SUYASH GOUR A4-66 ECS

```
import numpy as np
import pandas as pd
```

```
df = pd.read_csv('student_clustering.csv')
print("The shape of the dataset is: ", df.shape)
df.head()
```

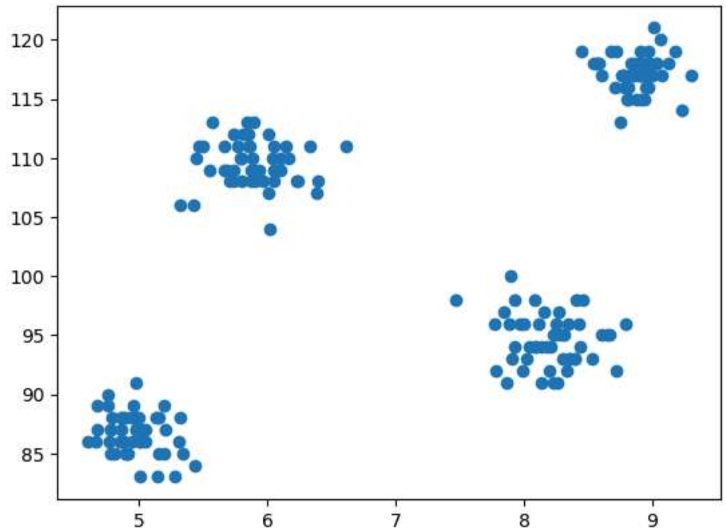
```
The shape of the dataset is:  (200, 2)
```

| | cgpa | iq |
|---|---|---|
| 0 | 5.13 | 88 |
| 1 | 5.90 | 113 |
| 2 | 8.36 | 93 |
| 3 | 8.27 | 97 |
| 4 | 5.45 | 110 |

Next steps: Generate code with df | View recommended plots | New interactive sheet

```
import matplotlib.pyplot as plt
plt.scatter(df['cgpa'],df['iq'])
```

```
<matplotlib.collections.PathCollection at 0x7bcd9b748100>
```



```
from sklearn.cluster import KMeans
```

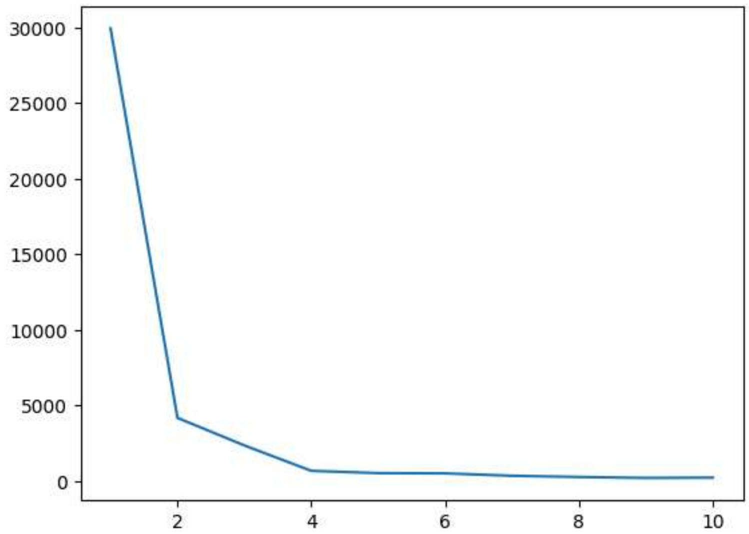
```
wcss = []
for i in range(1,11):
  km = KMeans(n_clusters=i)
  km.fit_predict(df)
  wcss.append(km.inertia_)
```

```
wcss
```

```
[29957.898287999997,
 4184.141269999999,
 2362.7133490000015,
 681.9696600000001,
 530.4298616986187,
 515.3871254832748,
 354.0352530907326,
 274.2294625999665,
 213.17281656519154,
 233.96773571921526]
```

```
plt.plot(range(1,11),wcss)
```

```
[<matplotlib.lines.Line2D at 0x7bcd921af430>]
```



```
X = df.iloc[:,:].values
km=KMeans(n_clusters=4)
y_means = km.fit_predict(X)
```

```
y_means
```

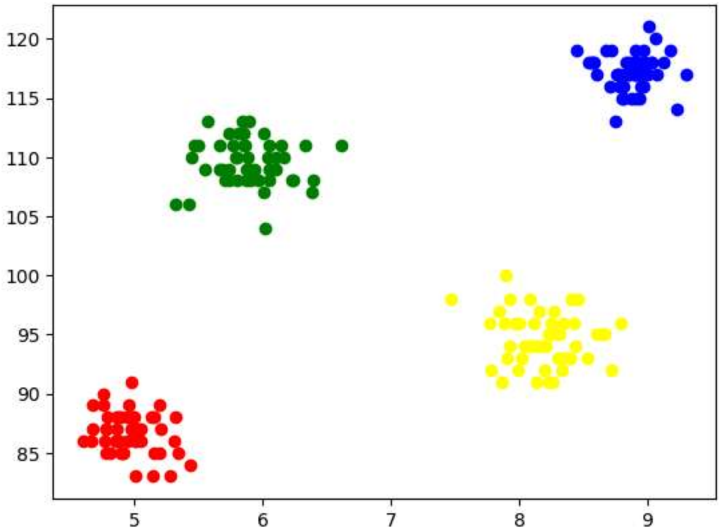
```
array([1, 2, 3, 3, 2, 2, 3, 0, 2, 3, 1, 2, 3, 1, 2, 3, 2, 3, 2, 2, 3, 1,
       3, 1, 1, 3, 1, 0, 3, 2, 0, 2, 0, 2, 3, 3, 0, 2, 1, 2, 1, 3, 3, 1,
       0, 0, 3, 2, 0, 2, 1, 1, 0, 3, 0, 2, 2, 0, 2, 0, 2, 3, 3, 0, 1, 0,
       3, 1, 2, 3, 2, 0, 3, 1, 2, 0, 2, 0, 1, 3, 3, 0, 2, 1, 0, 1, 0, 2,
       0, 2, 0, 0, 3, 1, 3, 3, 0, 3, 1, 0, 2, 1, 1, 0, 1, 1, 3, 1, 0, 0,
       3, 0, 2, 2, 3, 0, 3, 2, 0, 1, 1, 2, 3, 0, 3, 1, 3, 2, 1, 3, 3, 2,
       1, 1, 2, 0, 2, 1, 3, 3, 3, 1, 2, 1, 1, 0, 1, 0, 2, 1, 0, 1, 0, 0,
       1, 3, 2, 0, 2, 3, 1, 0, 2, 3, 0, 1, 2, 1, 1, 0, 0, 2, 0, 1, 1, 3,
       0, 2, 1, 0, 0, 2, 2, 2, 3, 1, 3, 3, 0, 2, 3, 3, 1, 1, 3, 1, 0, 2,
       2, 0], dtype=int32)
```

```
X[y_means == 3,1]
```

```
array([ 93.,  97.,  98.,  94.,  97.,  95.,  91.,  98.,  92.,  98.,  94.,
        96.,  96.,  96.,  93.,  94.,  96.,  96.,  95.,  93.,  95.,  94.,
        92.,  91.,  92.,  95.,  94.,  95.,  92.,  94.,  91.,  95.,  93.,
        97.,  98.,  96.,  93., 100.,  96.,  94.,  95.,  93.,  92.,  98.,
        96.,  93.,  91.,  93.,  94.,  96.])
```

```
plt.scatter(X[y_means == 0,0],X[y_means == 0,1],color='blue')
plt.scatter(X[y_means == 1,0],X[y_means == 1,1],color='red')
plt.scatter(X[y_means == 2,0],X[y_means == 2,1],color='green')
plt.scatter(X[y_means == 3,0],X[y_means == 3,1],color='yellow')
```

```
<matplotlib.collections.PathCollection at 0x7bcd915e0f70>
```

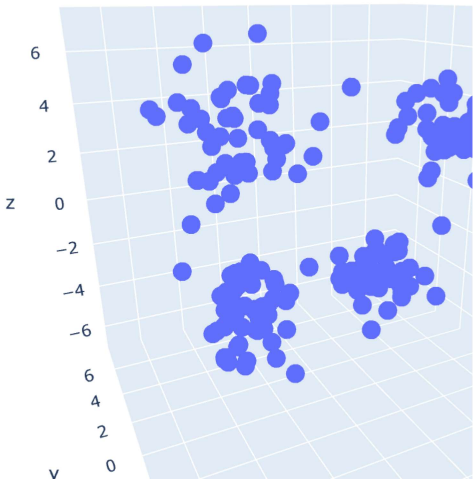


```
from sklearn.datasets import make_blobs

centroids = [(-5,-5,5),(5,5,-5),(3.5,-2.5,4),(-2.5,2.5,-4)]
cluster_std = [1,1,1,1]

X,y = make_blobs(n_samples=200,cluster_std=cluster_std,centers=centroids,n_features=3,random_state=1)
```

```
X
```

```
            [-3.37565464, -5.61175641,  4.47182825],
            [-2.37162301,  4.26041518, -3.03346075],
            [ 1.81594001, -3.6601701 ,  5.35010682],
            [ 5.04366899,  4.77368576, -3.66854289],
            [-4.19813897, -4.9534327 ,  4.81343023],
            [ 5.1340482 ,  6.20205486, -4.71525189],
            [ 3.39320601, -1.04857074,  3.38196315],
            [ 4.34086156, -2.60288722,  5.14690038],
            [-0.80619089,  2.69686978, -3.83013074],
            [-5.62353073, -4.47942366,  3.85565861],
            [ 5.56578332, -3.97115693,  3.1698281 ],
```

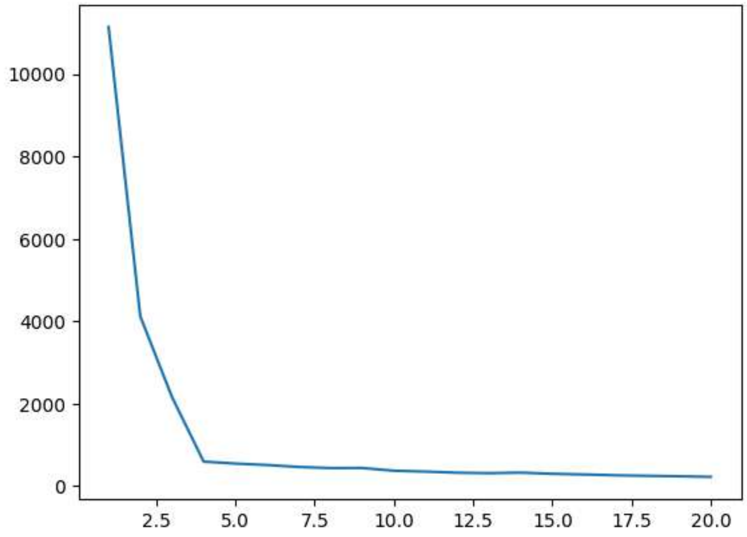
```
import plotly.express as px
fig = px.scatter_3d(x=X[:,0], y=X[:,1], z=X[:,2])
fig.show()
```



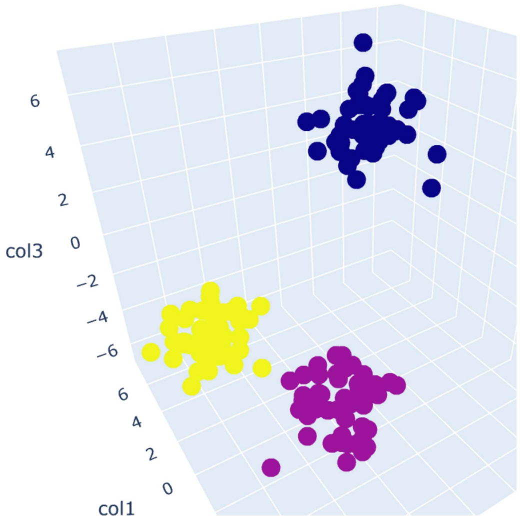
```
wcss = []
for i in range(1,21):
    km = KMeans(n_clusters=i)
    km.fit_predict(X)
    wcss.append(km.inertia_)
```

```
plt.plot(range(1,21),wcss)
```

```
[<matplotlib.lines.Line2D at 0x7bcd8cdca5f0>]
```



```
km = KMeans(n_clusters=4)
y_pred = km.fit_predict(X)


df = pd.DataFrame()

df['col1'] = X[:,0]
df['col2'] = X[:,1]
df['col3'] = X[:,2]
df['label'] = y_pred



fig = px.scatter_3d(df,x='col1', y='col2', z='col3',color='label')
fig.show()
```



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