MLDS HW1-1

TAs
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Outline

- Timeline
- Task Descriptions
- Team up
- GitHub Settings
- Q&A

Timeline

Three Parts in HW1

- (1-1) Deep vs Shallow:
  - Simulate a funtion.
  - Train on actual task using shallow and deep models.
- (1-2) Optimization
- (1-3) Generalization

Schedule

- 3/9 :
  - Release HW1-1
- 3/16 :
  - Release HW1-2
- 3/23:
  - Deadline to team-up by yourselves
  - Release HW1-3
- 3/30:
  - Deadline to team-up by TAs
- 4/6:
  - All HW1 due (including HW1-1, HW1-2 and HW1-3)

Task Descriptions

HW1-1: Deep vs Shallow

- Simulate a funtion:
  - function need to be single-input, single-output
  - function need to be non-linear

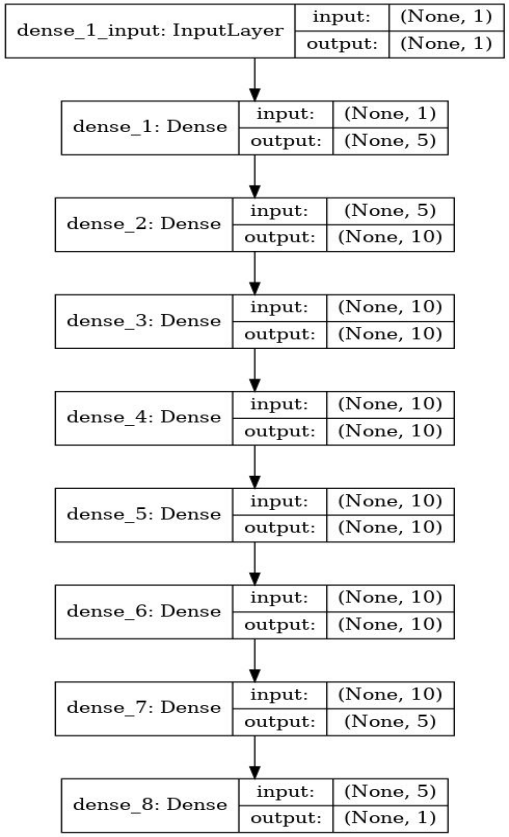
- Train on actual task:
  - MNIST or CIFAR-10

HW1-1 Simulate a Function 1/4

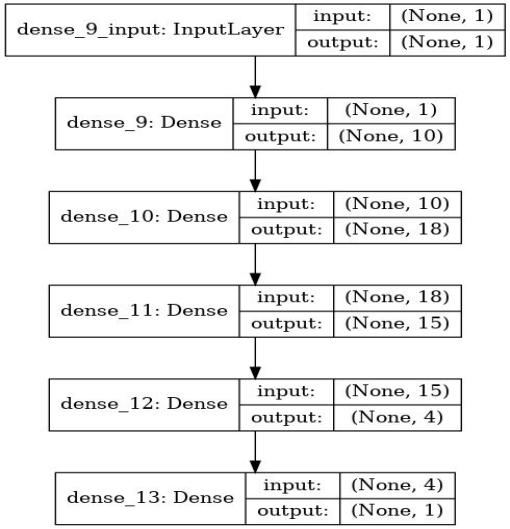
- Requirements:
  - train at least two different DNN models with the same amount of parameters until convergence
  - compare the training process of models by showing the loss in each epoch in a chart
  - visualize the ground-truth and predictions by models in a graph
- Tips:
  - constrain the input domain
  - hyper-parameters are important (i.e. tune all models to the best)

HW1-1 Simulate a Function 2/4

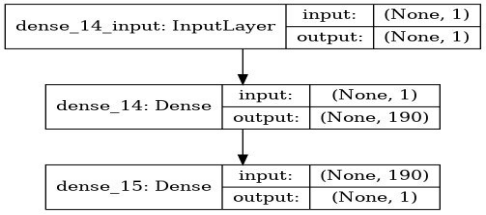
- Example models:



