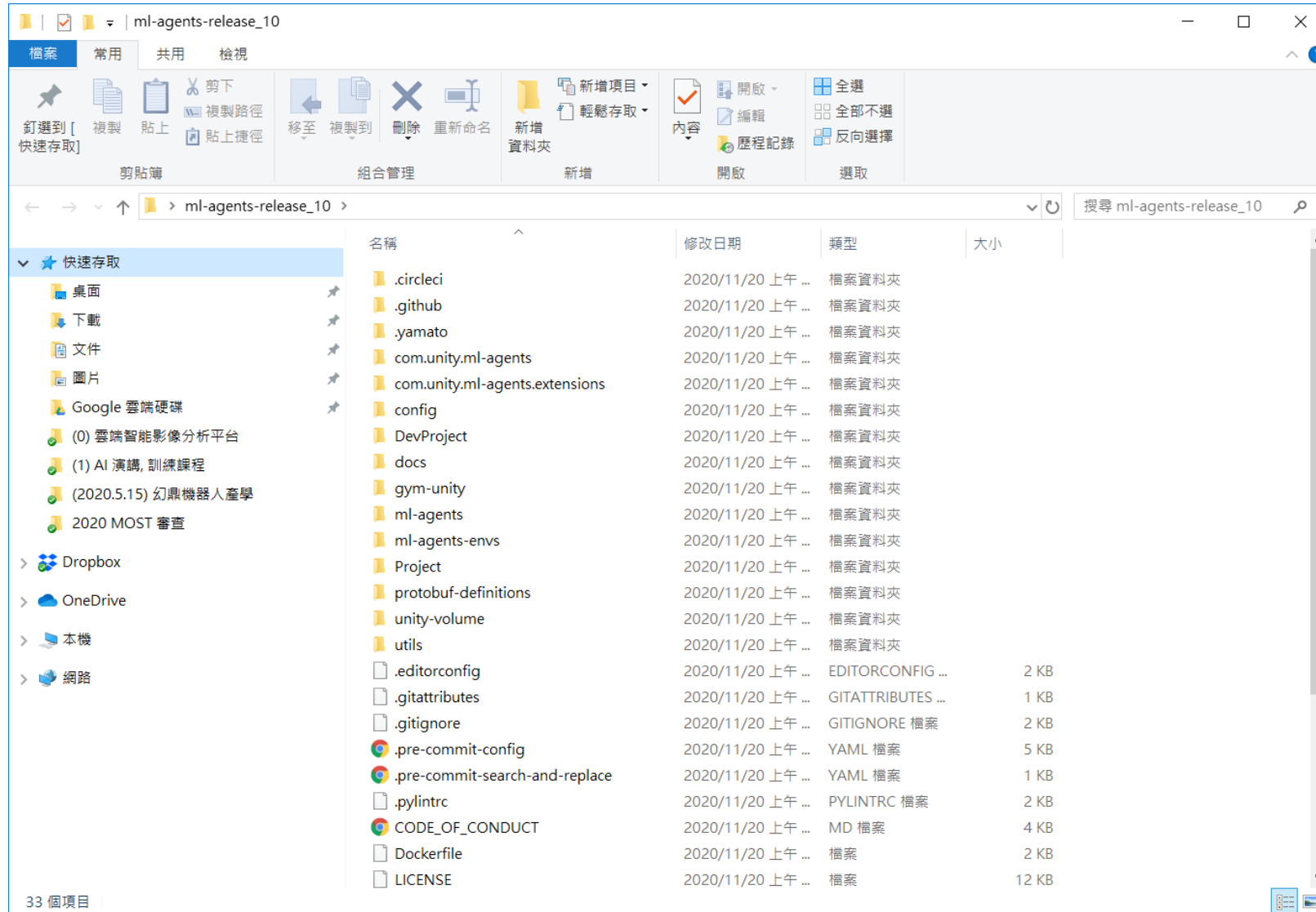


1. Download ML Agent Release 10 or later from GitHub

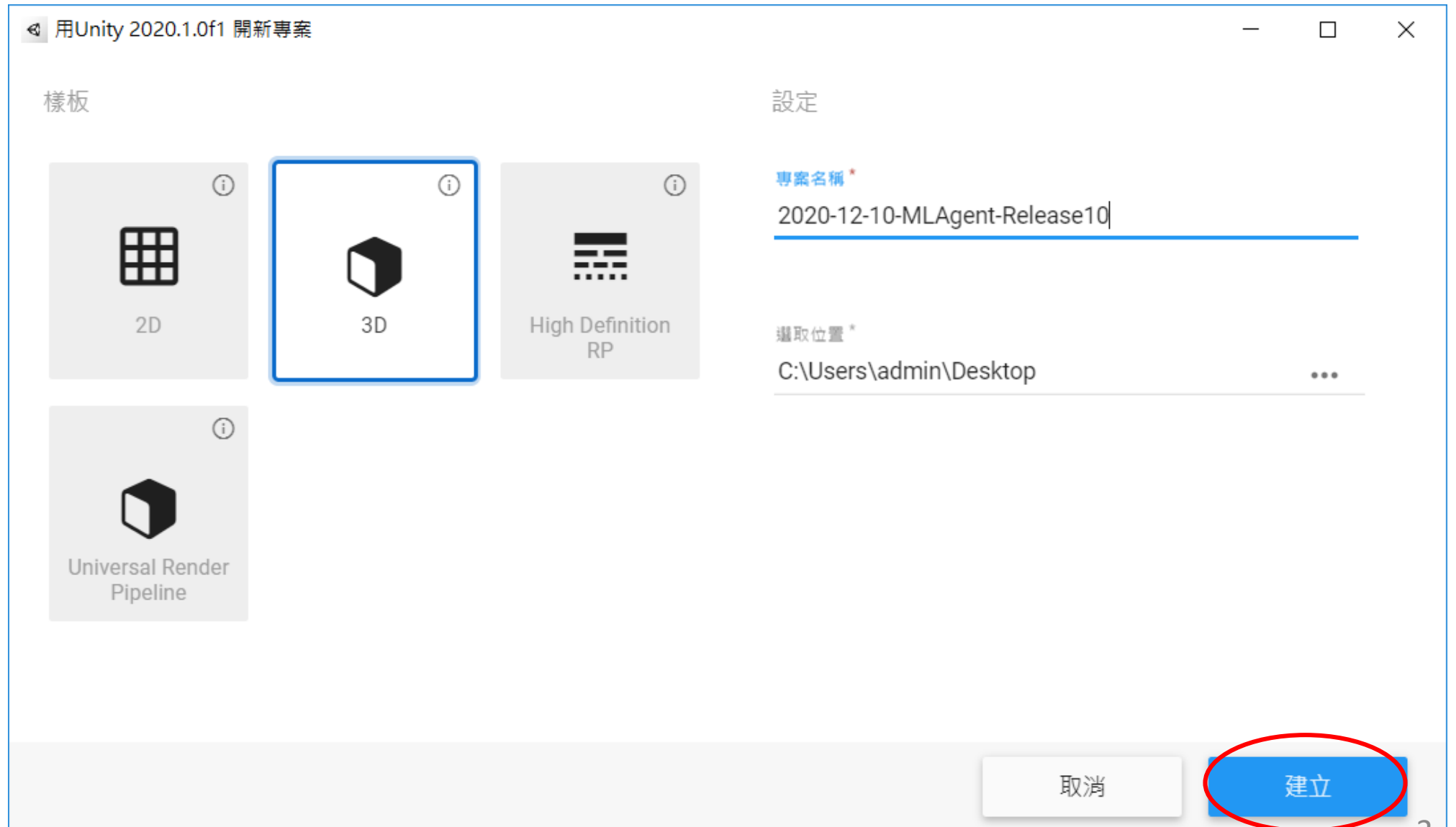
Version	Release Date	Source	Documentation	Download
master (unstable)	--	source	docs	download
Release 10	November 18, 2020	source	docs	download
Release 9	November 4, 2020	source	docs	download
Release 8	October 14, 2020	source	docs	download
Release 7	September 16, 2020	source	docs	download
Release 6	August 12, 2020	source	docs	download
Release 5	July 31, 2020	source	docs	download
Release 4	July 15, 2020	source	docs	download

<https://github.com/Unity-Technologies/ml-agents>

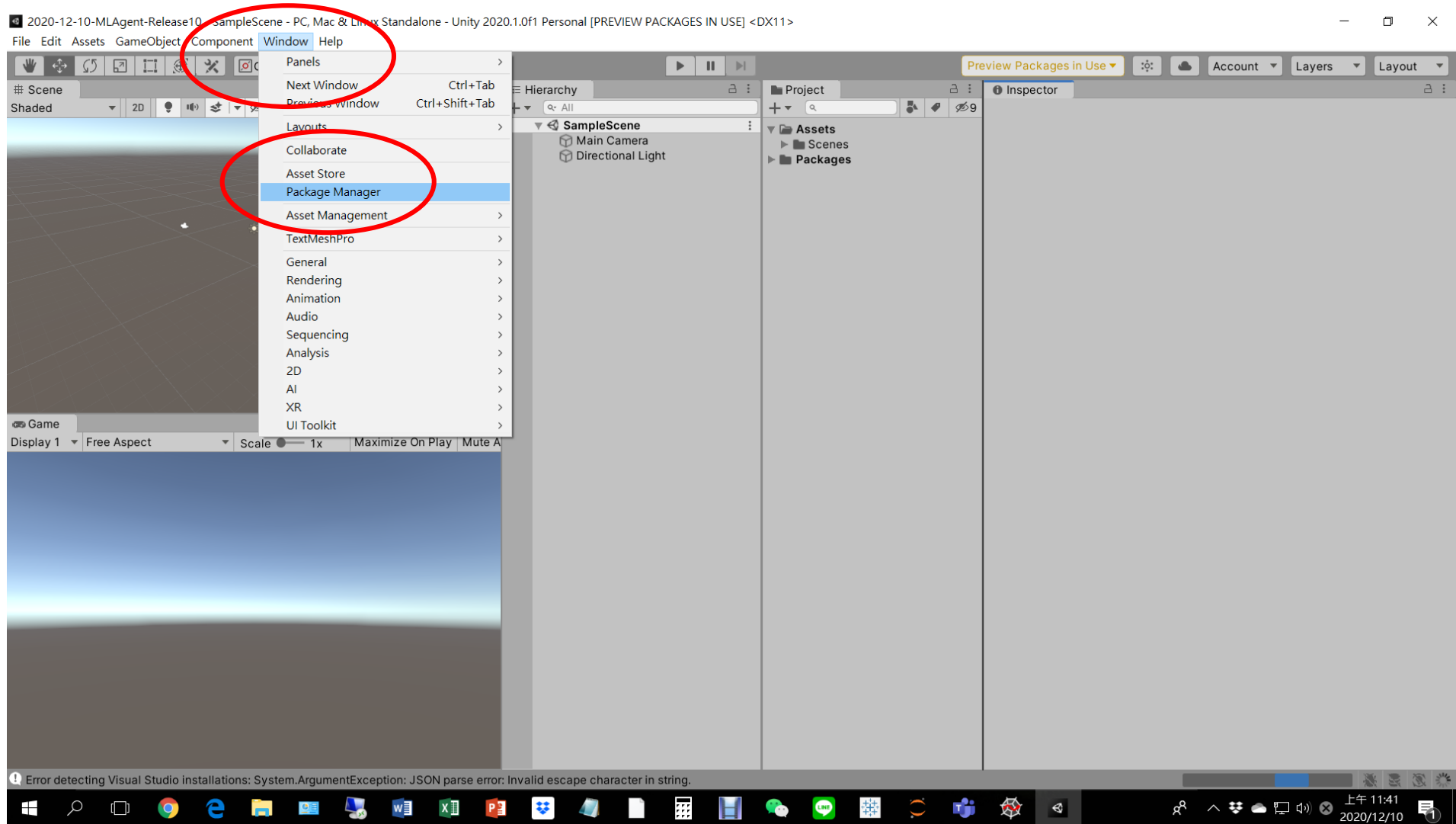
2. Unzip ml-agents-release_10 to your PC



