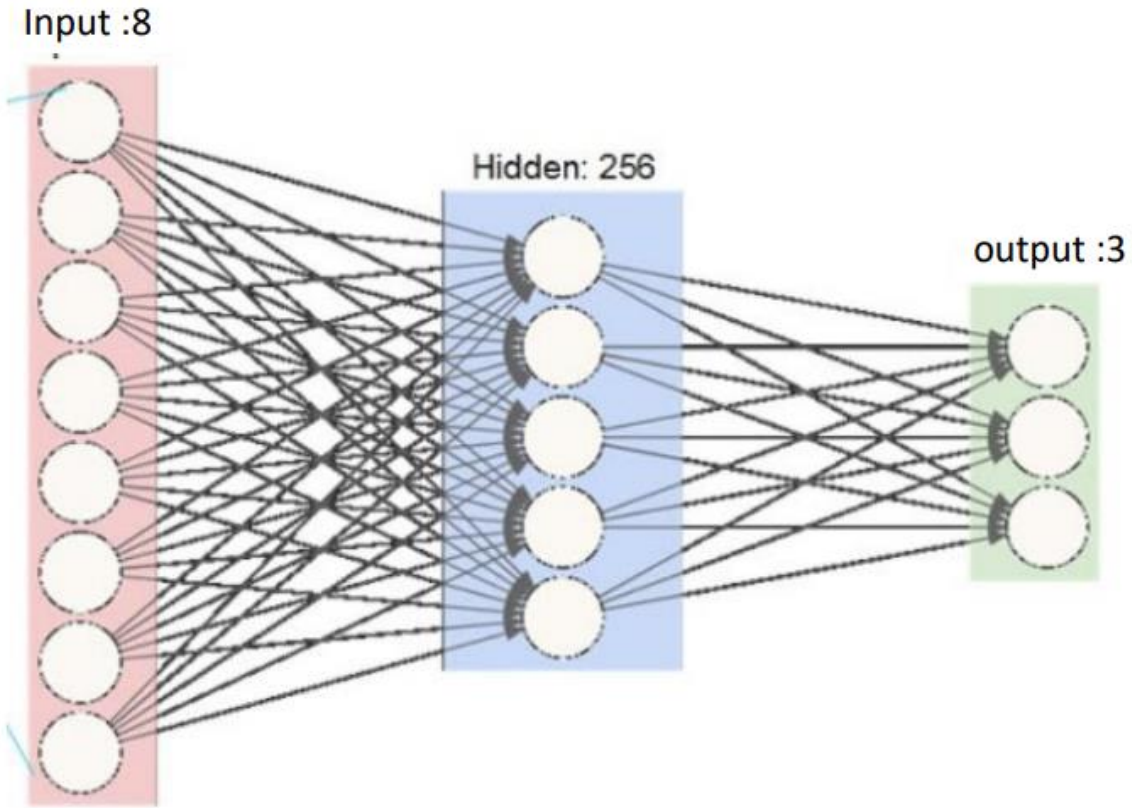
物聯網實務

12/7

Neural Networks



Initializes a sequential model

↓

Add layers

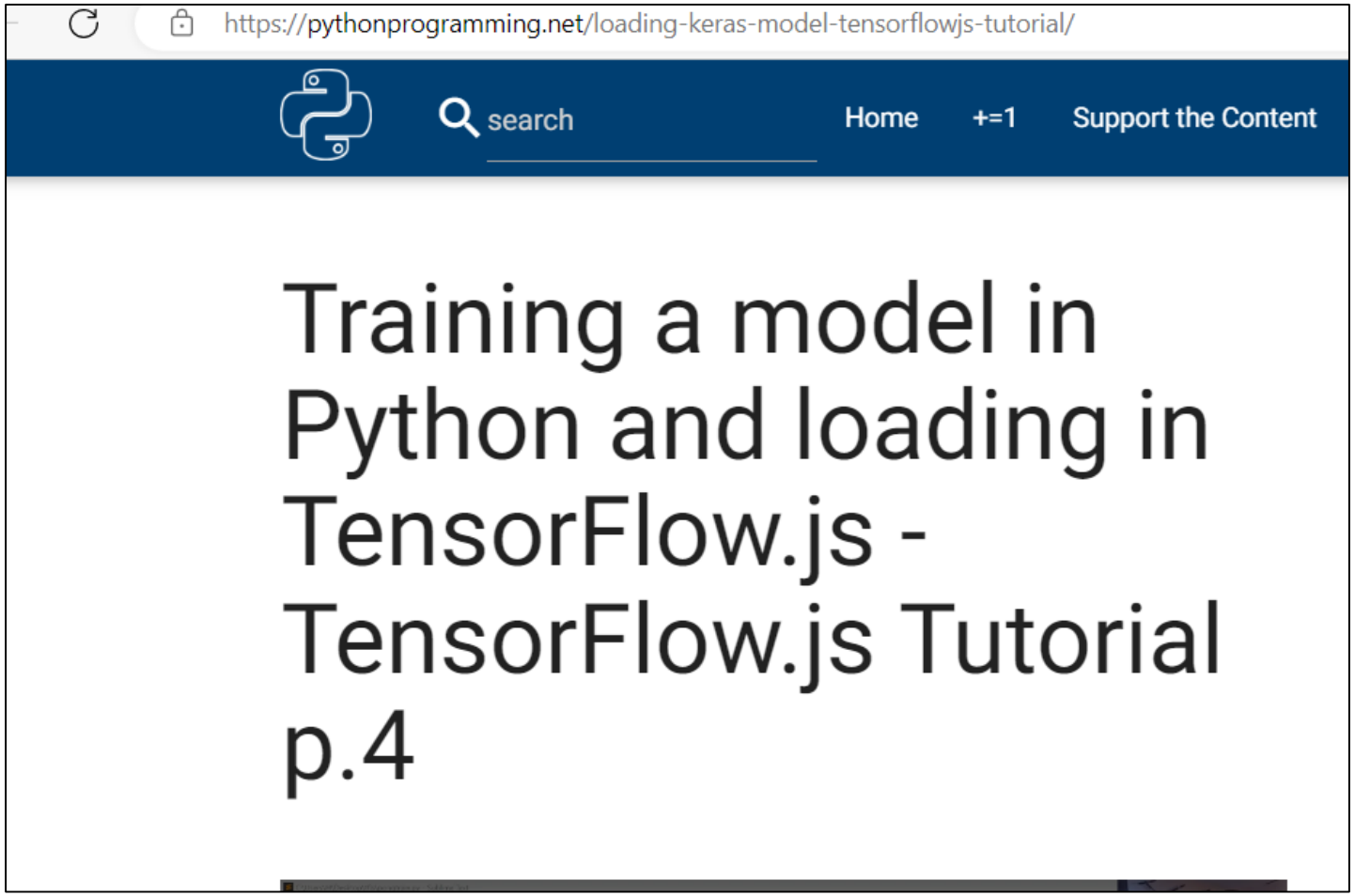
↓

Compile

↓

fit

Exercise 12-1 training a model in Python



https://pythonprogramming.net/loading-keras-model-tensorflowjs-tutorial/

Tensorflow.js

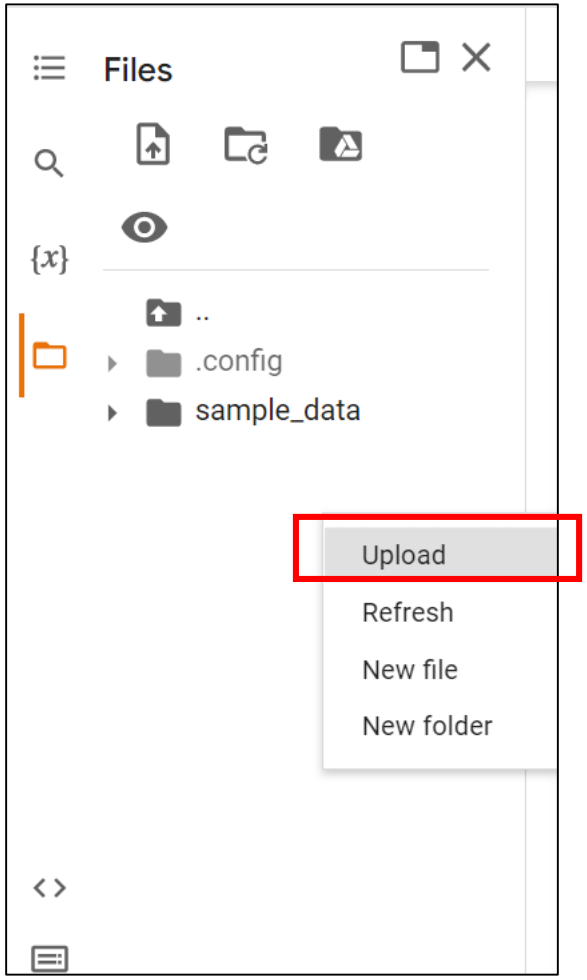
```
model = tf.sequential();

model.add(tf.layers.dense({units: 64,
activation:'relu', inputShape: [6]}));
//input is a 1x8
model.add(tf.layers.dropout(0.5));
model.add(tf.layers.dense({units: 64,
activation:'relu'}));
model.add(tf.layers.dropout(0.5));
model.add(tf.layers.dense({units: 3,
activation:'softmax'})); //returns a 1x3
console.log('model created');
```

```
const learningRate = 0.001;
const optimizer = tf.train.adam(learningRate);
model.compile({loss: 'categoricalCrossentropy'
, optimizer: optimizer, metrics: ['accuracy'
]});
```

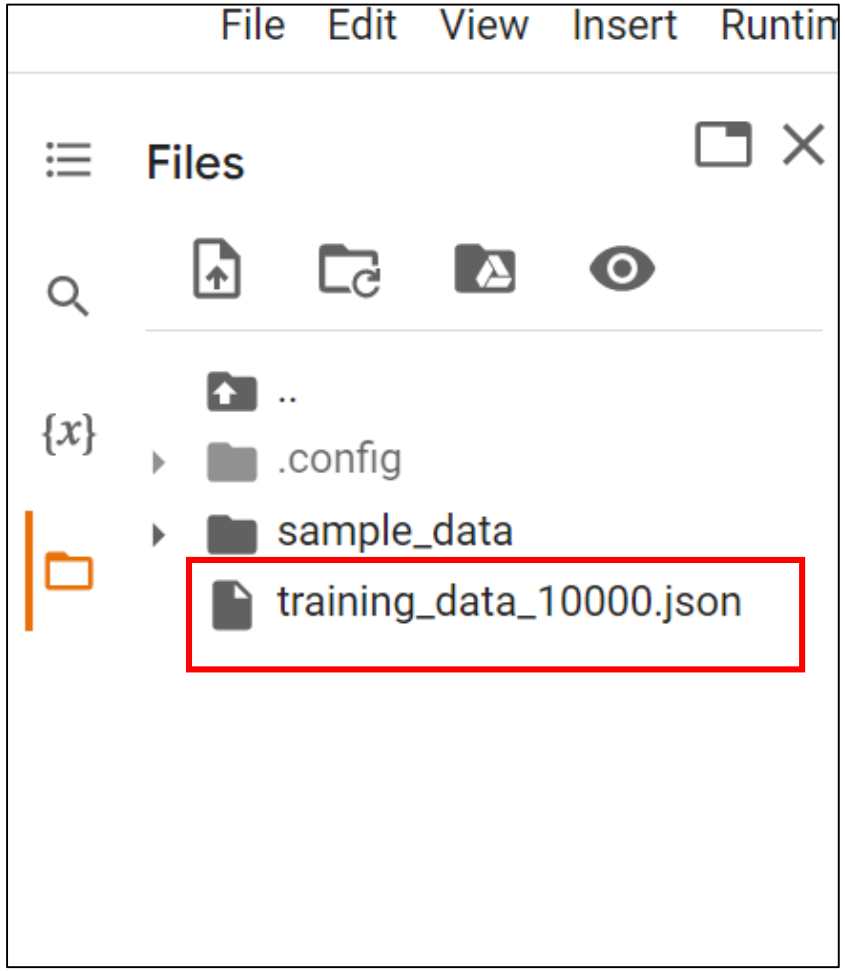
Keras

```
model = Sequential()
model.add(Dense(64, activation='relu', input_dim=6))
model.add(Dropout(0.5))
model.add(Dense(64, activation='relu'))
model.add(Dropout(0.5))
model.add(Dense(3, activation='softmax'))

adam = keras.optimizers.Adam(lr=0.001)

model.compile(loss='categorical_crossentropy',
              optimizer=adam,
              metrics=['accuracy'])

model.fit(x_train, y_train,epochs=100,batch_size=10)
```

Upload


Files
{x}
..
.config
sample_data
Upload
Refresh
New file
New folder

training_data_10000.json



!pip install tensorflowjs

```
!pip install tensorflowjs
```

```
Requirement already satisfied: google-auth-oauthlib<0.5,>=0.4.1 in /usr/local/lib/python3.8/dist-packages (fr
Requirement already satisfied: tensorboard-data-server<0.7.0,>=0.6.0 in /usr/local/lib/python3.8/dist-package
Requirement already satisfied: google-auth<3,>=1.6.3 in /usr/local/lib/python3.8/dist-packages (from tensorbo
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Requirement already satisfied: markdown>=2.6.8 in /usr/local/lib/python3.8/dist-packages (from tensorboard<2.
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Requirement already satisfied: urllib3!=1.25.0,!=1.25.1,<1.26,>=1.21.1 in /usr/local/lib/python3.8/dist-packa
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.8/dist-packages (from requests<3,
Requirement already satisfied: idna<3,>=2.5 in /usr/local/lib/python3.8/dist-packages (from requests<3,>=2.21
Requirement already satisfied: oauthlib>=3.0.0 in /usr/local/lib/python3.8/dist-packages (from requests-oauth
Requirement already satisfied: pandas in /usr/local/lib/python3.8/dist-packages (from tensorflow-decision-for
```

import tensorflowjs as tfjs

```
import tensorflowjs as tfjs
```

train

trainandconverttfjs.ipynb

File Edit View Insert Runtime Tools Help

Files

..
.config
sample_data
training_data_10000.json

+ Code + Text

[2]
```python
import tensorflowjs as tfjs
```

```python
import keras
from keras.models import Sequential
from keras.layers import Dense, Dropout
import json
import numpy as np

with open('training_data_10000.json') as f:
    data = json.load(f)
    xs = np.array(data['xs'])
    ys = np.array(data['ys'])


x_train = xs[:-15]
y_train = ys[:-15]
x_test = xs[-15:]
y_test = ys[-15:]
```

```python
model = Sequential()
model.add(Dense(64, activation='relu', input_dim=6))
model.add(Dropout(0.5))
model.add(Dense(64, activation='relu'))
model.add(Dropout(0.5))
model.add(Dense(3, activation='softmax'))

adam = keras.optimizers.Adam(lr=0.001)

model.compile(loss='categorical_crossentropy',
              optimizer=adam,
              metrics=['accuracy'])

model.fit(x_train, y_train,epochs=100,batch_size=10)

score = model.evaluate(x_test, y_test, batch_size=10)
print(score)
model.save("Keras-64x3-10epoch")
```

generate Keras-64x310epoch

trainandconverttfjs.ipynb

File Edit View Insert Runtime Tools Help All changes saved

Comment Share 裕評

Files

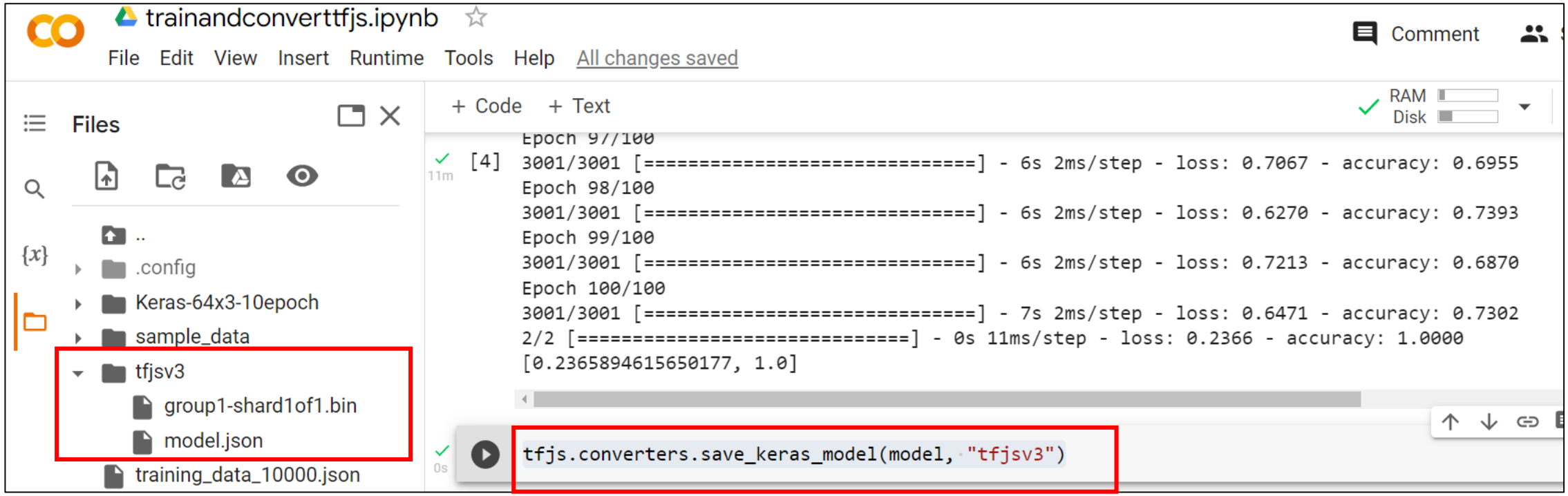
..
.config
Keras-64x3-10epoch
sample_data
training_data_10000.json

+ Code + Text

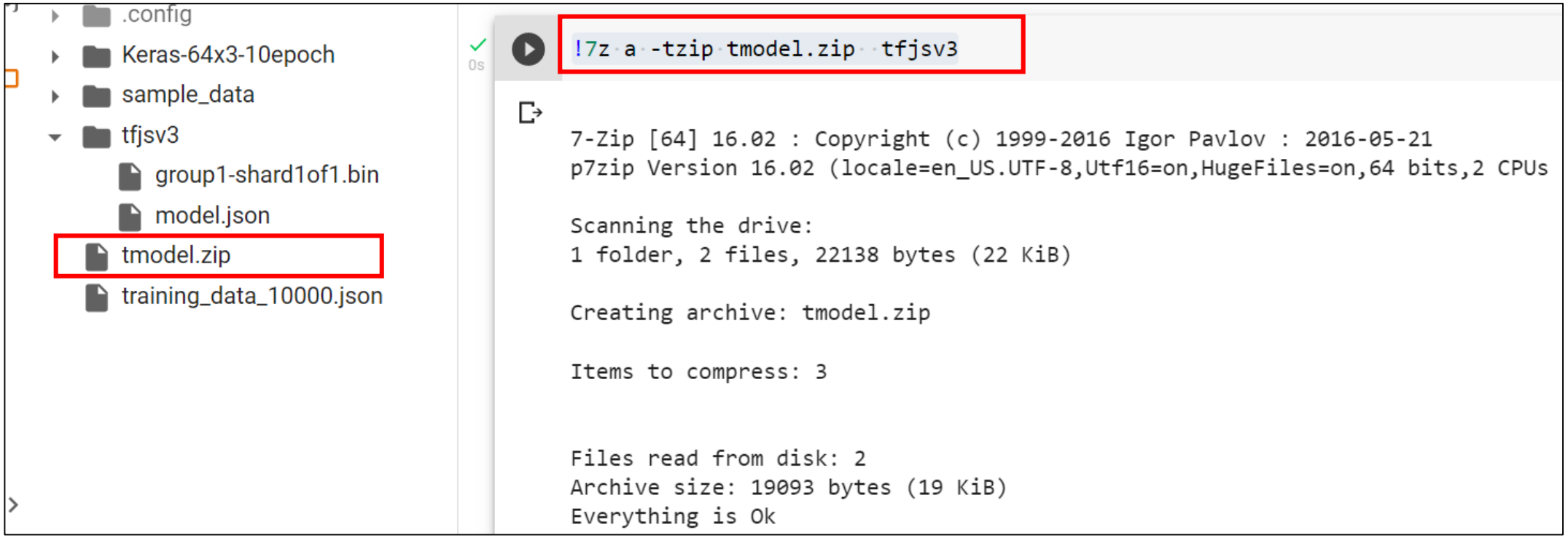
RAM Disk Editing

```
Epoch 91/100
3001/3001 [==============================] - 7s 2ms/step - loss: 0.8478 - accuracy: 0.5858
Epoch 92/100
3001/3001 [==============================] - 7s 2ms/step - loss: 0.7939 - accuracy: 0.6223
Epoch 93/100
3001/3001 [==============================] - 7s 2ms/step - loss: 0.7069 - accuracy: 0.6853
Epoch 94/100
3001/3001 [==============================] - 7s 2ms/step - loss: 0.7379 - accuracy: 0.6685
Epoch 95/100
3001/3001 [==============================] - 7s 2ms/step - loss: 0.6568 - accuracy: 0.7276
Epoch 96/100
3001/3001 [==============================] - 6s 2ms/step - loss: 0.7743 - accuracy: 0.6370
Epoch 97/100
3001/3001 [==============================] - 6s 2ms/step - loss: 0.7067 - accuracy: 0.6955
Epoch 98/100
3001/3001 [==============================] - 6s 2ms/step - loss: 0.6270 - accuracy: 0.7393
Epoch 99/100
3001/3001 [==============================] - 6s 2ms/step - loss: 0.7213 - accuracy: 0.6870
Epoch 100/100
3001/3001 [==============================] - 7s 2ms/step - loss: 0.6471 - accuracy: 0.7302
2/2 [==============================] - 0s 11ms/step - loss: 0.2366 - accuracy: 1.0000
[0.2365894615650177, 1.0]
```

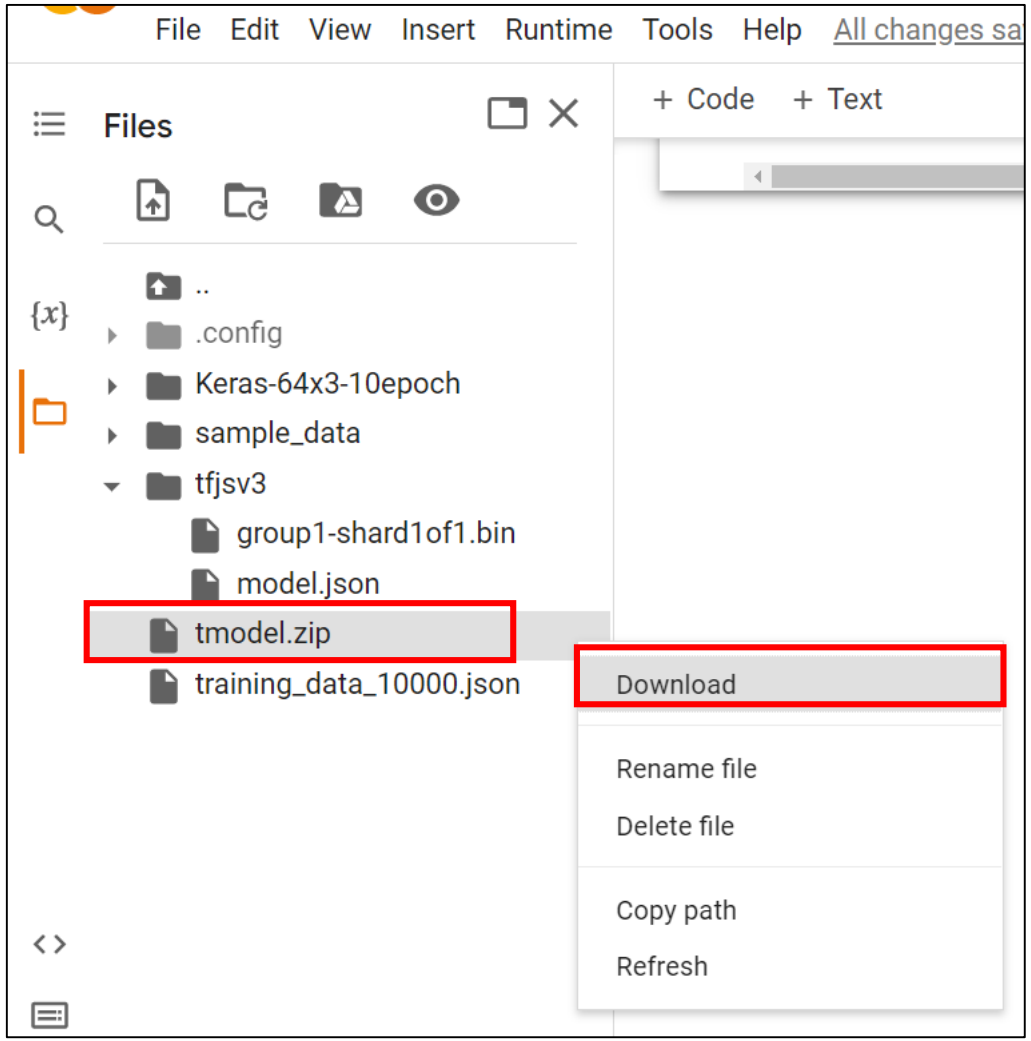
tfjs.converters.save_keras_model(model, "tfjsv3")



!7z a -tzip tmodel.zip tfjsv3



Download


File
Edit
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Help
All changes sa
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Files
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Keras-64x3-10epoch
sample_data
tfjsv3
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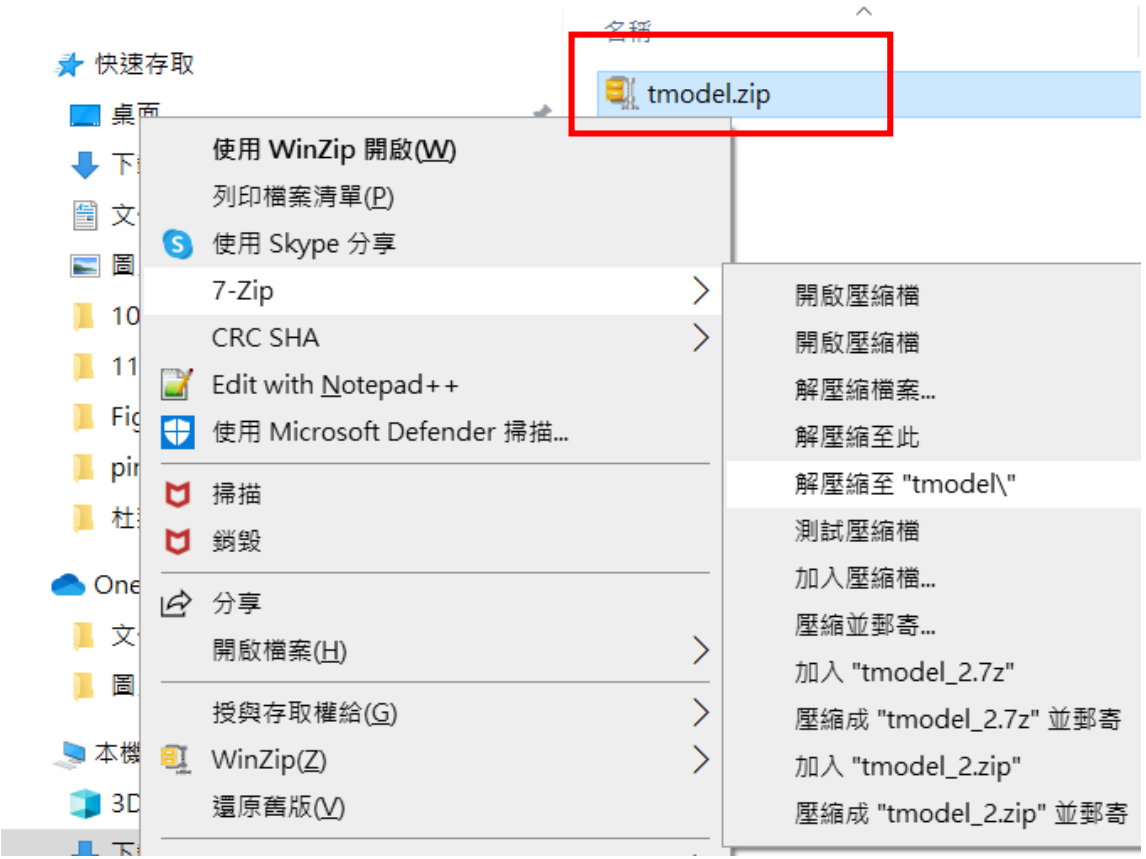
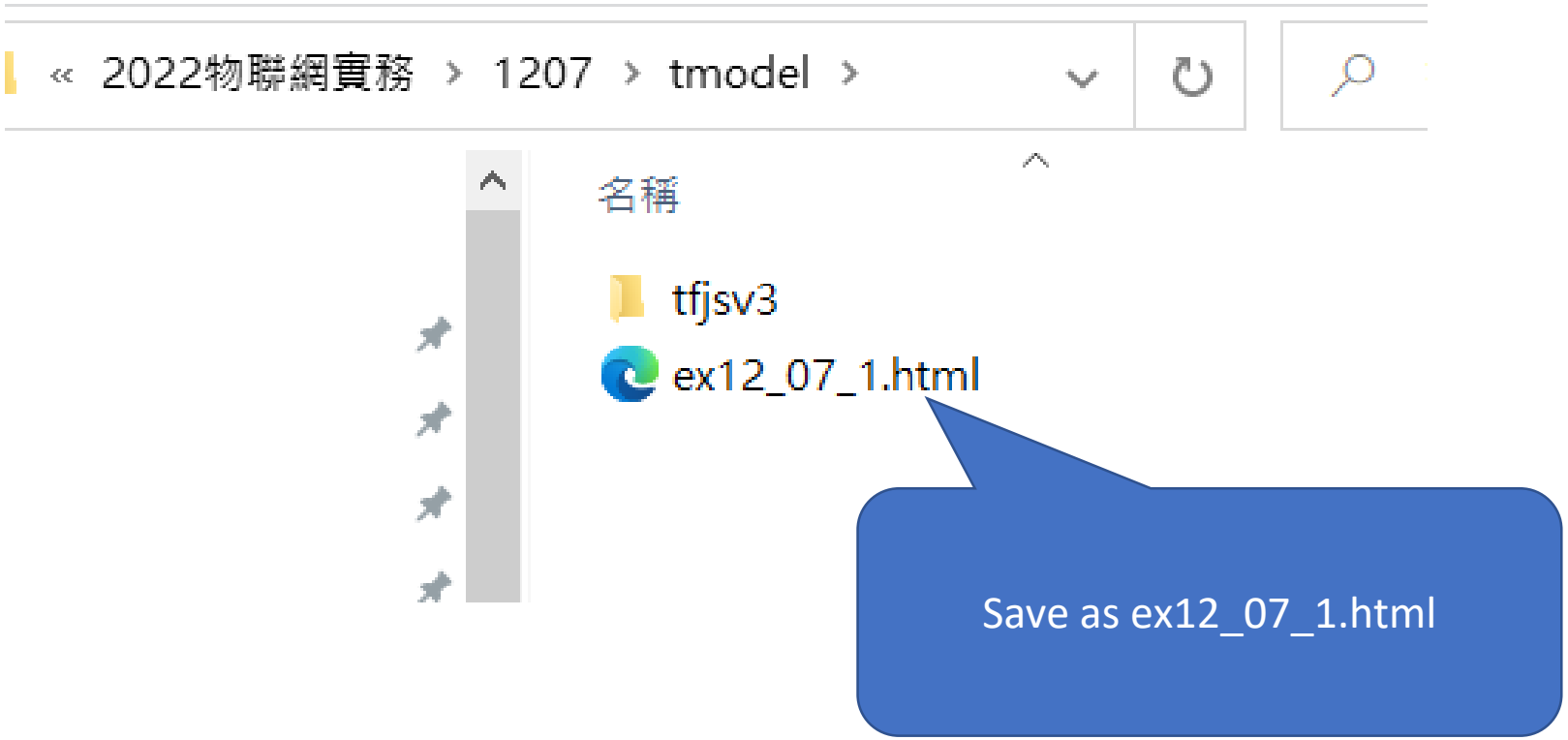
Download
Rename file
Delete file
Copy path
Refresh

