

```
In [1]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
%matplotlib inline
warnings.filterwarnings("ignore")
```

## Export Data

```
In [2]: exp=pd.read_csv('/kaggle/input/india-trade-data/2018-2010_export.csv')
exp.head()
```

```
Out[2]:
```

	HSCode	Commodity	value	country	year
0	2	MEAT AND EDIBLE MEAT OFFAL.	0.18	AFGHANISTAN TIS	2018
1	3	FISH AND CRUSTACEANS, MOLLUSCS AND OTHER AQUAT...	0.00	AFGHANISTAN TIS	2018
2	4	DAIRY PRODUCE; BIRDS' EGGS; NATURAL HONEY; EDI...	12.48	AFGHANISTAN TIS	2018
3	6	LIVE TREES AND OTHER PLANTS; BULBS; ROOTS AND ...	0.00	AFGHANISTAN TIS	2018
4	7	EDIBLE VEGETABLES AND CERTAIN ROOTS AND TUBERS.	1.89	AFGHANISTAN TIS	2018

```
In [3]: ### checking Data types
```

```
exp.dtypes
```

```
Out[3]: HSCode      int64
Commodity    object
value        float64
country      object
year         int64
dtype: object
```

-----> Datatypes are good

```
In [4]: ### Checking for null values
```

```
exp.isnull().sum()
```

```
Out[4]: HSCode      0
Commodity    0
value        14038
country      0
year         0
dtype: int64
```

## Sanity Check for export data

```
In [5]: ### Value must be >=0
```

```
exp[exp['value']<0.0].shape[0]
```

Out[5]: 0

## Visualization for export data

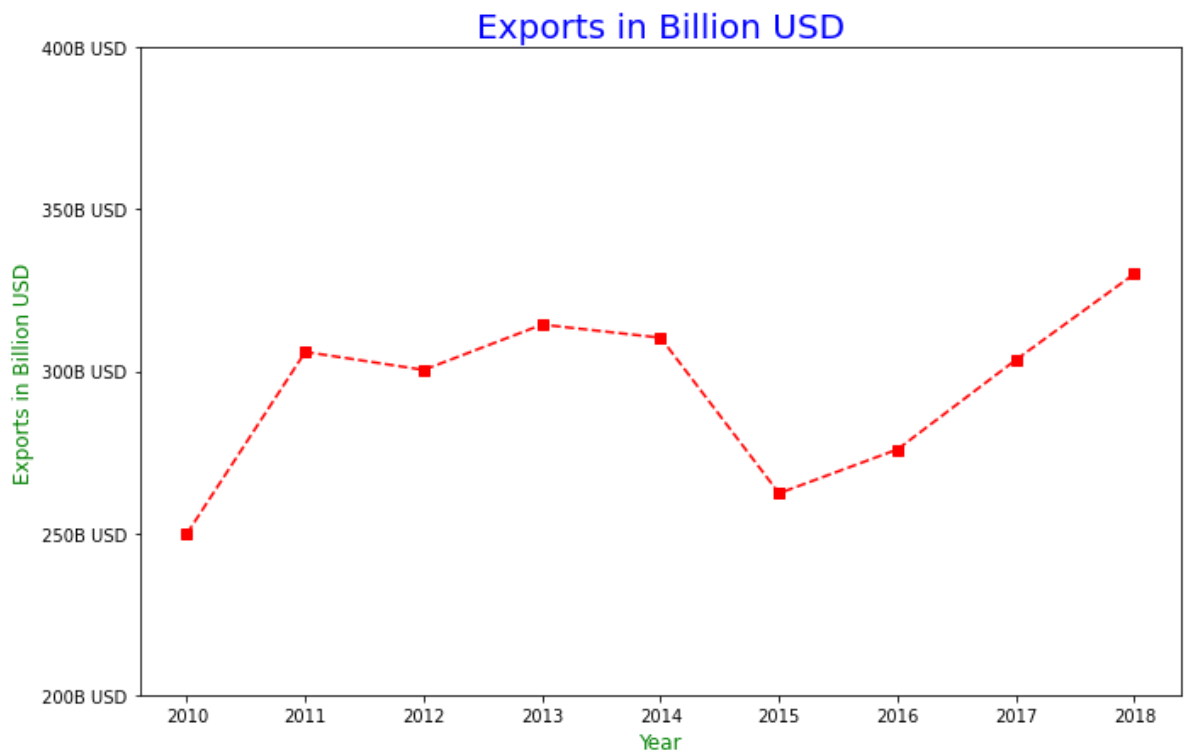
```
In [6]: ### In Which year India exported highest in value
plt.figure(figsize=[11,7])
exp.groupby(by='year')['value'].sum().sort_values(ascending=True).plot.bar(color='red')
plt.xlabel('Year')
plt.ylabel('Exports in Billion US$')
ticks = np.arange(0, 400000, 100000)
labels = ["{}B$".format(i//1000) for i in ticks]
plt.yticks(ticks, labels)
plt.title('Exports by year',fontdict={'fontsize': 20,'color':'Red'})
plt.show()
```



**Inference: In 2018,India exported highest in value while in 2010 it was lowest**

```
In [7]: ### Exports trend during 2010-2018 using Line plot

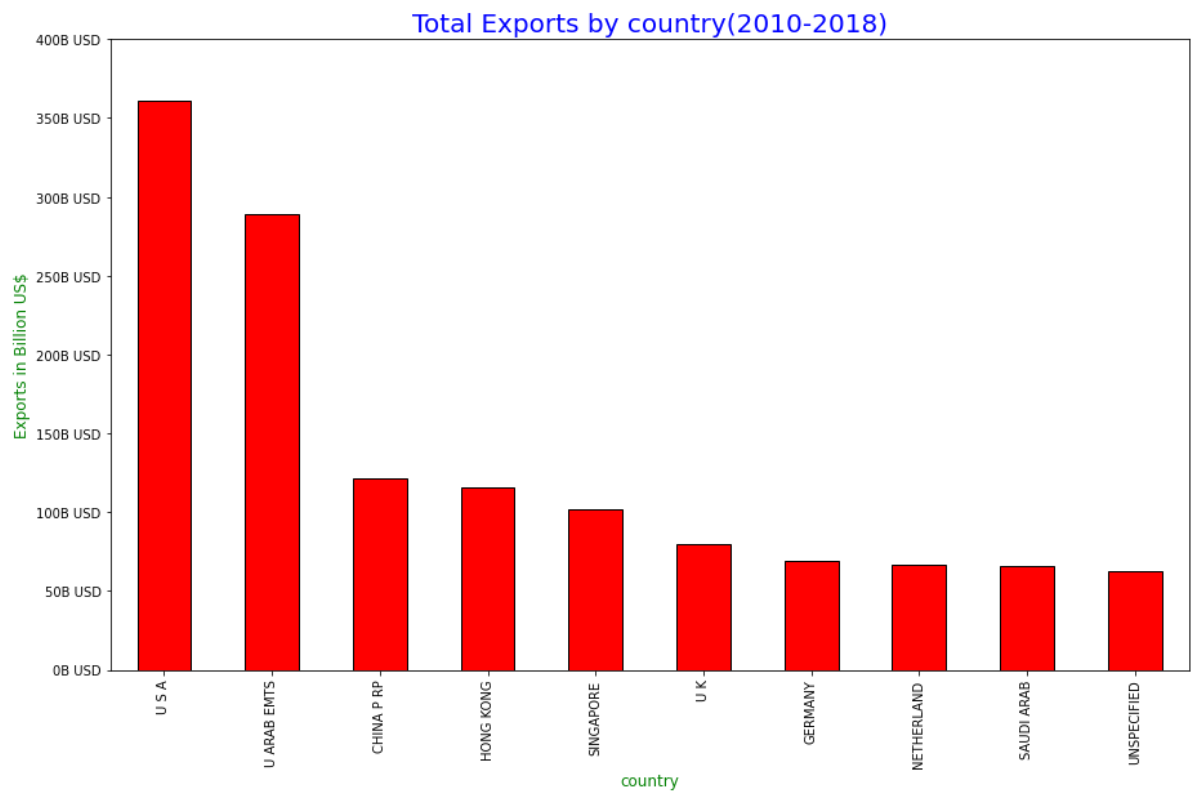
plt.figure(figsize=[11,7])
exp.groupby(by='year')['value'].sum().plot.line(color='red',marker='s',linestyle='solid')
ticks = np.arange(200000, 450000, 50000)
labels = ["{}B USD".format(i//1000) for i in ticks]
plt.yticks(ticks, labels)
plt.xlabel('Year',fontdict={'fontsize': 12,'color':'green'})
plt.ylabel('Exports in Billion USD',fontdict={'fontsize': 12,'color':'green'})
plt.title('Exports in Billion USD',fontdict={'fontsize': 20,'color':'Blue'})
plt.show()
```



***Inference 2: India's export is continuously increasing after 2015***

```
In [8]: ### To which country India exported highest?

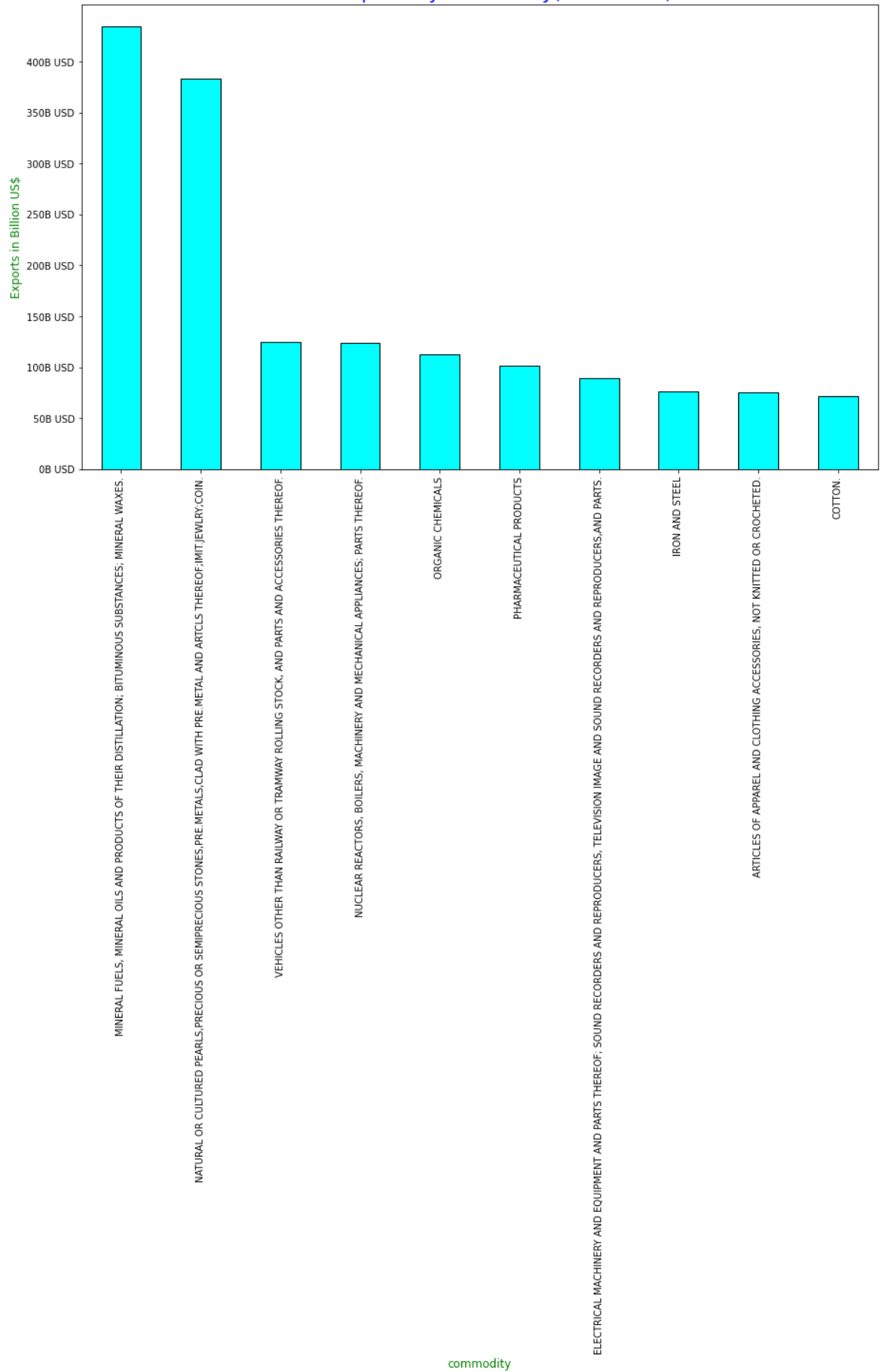
plt.figure(figsize=[15,9])
a=exp.groupby(by=['country'])['value'].sum().sort_values(ascending=False).head(10)
a.plot(kind='bar',color='red',edgecolor='black')
plt.xlabel('country',fontdict={'fontsize': 12,'color':'green'})
plt.ylabel('Exports in Billion US$',fontdict={'fontsize': 12,'color':'green'})
plt.title('Total Exports by country(2010-2018)',fontdict={'fontsize': 20,'color':'red'})
ticks = np.arange(0, 450000, 50000)
labels = ["{}B USD".format(i//1000) for i in ticks]
plt.yticks(ticks, labels)
plt.show()
```