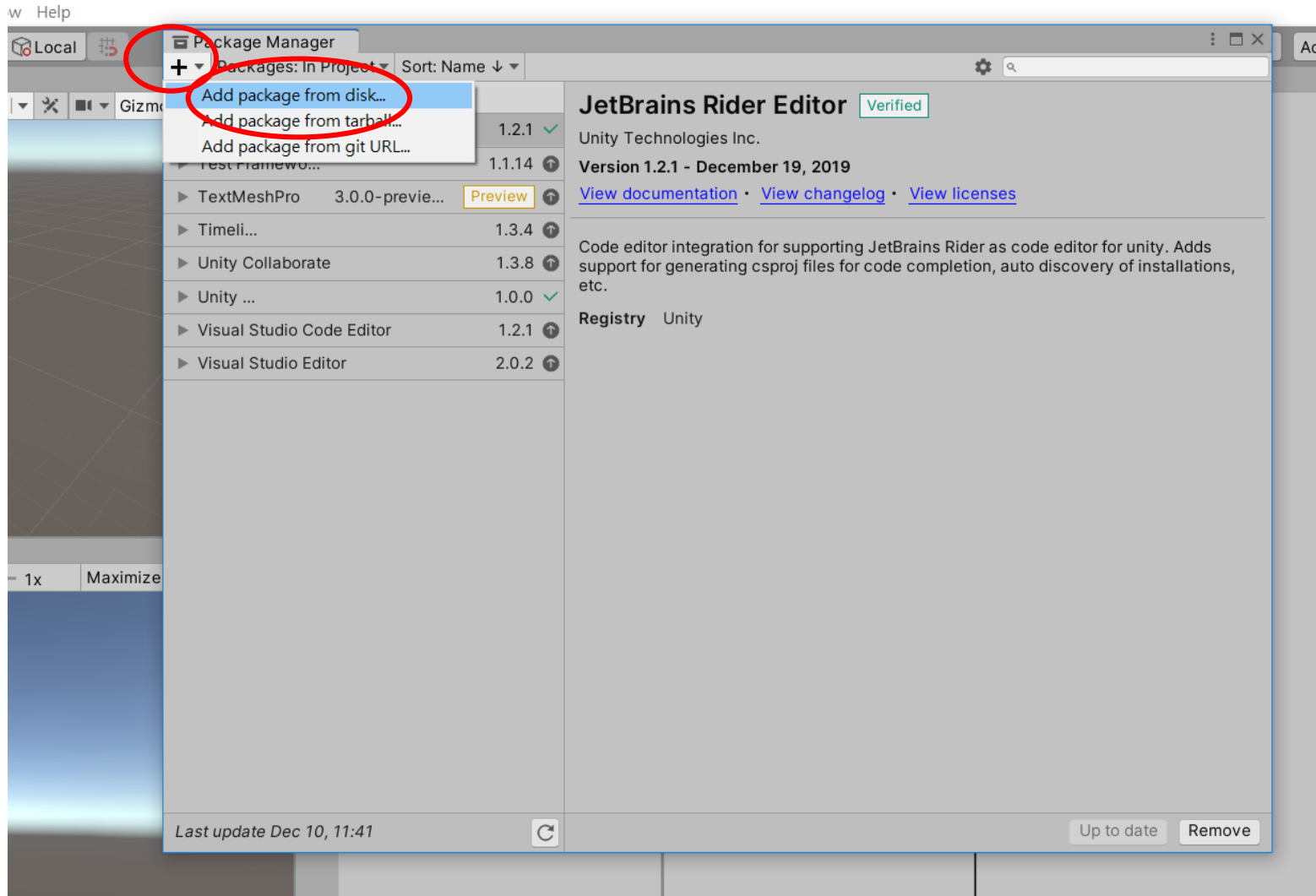
3. Create a new Unity project



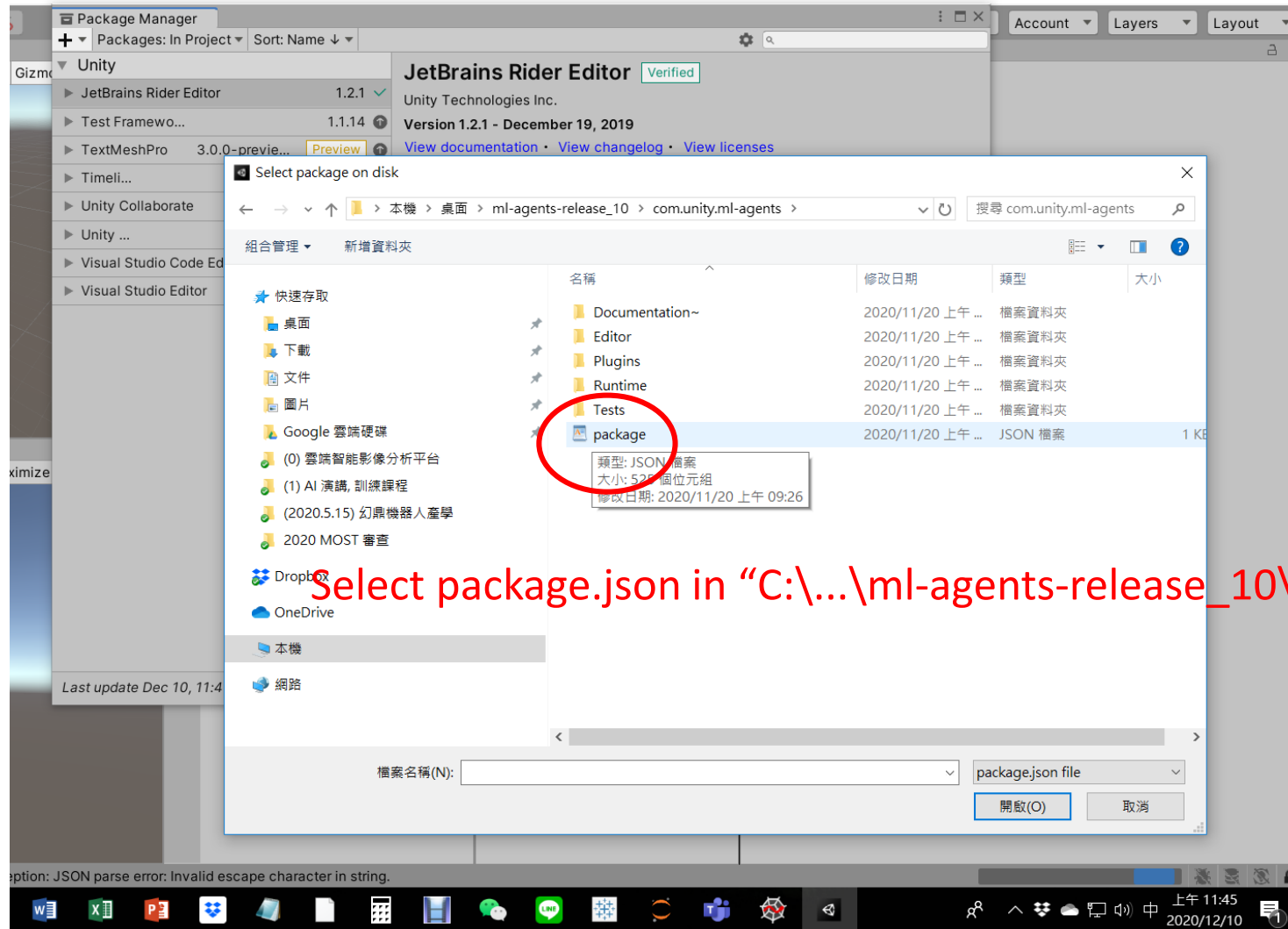
4. Use package manager to import ML Agent 10 to your Unity project



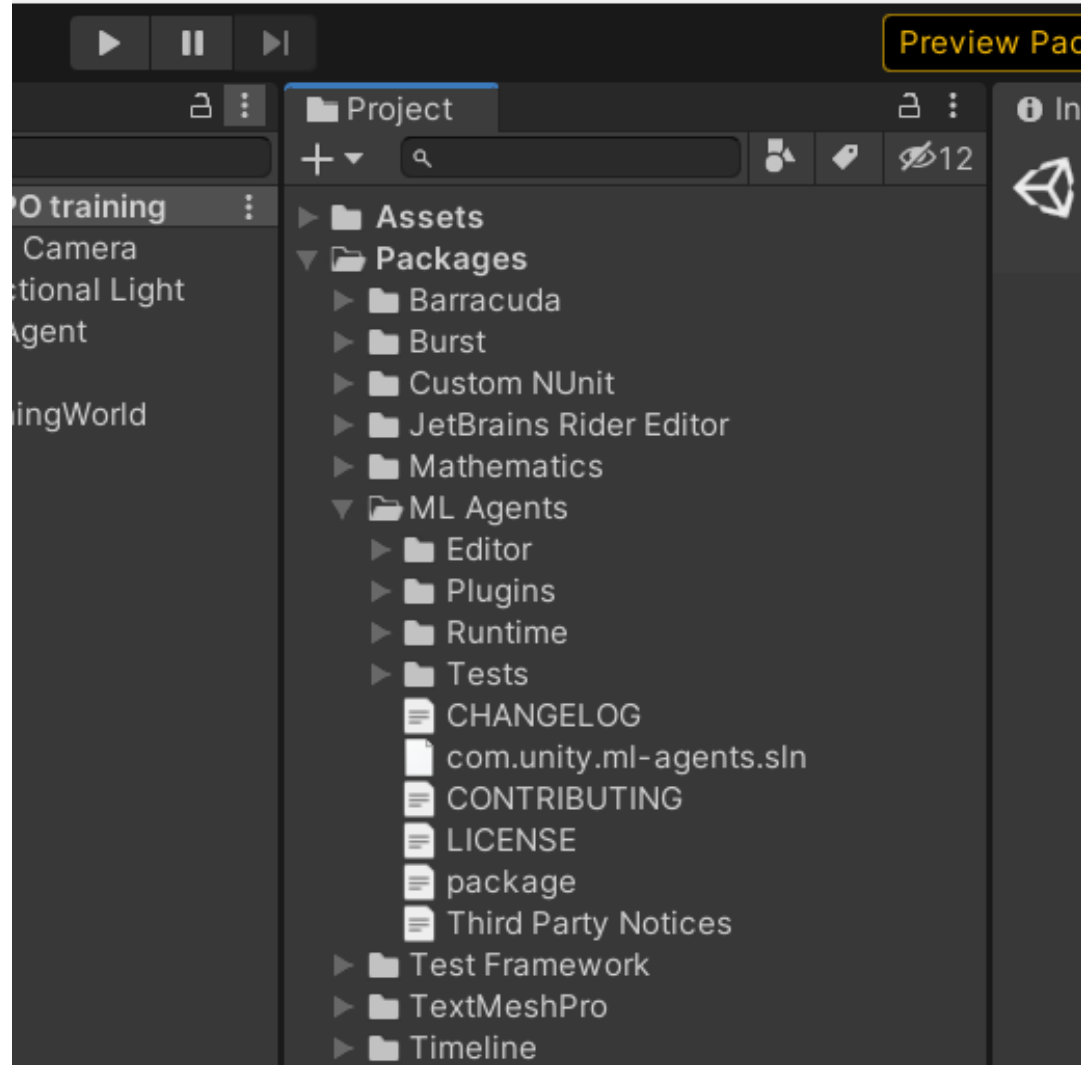
4. Use package manager to import ML Agent 10 to your Unity project



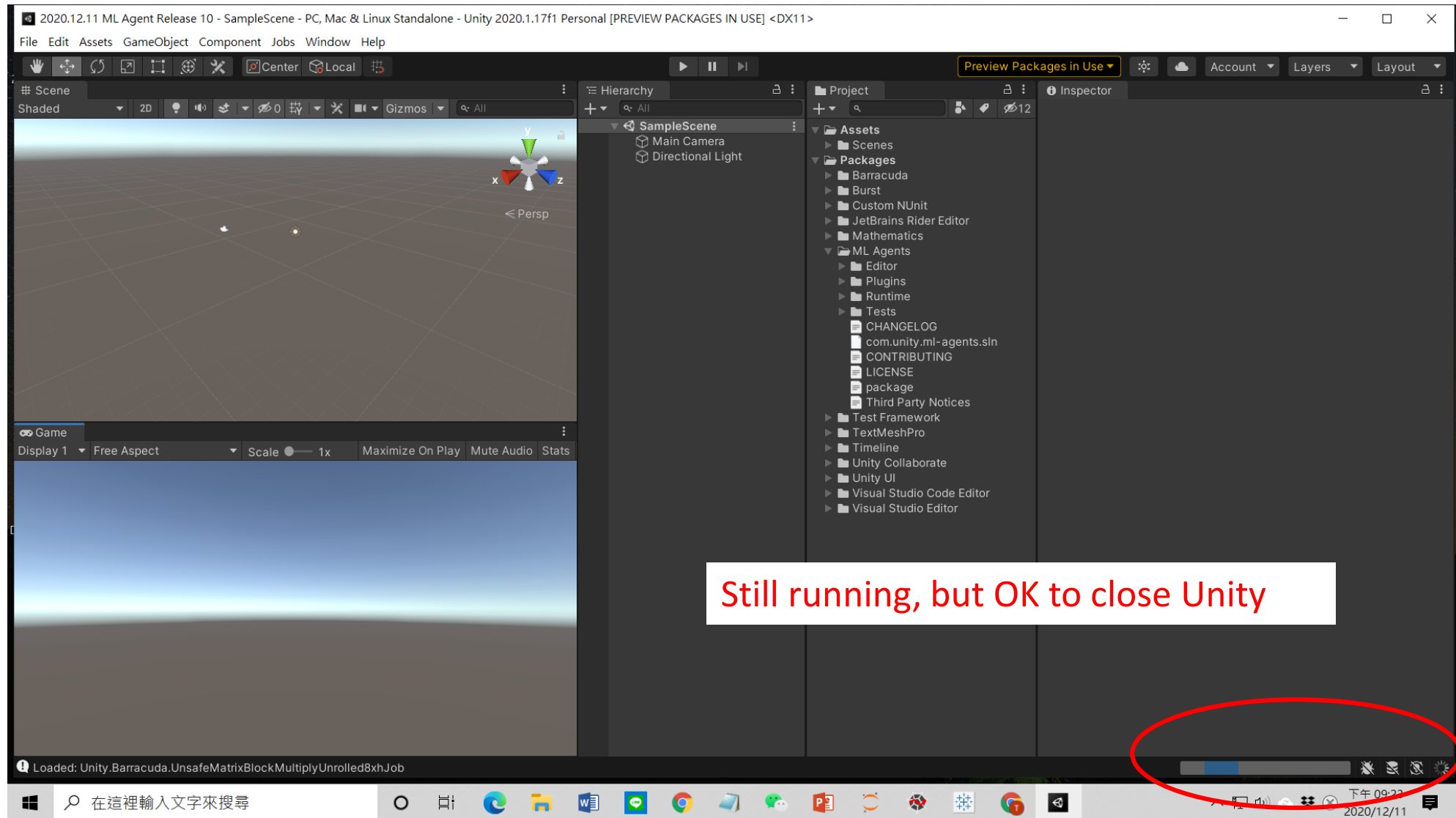
4. Use package manager to import ML Agent 10 to your Unity project



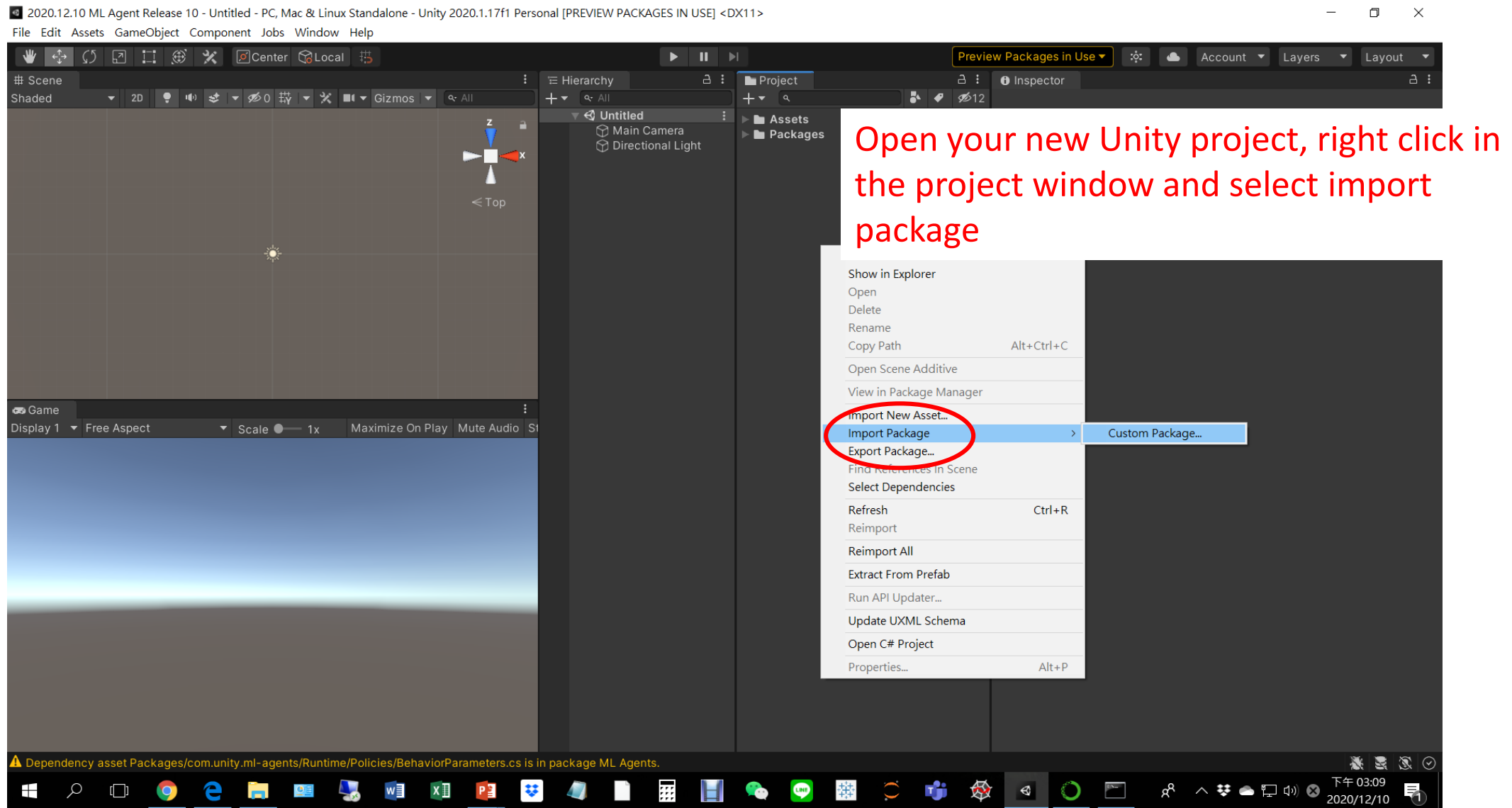
4. Use package manager to import ML Agent 10 to your Unity project



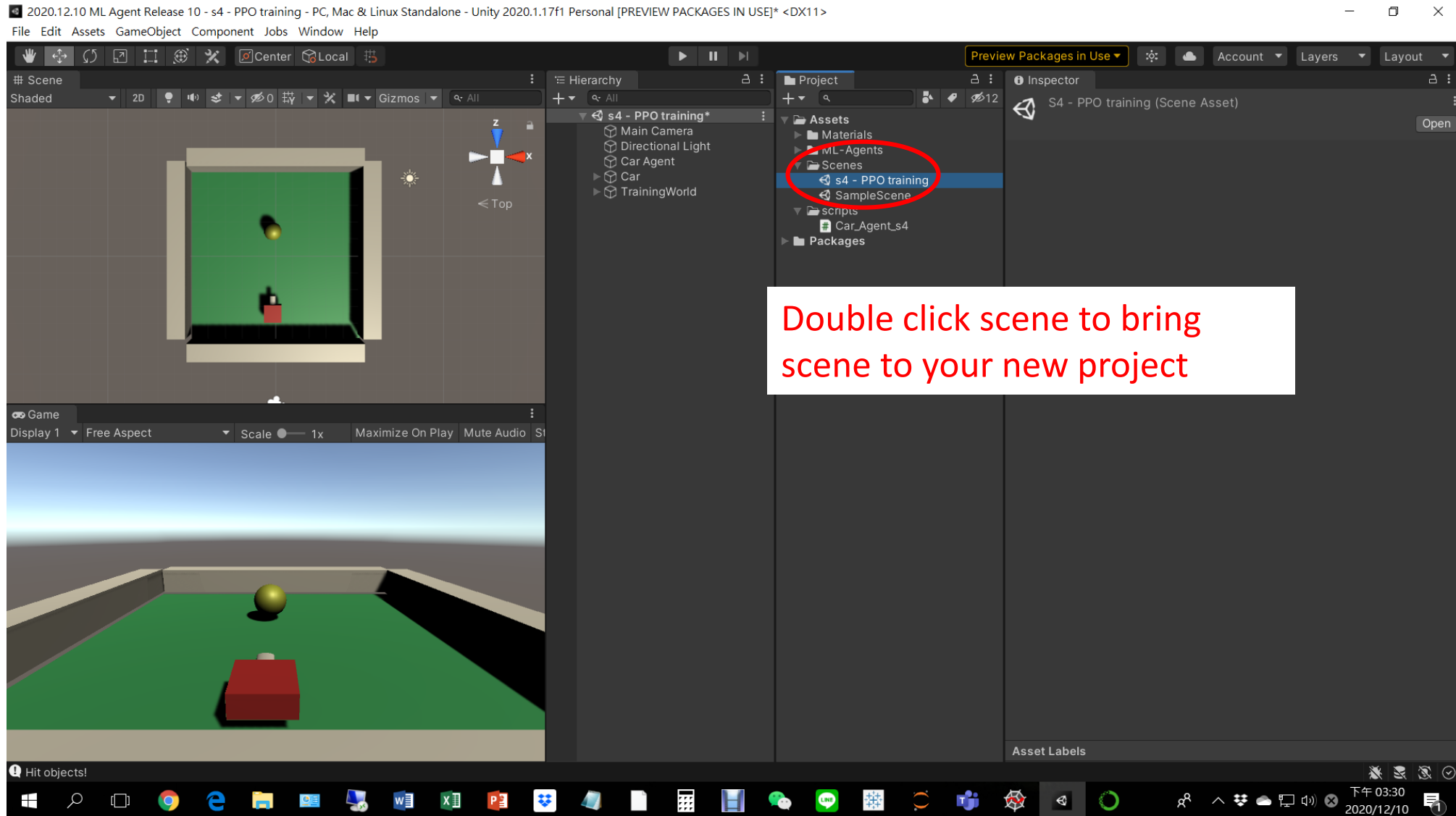
4. Use package manager to import ML Agent 10 to your Unity project



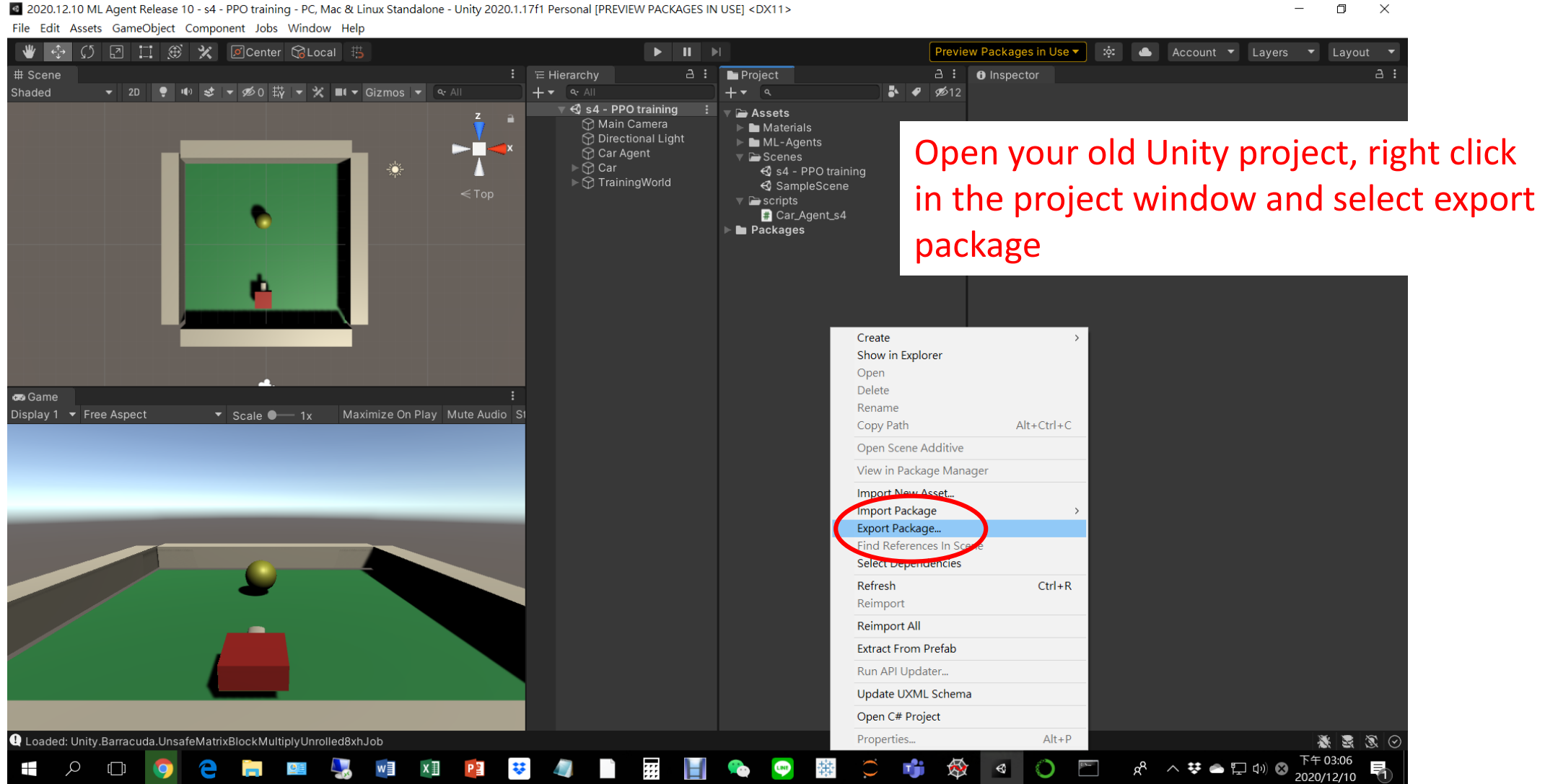
5. Import package to your new Unity project



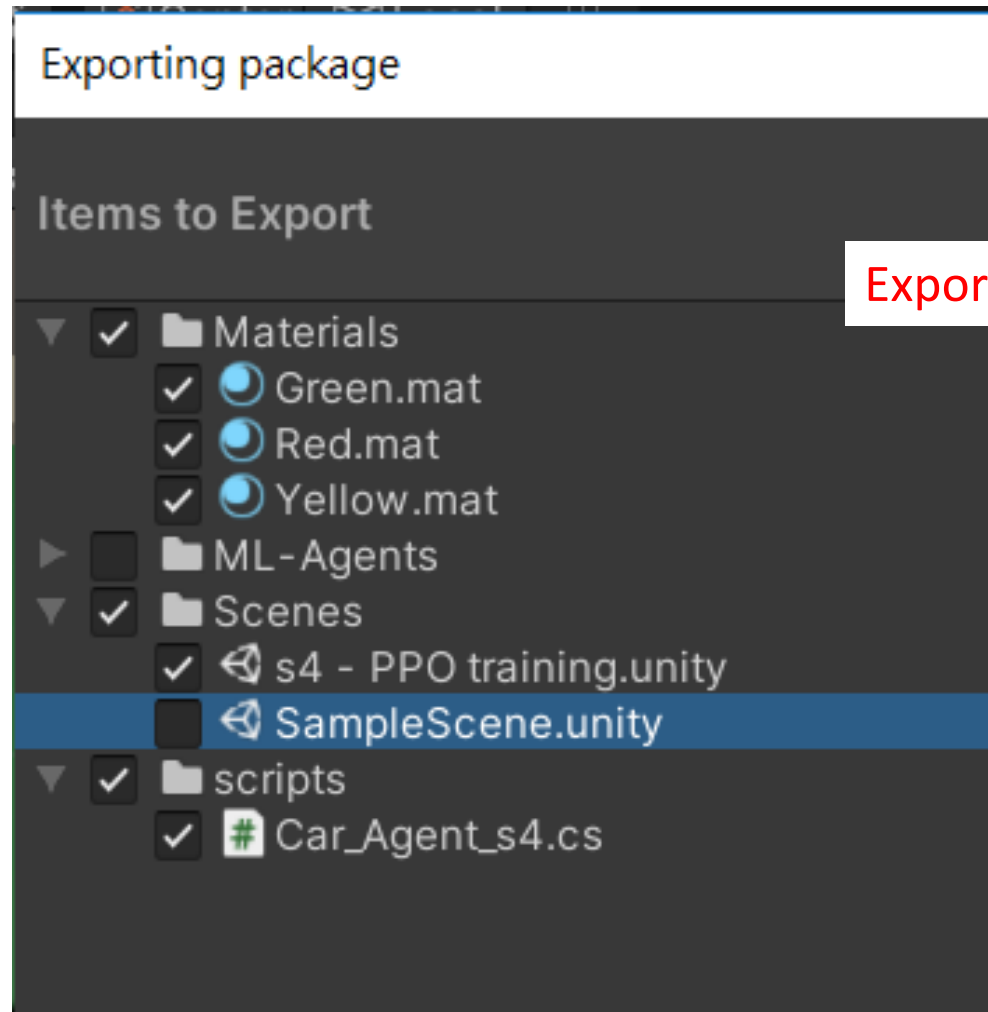
5. Import package to your new Unity project



(Export package from your old Unity project)



(Export package from your old Unity project)



Export materials, scenes, and cs

6. Install ML Agent to Anaconda

Anaconda Navigator

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ANACONDA NAVIGATOR

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base (root)

Name

T

Description

PyTorch-MLAgent

Open Terminal

Open with Python

Open with IPython

Open with Jupyter Notebook

Abseil python common libraries, see https

Configurable, python 2+3 compatible sphin

Read, rewrite, and write python asts nicel

A abstract syntax tree for python with inf

Attrs is the python package that will bring

Utilities to internationalize and localize py

Specifications for callback functions passe

✓ attrs

✓ babel

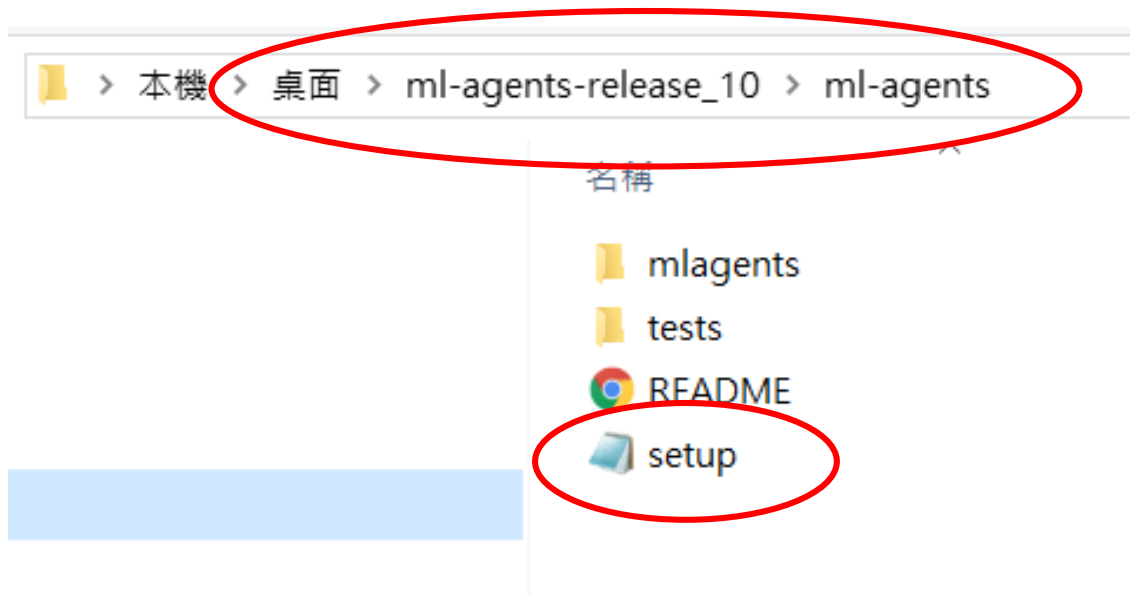
✓ backcall

6. Install ML Agent to Anaconda

```
C:\WINDOWS\system32\cmd.exe

(PyTorch-MLAgent) C:\Users\admin>cd C:\Users\admin\Desktop\ml-agents-release_10\ml-agents
(PyTorch-MLAgent) C:\Users\admin\Desktop\ml-agents-release_10\ml-agents>pip install .
```

1. cd to the directory where the setup.py is located
2. pip install .



6. Install ML Agent to Anaconda

Type "pip freeze" to confirm

C:\WINDOWS\system32\cmd.exe

```
(PyTorch-MLAgent) C:\Users\admin\Desktop\ml-agents-release_10\ml-agents>pip freeze
absl-py==0.9.0
alabaster==0.7.12
astor==0.8.1
astroid==2.4.2
attrs==19.3.0
Babel==2.8.0
backcall==0.1.0
bleach==3.1.1
boto3==1.14.33
botocore==1.17.33
brotlipy==0.7.0
cachetools==4.0.0
cattr==1.0.0
```

C:\WINDOWS\system32\cmd.exe

```
Keras-Applications==1.0.8
Keras-Preprocessing==1.1.0
keyring==21.2.1
kiwisolver==1.1.0
lazy-object-proxy==1.4.3
lxml==4.5.2
Markdown==3.2.1
MarkupSafe==1.1.1
matplotlib==3.1.3
mccabe==0.6.1
mistune==0.8.4
mkl-fft==1.0.15
mkl-random==1.1.0
mkl-service==2.3.0
mlagents==0.22.0
mlagents-envs==0.22.0
nbconvert==5.6.1
nbformat==5.0.4
```

7. Update PyTorch to 1.6.0 or later

The screenshot shows the PyTorch website's installation guide. The browser address bar shows 'pytorch.org'. The navigation bar includes links for 'Get Started', 'Ecosystem', 'Mobile', 'Blog', 'Tutorials', 'Docs', 'Resources', and 'GitHub'. The main content area is titled 'met the prerequisites below (e.g., numpy)' and mentions Anaconda as the recommended package manager. Below this is a table for selecting installation options:

PyTorch Build	Stable (1.7.0)		Preview (Nightly)	
Your OS	Linux	Mac	Windows	
Package	Conda	Pip	LibTorch	Source
Language	Python		C++ / Java	
CUDA	9.2	10.1	10.2	11.0
				None

Below the table, the 'Run this Command:' section shows the following command, which is circled in red:

```
conda install pytorch torchvision torchaudio cudatoolkit=10.2 -c pytorch
```

At the bottom left, there is a link for 'Previous versions of PyTorch >'. The Windows taskbar at the bottom shows the time as 02:28 on 2020/12/10.

<https://pytorch.org/>

7. Update PyTorch to 1.6.0 or later

```
C:\WINDOWS\system32\cmd.exe - conda install pytorch torchvision torchaudio cudatoolkit=10.2 -c pytorch
(PyTorch-MLAgent) C:\>
(PyTorch-MLAgent) C:\>
(PyTorch-MLAgent) C:\>
(PyTorch-MLAgent) C:\>
(PyTorch-MLAgent) C:\>conda install pytorch torchvision torchaudio cudatoolkit=10.2 -c pytorch
Collecting package metadata (repodata.json): done
Solving environment: done

==> WARNING: A newer version of conda exists. <==
  current version: 4.8.2
  latest version: 4.9.2

Please update conda by running

  $ conda update -n base -c defaults conda

## Package Plan ##

environment location: C:\Users\admin\Anaconda3\envs\PyTorch-MLAgent

added / updated specs:
- cudatoolkit=10.2
- pytorch
- torchaudio
- torchvision
```

7. Update PyTorch to 1.6.0 or later

C:\WINDOWS\system32\cmd.exe - conda install pytorch torchvision torchaudio cudatoolkit=10.2 -c pytorch

The following NEW packages will be INSTALLED:

dataclasses	pkgs/main/win-64::dataclasses-0.7-py36_0
libuv	pkgs/main/win-64::libuv-1.40.0-he774522_0
torchaudio	pytorch/win-64::torchaudio-0.7.0-py36
typing_extensions	pkgs/main/noarch::typing_extensions-3.7.4.3-py_0

The following packages will be UPDATED:

ca-certificates	2020.6.24-0	-->	2020.12.8-haa95532_0
certifi	2020.6.20-py36_0	-->	2020.12.5-py36haa95532_0
cudatoolkit	10.1.243-h74a9793_0	-->	10.2.89-h74a9793_1
openssl	1.1.1g-he774522_1	-->	1.1.1i-h2bbff1b_0
pytorch	1.4.0-py3.6_cuda101_cudnn7_0	-->	1.7.0-py3.6_cuda102_cudnn7_0
torchvision	0.5.0-py36_cu101	-->	0.8.1-py36_cu102

The following packages will be DOWNGRADED:

cudnn	7.6.5-cuda10.1_0	-->	7.6.5-cuda10.2_0
-------	------------------	-----	------------------

