Jason wants to marry Kriti. But Kriti's father saysJason first needs to be competentenough to marry his daughter. So he tells Jason thathe needs to buy a house, a car anda computer (Kriti is a binge-queen) to be worthy ofher. Love knows no bounds andneither does Jason. So he decides to take up thischallenge and works day and night forthe next 1 year. After toiling away for such a longtime, he now needs to calculate thetotal amount of money he requires to fulfill Kriti's(but really her father's) wishes to findout if he has enough saved up right now or not. Datahas been given below and youneed to use that to help him figure out how much hewould need to spend to afford all ofthe above mentioned things. Your goal is to give Jasona total estimate of his expenses.

In [ ]:

```
pip install category_encoders
```

```
Requirement already satisfied: category_encoders in /usr/local/lib/python3.7/dist-package
s (2.2.2)
Requirement already satisfied: numpy>=1.14.0 in /usr/local/lib/python3.7/dist-packages (f
rom category_encoders) (1.19.5)
Requirement already satisfied: statsmodels>=0.9.0 in /usr/local/lib/python3.7/dist-packag
es (from category_encoders) (0.10.2)
Requirement already satisfied: scipy>=1.0.0 in /usr/local/lib/python3.7/dist-packages (fr
om category_encoders) (1.4.1)
Requirement already satisfied: pandas>=0.21.1 in /usr/local/lib/python3.7/dist-packages (
from category_encoders) (1.1.5)
Requirement already satisfied: scikit-learn>=0.20.0 in /usr/local/lib/python3.7/dist-pack
ages (from category_encoders) (0.22.2.post1)
Requirement already satisfied: patsy>=0.5.1 in /usr/local/lib/python3.7/dist-packages (fr
om category_encoders) (0.5.1)
Requirement already satisfied: pytz>=2017.2 in /usr/local/lib/python3.7/dist-packages (fr
om pandas>=0.21.1->category_encoders) (2018.9)
Requirement already satisfied: python-dateutil>=2.7.3 in /usr/local/lib/python3.7/dist-pa
ckages (from pandas>=0.21.1->category_encoders) (2.8.1)
Requirement already satisfied: joblib>=0.11 in /usr/local/lib/python3.7/dist-packages (fr
om scikit-learn>=0.20.0->category_encoders) (1.0.1)
Requirement already satisfied: six in /usr/local/lib/python3.7/dist-packages (from patsy>
=0.5.1->category_encoders) (1.15.0)
```

Necessary Modules :

In [ ]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn import preprocessing, svm, model_selection
from sklearn.linear_model import LinearRegression, Lasso, Ridge
import seaborn as sns
import category_encoders as ce
```

```
/usr/local/lib/python3.7/dist-packages/statsmodels/tools/_testing.py:19: FutureWarning: p
andas.util.testing is deprecated. Use the functions in the public API at pandas.testing i
nstead.
  import pandas.util.testing as tm
```

Reading data :

In [ ]:

```
data=pd.read_csv('laptops.csv',encoding='ISO-8859-1',index_col=0)
```

In [ ]:

```
data
```

Out[ ]:

	Company	Product	TypeName	Inches	ScreenResolution	Cpu	Ram	Memory	Gpu	OpSys
1	Apple	MacBook Pro	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 2.3GHz	8GB	128GB SSD	Intel Iris Plus Graphics 640	macOS
2	Apple	Macbook Air	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8GB	128GB Flash Storage	Intel HD Graphics 6000	macOS
3	HP	250 G6	Notebook	15.6	Full HD 1920x1080	Intel Core i5 7200U 2.5GHz	8GB	256GB SSD	Intel HD Graphics 620	No OS
4	Apple	MacBook Pro	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.7GHz	16GB	512GB SSD	AMD Radeon Pro 455	macOS
5	Apple	MacBook Pro	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 3.1GHz	8GB	256GB SSD	Intel Iris Plus Graphics 650	macOS
...	...	...	...	...	...	...	...	...	...	...
1316	Lenovo	Yoga 500-14ISK	2 in 1 Convertible	14.0	IPS Panel Full HD / Touchscreen 1920x1080	Intel Core i7 6500U 2.5GHz	4GB	128GB SSD	Intel HD Graphics 520	Windows 10
1317	Lenovo	Yoga 900-13ISK	2 in 1 Convertible	13.3	IPS Panel Quad HD+ / Touchscreen 3200x1800	Intel Core i7 6500U 2.5GHz	16GB	512GB SSD	Intel HD Graphics 520	Windows 10
1318	Lenovo	IdeaPad 100S-14IBR	Notebook	14.0	1366x768	Intel Celeron Dual Core N3050 1.6GHz	2GB	64GB Flash Storage	Intel HD Graphics	Windows 10
1319	HP	15-AC110nv (i7-6500U/6GB/1TB/Radeon	Notebook	15.6	1366x768	Intel Core i7 6500U 2.5GHz	6GB	1TB HDD	AMD Radeon R5 M330	Windows 10
1320	Asus	X553SA-XX031T (N3050/4GB/500GB/W10)	Notebook	15.6	1366x768	Intel Celeron Dual Core N3050 1.6GHz	4GB	500GB HDD	Intel HD Graphics	Windows 10

1303 rows × 12 columns

In [ ]:

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1303 entries, 1 to 1320
Data columns (total 12 columns):
 #   Column            Non-Null Count  Dtype  
---  ------            --------------  -----  
 0   Company           1303 non-null   object 
 1   Product           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_euros       1303 non-null   float64
dtypes: float64(2), object(10)
memory usage: 132.3+ KB
```

