

```
import gym
import numpy as np
```

```
env = gym.make('CartPole-v1')
```

```

/usr/local/lib/python3.11/dist-packages/gym/core.py:317: DeprecationWarning: WARN: Initializing wrapper in old step API which returns a tuple
deprecation(
/usr/local/lib/python3.11/dist-packages/gym/wrappers/step_api_compatibility.py:39: DeprecationWarning: WARN: Initializing environment in old step API which returns a tuple
deprecation(

```

```
state = env.reset()
```

```
print(f"Action Space: {env.action_space}")
print(f"Observation Space: {env.observation_space}")
```

```

Action Space: Discrete(2)
Observation Space: Box([-4.8000002e+00 -3.4028235e+38 -4.1887903e-01 -3.4028235e+38], [4.8000002e+00 3.4028235e+38 4.1887903e-01 3.4028235e+38])

```

```
def describe_state(state):
    """
    This function prints out the individual components of the state
    State is a tuple (x, x_dot, theta, theta_dot)
    """
    cart_position, cart_velocity, pole_angle, pole_velocity = state
    print(f"Cart Position: {cart_position}")
    print(f"Cart Velocity: {cart_velocity}")
    print(f"Pole Angle: {pole_angle}")
    print(f"Pole Velocity: {pole_velocity}")
```

```
print("Initial State:")
describe_state(state)
```

```

Initial State:
Cart Position: -0.01466002594679594
Cart Velocity: 0.006833887193351984
Pole Angle: -0.0052196187898516655
Pole Velocity: -0.0010352267418056726

```

```
actions = {0: "Move Left", 1: "Move Right"}
for action in actions:
    print(f"Action {action}: {actions[action]}")
```

```

Action 0: Move Left
Action 1: Move Right

```

```
# Simulate a few steps to see state transitions and rewards
num_steps = 5
```

```
print("\nSimulating a few steps:")
for step in range(num_steps):
    action = env.action_space.sample() # Random action
    next_state, reward, done, info = env.step(action)

    print(f"\nStep {step + 1}:")
    print(f"Action taken: {actions[action]}")
    print("Next State:")
    describe_state(next_state)
    print(f"Reward: {reward}")
    print(f"Done: {done}")
```

```
# Close the environment when done
env.close()
```

```

Simulating a few steps:

Step 1:
Action taken: Move Left
Next State:
Cart Position: -0.010482742451131344
Cart Velocity: 0.006983452010899782
Pole Angle: -0.011147531680762768
Pole Velocity: -0.004334811586886644
Reward: 1.0
Done: False

```

```

Step 2:
Action taken: Move Left
Next State:
Cart Position: -0.010343072935938835
Cart Velocity: -0.1879768669605255
Pole Angle: -0.011234227567911148
Pole Velocity: 0.2848101854324341
Reward: 1.0
Done: False

```

```

Step 3:
Action taken: Move Left
Next State:
Cart Position: -0.014102610759437084
Cart Velocity: -0.3829368054866791
Pole Angle: -0.005538024008274078
Pole Velocity: 0.5739288330078125
Reward: 1.0
Done: False

```

```

Step 4:
Action taken: Move Left
Next State:
Cart Position: -0.021761346608400345
Cart Velocity: -0.5779806971549988
Pole Angle: 0.005940552800893784
Pole Velocity: 0.8648620247840881
Reward: 1.0
Done: False

```

```

Step 5:
Action taken: Move Left
Next State:
Cart Position: -0.03332095965743065
Cart Velocity: -0.7731829881668091
Pole Angle: 0.023237792775034904
Pole Velocity: 1.1594067811965942
Reward: 1.0
Done: False

```

```
import gym
```

```
# Load the Frozen Lake environment
env = gym.make('FrozenLake-v1')
```

```

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```

```
# Display the action and observation spaces
print(f"Action Space: {env.action_space}")
print(f"Observation Space: {env.observation_space}")
```

```

Action Space: Discrete(4)
Observation Space: Discrete(16)

```

```
import gym
```

```
# Load the Mountain Car environment
env = gym.make('MountainCar-v0')
```

```

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```

```
# Display the action and observation spaces
print(f"Action Space: {env.action_space}")
print(f"Observation Space: {env.observation_space}")
```

```

Action Space: Discrete(3)
Observation Space: Box([-1.2 -0.07], [0.6 0.07], (2,), float32)

```

```
import gym
```

```
# Load the Taxi environment
env = gym.make('Taxi-v3')
```

```

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```

```
deprecation(
```

```
# Display the action and observation spaces
print(f"Action Space: {env.action_space}")
print(f"Observation Space: {env.observation_space}")
```

```
↗ Action Space: Discrete(6)
  Observation Space: Discrete(500)
```

```
import gym
```

```
# Load the Cliff Walking environment
env = gym.make('CliffWalking-v0')
```

```
↗ /usr/local/lib/python3.11/dist-packages/gym/core.py:317: DeprecationWarning: WARN: Initializing wrapper in old step API which returns
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  deprecation(
```

```
# Display the action and observation spaces
print(f"Action Space: {env.action_space}")
print(f"Observation Space: {env.observation_space}")
```

```
↗ Action Space: Discrete(4)
  Observation Space: Discrete(48)
```