K-means clustering

In [1]:

```
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.preprocessing import StandardScaler
from sklearn.cluster import KMeans
```

In [3]:

```
df = pd.read_csv("dataset.csv")
df.columns = ["CustomerID", "Gender", "Age", "Annual_Income", "Spending_Score"]
df.head(5)
```

Out[3]:

	CustomerID	Gender	Age	Annual_Income	Spending_Score
0	**1**	**Male**	**19**	**15**	**39**
1	**2**	**Male**	**21**	**15**	**81**
2	**3**	**Female**	**20**	**16**	**6**
3	**4**	**Female**	**23**	**16**	**77**
4	**5**	**Female**	**31**	**17**	**40**

In [4]:

```
df.shape
```

Out[4]:

```
(200, 5)
```

In [5]:

```
df.isnull().sum()
```

Out[5]:

```
CustomerID         0
Gender             0
Age                0
Annual_Income      0
Spending_Score     0
dtype: int64
```

In [6]:

```
X = df.iloc[:, [3,4]].values
X
```

Out[6]:

```
array([[ 15,  39],
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       [ 16,   6],
       [ 16,  77],
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       [ 18,  94],
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       [ 19,  99],
```

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```

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       [120,  79],
       [126,  28],
       [126,  74],
       [137,  18],
       [137,  83]], dtype=int64)
```

In [7]:

```
scaler = StandardScaler()
X = scaler.fit_transform(X)
X
```

Out[7]:

```
array([[-1.73899919, -0.43480148],
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```

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```

```
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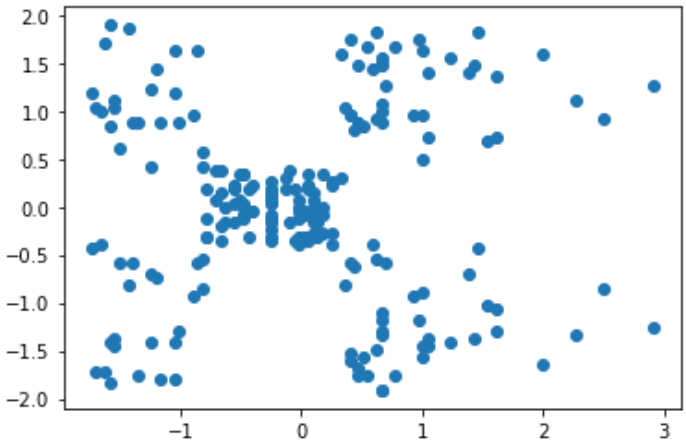
```

In [8]:

```
df.iloc[:, [3,4]] = X
```

In [9]:

```
plt.scatter(X[:, 0], X[:, 1])
plt.show()
```

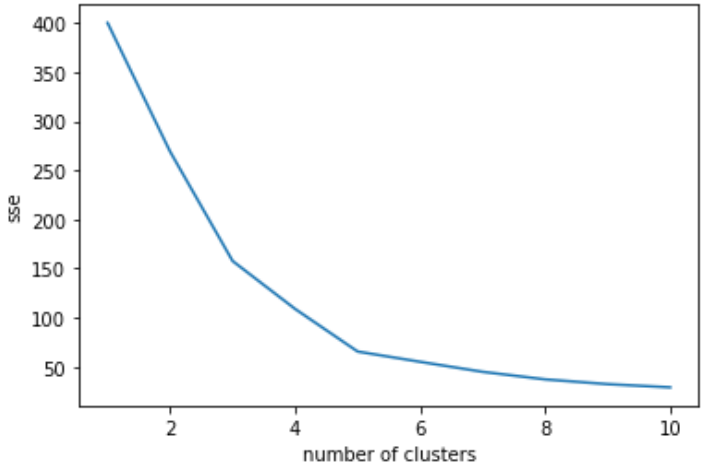


In [11]:

```
sse = []
for i in range(1,11):
    kmeans = KMeans(n_clusters=i, init="k-means++")
    kmeans.fit(X)
    sse.append(kmeans.inertia_)

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