Proceed ([y]/n)? y

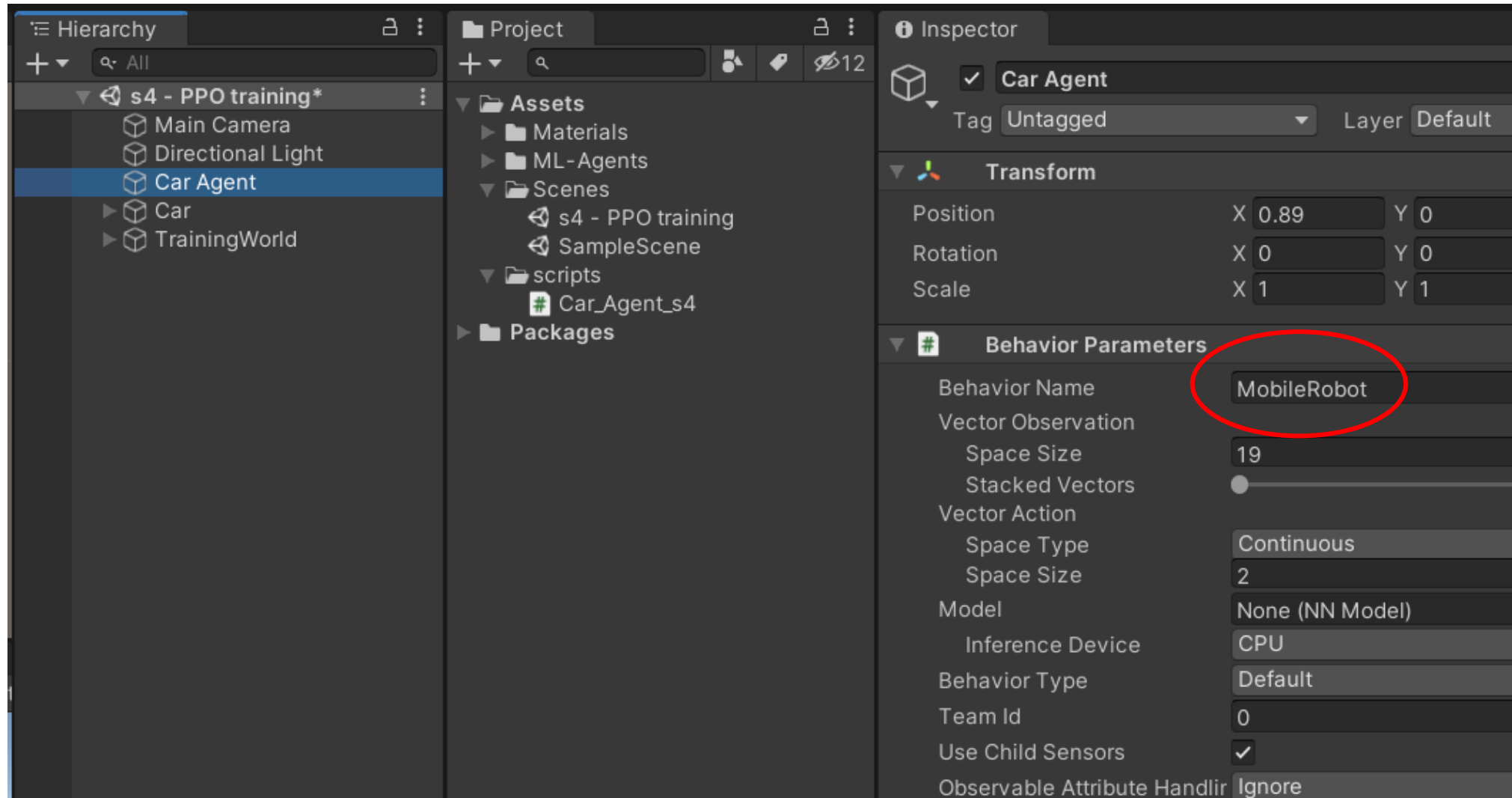
Downloading and Extracting Packages

torchaudio-0.7.0	2.7 MB	#####	100%
torchvision-0.8.1	7.2 MB	#####	100%
dataclasses-0.7	31 KB	#####	100%
pytorch-1.7.0	768.1 MB	###7	5%

7. Update PyTorch to 1.6.0 or later

```
toml==0.10.1  
torch==1.7.0  
torchaudio==0.7.0  
torchvision==0.8.1  
tornado==6.0.3  
tqdm==4.47.0  
traitlets==4.3.3
```

8. Change your behavior name



9. Create a configure file of the same name

> 本機 > 桌面 > ml-agents-release_10 > config > ppo

名稱

修改日期

類型

3DBall	2020/11/20 上午 ...	YAML 檔案
3DBall_randomize	2020/11/20 上午 ...	YAML 檔案
3DBallHard	2020/11/20 上午 ...	YAML 檔案
Basic	2020/11/20 上午 ...	YAML 檔案
Bouncer	2020/11/20 上午 ...	YAML 檔案
CrawlerDynamic	2020/11/20 上午 ...	YAML 檔案
CrawlerDynamicVariableSpeed	2020/11/20 上午 ...	YAML 檔案
CrawlerStatic	2020/11/20 上午 ...	YAML 檔案
CrawlerStaticVariableSpeed	2020/11/20 上午 ...	YAML 檔案
FoodCollector	2020/11/20 上午 ...	YAML 檔案
GridFoodCollector	2020/11/20 上午 ...	YAML 檔案
GridWorld	2020/11/20 上午 ...	YAML 檔案
Hallway	2020/11/20 上午 ...	YAML 檔案
Match3	2020/11/20 上午 ...	YAML 檔案
MobileRobot	2020/11/20 上午 ...	YAML 檔案
PushBlock	2020/11/20 上午 ...	YAML 檔案
Pyramids	2020/11/20 上午 ...	YAML 檔案
PyramidsRND	2020/11/20 上午 ...	YAML 檔案
Reacher	2020/11/20 上午 ...	YAML 檔案
SoccerTwos	2020/11/20 上午 ...	YAML 檔案

behaviors:

MobileRobot:

trainer_type: ppo

hyperparameters:

batch_size: 64

buffer_size: 12000

learning_rate: 0.0003

beta: 0.001

epsilon: 0.2

lambda: 0.99

num_epoch: 3

learning_rate_schedule: linear

network_settings:

normalize: true

hidden_units: 128

num_layers: 2

vis_encode_type: simple

reward_signals:

extrinsic:

time_horizon: 1000

summary_freq: 12000

threaded: true

You can download MobileRobot.yaml from my
GitHub

10. Start train

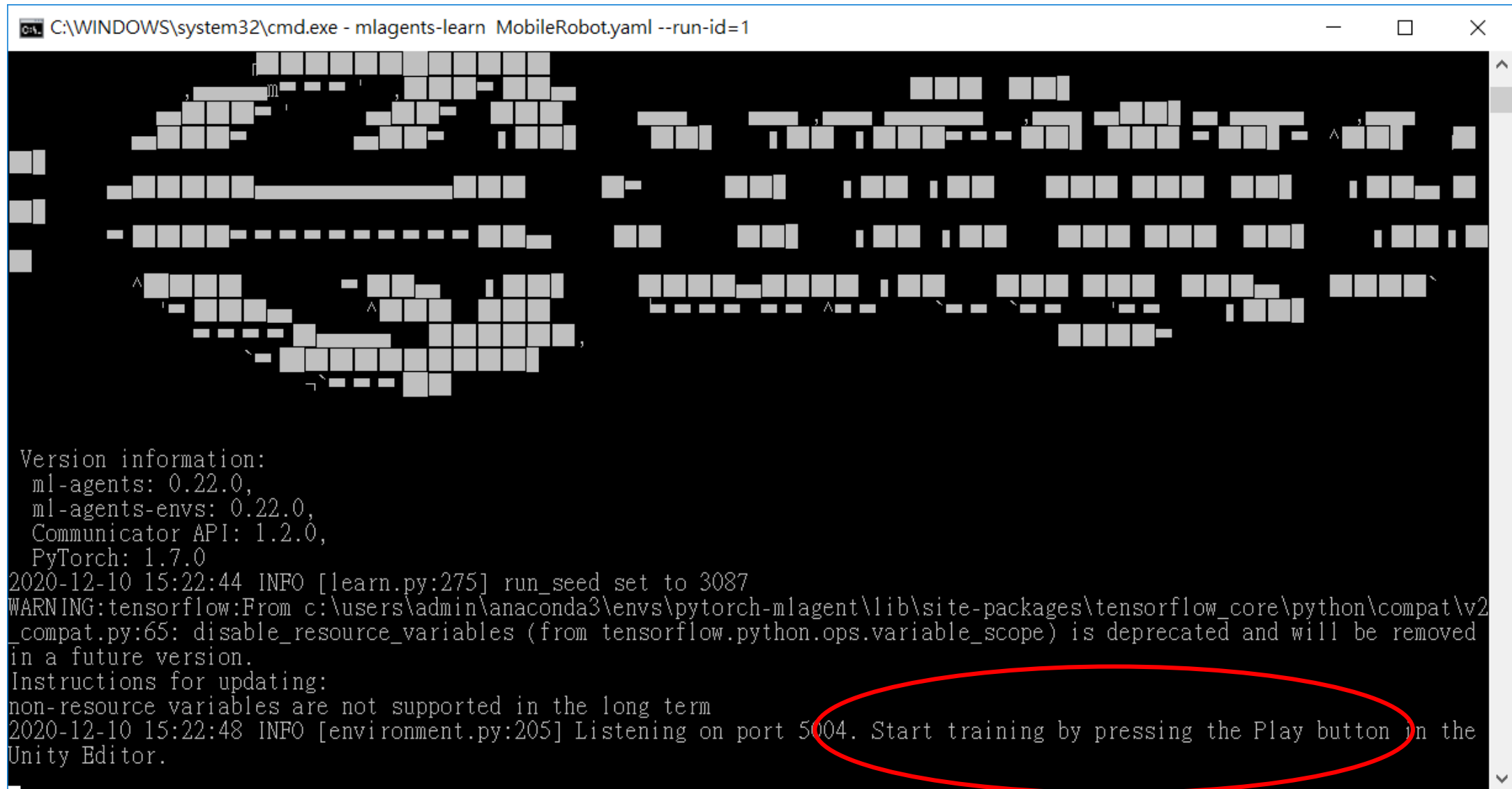
1. cd to the folder of your configuration file (C:\...\ml-agents-release_10\config\ppo)
2. mlagents-learn MobilRobot.yaml --run-id=1

C:\WINDOWS\system32\cmd.exe

```
(PyTorch-MLAgent) C:\>  
(PyTorch-MLAgent) C:\>  
(PyTorch-MLAgent) C:\>  
(PyTorch-MLAgent) C:\>  
(PyTorch-MLAgent) C:\>  
(PyTorch-MLAgent) C:\>  
(PyTorch-MLAgent) C:\>  
(PyTorch-MLAgent) C:\>  
(PyTorch-MLAgent) C:\>  
(PyTorch-MLAgent) C:\>cd C:\Users\admin\Desktop\ml-agents-release_10\config\ppo  
(PyTorch-MLAgent) C:\Users\admin\Desktop\ml-agents-release_10\config\ppo>mlagents-learn MobileRobot.yaml -run-id=1
```

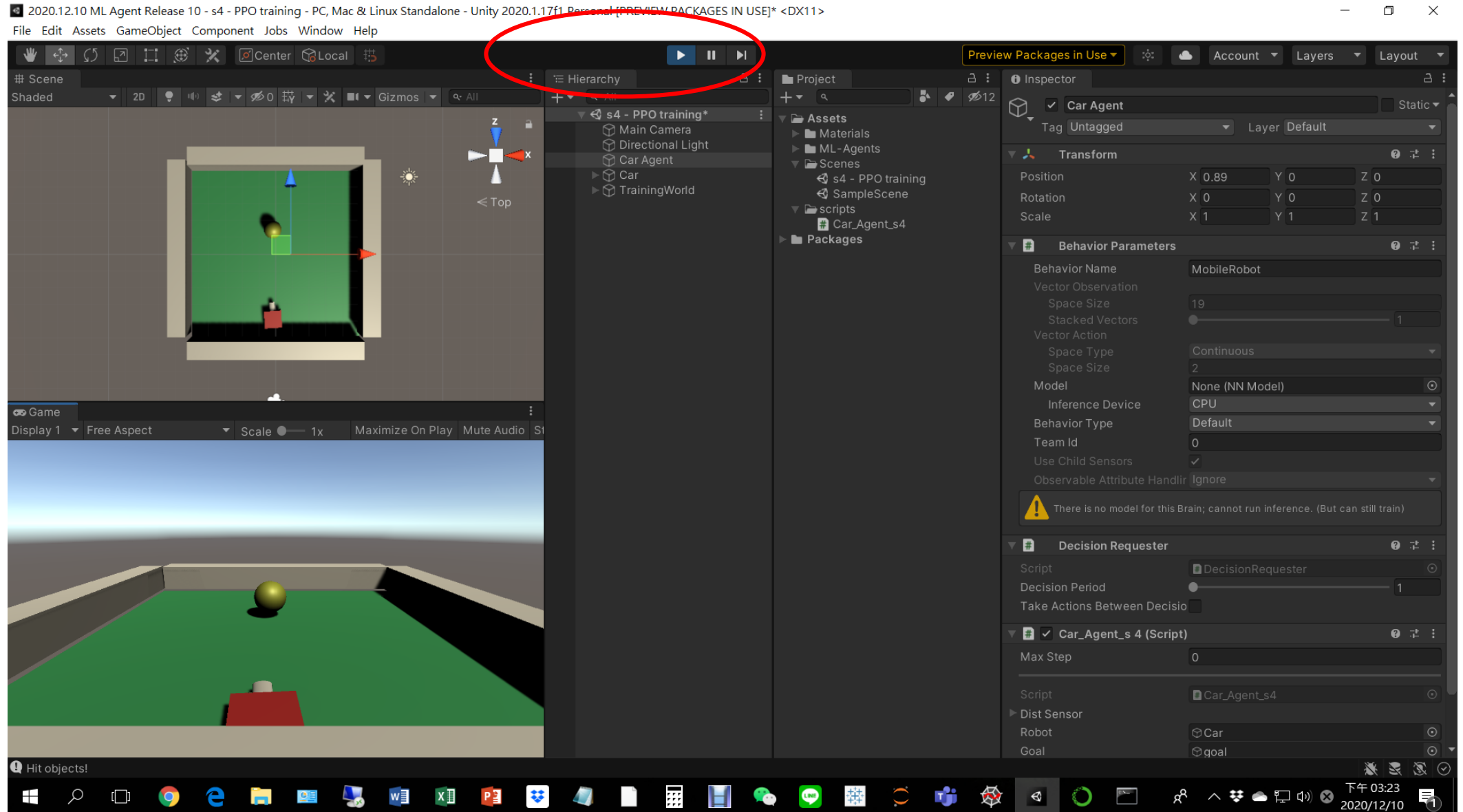
10. Start train

```
C:\WINDOWS\system32\cmd.exe - mlagents-learn MobileRobot.yaml --run-id=1
```



```
Version information:  
ml-agents: 0.22.0,  
ml-agents-envs: 0.22.0,  
Communicator API: 1.2.0,  
PyTorch: 1.7.0  
2020-12-10 15:22:44 INFO [learn.py:275] run_seed set to 3087  
WARNING:tensorflow:From c:\users\admin\anaconda3\envs\pytorch-mlagent\lib\site-packages\tensorflow_core\python\compat\v2_compat.py:65: disable_resource_variables (from tensorflow.python.ops.variable_scope) is deprecated and will be removed in a future version.  
Instructions for updating:  
non-resource variables are not supported in the long term  
2020-12-10 15:22:48 INFO [environment.py:205] Listening on port 5004. Start training by pressing the Play button in the Unity Editor.
```

10. Start train



(You might need to download MS VC redistributable)

```
C:\WINDOWS\system32\cmd.exe

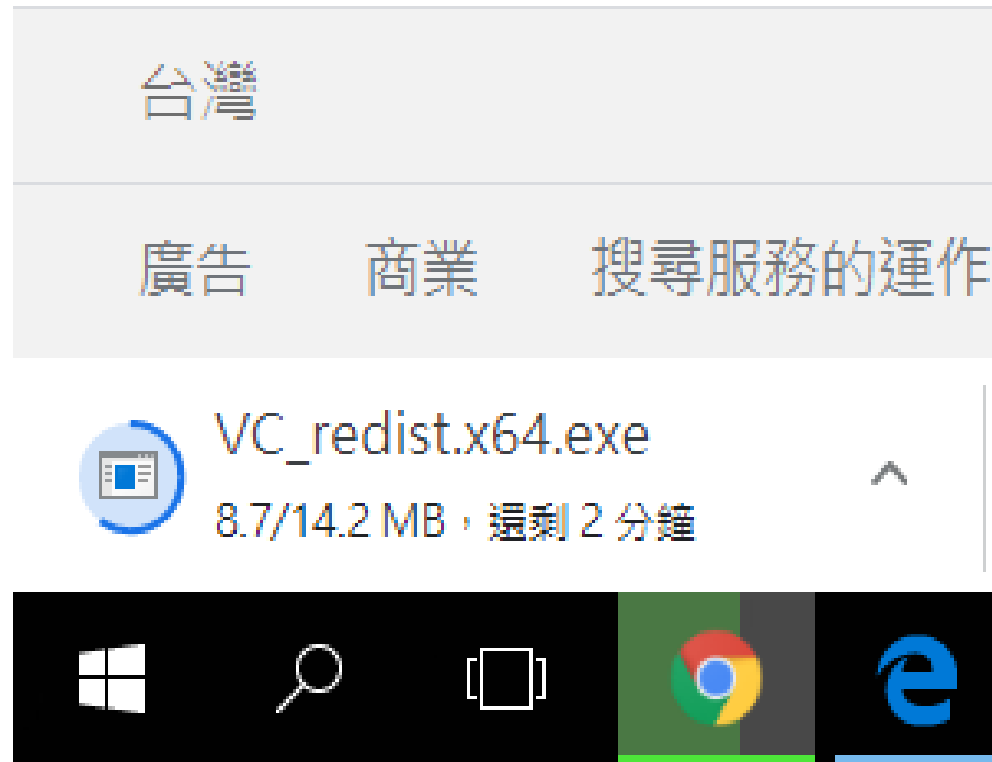
(PyTorch-MLagent) C:\Users\admin>cd C:\Users\admin\Desktop\ml-agents-release_10\config\ppo
(PyTorch-MLagent) C:\Users\admin\Desktop\ml-agents-release_10\config\ppo>mlagents-learn MobileRobot.yaml -run-id=1
Microsoft Visual C++ Redistributable is not installed, this may lead to the DLL load failure.
It can be downloaded at https://aka.ms/vs/16/release/vc_redist.x64.exe
Traceback (most recent call last):
  File "c:\users\admin\anaconda3\envs\pytorch-mlagent\lib\runpy.py", line 193, in _run_module_as_main
    "__main__", mod_spec)
  File "c:\users\admin\anaconda3\envs\pytorch-mlagent\lib\runpy.py", line 85, in _run_code
    exec(code, run_globals)
  File "C:\Users\admin\Anaconda3\envs\PyTorch-MLagent\Scripts\mlagents-learn.exe\__main__.py", line 4, in <module>
  File "c:\users\admin\anaconda3\envs\pytorch-mlagent\lib\site-packages\mlagents\trainers\learn.py", line 2, in <module>

    from mlagents import torch_utils
  File "c:\users\admin\anaconda3\envs\pytorch-mlagent\lib\site-packages\mlagents\torch_utils\__init__.py", line 1, in <module>
    from mlagents.torch_utils.torch import torch # noga
  File "c:\users\admin\anaconda3\envs\pytorch-mlagent\lib\site-packages\mlagents\torch_utils\torch.py", line 29, in <module>
    import torch # noga 1201
  File "c:\users\admin\anaconda3\envs\pytorch-mlagent\lib\site-packages\torch\__init__.py", line 128, in <module>
    raise err
OSError: [WinError 126] 找不到指定的模組。 Error loading "c:\users\admin\anaconda3\envs\pytorch-mlagent\lib\site-packages\torch\lib\asmjit.dll" or one of its dependencies.

(PyTorch-MLagent) C:\Users\admin\Desktop\ml-agents-release_10\config\ppo>
```

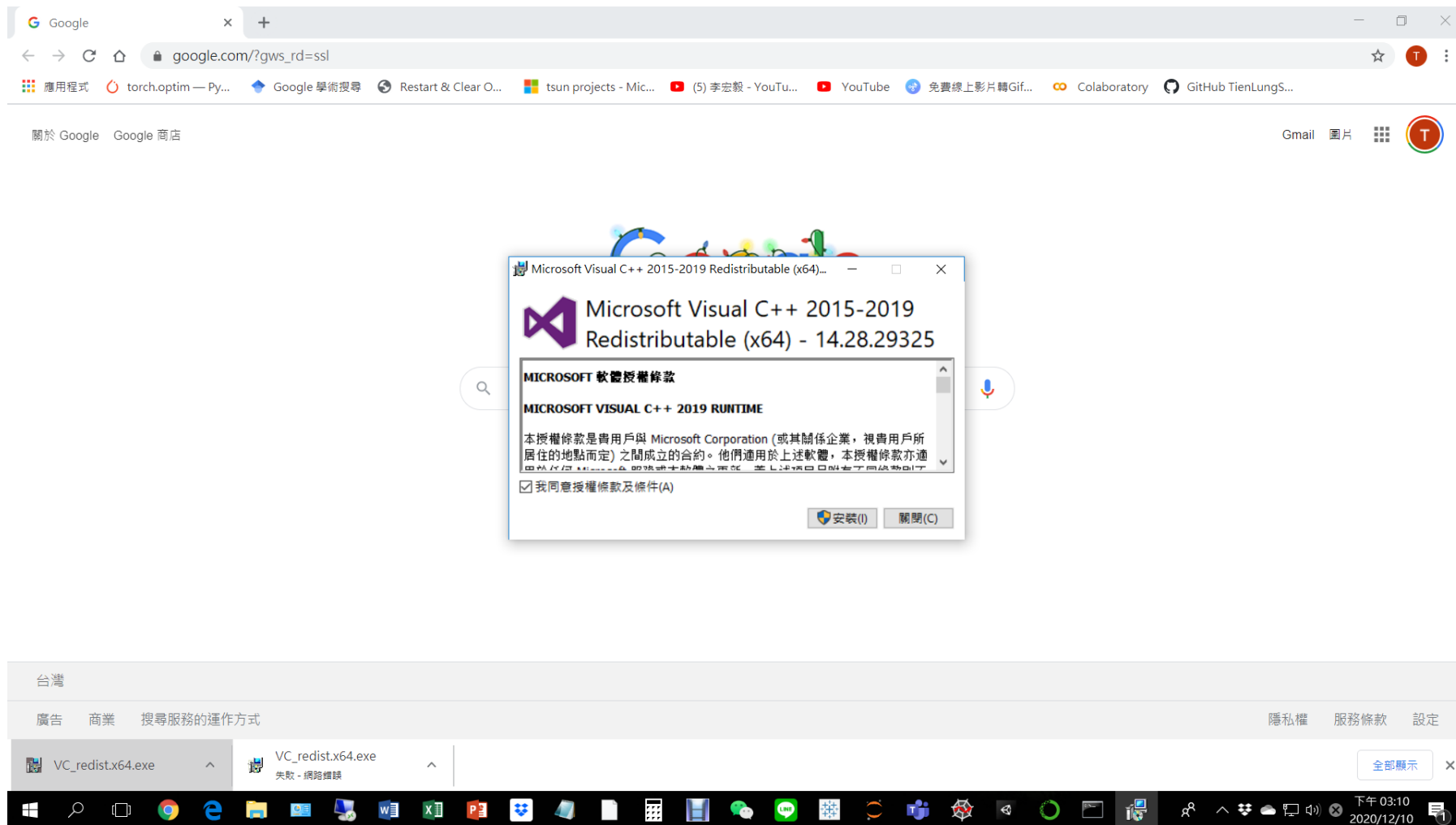
https://aka.ms/vs/16/release/vc_redist.x64.exe

(You might need to download MS VC redistributable)

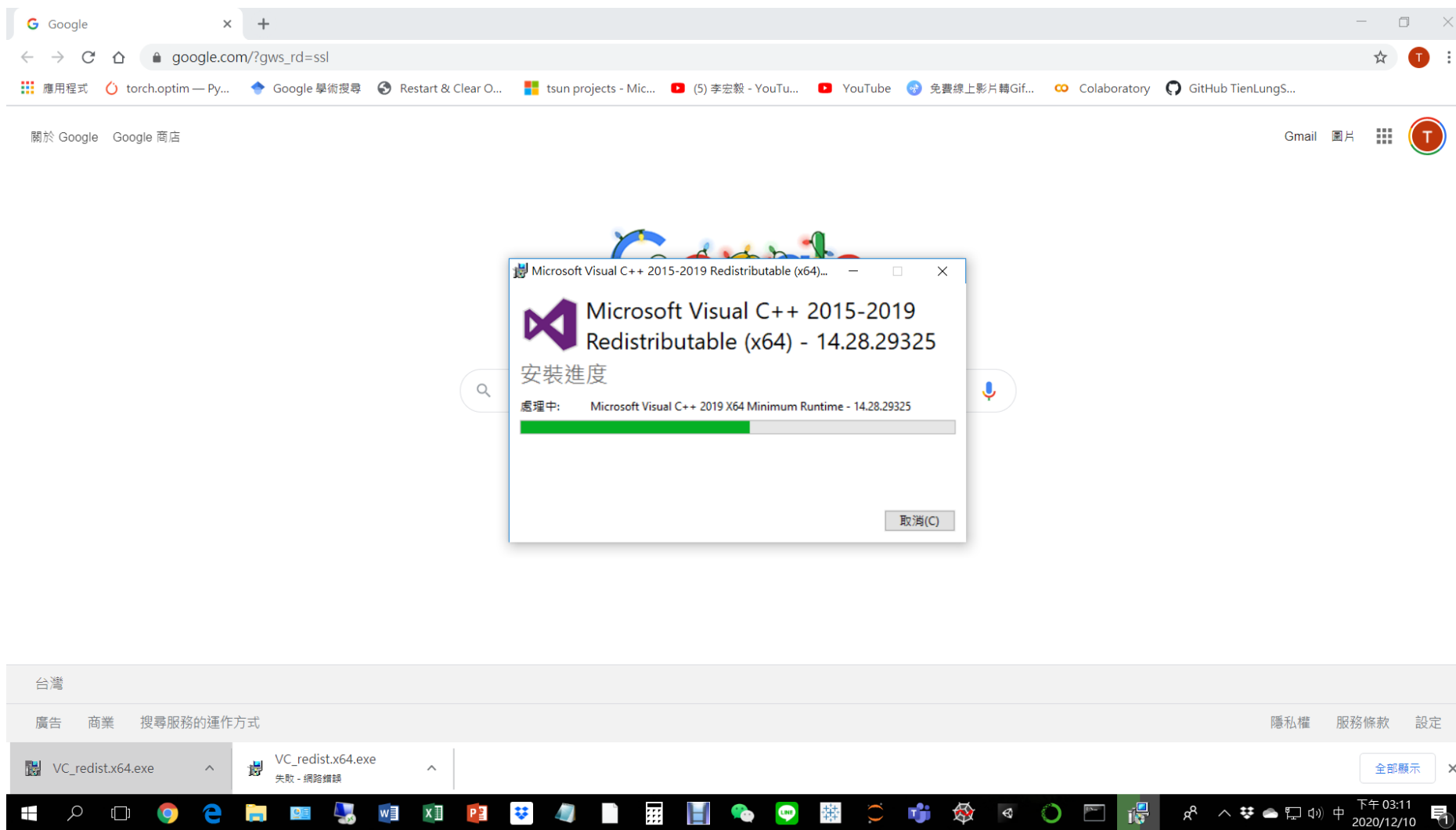


https://aka.ms/vs/16/release/vc_redist.x64.exe

(You might need to download MS VC redistributable)