model0 總參數量 : 571



model1 總參數量 : 572

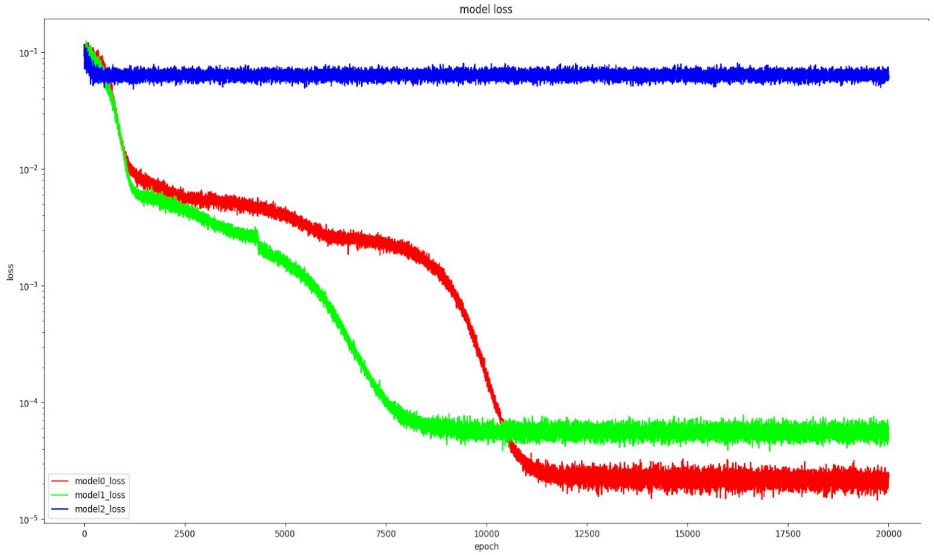


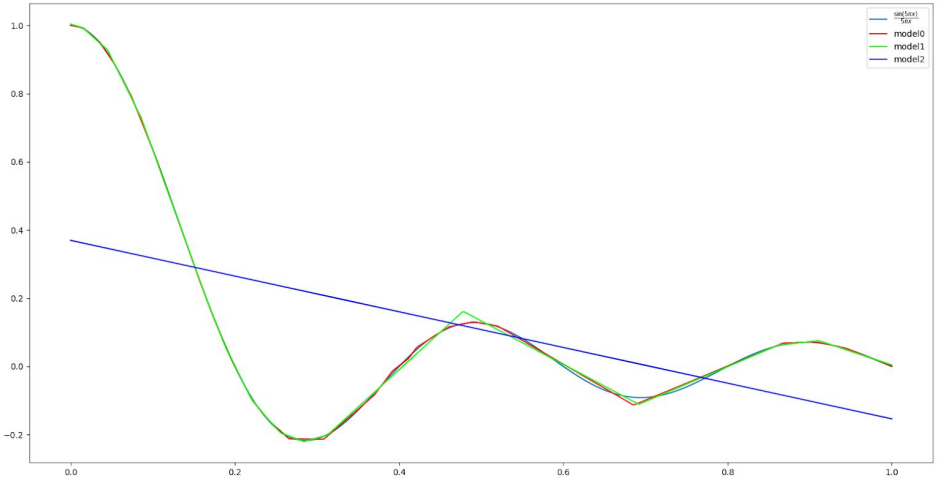
model2 總參數量 : 571

HW1-1 Simulate a Function 3/4

$$\frac{\sin(5\pi x)}{5\pi x}$$

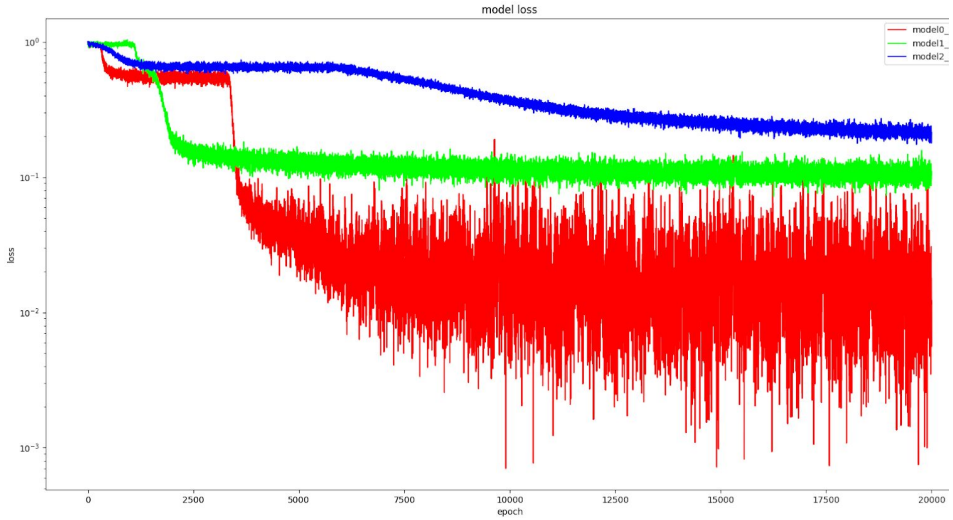
20000 epochs

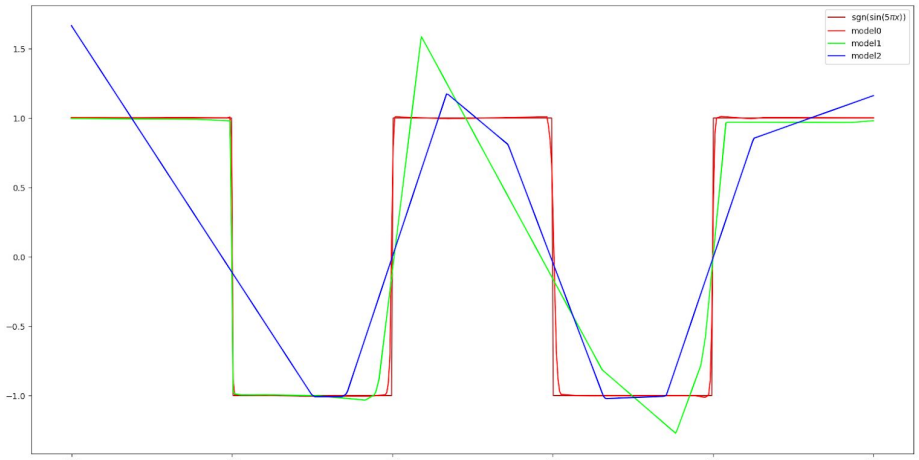




HW1-1 Simulate a Function 4/4

$\mathrm{sgn}\left(\sin(5\pi x)\right)$ 20000 epochs





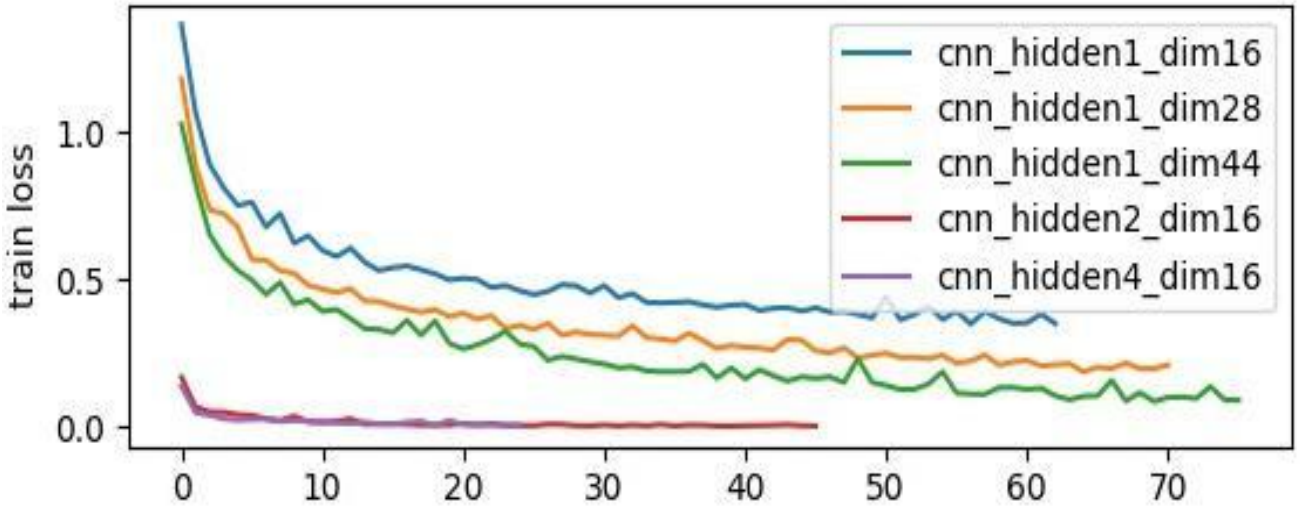
HW1-1 Train on Actual Tasks 1/3