**India exported highest(by value) to USA(2010-2018)**

```
In [9]: ### which Indian commodity was exported(highest in value)
plt.figure(figsize=[15,9])
a=exp.groupby(by=['Commodity'])['value'].sum().sort_values(ascending=False).head(10)
a.plot(kind='bar',color='cyan',edgecolor='black')
plt.xlabel('commodity',fontdict={'fontsize': 12,'color':'green'})
plt.ylabel('Exports in Billion US$',fontdict={'fontsize': 12,'color':'green'})
plt.title('Total Exports by commodity(2010-2018)',fontdict={'fontsize': 20,'color':'green'})
ticks = np.arange(0, 450000, 50000)
labels = ["{}B USD".format(i//1000) for i in ticks]
plt.yticks(ticks, labels)
plt.show()
```

Total Exports by commodity(2010-2018)

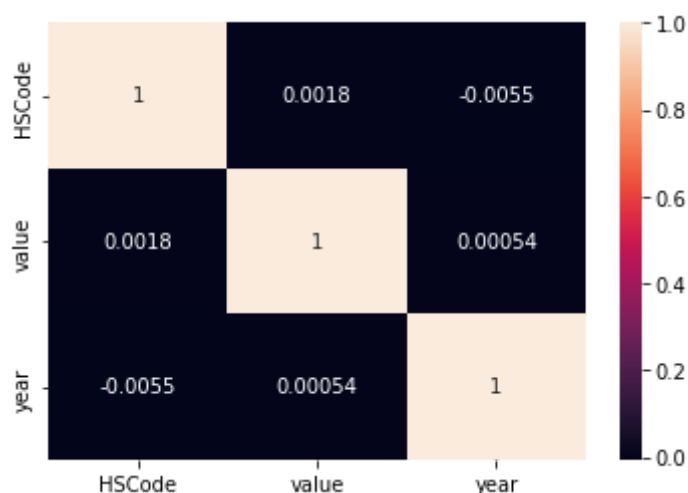


**Mineral wax,mineral fuel and other mineral product commodity was exported highest during 2010-2018**

```
In [10]: exp.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 137023 entries, 0 to 137022
Data columns (total 5 columns):
 #   Column      Non-Null Count  Dtype  
---  -
 0   HSCode      137023 non-null  int64  
 1   Commodity   137023 non-null  object  
 2   value       122985 non-null  float64 
 3   country     137023 non-null  object  
 4   year        137023 non-null  int64  
dtypes: float64(1), int64(2), object(2)
memory usage: 5.2+ MB
```

```
In [11]: expcorr=exp.corr()
sns.heatmap(expcorr,annot=True)
plt.show()
```



***No relationship found***

## Import Data

```
In [12]: imp=pd.read_csv('/kaggle/input/india-trade-data/2018-2010_import.csv')
imp.head()
```

```
Out[12]:
```

	HSCode	Commodity	value	country	year
0	5	PRODUCTS OF ANIMAL ORIGIN, NOT ELSEWHERE SPECI...	0.00	AFGHANISTAN TIS	2018
1	7	EDIBLE VEGETABLES AND CERTAIN ROOTS AND TUBERS.	12.38	AFGHANISTAN TIS	2018
2	8	EDIBLE FRUIT AND NUTS; PEEL OR CITRUS FRUIT OR...	268.60	AFGHANISTAN TIS	2018
3	9	COFFEE, TEA, MATE AND SPICES.	35.48	AFGHANISTAN TIS	2018
4	11	PRODUCTS OF THE MILLING INDUSTRY; MALT; STARCH...	NaN	AFGHANISTAN TIS	2018

```
In [13]: ### checking Data types
```

```
imp.dtypes
```

```
Out[13]: HSCode      int64  
Commodity   object  
value       float64  
country     object  
year        int64  
dtype: object
```

-----> Datatypes are good

```
In [14]: ### Checking for null values
```

```
imp.isnull().sum()
```

```
Out[14]: HSCode      0  
Commodity   0  
value       11588  
country     0  
year        0  
dtype: int64
```

## Sanity Check for Import data

```
In [15]: ### Value must be >=0
```

```
imp[imp['value']<0.0].shape[0]
```

```
Out[15]: 0
```

## Visualization for Import data

```
In [16]: ### In Which year India imported highest in value
```

```
plt.figure(figsize=[11,7])  
imp.groupby(by='year')['value'].sum().sort_values(ascending=False).plot.bar(color=  
plt.xlabel('Year')  
plt.ylabel('Import in Billion US$')  
ticks = np.arange(0, 500000, 50000)  
labels = ["{}B$".format(i//1000) for i in ticks]  
plt.yticks(ticks, labels)  
plt.title('Imports by year',fontdict={'fontsize': 20,'color':'Red'})  
plt.show()
```

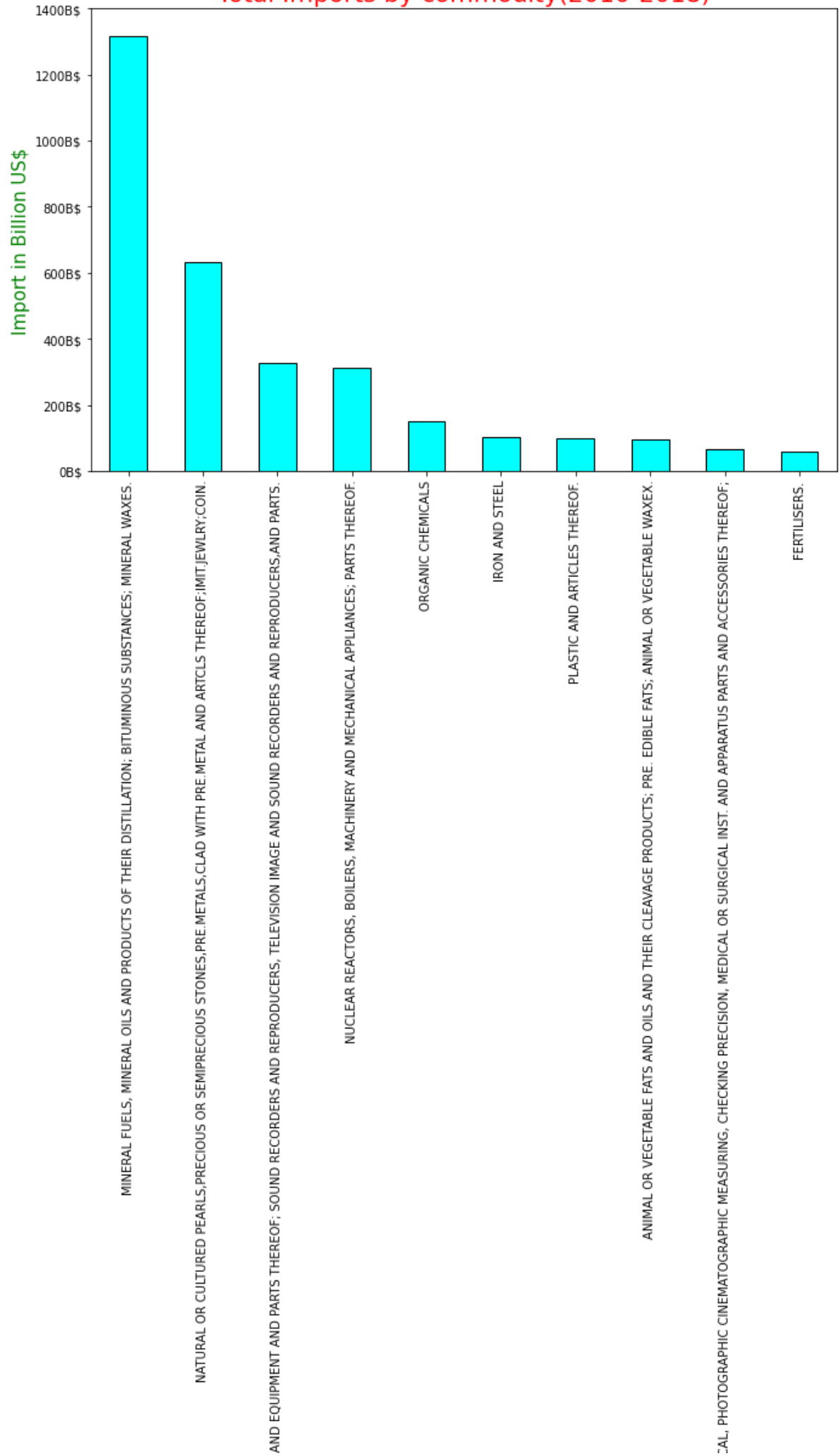


***In 2018 India imported highest***

```
In [17]: ### Which commodity has been imported highest by value?
plt.figure(figsize=[11,7])
imp_by_com=imp.groupby(by=['Commodity'])['value'].sum().sort_values(ascending=False)
imp_by_com.plot(kind='bar',color='cyan',edgecolor='black')
plt.xlabel('Year',fontdict={'fontsize': 15,'color':'green'})
plt.ylabel('Import in Billion US$',fontdict={'fontsize': 15,'color':'green'})
ticks = np.arange(0, 1600000, 200000)
labels = ["{}B$".format(i//1000) for i in ticks]
plt.yticks(ticks, labels)
plt.title('Total Imports by commodity(2010-2018)',fontdict={'fontsize': 20,'color'})
plt.show()
```

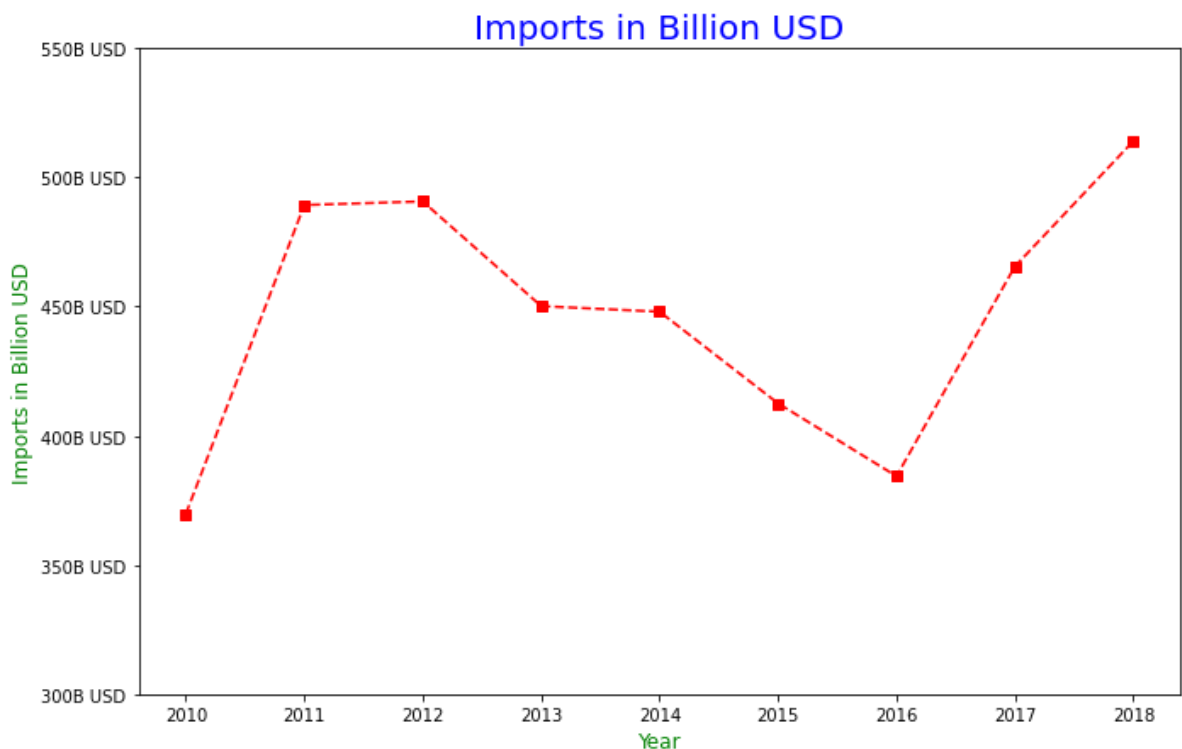


Total Imports by commodity(2010-2018)



Year

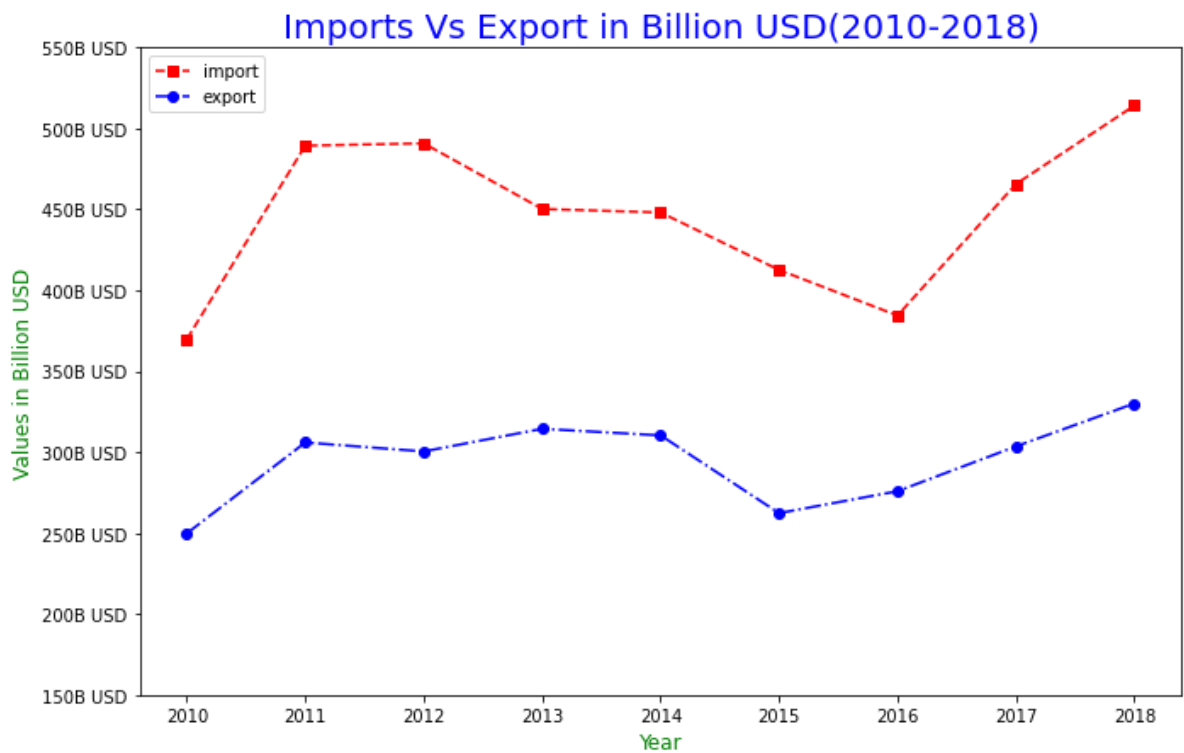
```
In [18]: ### Imports trend during 2010-2018 using line plot
plt.figure(figsize=[11,7])
imp.groupby(by='year')['value'].sum().plot.line(color='red',marker='s',linestyle='
ticks = np.arange(300000, 600000, 50000)
labels = ["{}B USD".format(i//1000) for i in ticks]
plt.yticks(ticks, labels)
plt.xlabel('Year',fontdict={'fontsize': 12,'color':'green'})
plt.ylabel('Imports in Billion USD',fontdict={'fontsize': 12,'color':'green'})
plt.title('Imports in Billion USD',fontdict={'fontsize': 20,'color':'Blue'})
plt.show()
```



## Merged Import-Export data

```
In [19]: ### We can compare Import Vs. Export during 2010-2018

plt.figure(figsize=[11,7])
imp.groupby(by='year')['value'].sum().plot.line(color='red',marker='s',linestyle='
exp.groupby(by='year')['value'].sum().plot.line(color='blue',marker='o',linestyle='
ticks = np.arange(150000, 600000, 50000)
labels = ["{}B USD".format(i//1000) for i in ticks]
plt.yticks(ticks, labels)
plt.xlabel('Year',fontdict={'fontsize': 12,'color':'green'})
plt.ylabel('Values in Billion USD',fontdict={'fontsize': 12,'color':'green'})
plt.title('Imports Vs Export in Billion USD(2010-2018)',fontdict={'fontsize': 20,'c
plt.legend()
plt.show()
```



***we can see that as exports increases/decreases import also increase/decreases or vice-versa.***

***India has been net importer in any year.***

```
In [20]: x=imp.groupby(by='year')['value'].sum()
y=exp.groupby(by='year')['value'].sum()
print(min(x-y))
print(max(x-y))
print(x-y)
```

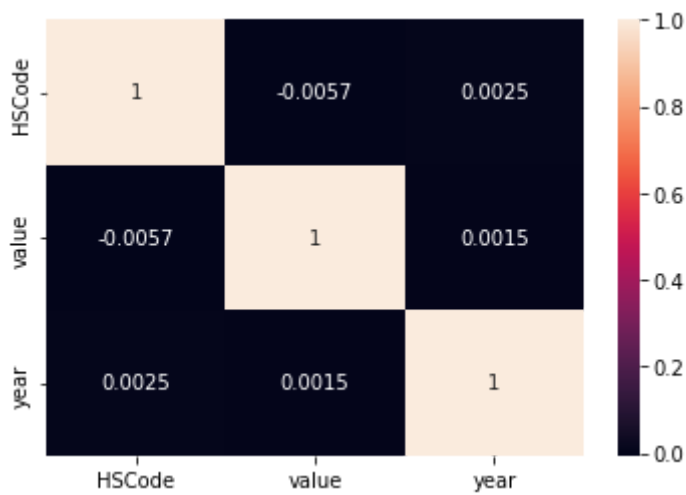
```
108515.02000000002
190345.75
year
2010    119961.07
2011    183363.53
2012    190345.75
2013    135804.38
2014    137705.61
2015    150263.23
2016    108515.02
2017    162066.17
2018    184012.69
Name: value, dtype: float64
```

***In 2016 trade gap was narrowest***

***In 2012 trade gap was widest***

```
In [21]: ### Finding correlation for import data

impcorr=imp.corr()
sns.heatmap(impcorr,annot=True)
plt.show()
```



No relationship found

```
In [22]: ### Grouping countries for export data
df1=exp.groupby(by='country')['value'].sum()
df1.head()
```

```
Out[22]: country
AFGHANISTAN TIS    4760.19
ALBANIA              196.51
ALGERIA             8232.24
AMERI SAMOA          3.40
ANDORRA              6.28
Name: value, dtype: float64
```

```
In [23]: ### Grouping countries for import data
df2=imp.groupby(by='country')['value'].sum()
df2.head()
```

```
Out[23]: country
AFGHANISTAN TIS    2686.62
ALBANIA             524.18
ALGERIA            10185.73
AMERI SAMOA         5.82
ANDORRA             5.45
Name: value, dtype: float64
```

```
In [24]: ### Merging data frame on country

df3=pd.merge(df1,df2,on='country')
df3.head()
```

```
Out[24]:
```

	value_x	value_y
<b>country</b>		
<b>AFGHANISTAN TIS</b>	4760.19	2686.62
<b>ALBANIA</b>	196.51	524.18
<b>ALGERIA</b>	8232.24	10185.73
<b>AMERI SAMOA</b>	3.40	5.82
<b>ANDORRA</b>	6.28	5.45

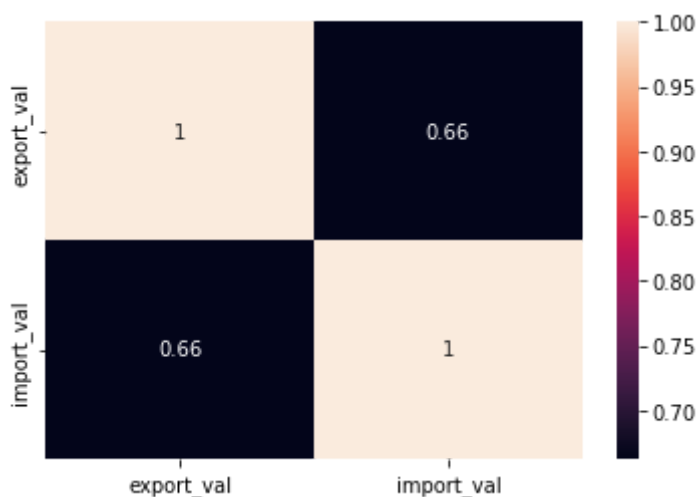
```
In [25]: df3.rename(columns={'value_x':'export_val','value_y':'import_val'},inplace=True)
```

```
In [26]: df3.head()
```

```
Out[26]:
```

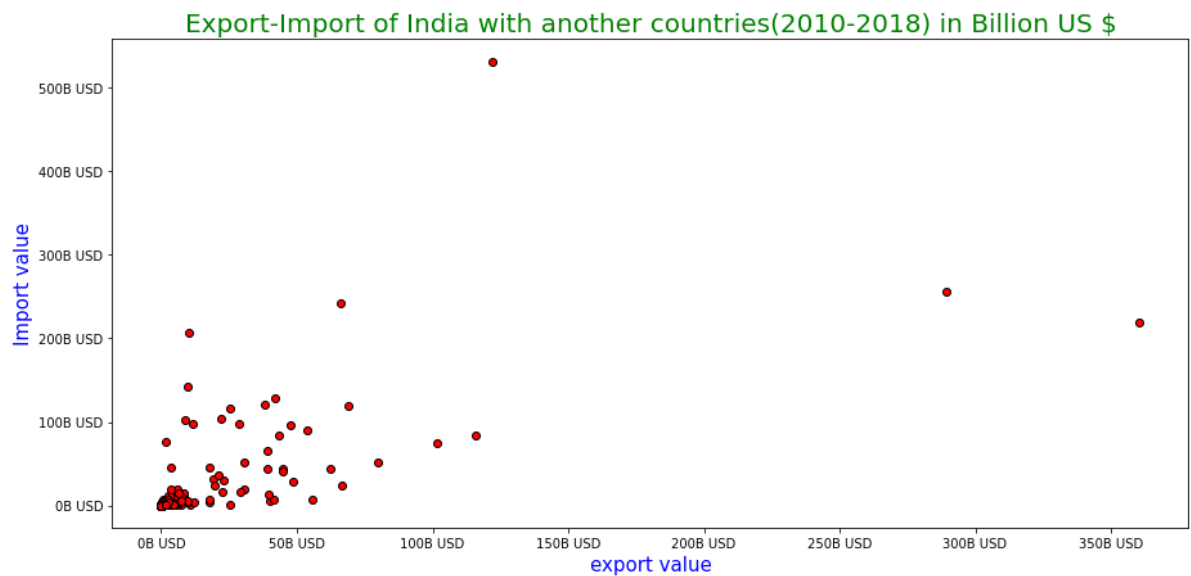
	export_val	import_val
country		
<b>AFGHANISTAN TIS</b>	4760.19	2686.62
<b>ALBANIA</b>	196.51	524.18
<b>ALGERIA</b>	8232.24	10185.73
<b>AMERI SAMOA</b>	3.40	5.82
<b>ANDORRA</b>	6.28	5.45

```
In [27]: ### Finding correlation b/w exoprt and import value
value_corr=df3.corr()
sns.heatmap(value_corr,annot=True)
plt.show()
```



***We can say that export\_val and import\_val are moderately positive correlated***

```
In [28]: plt.figure(figsize=[15,7])
plt.scatter(df3.export_val,df3.import_val,marker='o',edgecolor='black',color='red')
plt.ylabel('Import value',fontdict={'fontsize':15,'color':'blue'})
plt.xlabel('export value',fontdict={'fontsize':15,'color':'blue'})
ticks_y = np.arange(0, 600000, 100000)
ticks_x = np.arange(0, 400000, 50000)
labels_y = ["{}B USD".format(i//1000) for i in ticks_y]
labels_x = ["{}B USD".format(i//1000) for i in ticks_x]
plt.yticks(ticks_y, labels_y)
plt.xticks(ticks_x, labels_x)
plt.title('Export-Import of India with another countries(2010-2018) in Billion US $')
plt.show()
```



```
In [29]: ### Making a column for trade difference to find out with which country India a be

df3['trade_diff']=df3['export_val']-df3['import_val']
df3.head()
```

```
Out[29]:
```

	export_val	import_val	trade_diff
<b>country</b>			
<b>AFGHANISTAN TIS</b>	4760.19	2686.62	2073.57
<b>ALBANIA</b>	196.51	524.18	-327.67
<b>ALGERIA</b>	8232.24	10185.73	-1953.49
<b>AMERI SAMOA</b>	3.40	5.82	-2.42
<b>ANDORRA</b>	6.28	5.45	0.83

```
In [30]: df3['NE/NI']=df3['trade_diff'].apply(lambda x: 'NE' if x>0 else 'NI')

### NE means Net Exporter
### NI means Net Importer
df3.head()
```

```
Out[30]:
```

	export_val	import_val	trade_diff	NE/NI
<b>country</b>				
<b>AFGHANISTAN TIS</b>	4760.19	2686.62	2073.57	NE
<b>ALBANIA</b>	196.51	524.18	-327.67	NI
<b>ALGERIA</b>	8232.24	10185.73	-1953.49	NI
<b>AMERI SAMOA</b>	3.40	5.82	-2.42	NI
<b>ANDORRA</b>	6.28	5.45	0.83	NE

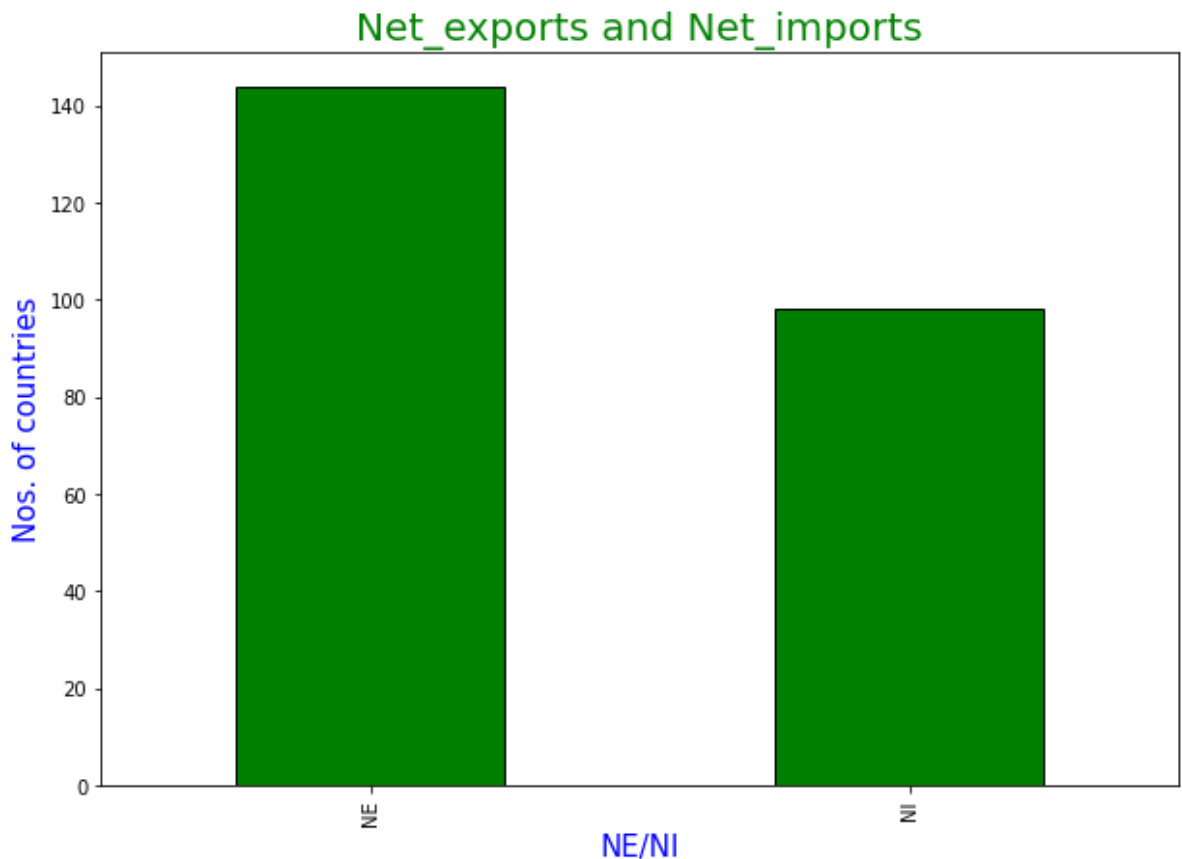
```
In [31]: ### With How many country India have been Net Exporter and Net Importer.

#plt.figure(figsize=[10,5])
df3['NE/NI'].value_counts(normalize=True)
```

```
Out[31]: NE    0.595041
        NI    0.404959
        Name: NE/NI, dtype: float64
```

***With 59.5% countries India's trade have been surplus and with 40.5% countries India's trade have been deficit***

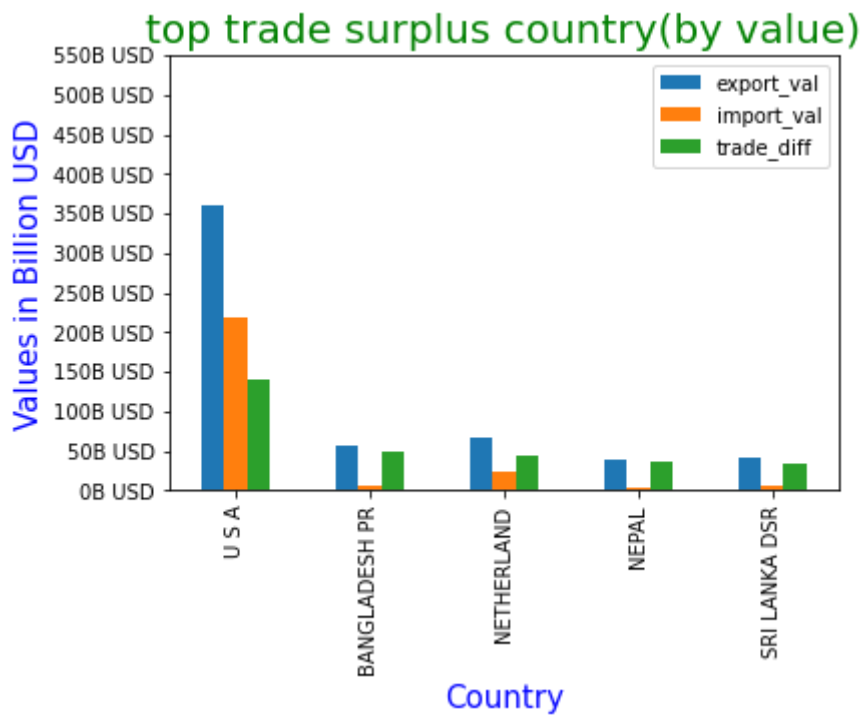
```
In [32]: ### Lets understand With bar graph
plt.figure(figsize=[10,7])
df3['NE/NI'].value_counts().plot.bar(color='green',edgecolor='black')
plt.title('Net_exports and Net_imports',fontdict={'fontsize':20,'color':'green'})
plt.ylabel('Nos. of countries',fontdict={'fontsize':15,'color':'blue'})
plt.xlabel('NE/NI',fontdict={'fontsize':15,'color':'blue'})
plt.show()
```



```
In [33]: ### Which are top 5 countries to which India exports more and imoprt Less?

plt.figure(figsize=[11,7])
top5=df3.sort_values(by='trade_diff',ascending=False).head(5)
top5.plot(kind='bar')
ticks = np.arange(0, 600000, 50000)
labels = ["{}B USD".format(i//1000) for i in ticks]
plt.yticks(ticks, labels)
plt.title('top trade surplus country(by value)',fontdict={'fontsize':20,'color':'g'})
plt.ylabel('Values in Billion USD',fontdict={'fontsize':15,'color':'blue'})
plt.xlabel('Country',fontdict={'fontsize':15,'color':'blue'})
plt.show()
```

<Figure size 792x504 with 0 Axes>

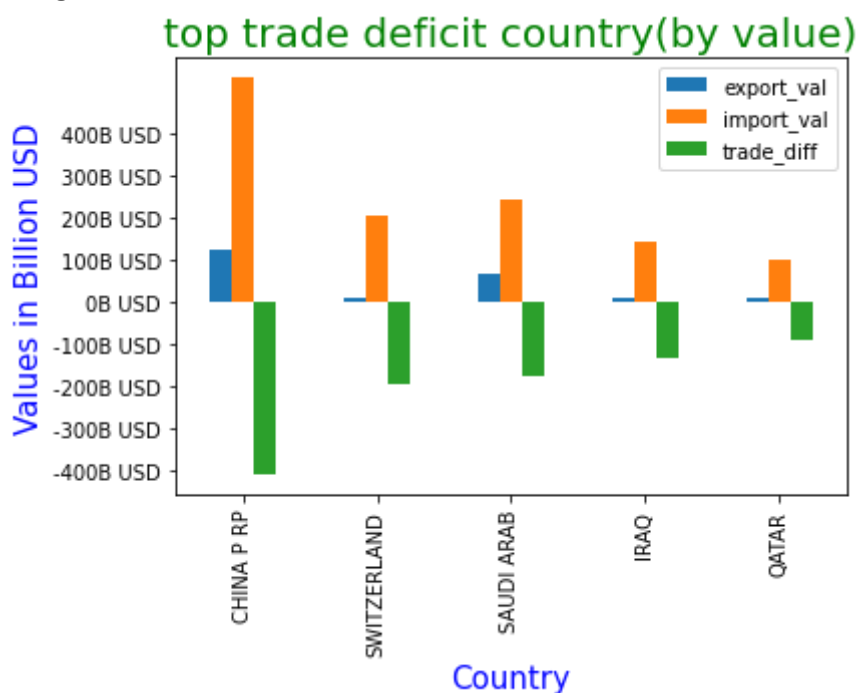


**With USA India's surplus trade has been highest**

```
In [34]: ### Which are top 5 countries to which India imports more and export less?

plt.figure(figsize=[11,7])
top5=df3.sort_values(by='trade_diff',ascending=True).head(5)
top5.plot(kind='bar')
ticks = np.arange(-400000, 500000, 100000)
labels = ["{}B USD".format(i//1000) for i in ticks]
plt.yticks(ticks, labels)
plt.title('top trade deficit country(by value)',fontdict={'fontsize':20,'color':'g'})
plt.ylabel('Values in Billion USD',fontdict={'fontsize':15,'color':'blue'})
plt.xlabel('Country',fontdict={'fontsize':15,'color':'blue'})
plt.show()
```

<Figure size 792x504 with 0 Axes>



**With China India's deficit trade has been highest**



In [35]: `### Which countries are India's top 5 trade partner?`

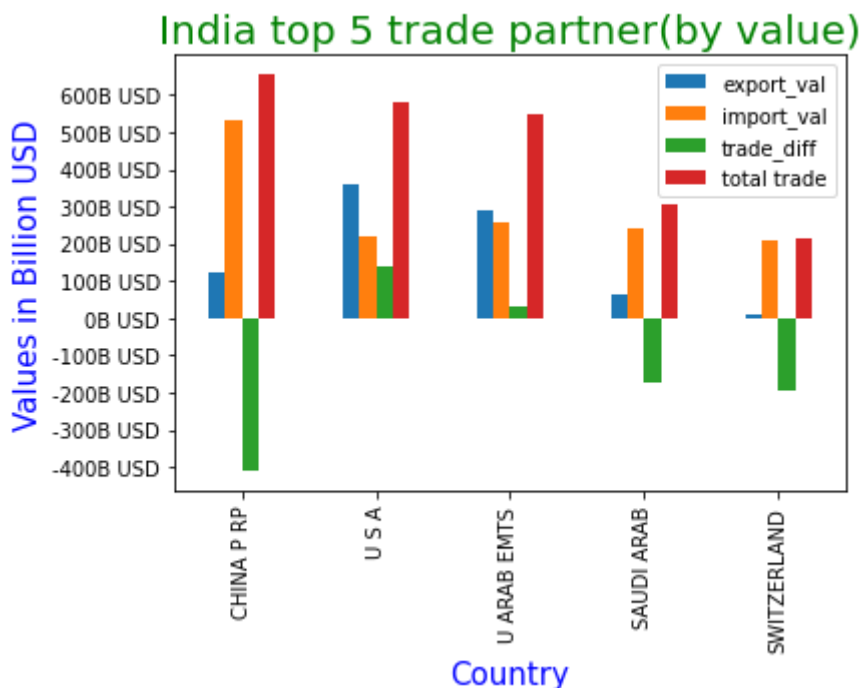
```
df3['total trade']=df3['export_val']+df3['import_val']
df3.head()
```

Out[35]:

	export_val	import_val	trade_diff	NE/NI	total trade
country					
<b>AFGHANISTAN TIS</b>	4760.19	2686.62	2073.57	NE	7446.81
<b>ALBANIA</b>	196.51	524.18	-327.67	NI	720.69
<b>ALGERIA</b>	8232.24	10185.73	-1953.49	NI	18417.97
<b>AMERI SAMOA</b>	3.40	5.82	-2.42	NI	9.22
<b>ANDORRA</b>	6.28	5.45	0.83	NE	11.73

```
In [36]: plt.figure(figsize=[11,7])
df3.sort_values(by='total trade',ascending=False).head(5).plot.bar()
ticks = np.arange(-400000, 700000, 100000)
labels = ["{}B USD".format(i//1000) for i in ticks]
plt.yticks(ticks, labels)
plt.title('India top 5 trade partner(by value)',fontdict={'fontsize':20,'color':'g'})
plt.ylabel('Values in Billion USD',fontdict={'fontsize':15,'color':'blue'})
plt.xlabel('Country',fontdict={'fontsize':15,'color':'blue'})
plt.show()
```

<Figure size 792x504 with 0 Axes>



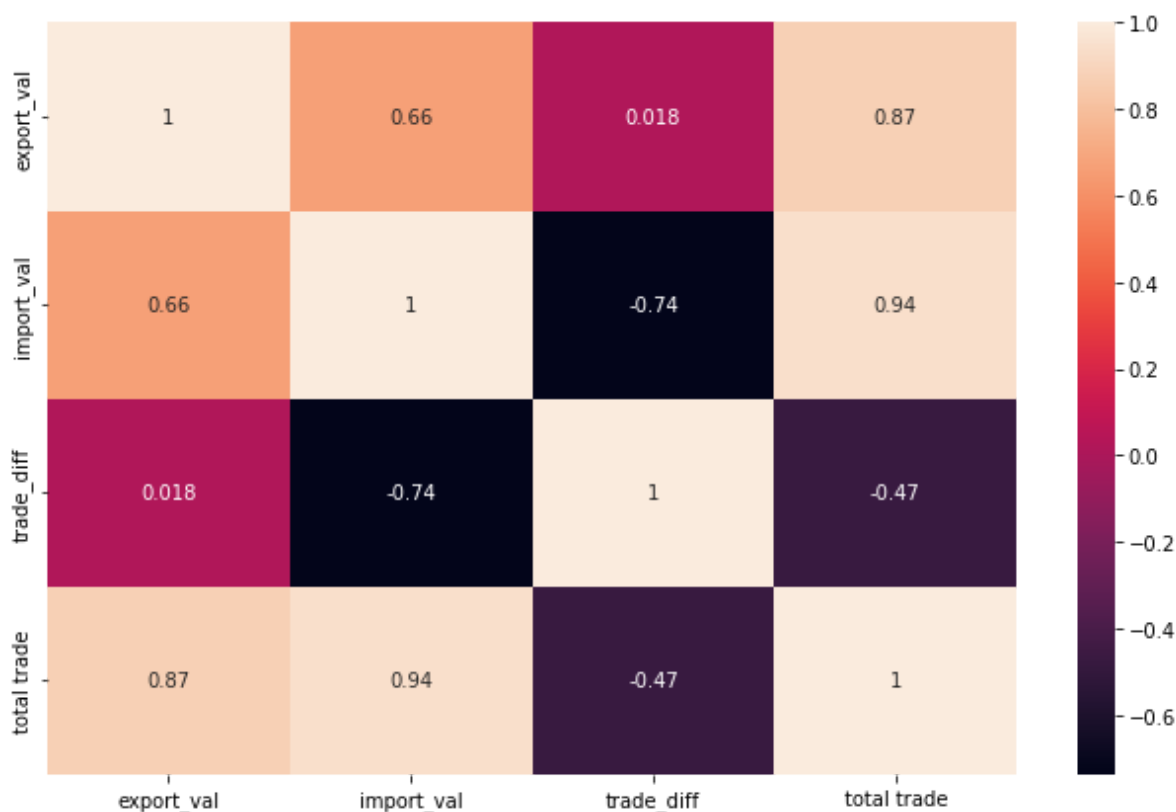
**China is India's top trading partner followed by USA**

```
In [37]: c=df3.corr()
c
```

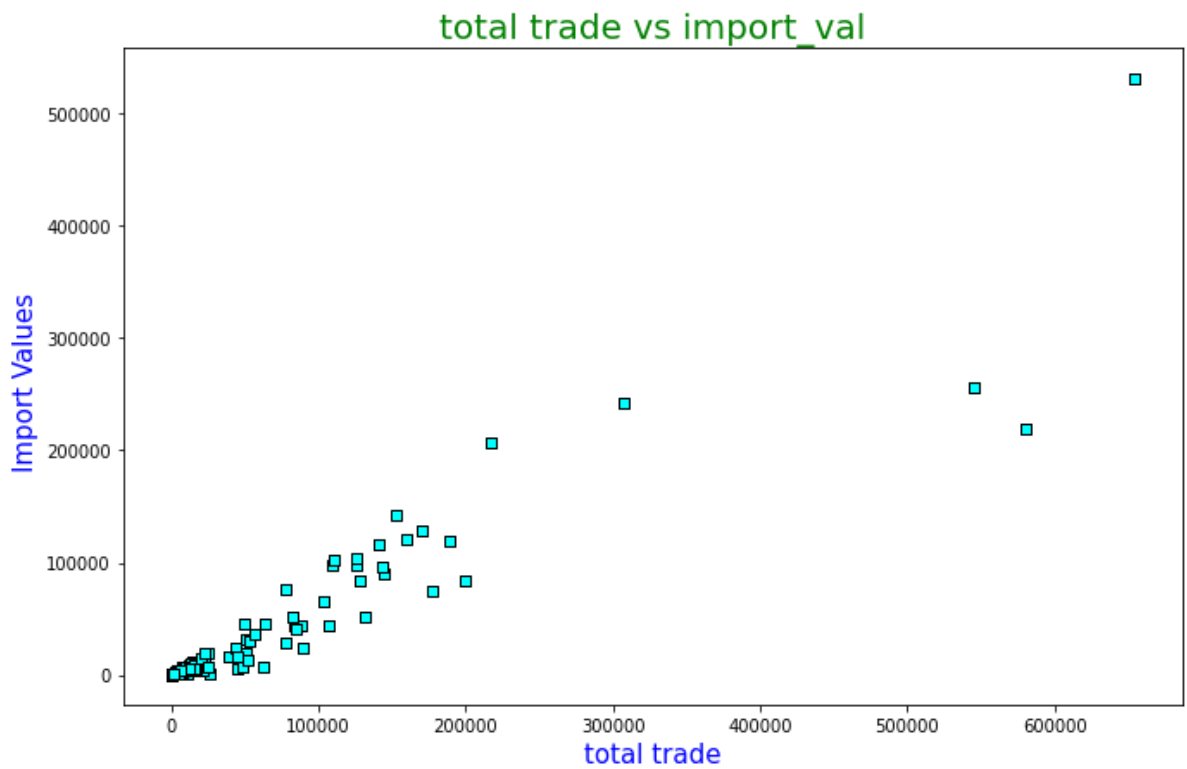
```
Out[37]:
```

	export_val	import_val	trade_diff	total trade
export_val	1.000000	0.662867	0.018169	0.872865
import_val	0.662867	1.000000	-0.736570	0.943948
trade_diff	0.018169	-0.736570	1.000000	-0.472022
total trade	0.872865	0.943948	-0.472022	1.000000

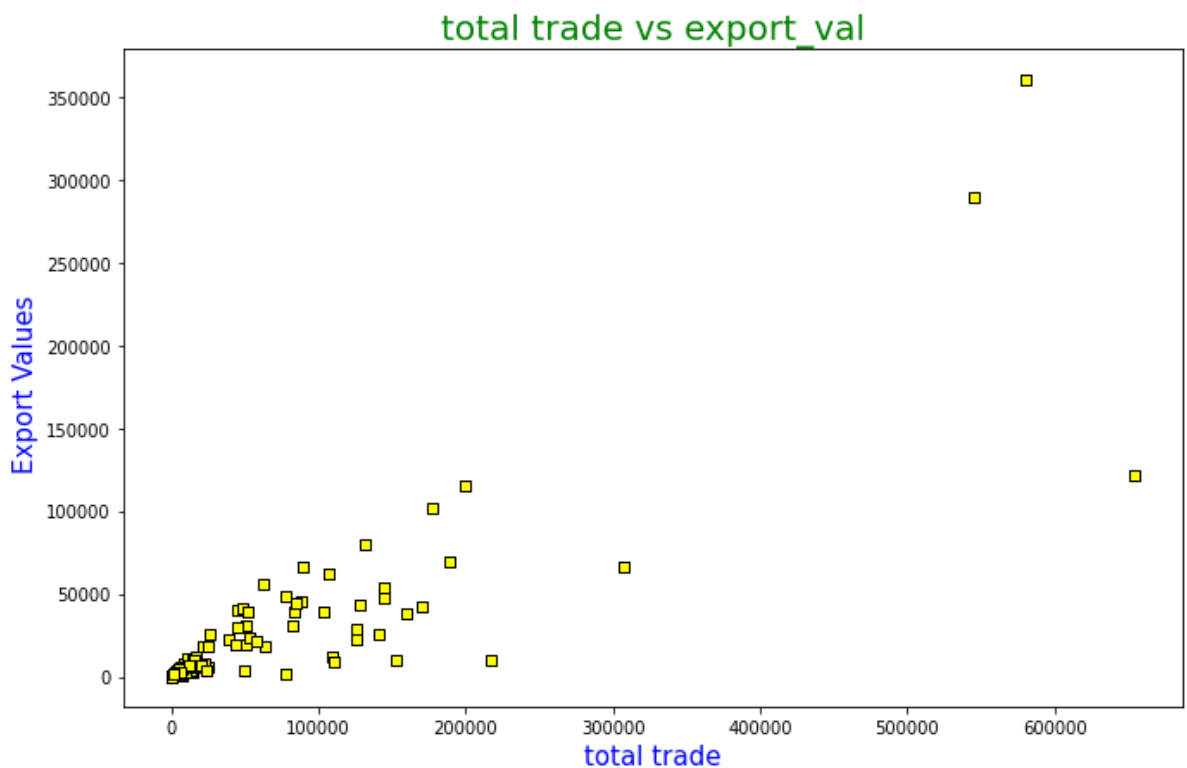
```
In [38]: plt.figure(figsize=[11,7])
c=df3.corr()
sns.heatmap(c,annot=True)
plt.show()
```



```
In [39]: plt.figure(figsize=[11,7])
plt.scatter(data=df3,x='total trade',y='import_val',marker='s',color='cyan',edgeco:
plt.title('total trade vs import_val',fontdict={'fontsize':20,'color':'green'})
plt.ylabel('Import Values ',fontdict={'fontsize':15,'color':'blue'})
plt.xlabel('total trade',fontdict={'fontsize':15,'color':'blue'})
plt.show()
```



```
In [40]: plt.figure(figsize=[11,7])
plt.scatter(data=df3,x='total trade',y='export_val',marker='s',color='yellow',edgecolor='black')
plt.title('total trade vs export_val',fontdict={'fontsize':20,'color':'green'})
plt.ylabel('Export Values ',fontdict={'fontsize':15,'color':'blue'})
plt.xlabel('total trade',fontdict={'fontsize':15,'color':'blue'})
plt.show()
```



```
In [41]: ### Export dataset grouped by country and year

exp_grpby_yr=exp.groupby(by=['country','year'])['value'].sum()
exp_grpby_yr.head()
```

```
Out[41]: country      year
AFGHANISTAN TIS  2010    422.31
                2011    510.81
                2012    472.55
                2013    474.26
                2014    422.48
Name: value, dtype: float64
```

```
In [42]: ### Import dataset grouped by country and year

imp_grpby_yr=imp.groupby(by=['country','year'])['value'].sum()
imp_grpby_yr.head()
```

```
Out[42]: country      year
AFGHANISTAN TIS  2010    146.01
                2011    132.49
                2012    159.53
                2013    208.76
                2014    261.92
Name: value, dtype: float64
```

```
In [43]: ### Merge both dataset which grouped by country and year both

merged_grp=pd.merge(exp_grpby_yr,imp_grpby_yr,on=['country','year'])
merged_grp.head()
```

```
Out[43]:
```

