disabled; this must be enabled on both the client and server sides" occurs, set local_infile to ON. Then reopen MySQL. Enter command step by step:
    - `SET global local_infile=true;`
    - `SHOW global variables LIKE 'local_infile';`

```
+---------------+-------+
| Variable_name | Value |
+---------------+-------+
| local_infile  | ON    |
+---------------+-------+
```

    - `QUIT`
    - `sudo mysql` **`--local_infile=1`** `-u root`
    (Without " **--local_infile=1**", "ERROR 2068 (HY000): LOAD DATA LOCAL INFILE file request rejected due to restrictions on access." occurs. Solution from https://bugs.mysql.com/bug.php?id=91872)
    - `USE hw0`
    - `DROP TABLE mask;`
    - `SOURCE create_table.sql`
    You need to set this parameter "local_infile" only when loading data into datasets.

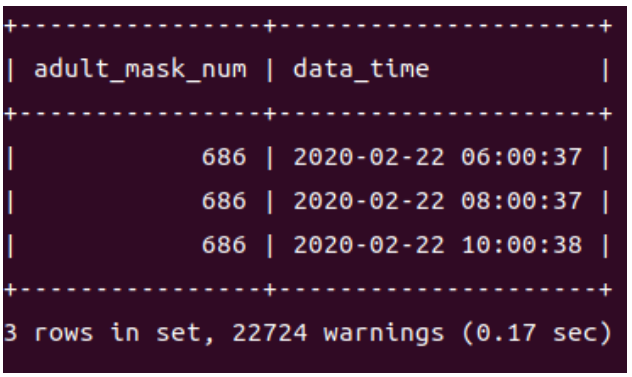
Now the data is loaded into the database, you can enter `SHOW TABLES;` to check tables in the database.

2.3 Test the database

After you load the data into database, run this SQL query:

```
SELECT mask.adult_mask_num, mask.data_time FROM mask
WHERE mask.inst_id = 5946012287 AND DATE(mask.data_time) = '2020-02-22';
```

Take a screenshot of your result.



```
+----------------+---------------------+
| adult_mask_num | data_time           |
+----------------+---------------------+
|            686 | 2020-02-22 06:00:37 |
|            686 | 2020-02-22 08:00:37 |
|            686 | 2020-02-22 10:00:38 |
+----------------+---------------------+
3 rows in set, 22724 warnings (0.17 sec)
```

Example of the screenshot result, **NOT** the answer.

3. HTML

HTML is the base language to write a website. At the end of the semester, you have to build a website to show your application about datasets, so this homework shows some basic codes of html to you. You can also learn more about html from *W3schools*.

3.1 Get the example code

Log in to Github and follow section **1.3**, you can get an example html code "**example_hw0.html**", and a sample image file "**example_hw0.png**".

3.2 Complete the html code

You can use the example code, or design your web page. There are four elements you need to put into your web page as follows:

- Name: your name
- Student ID: your student id
- Expectation: the expectation for this DB class
- MySQL screenshot: the screenshot of the section **2.3**

It is optional to beautify the appearance or add other elements into your web page. Remember the four elements above should be included.

3.3 Format of the file

You have to name the file in a specific way, according to the following list:

- html code: **{student_id}_hw0.html**
- MySQL screenshot: **{student_id}_hw0.png**

For example, if your student id is 123456, you should hand in two files **123456_hw0.html** and **123456_hw0.png**. After finishing all of these, send a pull request as mentioned in section **1.4** to submit the files.

4. Grading

In this homework, you will get 100 only if you finish all requested tasks and **will not** get any part score even if you finish part of the tasks.

5. Discussion

TAs had opened a channel **HW0 討論區** on Teams, you can post questions about the homework on the forum. TAs will answer questions as soon as possible.

Discussion rules:

1. Do not ask for the answer of the homework (probably no need to worry in this homework).
2. **Check if someone has asked the question you have before asking.**
3. We encourage you to answer other students' questions, but again, **do not give the answer** of the homework. Reply the messages to answer questions.
4. Since we have this discussion forum, do not send email to ask questions about the homework unless the questions are personal and you do not want to ask publicly.

6. Submission

1. The deadline of this homework is **3/17 (Fri.) 23:55:00**.
2. You only need to submit your results by sending a pull request on Github. For more details, please refer to section **1.4**. Note that you do not need to submit anything on New E3. Each wrong format or naming format causes -10 points to your score (after considering late submission penalty).
3. Late submission lead to score of (original score)*0.85^{days}, for example, if you submit your homework right after the deadline, your get (original score)*0.85 points.
4. If there is anything you are not sure about submission, ask in the discussion forum.