(You might need to download MS VC redistributable)



11. Training

```
C:\Windows\system32\cmd.exe - mlagents-learn MobileRobot.yaml --run-id=2

beta: 0.005
epsilon: 0.2
lambda: 0.95
num_epoch: 3
learning_rate_schedule: linear
network_settings:
  normalize: True
  hidden_units: 512
  num_layers: 3
  vis_encode_type: simple
  memory: None
reward_signals:
  extrinsic:
    gamma: 0.995
    strength: 1.0
  init_path: None
keep_checkpoints: 5
checkpoint_interval: 500000
max_steps: 7000000
time_horizon: 1000
summary_freq: 30000
threaded: True
self_play: None
behavioral_cloning: None
framework: pytorch

2020-12-12 11:39:12 INFO [stats.py:139] MobileRobot. Step: 30000. Time Elapsed: 56.278 s. No episode was completed since
last summary. Training.
2020-12-12 11:39:49 INFO [stats.py:139] MobileRobot. Step: 60000. Time Elapsed: 93.340 s. Mean Reward: -14.130. Std of Re
ward: 10.538. Training.
```

```
vis_encode_type: simple
reward_signals:
  extrinsic:
    gamma: 0.995
    strength: 1.0
keep_checkpoints: 5
max_steps: 7000000
time_horizon: 1000
summary_freq: 30000
threaded: true
```

12. Monitor training performance

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233 packages available

base (root)

PyTorch-MLAgent

Open Terminal

Open with Python

Open with IPython

Open with Jupyter Notebook

Name Description Version

Abseil python common libraries, see https://github.com/abseil/abseil-py.	0.9.0
Configurable, python 2+3 compatible sphinx theme.	0.7.12
Read, rewrite, and write python asts nicely	0.8.1
A abstract syntax tree for python with inference support.	2.4.2
Attrs is the python package that will bring back the joy of writing classes by relieving you from the drudgery of implementing object protocols (aka dunder methods).	19.3.0
Utilities to internationalize and localize python applications	2.8.0
Specifications for callback functions passed in to an api	0.1.0
	1.0
	3.1.0
Amazon web services sdk for python	1.14.33
Low-level, data-driven core of boto 3.	1.17.33
	0.7.0
Certificates for use with other packages.	2020.12.8
	4.0.0
	1.0.0
Python package for providing mozilla's ca bundle.	2020.12.5
Foreign function interface for python calling c code.	1.14.0
Universal character encoding detector	3.0.4
Python composable command line interface toolkit	7.1.2

Open another terminal window

下午 02:04 2020/12/11

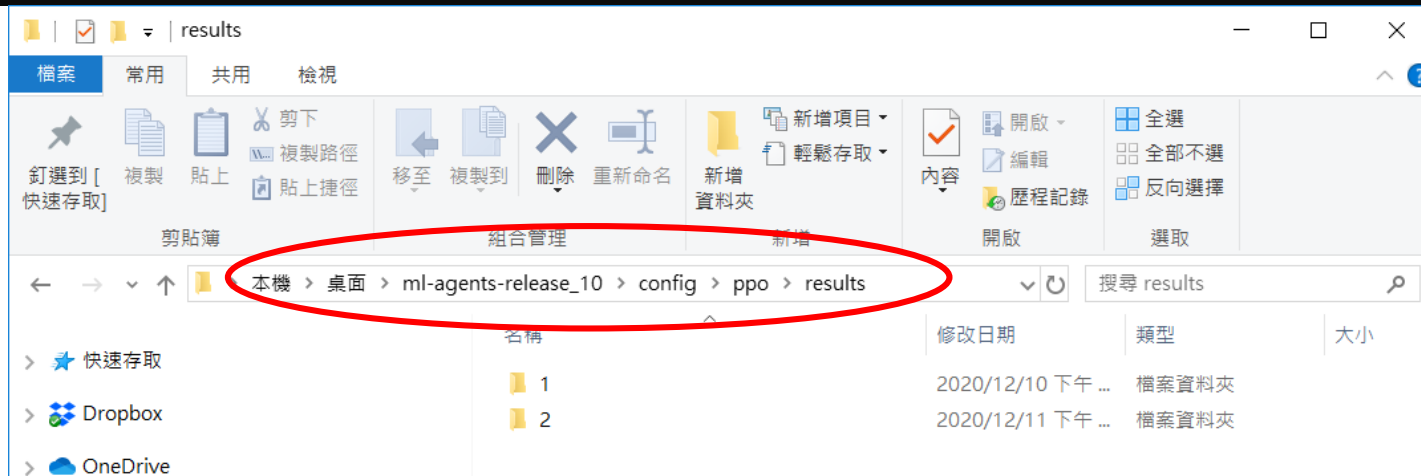
12. Monitor training performance

1. cd to the results folder (... ml-agents-release-10\config\ppo\results)
2. tensorboard --logdir=1

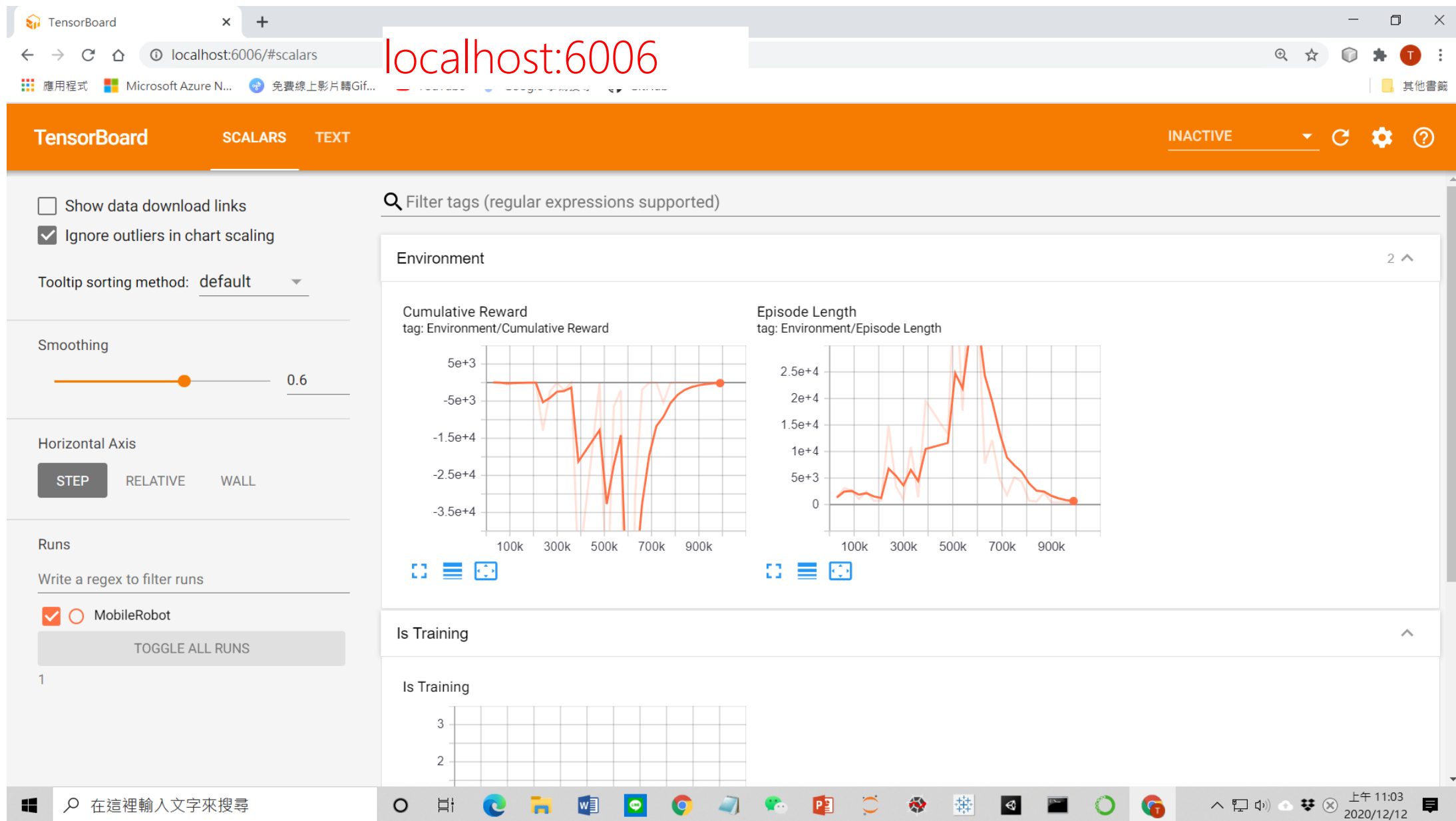
```
C:\Windows\system32\cmd.exe - tensorboard --logdir=1

(base) C:\Users\ADMIN>cd C:\ml-agents-release_10\config\ppo\results

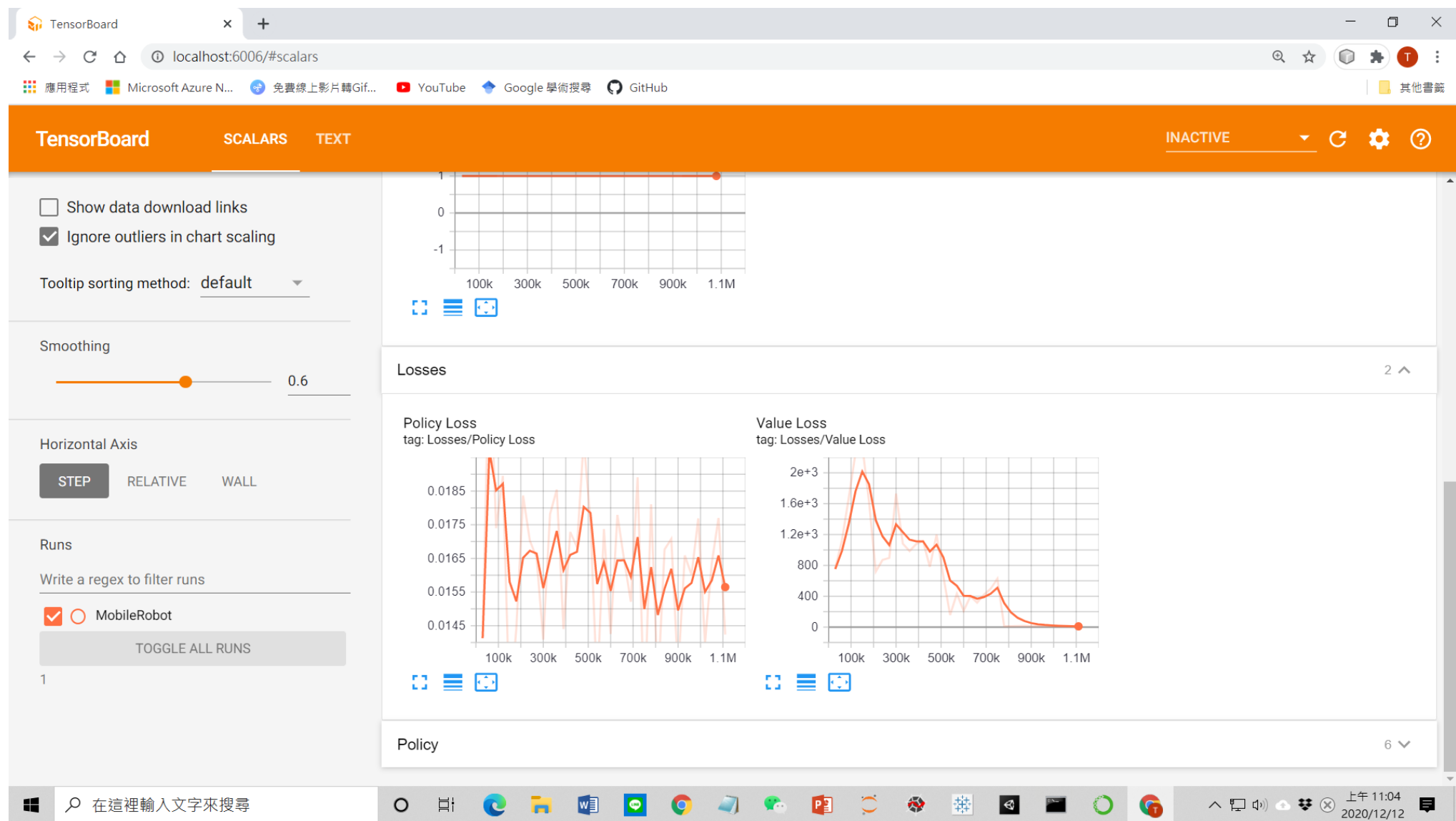
(base) C:\ml-agents-release_10\config\ppo\results>tensorboard --logdir=1
2020-12-12 11:01:50.969019: W tensorflow/stream_executor/platform/default/dso_loader.cc:55] Could not load dynamic library 'cudart64_101.dll'; dlderror: cudart64_101.dll not found
2020-12-12 11:01:50.969170: I tensorflow/stream_executor/cuda/cudart_stub.cc:29] Ignore above cudart dlerror if you do not have a GPU set up on your machine.
Serving TensorBoard on localhost; to expose to the network, use a proxy or pass --bind_all
TensorBoard 2.2.2 at http://localhost:6006/ (Press CTRL+C to quit)
```