			value_x	value_y
	country	year		
	<b>AFGHANISTAN TIS</b>	<b>2010</b>	422.31	146.01
		<b>2011</b>	510.81	132.49
		<b>2012</b>	472.55	159.53
		<b>2013</b>	474.26	208.76
		<b>2014</b>	422.48	261.92

```
In [44]: ###Reseting index
merged_grp.reset_index(inplace=True)
```

```
In [45]: ### rename column names

merged_grp.rename(columns={'value_x':'val_exp','value_y':'val_imp'},inplace=True)
merged_grp.head()
```

```
Out[45]:
```

	country	year	val_exp	val_imp
<b>0</b>	AFGHANISTAN TIS	2010	422.31	146.01
<b>1</b>	AFGHANISTAN TIS	2011	510.81	132.49
<b>2</b>	AFGHANISTAN TIS	2012	472.55	159.53
<b>3</b>	AFGHANISTAN TIS	2013	474.26	208.76
<b>4</b>	AFGHANISTAN TIS	2014	422.48	261.92

```
In [46]: ### Adding columnn net_val
merged_grp['net_trade']=merged_grp['val_exp']-merged_grp['val_imp']
merged_grp.head()
```

```
Out[46]:
```

	country	year	val_exp	val_imp	net_trade
0	AFGHANISTAN TIS	2010	422.31	146.01	276.30
1	AFGHANISTAN TIS	2011	510.81	132.49	378.32
2	AFGHANISTAN TIS	2012	472.55	159.53	313.02
3	AFGHANISTAN TIS	2013	474.26	208.76	265.50
4	AFGHANISTAN TIS	2014	422.48	261.92	160.56

Next, we will find export and import trend for india top 3 trade partner

```
In [47]: ###For CHINA

CHINA=merged_grp[merged_grp['country']=='CHINA P RP']
CHINA
```

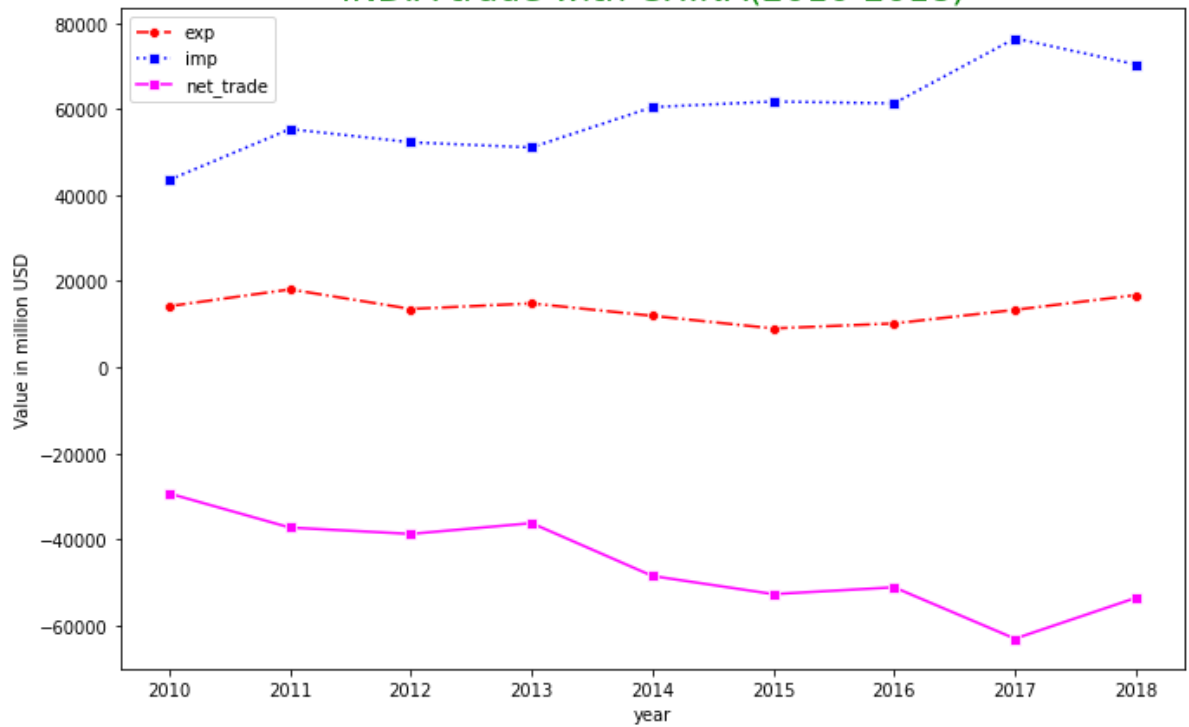
```
Out[47]:
```

	country	year	val_exp	val_imp	net_trade
378	CHINA P RP	2010	14168.65	43479.39	-29310.74
379	CHINA P RP	2011	18076.34	55313.17	-37236.83
380	CHINA P RP	2012	13534.66	52247.97	-38713.31
381	CHINA P RP	2013	14824.16	51034.30	-36210.14
382	CHINA P RP	2014	11934.07	60412.84	-48478.77
383	CHINA P RP	2015	9011.19	61707.54	-52696.35
384	CHINA P RP	2016	10171.66	61282.66	-51111.00
385	CHINA P RP	2017	13333.33	76380.35	-63047.02
386	CHINA P RP	2018	16751.94	70319.29	-53567.35

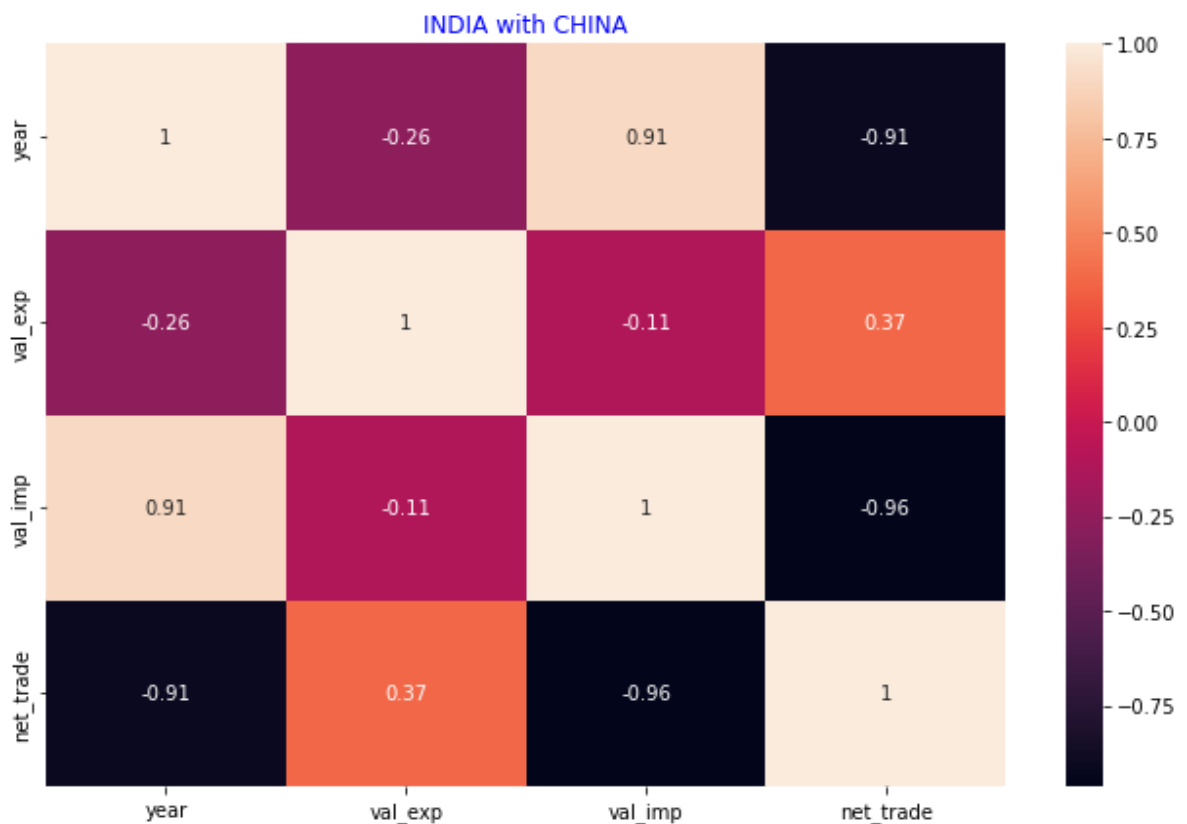
```
In [48]: ### LINEPLOT FOR INDIA'S TRADE WITH CHINA BETWEEN 2010-2018

plt.figure(figsize=[11,7])
# CHINA = merged_grp.query("COUNTRY == 'CHINA P RP'")
sns.lineplot(data=CHINA, x="year", y="val_exp", label='exp', marker='o', color='red',)
sns.lineplot(data=CHINA, x="year", y="val_imp", label='imp', marker='s', color='blue')
sns.lineplot(data=CHINA, x="year", y="net_trade", label='net_trade', marker='s', color='green')
plt.title('INDIA trade with CHINA(2010-2018)', fontdict={'fontsize':20, 'color':'green'})
plt.ylabel('Value in million USD')
plt.legend()
plt.show()
```

## INDIA trade with CHINA(2010-2018)



```
In [49]: ### Heatmap for India trade with CHINA
plt.figure(figsize=[11,7])
CHINA_corr=CHINA.corr()
sns.heatmap(CHINA_corr,annot=True)
plt.title('INDIA with CHINA',color='Blue')
plt.show()
```



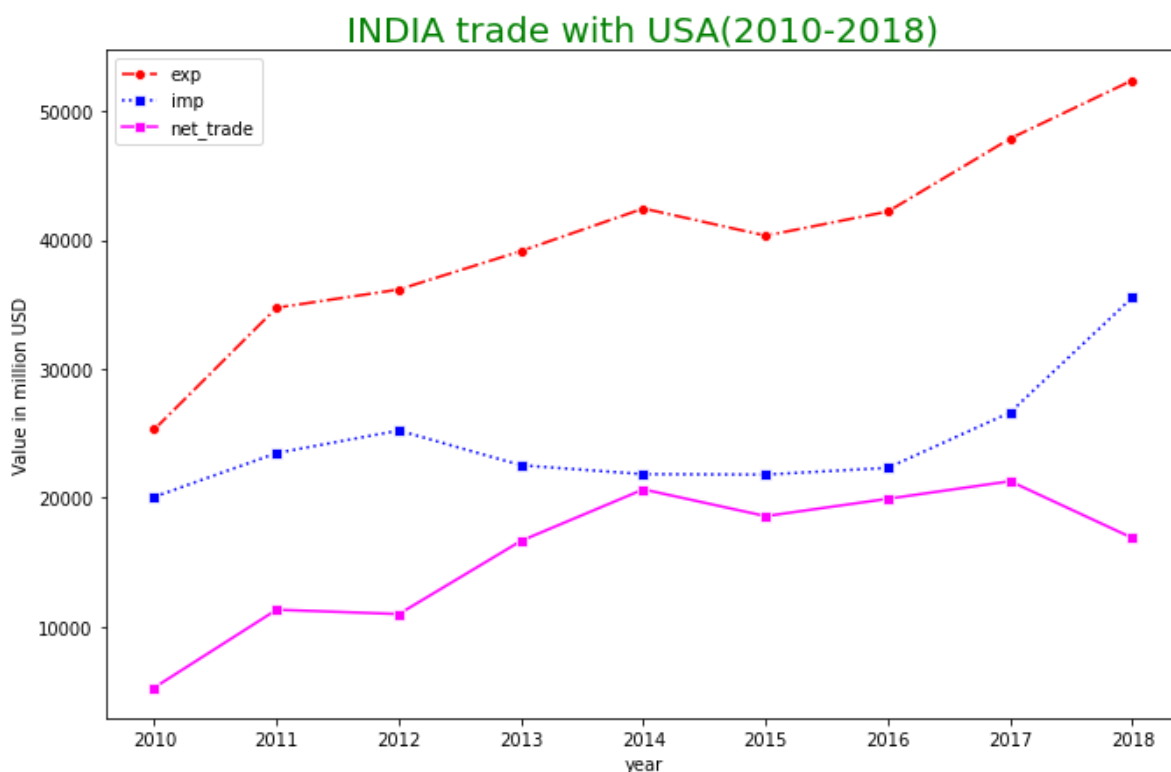
```
In [50]: ### For USA
USA=merged_grp[merged_grp['country']=='U S A']
USA
```

```
Out[50]:
```

