Double-click (or enter) to edit

```
Start coding or generate with AI.
```

```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import re as re
from sklearn.preprocessing import LabelEncoder,StandardScaler
from sklearn.linear_model import LinearRegression,Lasso
from sklearn.model_selection import train_test_split
from sklearn.metrics import mean_squared_error,mean_absolute_error
from sklearn.ensemble import RandomForestRegressor
import warnings
warnings.filterwarnings("ignore")
```

```
#load data
df = pd.read_csv("/content/sample_data/data.csv")
print(df.head())
```

```
   Unnamed: 0   brand                               name  price  \
0           0      HP      Victus 15-fb0157AX Gaming Laptop  49900
1           1      HP                 15s-fq5007TU Laptop  39900
2           2    Acer                One 14 Z8-415 Laptop  26990
3           3  Lenovo  Yoga Slim 6 14IAP8 82WU0095IN Laptop  59729
4           4   Apple       MacBook Air 2020 MGND3HN Laptop  69990

   spec_rating                      processor                          CPU  \
0    73.000000      5th Gen AMD Ryzen 5 5600H        Hexa Core, 12 Threads
1    60.000000   12th Gen Intel Core i3 1215U  Hexa Core (2P + 4E), 8 Threads
2    69.323529  11th Gen Intel Core i3 1115G4          Dual Core, 4 Threads
3    66.000000   12th Gen Intel Core i5 1240P  12 Cores (4P + 8E), 16 Threads
4    69.323529                       Apple M1           Octa Core (4P + 4E)

    Ram Ram_type    ROM ROM_type                        GPU  display_size  \
0   8GB     DDR4  512GB      SSD       4GB AMD Radeon RX 6500M          15.6
1   8GB     DDR4  512GB      SSD           Intel UHD Graphics          15.6
2   8GB     DDR4  512GB      SSD        Intel Iris Xe Graphics          14.0
3  16GB   LPDDR5  512GB      SSD      Intel Integrated Iris Xe          14.0
4   8GB     DDR4  256GB      SSD  Apple M1 Integrated Graphics          13.3

   resolution_width  resolution_height            OS  warranty
0              1920               1080  Windows 11 OS         1
1              1920               1080  Windows 11 OS         1
2              1920               1080  Windows 11 OS         1
3              2240               1400  Windows 11 OS         1
4              2560               1600        Mac OS         1
```

```
#Using drop to clean data
df = df.drop(['Unnamed: 0'], axis=1)
df.head()
```

	brand	name	price	spec_rating	processor	CPU	Ram	Ram_type	ROM	ROM_t
0	HP	Victus 15-fb0157AX Gaming Laptop	49900	73.000000	5th Gen AMD Ryzen 5 5600H	Hexa Core, 12 Threads	8GB	DDR4	512GB	
1	HP	15s-fq5007TU Laptop	39900	60.000000	12th Gen Intel Core i3 1215U	Hexa Core (2P + 4E), 8 Threads	8GB	DDR4	512GB	
2	Acer	One 14 Z8-415 Laptop	26990	69.323529	11th Gen Intel Core i3 1115G4	Dual Core, 4 Threads	8GB	DDR4	512GB	
3	Lenovo	Yoga Slim 6 14IAP8 82WU0095IN Laptop	59729	66.000000	12th Gen Intel Core i5 1240P	12 Cores (4P + 8E), 16 Threads	16GB	LPDDR5	512GB	
4	Apple	MacBook Air 2020 MGND3HN Laptop	69990	69.323529	Apple M1	Octa Core (4P + 4E)	8GB	DDR4	256GB	

```
#check the duplicated rows if any
print(df.duplicated().sum())
print(df.shape)
```

```
0
(893, 16)
```

```
#checking the null values
df.isnull().sum()
```

```
brand                0
name                 0
price                0
spec_rating          0
processor            0
CPU                  0
Ram                  0
Ram_type             0
ROM                  0
ROM_type             0
GPU                  0
display_size         0
resolution_width     0
resolution_height    0
OS                   0
warranty             0
dtype: int64
```

```
#descriptions
df.brand.value_counts()
df.shape
df.describe(include='object')
df.describe()
```

	price	spec_rating	display_size	resolution_width	resolution_height	war
count	893.000000	893.000000	893.000000	893.000000	893.000000	893.0
mean	79907.409854	69.379026	15.173751	2035.393057	1218.324748	1.0
std	60880.043823	5.541555	0.939095	426.076009	326.756883	0.3
min	9999.000000	60.000000	11.600000	1080.000000	768.000000	0.0
25%	44500.000000	66.000000	14.000000	1920.000000	1080.000000	1.0
50%	61990.000000	69.323529	15.600000	1920.000000	1080.000000	1.0
75%	90990.000000	71.000000	15.600000	1920.000000	1200.000000	1.0
max	450039.000000	89.000000	18.000000	3840.000000	3456.000000	3.0

Start coding or generate with AI.

```
# Identify numeric and categorical features
numeric_features = ['price', 'spec_rating', 'Ram', 'ROM', 'display_size', 'resolution_widtł
categorical_features = ['brand', 'name', 'processor','CPU', 'Ram_type','ROM_type', 'GPU', '
```

```
#Extract numbers and units
#Ram
def add_space_between_number_and_unit_Ram(input_string):
  return re.sub(r'(\d+)([a-zA-Z]+)', r'\1 \2', input_string)

df['Ram'] = df['Ram'].apply(add_space_between_number_and_unit_Ram)
print(df)
```

```
      brand                                           name   price  \
0        HP                Victus 15-fb0157AX Gaming Laptop   49900
1        HP                              15s-fq5007TU Laptop   39900
2      Acer                             One 14 Z8-415 Laptop   26990
3    Lenovo              Yoga Slim 6 14IAP8 82WU0095IN Laptop   59729
4     Apple                     MacBook Air 2020 MGND3HN Laptop   69990
..      ...                                             ...     ...
888    Asus          Vivobook 15X 2023 K3504VAB-NJ321WS Laptop   44990
889    Asus                     TUF A15 FA577RM-HQ032WS Laptop  110000
890    Asus  ROG Zephyrus G14 2023 GA402XV-N2034WS Gaming L...  189990
891    Asus  TUF Gaming F15 2023 FX507VU-LP083WS Gaming Laptop  129990
892    Asus  TUF Gaming A15 2023 FA577XU-LP041WS Gaming Laptop  131990

     spec_rating                     processor  \
0      73.000000       5th Gen AMD Ryzen 5 5600H
1      60.000000    12th Gen Intel Core i3 1215U
2      69.323529   11th Gen Intel Core i3 1115G4
3      66.000000    12th Gen Intel Core i5 1240P
4      69.323529                        Apple M1
..           ...                             ...
888    69.323529   13th Gen Intel Core i3 1315U
889    71.000000       6th Gen AMD Ryzen 7 6800H
890    89.000000      7th Gen AMD Ryzen 9 7940HS
891    73.000000   13th Gen Intel Core i7 13700H
892    84.000000      7th Gen AMD Ryzen 9 7940HS

                                  CPU    Ram Ram_type    ROM ROM_type  \
0              Hexa Core, 12 Threads   8 GB     DDR4  512GB      SSD
1    Hexa Core (2P + 4E), 8 Threads   8 GB     DDR4  512GB      SSD
2                Dual Core, 4 Threads   8 GB     DDR4  512GB      SSD
3    12 Cores (4P + 8E), 16 Threads  16 GB   LPDDR5  512GB      SSD
```

```
4             Octa Core (4P + 4E)   8 GB     DDR4  256GB      SSD
..                            ...    ...      ...    ...      ...
888  Hexa Core (2P + 4E), 8 Threads   8 GB     DDR4  512GB      SSD
889           Octa Core, 16 Threads  16 GB      DDR    1TB      SSD
890           Octa Core, 16 Threads  32 GB     DDR5    1TB      SSD
891  14 Cores (6P + 8E), 20 Threads  16 GB     DDR4  512GB      SSD
892           Octa Core, 16 Threads  16 GB     DDR4    1TB      SSD

                             GPU  display_size  resolution_width  \
0         4GB AMD Radeon RX 6500M          15.6              1920
1              Intel UHD Graphics          15.6              1920
2          Intel Iris Xe Graphics          14.0              1920
3        Intel Integrated Iris Xe          14.0              2240
4    Apple M1 Integrated Graphics          13.3              2560
..                            ...           ...               ...
888  Integrated Intel UHD Graphics          15.6              1920
889    6GB NVIDIA GeForce RTX 3060          15.6              2560
890    8GB NVIDIA GeForce RTX 4060          14.0              2560
891    6GB NVIDIA GeForce RTX 4050          15.6              1920
892    6GB NVIDIA GeForce RTX 4050          15.6              1920

     resolution_height             OS  warranty
0                 1080   Windows 11 OS         1
1                 1080   Windows 11 OS         1
2                 1080   Windows 11 OS         1
3                 1400   Windows 11 OS         1
4                 1600         Mac OS         1
```

```
#ROM
def add_space_between_number_and_unit_ROM(input_string):
    return re.sub(r'(\d+)([a-zA-Z]+)', r'\1 \2', input_string)

df['ROM'] = df['ROM'].apply(add_space_between_number_and_unit_ROM)
print(df)
```

```
       brand                                       name   price  \
0         HP            Victus 15-fb0157AX Gaming Laptop   49900
1         HP                        15s-fq5007TU Laptop   39900
2       Acer                         One 14 Z8-415 Laptop   26990
3     Lenovo          Yoga Slim 6 14IAP8 82WU0095IN Laptop   59729
4      Apple                MacBook Air 2020 MGND3HN Laptop   69990
..       ...                                        ...     ...
888     Asus       Vivobook 15X 2023 K3504VAB-NJ321WS Laptop   44990
889     Asus                TUF A15 FA577RM-HQ032WS Laptop  110000
890     Asus  ROG Zephyrus G14 2023 GA402XV-N2034WS Gaming L...  189990
891     Asus  TUF Gaming F15 2023 FX507VU-LP083WS Gaming Laptop  129990
892     Asus  TUF Gaming A15 2023 FA577XU-LP041WS Gaming Laptop  131990

     spec_rating                      processor  \
0      73.000000      5th Gen AMD Ryzen 5 5600H
1      60.000000   12th Gen Intel Core i3 1215U
2      69.323529  11th Gen Intel Core i3 1115G4
3      66.000000   12th Gen Intel Core i5 1240P
4      69.323529                       Apple M1
..           ...                            ...
888    69.323529  13th Gen Intel Core i3 1315U
889    71.000000      6th Gen AMD Ryzen 7 6800H
890    89.000000     7th Gen AMD Ryzen 9 7940HS
891    73.000000  13th Gen Intel Core i7 13700H
892    84.000000     7th Gen AMD Ryzen 9 7940HS

                               CPU    Ram Ram_type     ROM ROM_type  \
0           Hexa Core, 12 Threads   8 GB     DDR4  512 GB      SSD
1   Hexa Core (2P + 4E), 8 Threads   8 GB     DDR4  512 GB      SSD
2            Dual Core, 4 Threads   8 GB     DDR4  512 GB      SSD
3   12 Cores (4P + 8E), 16 Threads  16 GB   LPDDR5  512 GB      SSD
```

```
4              Octa Core (4P + 4E)   8 GB     DDR4  256 GB      SSD
..                             ...    ...      ...     ...      ...
888  Hexa Core (2P + 4E), 8 Threads   8 GB     DDR4  512 GB      SSD
889            Octa Core, 16 Threads  16 GB      DDR    1 TB      SSD
890            Octa Core, 16 Threads  32 GB     DDR5    1 TB      SSD
891  14 Cores (6P + 8E), 20 Threads  16 GB     DDR4  512 GB      SSD
892            Octa Core, 16 Threads  16 GB     DDR4    1 TB      SSD

                               GPU  display_size  resolution_width  \
0          4GB AMD Radeon RX 6500M          15.6              1920
1               Intel UHD Graphics          15.6              1920
2           Intel Iris Xe Graphics          14.0              1920
3         Intel Integrated Iris Xe          14.0              2240
4     Apple M1 Integrated Graphics          13.3              2560
..                             ...           ...               ...
888  Integrated Intel UHD Graphics          15.6              1920
889    6GB NVIDIA GeForce RTX 3060          15.6              2560
890    8GB NVIDIA GeForce RTX 4060          14.0              2560
891    6GB NVIDIA GeForce RTX 4050          15.6              1920
892    6GB NVIDIA GeForce RTX 4050          15.6              1920

     resolution_height              OS  warranty
0                 1080   Windows 11 OS         1
1                 1080   Windows 11 OS         1
2                 1080   Windows 11 OS         1
3                 1400   Windows 11 OS         1
```

```
# converting from TB>GB unit for Ram column
def turn_Ram_into_GB(value):
    if'TB' in value:
        return float(value[:value.find('TB')]) * 1024

    df ['Ram'] = df['Ram'].apply(turn_Ram_into_GB)

def turn_ROM_into_GB(value):
    if 'TB' in value:
        return int(value[:value.find('TB')]) * 1024

    df ['ROM'] = df['ROM'].apply(turn_ROM_into_GB)


#Remove the unit (String)

df ['Ram'] = df['Ram'].str[:-2]

df ['ROM'] = df['ROM'].str[:-2]
print(df)
```

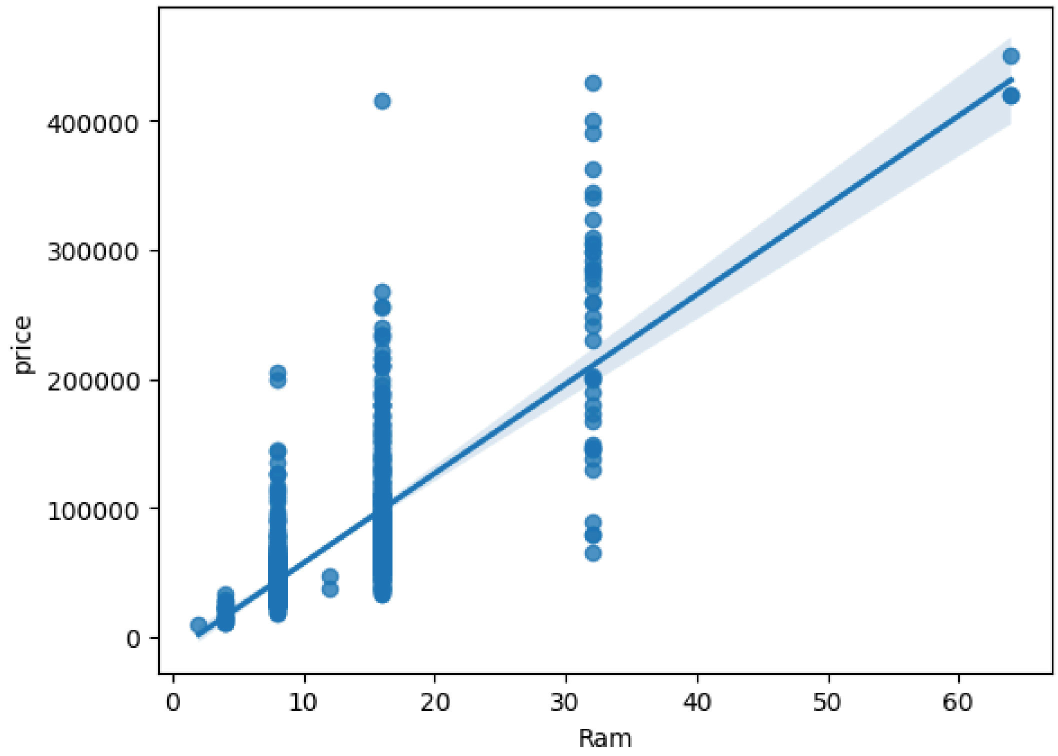
```
       brand                                           name   price  \
0         HP                 Victus 15-fb0157AX Gaming Laptop   49900
1         HP                               15s-fq5007TU Laptop   39900
2       Acer                               One 14 Z8-415 Laptop   26990
3     Lenovo              Yoga Slim 6 14IAP8 82WU0095IN Laptop   59729
4      Apple                    MacBook Air 2020 MGND3HN Laptop   69990
..       ...                                              ...     ...
888     Asus           Vivobook 15X 2023 K3504VAB-NJ321WS Laptop   44990
889     Asus                     TUF A15 FA577RM-HQ032WS Laptop  110000
890     Asus  ROG Zephyrus G14 2023 GA402XV-N2034WS Gaming L...  189990
891     Asus  TUF Gaming F15 2023 FX507VU-LP083WS Gaming Laptop  129990
892     Asus  TUF Gaming A15 2023 FA577XU-LP041WS Gaming Laptop  131990

     spec_rating                     processor  \
0      73.000000      5th Gen AMD Ryzen 5 5600H
1      60.000000   12th Gen Intel Core i3 1215U
```

```
2      69.323529  11th Gen Intel Core i3 1115G4
3      66.000000   12th Gen Intel Core i5 1240P
4      69.323529                       Apple M1
..           ...                            ...
888    69.323529  13th Gen Intel Core i3 1315U
889    71.000000      6th Gen AMD Ryzen 7 6800H
890    89.000000     7th Gen AMD Ryzen 9 7940HS
891    73.000000  13th Gen Intel Core i7 13700H
892    84.000000     7th Gen AMD Ryzen 9 7940HS

                                   CPU  Ram Ram_type   ROM ROM_type  \
0              Hexa Core, 12 Threads   8      DDR4  512       SSD
1    Hexa Core (2P + 4E), 8 Threads   8      DDR4  512       SSD
2               Dual Core, 4 Threads   8      DDR4  512       SSD
3    12 Cores (4P + 8E), 16 Threads  16    LPDDR5  512       SSD
4                Octa Core (4P + 4E)   8      DDR4  256       SSD
..                               ...  ...       ...   ...       ...
888  Hexa Core (2P + 4E), 8 Threads   8      DDR4  512       SSD
889            Octa Core, 16 Threads  16       DDR    1       SSD
890            Octa Core, 16 Threads  32      DDR5    1       SSD
891  14 Cores (6P + 8E), 20 Threads  16      DDR4  512       SSD
892            Octa Core, 16 Threads  16      DDR4    1       SSD

                              GPU  display_size  resolution_width  \
0          4GB AMD Radeon RX 6500M          15.6              1920
1              Intel UHD Graphics          15.6              1920
2            Intel Iris Xe Graphics          14.0              1920
3          Intel Integrated Iris Xe          14.0              2240
4     Apple M1 Integrated Graphics          13.3              2560
..                             ...           ...               ...
888  Integrated Intel UHD Graphics          15.6              1920
889    6GB NVIDIA GeForce RTX 3060          15.6              2560
890    8GB NVIDIA GeForce RTX 4060          14.0              2560
891    6GB NVIDIA GeForce RTX 4050          15.6              1920
892    6GB NVIDIA GeForce RTX 4050          15.6              1920

     resolution_height             OS  warranty
0                 1080   Windows 11 OS         1
1                 1080   Windows 11 OS         1
2                 1080   Windows 11 OS         1
3                 1400   Windows 11 OS         1
```

```
#conver Ram, ROM to int
df['Ram'] = df['Ram'].astype('int')
df['ROM'] = df['ROM'].astype('int')
```

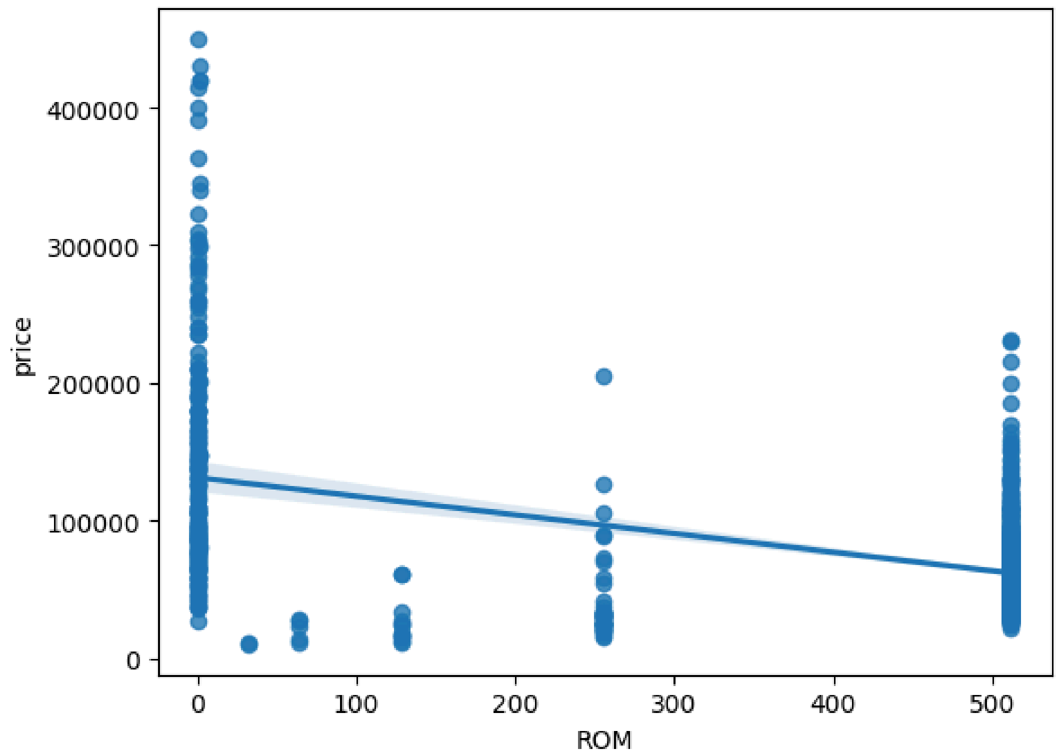
```
# plots
sns.regplot(x='Ram', y='price', data=df)
```

```
<Axes: xlabel='Ram', ylabel='price'>
```




```
sns.regplot(x='ROM', y='price', data=df)
```