Check for any missing values that are present in the dataset :

In [ ]:

```
data.isnull().sum()
```

Out[ ]:

```
Company             0
Product             0
TypeName            0
Inches              0
ScreenResolution    0
Cpu                 0
Ram                 0
Memory              0
Gpu                 0
OpSys               0
Weight              0
Price_euros         0
dtype: int64
```

Plotting :

In [ ]:

```
sns.catplot(x = "Price_euros",y = 'TypeName',data = data, hue = "Company",palette="Set3"
)
```

Out[ ]:

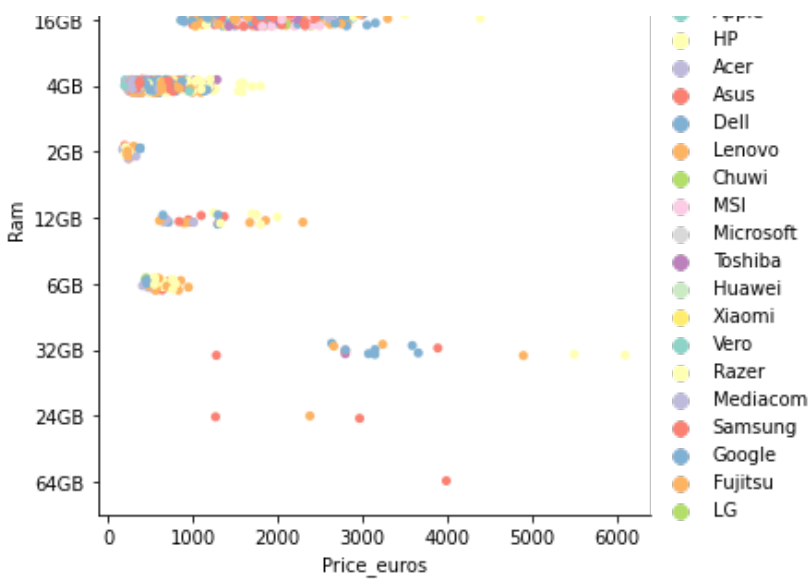
```
<seaborn.axisgrid.FacetGrid at 0x7fa7d0ecdb90>
```

In [ ]:

```
sns.catplot(x = "Price_euros",y = 'Ram',data = data, hue = "Company",palette="Set3")
```

Out[ ]:

```
<seaborn.axisgrid.FacetGrid at 0x7fa7bc23c790>
```

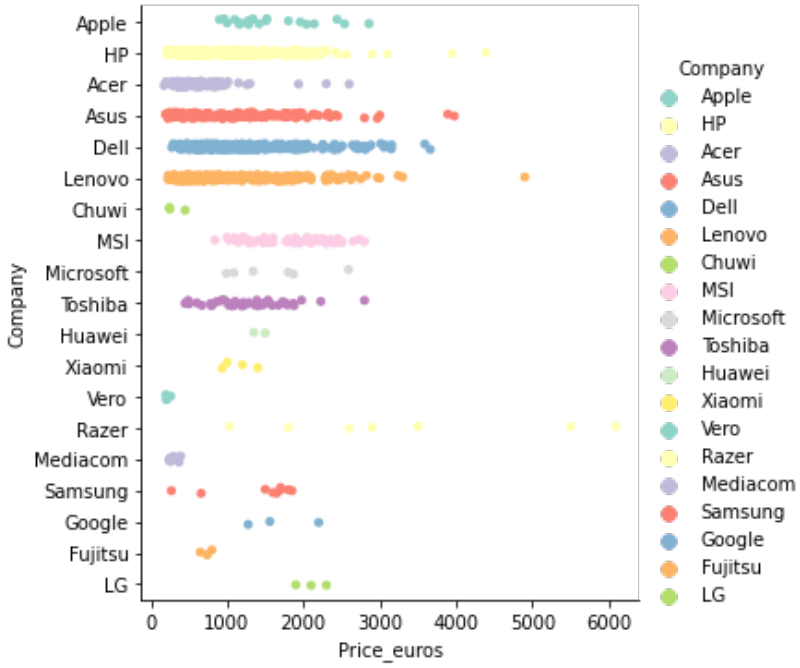


In [ ]:

```
sns.catplot(x = "Price_euros",y = 'Company',data = data, hue = "Company",palette="Set3")
```