	country	year	val_exp	val_imp	net_trade
1913	U S A	2010	25291.56	20050.41	5241.15
1914	U S A	2011	34741.33	23454.64	11286.69
1915	U S A	2012	36154.88	25204.39	10950.49
1916	U S A	2013	39141.81	22504.79	16637.02
1917	U S A	2014	42448.30	21814.27	20634.03
1918	U S A	2015	40335.68	21781.06	18554.62
1919	U S A	2016	42211.96	22307.18	19904.78
1920	U S A	2017	47878.17	26610.72	21267.45
1921	U S A	2018	52405.88	35549.20	16856.68

```
In [51]: ### LINEPLOT FOR INDIA'S TRADE WITH USA BETWEEN 2010-2018

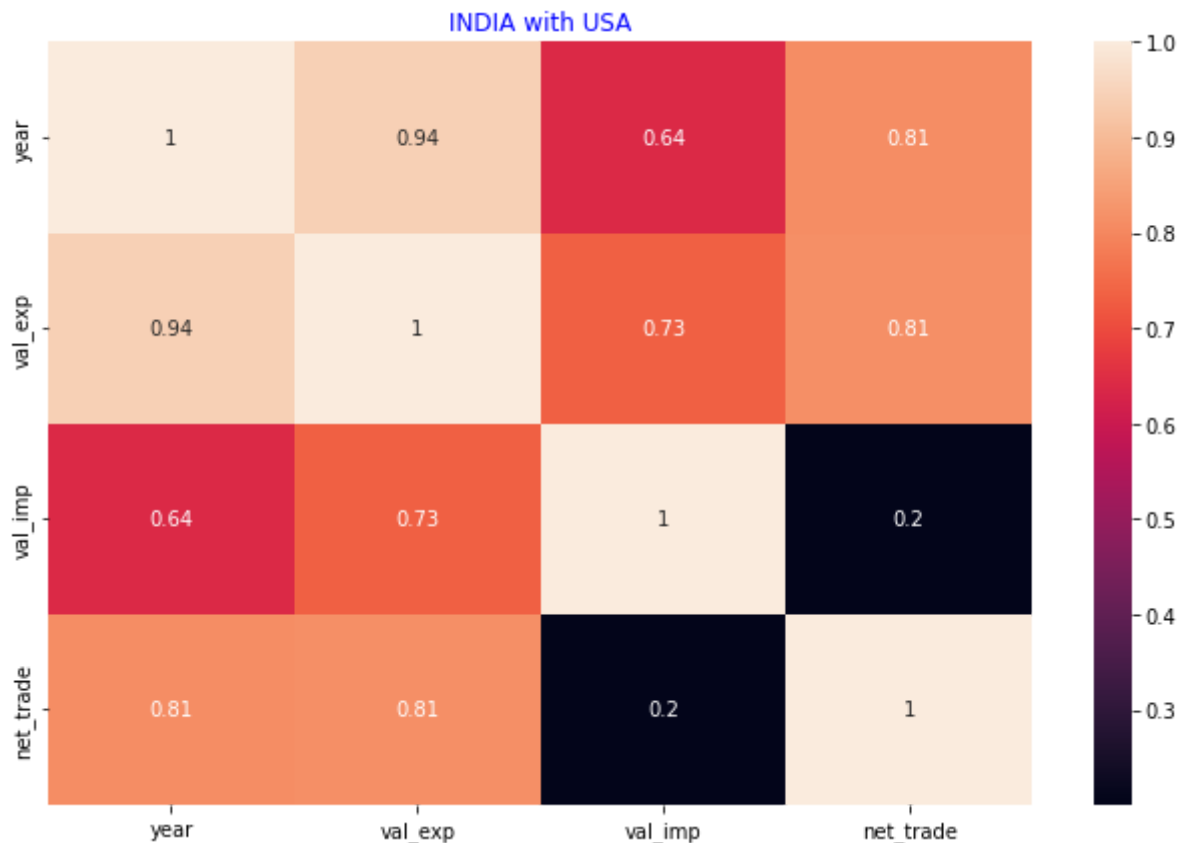
plt.figure(figsize=[11,7])
sns.lineplot(data=USA, x="year", y="val_exp",label='exp',marker='o',color='red',linestyle='dashdot')
sns.lineplot(data=USA, x="year", y="val_imp",label='imp',marker='s',color='blue',linestyle='dotted')
sns.lineplot(data=USA, x="year", y="net_trade",label='net_trade',marker='s',color='magenta',linestyle='solid')
plt.title('INDIA trade with USA(2010-2018)',fontdict={'fontsize':20,'color':'green'})
plt.ylabel('Value in million USD')
plt.legend()
plt.show()
```



```
In [52]: ### Heatmap for India trade with USA

plt.figure(figsize=[11,7])
USA_corr=USA.corr()
sns.heatmap(USA_corr,annot=True)
```

```
plt.title('INDIA with USA',color='Blue')
plt.show()
```



```
In [53]: ###For UAE

UAE=merged_grp[merged_grp['country']=='U ARAB EMTS']
UAE
```

```
Out[53]:
```

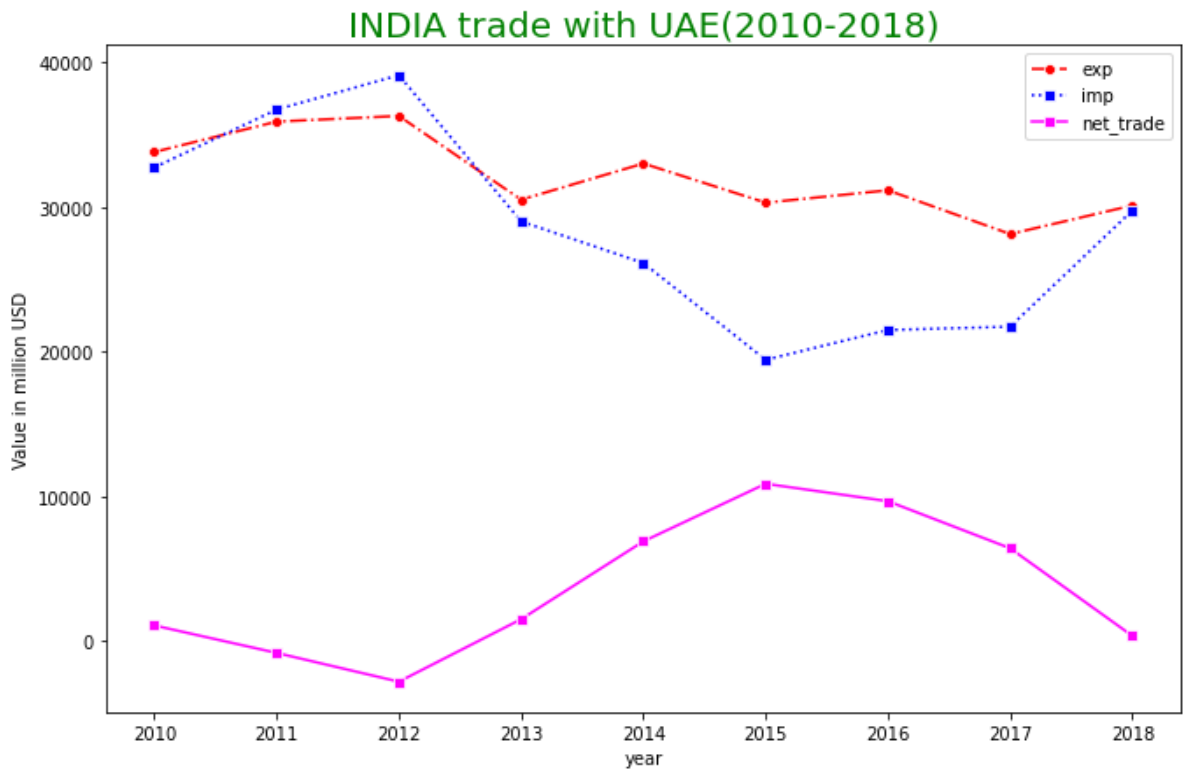
	country	year	val_exp	val_imp	net_trade
1895	U ARAB EMTS	2010	33822.08	32753.02	1069.06
1896	U ARAB EMTS	2011	35925.23	36756.16	-830.93
1897	U ARAB EMTS	2012	36316.29	39138.21	-2821.92
1898	U ARAB EMTS	2013	30520.08	29019.66	1500.42
1899	U ARAB EMTS	2014	33027.73	26139.73	6888.00
1900	U ARAB EMTS	2015	30316.16	19445.54	10870.62
1901	U ARAB EMTS	2016	31175.16	21509.69	9665.47
1902	U ARAB EMTS	2017	28145.77	21738.98	6406.79
1903	U ARAB EMTS	2018	30126.38	29785.09	341.29

```
In [54]: ### LINEPLOT FOR INDIA'S TRADE WITH UAE BETWEEN 2010-2018

plt.figure(figsize=[11,7])
sns.lineplot(data=UAE, x="year", y="val_exp",label='exp',marker='o',color='red',li
sns.lineplot(data=UAE, x="year", y="val_imp",label='imp',marker='s',color='blue',l
sns.lineplot(data=UAE, x="year", y="net_trade",label='net_trade',marker='s',color=
plt.title('INDIA trade with UAE(2010-2018)',fontdict={'fontsize':20,'color':'green
plt.ylabel('Value in million USD')
```

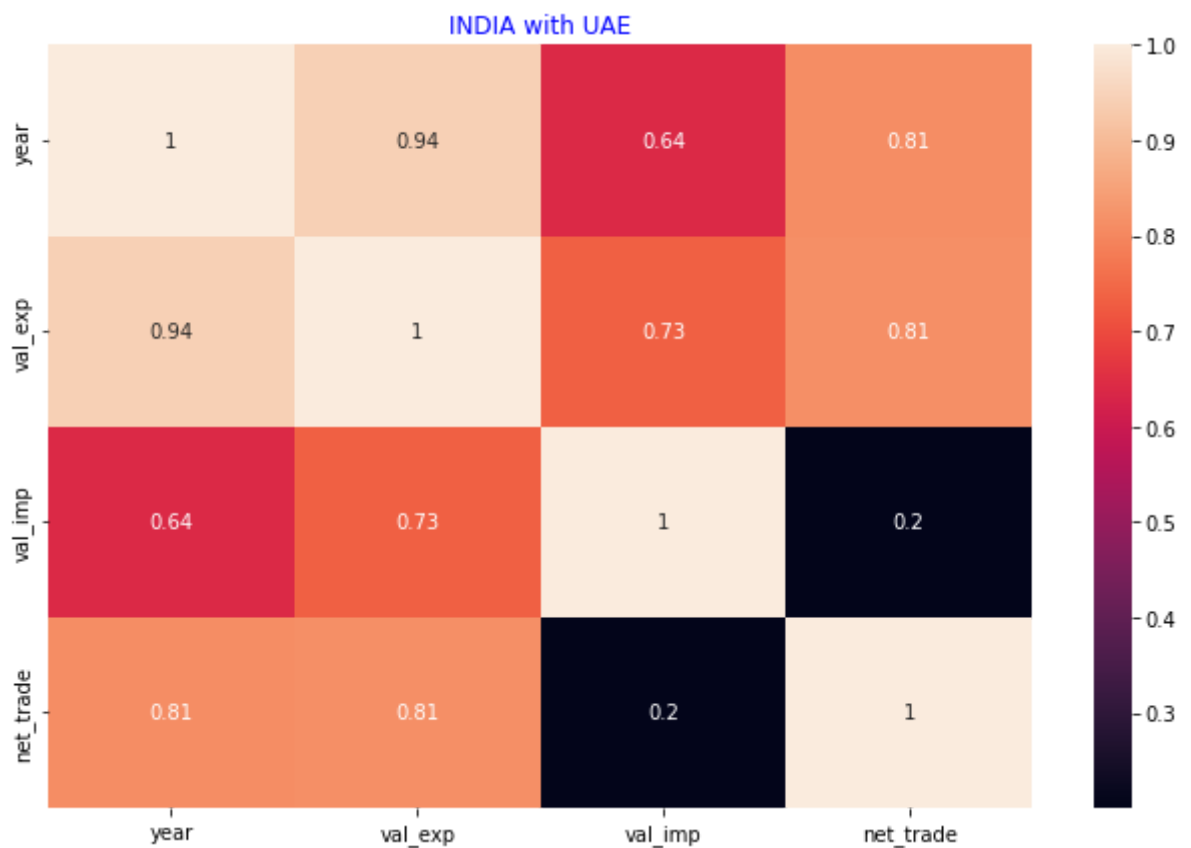


```
plt.legend()
plt.show()
```



In [55]: *### Heatmap for India trade with Uae*

```
plt.figure(figsize=[11,7])
UAE_corr=USA_corr()
sns.heatmap(USA_corr,annot=True)
plt.title('INDIA with UAE',color='Blue')
plt.show()
```