Extract tmodel.zip

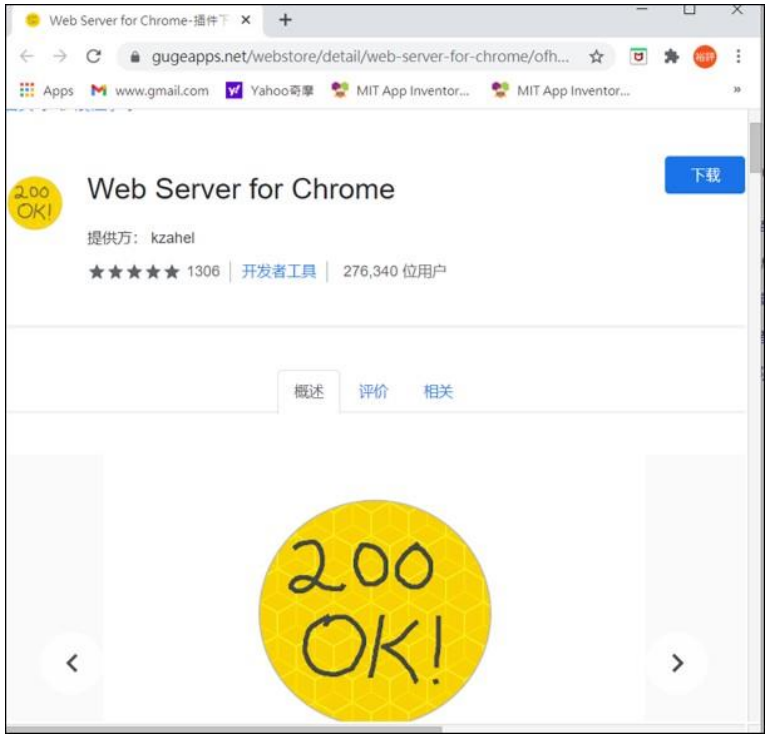


tmodel/tfjsv3

Copy ex12_07_1.txt and save as ex12_07_1.html



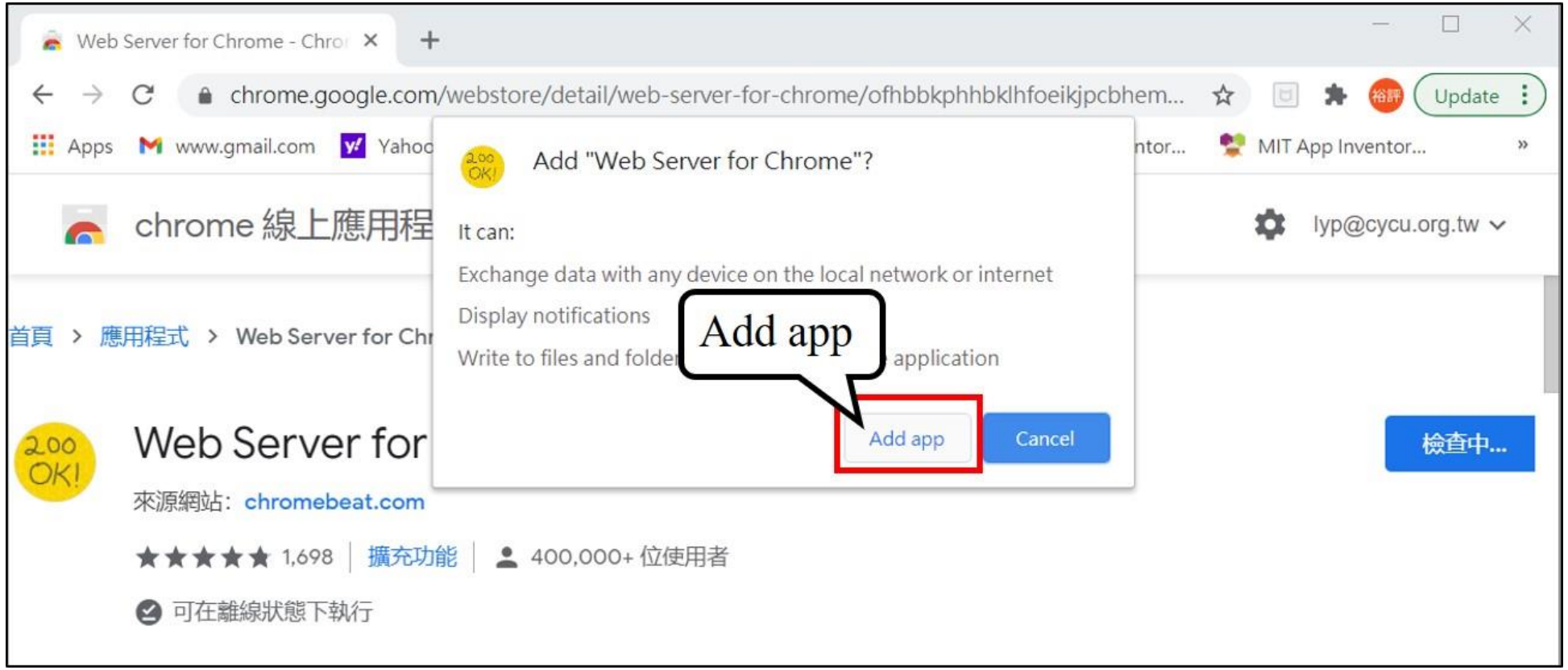
Web Server for Chrome



chrome線上應用程式商店

https://goo.gl/pxqLmU

Add app


Web Server for Chrome - Chro
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Update
Apps
www.gmail.com
Yahoo
MIT App Inventor...
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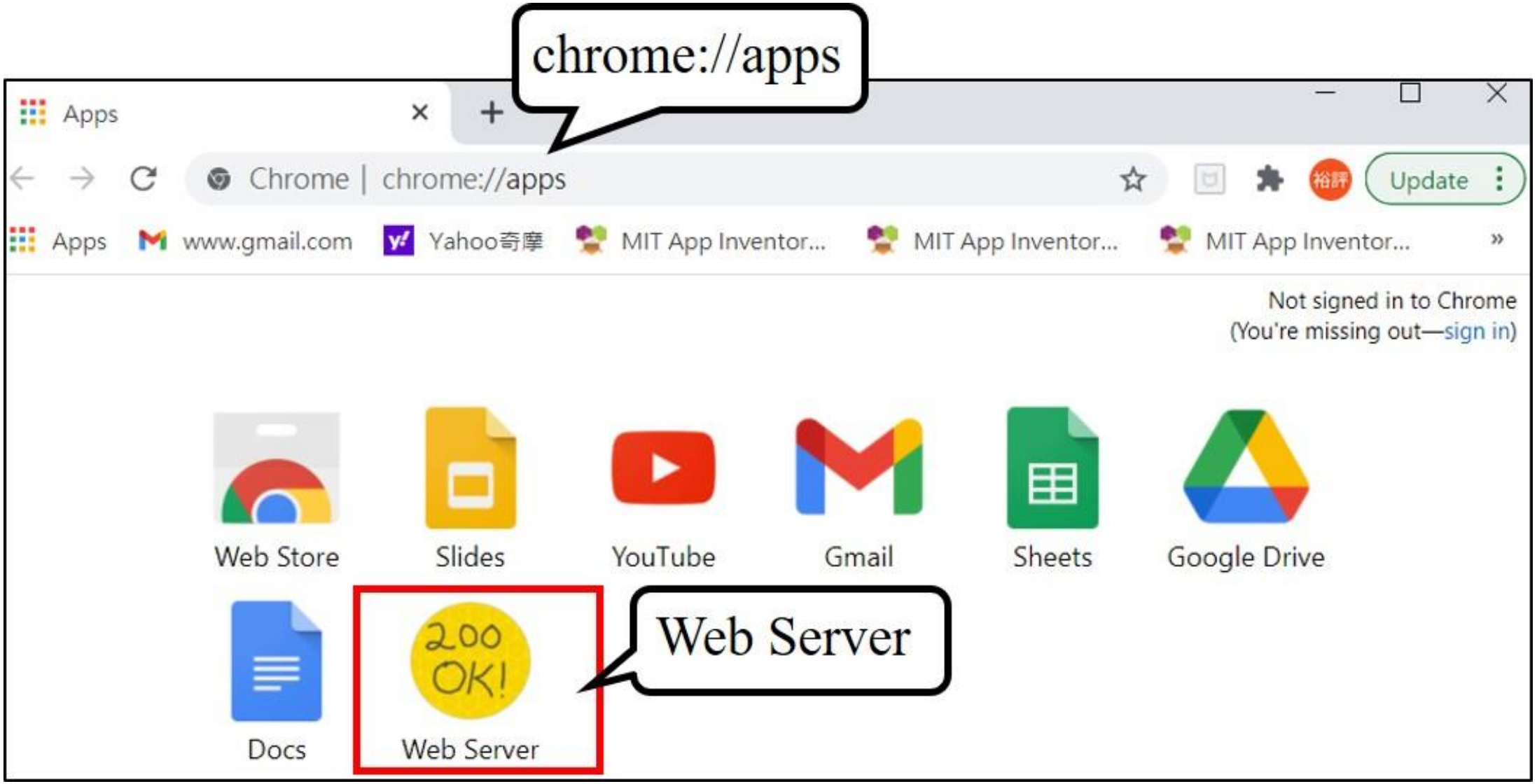
lyp@cycu.org.tw
首頁 > 應用程式 > Web Server for Chr
Add "Web Server for Chrome"?
It can:
Exchange data with any device on the local network or internet
Display notifications
Write to files and folder
application
Add app
Add app
Cancel
Web Server for
來源網站: chromebeat.com
1,698
擴充功能
400,000+ 位使用者
可在離線狀態下執行
檢查中...


chrome://apps
Apps
Chrome | chrome://apps
Update
Apps
www.gmail.com
Yahoo奇摩
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MIT App Inventor...
Not signed in to Chrome
(You're missing out—sign in)
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Slides
YouTube
Gmail
Sheets
Google Drive
Docs
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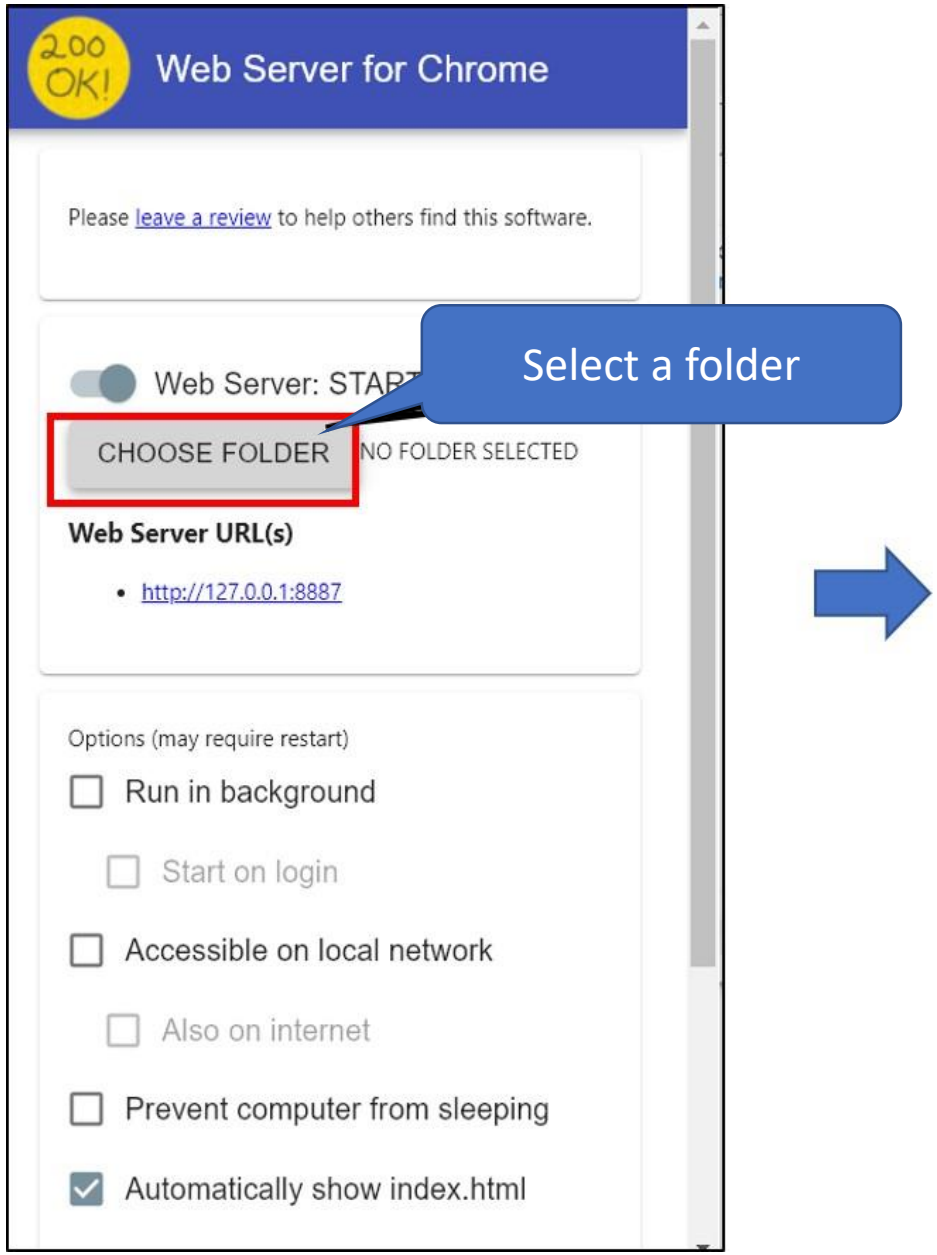
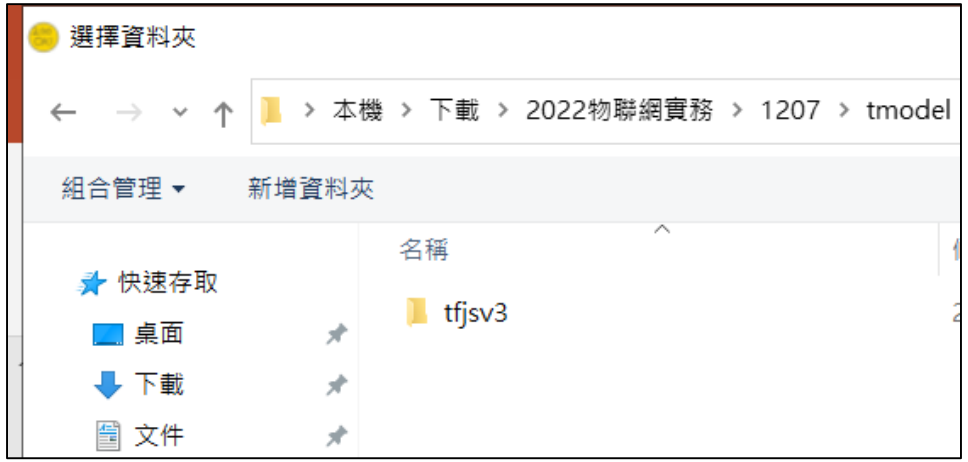
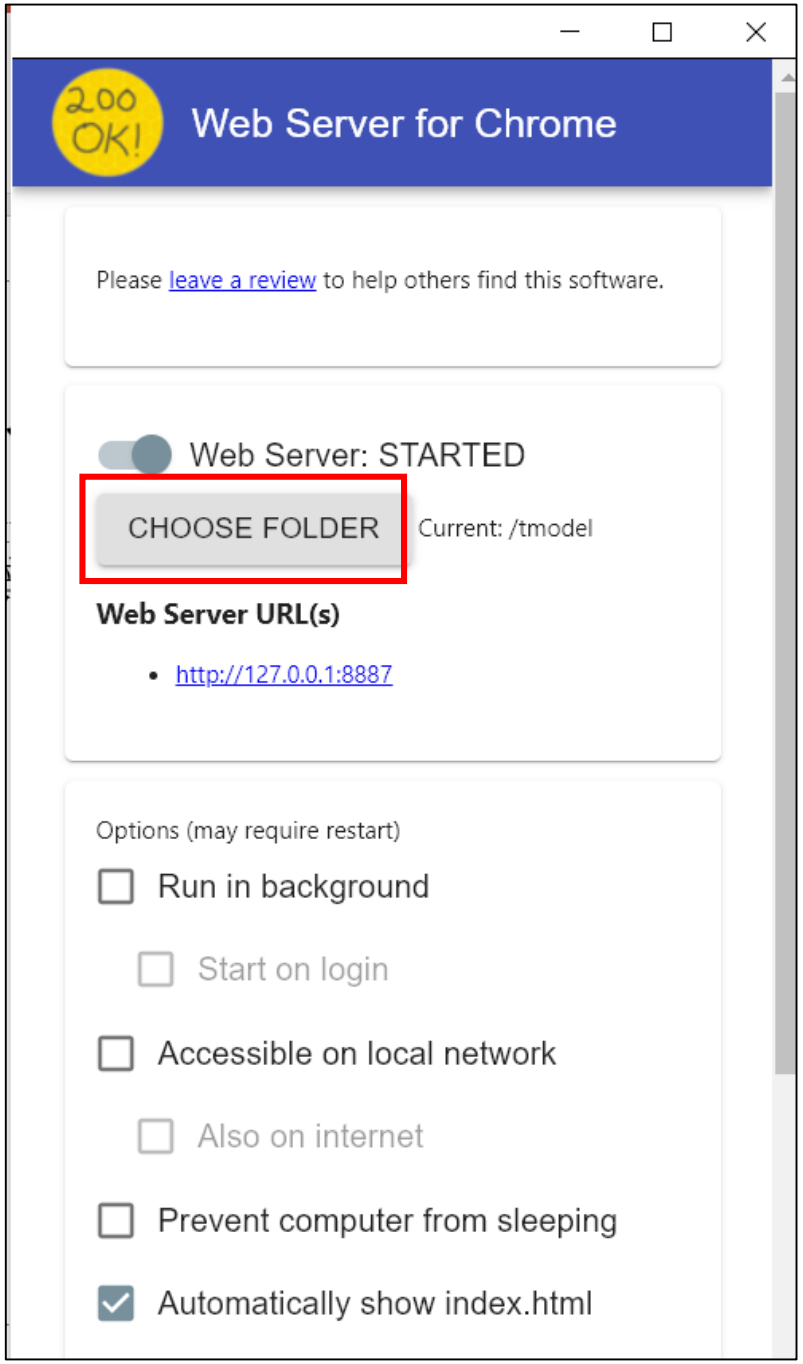

200 OK!
Web Server for Chrome
Please leave a review to help others find this software.
Web Server: START
Select a folder
CHOOSE FOLDER
NO FOLDER SELECTED
Web Server URL(s)
http://127.0.0.1:8887
Options (may require restart)
Run in background
Start on login
Accessible on local network
Also on internet
Prevent computer from sleeping
Automatically show index.html


選擇資料夾
本機 › 下載 › 2022物聯網實務 › 1207 › tmodel
組合管理
新增資料夾
名稱
快速存取
桌面
下載
文件
tfjsv3

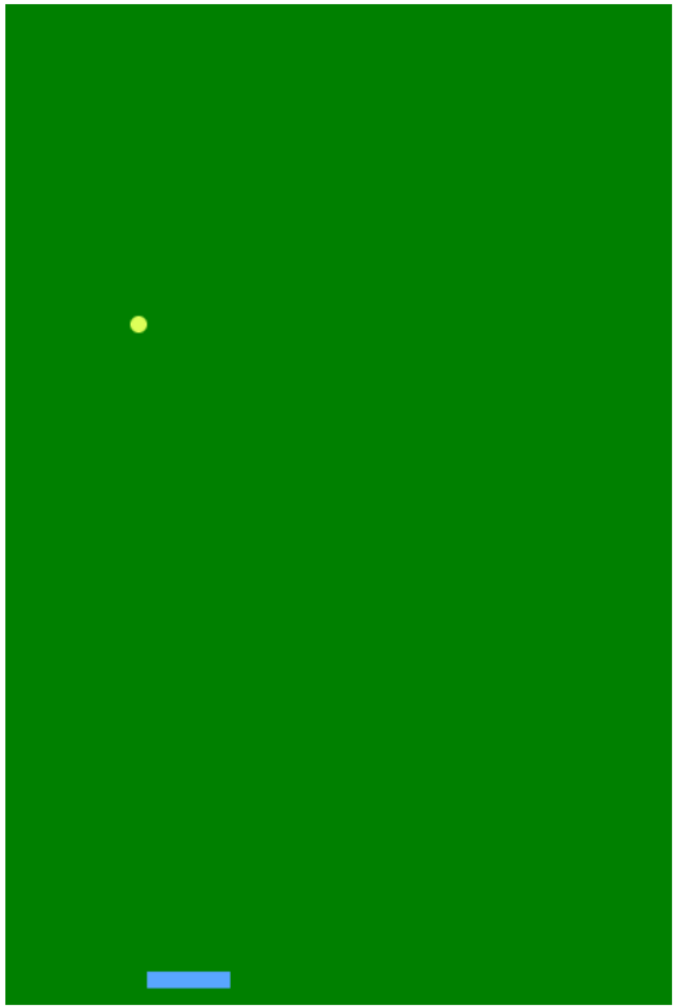

200 OK!
Web Server for Chrome
Please leave a review to help others find this software.
Web Server: STARTED
CHOOSE FOLDER
Current: /tmodel
Web Server URL(s)
http://127.0.0.1:8887
Options (may require restart)
Run in background
Start on login
Accessible on local network
Also on internet
Prevent computer from sleeping
Automatically show index.html

http://127.0.0.1:8887/ex12_07_1.html

AI play ping pong game

127.0.0.1:8887/ex12_07_1.html

AI Playing Ping Pong Game



Elements | Console | Sources | Network | Performance | Memory | Application | Security

top | Filter | Default levels | 1 Issue: 1 | 1 hidden

```
ex12_07_1.html:179
▶ Int32Array [0, buffer: ArrayBuffer(4), byteLength: 4, byteOffset: 0, length: 1, Symbol(Symbol.toStringTag): 'Int32Array']
Tensor                                                                array_ops.ts:1136
    [[105, 95, 207, 100, 92, 204],]
Tensor                                                                array_ops.ts:1136
    [[0.99845, 0.0015495, 4e-7],]
ex12_07_1.html:179
▶ Int32Array [0, buffer: ArrayBuffer(4), byteLength: 4, byteOffset: 0, length: 1, Symbol(Symbol.toStringTag): 'Int32Array']
Tensor                                                                array_ops.ts:1136
    [[100, 92, 204, 95, 89, 201],]
Tensor                                                                array_ops.ts:1136
    [[0.9950423, 0.004688, 0.0002696],]
ex12_07_1.html:179
▶ Int32Array [0, buffer: ArrayBuffer(4), byteLength: 4, byteOffset: 0, length: 1, Symbol(Symbol.toStringTag): 'Int32Array']
Tensor                                                                array_ops.ts:1136
    [[95, 89, 201, 90, 86, 198],]
Tensor                                                                array_ops.ts:1136
    [[0.8644492, 0.0121526, 0.1233983],]
ex12_07_1.html:179
▶ Int32Array [0, buffer: ArrayBuffer(4), byteLength: 4, byteOffset: 0, length: 1, Symbol(Symbol.toStringTag): 'Int32Array']
>
```

Console | What's New ×

Highlights from the Chrome 108 update

Hints for inactive CSS properties

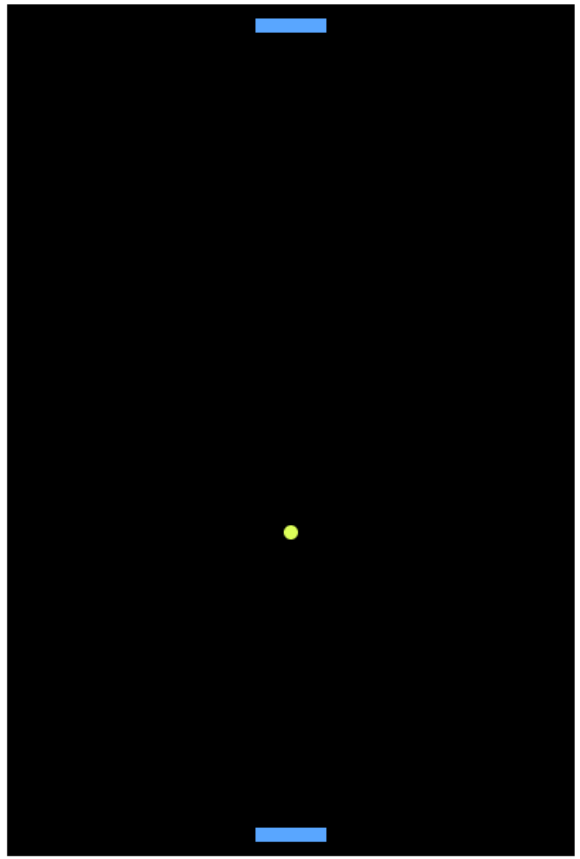
Identify CSS styles that are entirely valid but have no visible effect.

