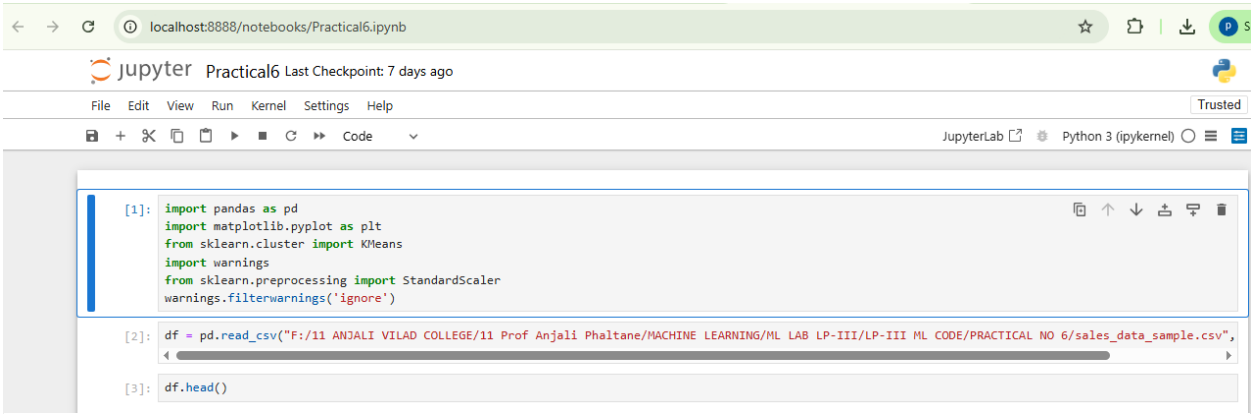
Practical No 5

Title: Implement K-Means clustering/ hierarchical clustering on sales_data_sample.csv dataset. Determine the number of clusters using the elbow method.

Dataset link : https://www.kaggle.com/datasets/kyanyoga/sample-sales-data




```
[3]: df.head()
```

[3]:

	ORDERNUMBER	QUANTITYORDERED	PRICEEACH	ORDERLINENUMBER	SALES	ORDERDATE	STATUS	QTR_ID	MONTH_ID	YEAR_ID	...	ADDRESSLINE1	ADDRESSI
0	10107	30	95.70	2	2871.00	2/24/2003 0:00	Shipped	1	2	2003	...	897 Long Airport Avenue	
1	10121	34	81.35	5	2765.90	5/7/2003 0:00	Shipped	2	5	2003	...	59 rue de l'Abbaye	
2	10134	41	94.74	2	3884.34	7/1/2003 0:00	Shipped	3	7	2003	...	27 rue du Colonel Pierre Avia	
3	10145	45	83.26	6	3746.70	8/25/2003 0:00	Shipped	3	8	2003	...	78934 Hillside Dr.	
4	10159	49	100.00	14	5205.27	10/10/2003 0:00	Shipped	4	10	2003	...	7734 Strong St.	

5 rows × 25 columns

[4]:
```
df.info()
```

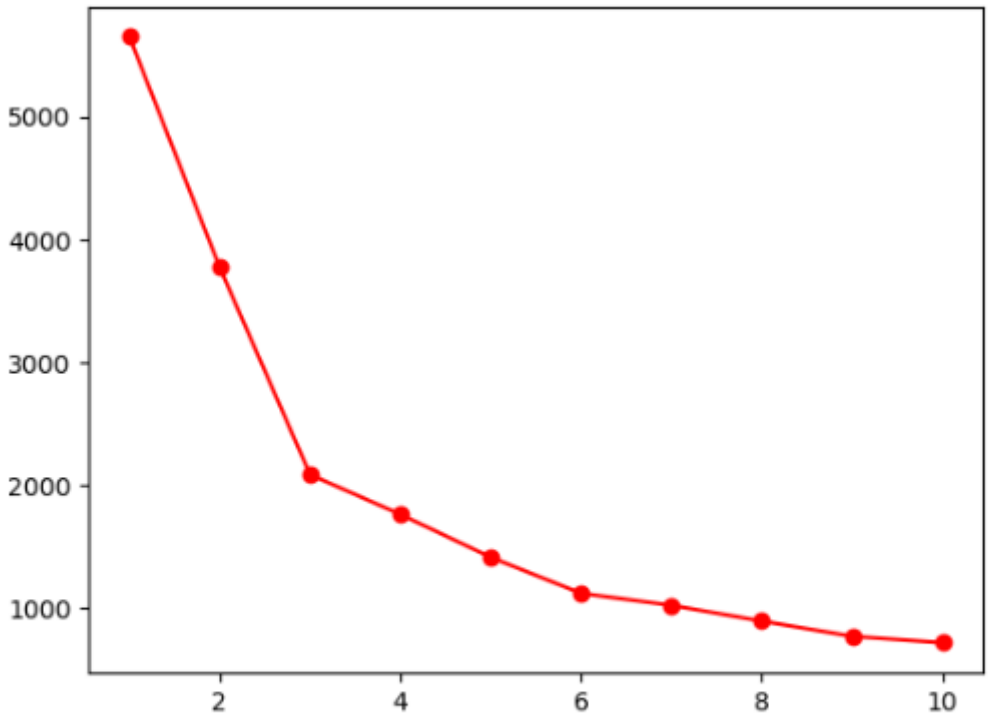
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2823 entries, 0 to 2822
Data columns (total 25 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   ORDERNUMBER       2823 non-null   int64
 1   QUANTITYORDERED   2823 non-null   int64
 2   PRICEEACH         2823 non-null   float64
 3   ORDERLINENUMBER   2823 non-null   int64
 4   SALES             2823 non-null   float64
 5   ORDERDATE         2823 non-null   object
 6   STATUS            2823 non-null   object
 7   QTR_ID            2823 non-null   int64
 8   MONTH_ID          2823 non-null   int64
 9   YEAR_ID           2823 non-null   int64
 10  PRODUCTLINE       2823 non-null   object
 11  MSRP              2823 non-null   int64
 12  PRODUCTCODE       2823 non-null   object
 13  CUSTOMERNAME      2823 non-null   object
 14  PHONE             2823 non-null   object
 15  ADDRESSLINE1      2823 non-null   object
 16  ADDRESSLINE2      302 non-null    object
 17  CITY              2823 non-null   object
 18  STATE             1337 non-null   object
 19  POSTALCODE        2747 non-null   object
 20  COUNTRY           2823 non-null   object
```

[5]:
```
df = df[['ORDERLINENUMBER', 'SALES']]
```

[6]:
```
scaler = StandardScaler()
scaled_values = scaler.fit_transform(df.values)
```

[7]:
```
wcss = []
for i in range(1, 11):
    model = KMeans(n_clusters=i, init='k-means++')
    model.fit_predict(scaled_values)
    wcss.append(model.inertia_)
```

[8]:
```
plt.plot(range(1, 11), wcss, 'ro-')
plt.show()
```



[9]:
```
model = KMeans(n_clusters=7, init='k-means++')
clusters = model.fit_predict(scaled_values)
clusters
```

[9]:
```
model = KMeans(n_clusters=7, init='k-means++')
clusters = model.fit_predict(scaled_values)
clusters
```

[9]:
```
array([4, 4, 0, ..., 0, 4, 6])
```

[11]:
```
df['cluster'] = clusters
```

[12]:
```
df
```

[12]:

	ORDERLINENUMBER	SALES	cluster
0	2	2871.00	4
1	5	2765.90	4
2	2	3884.34	0
3	6	3746.70	6
4	14	5205.27	2
...	...	...	...
2818	15	2244.40	5
2819	1	3978.51	0
2820	4	5417.57	0
2821	1	2116.16	4
2822	9	3079.44	6

2823 rows × 3 columns

[13]:
```
model.inertia_
```

[13]:
```
1015.2842531153531
```

[14]:
```
plt.scatter(df['ORDERLINENUMBER'], df['SALES'], c=df['cluster'])
plt.show()
```