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DA-1

Importing Libraries

```
In [1]: 1 import numpy as np
2 import pandas as pd
3 import matplotlib.pyplot as plt
4 from bs4 import BeautifulSoup as bs
5 import requests
6 from warnings import filterwarnings
7 filterwarnings("ignore")
```

Using Web Scraping to collect the data

```
In [2]: 1 while True:
2     try:
3         link = 'https://www.flipkart.com/search?q=laptops&otracker=search&otracker1=search&marketplace=FLIPKART&as-show=on&as-off'
4         print(link)
5         page = requests.get(link)
6         print(page)
7         break
8     except:
9         pass
```

```
https://www.flipkart.com/search?q=laptops&otracker=search&otracker1=search&marketplace=FLIPKART&as-show=on&as-off (https://www.flipkart.com/search?q=laptops&otracker=search&otracker1=search&marketplace=FLIPKART&as-show=on&as-off)
<Response [200]>
```

```
In [3]: 1 soup = bs(page.content,'html.parser')
```

```
In [4]: 1 # items = soup.find_all('div',class_='_4rR01T")
2 # items=[i.get_text() for i in items]
3 # items = [i.split(" - (")[-1] for i in items]
```

```
In [5]: 1 details = soup.find_all("li",class_="rgWa7D")
2 details = [i.get_text() for i in details]
```

```
In [6]: 1 lis,newlis=[[],[]]
2 for i in details:
3     if ("Intel ")in i or ("AMD ") in i or ("M1") in i:
4         if newlis:
5             lis.append(newlis)
6             newlis=[]
7             newlis.append(i)
8         else:
9             newlis.append(i)
10    else:
11        newlis.append(i)
12 newlisnew=[]
13 for i in lis:
14     newlisnew.append(" ".join(i))
```

```
In [7]: 1 items = []
2 for i in newlisnew:
3     if ' GB DDR4' in i:
4         items.append(i.split(" GB DDR4")[0][:-2])
5     elif ' GB DDR3' in i:
6         items.append(i.split(" GB DDR3")[0][:-2])
7     elif ' GB LPDDR4X' in i:
8         items.append(i.split(" GB LPDDR4X")[0][:-2])
9     else:
10        items.append("")
11 company = [i.split()[0] for i in items]
```

```
In [8]: 1 pages=soup.find_all('a',class_='ge-49M',href=True)
2 pages = [str(i).split('>')[0][31:] for i in pages ]
```

```
In [9]: 1 ratings = soup.find_all("div",class_='_3LWZIK')
2 ratings = [i.get_text() for i in ratings]
```

```
In [10]: 1 prices = soup.find_all("div",class_="_30jeq3 _1_WHN1")
2 prices = [i.get_text().replace("₹","").replace(",","") for i in prices]
```

```
In [11]: 1 # details = soup.find_all("li",class_="rgWa7D")
2 # details = [i.get_text() for i in details]
```

```
In [12]: 1 # indepth_link = soup.find_all("a",class_ = '_1fQZEK')
```

```
In [13]: 1 # start= str(indepth_link[0]).index("href=")
2 # end = str(indepth_link[0]).index(" rel=")
3 # links = ['https://www.flipkart.com'+str(str(i)[start+6:end-1]) for i in indepth_link]
```

```
In [14]: 1 lis,newlis=[],[]
2 for i in details:
3     if ("Intel ")in i or ("AMD ") in i or ("M1") in i :
4         if newlis:
5             lis.append(newlis)
6             newlis=[]
7             newlis.append(i)
8         else:
9             newlis.append(i)
10    else:
11        newlis.append(i)
12 newlisnew=[]
13 for i in lis:
14     newlisnew.append(" ".join(i))
```

Collecting data and filtering everything

In [15]:

```
1 processor_brand=[]
2 processor = []
3 ram = []
4 ram_type=[]
5 os = []
6 screen_size=[]
7 ssd_present=[]
8 ssd_capacity=[]
9 hdd_capacity=[]
10 # count=0
11 for i in newlistnew:
12     if "Intel" in i:
13         #     print(count)
14         processor_brand.append("Intel")
15         processor.append(i.split()[1]+" "+i.split()[2])
16     elif 'AMD' in i:
17         #     print(count)
18         processor_brand.append("AMD")
19         processor.append(i.split()[1]+" "+i.split()[2])
20     elif "M1" in i:
21         #     print(count)
22         processor_brand.append("M1")
23         processor.append(i.split()[1]+" "+i.split()[2])
24     else:
25         processor_brand.append("")
26         processor.append("")
27     # count+=1
28     if ' GB DDR4 RAM' in i:
29         index = i.index(' GB DDR4 RAM')
30         ram.append(i[index-2:index])
31         ram_type.append("DDR4")
32     elif ' GB DDR3' in i:
33         index = i.index(' GB DDR3 RAM')
34         ram.append(i[index-2:index])
35         ram_type.append("DDR3")
36     else:
37         ram.append("")
38     if ' Operating System' in i:
39         a = i.split()
40         index = a.index("Operating")
41         if a[index-1]=="10":
42             os.append("Windows 10")
43         elif a[index-2]=='Mac':
44             os.append("Mac Os")
45         else:
46             os.append(a[index-1])
47     else:
48         os.append("")
49     if "inch" in i:
50         a = i.split()
51         if 'inches' in a:
52             index = a.index("inches")
53         else:
54             index = a.index("inch")
55         screen_size.append(a[index-1].strip("(")+" inch")
56     if (" GB SSD" in i) or (" TB SSD" in i):
57         ssd_present.append("Yes")
58         if " GB SSD" in i:
59             start = i.index(" GB SSD")-3
60             end=i.index(" GB SSD")
61             ssd_capacity.append(i[start:end])
62         elif ' TB SSD' in i:
63             index = i.index(" TB SSD")
64             ssd_capacity.append(int([index-1])*1024)
65     else:
66         ssd_present.append("No")
67         ssd_capacity.append("")
68     if " HDD" in i:
69         index = i.index(" HDD")
70         hdd_capacity.append(i[index-4])
71     else:
72         hdd_capacity.append("")
```

Creating a dataframe in order to carry out further steps

```
In [16]: data = pd.DataFrame({
    'items':items[:len(processor)],
    'company':company[:len(processor)],
    'ratings_out_of_5':ratings[:len(processor)],
    'prices':prices[:len(processor)],
    'processor_brand':processor_brand,
    'processor':processor,
    'ram':ram,
    'ram_type':ram_type,
    'operating_system':os,
    'screen_size':screen_size,
    'ssd_present':ssd_present,
    'ssd_capacity':ssd_capacity,
    'hdd_capacity_in_TB':hdd_capacity,
    'Purchased': [np.random.choice(["No","Yes"]) for i in range(0,len(processor))]})
data.to_csv("Dataset.csv",index=False)
# Name of Laptop
# Company of laptop (or Laptop belongs to which company) (Categorical)
# What are the rating mentioned overall to the device (continuous)
# Price of the laptop (continuous)
# what is the processor of the laptop this will be categorical as Intel or AMD (Categorical)
# Type of processor of the laptop (Categorical)
# how much ram does it have (Categorical)
# what is the type of ram (Categorical)
# consist of which operating system by default (Categorical)
# Screen-size of the laptop (Categorical)
# is SSD present in the laptop (Categorical)
# What is the capacity of the SSD (continuous)
# What is the capacity of HDD (Categorical)
# this is generated randomly whether the customer will buy a laptop or not
# Storing data into csv file
```

In [17]: 1 data.shape

Out[17]: (23, 14)

In [18]: 1 data = data.replace("",np.nan)

In [19]: 1 data.head()

Out[19]:

	items	company	ratings out of 5	prices	processor_brand	processor	ram	ram_type	operating_system	screen_size	ssd_present	ssd_capacity	hdd_capacity_in_TB	
0	AMD Ryzen 5 Quad Core Processor (3rd Gen)	AMD	4.4	48990	AMD	Ryzen 5	8	DDR4	Windows 10	14 inch	Yes	256	1	
1	Intel Core i3 Processor (10th Gen)	Intel	4	35990	Intel	Core i3	8	DDR4	Windows 10	15.6 inch	Yes	256	NaN	
2	Intel Core i5 Processor (9th Gen)	Intel	4.5	52990	Intel	Core i5	8	DDR4	Windows 10	15.6 inch	Yes	512	NaN	
3	Intel Core i3 Processor (10th Gen)	Intel	4.2	33490	Intel	Core i3	4	DDR4	Windows 10	15.6 inch	Yes	256	NaN	
4	Intel Core i3 Processor (10th Gen)	Intel	4.2	35990	Intel	Core i3	8	DDR4	Windows 10	14 inch	Yes	256	NaN	

In [20]: 1 data.isnull().sum()

Out[20]:

items	0
company	0
ratings_out_of_5	0
prices	0
processor_brand	0
processor	0
ram	0
ram_type	0
operating_system	0
screen_size	0
ssd_present	0
ssd_capacity	4
hdd_capacity_in_TB	14
Purchased	0
dtype: int64	

Filling null values

```
In [21]: 1 data = data.replace(np.nan,0)
2 data.head()
```

Out[21]:

	items	company	ratings out of 5	prices	processor_brand	processor	ram	ram_type	operating_system	screen_size	ssd_present	ssd_capacity	hdd_capacity_in_TB
0	AMD Ryzen 5 Quad Core Processor (3rd Gen)	AMD	4.4	48990	AMD	Ryzen 5	8	DDR4	Windows 10	14 inch	Yes	256	1
1	Intel Core i3 Processor (10th Gen)	Intel	4	35990	Intel	Core i3	8	DDR4	Windows 10	15.6 inch	Yes	256	0
2	Intel Core i5 Processor (9th Gen)	Intel	4.5	52990	Intel	Core i5	8	DDR4	Windows 10	15.6 inch	Yes	512	0
3	Intel Core i3 Processor (10th Gen)	Intel	4.2	33490	Intel	Core i3	4	DDR4	Windows 10	15.6 inch	Yes	256	0
4	Intel Core i3 Processor (10th Gen)	Intel	4.2	35990	Intel	Core i3	8	DDR4	Windows 10	14 inch	Yes	256	0

Using train test split and selecting features

```
In [22]: 1 from sklearn.model_selection import train_test_split
2 x = data.drop(["items", "Purchased"], axis=1)
3 y = data[["Purchased"]]
```

Transforming string to numeric

```
In [23]: 1 from sklearn.preprocessing import LabelEncoder
2 le = LabelEncoder()
3 x[["company"]] = le.fit_transform(x[["company"]])
4 x[["processor_brand"]] = le.fit_transform(x[["processor_brand"]])
5 x[["processor"]] = le.fit_transform(x[["processor"]])
6 x[["ram_type"]] = le.fit_transform(x[["ram_type"]])
7 x[["operating_system"]] = le.fit_transform(x[["operating_system"]])
8 x[["screen_size"]] = le.fit_transform(x[["screen_size"]])
9 x[["ssd_present"]] = le.fit_transform(x[["ssd_present"]])
10 y["Purchased"] = le.fit_transform(y[["Purchased"]])
```

```
In [24]: 1 xtrain,xtest,ytrain,ytest = train_test_split(x,y,shuffle=True,test_size=0.1)
```

Using Logistic Regression

```
In [25]: 1 from sklearn.linear_model import LogisticRegression
2 lr = LogisticRegression()
3 lr.fit(xtrain,ytrain)
4 predictions = lr.predict(xtest)
```

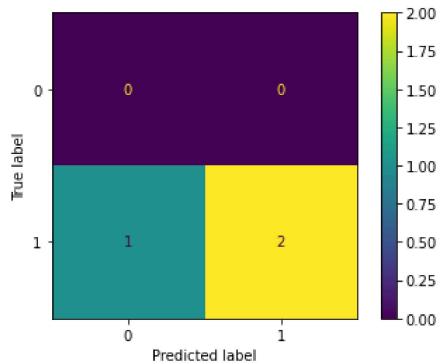
```
In [26]: 1 predictions
```

Out[26]: array([0, 1, 1])

Using Confusion Matrix and accuracy score to find how much better the algorithm performs

```
In [27]: 1 from sklearn.metrics import accuracy_score,plot_confusion_matrix  
2 plot_confusion_matrix(lr,xtest,ytest)
```

Out[27]: <sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x2f92a0d4af0>



```
In [28]: 1 accuracy_score(predictions,ytest)
```

Out[28]: 0.6666666666666666