In [21]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

In [2]:
```
df = pd.read_csv('laptop_data.csv')
```

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

Out[3]:

	Unnamed: 0	Company	TypeName	Inches	ScreenResolution	Cpu	Ram	Memory	Gpu
0	0	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 2.3GHz	8GB	128GB SSD	Intel Iris Plus Graphics 640
1	1	Apple	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8GB	128GB Flash Storage	Intel HD Graphics 6000
2	2	HP	Notebook	15.6	Full HD 1920x1080	Intel Core i5 7200U 2.5GHz	8GB	256GB SSD	Intel HD Graphics 620
3	3	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.7GHz	16GB	512GB SSD	AMD Radeon Pro 455
4	4	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 3.1GHz	8GB	256GB SSD	Intel Iris Plus Graphics 650

In [4]:
```
df.shape
```

Out[4]:
```
(1303, 12)
```

In [5]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1303 entries, 0 to 1302
Data columns (total 12 columns):
 #   Column            Non-Null Count  Dtype  
---  ------            --------------  -----  
 0   Unnamed: 0        1303 non-null   int64  
 1   Company           1303 non-null   object 
 2   TypeName          1303 non-null   object 
 3   Inches            1303 non-null   float64
 4   ScreenResolution  1303 non-null   object 
 5   Cpu               1303 non-null   object 
 6   Ram               1303 non-null   object 
 7   Memory            1303 non-null   object 
 8   Gpu               1303 non-null   object 
 9   OpSys             1303 non-null   object 
 10  Weight            1303 non-null   object 
 11  Price             1303 non-null   float64
dtypes: float64(2), int64(1), object(9)
memory usage: 122.3+ KB
```

In [6]:
```
df.duplicated().sum()
```

Out[6]:
```
0
```

In [7]:
```
df.isnull().sum()
```

Out[7]:
```
Unnamed: 0          0
Company             0
TypeName            0
Inches              0
ScreenResolution    0
Cpu                 0
Ram                 0
Memory              0
Gpu                 0
OpSys               0
Weight              0
Price               0
dtype: int64
```

In [8]:
```
df.drop(columns=['Unnamed: 0'],inplace=True)
```

In [9]:
```
df.head()
```

Out[9]:

	Company	TypeName	Inches	ScreenResolution	Cpu	Ram	Memory	Gpu	OpSys	W
0	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 2.3GHz	8GB	128GB SSD	Intel Iris Plus Graphics 640	macOS	1
1	Apple	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8GB	128GB Flash Storage	Intel HD Graphics 6000	macOS	1
2	HP	Notebook	15.6	Full HD 1920x1080	Intel Core i5 7200U 2.5GHz	8GB	256GB SSD	Intel HD Graphics 620	No OS	1
3	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.7GHz	16GB	512GB SSD	AMD Radeon Pro 455	macOS	1
4	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 3.1GHz	8GB	256GB SSD	Intel Iris Plus Graphics 650	macOS	1

In [13]:
```
df['Ram'] = df['Ram'].str.replace('GB','')
df['Weight'] = df['Weight'].str.replace('kg','')
```

In [14]:
```
df.head()
```

Out[14]:

	Company	TypeName	Inches	ScreenResolution	Cpu	Ram	Memory	Gpu	OpSys	We
0	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 2.3GHz	8	128GB SSD	Intel Iris Plus Graphics 640	macOS	
1	Apple	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8	128GB Flash Storage	Intel HD Graphics 6000	macOS	
2	HP	Notebook	15.6	Full HD 1920x1080	Intel Core i5 7200U 2.5GHz	8	256GB SSD	Intel HD Graphics 620	No OS	
3	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.7GHz	16	512GB SSD	AMD Radeon Pro 455	macOS	
4	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 3.1GHz	8	256GB SSD	Intel Iris Plus Graphics 650	macOS	

In [15]:
```
df['Ram'] = df['Ram'].astype('int32')
df['Weight'] = df['Weight'].astype('float32')
```

In [16]:
```
df.info()
```

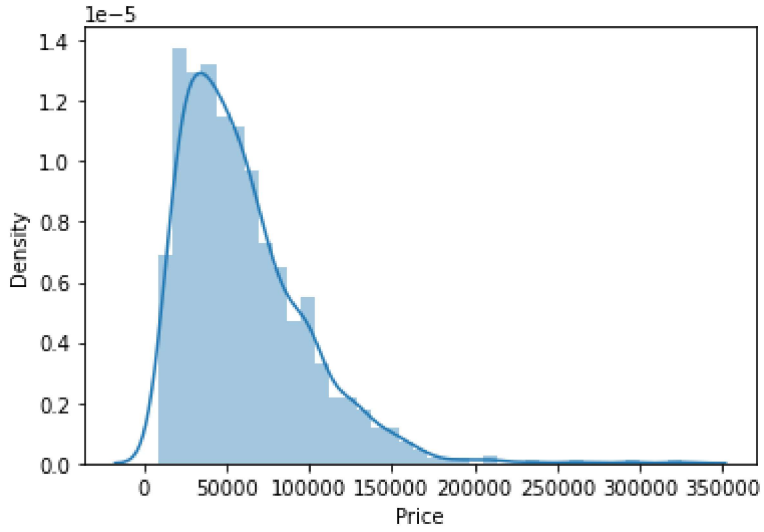
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1303 entries, 0 to 1302
Data columns (total 11 columns):
 #   Column            Non-Null Count  Dtype  
---  ------            --------------  -----  
 0   Company           1303 non-null   object 
 1   TypeName          1303 non-null   object 
 2   Inches            1303 non-null   float64
 3   ScreenResolution  1303 non-null   object 
 4   Cpu               1303 non-null   object 
 5   Ram               1303 non-null   int32  
 6   Memory            1303 non-null   object 
 7   Gpu               1303 non-null   object 
 8   OpSys             1303 non-null   object 
 9   Weight            1303 non-null   float32
 10  Price             1303 non-null   float64
dtypes: float32(1), float64(2), int32(1), object(7)
memory usage: 101.9+ KB
```

In [17]:
```
import seaborn as sns
```

In [18]:
```
sns.distplot(df['Price'])
```

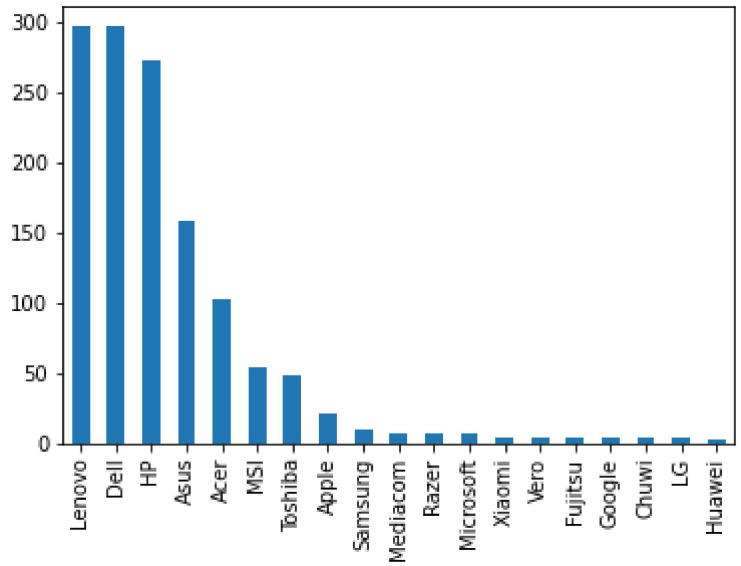
```
C:\Users\91842\anaconda3\lib\site-packages\seaborn\distributions.py:2557: Fut
ureWarning: `distplot` is a deprecated function and will be removed in a futu
re version. Please adapt your code to use either `displot` (a figure-level fu
nction with similar flexibility) or `histplot` (an axes-level function for hi
stograms).
  warnings.warn(msg, FutureWarning)
```

Out[18]: <AxesSubplot:xlabel='Price', ylabel='Density'>

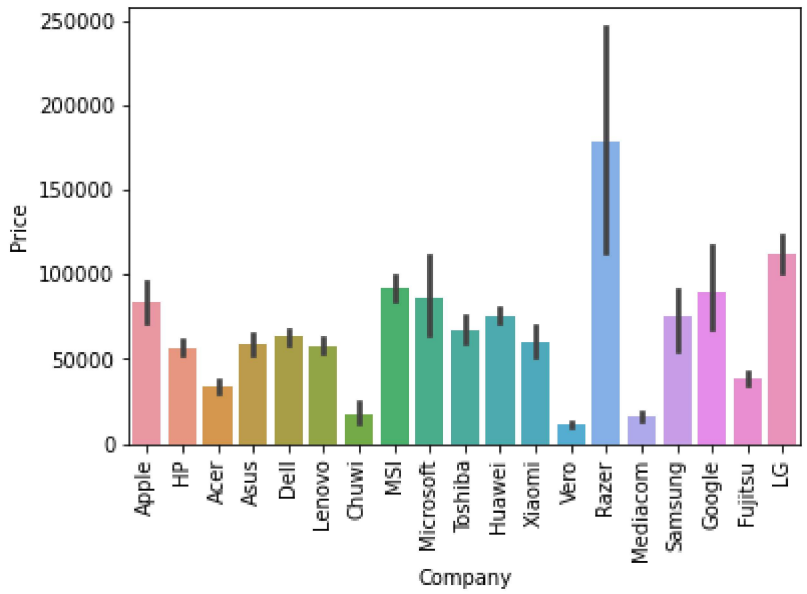


In [19]:
```
df['Company'].value_counts().plot(kind='bar')
```

Out[19]: <AxesSubplot:>

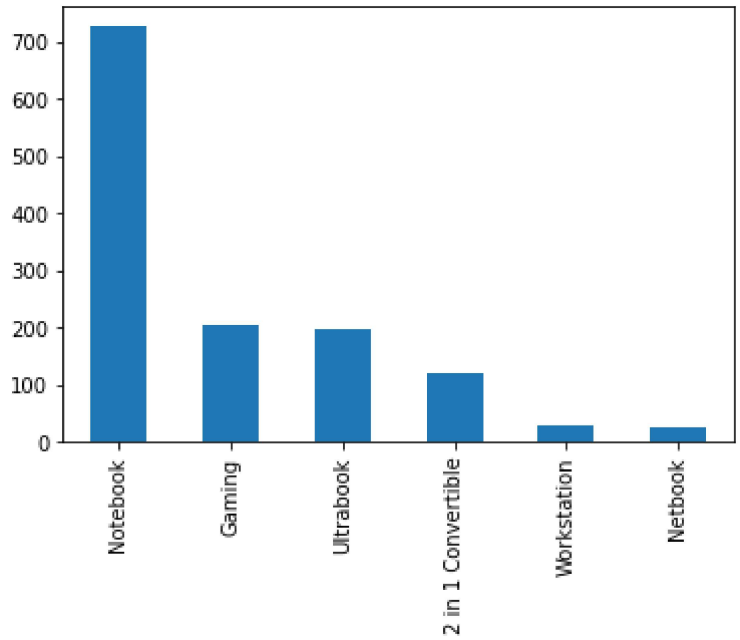


In [27]:
```
sns.barplot(x=df['Company'],y=df['Price'])
plt.xticks(rotation='vertical')
plt.show()
```

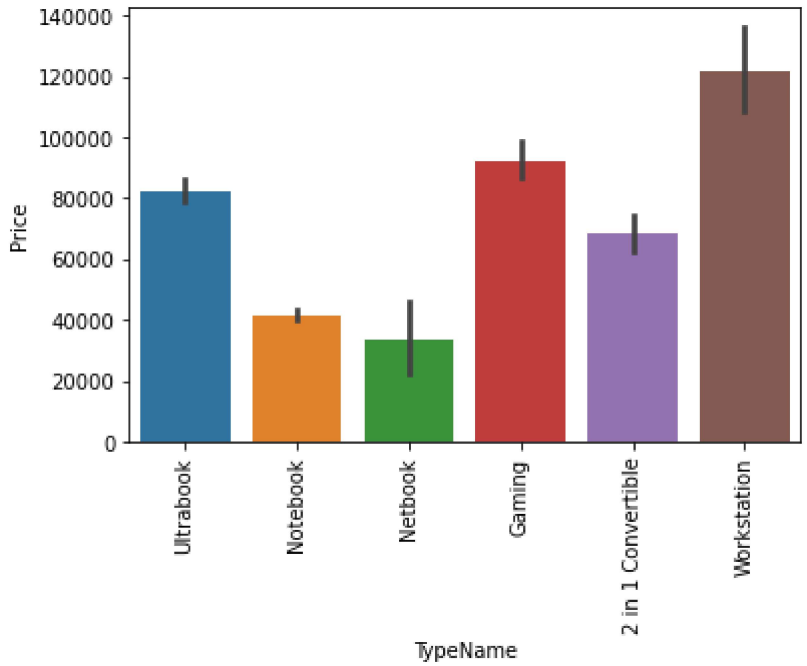


In [28]:
```
df['TypeName'].value_counts().plot(kind='bar')
```

Out[28]: <AxesSubplot:>



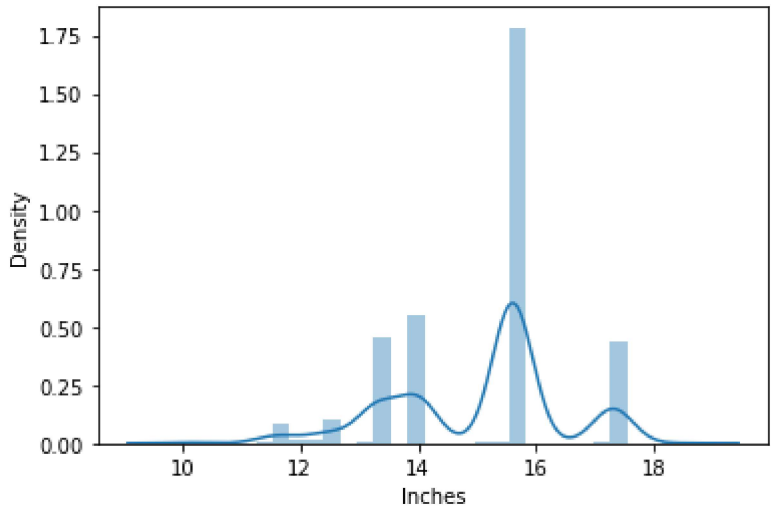
In [29]:
```
sns.barplot(x=df['TypeName'],y=df['Price'])
plt.xticks(rotation='vertical')
plt.show()
```



In [30]:
```
sns.distplot(df['Inches'])
```

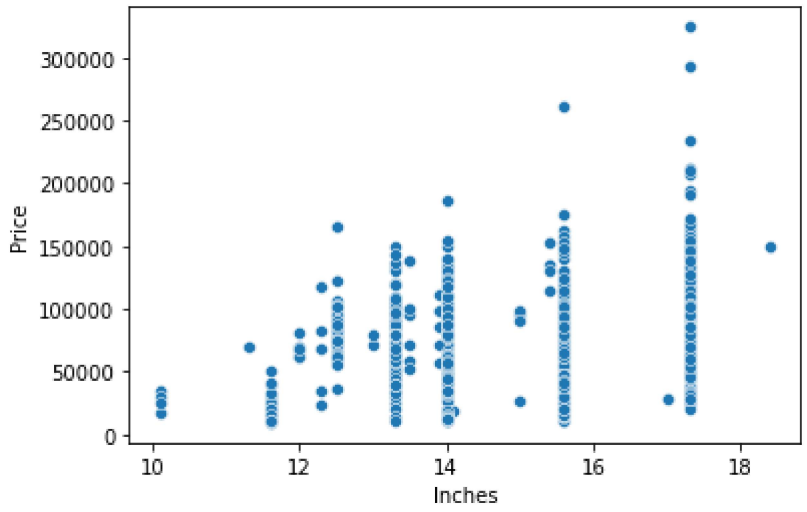
```
C:\Users\91842\anaconda3\lib\site-packages\seaborn\distributions.py:2557: Fut
ureWarning: `distplot` is a deprecated function and will be removed in a futu
re version. Please adapt your code to use either `displot` (a figure-level fu
nction with similar flexibility) or `histplot` (an axes-level function for hi
stograms).
  warnings.warn(msg, FutureWarning)
```