Model summary

```
_________________________________________________________________
Layer (type)                 Output shape              Param #
=================================================================
dense_Dense1 (Dense)         [null,64]                 448
_________________________________________________________________
dropout_Dropout1 (Dropout)   [null,64]                 0
_________________________________________________________________
dense_Dense2 (Dense)         [null,64]                 4160
_________________________________________________________________
dropout_Dropout2 (Dropout)   [null,64]                 0
_________________________________________________________________
dense_Dense3 (Dense)         [null,3]                  195
=================================================================
Total params: 4803
Trainable params: 4803
Non-trainable params: 0
_________________________________________________________________
```

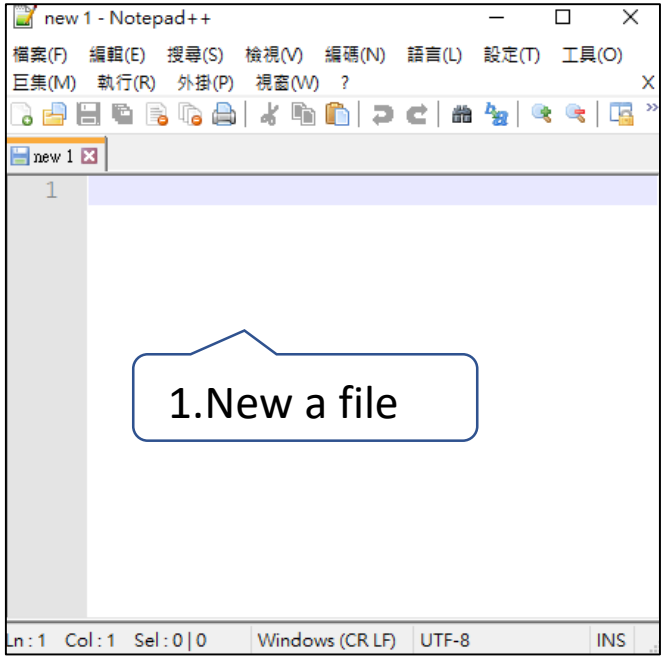
Pong Game AI using TensorFlow JS

Yu-Ping Liao Ping Pong Game



Exercise 12-2

- **Pong Clone In JavaScript**
- • we will have just a simple HTML file that is:”ponggame.html”

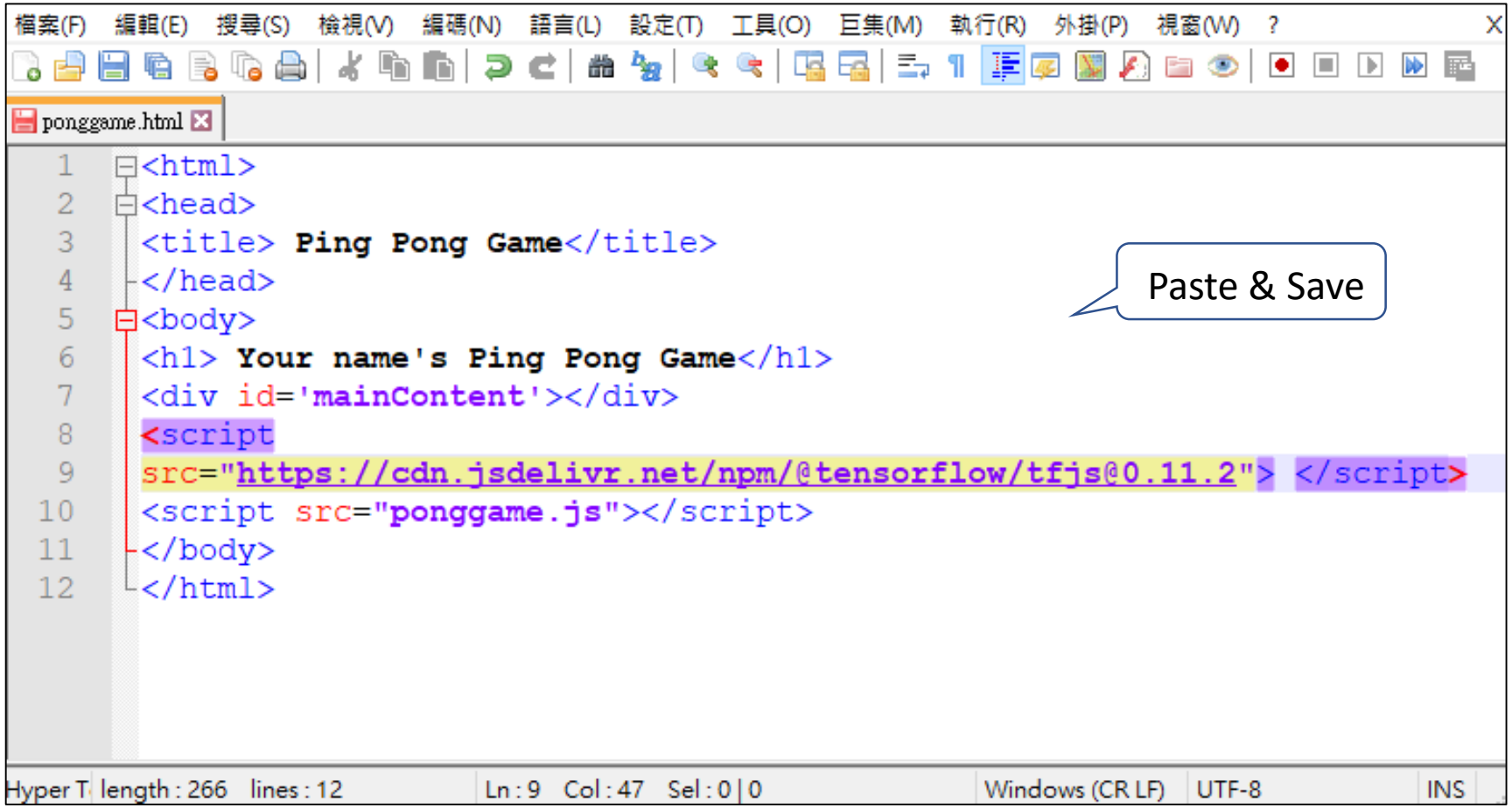


ponggame.html

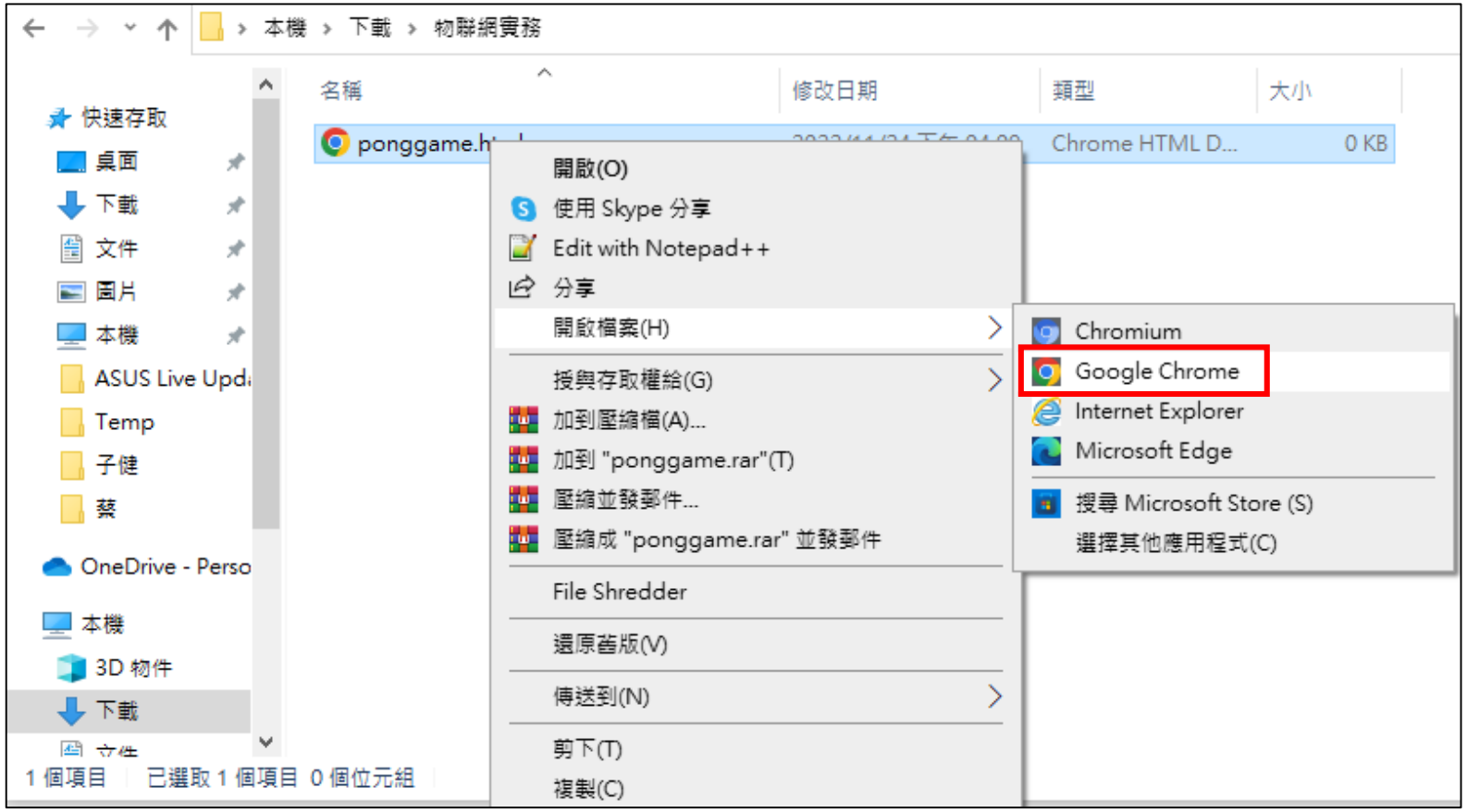
```
<html>
<head>
<title> Ping Pong Game</title>
</head>
<body>
<h1> Your name's Ping Pong Game</h1>
<div id='mainContent'></div>
<script src="https://cdn.jsdelivr.net/npm/@tensorflow/tfjs@0.11.2"> </script>
<script src="ponggame.js"></script>
</body>
</html>
```

Copy

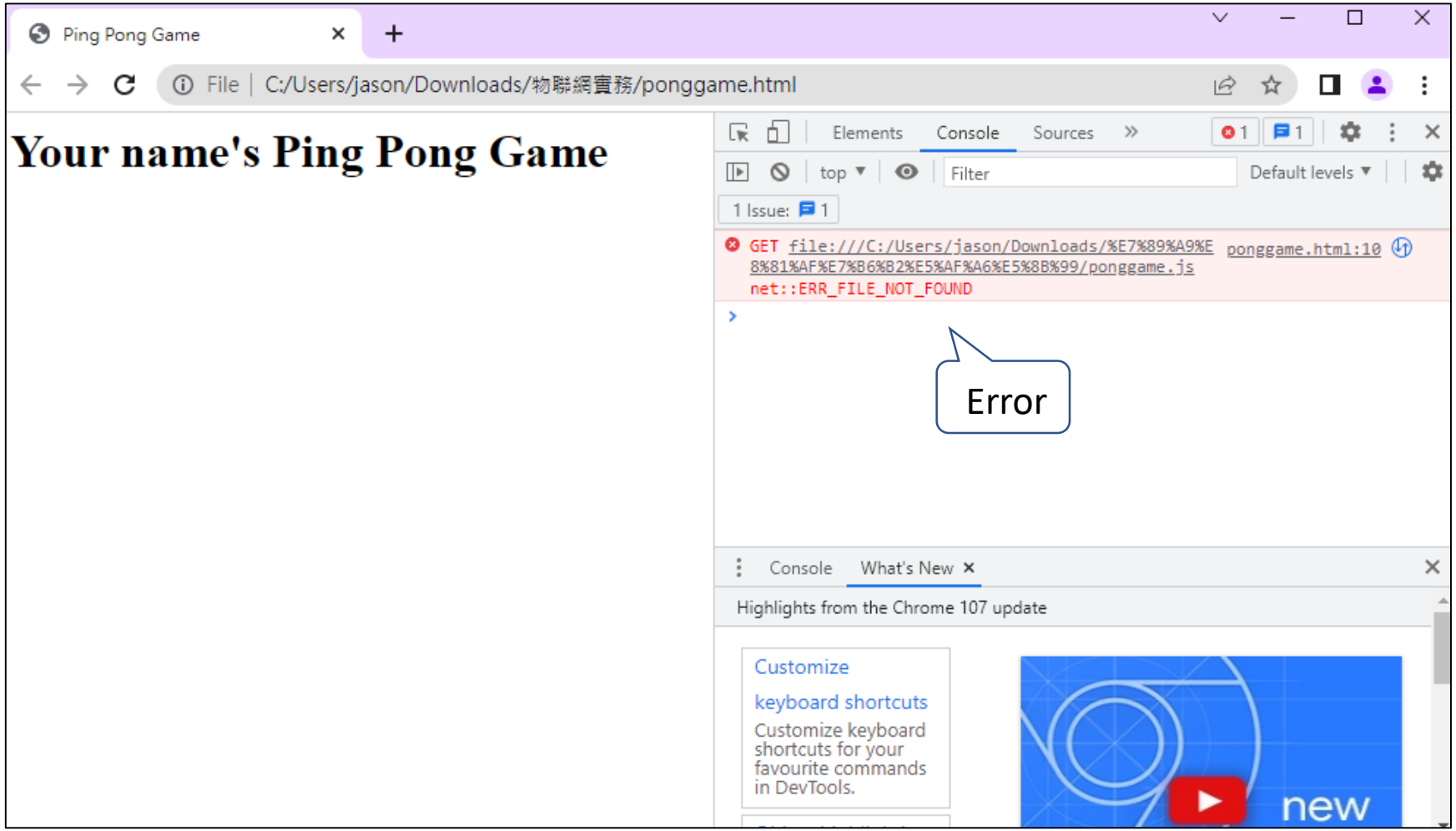
ponggame.html



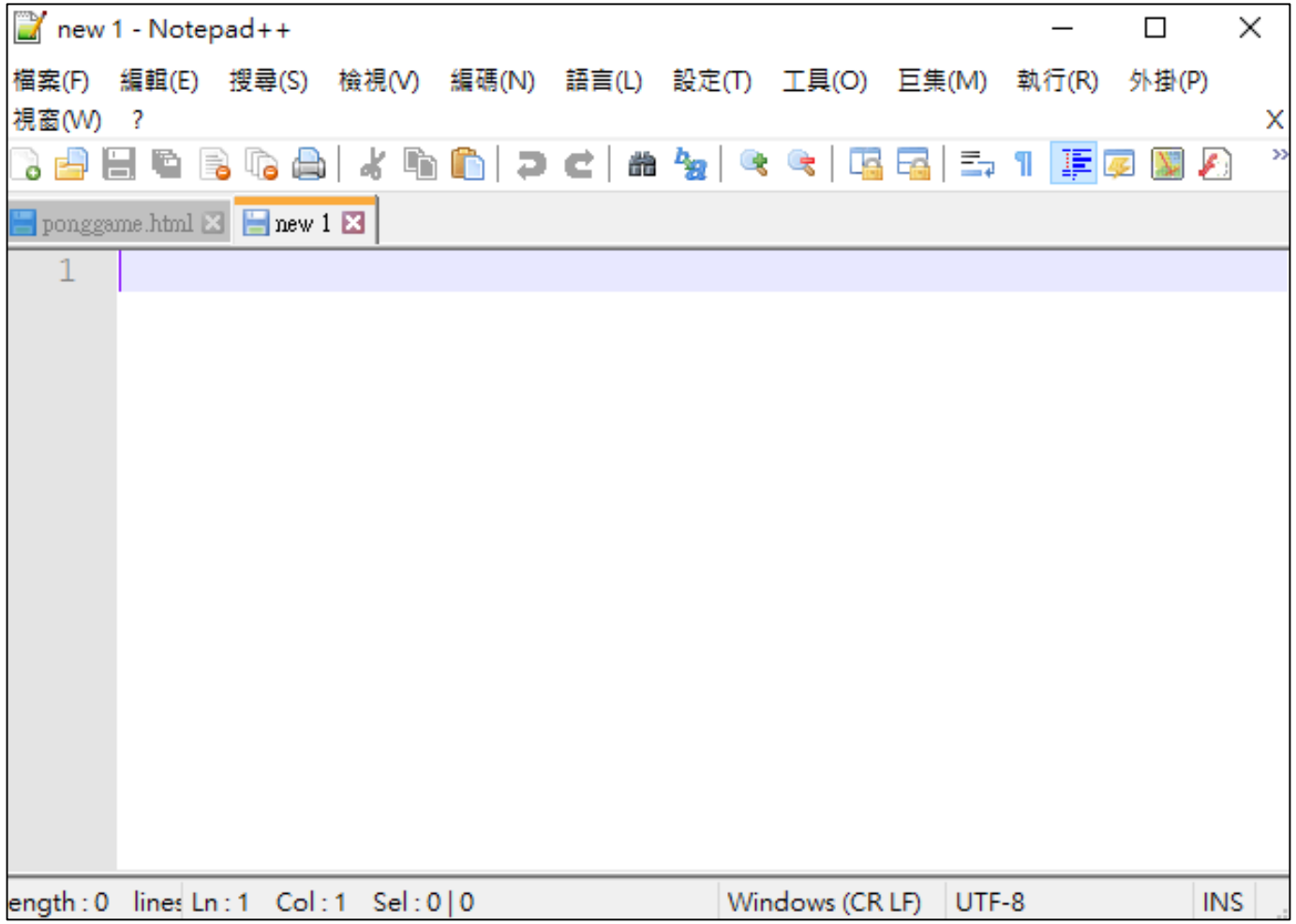
Open ponggame.html with Google Chrome



Ctrl+Shift+I


Ping Pong Game
File | C:/Users/jason/Downloads/物聯網實務/ponggame.html
Your name's Ping Pong Game
Elements
Console
Sources
top
Filter
Default levels
1 Issue: 1
GET file:///C:/Users/jason/Downloads/%E7%89%A9%E8%81%AF%E7%B6%B2%E5%AF%A6%E5%8B%99/ponggame.js net::ERR_FILE_NOT_FOUND
ponggame.html:10
Error
Console
What's New
Highlights from the Chrome 107 update
Customize
keyboard shortcuts
Customize keyboard shortcuts for your favourite commands in DevTools.
new

New a file


new 1 - Notepad++
檔案(F) 編輯(E) 搜尋(S) 檢視(V) 編碼(N) 語言(L) 設定(T) 工具(O) 巨集(M) 執行(R) 外掛(P)
視窗(W) ?
ponggame.html
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Windows (CR LF)
UTF-8
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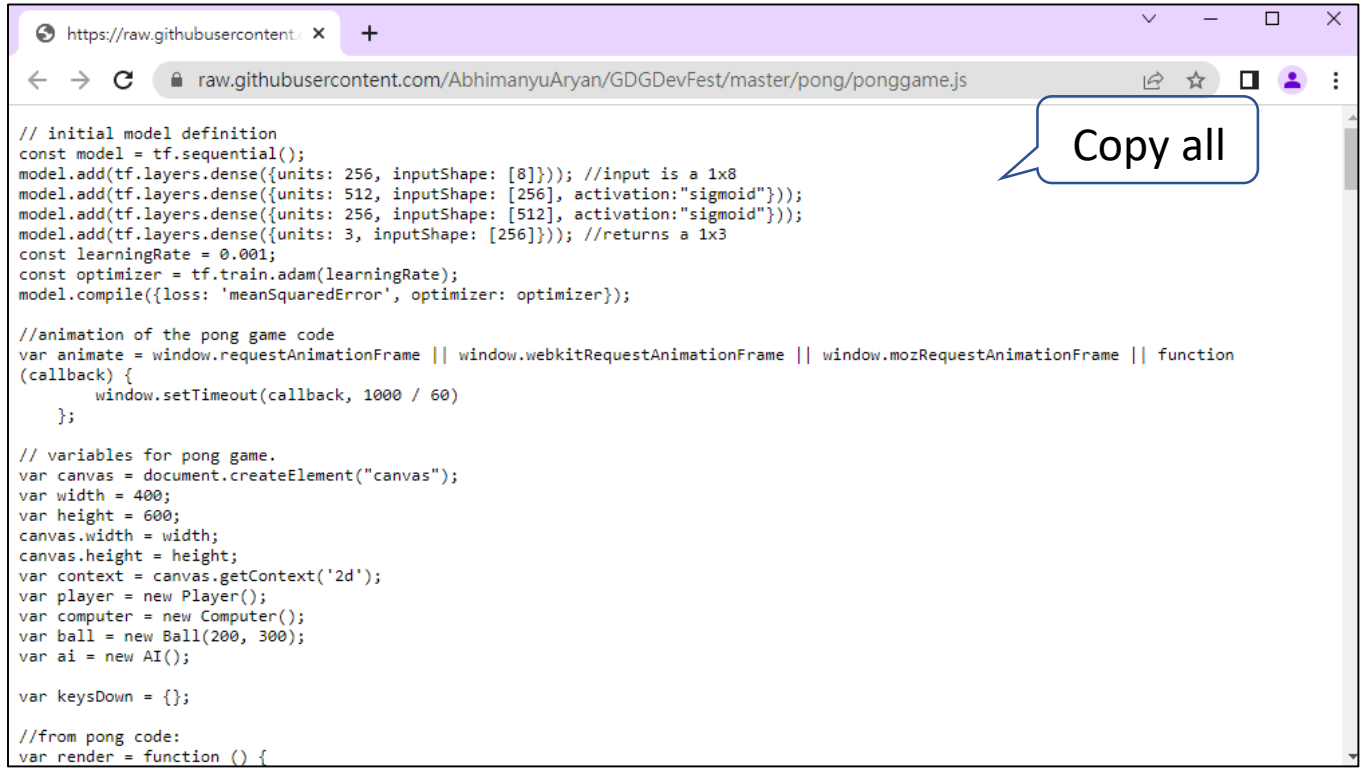
Copy

- https://raw.githubusercontent.com/AbhimanyuAryan/GDGDevFest/master/pong/ponggame.js




```
// initial model definition
const model = tf.sequential();
model.add(tf.layers.dense({units: 256, inputShape: [8]})); //input is a 1x8
model.add(tf.layers.dense({units: 512, inputShape: [256], activation:"sigmoid"}));
model.add(tf.layers.dense({units: 256, inputShape: [512], activation:"sigmoid"}));
model.add(tf.layers.dense({units: 3, inputShape: [256]})); //returns a 1x3
const learningRate = 0.001;
const optimizer = tf.train.adam(learningRate);
model.compile({loss: 'meanSquaredError', optimizer: optimizer});

//animation of the pong game code
var animate = window.requestAnimationFrame || window.webkitRequestAnimationFrame || window.mozRequestAnimationFrame || function
(callback) {
        window.setTimeout(callback, 1000 / 60)
    };

// variables for pong game.
var canvas = document.createElement("canvas");
var width = 400;
var height = 600;
canvas.width = width;
canvas.height = height;
var context = canvas.getContext('2d');
var player = new Player();
var computer = new Computer();
var ball = new Ball(200, 300);
var ai = new AI();

var keysDown = {};

//from pong code:
var render = function () {
```

