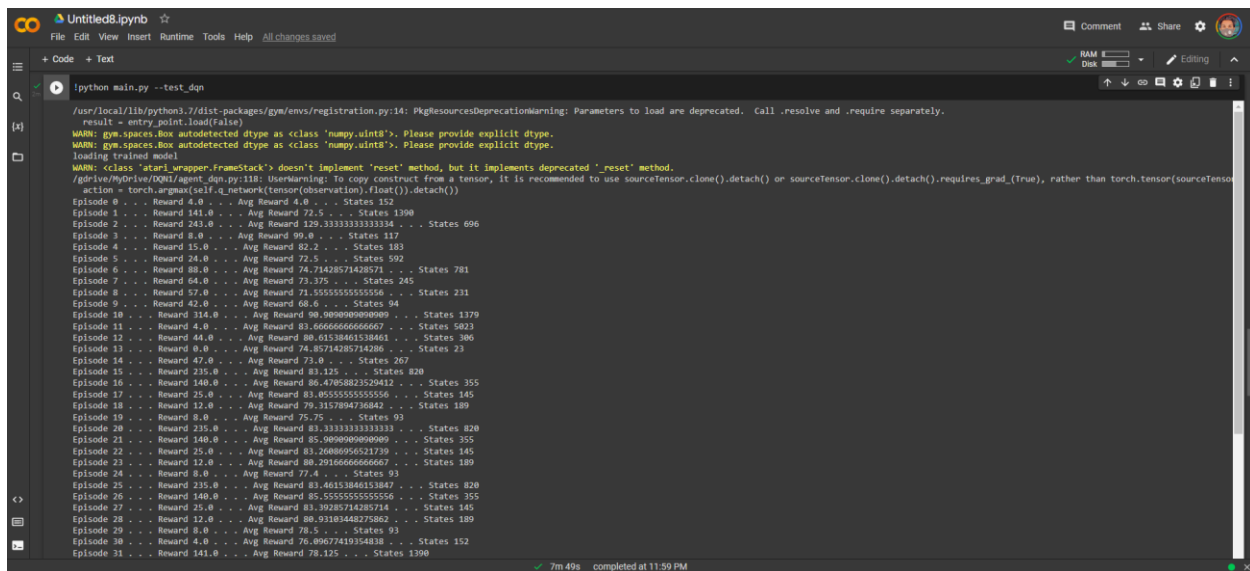


## RL – Project 3

Screenshots of test results:

The mean score is over 100 episodes

Convolutional Neural Network: Vanilla Convolutional Neural Network

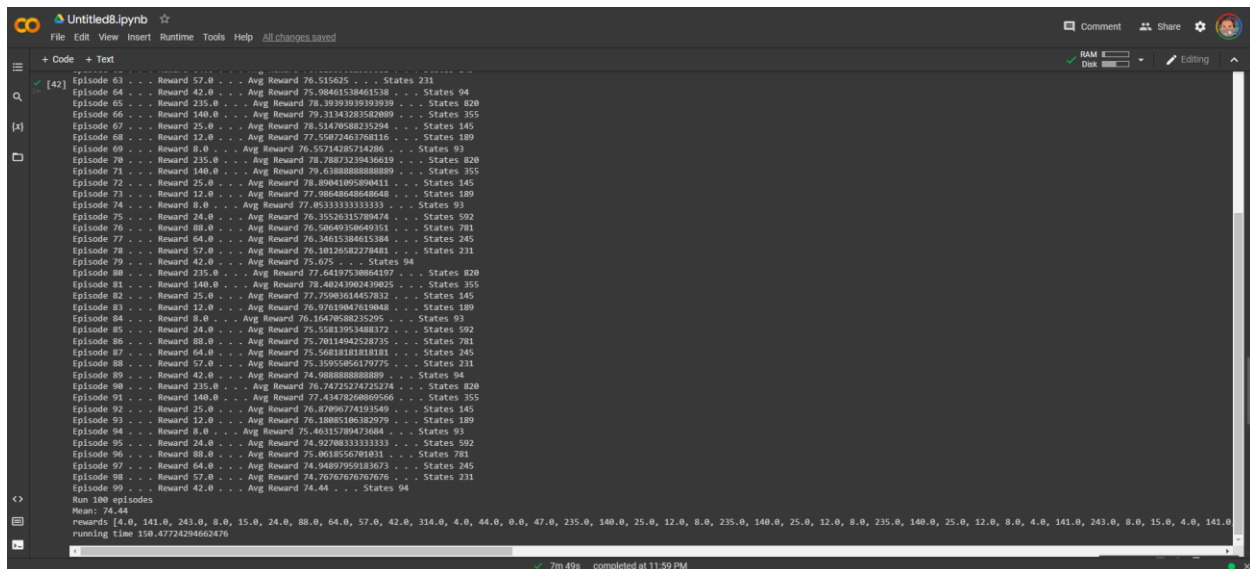


```
Untitled8.ipynb
File Edit View Insert Runtime Tools Help All changes saved
+ Code + Text
[+] ipython main.py --test_dqn

/usr/local/lib/python3.7/dist-packages/gym/envs/registration.py:14: PkgResourcesDeprecationWarning: Parameters to load are deprecated. Call .resolve and .require separately.
  result = entry_point.load(False)
WARN: gym.spaces.Box autodetected dtype as <class 'numpy.uint8'>. Please provide explicit dtype.
WARN: gym.spaces.Box autodetected dtype as <class 'numpy.uint8'>. Please provide explicit dtype.
loading trained model
WARN: <class 'atar_wrapper.FrameStack'> doesn't implement 'reset' method, but it implements deprecated 'reset' method.
/gdrive/g0/drive/DOQ/agent_dqn.py:118: UserWarning: To copy construct from a tensor, it is recommended to use sourceTensor.clone().detach() or sourceTensor.clone().detach().requires_grad_(True), rather than torch.tensor(sourceTensor.detach()).
  action = torch.tensor(self.network(tensor(observation).float()).detach())

Episode 0 . . . Reward 4.0 . . . Avg Reward 4.0 . . . States 152
Episode 1 . . . Reward 141.0 . . . Avg Reward 72.5 . . . States 1300
Episode 2 . . . Reward 243.0 . . . Avg Reward 129.13333333333334 . . . States 696
Episode 3 . . . Reward 8.0 . . . Avg Reward 89.0 . . . States 117
Episode 4 . . . Reward 15.0 . . . Avg Reward 82.2 . . . States 183
Episode 5 . . . Reward 24.0 . . . Avg Reward 72.5 . . . States 592
Episode 6 . . . Reward 88.0 . . . Avg Reward 74.71428571428571 . . . States 781
Episode 7 . . . Reward 64.0 . . . Avg Reward 73.375 . . . States 245
Episode 8 . . . Reward 57.0 . . . Avg Reward 71.55555555555556 . . . States 231
Episode 9 . . . Reward 42.0 . . . Avg Reward 68.0 . . . States 94
Episode 10 . . . Reward 314.0 . . . Avg Reward 88.99999999999999 . . . States 1379
Episode 11 . . . Reward 4.0 . . . Avg Reward 83.66666666666667 . . . States 5023
Episode 12 . . . Reward 44.0 . . . Avg Reward 86.61538461538461 . . . States 386
Episode 13 . . . Reward 0.0 . . . Avg Reward 74.85714285714286 . . . States 23
Episode 14 . . . Reward 47.0 . . . Avg Reward 73.0 . . . States 267
Episode 15 . . . Reward 235.0 . . . Avg Reward 83.125 . . . States 820
Episode 16 . . . Reward 140.0 . . . Avg Reward 86.47958823529412 . . . States 355
Episode 17 . . . Reward 25.0 . . . Avg Reward 81.95555555555556 . . . States 145
Episode 18 . . . Reward 12.0 . . . Avg Reward 79.3157894736842 . . . States 189
Episode 19 . . . Reward 8.0 . . . Avg Reward 75.75 . . . States 93
Episode 20 . . . Reward 235.0 . . . Avg Reward 83.33333333333333 . . . States 820
Episode 21 . . . Reward 140.0 . . . Avg Reward 85.90909090909091 . . . States 355
Episode 22 . . . Reward 25.0 . . . Avg Reward 83.2688995621739 . . . States 145
Episode 23 . . . Reward 12.0 . . . Avg Reward 80.29256666666667 . . . States 189
Episode 24 . . . Reward 8.0 . . . Avg Reward 77.4 . . . States 93
Episode 25 . . . Reward 235.0 . . . Avg Reward 83.46153846153847 . . . States 820
Episode 26 . . . Reward 140.0 . . . Avg Reward 85.55555555555556 . . . States 355
Episode 27 . . . Reward 25.0 . . . Avg Reward 83.38285714285714 . . . States 145
Episode 28 . . . Reward 12.0 . . . Avg Reward 80.93103448275862 . . . States 189
Episode 29 . . . Reward 8.0 . . . Avg Reward 78.5 . . . States 93
Episode 30 . . . Reward 4.0 . . . Avg Reward 76.89074103448276 . . . States 152
Episode 31 . . . Reward 141.0 . . . Avg Reward 78.125 . . . States 1300

7m 49s completed at 11:59 PM
```



```
Untitled8.ipynb
File Edit View Insert Runtime Tools Help All changes saved
+ Code + Text
[42] Run 180 episodes
Mean: 74.44
rewards [4.0, 141.0, 243.0, 8.0, 15.0, 24.0, 88.0, 64.0, 57.0, 42.0, 314.0, 4.0, 44.0, 0.0, 47.0, 235.0, 140.0, 25.0, 12.0, 8.0, 235.0, 140.0, 25.0, 12.0, 8.0, 4.0, 141.0, 243.0, 8.0, 15.0, 4.0, 141.0]
running time 150.47774294662476

7m 49s completed at 11:59 PM
```

## Hyper Parameters Used:

Batch size: 32

Replay size: 20000

Learning Rate:  $1e-4$

Initial epsilon = 0.95

Total number of episodes = 60000000

Loss Function: Smooth L1 loss

Optimizer Used: Adam Optimizer

## Log Files Graph representation

