```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt


df = pd.read_csv('Ads_Optimisation.csv')
df
```

	Ad 1	Ad 2	Ad 3	Ad 4	Ad 5	Ad 6	Ad 7	Ad 8	Ad 9	Ad 10
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
...	...	...	...	...	...	...	...	...	...	...
9995	0	0	1	0	0	0	0	1	0	0
9996	0	0	0	0	0	0	0	0	0	0
9997	0	0	0	0	0	0	0	0	0	0
9998	1	0	0	0	0	0	0	1	0	0
9999	0	1	0	0	0	0	0	0	0	0

10000 rows × 10 columns

```
import random
N = 10000
d = 10
ads_selected = []
total_reward= 0
for n in range(0, N):
    ad = random.randrange(d)
    ads_selected.append(ad)
    reward = df.values[n, ad]
    total_reward = total_reward + reward
print(total_reward)
```

```
1277
```

```
pd.Series(ads_selected).tail(1000).value_counts(normalize=True)
```

```
7    0.111
3    0.108
5    0.108
```

```
1    0.107
0    0.103
8    0.099
4    0.095
9    0.094
2    0.091
6    0.084
dtype: float64
```

```
#Implementing UCB
import math
N = 10000
d = 10
ads_selected = []
number_of_selections = [0]*d
sum_of_reward = [0]*d
total_reward = 0


for n in range(10000):
    ad = 0
    max_upper_bound = 0
    for i in range(0, d):
        if(number_of_selections[i] > 0):
            average_reward = sum_of_reward[i] / number_of_selections[i]
            delta_i = math.sqrt(2*math.log(n+1) / number_of_selections[i])
            upper_bound = average_reward + delta_i
        else:
            upper_bound = 1e400
        if upper_bound > max_upper_bound:
            max_upper_bound = upper_bound
            ad = i
    ads_selected.append(ad)
    number_of_selections[ad] += 1
    reward = df.values[n, ad]
    sum_of_reward[ad] += reward
    total_reward += reward
print(total_reward)
```

```
2125
```

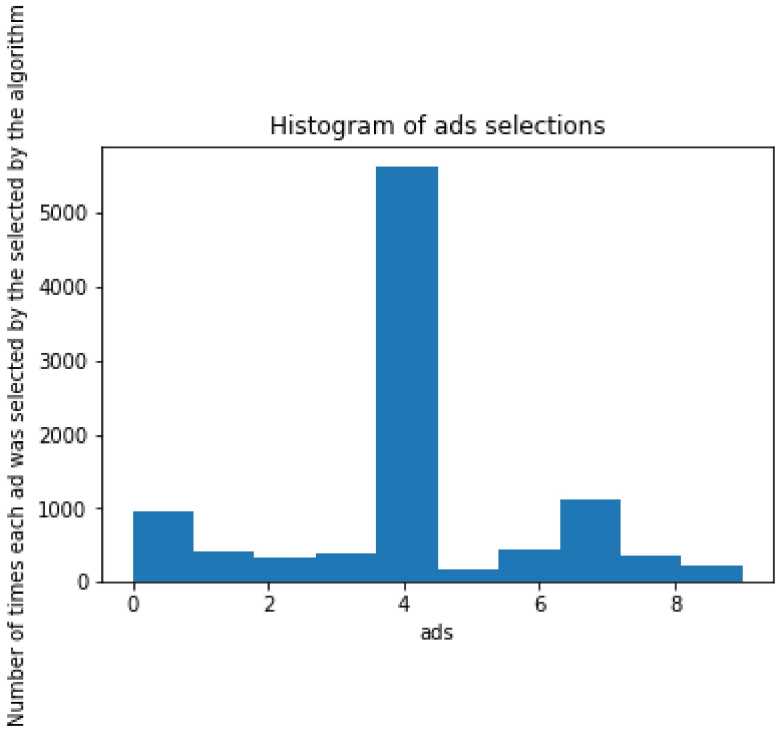
```
pd.Series(ads_selected).tail(1000).value_counts(normalize=True)
```

```
4    0.771
0    0.106
7    0.034
3    0.034
2    0.026
1    0.007
6    0.007
8    0.006
9    0.005
```

```
5    0.004
dtype: float64
```

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

```
Text(0, 0.5, 'Number of times each ad was selected by the selected by the algorithm')
```



Colab paid products - Cancel contracts here