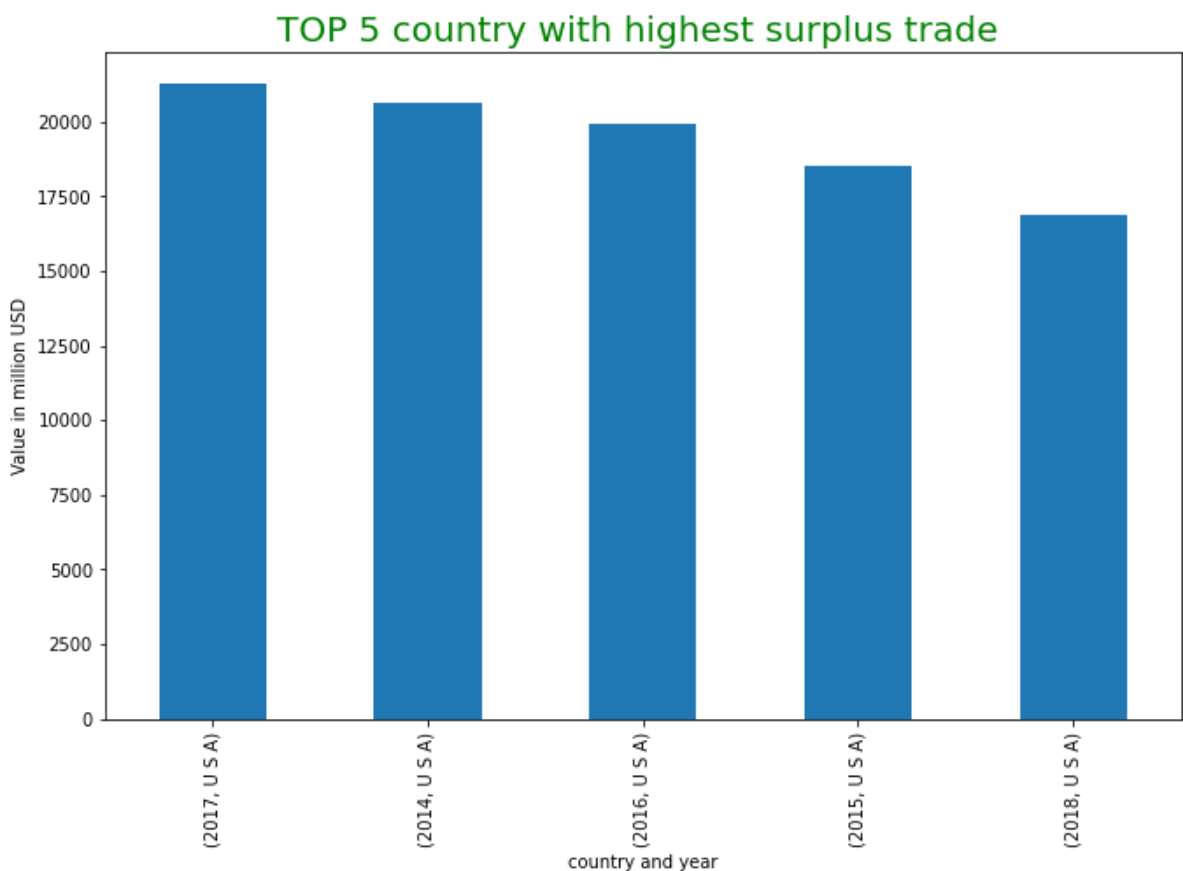


**These are the trade analysis of india top 3 trade partner(by value),we can do for all countries**

```
In [56]: d=merged_grp.groupby(by=['year','country'])['net_trade'].sum().sort_values(ascending=True)
d
d
```

```
Out[56]: year  country
2017  U S A      21267.45
2014  U S A      20634.03
2016  U S A      19904.78
2015  U S A      18554.62
2018  U S A      16856.68
...
2014  CHINA P RP  -48478.77
2016  CHINA P RP  -51111.00
2015  CHINA P RP  -52696.35
2018  CHINA P RP  -53567.35
2017  CHINA P RP  -63047.02
Name: net_trade, Length: 2055, dtype: float64
```

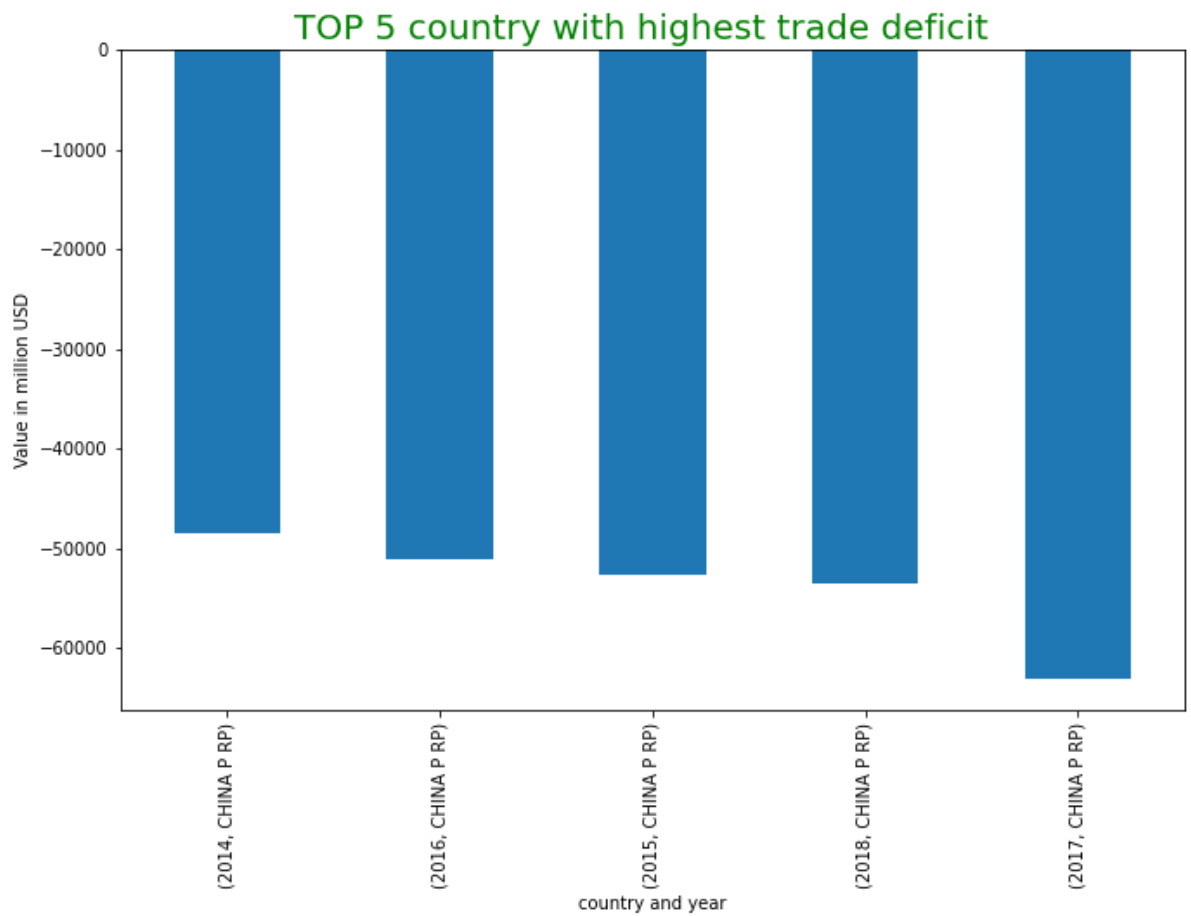
```
In [57]: plt.figure(figsize=[11,7])
d=merged_grp.groupby(by=['year','country'])['net_trade'].sum().sort_values(ascending=True)
d.plot(kind='bar')
plt.title('TOP 5 country with highest surplus trade ',fontdict={'fontsize':20,'color':'red'})
plt.ylabel('Value in million USD')
plt.xlabel('country and year')
plt.show()
```



**India's highest surplus trade in 2017 with USA**

```
In [58]: plt.figure(figsize=[11,7])
d=merged_grp.groupby(by=['year','country'])['net_trade'].sum().sort_values(ascending=True)
d.plot(kind='bar')
```

```
plt.title('TOP 5 country with highest trade deficit ',fontdict={'fontsize':20,'co
plt.ylabel('Value in million USD')
plt.xlabel('country and year')
plt.show()
```



***India's highest deficit trade was in 2017 and with CHINA***

***IN 2017,FOR INDIA TRADE DEFICIT WAS HIGHEST(WITH CHINA) AND TRADE SURPLUS(WITH USA) AS WELL***

```
In [59]: merged_grp['total trade']=merged_grp['val_imp']+merged_grp['val_exp']
merged_grp
```

Out[59]:

	country	year	val_exp	val_imp	net_trade	total trade
0	AFGHANISTAN TIS	2010	422.31	146.01	276.30	568.32
1	AFGHANISTAN TIS	2011	510.81	132.49	378.32	643.30
2	AFGHANISTAN TIS	2012	472.55	159.53	313.02	632.08
3	AFGHANISTAN TIS	2013	474.26	208.76	265.50	683.02
4	AFGHANISTAN TIS	2014	422.48	261.92	160.56	684.40
...	...	...	...	...	...	...
2050	ZIMBABWE	2014	223.84	32.69	191.15	256.53
2051	ZIMBABWE	2015	205.01	24.44	180.57	229.45
2052	ZIMBABWE	2016	109.02	60.45	48.57	169.47
2053	ZIMBABWE	2017	163.46	62.20	101.26	225.66
2054	ZIMBABWE	2018	181.62	7.81	173.81	189.43

2055 rows × 6 columns

```
In [60]: d=merged_grp.groupby(by=['year','country'])['total trade'].sum()  
d
```

```
Out[60]: year  country  
2010  AFGHANISTAN TIS      568.32  
      ALBANIA              11.60  
      ALGERIA             2598.11  
      AMERI SAMOA          0.35  
      ANDORRA              0.28  
      ...  
2018  VIRGIN IS US         43.29  
      WALLIS F IS          0.00  
      YEMEN REPubLC       753.00  
      ZAMBIA              829.40  
      ZIMBABWE            189.43  
Name: total trade, Length: 2055, dtype: float64
```

In [ ]:

In [ ]:

***Inferences 1: In 2018,India exported highest(in value) while in 2010 it was lowest***

***Inference 2:India's export is continously increasing after 2015***

***Inference 3: India exported highest(in value) to USA(2010-2018)***

***Inference 4:Mineral wax,mineral fuel and other mineral product commodity was exported highes during 2010-2018***

***Inference 5: In 2018 India imported highest while in 2010 it was lowest***

***Inference 6: In 2018,India exports and imports are highest***

***Inference 7: In 2010,India exports and imports are lowest***

***Inference 8 :In commodity,Mineral wax,mineral fuel and other mineral product was imported highest during 2010-2018***

***Inference 9: India has been net importer in any year***

***Inference 10: In 2016 trade gap was narrowest***

***Inference 11: In 2012 trade gap was widest***

***Inference 12: We can say that export\_val and import\_val are moderately positive correlated.Correlation coefficient=0.66***

***Inference 13: With 59.5% countries India's trade have been surplus and with 40.5% countries India,s have been deficit***

***Inference 14: USA has been topmost surplus trade partner during()2010-2018***

***Inference 15: China has been topmost deficit trade partner for India during()2010-2018***

***Inference 16: China has been India's top trading partner betwwen 2010-2018 followed by USA in terms of both exoprts and inports***

***Inference 17:India's highest surplus trade was in 2017 with USA***

***Inference 18:India's highest deficit trade was in 2017 with China***

In [ ]: