```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.cluster import KMeans

sdm=pd.read_csv('/content/Student_Marks.csv')

sdm.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 100 entries, 0 to 99
Data columns (total 3 columns):
 #   Column          Non-Null Count  Dtype  
---  ------          --------------  -----  
 0   number_courses  100 non-null    int64  
 1   time_study      100 non-null    float64
 2   Marks           100 non-null    float64
dtypes: float64(2), int64(1)
memory usage: 2.5 KB
```

```
sdm.isnull().sum()
```

```
number_courses    0
time_study        0
Marks             0
dtype: int64
```

```
sdm.shape
```

```
(100, 3)
```

```
x=sdm.iloc[:,[1,2]].values

print(x)
```

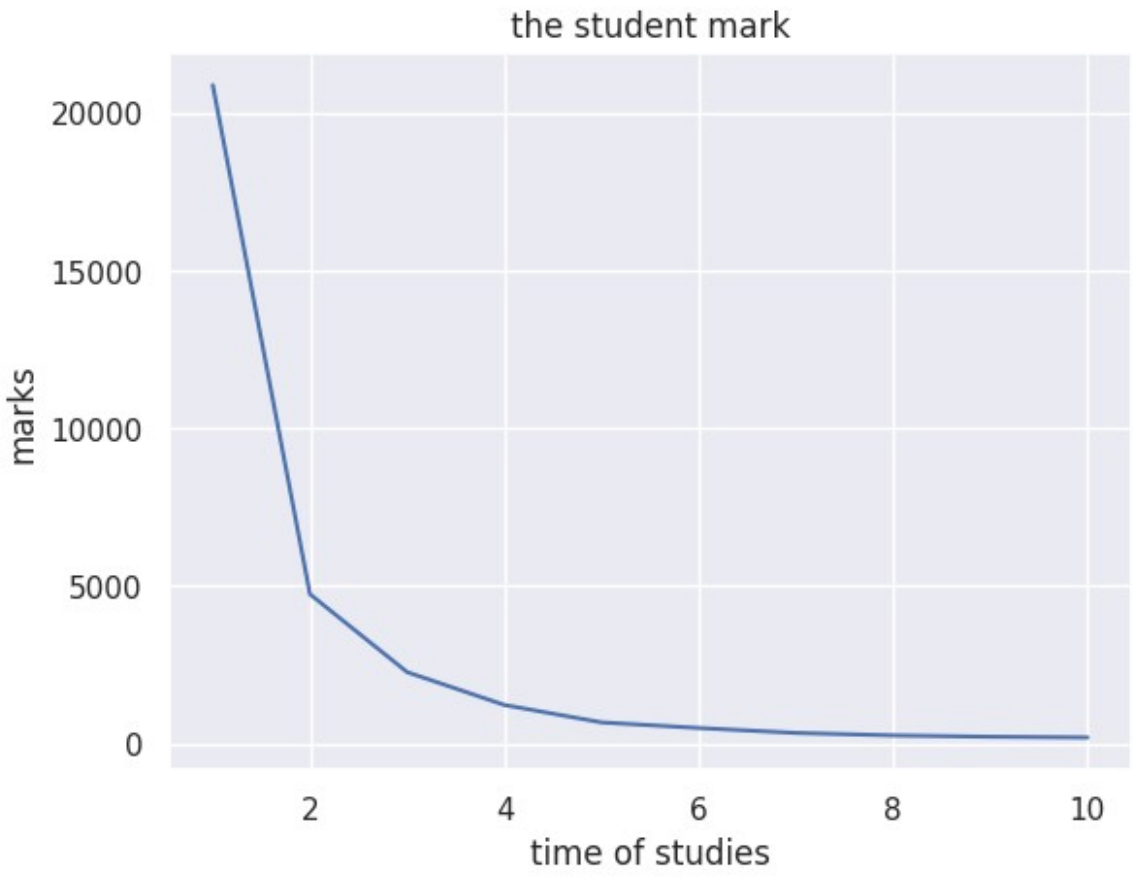
```
[[ 4.508 19.202]
 [ 0.096  7.734]
 [ 3.133 13.811]
 [ 7.909 53.018]
 [ 7.811 55.299]
 [ 3.211 17.822]
 [ 6.063 29.889]
 [ 3.413 17.264]
 [ 4.41  20.348]
 [ 6.173 30.862]
 [ 7.353 42.036]
 [ 0.423 12.132]
 [ 4.218 24.318]
 [ 4.274 17.672]
 [ 2.908 11.397]
```

```
[ 4.26  19.466]
[ 5.719 30.548]
[ 6.08  38.49 ]
[ 7.711 50.986]
[ 3.977 25.133]
[ 4.733 22.073]
[ 6.126 35.939]
[ 2.051 12.209]
[ 4.875 28.043]
[ 3.635 16.517]
[ 1.407  6.623]
[ 0.508 12.647]
[ 4.378 26.532]
[ 0.156  9.333]
[ 1.299  8.837]
[ 3.864 24.172]
[ 1.923  8.1  ]
[ 0.932 15.038]
[ 6.594 39.965]
[ 4.083 17.171]
[ 7.543 43.978]
[ 2.966 13.119]
[ 7.283 46.453]
[ 6.533 41.358]
[ 7.775 51.142]
[ 0.14   7.336]
[ 2.754 15.725]
[ 3.591 19.771]
[ 1.557 10.429]
[ 1.954  9.742]
[ 2.061  8.924]
[ 3.797 16.703]
[ 4.779 22.701]
[ 5.635 26.882]
[ 3.913 19.106]
[ 6.703 40.602]
[ 4.13  22.184]
[ 0.771  7.892]
[ 6.049 36.653]
[ 7.591 53.158]
[ 2.913 18.238]
[ 7.641 53.359]
[ 7.649 51.583]
[ 6.198 31.236]
[ 7.468 51.343]
[ 0.376 10.522]
[ 2.438 10.844]
[ 3.606 19.59 ]
[ 4.869 21.379]
```

```
 [ 0.13  12.591]
 [ 2.142 13.562]
 [ 5.473 27.569]
 [ 0.55   6.185]
 [ 1.395  8.92 ]
 [ 3.948 21.4  ]
 [ 3.736 16.606]
 [ 2.518 13.416]
 [ 4.633 20.398]
 [ 1.629  7.014]
 [ 6.954 39.952]
 [ 0.803  6.217]
 [ 6.379 36.746]
 [ 5.985 38.278]
 [ 7.451 49.544]
 [ 0.805  6.349]
 [ 7.957 54.321]
 [ 2.262 17.705]
 [ 7.41  44.099]
 [ 3.197 16.106]
 [ 1.982 16.461]
 [ 6.201 39.957]
 [ 4.067 23.149]
 [ 1.033  6.053]
 [ 1.803 11.253]
 [ 6.376 40.024]
 [ 4.182 24.394]
 [ 2.73  19.564]
 [ 5.027 23.916]
 [ 6.471 42.426]
 [ 3.919 24.451]
 [ 3.561 19.128]
 [ 0.301  5.609]
 [ 7.163 41.444]
 [ 0.309 12.027]
 [ 6.335 32.357]]
```

```
wcss=[]
for i in range(1,11):
  Kmeans = KMeans(n_clusters=i,init='k-means++',random_state=55)
  Kmeans.fit(x)
  wcss.append(Kmeans.inertia_)

sns.set()
plt.plot(range(1,11),wcss)
plt.title('the student mark')
plt.xlabel('time of studies')
plt.ylabel('marks')
plt.show()
```


the student mark
20000
15000
10000
5000
0
marks
2
4
6
8
10
time of studies