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DS Practical

In [1]:
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt

import warnings
warnings.filterwarnings("ignore")
```

In [2]:
```
data_2015=pd.read_csv('2015.csv')
data_2016=pd.read_csv('2016.csv')
data_2017=pd.read_csv('2017.csv')
data_2018=pd.read_csv('2018.csv')
data_2019=pd.read_csv('2019.csv')

data_2015.columns=[each.split()[0] if(len(each.split())>2) else each.replace(' ","_") for each in data_2015.columns]
data_2016.columns=[each.split()[0] if(len(each.split())>2) else each.replace(' ","_") for each in data_2016.columns]
data_2017.columns=[each.replace(',","") for each in data_2017.columns]
data_2018.columns=[each.split()[0] if(len(each.split())>2) else each.replace(' ","_") for each in data_2016.columns]
```

In [3]:
```
data_2015.head()
```

Out[3]:

	Country	Region	Happiness_Rank	Happiness_Score	Standard_Error	Economy	Family	Health	Freedom	Trus
0	Switzerland	Western Europe	1	7.587	0.03411	1.39651	1.34951	0.94143	0.66557	0.4197
1	Iceland	Western Europe	2	7.561	0.04884	1.30232	1.40223	0.94784	0.62877	0.1414
2	Denmark	Western Europe	3	7.527	0.03328	1.32548	1.36058	0.87664	0.64938	0.4835
3	Norway	Western Europe	4	7.522	0.03880	1.45900	1.33095	0.88521	0.66973	0.3650
4	Canada	North America	5	7.427	0.03553	1.32629	1.32261	0.90563	0.63297	0.3295

In [4]:
```
data_2015.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 158 entries, 0 to 157
Data columns (total 12 columns):
 #   Column          Non-Null Count  Dtype  
---  ------          --------------  -----  
 0   Country         158 non-null    object 
 1   Region          158 non-null    object 
 2   Happiness_Rank  158 non-null    int64  
 3   Happiness_Score 158 non-null    float64
 4   Standard_Error  158 non-null    float64
 5   Economy         158 non-null    float64
 6   Family          158 non-null    float64
 7   Health          158 non-null    float64
 8   Freedom         158 non-null    float64
 9   Trust           158 non-null    float64
 10  Generosity      158 non-null    float64
 11  Dystopia_Residual  158 non-null    float64
dtypes: float64(9), int64(1), object(2)
memory usage: 14.9+ KB
```

In [5]:
```
region_lists=list(data_2015['Region'].unique())
region_lists
```

Out[5]:
```
['Western Europe',
 'North America',
 'Australia and New Zealand',
 'Middle East and Northern Africa',
 'Latin America and Caribbean',
 'Southeastern Asia',
 'Central and Eastern Europe',
 'Eastern Asia',
 'Sub-Saharan Africa',
 'Southern Asia']
```

In [6]:
```
print('Are There Missing Data? :',data_2015.isnull().any().any())
print(data_2015.isnull().sum())
```

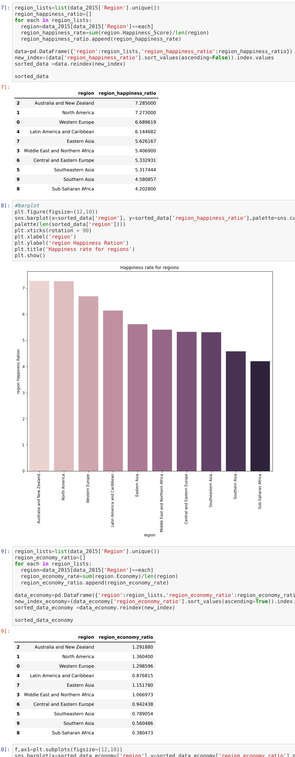
```
Are There Missing Data? : False
Country             0
Region              0
Happiness_Rank      0
Happiness_Score     0
Standard_Error      0
Economy             0
Family              0
Health              0
Freedom             0
Trust               0
Generosity          0
Dystopia_Residual   0
dtype: int64
```

In [7]:
```
region_lists=list(data_2015['Region'].unique())
ref_happiness_ratio=[]
for each in region_lists:
    region=data_2015[data_2015['Region']==each]
    region_happiness_ratio=sum(region.Happiness_Score)/len(region)
    ref_happiness_ratio.append(region_happiness_rate)

data=pd.DataFrame({'region':region_lists,'region_happiness_ratio':region_happiness_ratio})
new_index=data['region_happiness_ratio'].sort_values(ascending=False).index.values
sorted_data =data.reindex(new_index)

sorted_data
```

Out[7]:

	region	region_happiness_ratio
2	Australia and New Zealand	7.285000
1	North America	7.273000
6	Western Europe	6.689619
4	Latin America and Caribbean	6.144682
7	Eastern Asia	5.626167
3	Middle East and Northern Africa	5.406900
5	Central and Eastern Europe	5.332931
8	Southeastern Asia	5.317444
9	Southern Asia	4.580857
0	Sub-Saharan Africa	4.202800

In [8]:
```
#barplot
plt.figure(figsize=(12,10))
sns.barplot(x=sorted_data['region'], y=sorted_data['region_happiness_ratio'],palette=sns.cubehelix_palette(len(sorted_data['region'])))
plt.xticks(rotation= 90)
plt.xlabel('region')
plt.ylabel('region Happiness Ration')
plt.title('Happiness rate for regions')
plt.show()
```

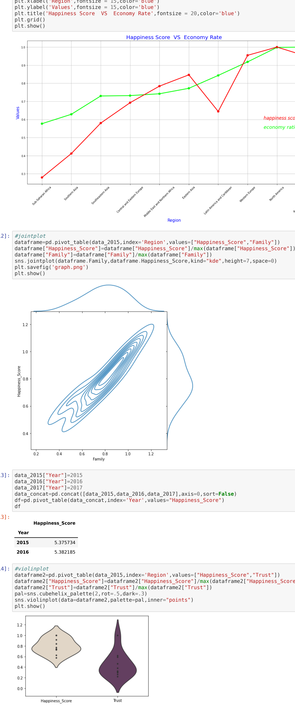


In [9]:
```
region_lists=list(data_2015['Region'].unique())
region_economy_ratio=[]
for each in region_lists:
    region=data_2015[data_2015['Region']==each]
    region_economy_rate=sum(region.Economy)/len(region)
    region_economy_ratio.append(region_economy_rate)

data_economy=pd.DataFrame({'region':region_lists,'region_economy_ratio':region_economy_ratio})
new_index_economy=(data_economy['region_economy_ratio'].sort_values(ascending=True)).index.values
sorted_data_economy =data_economy.reindex(new_index)

sorted_data_economy
```

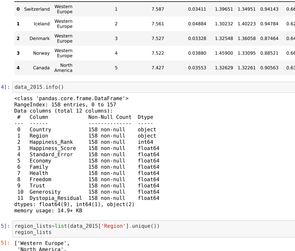
Out[9]:

	region	region_economy_ratio
2	Australia and New Zealand	1.291880
1	North America	1.360400
6	Western Europe	1.290596
4	Latin America and Caribbean	0.876815
7	Eastern Asia	1.151780
3	Middle East and Northern Africa	1.066973
5	Central and Eastern Europe	0.942438
8	Southeastern Asia	0.789054
9	Southern Asia	0.560486
0	Sub-Saharan Africa	0.380473

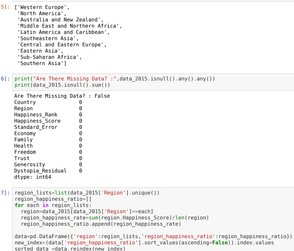
In [10]:
```
f,axis1=plt.subplots(figsize=(12,10))
sns.barplot(x=sorted_data_economy['region'],y=sorted_data_economy['region_economy_ratio'],palette="rocket",ax=axis1)
plt.xticks(rotation=90)
plt.xlabel('Region')
plt.ylabel('Region Economy Ratio')
plt.title('Economy rate for regions')
plt.show()
```



In [11]:
```
#Point plot
sorted['region_happiness_ratio']=sorted_data['region_happiness_ratio']/max(sorted_data['region_happiness_ratio'])
sorted_data_economy['region_economy_ratio']=sorted_data_economy['region_economy_ratio']/max(sorted_data_economy['region_economy_ratio'])

data=pd.concat([sorted_data,sorted_data_economy['region_economy_ratio']],axis=1)
data.sort_values('region_happiness_ratio',inplace=True)


f,ax1 = plt.subplots(figsize =(20,10))
sns.pointplot(x='region',y='region_happiness_ratio',data=data,color='lime',alpha=0.8)
sns.pointplot(x='region',y='region_economy_ratio',data=data,color='red',alpha=0.8)
plt.text(7.55,0.6,'happiness score ratio',color='red',fontsize = 17,style = 'italic')
plt.text(7.55,0.55,'economy ratio',color='lime',fontsize = 18,style = 'italic')
plt.xlabel('region',fontsize = 15,color='blue')
plt.ylabel('Values',fontsize = 15,color='blue')
plt.title('Happiness Score  VS  Economy Rate',fontsize = 20,color='blue')
plt.grid()
plt.show()
```



In [12]:
```
#pointplot
dataframe=pd.pivot_table(data_2015,index='Region',values=["Happiness_Score","Family"])
dataframe["Happiness_Score"]=dataframe["Happiness_Score"]/max(dataframe["Happiness_Score"])
dataframe["Family"]=dataframe["Family"]/max(dataframe["Family"])
sns.jointplot(dataframe.Family,dataframe.Happiness_Score,kind="kde",height=7,space=0)
plt.savefig('graph.png')
plt.show()
```



In [13]:
```
data_2015["Year"]=2015
data_2016["Year"]=2016
data_2017["Year"]=2017
data_concat=pd.concat([data_2015,data_2016,data_2017],axis=0,sort=False)
df=pd.pivot_table(data_concat,index='Year',values="Happiness_Score")
df
```

Out[13]:

	Happiness_Score
Year	
2015	5.375734
2016	5.382185

In [14]:
```
#violinplot
dataframe2=pd.pivot_table(data_2015,index='Region',values=["Happiness_Score","Trust"])
dataframe2["Happiness_Score"]=dataframe2["Happiness_Score"]/max(dataframe2["Happiness_Score"])
dataframe2["Trust"]=dataframe2["Trust"]/max(dataframe2["Trust"])
pal=sns.cubehelix_palette(2,rot=-.5,dark=.3)
sns.violinplot(data=dataframe2,palette=pal,inner="points")
plt.show()
```