- Requirements:
  - use MNIST or CIFAR-10
  - use CNN or DNN
  - visualize the training process by showing both loss and accuracy on two charts
- Tips:
  - CNN is easier to see the difference

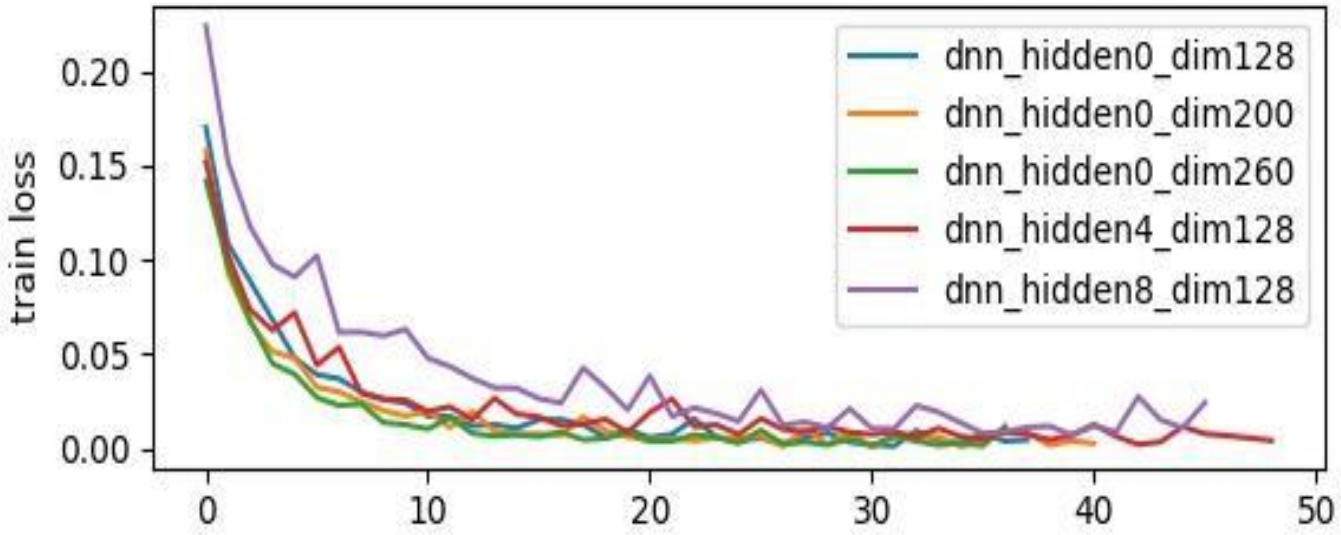
HW1-1 Train on Actual Tasks 2/3

在這兩個圖中，黃色線和紅色線代表的兩個 model 參數數量是接近的，但是深度和寬度不同。綠色和紫色也是同樣狀況，但他們的參數比前面兩個還要多。藍綠色的則是最淺最窄參數最少的。這兩個圖中只有兩兩參數接近，因此雖然有五個 model，但是不符合 bonus 題規定的至少要三個參數接近不同深淺的 model。但是若不是加分題只要兩個 model 是可以的。