Out[30]: <AxesSubplot:xlabel='Inches', ylabel='Density'>



In [31]:
```
sns.scatterplot(x=df['Inches'],y=df['Price'])
```

Out[31]: <AxesSubplot:xlabel='Inches', ylabel='Price'>



In [32]:
```
df['ScreenResolution'].value_counts()
```

Out[32]:
```
Full HD 1920x1080                                507
1366x768                                         281
IPS Panel Full HD 1920x1080                      230
IPS Panel Full HD / Touchscreen 1920x1080         53
Full HD / Touchscreen 1920x1080                   47
1600x900                                          23
Touchscreen 1366x768                              16
Quad HD+ / Touchscreen 3200x1800                  15
IPS Panel 4K Ultra HD 3840x2160                   12
IPS Panel 4K Ultra HD / Touchscreen 3840x2160     11
4K Ultra HD / Touchscreen 3840x2160               10
Touchscreen 2560x1440                              7
IPS Panel 1366x768                                 7
4K Ultra HD 3840x2160                              7
IPS Panel Quad HD+ / Touchscreen 3200x1800         6
Touchscreen 2256x1504                              6
IPS Panel Retina Display 2304x1440                 6
IPS Panel Retina Display 2560x1600                 6
IPS Panel Touchscreen 2560x1440                    5
IPS Panel 2560x1440                                4
IPS Panel Retina Display 2880x1800                 4
IPS Panel Touchscreen 1920x1200                    4
1440x900                                           4
Quad HD+ 3200x1800                                 3
IPS Panel Quad HD+ 2560x1440                       3
1920x1080                                          3
Touchscreen 2400x1600                              3
IPS Panel Touchscreen 1366x768                     3
2560x1440                                          3
IPS Panel Full HD 2160x1440                        2
IPS Panel Touchscreen / 4K Ultra HD 3840x2160      2
IPS Panel Quad HD+ 3200x1800                       2
Touchscreen / Full HD 1920x1080                    1
IPS Panel Retina Display 2736x1824                 1
IPS Panel Full HD 1920x1200                        1
IPS Panel Full HD 1366x768                         1
Touchscreen / 4K Ultra HD 3840x2160                1
IPS Panel Touchscreen 2400x1600                    1
IPS Panel Full HD 2560x1440                        1
Touchscreen / Quad HD+ 3200x1800                   1
Name: ScreenResolution, dtype: int64
```

In [34]:
```
df['Touchscreen'] = df['ScreenResolution'].apply(lambda x:1 if 'Touchscreen' i
```

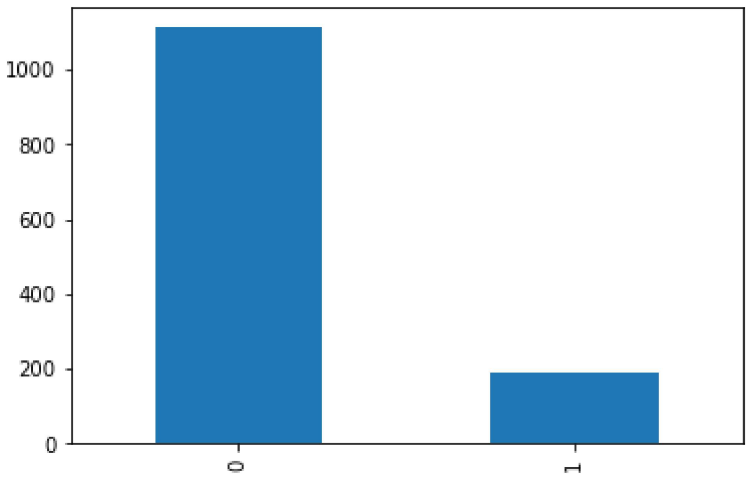
In [37]:
```
df.sample(5)
```

Out[37]:

	Company	TypeName	Inches	ScreenResolution	Cpu	Ram	Memory	Gpu	OpSy
1154	Dell	Notebook	15.6	IPS Panel Touchscreen / 4K Ultra HD 3840x2160	Intel Core i5 6300HQ 2.3GHz	8	256GB SSD	Nvidia GeForce 960M	Window 1
750	Lenovo	Netbook	11.6	Touchscreen 1366x768	Intel Celeron Dual Core N3060 1.6GHz	4	128GB SSD	Intel HD Graphics 400	Window 1
1246	Dell	Notebook	14.0	1366x768	Intel Core i5 7200U 2.5GHz	4	500GB HDD	Intel HD Graphics 620	Window 1
879	HP	Notebook	15.6	Full HD 1920x1080	Intel Core i5 7200U 2.5GHz	4	256GB SSD	Intel HD Graphics 620	Window 1
1021	Toshiba	Ultrabook	13.3	Full HD 1920x1080	Intel Core i5 6200U 2.3GHz	8	256GB SSD	Intel HD Graphics 520	Window 1

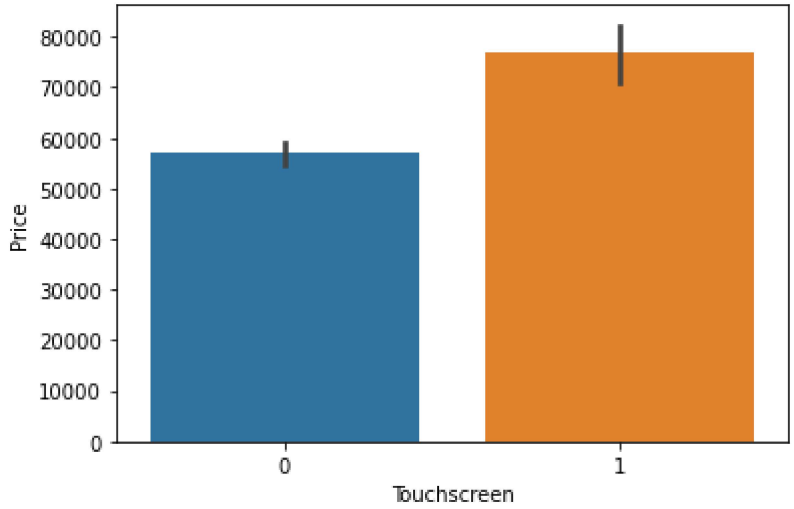
In [38]:
```
df['Touchscreen'].value_counts().plot(kind='bar')
```

Out[38]:
```
<AxesSubplot:>
```



In [39]:
```
sns.barplot(x=df['Touchscreen'],y=df['Price'])
```

Out[39]:
```
<AxesSubplot:xlabel='Touchscreen', ylabel='Price'>
```



In [40]:
```
df['Ips'] = df['ScreenResolution'].apply(lambda x:1 if 'IPS' in x else 0)
```

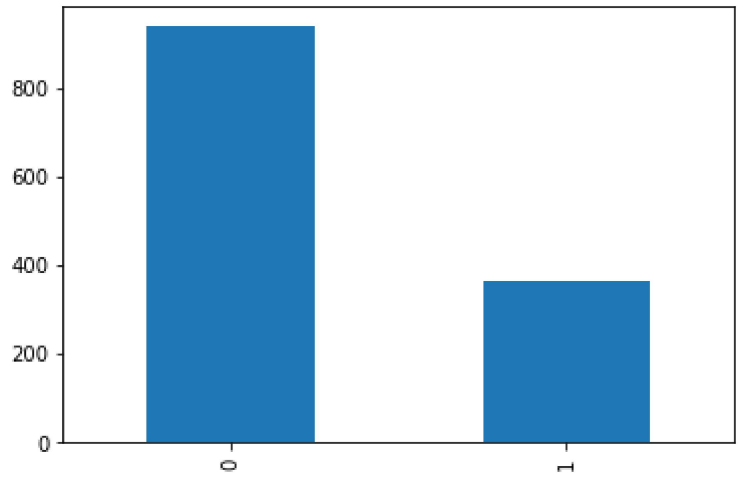
In [41]:
```
df.head()
```

Out[41]:

	Company	TypeName	Inches	ScreenResolution	Cpu	Ram	Memory	Gpu	OpSys	We
0	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 2.3GHz	8	128GB SSD	Intel Iris Plus Graphics 640	macOS	
1	Apple	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8	128GB Flash Storage	Intel HD Graphics 6000	macOS	
2	HP	Notebook	15.6	Full HD 1920x1080	Intel Core i5 7200U 2.5GHz	8	256GB SSD	Intel HD Graphics 620	No OS	
3	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.7GHz	16	512GB SSD	AMD Radeon Pro 455	macOS	
4	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 3.1GHz	8	256GB SSD	Intel Iris Plus Graphics 650	macOS	

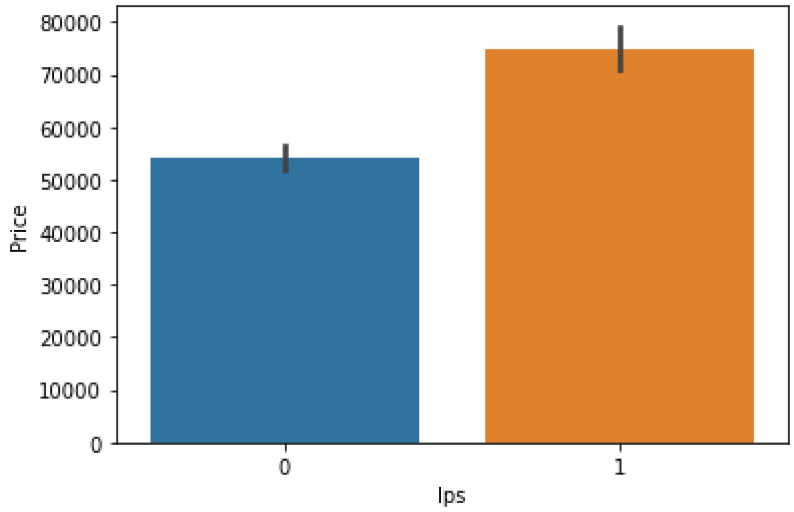
In [42]:
```
df['Ips'].value_counts().plot(kind='bar')
```

Out[42]: <AxesSubplot:>



In [43]:
```
sns.barplot(x=df['Ips'],y=df['Price'])
```

Out[43]: <AxesSubplot:xlabel='Ips', ylabel='Price'>



In [47]:
```
new = df['ScreenResolution'].str.split('x',n=1,expand=True)
```

In [48]:
```
df['X_res'] = new[0]
df['Y_res'] = new[1]
```

In [50]:
```
df.sample(5)
```

Out[50]:

	Company	TypeName	Inches	ScreenResolution	Cpu	Ram	Memory	Gpu	OpSy
141	Lenovo	Notebook	14.0	IPS Panel Full HD 1920x1080	Intel Core i5 8250U 1.6GHz	8	256GB SSD	AMD Radeon RX 550	Window 1
1055	HP	Notebook	15.6	1366x768	Intel Core i3 6100U 2.3GHz	4	500GB HDD	Intel HD Graphics 520	Window 1
75	Asus	Gaming	15.6	Full HD 1920x1080	Intel Core i7 7700HQ 2.8GHz	8	1TB HDD	Nvidia GeForce GTX 1050	Window 1
984	Toshiba	Notebook	14.0	1366x768	Intel Core i5 6200U 2.3GHz	4	500GB HDD	Intel HD Graphics 520	Window 1
337	HP	Notebook	15.6	Full HD 1920x1080	Intel Core i5 7200U 2.5GHz	8	256GB SSD	Intel HD Graphics 620	Window 1

In [59]:
```
df['X_res'] = df['X_res'].str.replace(',','').str.findall(r'(\d+\.?\d+)').appl
```

In [60]:
```
df.head()
```

Out[60]:

	Company	TypeName	Inches	ScreenResolution	Cpu	Ram	Memory	Gpu	OpSys	We
0	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 2.3GHz	8	128GB SSD	Intel Iris Plus Graphics 640	macOS	
1	Apple	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8	128GB Flash Storage	Intel HD Graphics 6000	macOS	
2	HP	Notebook	15.6	Full HD 1920x1080	Intel Core i5 7200U 2.5GHz	8	256GB SSD	Intel HD Graphics 620	No OS	
3	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.7GHz	16	512GB SSD	AMD Radeon Pro 455	macOS	
4	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 3.1GHz	8	256GB SSD	Intel Iris Plus Graphics 650	macOS	

In [62]:
```
df['X_res'] = df['X_res'].astype('int')
df['Y_res'] = df['Y_res'].astype('int')
```

In [63]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1303 entries, 0 to 1302
Data columns (total 15 columns):
 #   Column            Non-Null Count  Dtype  
---  ------            --------------  -----  
 0   Company           1303 non-null   object 
 1   TypeName          1303 non-null   object 
 2   Inches            1303 non-null   float64
 3   ScreenResolution  1303 non-null   object 
 4   Cpu               1303 non-null   object 
 5   Ram               1303 non-null   int32  
 6   Memory            1303 non-null   object 
 7   Gpu               1303 non-null   object 
 8   OpSys             1303 non-null   object 
 9   Weight            1303 non-null   float32
 10  Price             1303 non-null   float64
 11  Touchscreen       1303 non-null   int64  
 12  Ips               1303 non-null   int64  
 13  X_res             1303 non-null   int32  
 14  Y_res             1303 non-null   int32  
dtypes: float32(1), float64(2), int32(3), int64(2), object(7)
memory usage: 132.5+ KB
```

In [65]:
```
df.corr()['Price']
```

Out[65]:
```
Inches         0.068197
Ram            0.743007
Weight         0.210370
Price          1.000000
Touchscreen    0.191226
Ips            0.252208
X_res          0.556529
Y_res          0.552809
Name: Price, dtype: float64
```

In [68]:
```
df['ppi'] = (((df['X_res']**2) + (df['Y_res']**2))**0.5/df['Inches']).astype('
```

In [69]:
```
df.corr()['Price']
```

Out[69]:
```
Inches         0.068197
Ram            0.743007
Weight         0.210370
Price          1.000000
Touchscreen    0.191226
Ips            0.252208
X_res          0.556529
Y_res          0.552809
ppi            0.473487
Name: Price, dtype: float64
```

In [70]:
```
df.drop(columns=['ScreenResolution'],inplace=True)
```

In [71]:
```
df.head()
```

Out[71]:

	Company	TypeName	Inches	Cpu	Ram	Memory	Gpu	OpSys	Weight	Price
0	Apple	Ultrabook	13.3	Intel Core i5 2.3GHz	8	128GB SSD	Intel Iris Plus Graphics 640	macOS	1.37	71378.6832
1	Apple	Ultrabook	13.3	Intel Core i5 1.8GHz	8	128GB Flash Storage	Intel HD Graphics 6000	macOS	1.34	47895.5232
2	HP	Notebook	15.6	Intel Core i5 7200U 2.5GHz	8	256GB SSD	Intel HD Graphics 620	No OS	1.86	30636.0000
3	Apple	Ultrabook	15.4	Intel Core i7 2.7GHz	16	512GB SSD	AMD Radeon Pro 455	macOS	1.83	135195.3360
4	Apple	Ultrabook	13.3	Intel Core i5 3.1GHz	8	256GB SSD	Intel Iris Plus Graphics 650	macOS	1.37	96095.8080

In [72]:
```
df.drop(columns=['Inches','X_res','Y_res'],inplace=True)
```

In [73]:
```
df.head()
```

Out[73]:

	Company	TypeName	Cpu	Ram	Memory	Gpu	OpSys	Weight	Price	Touchsc
0	Apple	Ultrabook	Intel Core i5 2.3GHz	8	128GB SSD	Intel Iris Plus Graphics 640	macOS	1.37	71378.6832	
1	Apple	Ultrabook	Intel Core i5 1.8GHz	8	128GB Flash Storage	Intel HD Graphics 6000	macOS	1.34	47895.5232	
2	HP	Notebook	Intel Core i5 7200U 2.5GHz	8	256GB SSD	Intel HD Graphics 620	No OS	1.86	30636.0000	
3	Apple	Ultrabook	Intel Core i7 2.7GHz	16	512GB SSD	AMD Radeon Pro 455	macOS	1.83	135195.3360	
4	Apple	Ultrabook	Intel Core i5 3.1GHz	8	256GB SSD	Intel Iris Plus Graphics 650	macOS	1.37	96095.8080	

In [74]:
```
df['Cpu'].value_counts()
```

Out[74]:
```
Intel Core i5 7200U 2.5GHz               190
Intel Core i7 7700HQ 2.8GHz              146
Intel Core i7 7500U 2.7GHz               134
Intel Core i7 8550U 1.8GHz                73
Intel Core i5 8250U 1.6GHz                72
                                        ...
Intel Celeron Quad Core N3710 1.6GHz       1
Intel Core i5 7200U 2.7GHz                 1
Intel Pentium Dual Core N4200 1.1GHz       1
AMD FX 8800P 2.1GHz                        1
Intel Atom x5-Z8300 1.44GHz                1
Name: Cpu, Length: 118, dtype: int64
```

In [79]:
```
df['Cpu Name'] = df['Cpu'].apply(lambda x:" ".join(x.split()[0:3]))
```

In [80]:
```
df.head()
```

Out[80]:

	Company	TypeName	Cpu	Ram	Memory	Gpu	OpSys	Weight	Price	Touchsc
0	Apple	Ultrabook	Intel Core i5 2.3GHz	8	128GB SSD	Intel Iris Plus Graphics 640	macOS	1.37	71378.6832	
1	Apple	Ultrabook	Intel Core i5 1.8GHz	8	128GB Flash Storage	Intel HD Graphics 6000	macOS	1.34	47895.5232	
2	HP	Notebook	Intel Core i5 7200U 2.5GHz	8	256GB SSD	Intel HD Graphics 620	No OS	1.86	30636.0000	
3	Apple	Ultrabook	Intel Core i7 2.7GHz	16	512GB SSD	AMD Radeon Pro 455	macOS	1.83	135195.3360	
4	Apple	Ultrabook	Intel Core i5 3.1GHz	8	256GB SSD	Intel Iris Plus Graphics 650	macOS	1.37	96095.8080	

In [81]:
```
def fetch_processor(text):
    if text == 'Intel Core i7' or text == 'Intel Core i5' or text == 'Intel Co
        return text
    else:
        if text.split()[0] == 'Intel':
            return 'Other Intel Processor'
        else:
            return 'AMD Processor'
```

In [82]:
```
df['Cpu brand'] = df['Cpu Name'].apply(fetch_processor)
```

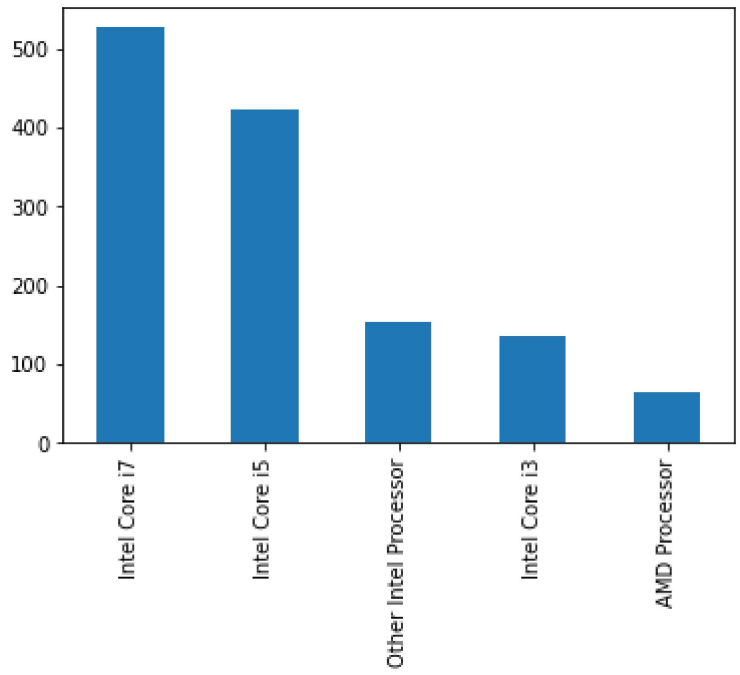
In [83]:
```
df.head()
```

Out[83]:

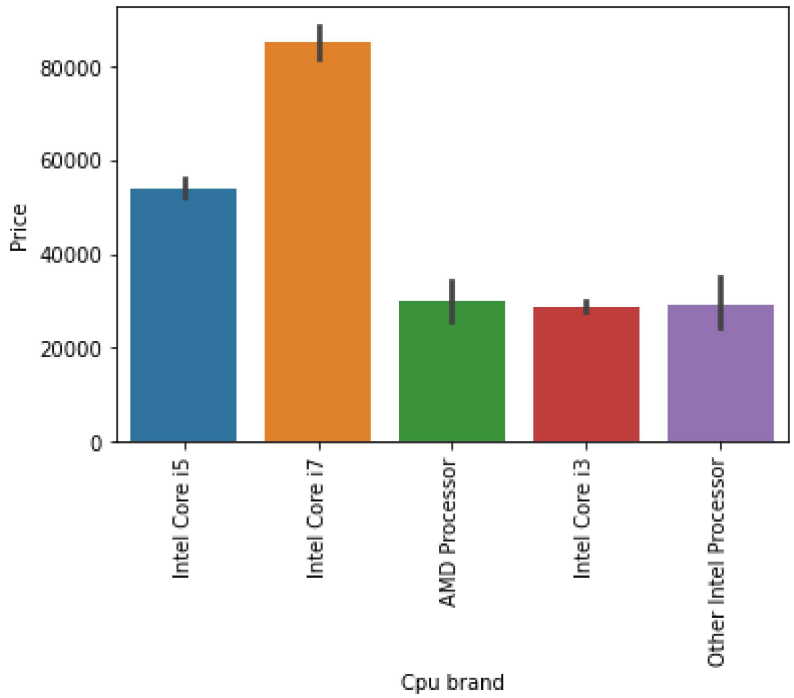
	Company	TypeName	Cpu	Ram	Memory	Gpu	OpSys	Weight	Price	Touchsc
0	Apple	Ultrabook	Intel Core i5 2.3GHz	8	128GB SSD	Intel Iris Plus Graphics 640	macOS	1.37	71378.6832	
1	Apple	Ultrabook	Intel Core i5 1.8GHz	8	128GB Flash Storage	Intel HD Graphics 6000	macOS	1.34	47895.5232	
2	HP	Notebook	Intel Core i5 7200U 2.5GHz	8	256GB SSD	Intel HD Graphics 620	No OS	1.86	30636.0000	
3	Apple	Ultrabook	Intel Core i7 2.7GHz	16	512GB SSD	AMD Radeon Pro 455	macOS	1.83	135195.3360	
4	Apple	Ultrabook	Intel Core i5 3.1GHz	8	256GB SSD	Intel Iris Plus Graphics 650	macOS	1.37	96095.8080	

In [84]:
```
df['Cpu brand'].value_counts().plot(kind='bar')
```

Out[84]:
```
<AxesSubplot:>
```



In [87]:
```
sns.barplot(x=df['Cpu brand'],y=df['Price'])
plt.xticks(rotation='vertical')
plt.show()
```



In [88]:
```
df.drop(columns=['Cpu','Cpu Name'],inplace=True)
```

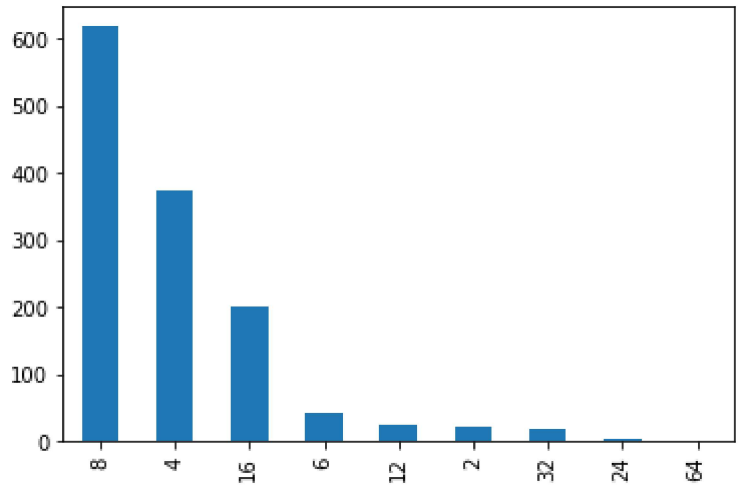
In [89]:
```
df.head()
```

Out[89]:

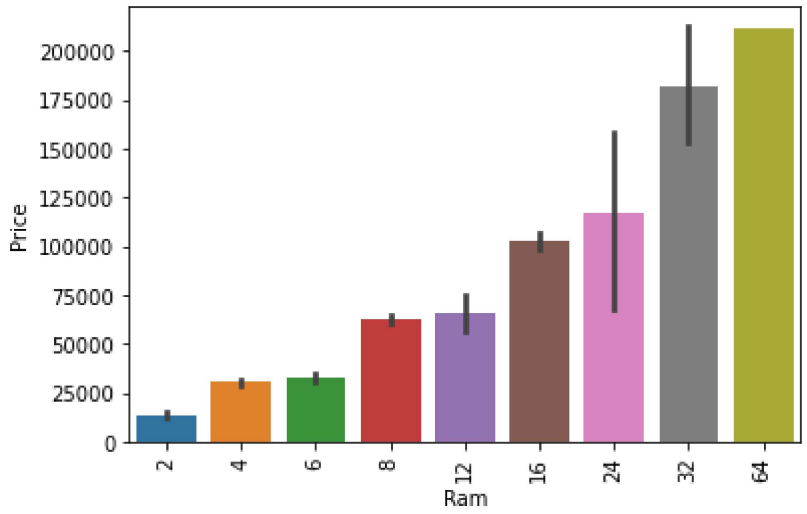
	Company	TypeName	Ram	Memory	Gpu	OpSys	Weight	Price	Touchscreen	Ips
0	Apple	Ultrabook	8	128GB SSD	Intel Iris Plus Graphics 640	macOS	1.37	71378.6832	0	
1	Apple	Ultrabook	8	128GB Flash Storage	Intel HD Graphics 6000	macOS	1.34	47895.5232	0	
2	HP	Notebook	8	256GB SSD	Intel HD Graphics 620	No OS	1.86	30636.0000	0	
3	Apple	Ultrabook	16	512GB SSD	AMD Radeon Pro 455	macOS	1.83	135195.3360	0	
4	Apple	Ultrabook	8	256GB SSD	Intel Iris Plus Graphics 650	macOS	1.37	96095.8080	0	

In [90]:
```
df['Ram'].value_counts().plot(kind='bar')
```

Out[90]: <AxesSubplot:>



In [91]:
```
sns.barplot(x=df['Ram'],y=df['Price'])
plt.xticks(rotation='vertical')
plt.show()
```



In [92]:
```
df['Memory'].value_counts()
```

Out[92]:
```
256GB SSD                        412
1TB HDD                          223
500GB HDD                        132
512GB SSD                        118
128GB SSD +  1TB HDD              94
128GB SSD                         76
256GB SSD +  1TB HDD              73
32GB Flash Storage                38
2TB HDD                           16
64GB Flash Storage                15
512GB SSD +  1TB HDD              14
1TB SSD                           14
256GB SSD +  2TB HDD              10
1.0TB Hybrid                       9
256GB Flash Storage                8
16GB Flash Storage                 7
32GB SSD                           6
180GB SSD                          5
128GB Flash Storage                4
16GB SSD                           3
512GB SSD +  2TB HDD               3
256GB SSD +  256GB SSD             2
128GB SSD +  2TB HDD               2
256GB SSD +  500GB HDD             2
512GB Flash Storage                2
1TB SSD +  1TB HDD                 2
32GB HDD                           1
64GB SSD                           1
1.0TB HDD                          1
512GB SSD +  256GB SSD             1
512GB SSD +  1.0TB Hybrid          1
8GB SSD                            1
240GB SSD                          1
128GB HDD                          1
1TB HDD +  1TB HDD                 1
512GB SSD +  512GB SSD             1
256GB SSD +  1.0TB Hybrid          1
508GB Hybrid                       1
64GB Flash Storage +  1TB HDD      1
Name: Memory, dtype: int64
```

In [93]:
```
df['Memory'] = df['Memory'].astype(str).replace('\.0', '', regex=True)
df["Memory"] = df["Memory"].str.replace('GB', '')
df["Memory"] = df["Memory"].str.replace('TB', '000')
new = df["Memory"].str.split("+", n = 1, expand = True)

df["first"]= new[0]
df["first"]=df["first"].str.strip()

df["second"]= new[1]

df["Layer1HDD"] = df["first"].apply(lambda x: 1 if "HDD" in x else 0)
df["Layer1SSD"] = df["first"].apply(lambda x: 1 if "SSD" in x else 0)
df["Layer1Hybrid"] = df["first"].apply(lambda x: 1 if "Hybrid" in x else 0)
df["Layer1Flash_Storage"] = df["first"].apply(lambda x: 1 if "Flash Storage" i

df['first'] = df['first'].str.replace(r'\D', '')

df["second"].fillna("0", inplace = True)

df["Layer2HDD"] = df["second"].apply(lambda x: 1 if "HDD" in x else 0)
df["Layer2SSD"] = df["second"].apply(lambda x: 1 if "SSD" in x else 0)
df["Layer2Hybrid"] = df["second"].apply(lambda x: 1 if "Hybrid" in x else 0)
df["Layer2Flash_Storage"] = df["second"].apply(lambda x: 1 if "Flash Storage"

df['second'] = df['second'].str.replace(r'\D', '')

df["first"] = df["first"].astype(int)
df["second"] = df["second"].astype(int)

df["HDD"]=(df["first"]*df["Layer1HDD"]+df["second"]*df["Layer2HDD"])
df["SSD"]=(df["first"]*df["Layer1SSD"]+df["second"]*df["Layer2SSD"])
df["Hybrid"]=(df["first"]*df["Layer1Hybrid"]+df["second"]*df["Layer2Hybrid"])
df["Flash_Storage"]=(df["first"]*df["Layer1Flash_Storage"]+df["second"]*df["La

df.drop(columns=['first', 'second', 'Layer1HDD', 'Layer1SSD', 'Layer1Hybrid',
       'Layer1Flash_Storage', 'Layer2HDD', 'Layer2SSD', 'Layer2Hybrid',
       'Layer2Flash_Storage'],inplace=True)
```

```
<ipython-input-93-10829db803de>:16: FutureWarning: The default value of regex
will change from True to False in a future version.
  df['first'] = df['first'].str.replace(r'\D', '')
<ipython-input-93-10829db803de>:25: FutureWarning: The default value of regex
will change from True to False in a future version.
  df['second'] = df['second'].str.replace(r'\D', '')
```

In [98]:
```
df.sample(5)
```

Out[98]:

	Company	TypeName	Ram	Memory	Gpu	OpSys	Weight	Price	Touchscreen
1247	Asus	Gaming	16	256 SSD + 1000 HDD	Nvidia GeForce GTX 1070	Windows 10	2.34	123876.000	0
505	Lenovo	Notebook	8	256 SSD	Intel HD Graphics 620	Windows 10	1.44	50562.720	0
820	Lenovo	Notebook	4	500 HDD	Intel HD Graphics 520	Windows 10	2.10	26101.872	0
21	Lenovo	Gaming	8	128 SSD + 1000 HDD	Nvidia GeForce GTX 1050	Windows 10	2.50	53226.720	0
301	Asus	Gaming	16	256 SSD + 1000 HDD	Nvidia GeForce GTX 1070	Windows 10	2.90	113060.160	0

In [99]:
```
df.drop(columns=['Memory'],inplace=True)
```

In [100]:
```
df.head()
```

Out[100]:

	Company	TypeName	Ram	Gpu	OpSys	Weight	Price	Touchscreen	Ips	
0	Apple	Ultrabook	8	Intel Iris Plus Graphics 640	macOS	1.37	71378.6832	0	1	226.983
1	Apple	Ultrabook	8	Intel HD Graphics 6000	macOS	1.34	47895.5232	0	0	127.677
2	HP	Notebook	8	Intel HD Graphics 620	No OS	1.86	30636.0000	0	0	141.211
3	Apple	Ultrabook	16	AMD Radeon Pro 455	macOS	1.83	135195.3360	0	1	220.534
4	Apple	Ultrabook	8	Intel Iris Plus Graphics 650	macOS	1.37	96095.8080	0	1	226.983

In [101]:
```
df.corr()['Price']
```

Out[101]:
```
Ram              0.743007
Weight           0.210370
Price            1.000000
Touchscreen      0.191226
Ips              0.252208
ppi              0.473487
HDD             -0.096441
SSD              0.670799
Hybrid           0.007989
Flash_Storage   -0.040511
Name: Price, dtype: float64
```

In [102]:
```
df.drop(columns=['Hybrid','Flash_Storage'],inplace=True)
```

In [103]:
```
df.head()
```

Out[103]:

	Company	TypeName	Ram	Gpu	OpSys	Weight	Price	Touchscreen	Ips	
0	Apple	Ultrabook	8	Intel Iris Plus Graphics 640	macOS	1.37	71378.6832	0	1	226.983
1	Apple	Ultrabook	8	Intel HD Graphics 6000	macOS	1.34	47895.5232	0	0	127.677
2	HP	Notebook	8	Intel HD Graphics 620	No OS	1.86	30636.0000	0	0	141.211
3	Apple	Ultrabook	16	AMD Radeon Pro 455	macOS	1.83	135195.3360	0	1	220.534
4	Apple	Ultrabook	8	Intel Iris Plus Graphics 650	macOS	1.37	96095.8080	0	1	226.983

In [104]:
```
df['Gpu'].value_counts()
```

Out[104]:
```
Intel HD Graphics 620      281
Intel HD Graphics 520      185
Intel UHD Graphics 620      68
Nvidia GeForce GTX 1050     66
Nvidia GeForce GTX 1060     48
                          ...
Intel HD Graphics 540        1
AMD FirePro W6150M           1
AMD Radeon R5 M315           1
AMD Radeon R7 M360           1
AMD FirePro W5130M           1
Name: Gpu, Length: 110, dtype: int64
```

In [106]:
```
df['Gpu brand'] = df['Gpu'].apply(lambda x:x.split()[0])
```

In [107]:
```
df.head()
```

Out[107]:

	Company	TypeName	Ram	Gpu	OpSys	Weight	Price	Touchscreen	Ips	
0	Apple	Ultrabook	8	Intel Iris Plus Graphics 640	macOS	1.37	71378.6832	0	1	226.983
1	Apple	Ultrabook	8	Intel HD Graphics 6000	macOS	1.34	47895.5232	0	0	127.677
2	HP	Notebook	8	Intel HD Graphics 620	No OS	1.86	30636.0000	0	0	141.211
3	Apple	Ultrabook	16	AMD Radeon Pro 455	macOS	1.83	135195.3360	0	1	220.534
4	Apple	Ultrabook	8	Intel Iris Plus Graphics 650	macOS	1.37	96095.8080	0	1	226.983

In [108]:
```
df['Gpu brand'].value_counts()
```

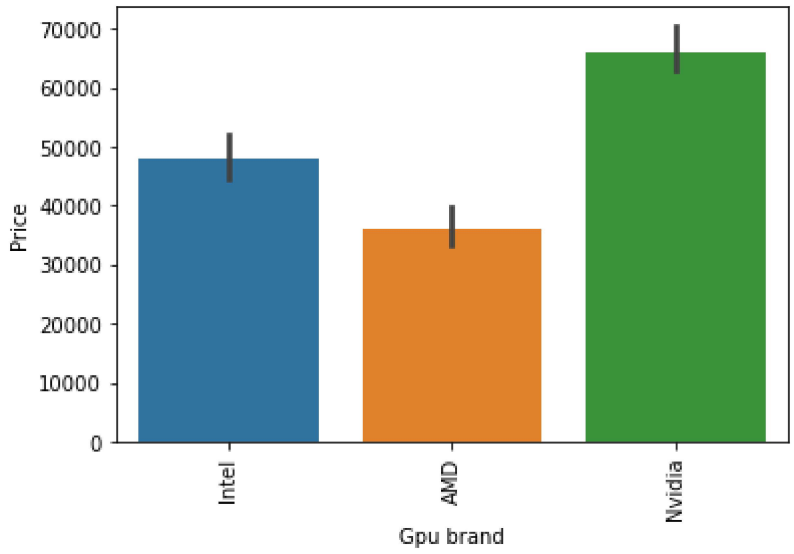
Out[108]:
```
Intel     722
Nvidia    400
AMD       180
ARM         1
Name: Gpu brand, dtype: int64
```

In [111]:
```
df = df[df['Gpu brand'] != 'ARM']
```

In [112]:
```
df['Gpu brand'].value_counts()
```

Out[112]:
```
Intel     722
Nvidia    400
AMD       180
Name: Gpu brand, dtype: int64
```

In [115]:
```
sns.barplot(x=df['Gpu brand'],y=df['Price'],estimator=np.median)
plt.xticks(rotation='vertical')
plt.show()
```



In [116]:
```
df.drop(columns=['Gpu'],inplace=True)
```

```
C:\Users\91842\anaconda3\lib\site-packages\pandas\core\frame.py:4308: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  return super().drop(
```

In [117]:
```
df.head()
```

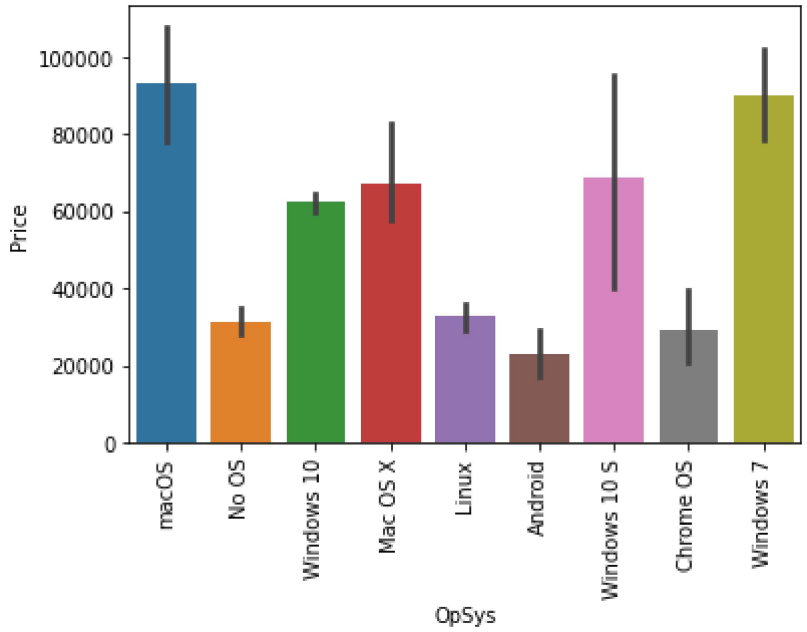
Out[117]:

	Company	TypeName	Ram	OpSys	Weight	Price	Touchscreen	Ips	ppi	Cp bran
0	Apple	Ultrabook	8	macOS	1.37	71378.6832	0	1	226.983005	Int Cor i
1	Apple	Ultrabook	8	macOS	1.34	47895.5232	0	0	127.677940	Int Cor i
2	HP	Notebook	8	No OS	1.86	30636.0000	0	0	141.211998	Int Cor i
3	Apple	Ultrabook	16	macOS	1.83	135195.3360	0	1	220.534624	Int Cor i
4	Apple	Ultrabook	8	macOS	1.37	96095.8080	0	1	226.983005	Int Cor i

In [118]:
```
df['OpSys'].value_counts()
```

Out[118]:
```
Windows 10      1072
No OS             66
Linux             62
Windows 7         45
Chrome OS         26
macOS             13
Windows 10 S       8
Mac OS X           8
Android            2
Name: OpSys, dtype: int64
```

In [120]:
```
sns.barplot(x=df['OpSys'],y=df['Price'])
plt.xticks(rotation='vertical')
plt.show()
```



In [121]:
```
def cat_os(inp):
    if inp == 'Windows 10' or inp == 'Windows 7' or inp == 'Windows 10 S':
        return 'Windows'
    elif inp == 'macOS' or inp == 'Mac OS X':
        return 'Mac'
    else:
        return 'Others/No OS/Linux'
```

In [122]:
```
df['os'] = df['OpSys'].apply(cat_os)
```

```
<ipython-input-122-38671a3c07bd>:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  df['os'] = df['OpSys'].apply(cat_os)
```

In [123]:
```
df.head()
```

Out[123]:

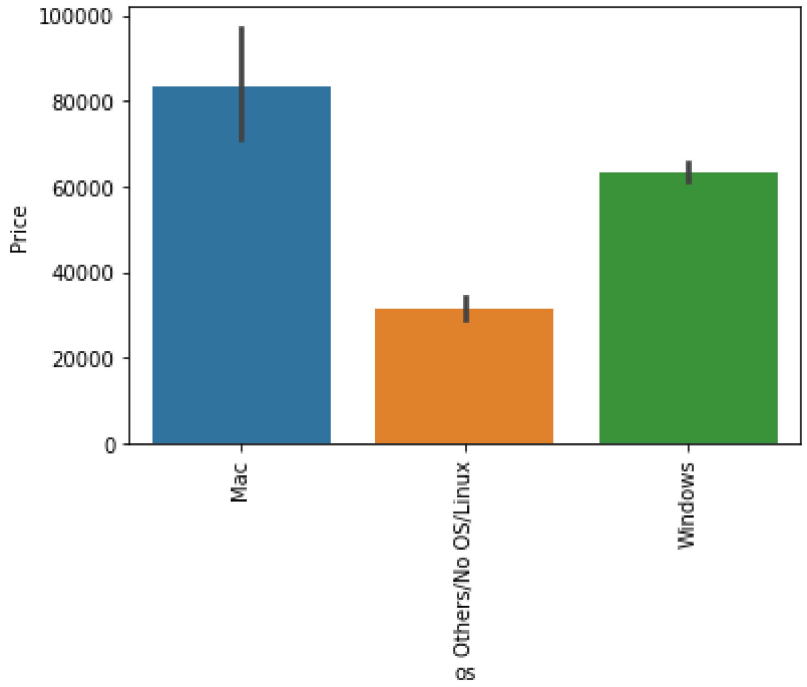
	Company	TypeName	Ram	OpSys	Weight	Price	Touchscreen	Ips	ppi	Cp bran
0	Apple	Ultrabook	8	macOS	1.37	71378.6832	0	1	226.983005	Int Cor i
1	Apple	Ultrabook	8	macOS	1.34	47895.5232	0	0	127.677940	Int Cor i
2	HP	Notebook	8	No OS	1.86	30636.0000	0	0	141.211998	Int Cor i
3	Apple	Ultrabook	16	macOS	1.83	135195.3360	0	1	220.534624	Int Cor i
4	Apple	Ultrabook	8	macOS	1.37	96095.8080	0	1	226.983005	Int Cor i

In [124]:
```
df.drop(columns=['OpSys'],inplace=True)
```

```
C:\Users\91842\anaconda3\lib\site-packages\pandas\core\frame.py:4308: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  return super().drop(
```

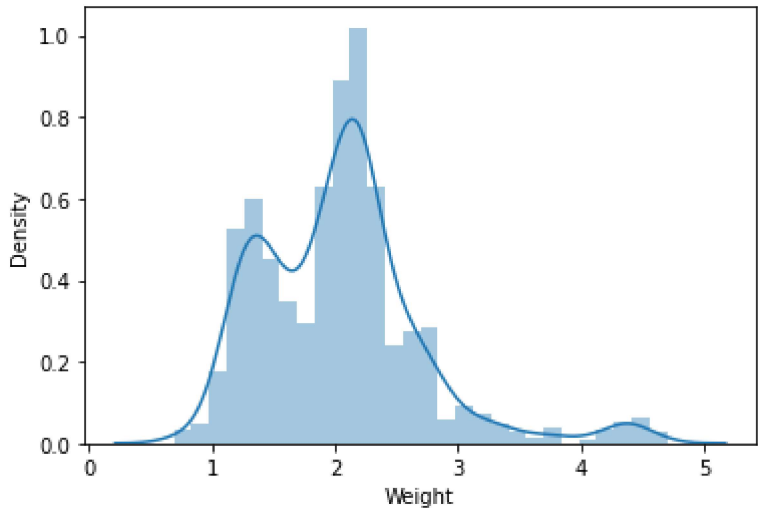
In [125]:
```
sns.barplot(x=df['os'],y=df['Price'])
plt.xticks(rotation='vertical')
plt.show()
```



In [126]:
```
sns.distplot(df['Weight'])
```

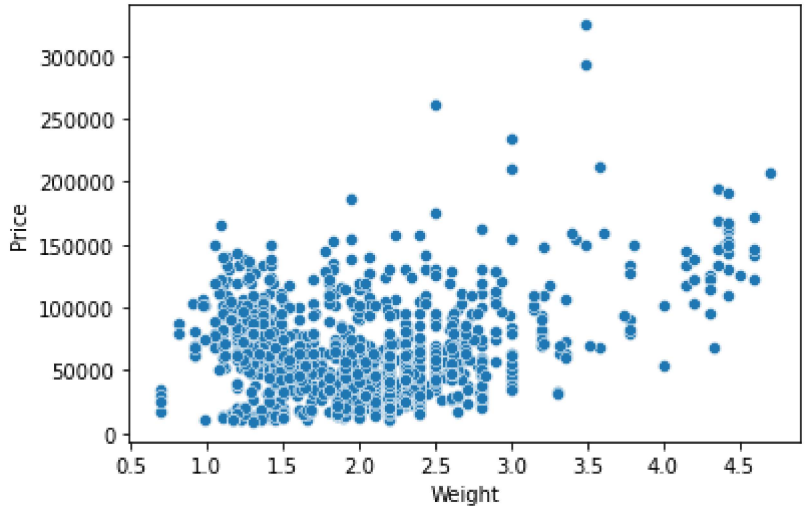
```
C:\Users\91842\anaconda3\lib\site-packages\seaborn\distributions.py:2557: Fut
ureWarning: `distplot` is a deprecated function and will be removed in a futu
re version. Please adapt your code to use either `displot` (a figure-level fu
nction with similar flexibility) or `histplot` (an axes-level function for hi
stograms).
  warnings.warn(msg, FutureWarning)
```

Out[126]:
```
<AxesSubplot:xlabel='Weight', ylabel='Density'>
```



In [127]:
```
sns.scatterplot(x=df['Weight'],y=df['Price'])
```

Out[127]:
```
<AxesSubplot:xlabel='Weight', ylabel='Price'>
```

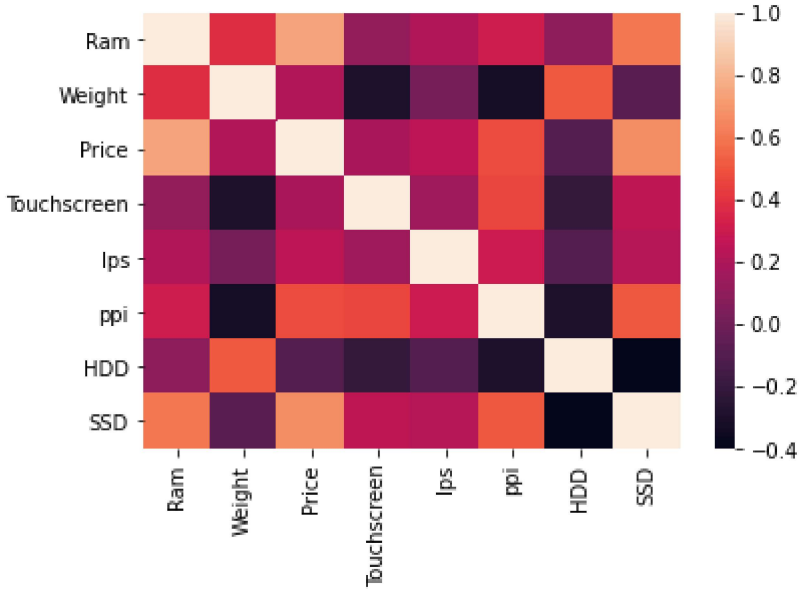


In [128]:
```
df.corr()['Price']
```

Out[128]:
```
Ram            0.742905
Weight         0.209867
Price          1.000000
Touchscreen    0.192917
Ips            0.253320
ppi            0.475368
HDD           -0.096891
SSD            0.670660
Name: Price, dtype: float64
```

In [130]:
```
sns.heatmap(df.corr())
```

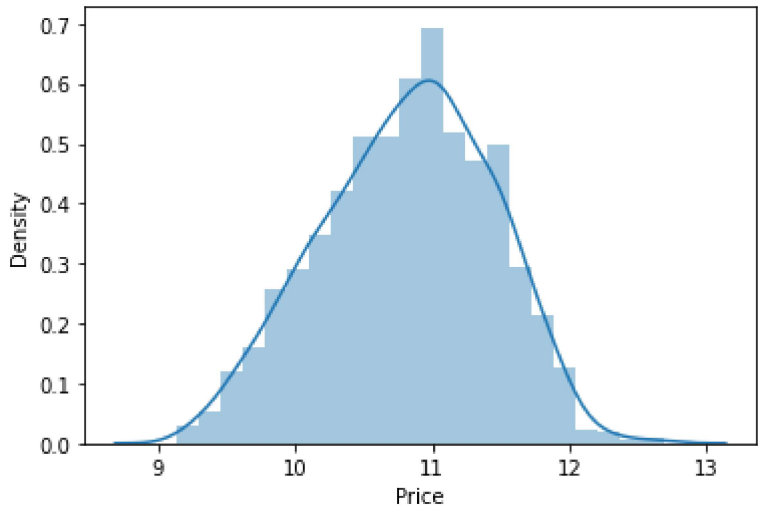
Out[130]:
```
<AxesSubplot:>
```



In [133]:
```
sns.distplot(np.log(df['Price']))
```

```
C:\Users\91842\anaconda3\lib\site-packages\seaborn\distributions.py:2557: Fut
ureWarning: `distplot` is a deprecated function and will be removed in a futu
re version. Please adapt your code to use either `displot` (a figure-level fu
nction with similar flexibility) or `histplot` (an axes-level function for hi
stograms).
  warnings.warn(msg, FutureWarning)
```

Out[133]: <AxesSubplot:xlabel='Price', ylabel='Density'>



In [134]:
```
X = df.drop(columns=['Price'])
y = np.log(df['Price'])
```