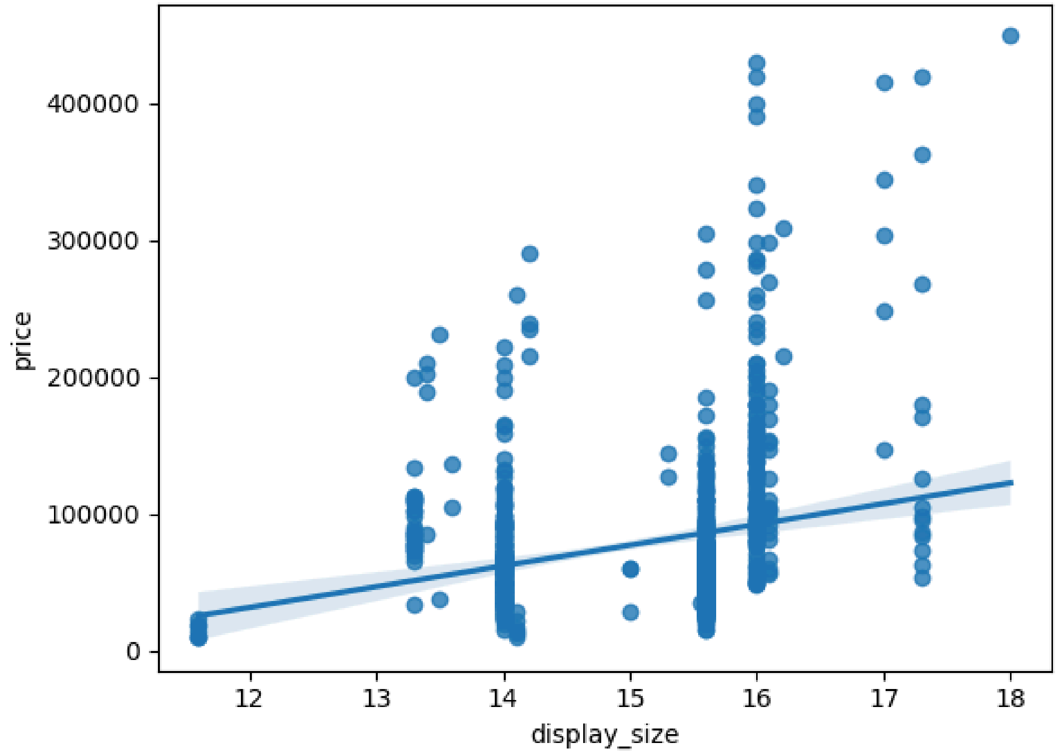
```
<Axes: xlabel='ROM', ylabel='price'>
```



Double-click (or enter) to edit

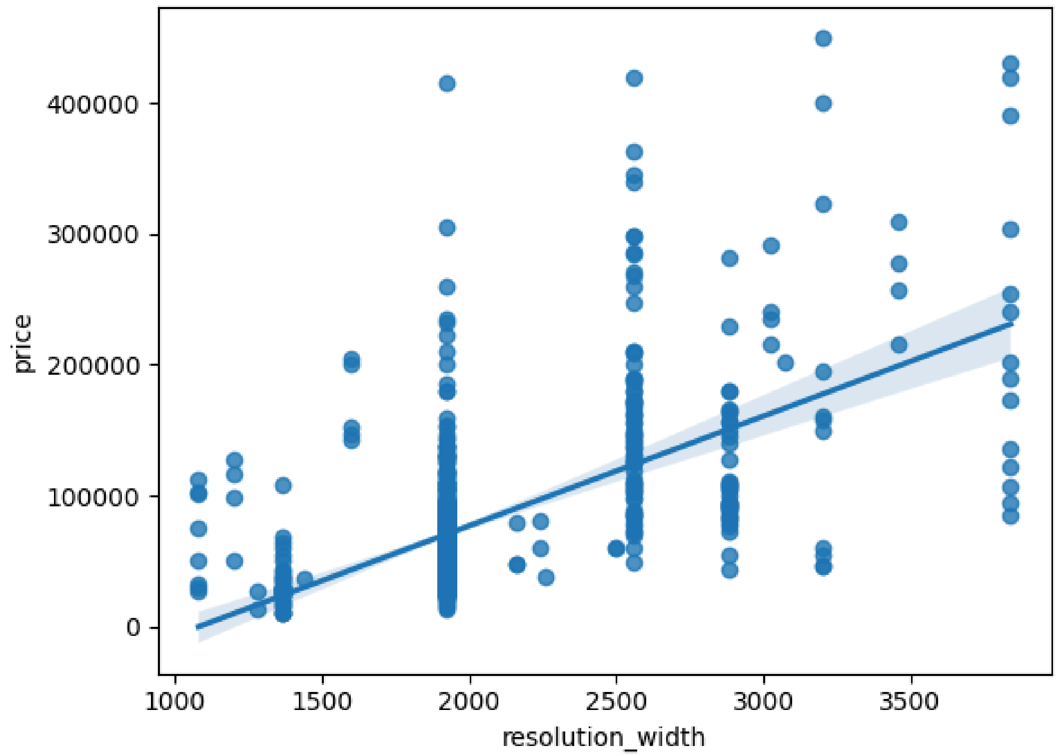
```
sns.regplot(x='display_size', y='price', data=df)
```

<Axes: xlabel='display_size', ylabel='price'>



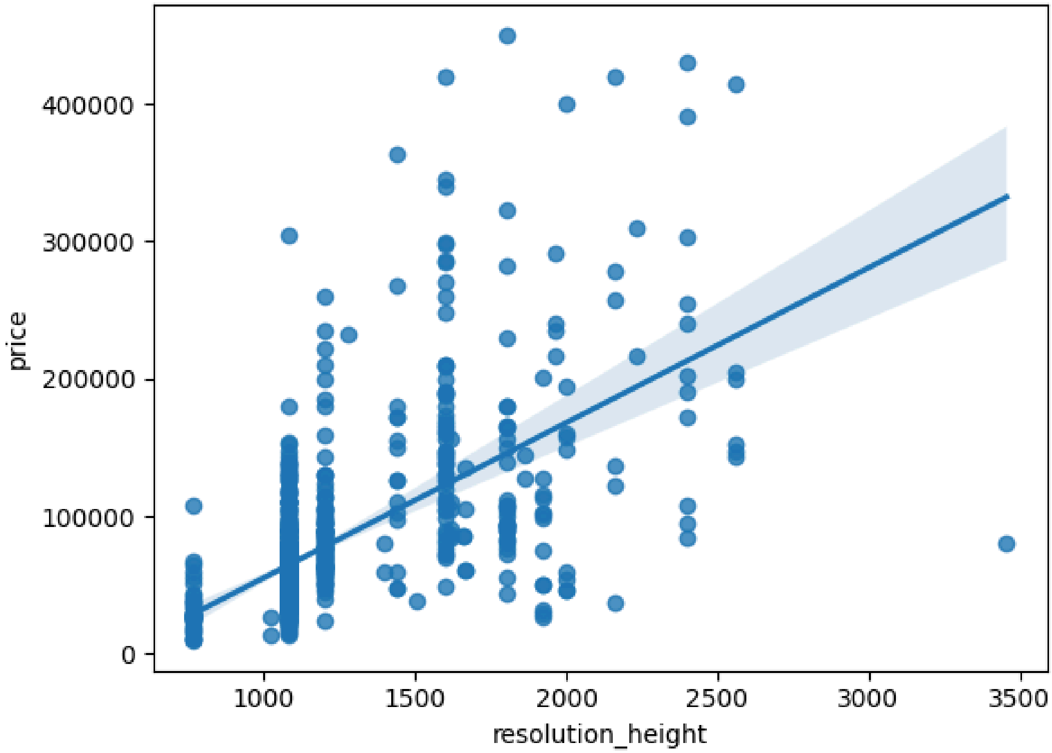

```
sns.regplot(x='resolution_width', y='price', data=df)
```

<Axes: xlabel='resolution_width', ylabel='price'>



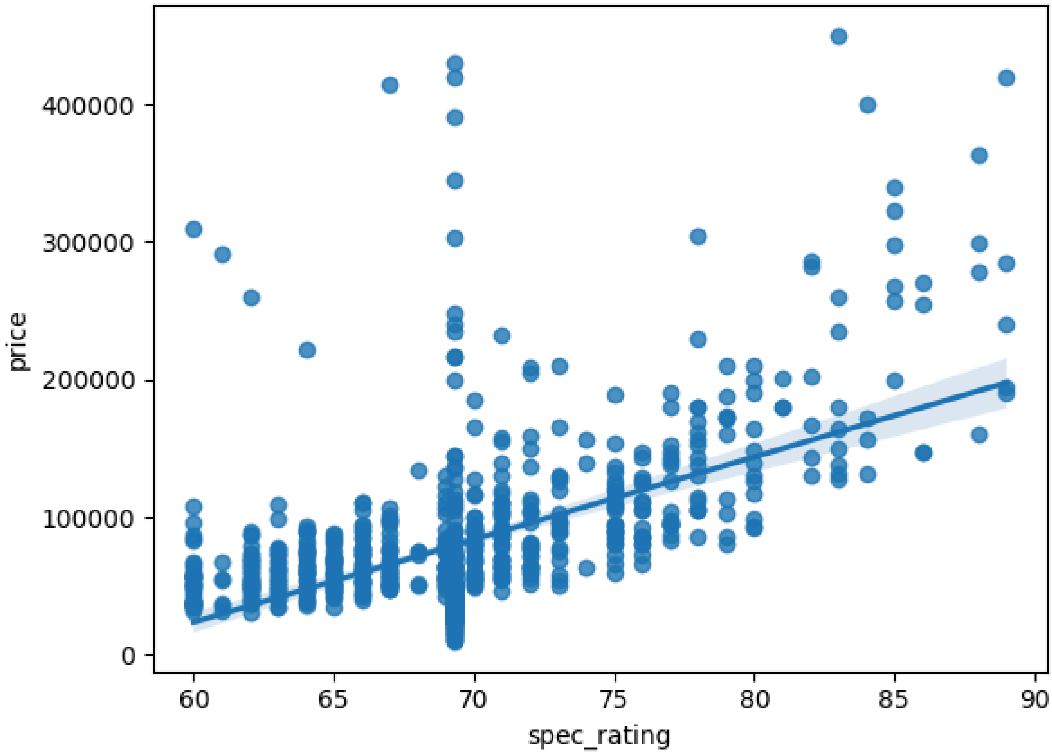

```
sns.regplot(x='resolution_height', y='price', data=df)
```

```
<Axes: xlabel='resolution_height', ylabel='price'>
```



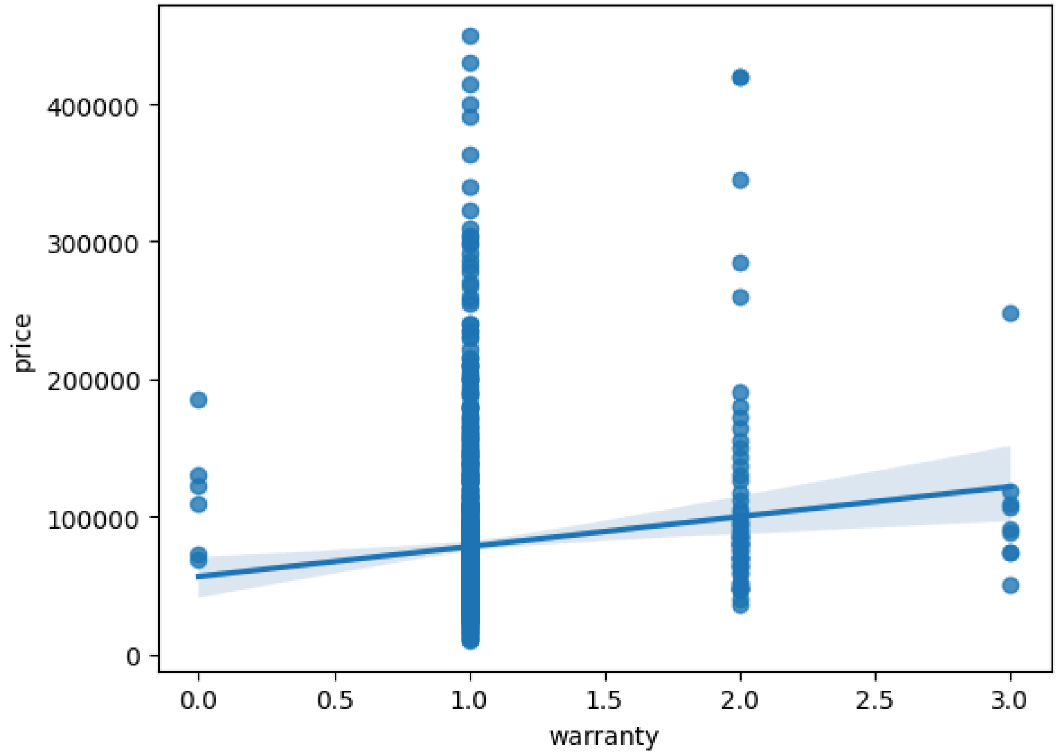

```
sns.regplot(x='spec_rating', y='price', data=df)
```

```
<Axes: xlabel='spec_rating', ylabel='price'>
```



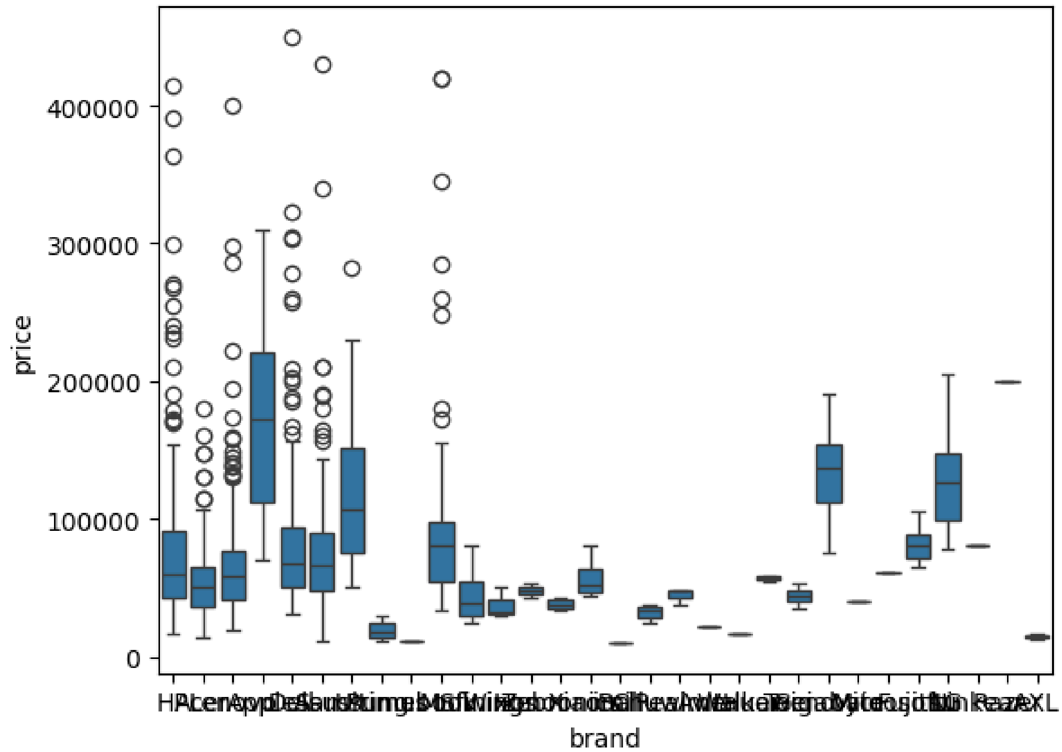

```
sns.regplot(x='warranty', y='price', data=df)
```

```
<Axes: xlabel='warranty', ylabel='price'>
```



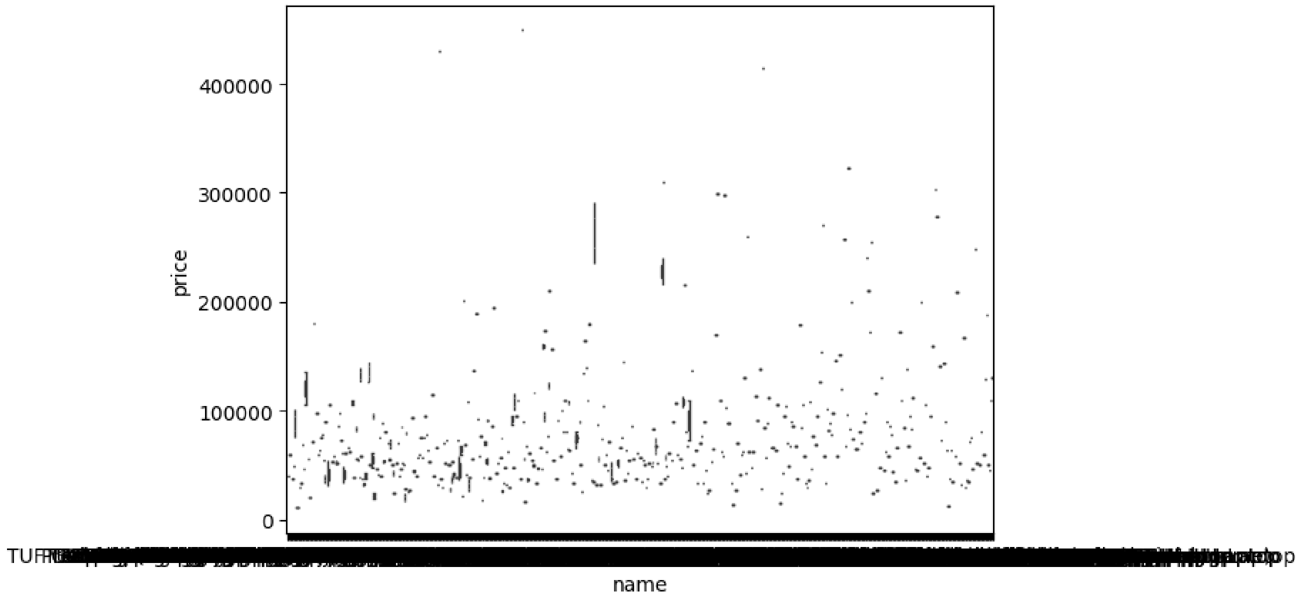

```
#boxplots
sns.boxplot(x='brand', y='price', data=df)
```

```
<Axes: xlabel='brand', ylabel='price'>
```



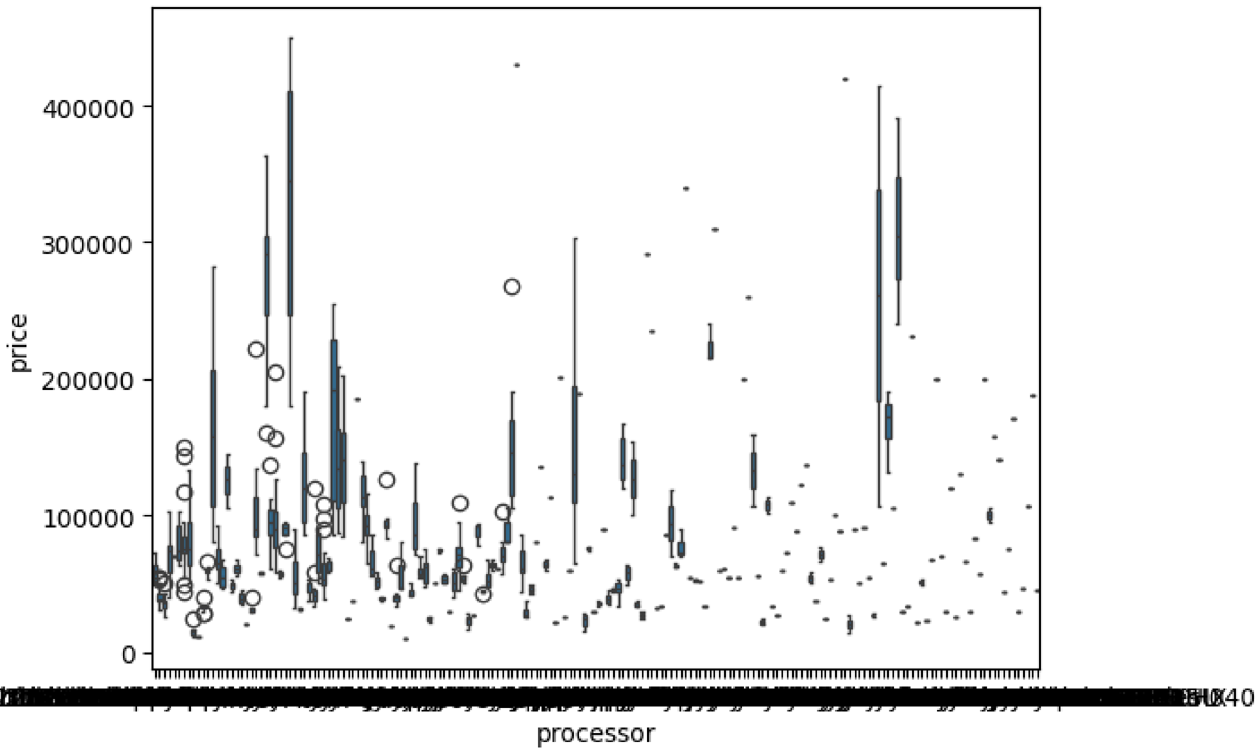

```
sns.boxplot(x='name', y='price', data=df)
```

```
<Axes: xlabel='name', ylabel='price'>
```



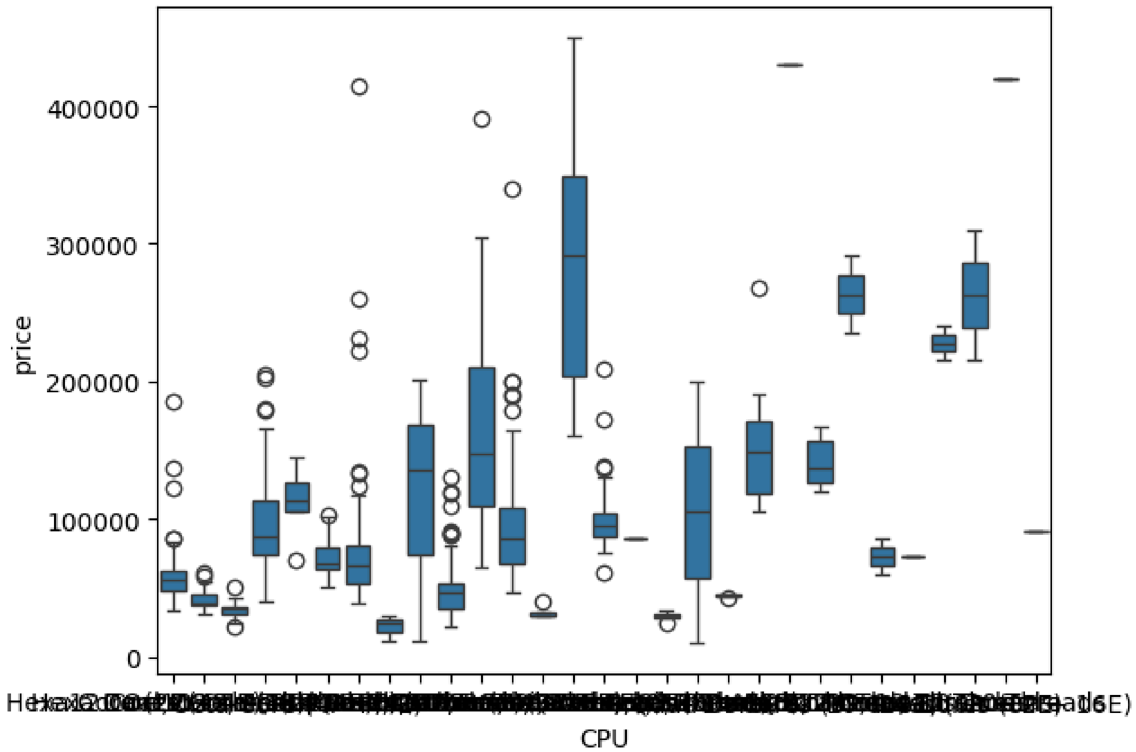

```
sns.boxplot(x='processor', y='price', data=df)
```

```
<Axes: xlabel='processor', ylabel='price'>
```



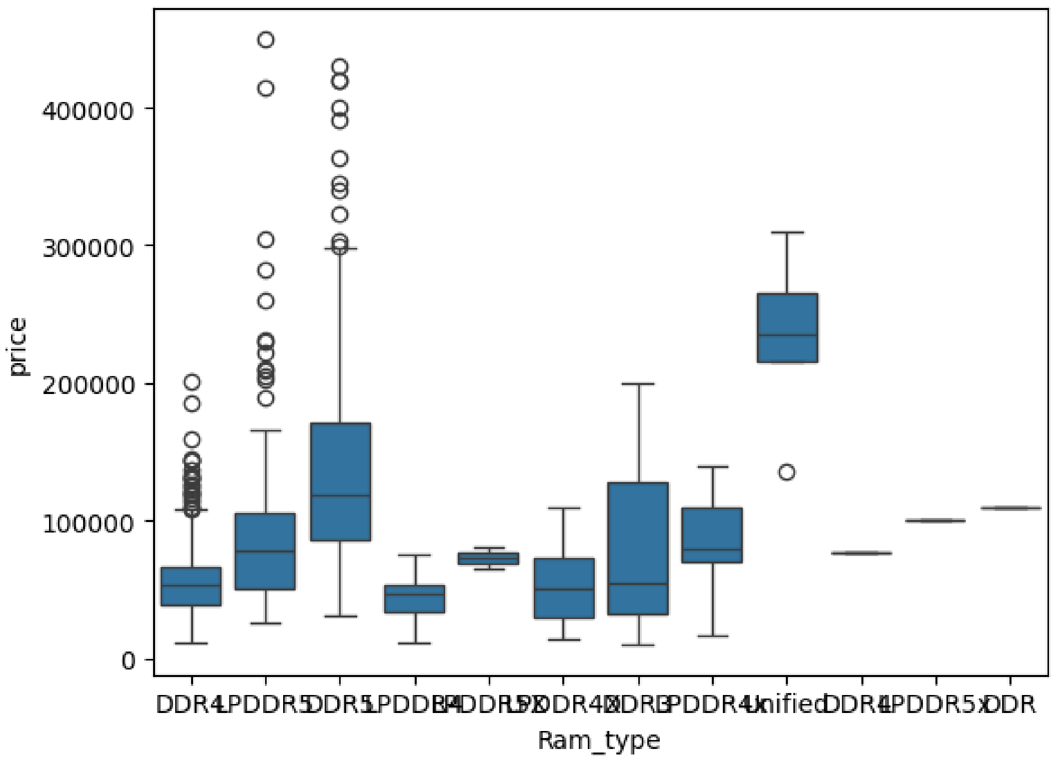

```
sns.boxplot(x='CPU', y='price', data=df)
```

```
<Axes: xlabel='CPU', ylabel='price'>
```



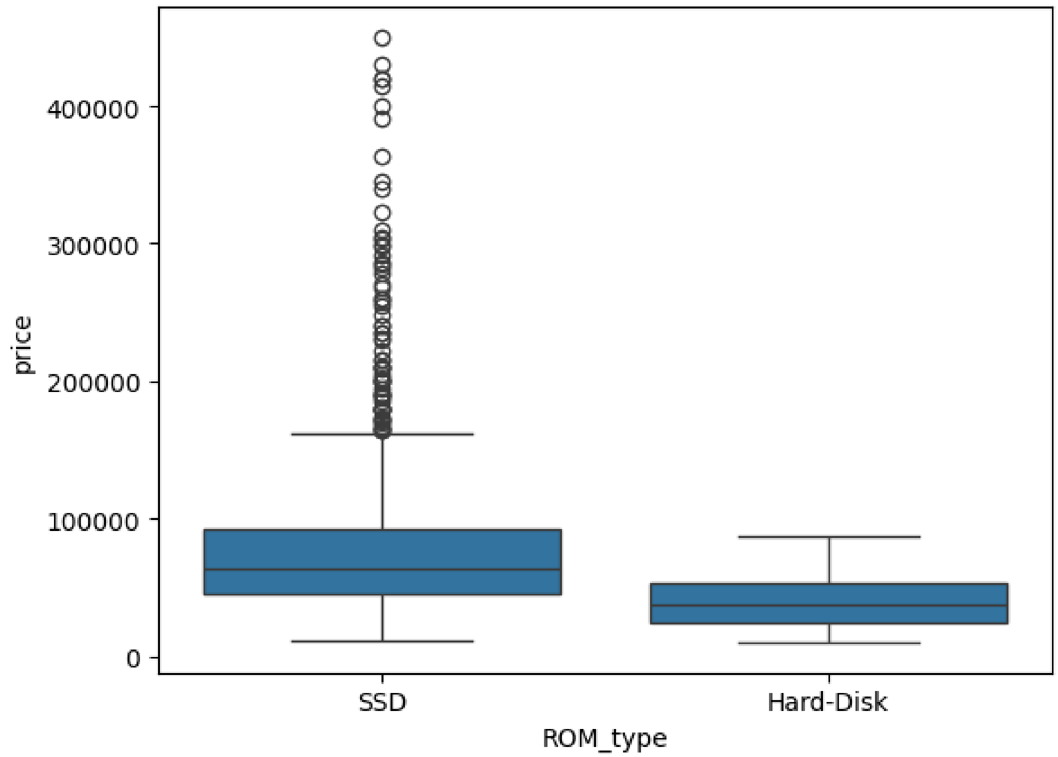

```python
sns.boxplot(x='Ram_type', y='price', data=df)
```

```
<Axes: xlabel='Ram_type', ylabel='price'>
```



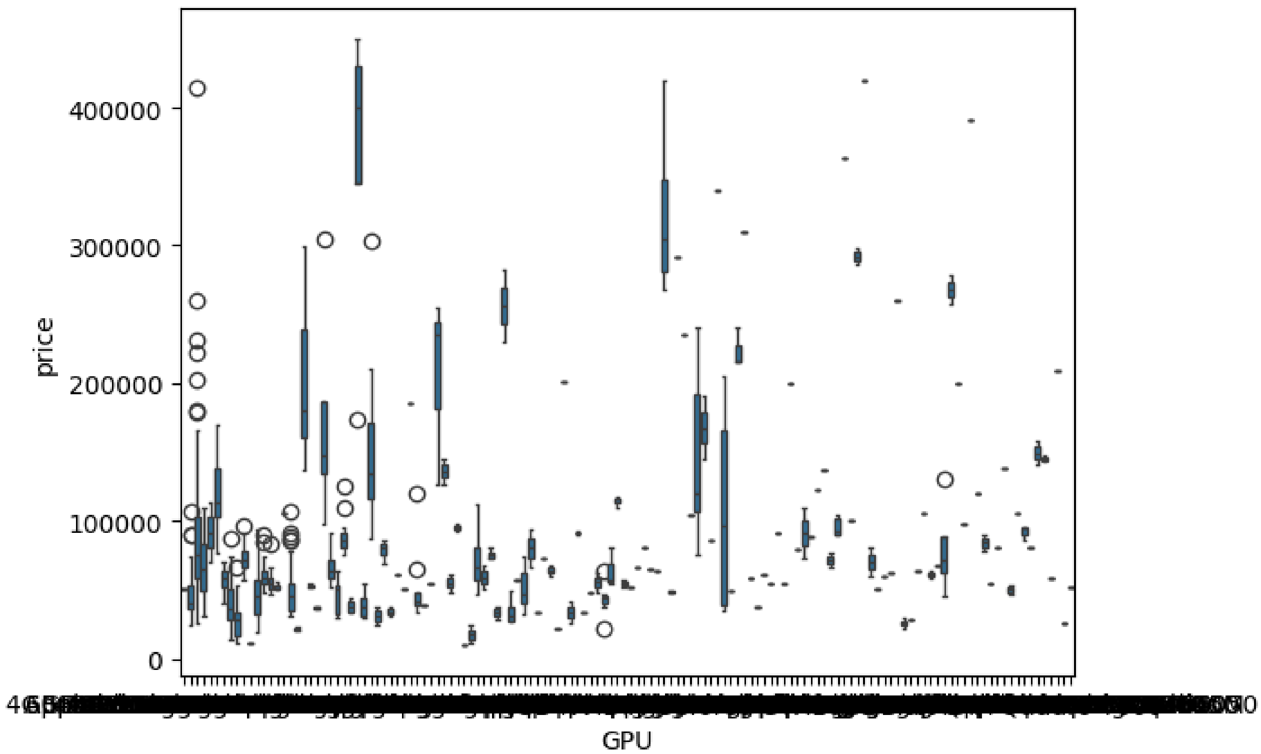

```python
sns.boxplot(x='ROM_type', y='price', data=df)
```

```
<Axes: xlabel='ROM_type', ylabel='price'>
```



