DEEP Q-LEARNING IMPLEMENTATION

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Sebelum melakukan implementasi DQL ini ada beberapa library yang harus dipersiapkan yaitu:

1. IPYKERNEL
2. PYTORCH
3. PYGAME
4. IPYTHON

1. Cara Instal IPYKERNEL

a. Pastikan Anda telah menginstal ipykernel di lingkungan Anda. Jika Anda menggunakan pip untuk menginstal ipykernel di python env, pastikan pip diinstal dengan syntax sebagai berikut.

```
pip install ipykernel
```

b. Misalnya, menggunakan lingkungan conda, instal Kernel di lingkungan pertama:Python (myenv)

```
source activate myenv
python -m ipykernel install --user --name myenv --display-name "Python (myenv)"
```

c. Dan di lingkungan kedua, setelah memastikan ipykernel diinstal di dalamnya:

```
source activate other-env
```

python -m ipykernel install --user --name other-env --display-name "Python (other-env)"

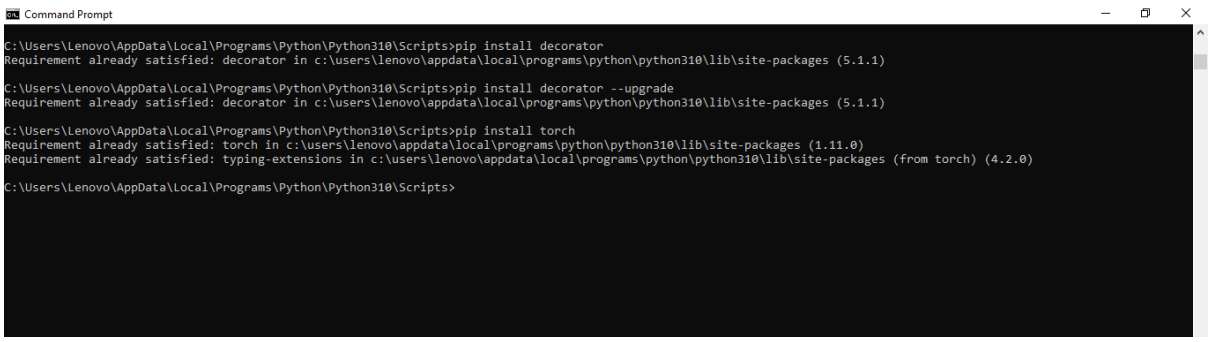
2. Cara Instal PYTORCH

Cara install PyTorch di Windows sangatlah mudah. Cukup buka *Anaconda Prompt* (AP). Untuk menemukan Anaconda Prompt, bisa dicari melalui **Start -> Command Prompt-> direktori script python**

Setelah itu cukup ketikkan di cmd tepat seperti ini:

pip install torch

Tunggu beberapa saat, kemudian akan dicollage oleh sistem.



3. Cara Instal PYGAME

a. Buka CMD

b. cek versi python dengan cara **python -version**

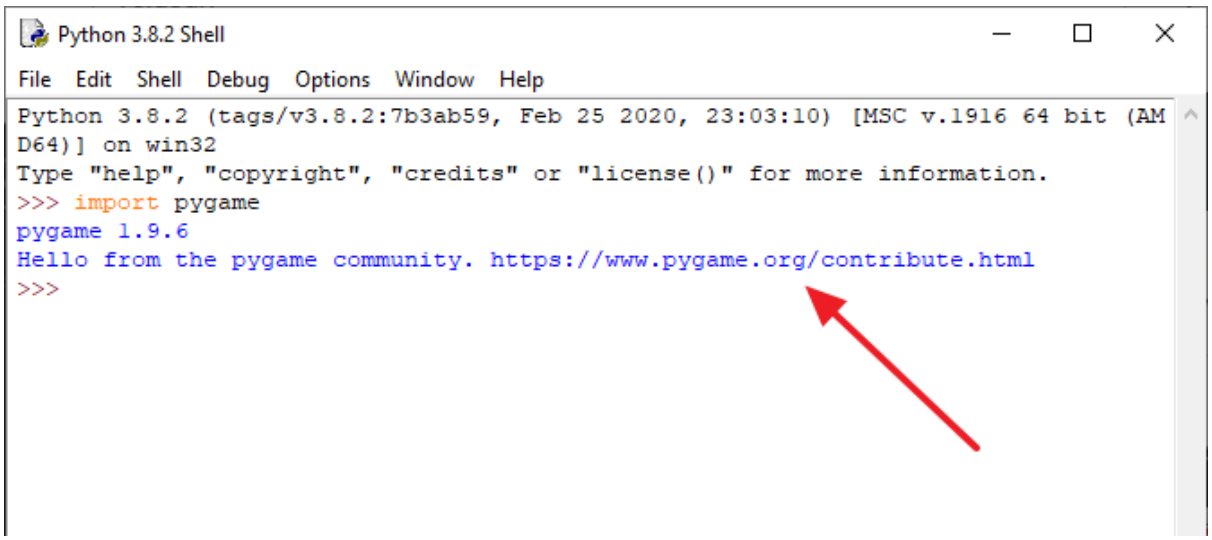
c. mengecek pip python dengan cara **pip -version**