- MNIST: CNN

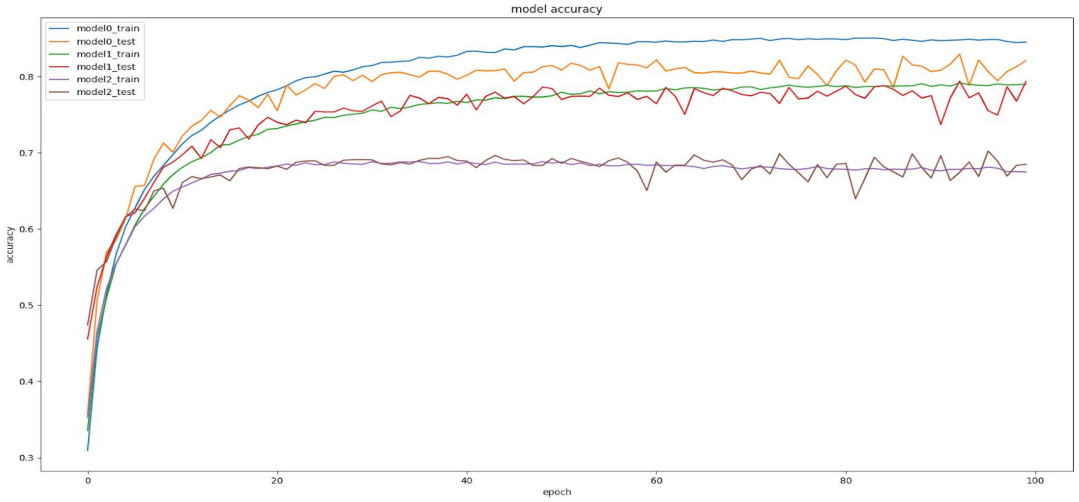


- MNIST: DNN

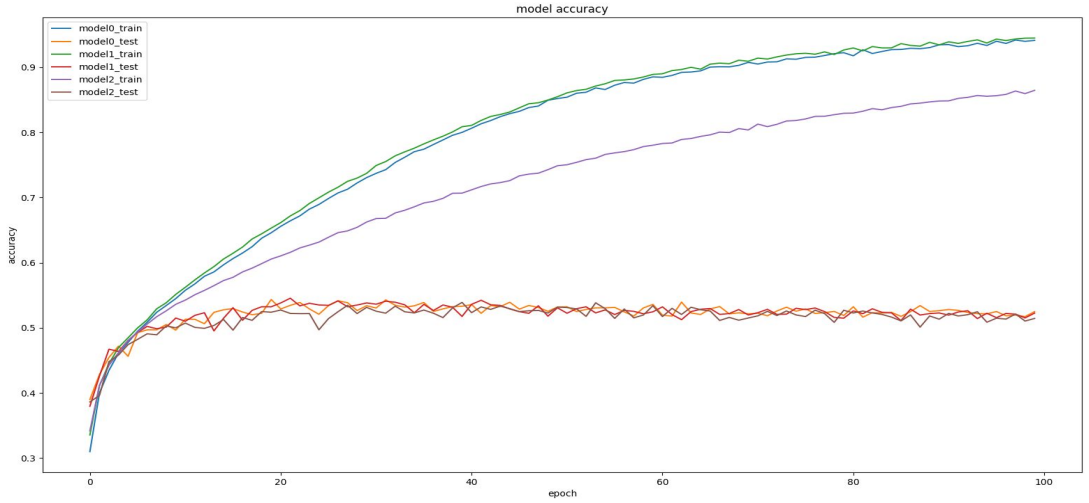


HW1-1 Train on Actual Tasks 3/3

- CIFAR-10: CNN



- CIFAR-10: DNN



Grading Policy:

- Only Reports are related to score
- But still need to push code to github (TAs will probably check some codes)
- HW1-1 : 5%
- HW1-2 : 10%
- HW1-3 : 10%
- 分工表 : 0.5%
- 上台分享 : 1%
- 上台分享前三名 : 1%

HW1-1 Report Questions

- Simulate a Function:
  - Describe the models you use, including the number of parameters (at least two models) and the function you use. (0.5%)
  - In one chart, plot the training loss of all models. (0.5%)
  - In one graph, plot the predicted function curve of all models and the ground-truth function curve. (0.5%)
  - Comment on your results. (1%)
  - Use more than two models in all previous questions. (bonus 0.25%)
  - Use more than one function. (bonus 0.25%)
- Train on Actual Tasks:
  - Describe the models you use and the task you chose. (0.5%)
  - In one chart, plot the training loss of all models. (0.5%)
  - In one chart, plot the training accuracy. (0.5%)
  - Comment on your results. (1%)
  - Use more than two models in all previous questions. (bonus 0.25%)
  - Train on more than one task. (bonus 0.25%)

Allow Packages

- python 3.6
- TensorFlow r1.6
- PyTorch 0.3 / torchvision
- Keras 2.0.7 (TensorFlow backend only)
- MXNet 1.1.0
- CNTK 2.4
- matplotlib
- Python Standard Library
- If you want to use other packages, please ask TAs for permission first!
- new allowed package: pandas, sklearn

Submission

- Deadline: **2018/4/6 23:59 (GMT+8)**
- Write the questions of HW1-1, HW1-2 and HW1-3 in **one** report.
- Chinese unless you are not familiar with Chinese
- At most 10 pages for HW1-1, HW1-2 and HW1-3
- Your github must have several files under directory hw1/
  - Readme.*
  - Report.pdf
  - other code
- In your Readme, state clearly how to run your program to generate the results in your report.
- Files for training is required.

