




Start coding or [generate](#) with AI.

```
import pandas as pd
```

```
dataset = pd.read_csv('Ads_CTR_Optimisation.csv')
display(dataset.head())
```



	Ad 0	Ad 1	Ad 2	Ad 3	Ad 4	Ad 5	Ad 6	Ad 7	Ad 8	Ad 9
0	1	0	0	0	1	0	0	0	1	0
1	0	0	0	0	0	0	0	0	1	0
2	0	0	0	0	0	0	0	0	0	0
3	0	1	0	0	0	0	0	1	0	0
4	0	0	0	0	0	0	0	0	0	0

```
import numpy as np
```

```
N = dataset.shape[1]
numbers_of_selections = [0] * N
sums_of_rewards = [0] * N
ads_selected = []
```

```
import random
```

```
epsilon = 0.1
total_rewards = 0
for n in range(0, dataset.shape[0]):
    ad = 0
    max_upper_bound = 0
    if random.random() < epsilon:
        ad = random.randrange(N)
    else:
        for i in range(0, N):
            if (numbers_of_selections[i] > 0):
                average_reward = sums_of_rewards[i] / numbers_of_selections[i]
                if (average_reward > max_upper_bound):
                    max_upper_bound = average_reward
                    ad = i
            else:
                # If an ad hasn't been selected, we can't calculate an average reward.
                # To ensure all ads are tried at least once in the exploitation phase,
                # we can assign a very high initial max_upper_bound to unselected ads.
                # However, for simplicity in this implementation, we will rely on the
                # exploration phase to select each ad at least once.
                pass
```

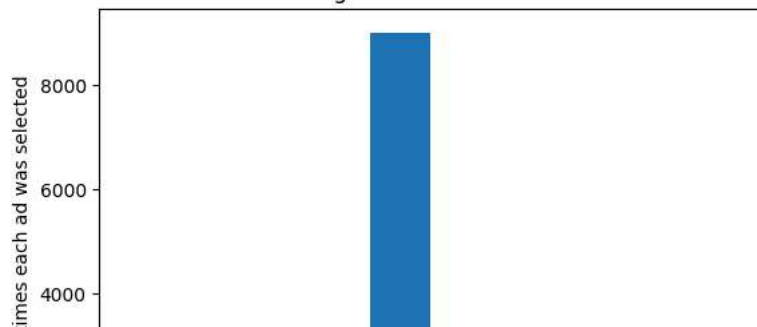
```
ads_selected.append(ad)
numbers_of_selections[ad] += 1
reward = dataset.values[n, ad]
sums_of_rewards[ad] += reward
total_rewards += reward
```

```
import matplotlib.pyplot as plt
```

```
plt.hist(ads_selected)
plt.title('Histogram of ads selections')
plt.xlabel('Ads')
plt.ylabel('Number of times each ad was selected')
plt.show()
```



Histogram of ads selections



```
reward = dataset.values[n, ad]
sums_of_rewards[ad] = sums_of_rewards[ad] + reward
total_rewards = total_rewards + reward
```

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Histogram of ads selections