d. setelah itu menginstall Pygame dengan cara **pip install pygame**

e. setelah itu buka IDLE setelah itu di dalamnya ketikan **import pygame**

f.

g. jika tidak ada error maka akan muncul seperti gambar dibawah ini



4. Cara Instal IPYTHON

a. Jika sebelumnya sudah menginstal python langkan selanjutnya untuk mendapatkan IPYTHON adalah dengan **pip install ipython**

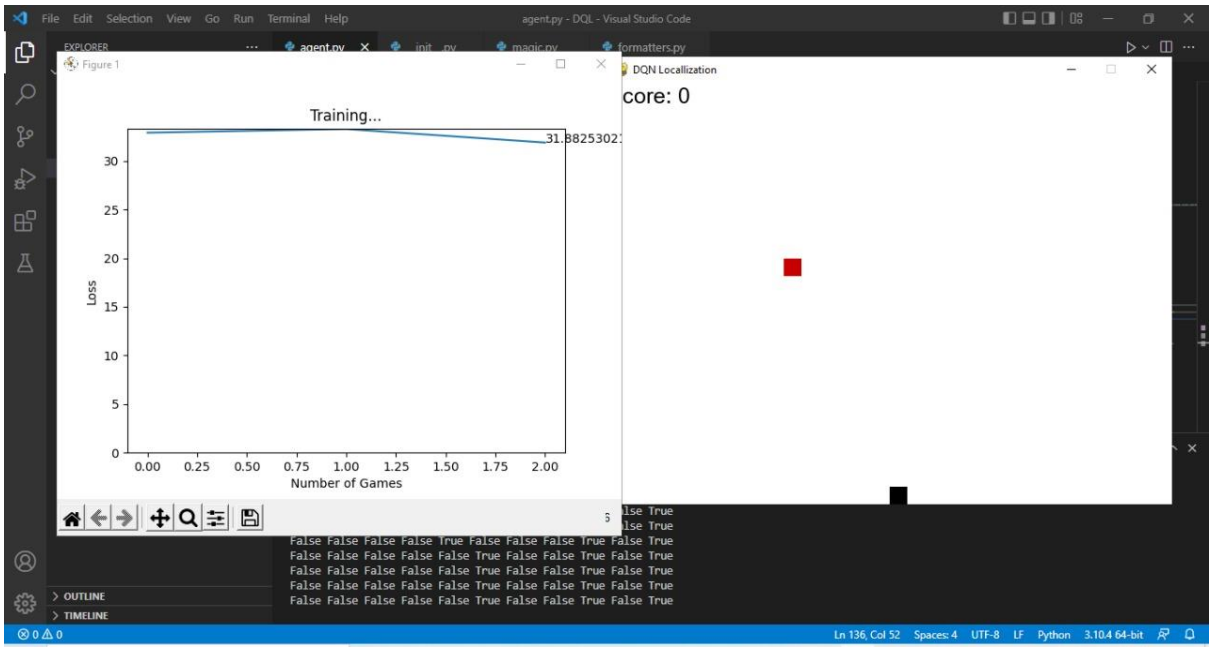
b. Setelah tidak ada error mak library **ipython** sudah terpasang di komputer.