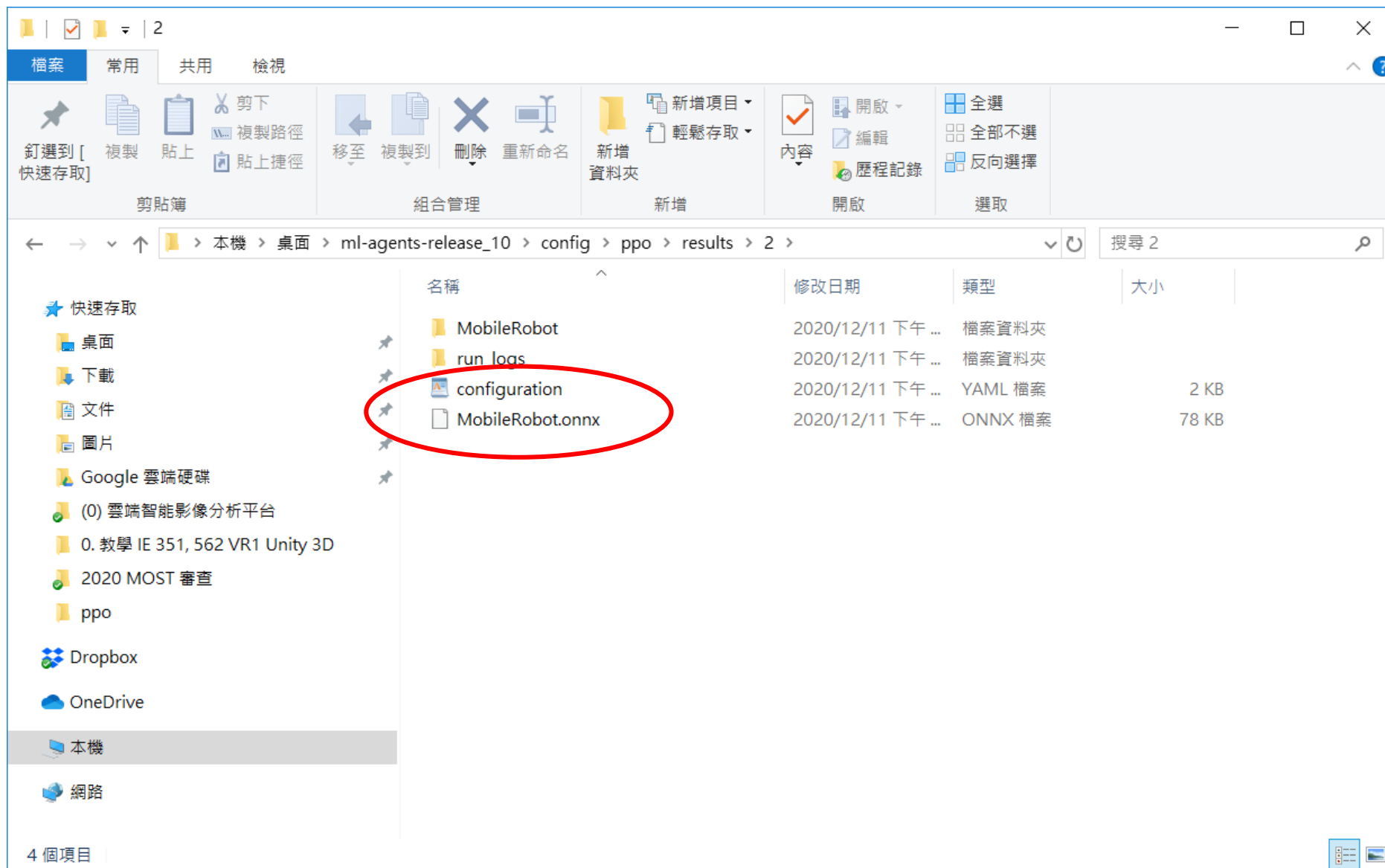
12. Monitor training performance



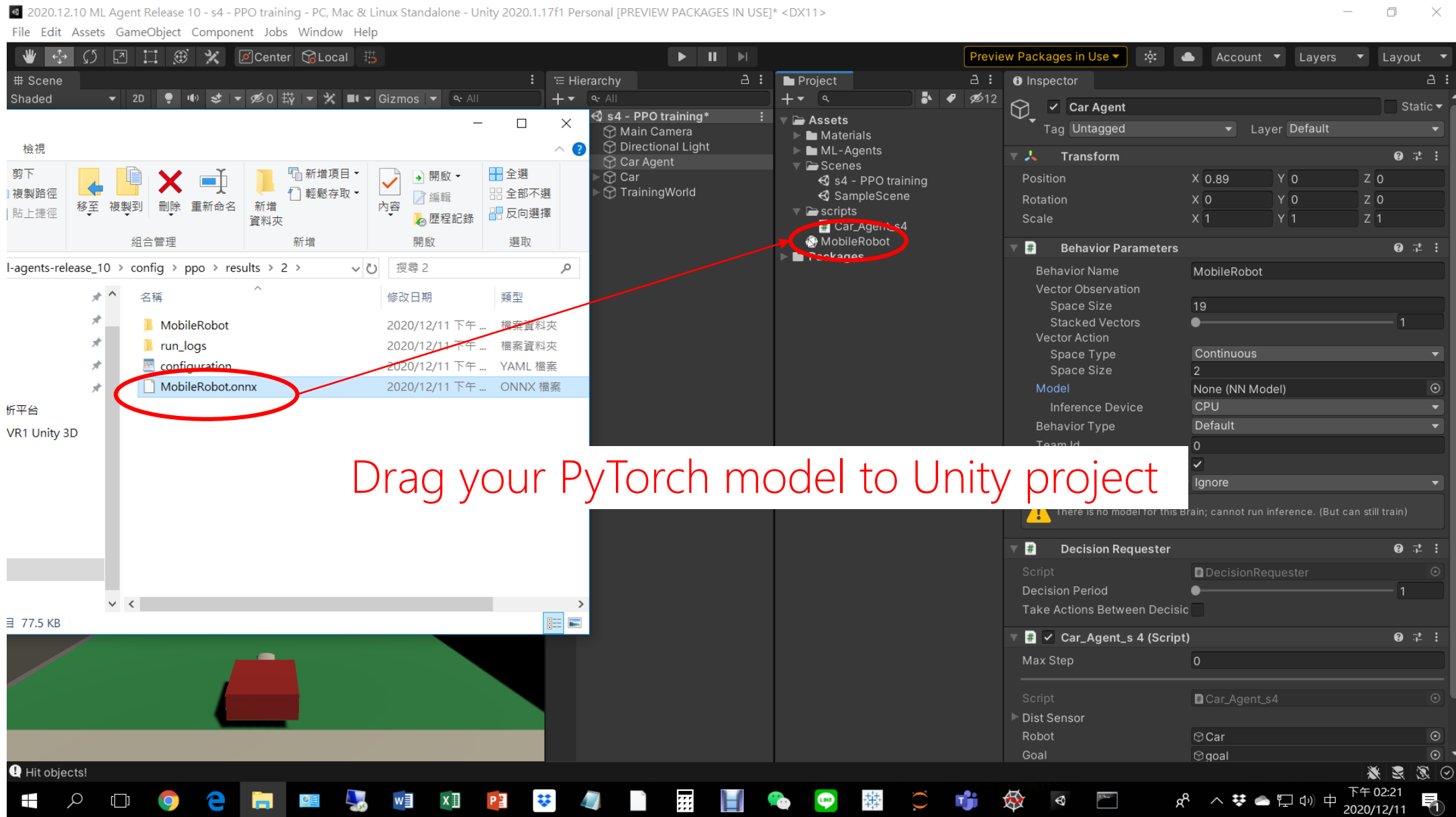
12. Monitor training performance



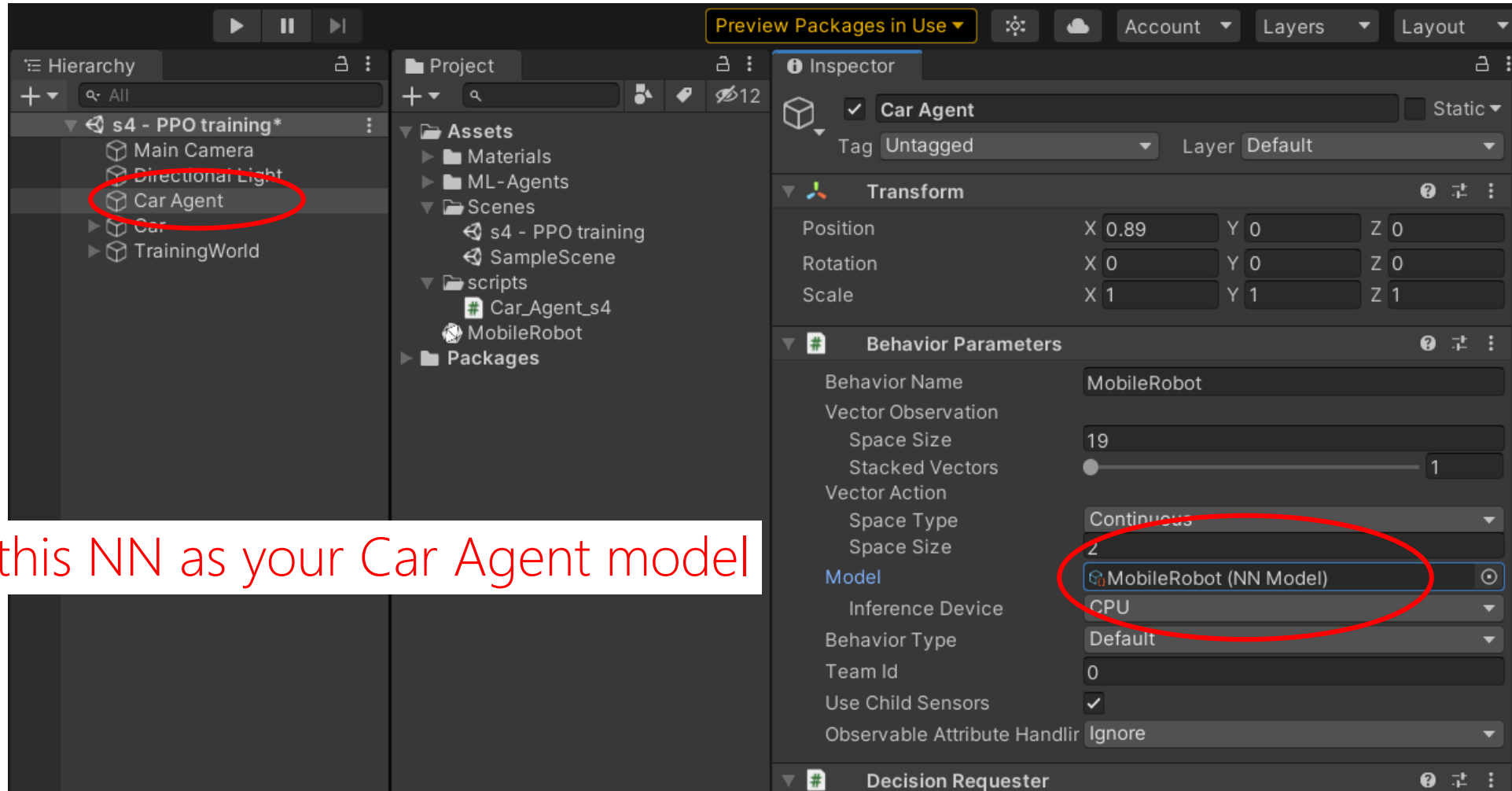
13. Finish training



14. Test



14. Test



14. Test

