

**classmate**  
Date \_\_\_\_\_  
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Concepts:

- ## Limitations & considerations

- ## 1. Import dependencies

## # Open AI gym spaces:

1. Box -  $n$  dimensional tensor, range of values  
eg: Box (0, 1, shape = (3, 3))
2. Discrete - set of items  
eg: Discrete (3)



3. Tuple - tuple of other spaces eg. Box or Discrete  
eg: `Tuple((Discrete(2), Box(0, 100, shape(1, 1))))`
4. Dict - dictionary of spaces eg. Box or discrete  
eg: `Dict({'height': Discrete(2), 'speed': Box(0, 100, shape(1, 1))})`
5. MultiBinary - one hot encoded binary values  
eg: `MultiBinary(4)`
6. MultiDiscrete - multiple discrete values  
eg: `MultiDiscrete([5, 2, 2])`

## 2. Load Environment

```
environment_name = 'CartPole-v0'
env = gym.make(environment_name)
```

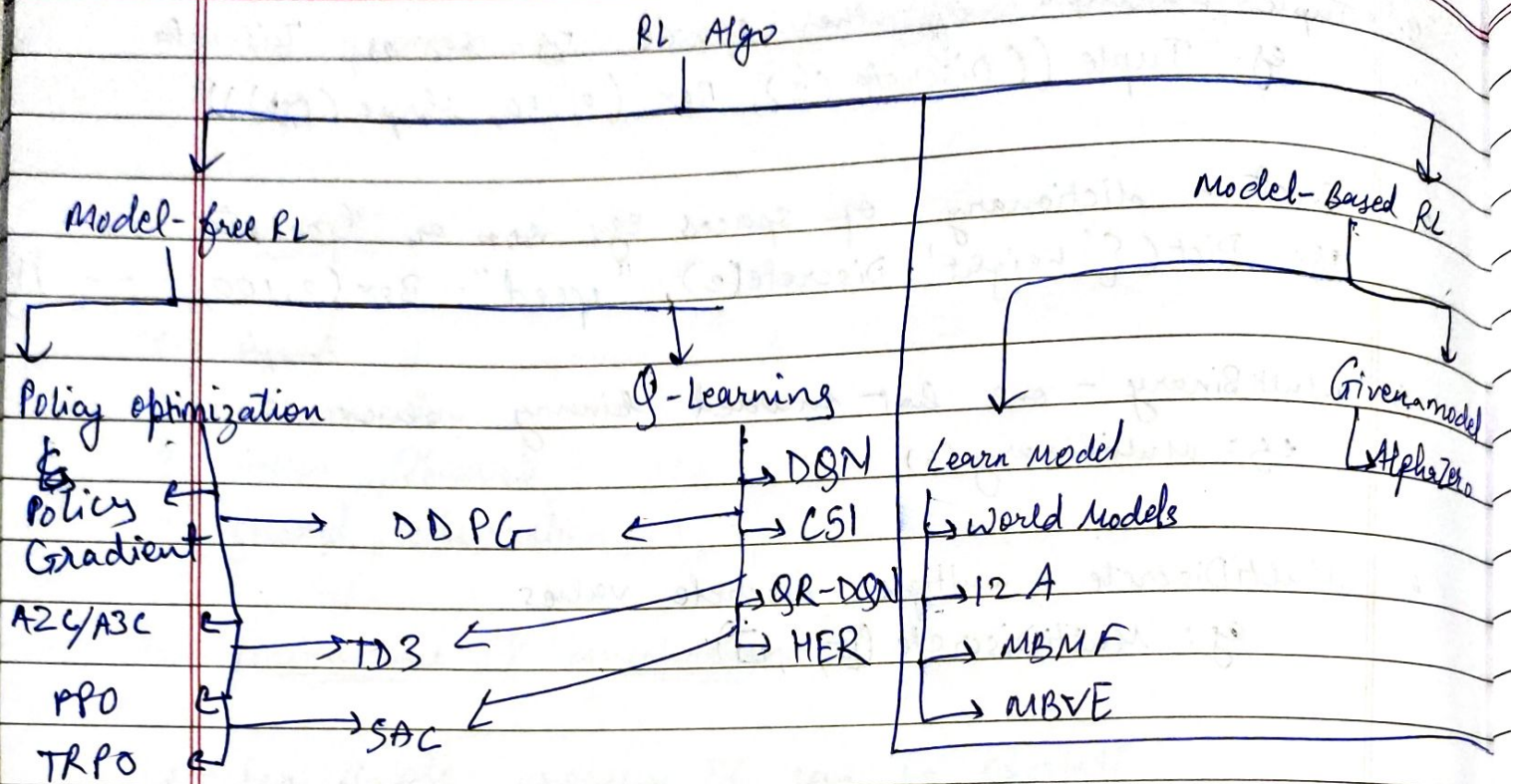
environment\_name

## 3. Understanding the Environment

```
env.action_space.sample()
env.observation_space.sample()
```

## 4. Training





Name	Box	Discrete	Multi Discrete	Multi Binary	Multi Processing
A2C	✓	✓	✓	✓	✓
DDPG	✓	X	X	X	X
DQN	X	✓	X	X	X
HER	✓	✓	X	X	X
PPO	✓	✓	✓	✓	✓
SAC	✓	X	X	X	X
TD3	✓	X	X	X	X

### # Action Space

DQN: Discrete single process

PPO or A2C: Discrete multi processed

SAC or TD3: Continuous single processed

PPO or A2C: Continuous multi processed



## Understand Training Metrics:

for A2C Algo

### 1. Evaluation Metrics:

Ep-len-mean, ep-raw mean

### 2. Time Metrics:

Fps, iterations, time-elapsed, total-timesteps

### 3. Loss Metrics:

Entropy-loss, Policy-loss, value-loss

### 4. Other Metrics:

Explained-variance; Learning rate, n-updates

### 5. Save Model & Reload Model

### 6. Evaluation

### 7. Test Model.

### 8. Viewing Logs in TensorBoard.

## Training Strategies:

1. Train for longer

2. Hyperparameter tuning

3. Try diff<sup>n</sup> algorithm.

9. Adding a callback to training stage

10. Changing policies.

11. Using Alternate Algo.