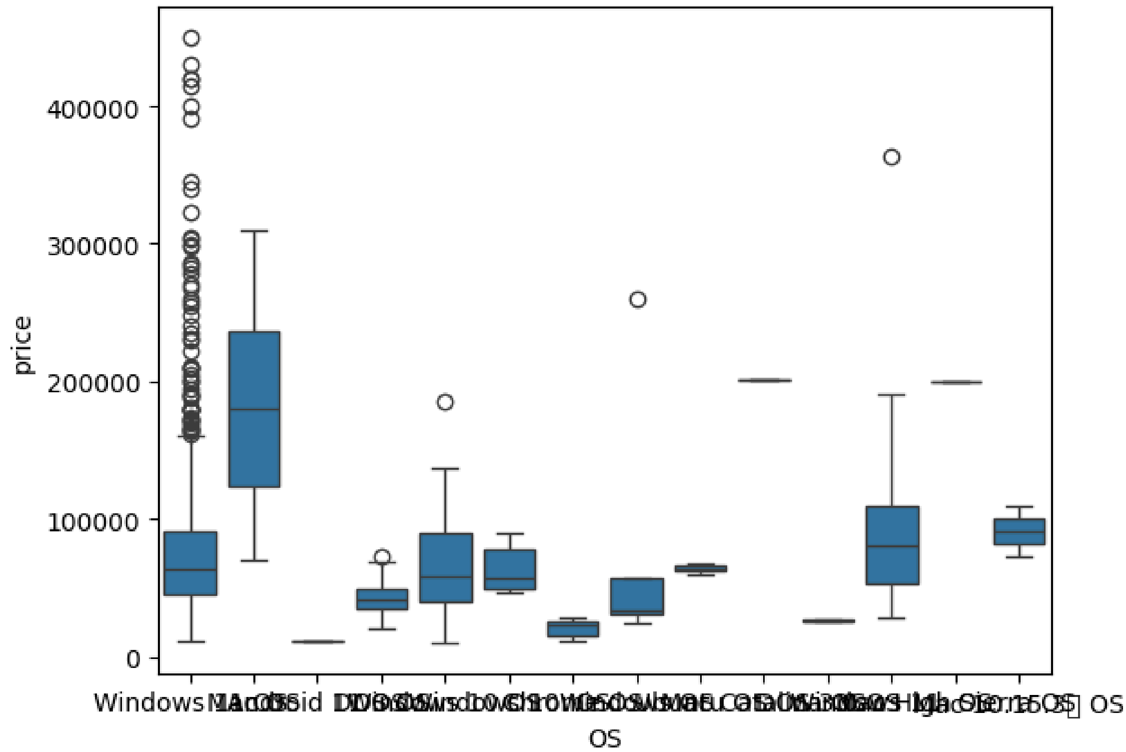

```
sns.boxplot(x='GPU', y='price', data=df)
```

```
<Axes: xlabel='GPU', ylabel='price'>
```




```
sns.boxplot(x='OS', y='price', data=df)
```

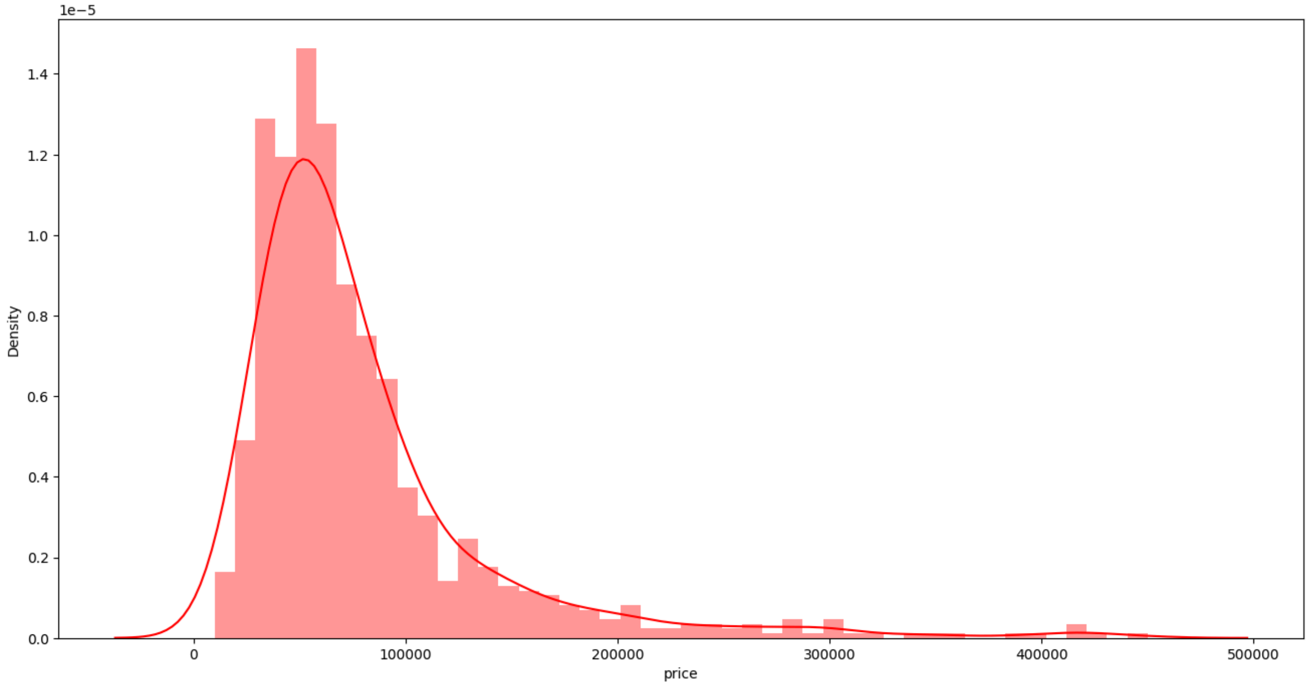
```
<Axes: xlabel='OS', ylabel='price'>
```



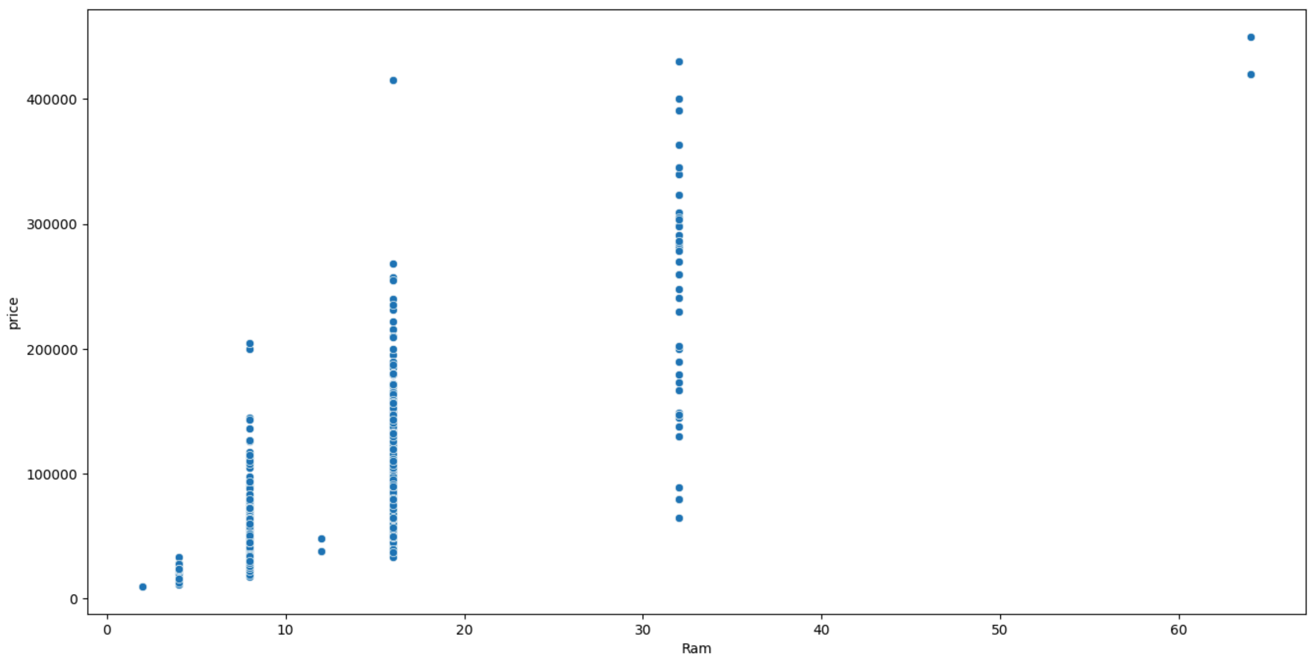

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 893 entries, 0 to 892
Data columns (total 16 columns):
 #   Column             Non-Null Count  Dtype  
---  ------             --------------  -----  
 0   brand              893 non-null    object 
 1   name               893 non-null    object 
 2   price              893 non-null    int64  
 3   spec_rating        893 non-null    float64
 4   processor          893 non-null    object 
 5   CPU                893 non-null    object 
 6   Ram                893 non-null    int64  
 7   Ram_type           893 non-null    object 
 8   ROM                893 non-null    int64  
 9   ROM_type           893 non-null    object 
 10  GPU                893 non-null    object 
 11  display_size       893 non-null    float64
 12  resolution_width   893 non-null    int64  
 13  resolution_height  893 non-null    int64  
 14  OS                 893 non-null    object 
 15  warranty           893 non-null    int64  
dtypes: float64(2), int64(6), object(8)
memory usage: 111.8+ KB
```

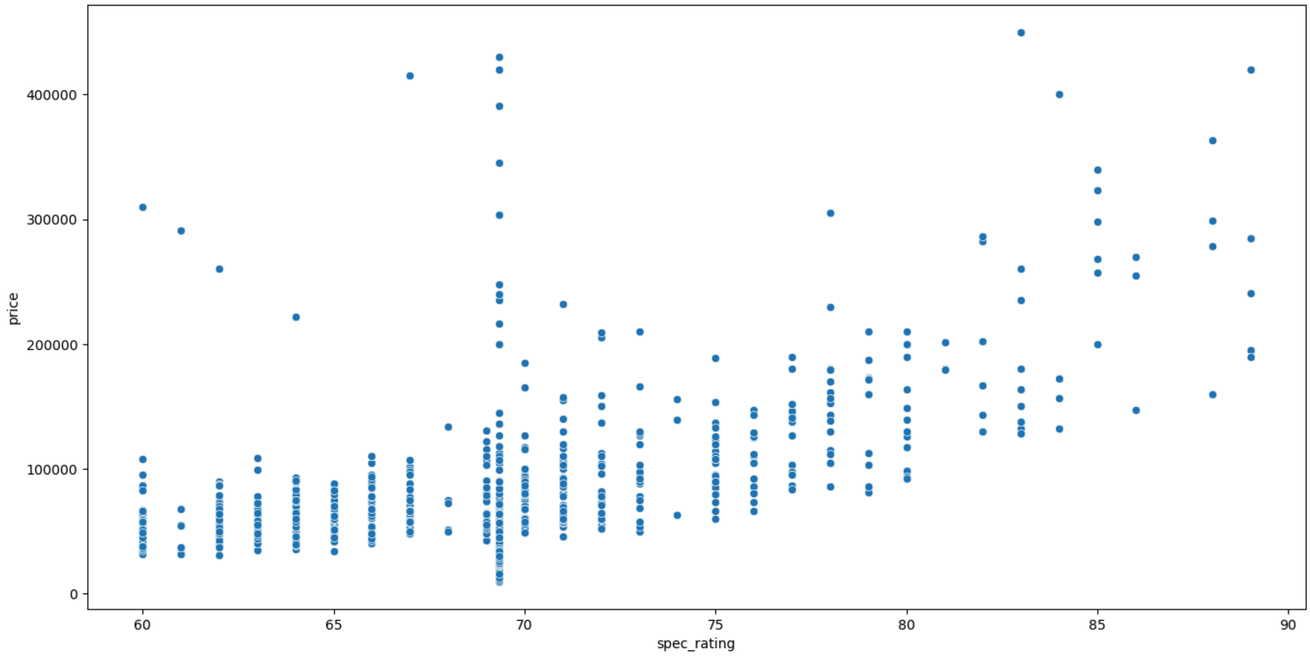
```
#Exploratory Data Analysis

#Price Distribution plot
plt.figure(figsize=(16,8))
sns.distplot(df['price'],color='red')
plt.show()
```



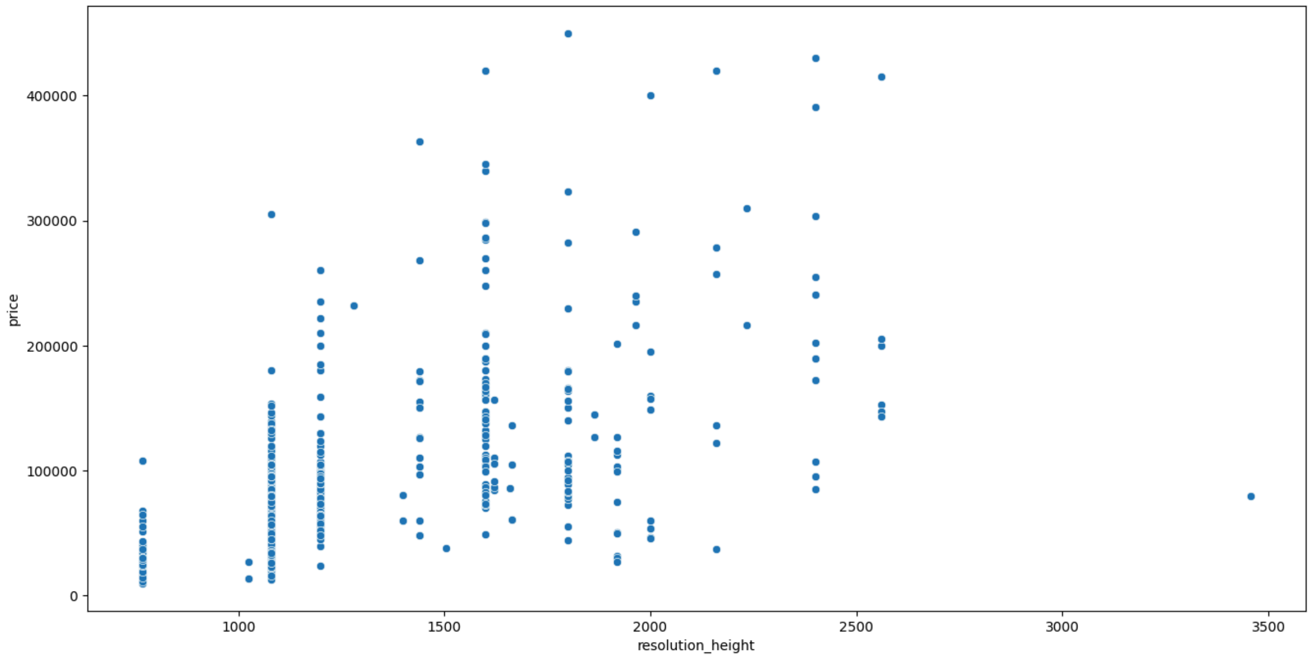

```
#Scatterplots
plt.figure(figsize=(16,8))
sns.scatterplot(x = df['Ram'],y = df['price'])
plt.show()
```




```
plt.figure(figsize=(16,8))
sns.scatterplot(x = df['spec_rating'],y = df['price'])
plt.show()
```




```
plt.figure(figsize=(16,8))
sns.scatterplot(x = df['resolution_height'],y = df['price'])
plt.show()
```



```
#Transformation-converting categorical data into numerical data

labelencoder = LabelEncoder()
df.brand = labelencoder.fit_transform(df.brand)
df.name = labelencoder.fit_transform(df.name)
df.processor = labelencoder.fit_transform(df.processor)
df.CPU = labelencoder.fit_transform(df.CPU)
df.Ram_type = labelencoder.fit_transform(df.Ram_type)
df.ROM_type = labelencoder.fit_transform(df.ROM_type)
df.GPU = labelencoder.fit_transform(df.GPU)
df.OS = labelencoder.fit_transform(df.OS)
print(df)
```

```
     brand  name   price  spec_rating  processor  CPU  Ram  Ram_type  ROM  \
0        9   647   49900    73.000000        105   19    8         2  512
1        9    38   39900    60.000000         34   18    8         2  512
2        1   440   26990    69.323529         15   17    8         2  512
3       14   784   59729    66.000000         39    6   16         8  512
4        2   378   69990    69.323529        160   21    8         2  256
..     ...   ...     ...          ...        ...  ...  ...       ...  ...
888      3   697   44990    69.323529         80   18    8         2  512
889      3   528  110000    71.000000        122   24   16         0    1
890      3   506  189990    89.000000        143   24   32         4    1
891      3   534  129990    73.000000         73    8   16         2  512
892      3   530  131990    84.000000        143   24   16         2    1

     ROM_type  GPU  display_size  resolution_width  resolution_height  OS  \
0           1   19          15.6              1920               1080  12
1           1  126          15.6              1920               1080  12
2           1  123          14.0              1920               1080  12
3           1  111          14.0              2240               1400  12
4           1   91          13.3              2560               1600   7
..        ...  ...           ...               ...                ...  ..
888         1   95          15.6              1920               1080  12
889         1   52          15.6              2560               1440  11
890         1   63          14.0              2560               1600  12
891         1   53          15.6              1920               1080  12
892         1   53          15.6              1920               1080  12

     warranty
0           1
1           1
2           1
3           1
4           1
..        ...
888         1
889         1
890         1
891         1
892         1

[893 rows x 16 columns]
```

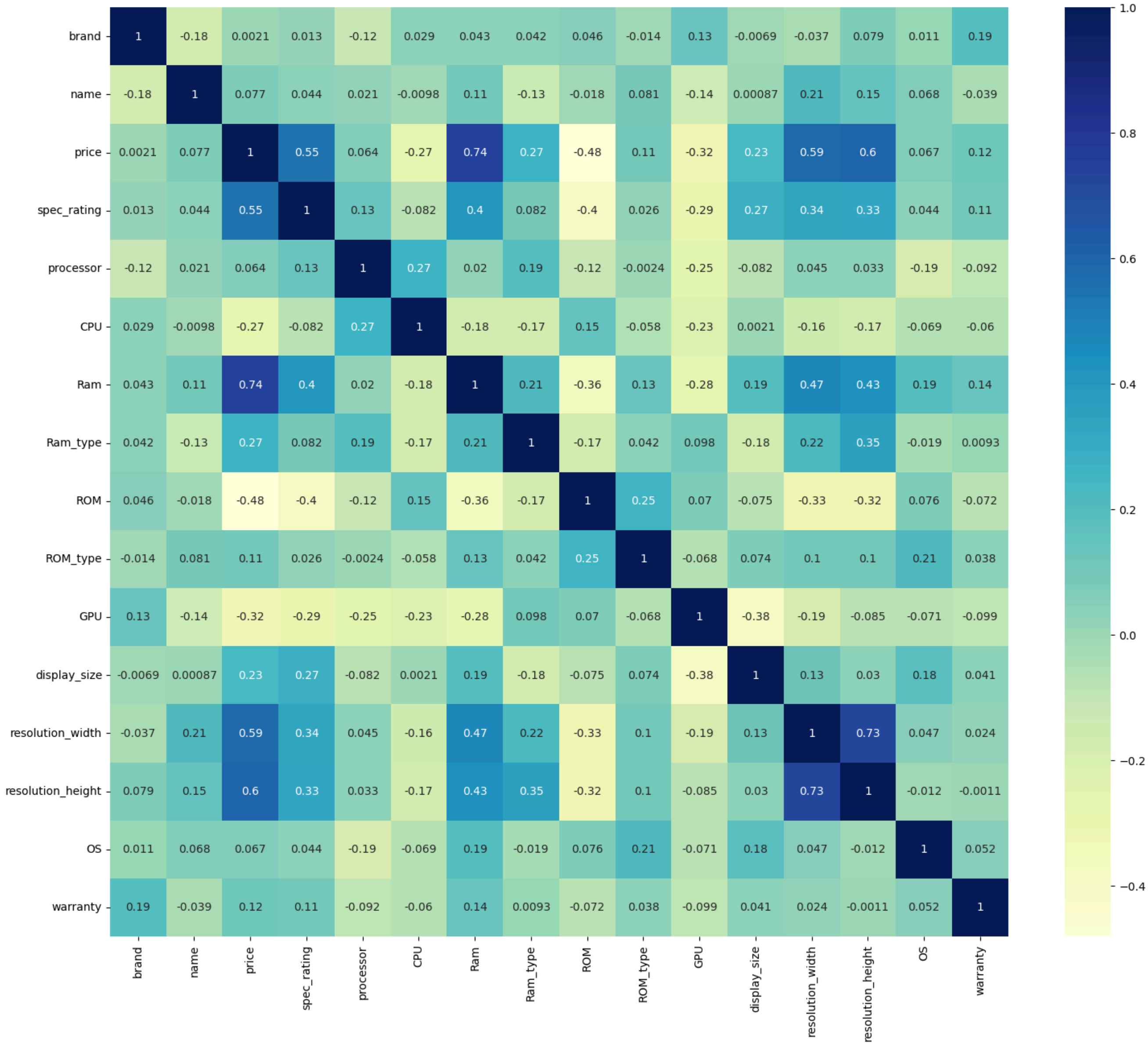
```
#Coefficient of correlations

target_correlations = df.corr()['price'].apply(abs).sort_values()
target_correlations
```

```
brand                 0.002070
processor             0.064416
OS                    0.066910
name                  0.077481
ROM_type              0.105690
```

```
warranty             0.117101
display_size         0.233815
Ram_type             0.267315
CPU                  0.273260
GPU                  0.324344
ROM                  0.481178
spec_rating          0.546391
resolution_width     0.586042
resolution_height    0.604748
Ram                  0.736924
price                1.000000
Name: price, dtype: float64
```

```
plt.figure(figsize=(18, 15))
sns.heatmap(df.corr(), annot=True, cmap='YlGnBu')
```

```
<Axes: >
```



```
#select the features which impact the target veriable(price)
selected_features =target_correlations[-12:].index
selected_features=list(selected_features)
selected_features
```

```
['ROM_type',
 'warranty',
 'display_size',
 'Ram_type',
 'CPU',
 'GPU',
 'ROM',
 'spec_rating',
 'resolution_width',
 'resolution_height',
 'Ram',
 'price']
```

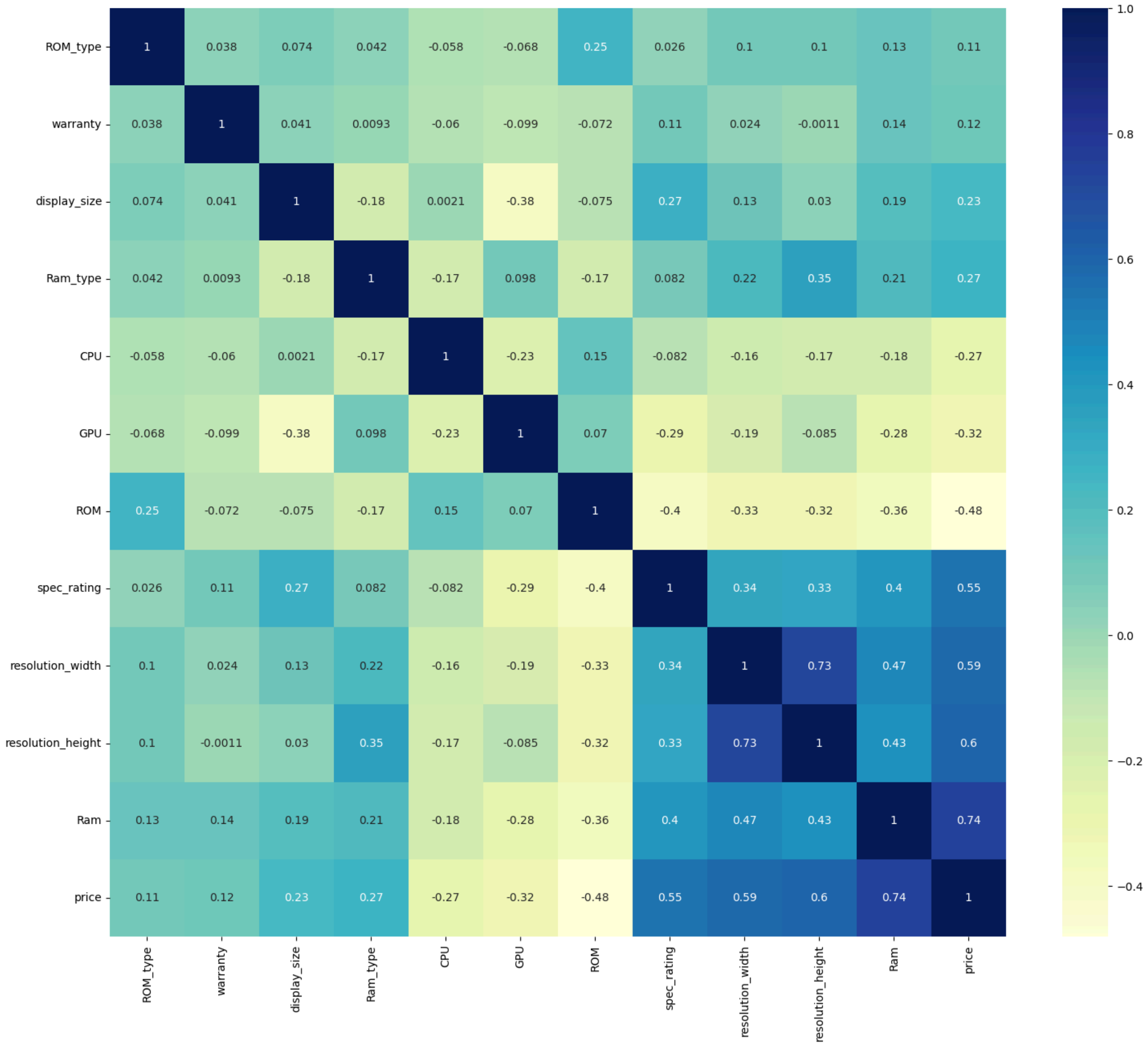
```
#check the corr of the selected features
limited_df =df[selected_features]
limited_df
```

	ROM_type	warranty	display_size	Ram_type	CPU	GPU	ROM	spec_rating	resolution_w
0	1	1	15.6	2	19	19	512	73.000000	
1	1	1	15.6	2	18	126	512	60.000000	
2	1	1	14.0	2	17	123	512	69.323529	
3	1	1	14.0	8	6	111	512	66.000000	
4	1	1	13.3	2	21	91	256	69.323529	
...	...	...	...	...	...	...	...	...	
888	1	1	15.6	2	18	95	512	69.323529	
889	1	1	15.6	0	24	52	1	71.000000	
890	1	1	14.0	4	24	63	1	89.000000	
891	1	1	15.6	2	8	53	512	73.000000	
892	1	1	15.6	2	24	53	1	84.000000	

893 rows × 12 columns

```
plt.figure(figsize=(18, 15))
sns.heatmap(limited_df.corr(), annot=True, cmap='YlGnBu')
```

<Axes: >




```
# The more blue areas founded, the more correlated to the price

#Scaling(normalization)
X, y =limited_df.drop('price', axis=1), limited_df['price']

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.1)

scaler = StandardScaler()

X_train_scaled = scaler.fit_transform(X_train)
X_test_scaled = scaler.transform(X_test)
```

```
#Fit and Evaluate Model

#Multiple_linear_Regression(MLR)
model = LinearRegression()
model_mlr = model.fit(X_train,y_train)
#Predict price using test
y_pred_MLR = model_mlr.predict(X_test)
```

```
#Calculating the Mean Square Error for MLR
mse_MLR = mean_squared_error(y_test,y_pred_MLR)
print('The mean square error for Multiple Linear Regression: ', mse_MLR)
```

```
The mean square error for Multiple Linear Regression:  794801305.136414
```

```
#Calculating the Mean Absolute Error for MLR
mae_MLR= mean_absolute_error(y_test, y_pred_MLR)
print('The mean absolute error for Multiple Linear Regression: ', mae_MLR)
```

```
The mean absolute error for Multiple Linear Regression:  19139.406643778206
```

```
#Random Forest Regressor
forest = RandomForestRegressor()

forest.fit(X_train_scaled, y_train)
forest.score(X_test_scaled, y_test)
```

```
0.7125265891251428
```

```
#prediction of laptop price using testing
y_pred_RF = forest.predict(X_test_scaled)
```

```
#Random Forest Evaluation
#Calculating the Mean Square Error for Random Forest Model
mse_RF = mean_squared_error(y_test, y_pred_RF)
print('The mean square error of price and predicted value is: ', mse_RF)
```

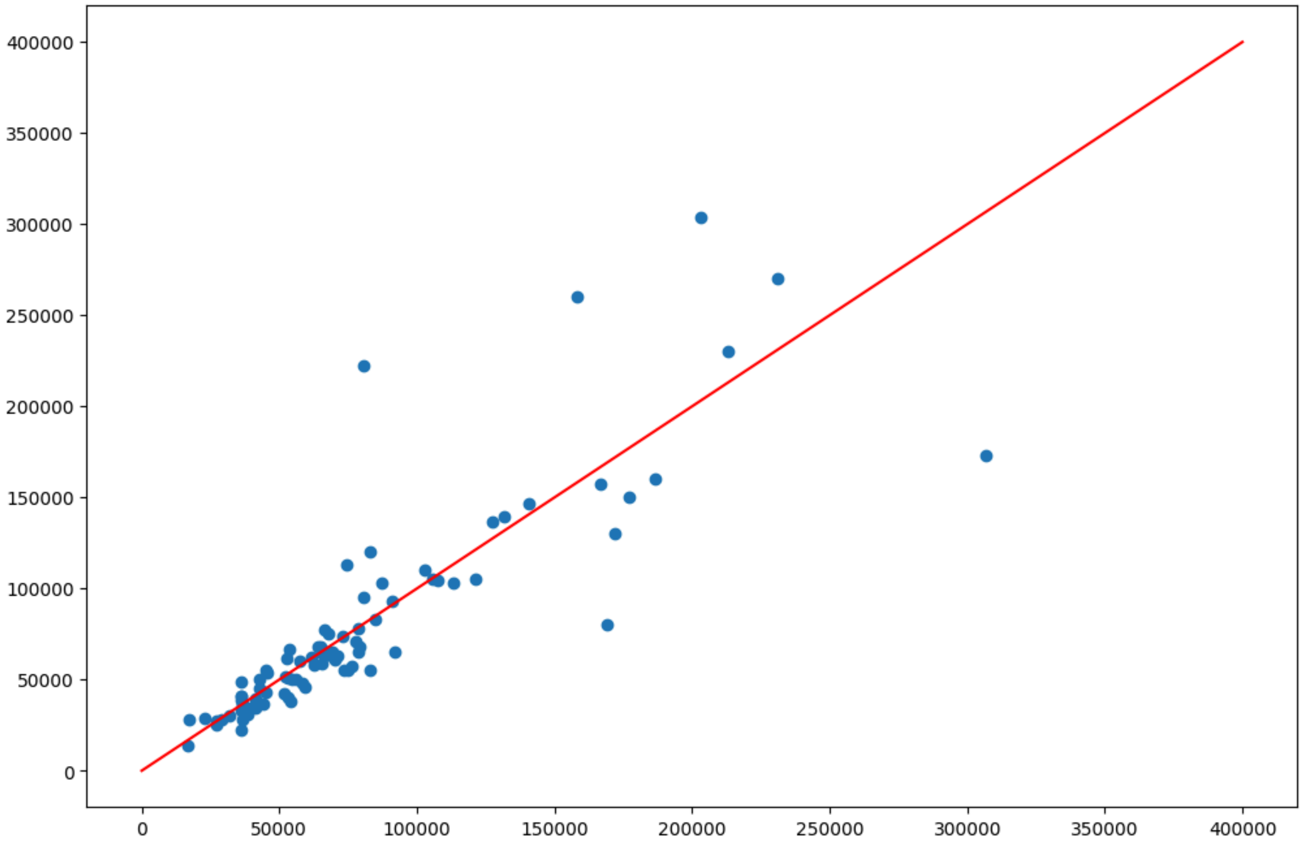
```
The mean square error of price and predicted value is:  901324956.1502393
```

```
#Calculating the absolute Square Error for Random Forest Model
mae_RF= mean_absolute_error(y_test, y_pred_RF)
print('The mean absolute error of price and predicted value is: ', mae_RF)
```

```
The mean absolute error of price and predicted value is:  15194.167113442421
```

```
#line and scatter plot
plt.figure(figsize=(12,8))
plt.scatter(y_pred_RF, y_test)
plt.plot(range(0, 400000), range(0, 400000), c='red')
```

```
[<matplotlib.lines.Line2D at 0x7ba3c4d9a3e0>]
```




```
#LASSO Model
LassoModel = Lasso()
model_lm = LassoModel.fit(X_train,y_train)

y_pred_lasso = model_lm.predict(X_test)
```

```
#LASSO Evaluation
#Mean Absolute Error for LASSO Model
mae_lasso= mean_absolute_error(y_test,y_pred_lasso)
print('The mean absolute error of price and predicted value is: ', mae_lasso)
```

```
The mean absolute error of price and predicted value is:  19140.350232765788
```

```
#Mean squared Error for LASSO Model
mse_lasso = mean_squared_error(y_test, y_pred_lasso)
print('The mean square error of price and predicted value is: ', mse_lasso)
```

```
The mean square error of price and predicted value is:  794845643.8141383
```

```
scores = [('MLR', mae_MLR),
          ('Random Forest', mae_RF),
          ('LASSO', mae_lasso)
         ]
```

```
mae = pd.DataFrame(data = scores, columns=['Model', 'MAE Score'])
mae
```