```
plt.xlabel("number of clusters")
plt.ylabel("sse")
plt.show()
```



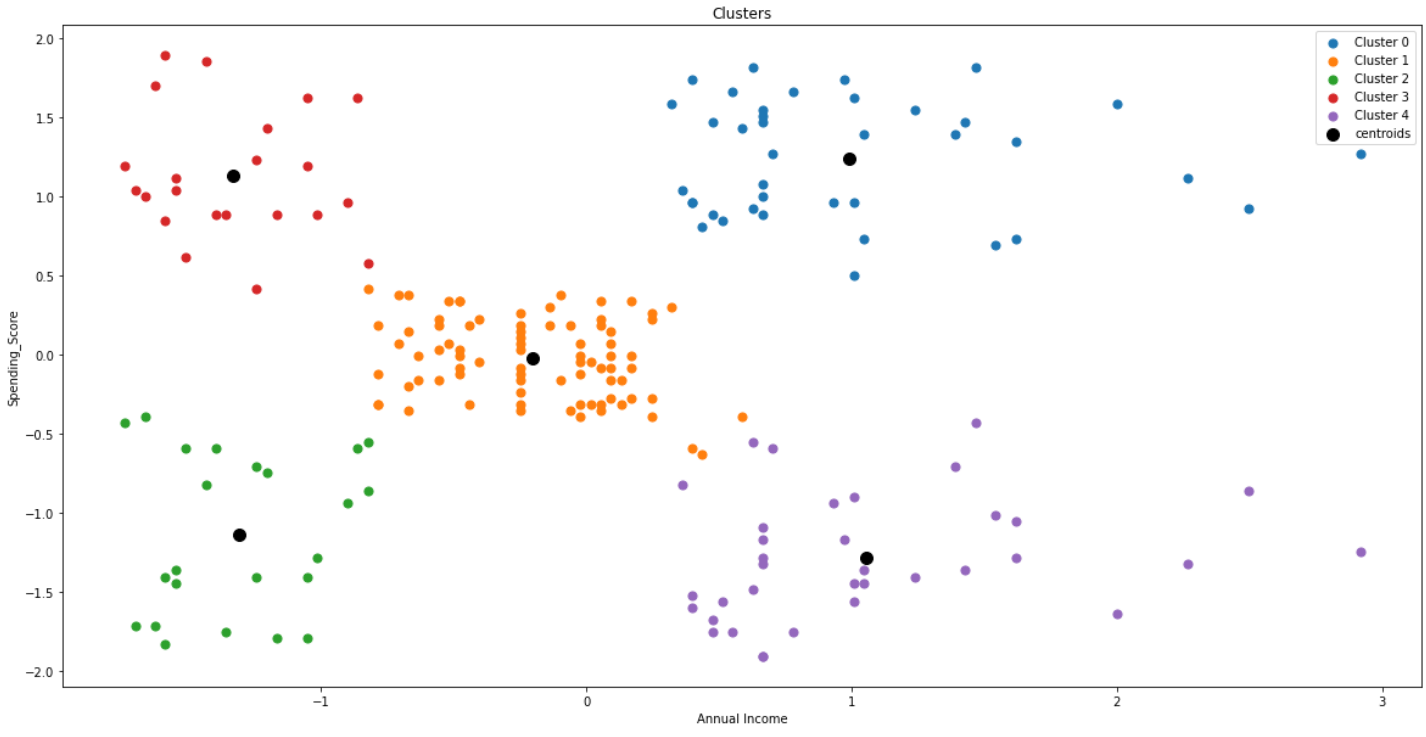
In [12]:

```
n_clusters = 5
model = KMeans(n_clusters=n_clusters, init="k-means++")
pred = model.fit_predict(X)
```

In [13]:

```
plt.figure(figsize=(20,10))
for i in range(0, n_clusters):
    plt.scatter(X[pred == i, 0], X[pred == i, 1], s=50, label="Cluster %d" % i)

plt.scatter(model.cluster_centers_[:,0], model.cluster_centers_[:,1], s = 100, c = 'blac
k', label='centroids')
plt.title("Clusters")
plt.xlabel("Annual Income")
plt.ylabel("Spending_Score")
plt.legend()
plt.show()
```



In [ ]: