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

```
from google.colab import files
uploaded = files.upload()
```

Choose Files datasetkmeans.csv

- **datasetkmeans.csv**(text/csv) - 2429 bytes, last modified: 4/16/2024 - 100% done

```
Saving datasetkmeans.csv to datasetkmeans.csv
```

```
dataset = pd.read_csv('datasetkmeans.csv')
```

```
print(dataset.shape)
print(dataset.describe())
print(dataset.head(5))
```

```
(303, 2)
           INCOME       SPEND
count  303.000000  303.000000
mean   245.273927  149.646865
std     48.499412   22.905161
min    126.000000   71.000000
25%    211.000000  133.500000
50%    240.000000  153.000000
75%    274.000000  166.000000
max    417.000000  202.000000
   INCOME  SPEND
0     233    150
1     250    187
2     204    172
3     236    178
4     354    163
```

```
Income = dataset['INCOME'].values
Spend = dataset['SPEND'].values
X = np.array(list(zip(Income, Spend)))
X
```

```
           [254, 159],
           [325, 154],
           [126, 173],
           [313, 133],
           [211, 161],
           [262, 155],
           [215, 170],
           [214, 168],
           [193, 162],
           [204, 172],
           [243, 152],
           [303, 122],
           [271, 182],
```

```
from sklearn.cluster import KMeans
wcss = []
for i in range(1,11):
    km=KMeans(n_clusters=i, random_state=0)
    km.fit(X)
    wcss.append(km.inertia_)
plt.plot(range(1,11),wcss,color="red", marker ="8")
plt.title('Optimal K Value')
plt.xlabel('Number of clusters')
plt.ylabel('WCSS')
plt.show()
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:870: FutureWarning
  warnings.warn(
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/usr/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:870: FutureWarning
  warnings.warn(
```
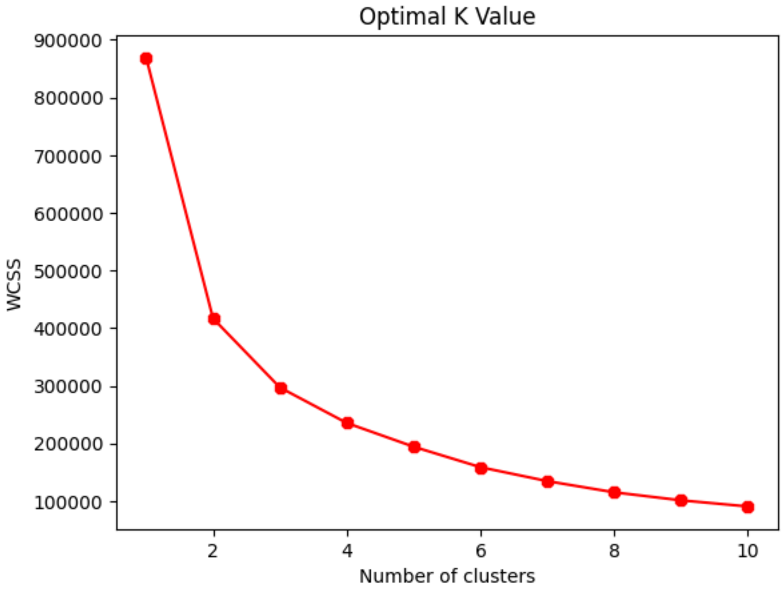
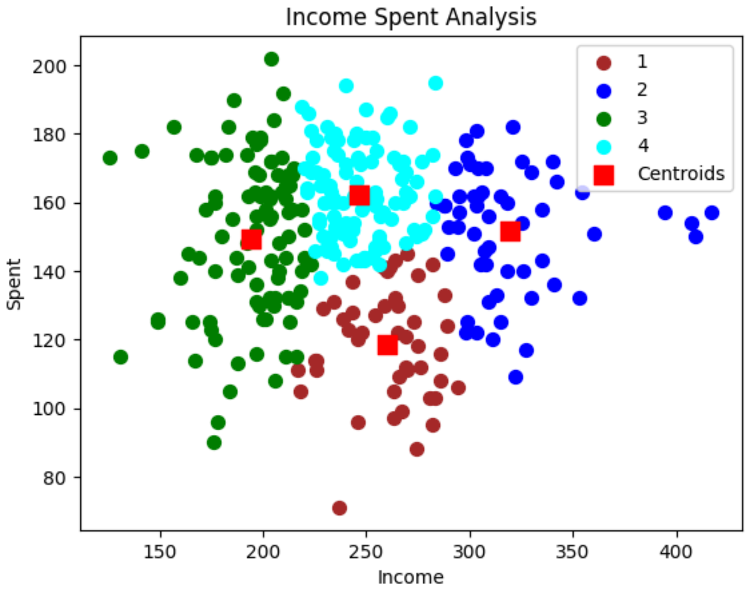



```
model=KMeans(n_clusters=4, random_state=0)
y_means = model.fit_predict(X)
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:870: FutureWarning: The default value of `n_init` will change fro
  warnings.warn(
plt.scatter(X[y_means==0,0],X[y_means==0,1],s=50, c='brown',label='1')
plt.scatter(X[y_means==1,0],X[y_means==1,1],s=50, c='blue',label='2')
plt.scatter(X[y_means==2,0],X[y_means==2,1],s=50, c='green',label='3')
plt.scatter(X[y_means==3,0],X[y_means==3,1],s=50, c='cyan',label='4')
plt.scatter(model.cluster_centers_[:,0], model.cluster_centers_[:,1],s=100,marker='s', c='red', label='Centroids')
plt.title('Income Spent Analysis')
plt.xlabel('Income')
plt.ylabel('Spent')
plt.legend()
plt.show()
```


Income Spent Analysis
Spent
Income
● 1
● 2
● 3
● 4
■ Centroids