Team up

Rules

1. 1~3 people a team
2. fill out the form: **https://ppt.cc/fiTrxx** (same as the form of github repo)
3. One github repo a team.
4. Deadline: 3/23

GitHub

開設GitHub帳號

1. GitHub: https://github.com/ 使用學校信箱開帳號
    a. 學校信箱可免費使用private功能
    b. 可綁定多個信箱
2. 申請學生版的附加功能

    網址: https://education.github.com/

step 1.進入網址

GitHub Education
Stories
Events
Student pack
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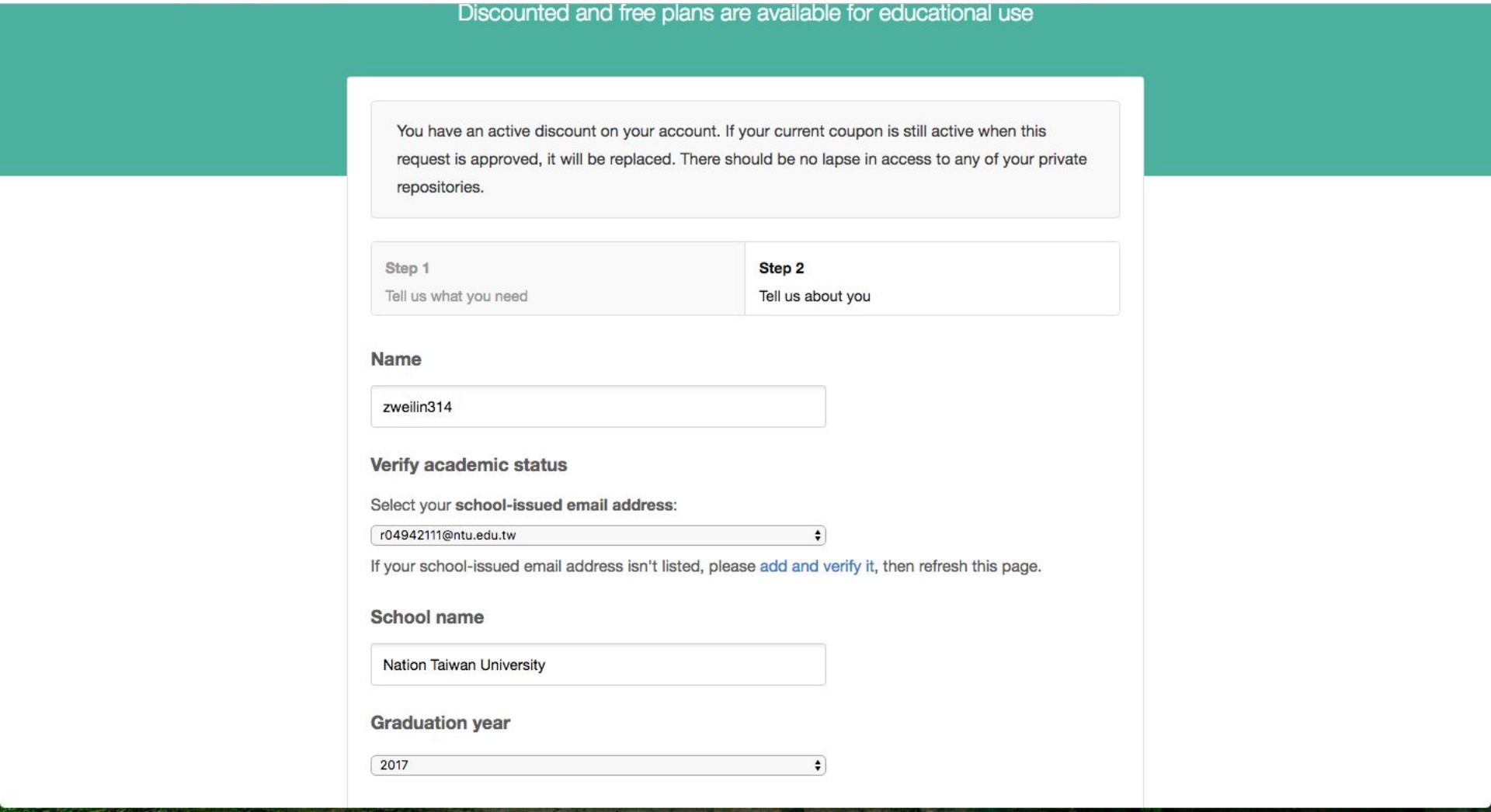
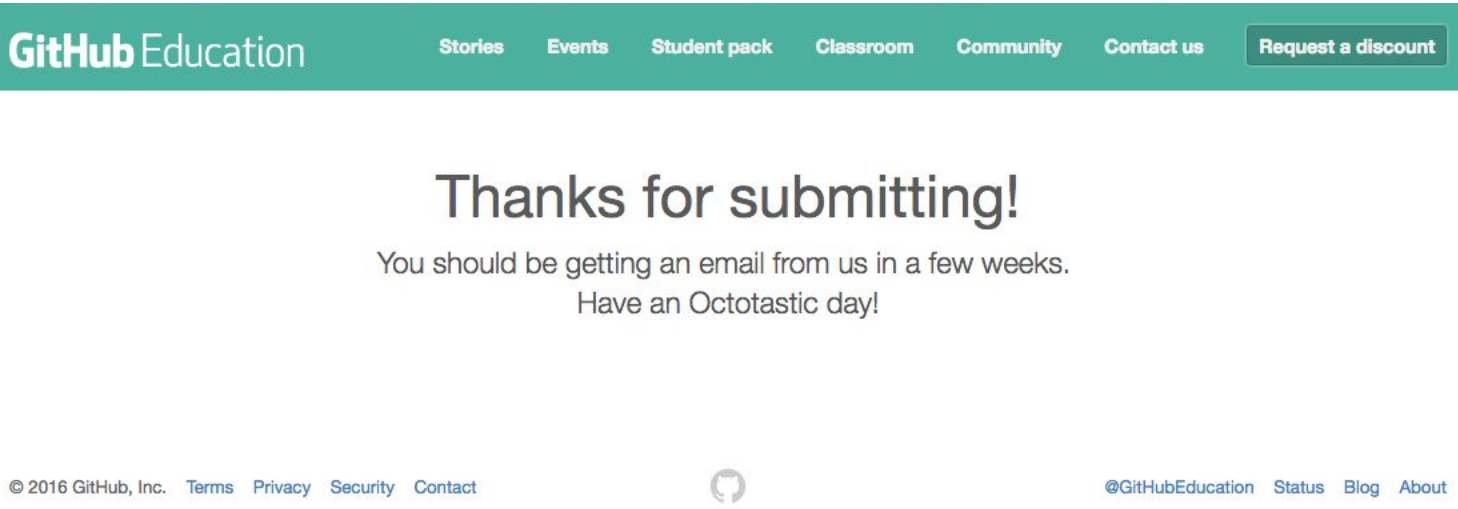
Contact us
TEACH AND LEARN
BETTER, TOGETHER
Request a discount
STUDENT DEVELOPER PACK
Get the Student Developer Pack
Dozens of free resources from great companies to help students learn.
Get the pack
STORIES