Out[ ]:

```
<seaborn.axisgrid.FacetGrid at 0x7fa7a880d890>
```

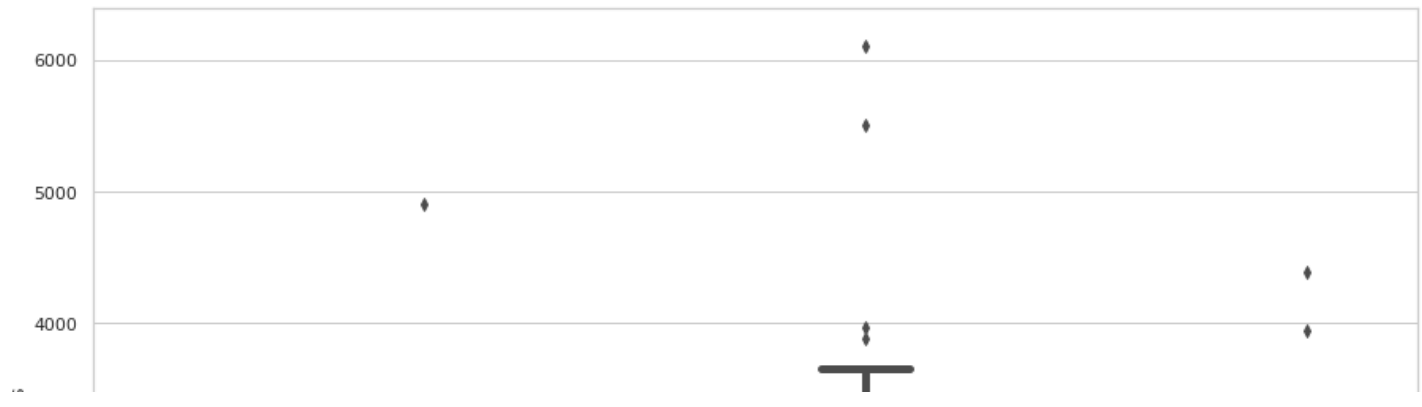


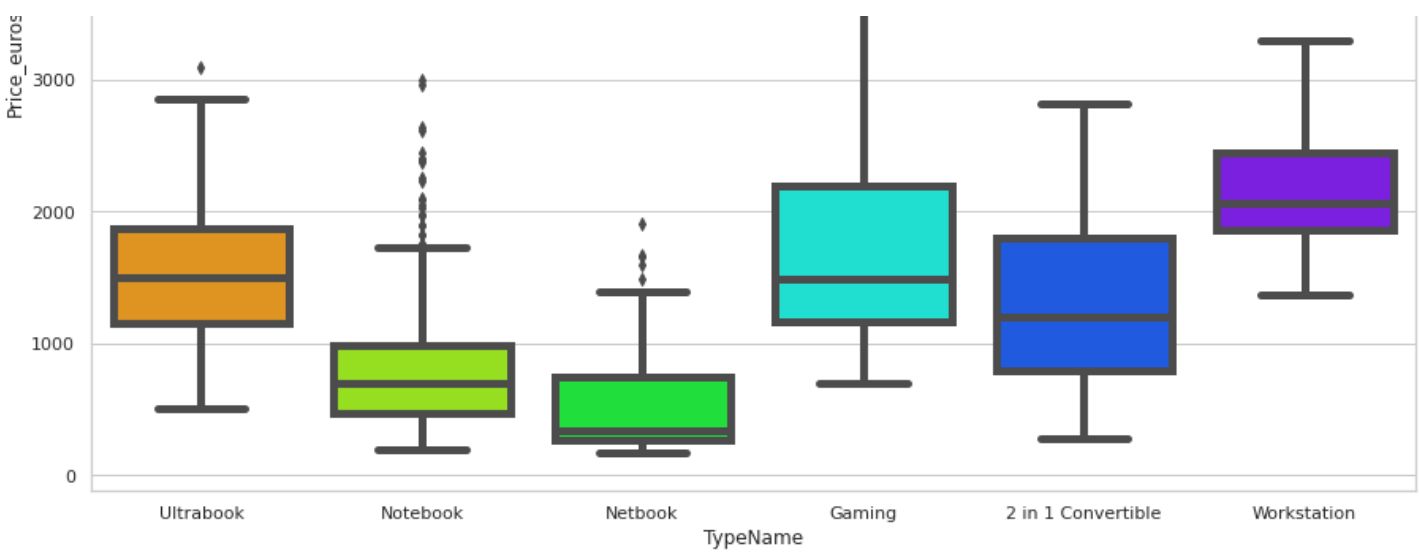
In [ ]:

```
plt.figure(figsize=(15,10))
sns.set_theme(style="whitegrid")
sns.boxplot(x='TypeName',y='Price_euros',data = data,palette='gist_rainbow',linewidth=5)
```

Out[ ]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f19eced8510>
```





Dealing with outliers :

In [ ]:

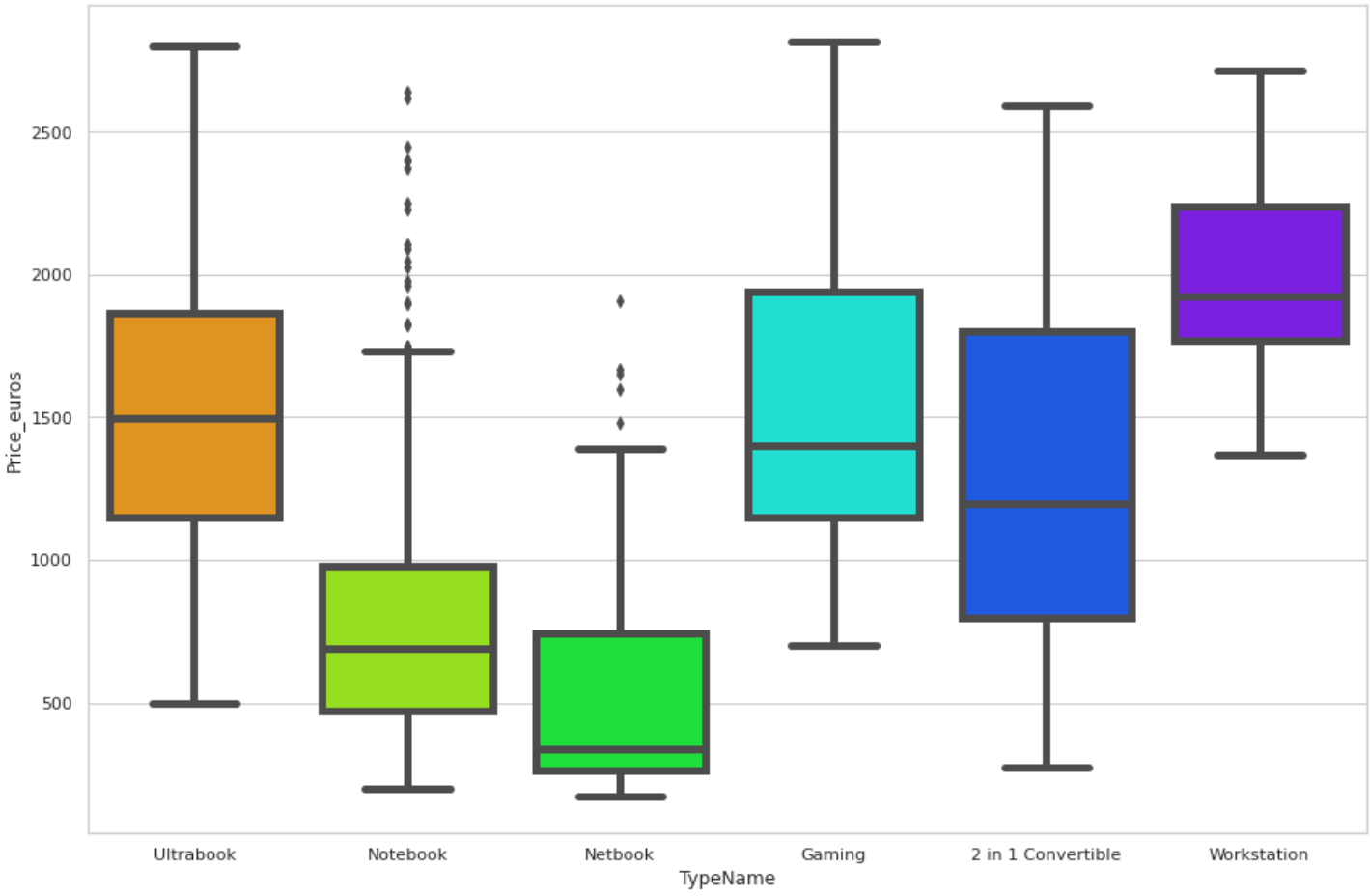
```
Q1 = data['Price_euros'].quantile(0.25)
Q3 = data['Price_euros'].quantile(0.75)
IQR = Q3 - Q1
filter = (data['Price_euros'] >= Q1 - 1.5 * IQR) & (data['Price_euros'] <= Q3 + 1.5 *IQR
)
data = data.loc[filter]
```

In [ ]:

```
plt.figure(figsize=(15,10))
sns.set_theme(style="whitegrid")
sns.boxplot(x='TypeName',y='Price_euros',data = data,palette='gist_rainbow',linewidth=5)
```

Out[ ]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f19eb0e17d0>
```



Process of Data Cleaning:

In [ ]:

```
def sufrem(clmn):
    clmn = clmn.str.replace(r'TB', '')
    clmn = clmn.str.replace(r'GB', '').fillna(0)
    return clmn
def TBhandle(clmn):
    if clmn < 6 :
        return clmn*1024
    else :
        return clmn
```

In [ ]:

```
def clean(df):
    df['Ram'] = df['Ram'].replace('[GB]', '', regex=True)
    df['Ram'] = pd.to_numeric(df['Ram'])
    df['Weight'] = df['Weight'].replace('[kg]', '', regex=True)
    df['Weight'] = pd.to_numeric(df['Weight'])
    df['cpu_speed(GHz)'] = pd.to_numeric(df['Cpu'].str.split(' ').str[-1].replace('[GHz]
', '', regex=True))
    df['cpu_manuf'] = df['Cpu'].str.split(' ').str[0]
    df['Horizontal'] = pd.to_numeric(df['ScreenResolution'].str.split(' ').str[-1].str.s
plit('x').str[0])
    df['Vertical'] = pd.to_numeric(df['ScreenResolution'].str.split(' ').str[-1].str.spl
it('x').str[1])
    t_arr = []
    for i in df['ScreenResolution'] :
        s = i.split(' ')
        if "Touchscreen" in s:
            touch = True
        else :
            touch = False
        t_arr.append(touch)
    df['Touch'] = pd.to_numeric(t_arr)
    SSD = []
    HDD = []
    Hybrid = []
    Flash = []
    for i in df['Memory']:
        dual_s = i.split(' ')
        if "SSD" in dual_s :
            SSD_val = dual_s[dual_s.index('SSD')-1]
            SSD.append(SSD_val)
        else :
            SSD.append('0')
        if "HDD" in dual_s :
            HDD_val = dual_s[dual_s.index("HDD")-1]
            HDD.append(HDD_val)
        else :
            HDD.append('0')
        if "Flash" in dual_s :
            Flash_val = dual_s[dual_s.index("Flash")-1]
            Flash.append(Flash_val)
        else :
            Flash.append('0')
        if "Hybrid" in dual_s :
            Hybrid_val = dual_s[dual_s.index("Hybrid")-1]
            Hybrid.append(Hybrid_val)
        else :
            Hybrid.append('0')
    df['Flash'] = Flash
    df['HDD'] = HDD
    df['SSD'] = SSD
    df['Hybrid'] = Hybrid
    df[['HDD','SSD','Flash','Hybrid']] = df[['HDD','SSD','Flash','Hybrid']].apply(sufrem
)
    df['HDD'] = pd.to_numeric(df['HDD']).apply(TBhandle)
    df['SSD'] = pd.to_numeric(df['SSD']).apply(TBhandle)
```

```
    df['Flash'] = pd.to_numeric(df['Flash']).apply(TBhandle)
    df['Hybrid'] = pd.to_numeric(df['Hybrid']).apply(TBhandle)
    cpu_dummies = pd.get_dummies(df['cpu_manuf'], prefix = 'cpu')
    opsys_dummies = pd.get_dummies(df['OpSys'], prefix = 'op')
    type_dummies = pd.get_dummies(df['TypeName'], prefix = 'Type')
    df = pd.concat([cpu_dummies, type_dummies , opsys_dummies, df], axis=1)
    df.drop('cpu_manuf',axis = 1, inplace = True)
    df.drop('OpSys',axis = 1, inplace = True)
    df.drop('TypeName',axis = 1, inplace = True)
    df.drop(columns=['Memory','Company','Product','ScreenResolution','Cpu'], inplace = T
rue)
    return df

df = clean(data)
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:2: 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_g
uide/indexing.html#returning-a-view-versus-a-copy

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:3: 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_g
uide/indexing.html#returning-a-view-versus-a-copy
  This is separate from the ipykernel package so we can avoid doing imports until
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:4: 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_g
uide/indexing.html#returning-a-view-versus-a-copy
  after removing the cwd from sys.path.
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:5: 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_g
uide/indexing.html#returning-a-view-versus-a-copy
  """
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:6: 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_g
uide/indexing.html#returning-a-view-versus-a-copy

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:7: 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_g
uide/indexing.html#returning-a-view-versus-a-copy
  import sys
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:8: 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_g
uide/indexing.html#returning-a-view-versus-a-copy

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:9: 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_g
uide/indexing.html#returning-a-view-versus-a-copy
  if __name__ == '__main__':
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:18: SettingWithCopyWarning:
```

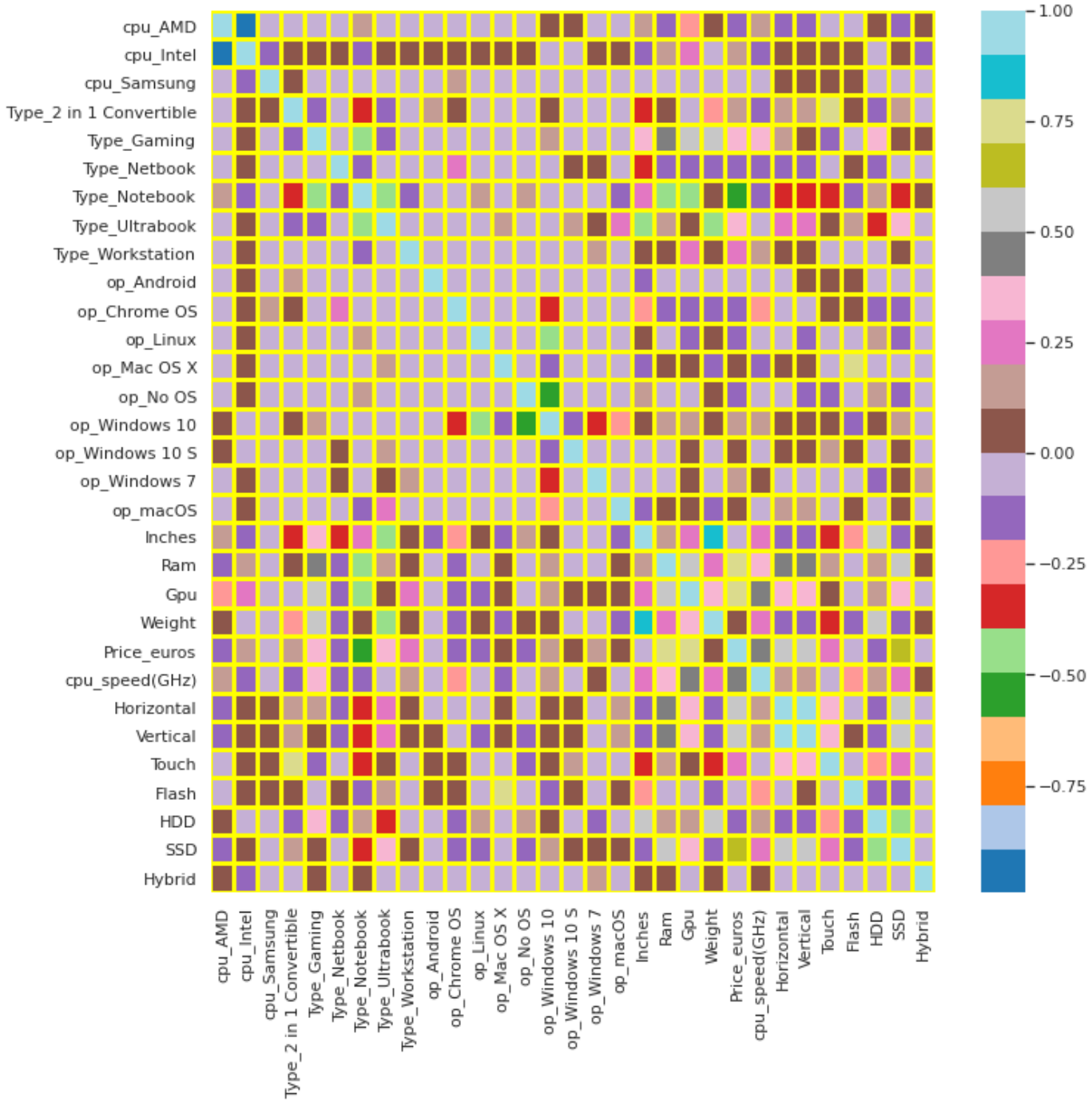
```
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_g
uide/indexing.html#returning-a-view-versus-a-copy
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:45: 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_g
uide/indexing.html#returning-a-view-versus-a-copy
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:46: 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_g
uide/indexing.html#returning-a-view-versus-a-copy
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:47: 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_g
uide/indexing.html#returning-a-view-versus-a-copy
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:48: 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_g
uide/indexing.html#returning-a-view-versus-a-copy
/usr/local/lib/python3.7/dist-packages/pandas/core/frame.py:3069: 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_g
uide/indexing.html#returning-a-view-versus-a-copy
  self[k1] = value[k2]
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:50: 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_g
uide/indexing.html#returning-a-view-versus-a-copy
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:51: 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_g
uide/indexing.html#returning-a-view-versus-a-copy
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:52: 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_g
uide/indexing.html#returning-a-view-versus-a-copy
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:53: 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_g
uide/indexing.html#returning-a-view-versus-a-copy
```

In [ ]:

```
corrmat = df.corr()
fig, ax = plt.subplots()
fig.set_size_inches(11,11)
sns.heatmap(corrmat,cmap = "tab20",linewidths = 2,linecolor = "yellow")
```

Out[ ]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f19e4b37c90>
```



Target Encoding :

In [ ]:

```
encoder=ce.TargetEncoder(cols='Gpu')
gpu_encoded = encoder.fit_transform(df['Gpu'],df['Price_euros'])
df['Gpu'] = gpu_encoded['Gpu']
```

```
/usr/local/lib/python3.7/dist-packages/category_encoders/utils.py:21: FutureWarning: is_c
ategorical is deprecated and will be removed in a future version.  Use is_categorical_dty
pe instead
  elif pd.api.types.is_categorical(cols):
```

In [ ]:

```
temp1 = df['Gpu']
temp2 = data['Gpu']
gpudf = pd.DataFrame()
gpudf['Gpu']   = temp2
gpudf['val']   = temp1
```

In [ ]:

```
df.head()
```

Out[ ]:

	cpu_AMD	cpu_Intel	cpu_Samsung	Type_2 in 1 Convertible	Type_Gaming	Type_Netbook	Type_Notebook	Type_Ultrabook	Type_Work
1	0	1	0	0	0	0	0	1	
2	0	1	0	0	0	0	0	1	
3	0	1	0	0	0	0	1	0	
4	0	1	0	0	0	0	0	1	
5	0	1	0	0	0	0	0	1	

In [ ]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1274 entries, 1 to 1320
Data columns (total 31 columns):
 #   Column                    Non-Null Count  Dtype
---  ------                    --------------  -----
 0   cpu_AMD                   1274 non-null   uint8
 1   cpu_Intel                 1274 non-null   uint8
 2   cpu_Samsung               1274 non-null   uint8
 3   Type_2 in 1 Convertible   1274 non-null   uint8
 4   Type_Gaming               1274 non-null   uint8
 5   Type_Netbook              1274 non-null   uint8
 6   Type_Notebook             1274 non-null   uint8
 7   Type_Ultrabook            1274 non-null   uint8
 8   Type_Workstation          1274 non-null   uint8
 9   op_Android                1274 non-null   uint8
 10  op_Chrome OS              1274 non-null   uint8
 11  op_Linux                  1274 non-null   uint8
 12  op_Mac OS X               1274 non-null   uint8
 13  op_No OS                  1274 non-null   uint8
 14  op_Windows 10             1274 non-null   uint8
 15  op_Windows 10 S           1274 non-null   uint8
 16  op_Windows 7              1274 non-null   uint8
 17  op_macOS                  1274 non-null   uint8
 18  Inches                    1274 non-null   float64
 19  Ram                       1274 non-null   int64
 20  Gpu                       1274 non-null   float64
 21  Weight                    1274 non-null   float64
 22  Price_euros               1274 non-null   float64
 23  cpu_speed(GHz)            1274 non-null   float64
 24  Horizontal                1274 non-null   int64
 25  Vertical                  1274 non-null   int64
 26  Touch                     1274 non-null   bool
 27  Flash                     1274 non-null   int64
 28  HDD                       1274 non-null   float64
 29  SSD                       1274 non-null   int64
 30  Hybrid                    1274 non-null   float64
dtypes: bool(1), float64(7), int64(5), uint8(18)
memory usage: 193.0 KB
```

Building a Model :

In [ ]:

```
y = (df['Price_euros'])
X = np.array(df.drop(['Price_euros'],1))
```

In [ ]:

```
X_train , X_test , y_train , y_test = model_selection.train_test_split(X , y , test_size
= 0.2, random_state = 22)
```

Cleaning Data To Be Predicted :

In [ ]:

```
pred_df = pd.DataFrame({'Company':['HP'],'Product':['250 G6'],'TypeName' : ['Notebook'],
'Inches' : [14],'ScreenResolution' : ['IPS Panel Full HD 1920x1080'], 'Cpu' : ['Intel Co
re i7 7500U 2.7GHz'],'Ram' : ['8GB'],'Memory' : ['1TB SSD'],'Gpu' : ['Intel HD Graphics
620'], 'OpSys' : ['Linux'], 'Weight' : ['1.5kg']})
pred_df = clean(pred_df)
```

In [ ]:

```
l = ['cpu_AMD','cpu_Intel','cpu_Samsung','Type_2 in 1 Convertible','Type_Gaming','Type_Ne
tbook','Type_Notebook','Type_Ultrabook','Type_Workstation','op_Android','op_Chrome', 'op_
Linux',
       'op_Mac OS X', 'op_No OS', 'op_Windows 10', 'op_Windows 10 S',
       'op_Windows 7', 'op_macOS']
for col in l:
    pred_df[col] = 0
```

In [ ]:

```
a = pred_df['Gpu'][0]
pred_df['Gpu'] = gpudf.loc[gpudf.Gpu==a,'val'].values[0]
```

Linear Regression :

In [ ]:

```
clf = LinearRegression ()
clf.fit(X_train , y_train)
```

Out[ ]:

```
LinearRegression(copy_X=True, fit_intercept=True, n_jobs=None, normalize=False)
```

In [ ]:

```
clf.score(X_train,y_train)
```

Out[ ]:

```
0.7963799723663094
```

In [ ]:

```
clf.score(X_test,y_test)
```

Out[ ]:

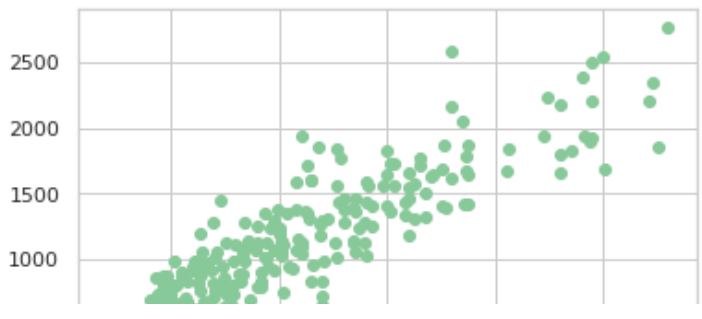
```
0.7888777682574388
```

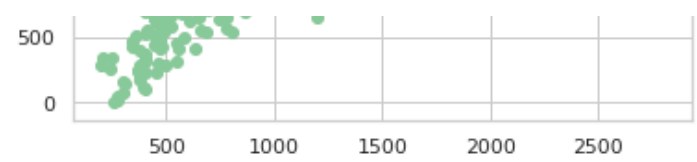
In [ ]:

```
y_predicted = clf.predict(X_test)
plt.scatter(y_test,y_predicted,color = '#88c999')
```

Out[ ]:

```
<matplotlib.collections.PathCollection at 0x7f19e57afe90>
```





Ridge:

In [ ]:

```
ridlr = Ridge()
ridlr.fit(X_train, y_train)
score = ridlr.score(X_test,y_test)
score
```

Out[ ]:

```
0.7892888500291874
```

Random Forest Regressor :

In [ ]:

```
from sklearn.ensemble import RandomForestRegressor
rfr = RandomForestRegressor()
```

In [ ]:

```
rfr.fit(X_train,y_train)
```

Out[ ]:

```
RandomForestRegressor(bootstrap=True, ccp_alpha=0.0, criterion='mse',
                      max_depth=None, max_features='auto', max_leaf_nodes=None,
                      max_samples=None, min_impurity_decrease=0.0,
                      min_impurity_split=None, min_samples_leaf=1,
                      min_samples_split=2, min_weight_fraction_leaf=0.0,
                      n_estimators=100, n_jobs=None, oob_score=False,
                      random_state=None, verbose=0, warm_start=False)
```

In [ ]:

```
rfr.score(X_train,y_train)  #train score
```

Out[ ]:

```
0.976429910826258
```

In [ ]:

```
rfr.score(X_test,y_test)   #test score
```

Out[ ]:

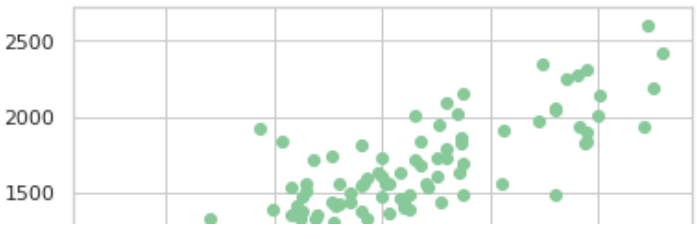
```
0.8493155728100502
```

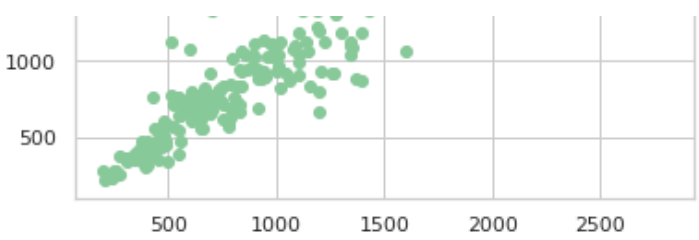
In [ ]:

```
y_predicted = rfr.predict(X_test)
plt.scatter(y_test,y_predicted, color = '#88c999')
```

Out[ ]:

```
<matplotlib.collections.PathCollection at 0x7f19e5799ed0>
```





From the above, Random forest Regressor has the best Scores. So the required value to be predicted :

In [ ]:

```
price = rfr.predict(pred_df)[0]
price
```

Out[ ]:

```
308.4726000000001
```