Save As ponggame.js

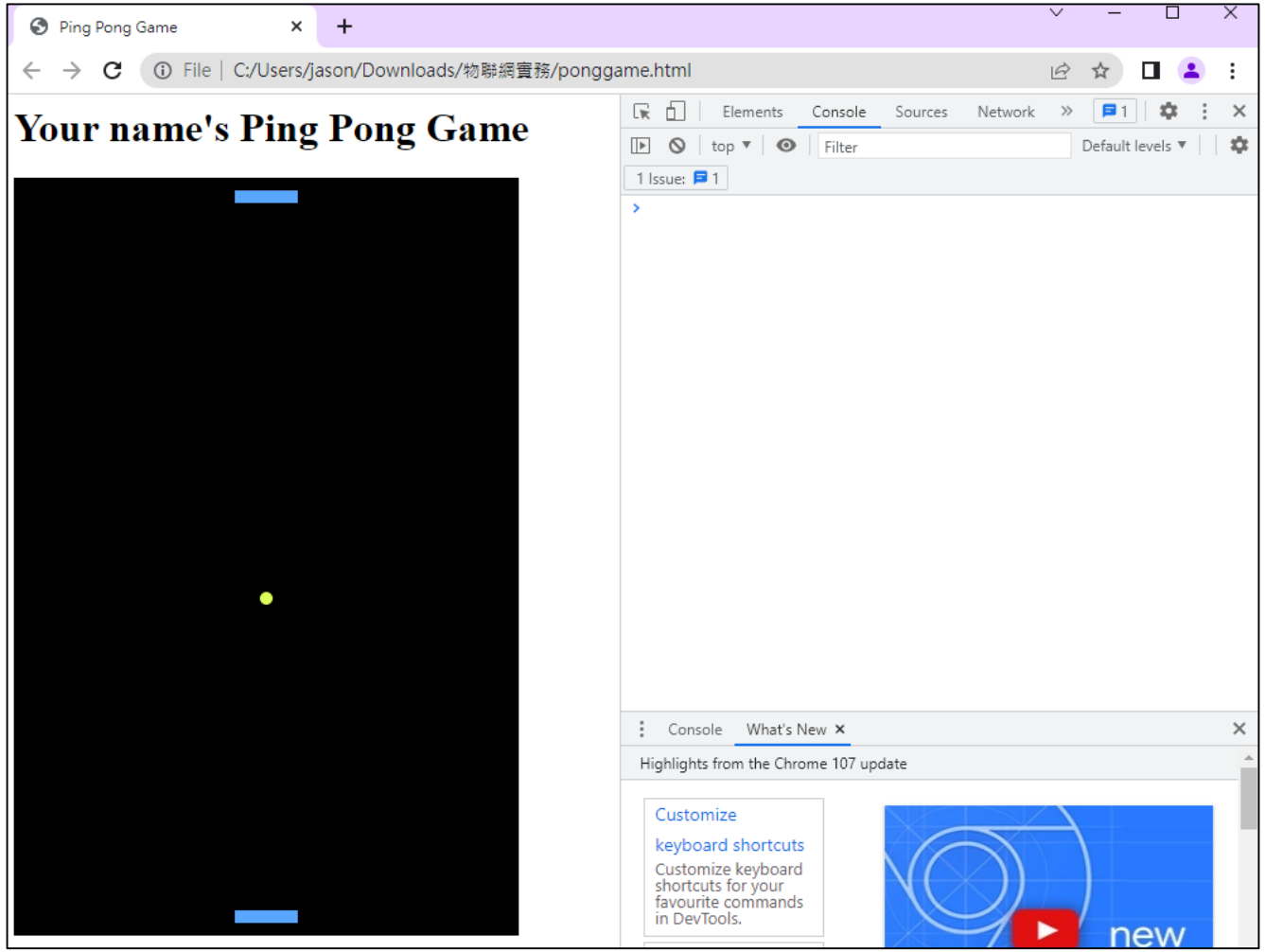
ponggame.html | ponggame.js

```
// initial model definition
const model = tf.sequential();
model.add(tf.layers.dense({units: 256, inputShape: [8]})); //input is
model.add(tf.layers.dense({units: 512, inputShape: [256], activation:
model.add(tf.layers.dense({units: 256, inputShape: [512], activation:
model.add(tf.layers.dense({units: 3, inputShape: [256]})); //returns
const learningRate = 0.001;
const optimizer = tf.train.adam(learningRate);
model.compile({loss: 'meanSquaredError', optimizer: optimizer});

//animation of the pong game code
var animate = window.requestAnimationFrame || window.webkitRequestAni
        window.setTimeout(callback, 1000 / 60)
    };

// variables for pong game.
var canvas = document.createElement("canvas");
var width = 400;
var height = 600;
canvas.width = width;
```

Paste

avaSc length : 8,834 lines : 323 | Ln : 323 Col : 4 Sel : 0 | 0 | Windows (CR LF) | UTF-8 | INS

Reload ponggame.html (F5)



Edit name

Ponggame.html

C:\Users\jason\Downloads\物聯網實務\ponggame.html - Notepad++

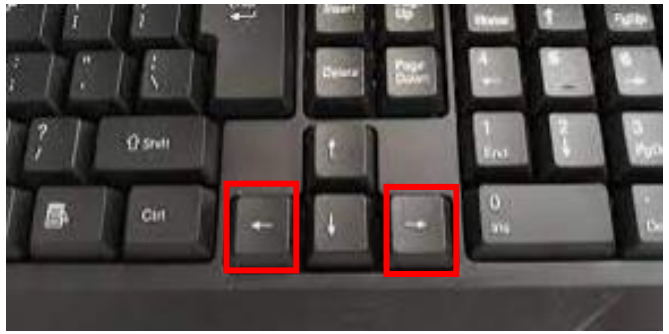
```html
<html>
<head>
<title> Ping Pong Game</title>
</head>
<body>
<h1> Yu-Ping Liao Ping Pong Game</h1>
<div id='mainContent'></div>
<script
src="https://cdn.jsdelivr.net/npm/@tensorflow/tfjs@0.11.2"> </script>
<script src="ponggame.js"></script>
</body>
</html>
```

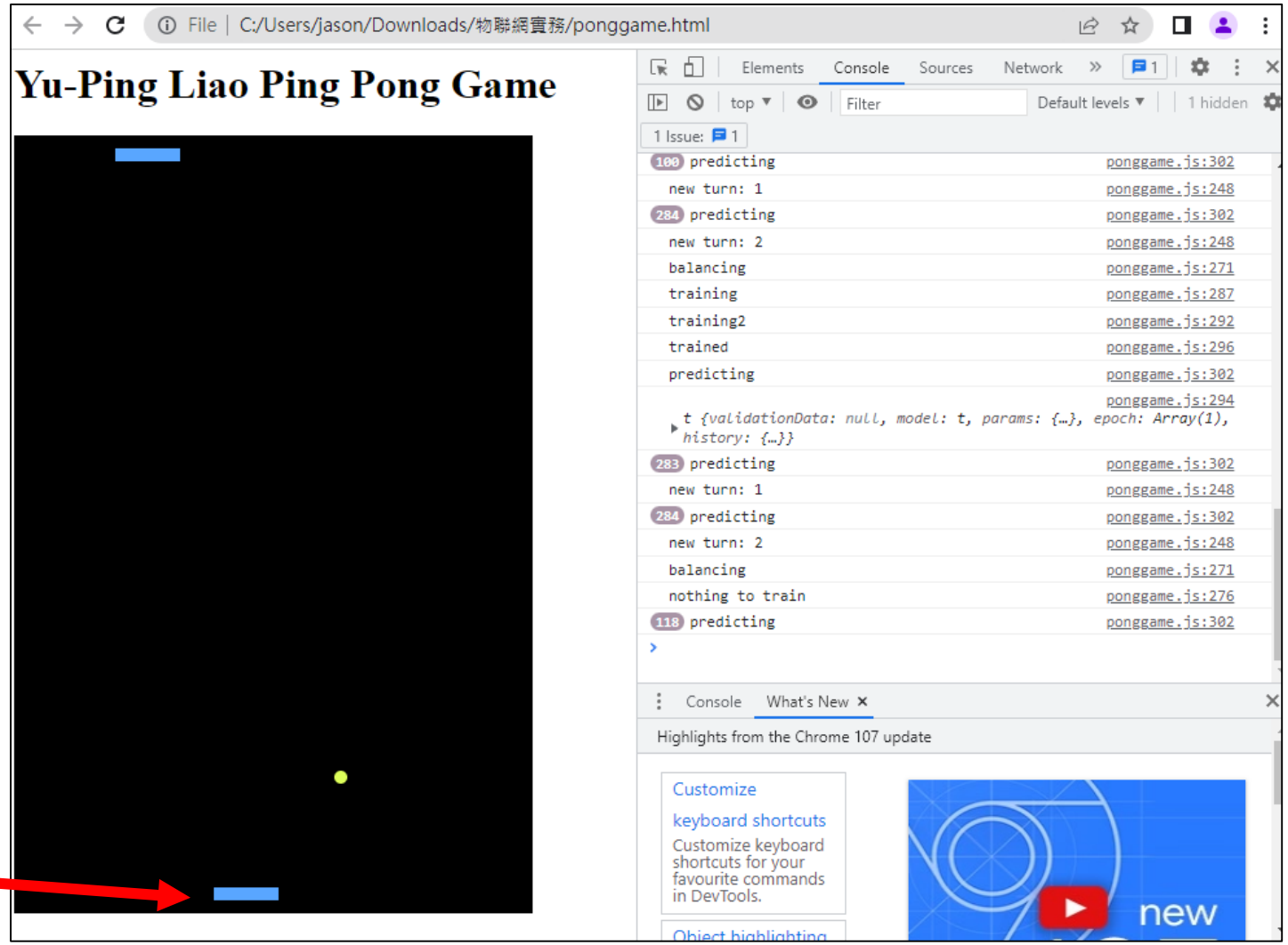
Ping Pong Game

File | C:/Users/jason/Downloads/物聯網實務/ponggame.html

Yu-Ping Liao Ping Pong Game

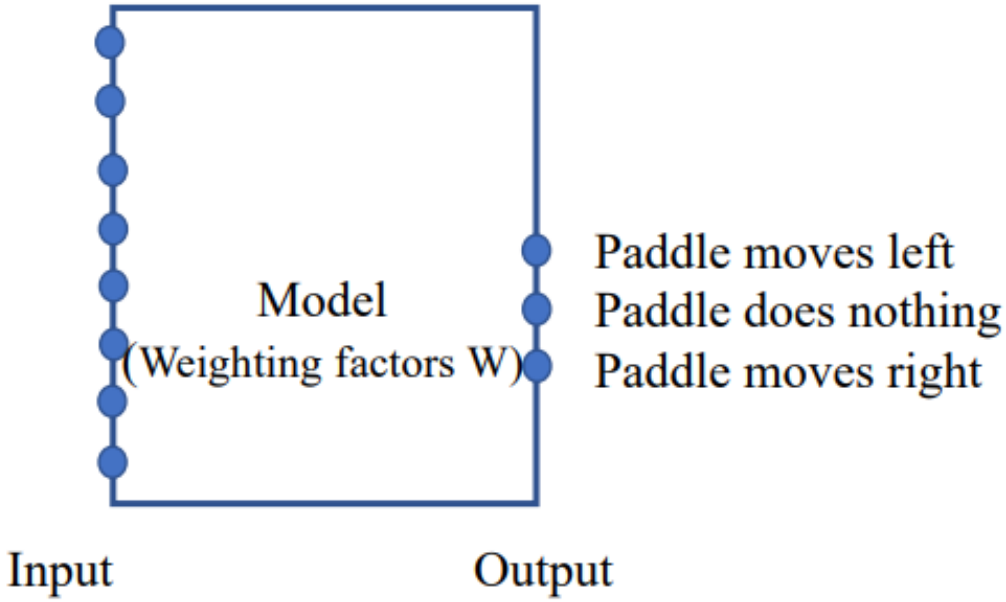
Play with AI




File | C:/Users/jason/Downloads/物聯網實務/ponggame.html
Yu-Ping Liao Ping Pong Game
Elements
Console
Sources
Network
top
Filter
Default levels
1 hidden
1 Issue: 1
100 predicting ponggame.js:302
new turn: 1 ponggame.js:248
284 predicting ponggame.js:302
new turn: 2 ponggame.js:248
balancing ponggame.js:271
training ponggame.js:287
training2 ponggame.js:292
trained ponggame.js:296
predicting ponggame.js:302
ponggame.js:294
t {validationData: null, model: t, params: {…}, epoch: Array(1), history: {…}}
283 predicting ponggame.js:302
new turn: 1 ponggame.js:248
284 predicting ponggame.js:302
new turn: 2 ponggame.js:248
balancing ponggame.js:271
nothing to train ponggame.js:276
118 predicting ponggame.js:302
Console
What's New
Highlights from the Chrome 107 update
Customize
keyboard shortcuts
Customize keyboard shortcuts for your favourite commands in DevTools.
new

Model

1. Player paddle x
2. Computer paddle x
3. Ball x
4. Ball y
5. previous ball x
6. previous ball y
7. previous player paddle x
8. previous computer paddle x



Exercise 12-3

連結：https://utm.to/4lzscf

模組編號與名稱		【區塊鏈課前測驗】模組一：區塊鏈原理與應用
教學目標		讓學生對區塊鏈有基礎認識
題號 1	題目	1-1 關於「比特幣」，你的理解是?
	選項	A. 非常了解 B. 了解 C. 不是很了解 D. 聽過但不理解 E. 完全沒聽過
	備註	藉由是否知道比特幣來瞭解學生對區塊鏈認知並於課程帶入區塊鏈技術
題號 2	題目	1-2 關於比特幣跟傳統貨幣的差異，下列何者錯誤?
	選項	A. 比特幣的貨幣總量統一由政府控制 B. 比特幣沒有通貨膨脹的問題 C. 比特幣是不可偽造的 D. 比特幣交易內容是不可被竄改的
	備註	