tas2

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0.1 Lab1

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[ ]:
```
import random
import numpy as np
import matplotlib.pyplot as plt
```

[ ]:
```
class Bandit:
    def __init__(self, arms=10):
        self.prob_recompenza = np.random.rand(arms)

    def pull(self, arms):
        if np.random.rand() < self.prob_recompenza[arms]:
            return 1
        else:
            return 0
```

[ ]:
```
class Agente:
    def __init__(self, arms=10, epsilon=0.01):
        self.arms = arms
        self.epsilon = epsilon
        self.recompenza = np.zeros(arms) # matriz de recompenzas
        self.conteoArms = np.zeros(arms) # matriz para el conteo de veces que␣
 ↪se ha extraido cada barzo

    def selectArm(self):
        if np.random.rand() < self.epsilon: # explore (acción greedy)
            accion = np.random.randint(self.arms)
            return accion
        else: # exploit ( acción -greedy)
            accion = np.argmax(self.recompenza)
            return accion

    def updateEstimate(self,recompensa,arms=10):
        self.conteoArms[arms] += 1
```

```
        self.recompenza[arms] += (recompensa - self.recompenza[arms]) / self.
 ↪conteoArms[arms]
```

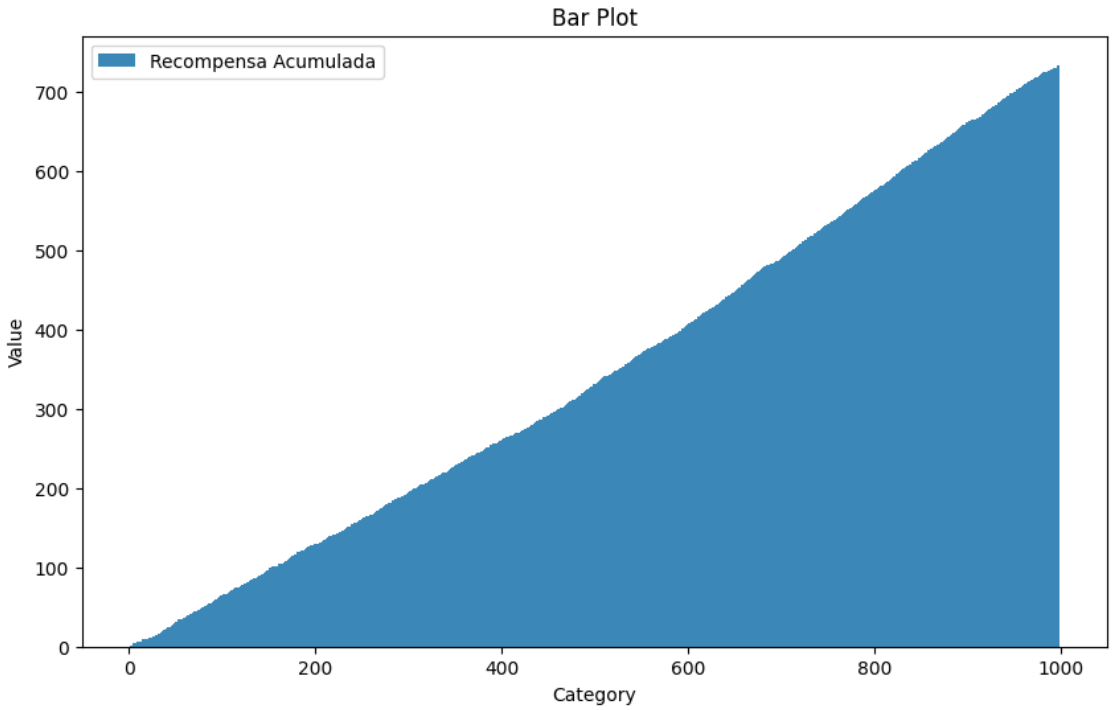
[ ]:
```
# SIMULACIÓN
iteraciones = 1000
recompensa_total = 0
bandit = Bandit()
agente = Agente(epsilon=0.1)
history_acc_reward = []

for _ in range(iteraciones):
    arm = agente.selectArm()
    reward = bandit.pull(arm)
    agente.updateEstimate(reward, arm)
    recompensa_total += reward
    history_acc_reward.append(recompensa_total)

print(f'La recompensa acumulada para {iteraciones} iteraciones es de␣
 ↪{recompensa_total}')
```

```
La recompensa acumulada para 1000 iteraciones es de 734
```

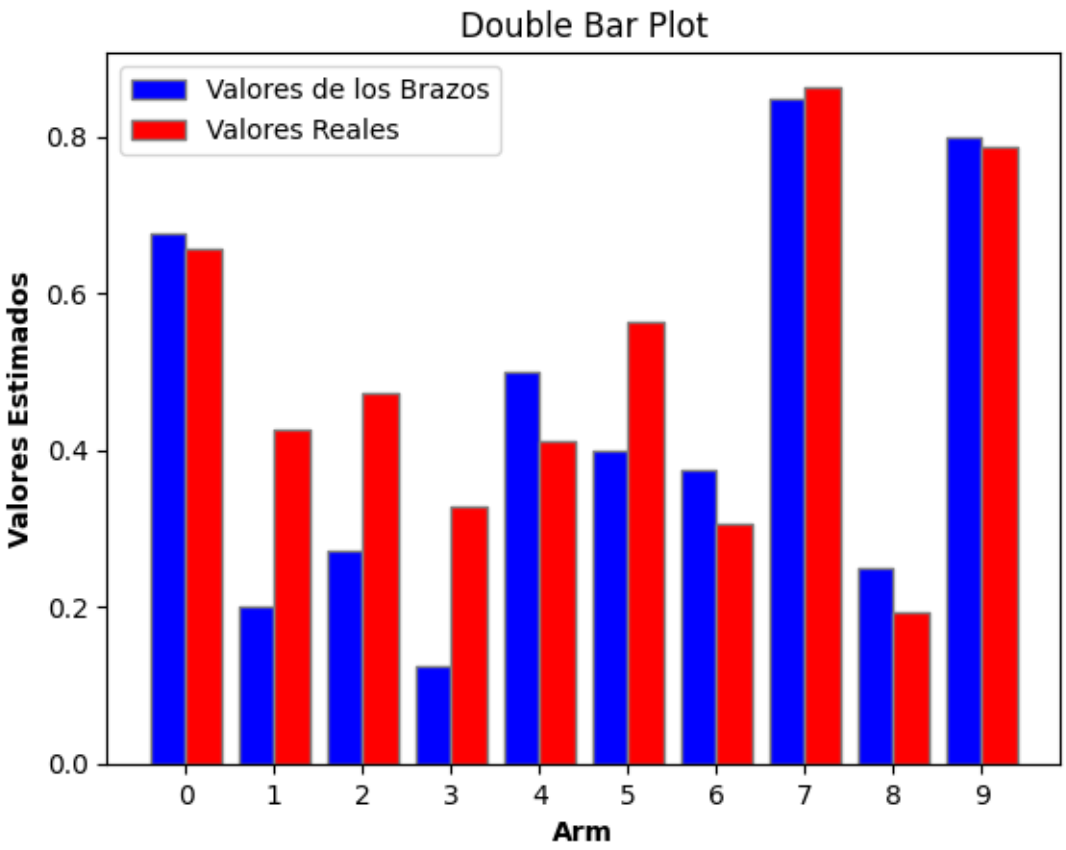
[ ]:
```
for index, n in enumerate(history_acc_reward):
    if n == 0:
        print('xd', index)
```

```
xd 0
```

[ ]:
```
plt.figure(figsize=(10, 6))
plt.bar([i for i in range(len(history_acc_reward))], history_acc_reward,␣
 ↪color='#3b88b8', label='Recompensa Acumulada', width=1)
plt.title('Bar Plot')
plt.xlabel('Category')
plt.ylabel('Value')
plt.legend()
plt.show()
```



[ ]:
```
arms = agente.recompenza
real = bandit.prob_recompenza

n = len(arms)
r1 = np.arange(n)
r2 = [x + 0.4 for x in r1]

# Plot the bars
plt.bar(r1, arms, color='b', width=0.4, edgecolor='grey', label='Valores de los␣
 ↪Brazos')
plt.bar(r2, real, color='r', width=0.4, edgecolor='grey', label='Valores␣
 ↪Reales')

# Add labels
plt.xlabel('Arm', fontweight='bold')
plt.ylabel('Valores Estimados', fontweight='bold')
plt.title('Double Bar Plot')
plt.xticks([r + 0.4/2 for r in range(n)], list(range(len(arms))))

# Add legend
plt.legend()

# Show the plot
plt.show()
```


Double Bar Plot
Valores de los Brazos
Valores Reales
Valores Estimados
0.0
0.2
0.4
0.6
0.8
0
1
2
3
4
5
6
7
8
9
Arm