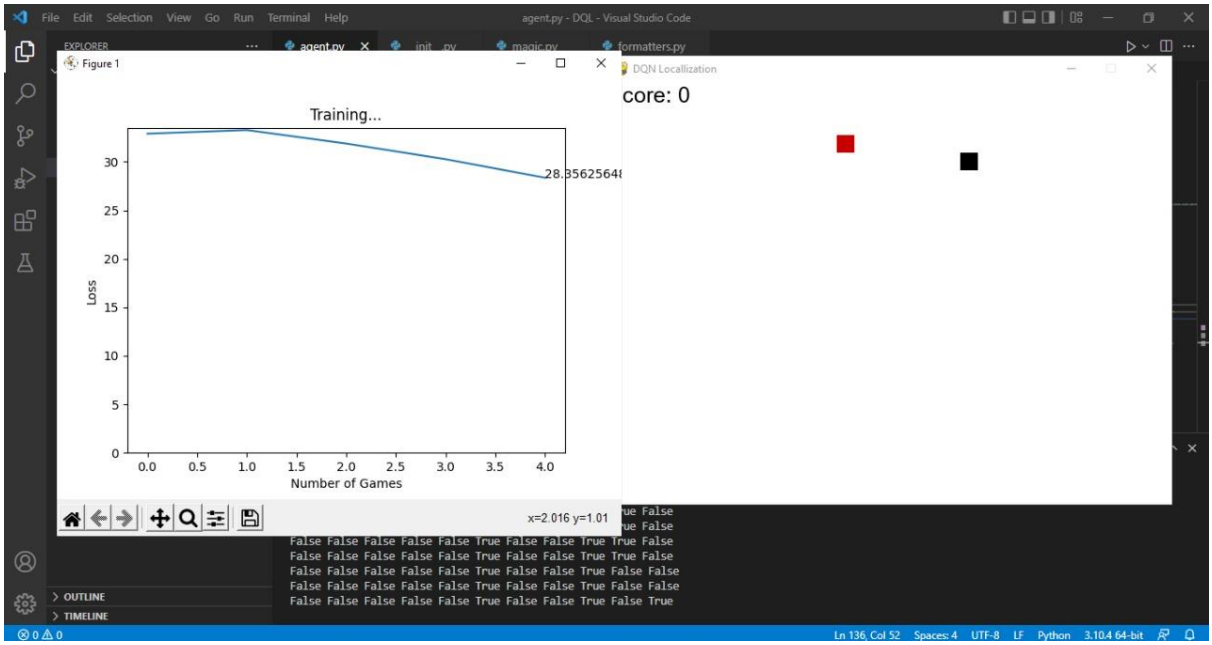
```
C:\Users\Lenovo\AppData\Local\Programs\Python\Python310\Scripts>pip install decorator
Requirement already satisfied: decorator in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (5.1.1)

C:\Users\Lenovo\AppData\Local\Programs\Python\Python310\Scripts>pip install decorator --upgrade
Requirement already satisfied: decorator in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (5.1.1)

C:\Users\Lenovo\AppData\Local\Programs\Python\Python310\Scripts>pip install torch
Requirement already satisfied: torch in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (1.11.0)
Requirement already satisfied: typing-extensions in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (from torch) (4.2.0)

C:\Users\Lenovo\AppData\Local\Programs\Python\Python310\Scripts>pip install IPython
Requirement already satisfied: IPython in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (7.29.0)
Requirement already satisfied: jedi>=0.16 in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (from IPython) (0.18.0)
Requirement already satisfied: prompt-toolkit!=3.0.0,!=3.0.1,<3.1.0,>=2.0.0 in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (from IPython)
(3.0.29)
Requirement already satisfied: traitlets>=4.2 in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (from IPython) (5.1.0)
Requirement already satisfied: pickleshare in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (from IPython) (0.7.5)
Requirement already satisfied: decorator in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (from IPython) (5.1.1)
Requirement already satisfied: pygments in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (from IPython) (2.10.0)
Requirement already satisfied: backcall in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (from IPython) (0.2.0)
Requirement already satisfied: colorama in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (from IPython) (0.4.4)
Requirement already satisfied: matplotlib-inline in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (from IPython) (0.1.2)
Requirement already satisfied: setuptools>=18.5 in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (from IPython) (62.1.0)
Requirement already satisfied: parso<0.9.0,>=0.8.0 in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (from jedi>=0.16->IPython) (0.8.3)
Requirement already satisfied: wcwidth in c:\users\lenovo\appdata\local\programs\python\python310\lib\site-packages (from prompt-toolkit!=3.0.0,!=3.0.1,<3.1.0,>=2.0.0->
IPython) (0.2.5)

C:\Users\Lenovo\AppData\Local\Programs\Python\Python310\Scripts>
```

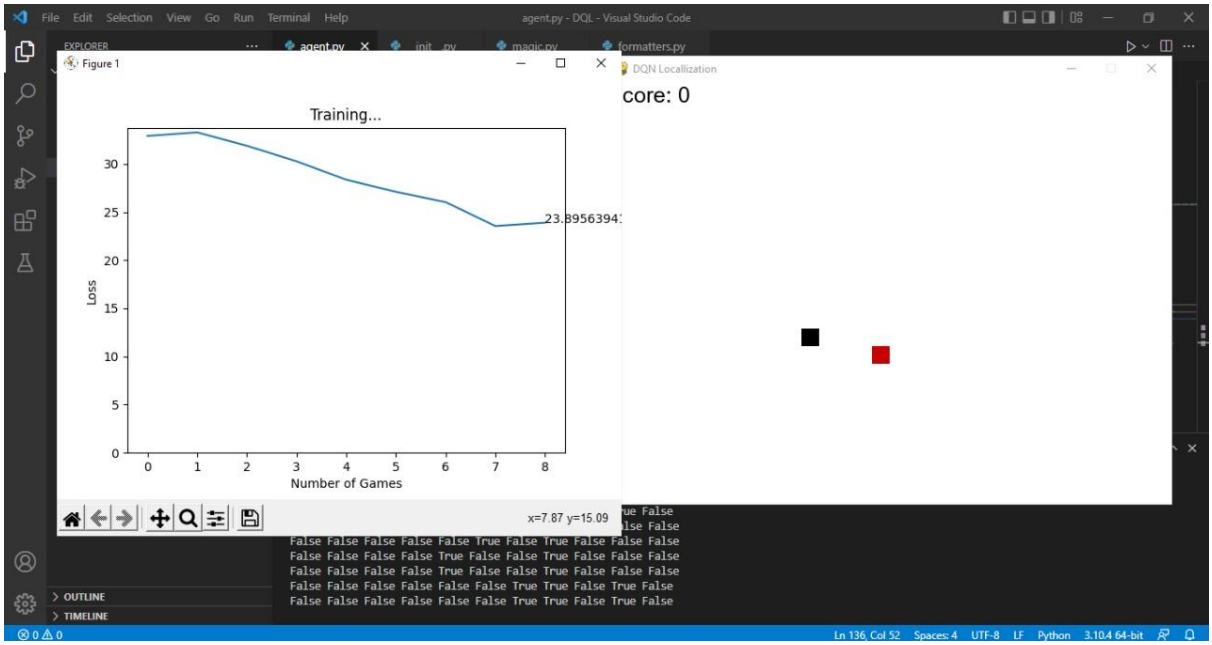
karena pada site-packages di laptop saya sudah ada IPython, maka ketika saya ingin install kembali status IPython telah already.

5. ANALISIS HASIL RUN

Kami telah berhasil running folder DQL dengan merunning file agent.py. Karena kami telah menginstall library dan konfigurasi dependency nya, maka file agent.py berhasil dijalankan. Kami memeriksa hasil running program selama beberapa menit lalu menganalisis sistem trainingnya. Bukti running dan hasil program dapat dilihat pada gambar berikut.




File Edit Selection View Go Run Terminal Help
agent.py - DQL - Visual Studio Code
Figure 1
Training...
Loss
Number of Games
28.3562564
x=2.016 y=1.01
DQN Localization
core: 0
OUTLINE
TIMELINE
Ln 136, Col 52 Spaces: 4 UTF-8 LF Python 3.10.4 64-bit


File Edit Selection View Go Run Terminal Help
agent.py - DQL - Visual Studio Code
Figure 1
Training...
Loss
Number of Games
23.8956394
x=7.87 y=15.09
DQN Localization
core: 0
OUTLINE
TIMELINE
Ln 136, Col 52 Spaces: 4 UTF-8 LF Python 3.10.4 64-bit

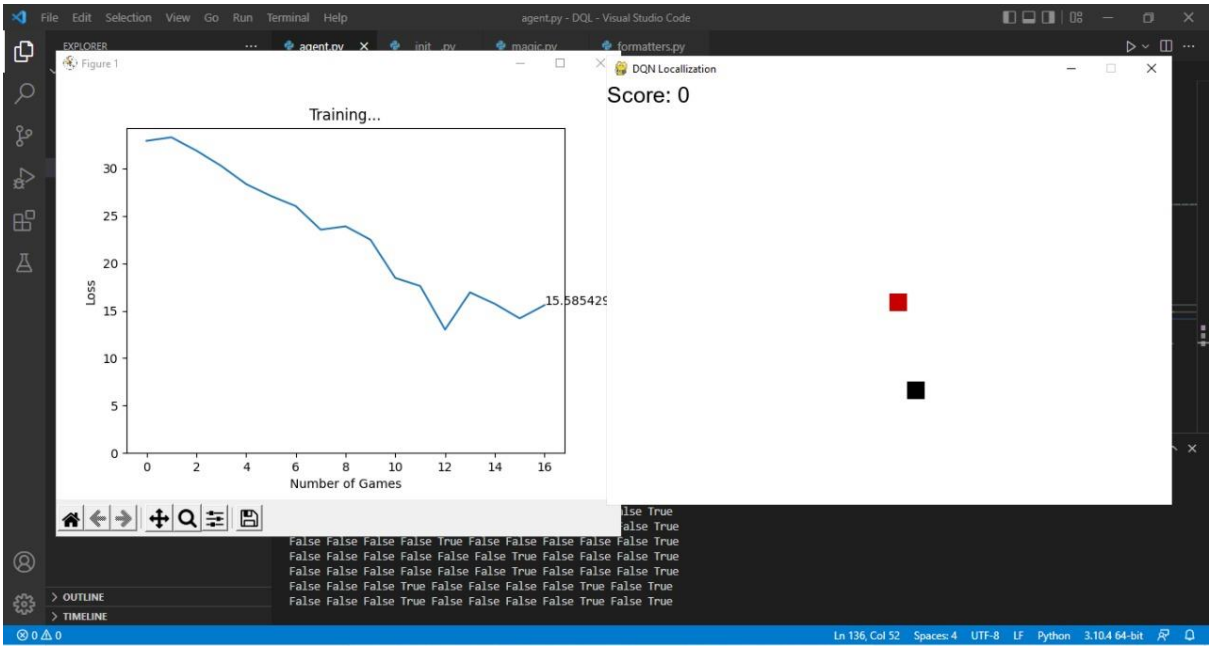


Figure 1
Training...
Loss
Number of Games
15.585429
DQN Localization
Score: 0

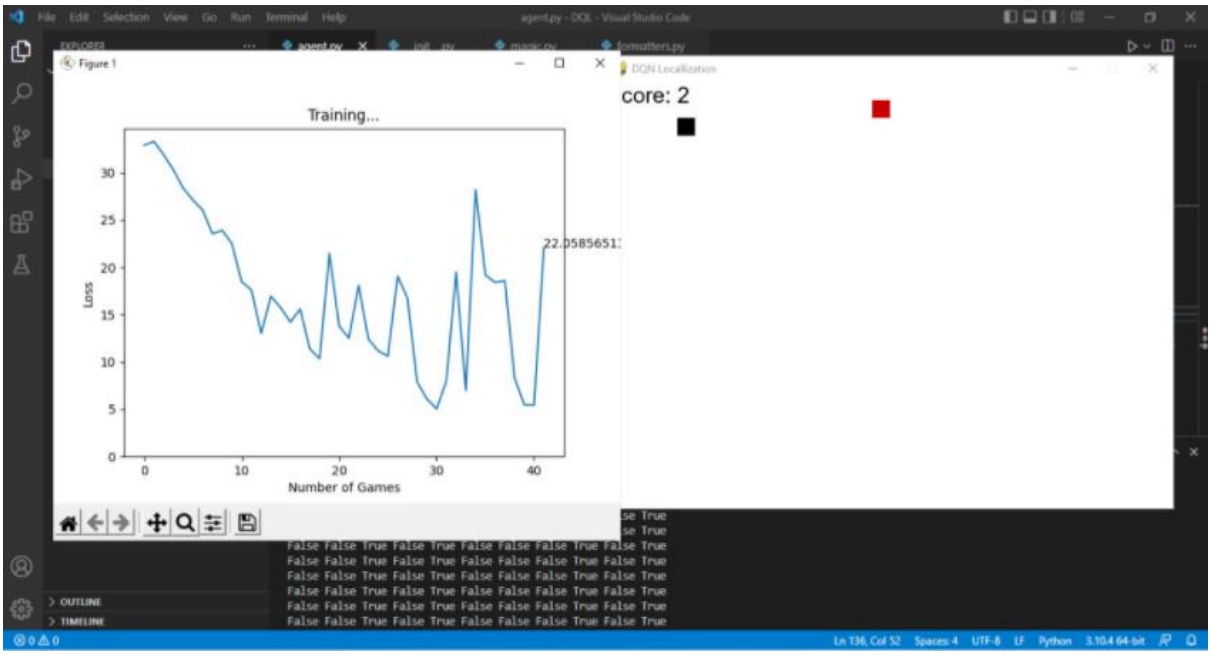
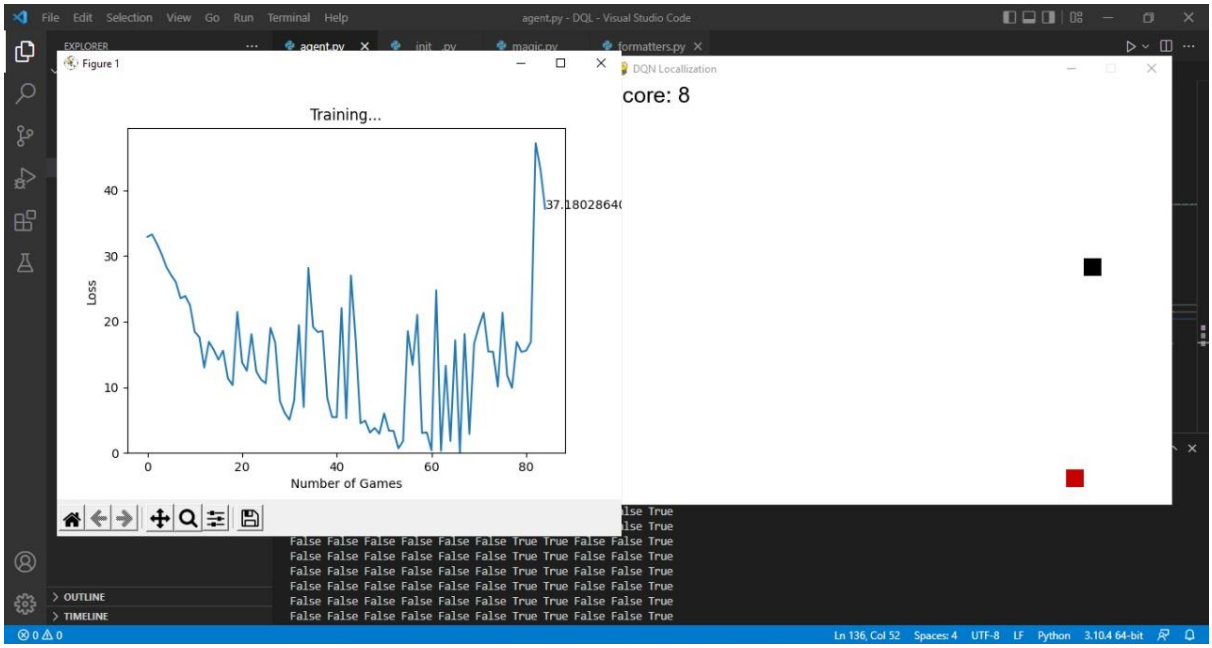


Figure 1
Training...
Loss
Number of Games
22.0585651
DQN Localization
core: 2



Berdasarkan hasil grafik di atas, dapat dilihat bahwa pada awal-awal running, proses training berjalan lambat. Agent dan reward yang didapat sangat lama sehingga memerlukan waktu beberapa menit lagi untuk mendapatkan hasil training yang bagus. Setelah sekitar kurang lebih 10 menit, hasil training menjadi cukup bagus sehingga proses agent , action, dan reward yang didapat dapat dirasakan dengan lumayan cepat.