step 2.填入資料


Discounted and free plans are available for educational use
You have an active discount on your account. If your current coupon is still active when this request is approved, it will be replaced. There should be no lapse in access to any of your private repositories.
Step 1
Tell us what you need
Step 2
Tell us about you
Name
zweilin314
Verify academic status
Select your school-issued email address:
r04942111@ntu.edu.tw
If your school-issued email address isn't listed, please add and verify it, then refresh this page.
School name
Nation Taiwan University
Graduation year
2017

step 3.靜候佳音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You should be getting an email from us in a few weeks.
Have an Octotastic day!
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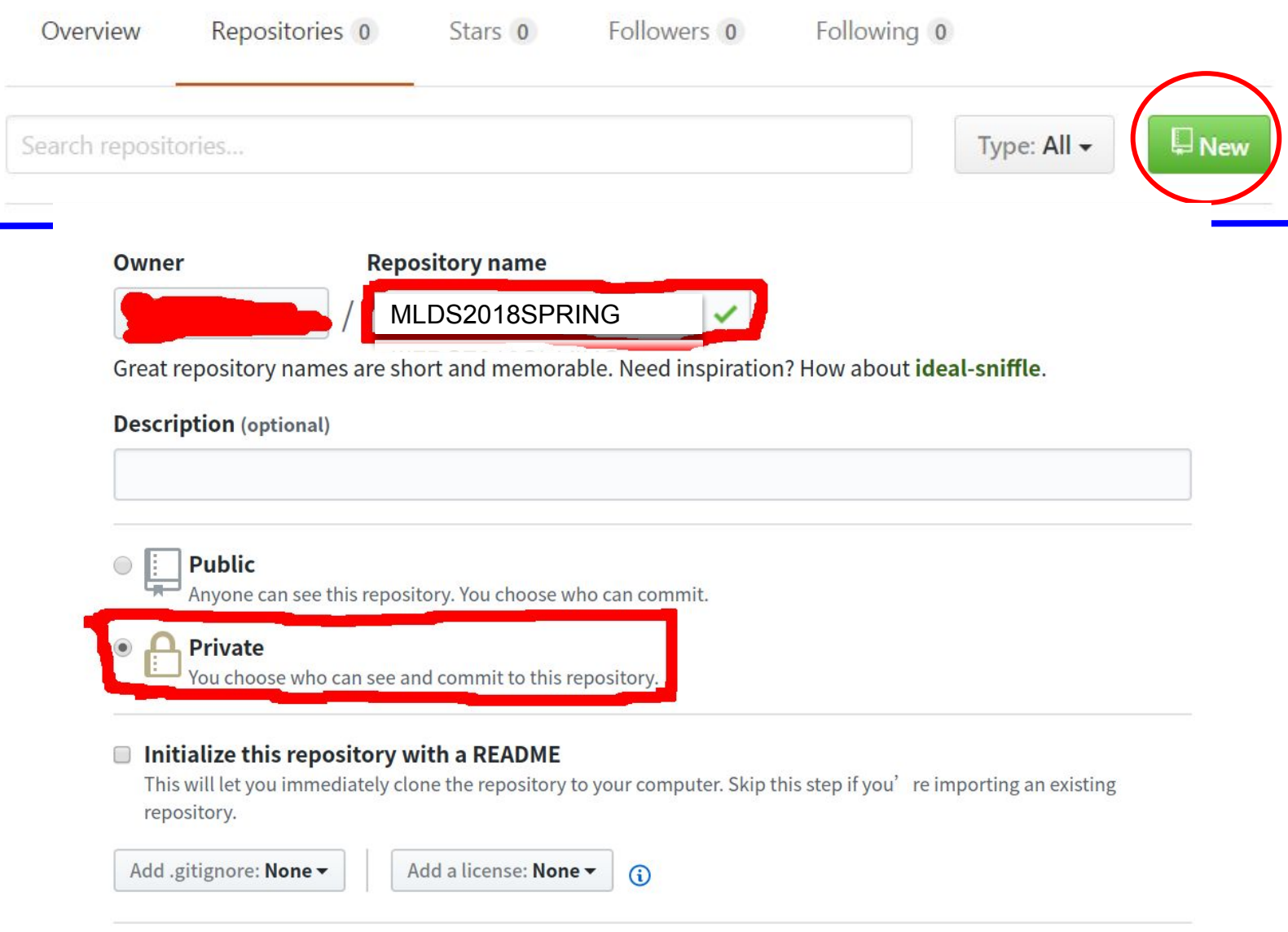
About

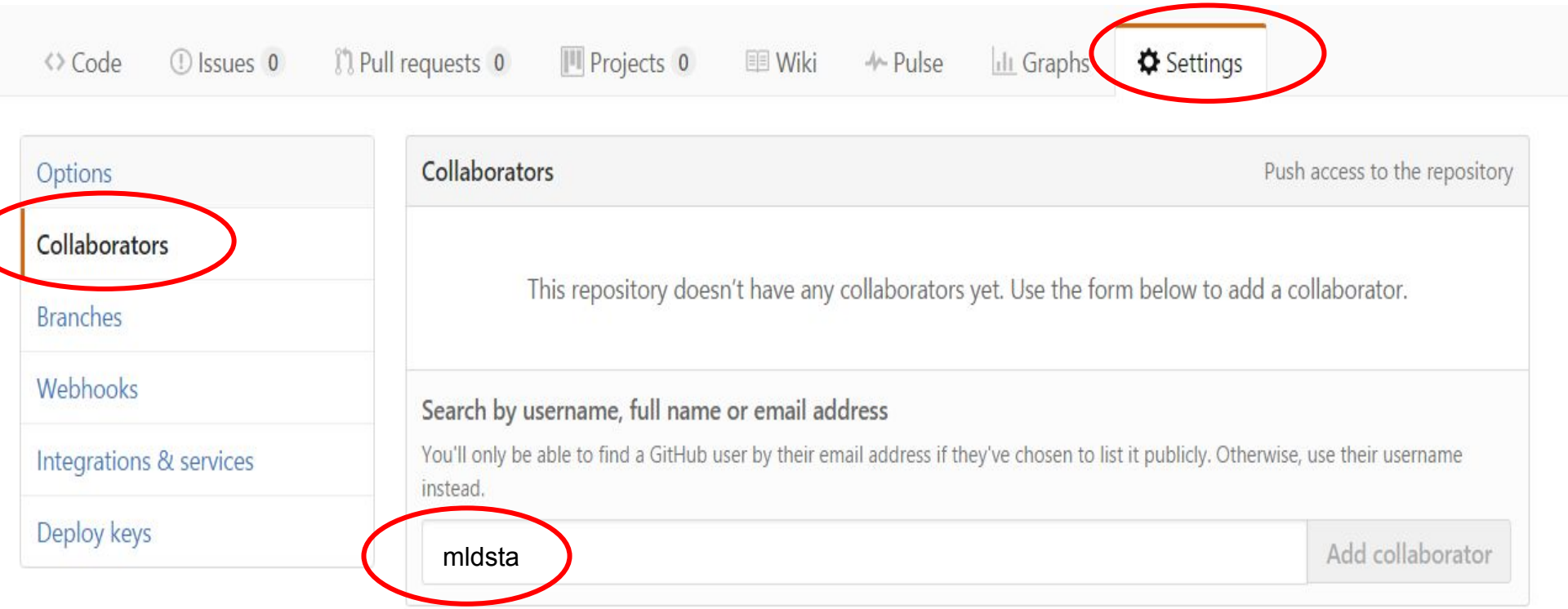
作業繳交

1. New repository
    a. 請將名稱取為 **MLDS2018SPRING**
    b. 往後所有的作業程式都會在這個路徑下被批改
    c. 權限請設為 **private**
2. 將助教帳號加入存取權
    a. 名稱: **mldsta**

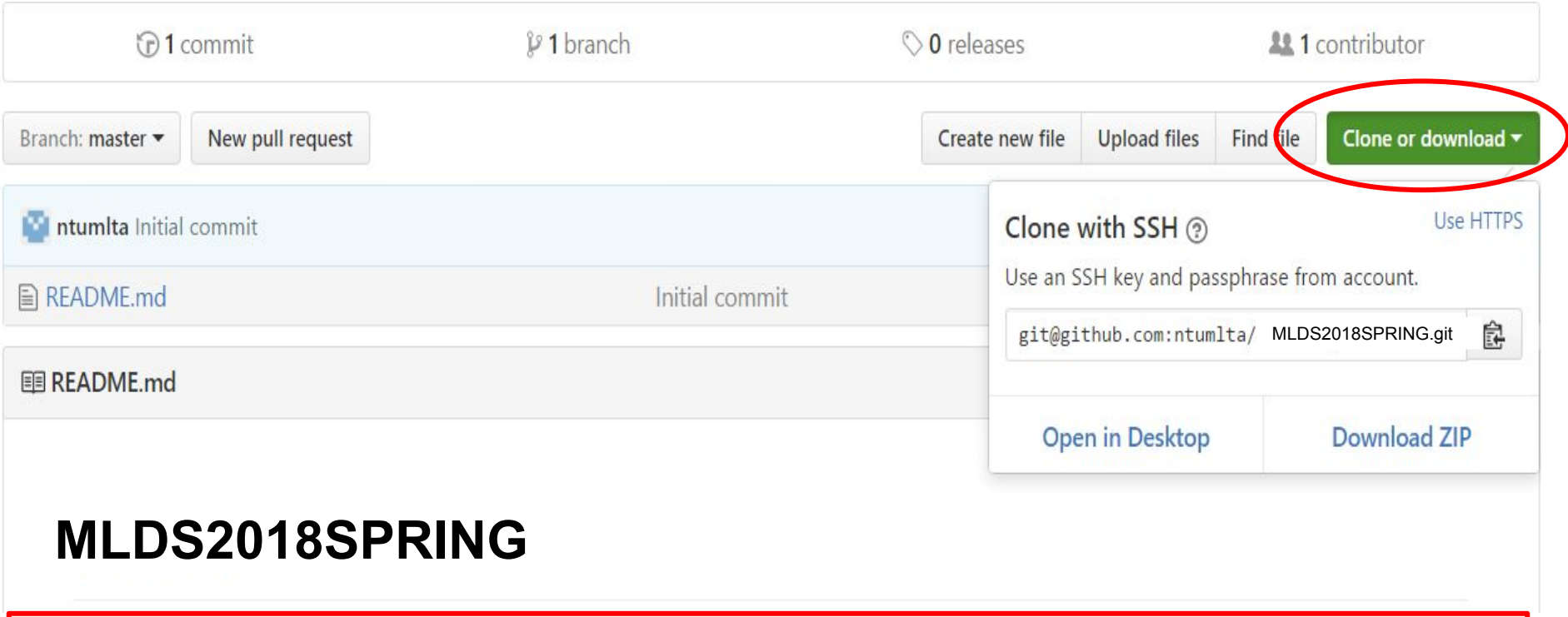
Create New Repository



Add TA account to Collaborators



Get Your Git Repo URL

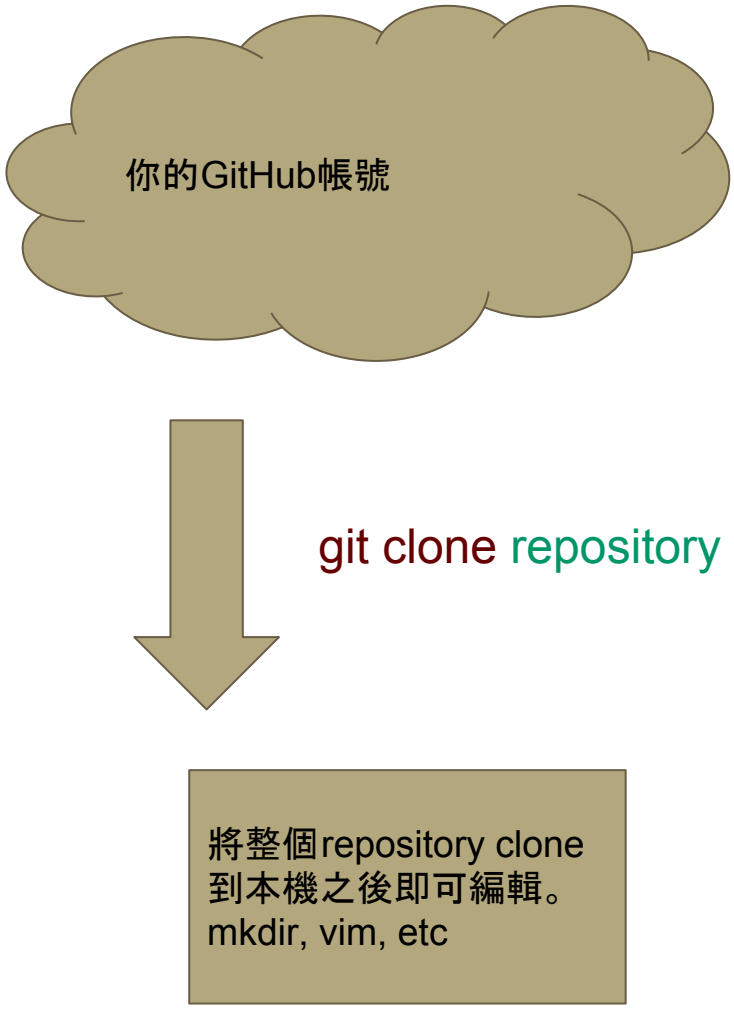


MLDS2018SPRING

填Git Repo URL表單: https://ppt.cc/fiTrxx

GitHub

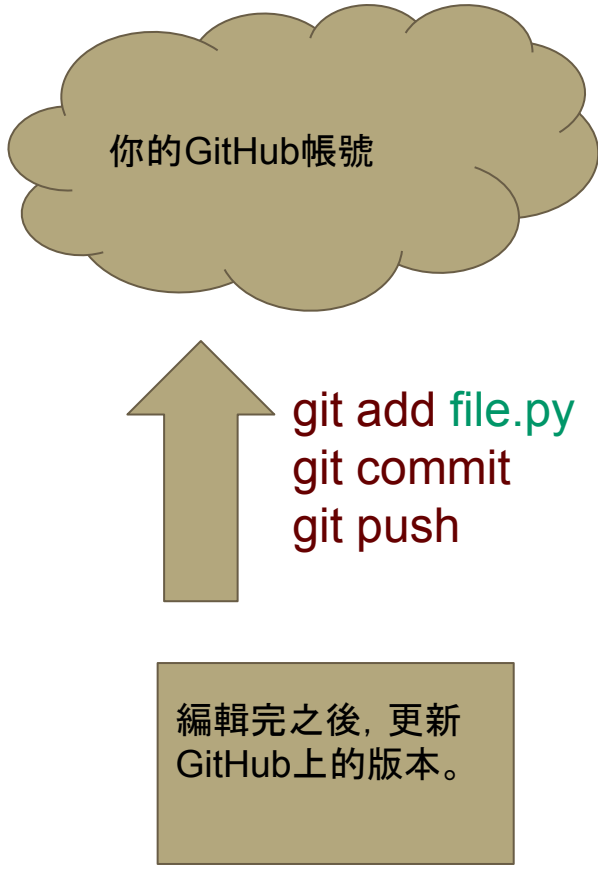
1. Open your terminal.
2. $git clone ***git repo url***
3. $cd MLDS2018SPRING
4. $mkdir hw1
5. ...
6. ...



GitHub

1. $git add xxx.py
   (請確保所有作業所需檔案
   都被成功加入repository
   (Q1.sh, Q2.sh, Q1.py Q2.py)
2. $git commit
3. $git push
4. 在GitHub網頁上確認master是否已更新

更多 : https://goo.gl/NRRCLm



Q&A

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