Line Graphs in Seaborn

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

In [2]:
```
# plt.style.use('ggplot') # Other sytles to use; fivethirtyeight
sns.set_theme(style="whitegrid")
sns.set(rc={'figure.figsize':(20,10)}) # Set figure size
sns.set(font_scale = 2)
```

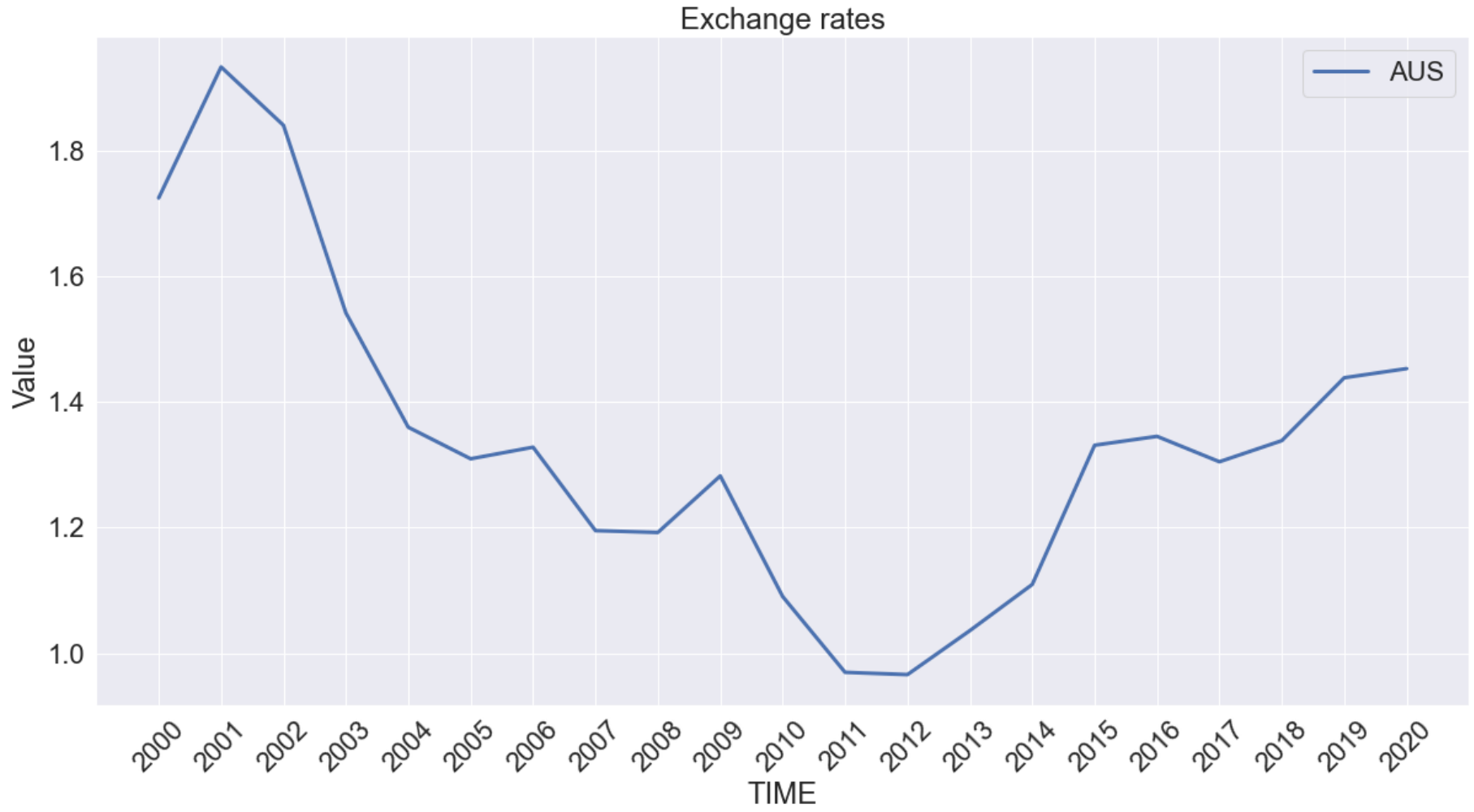
Simple line graph

In [3]:
```
ex_rate_df=pd.read_csv('Exchange_Rates.csv')
ex_rate_df['TIME']=ex_rate_df['TIME'].astype(str)
simple_line_graph_ex_rate_df=ex_rate_df.query("LOCATION=='AUS'")
simple_line_graph_ex_rate_df.head()
```

Out[3]:

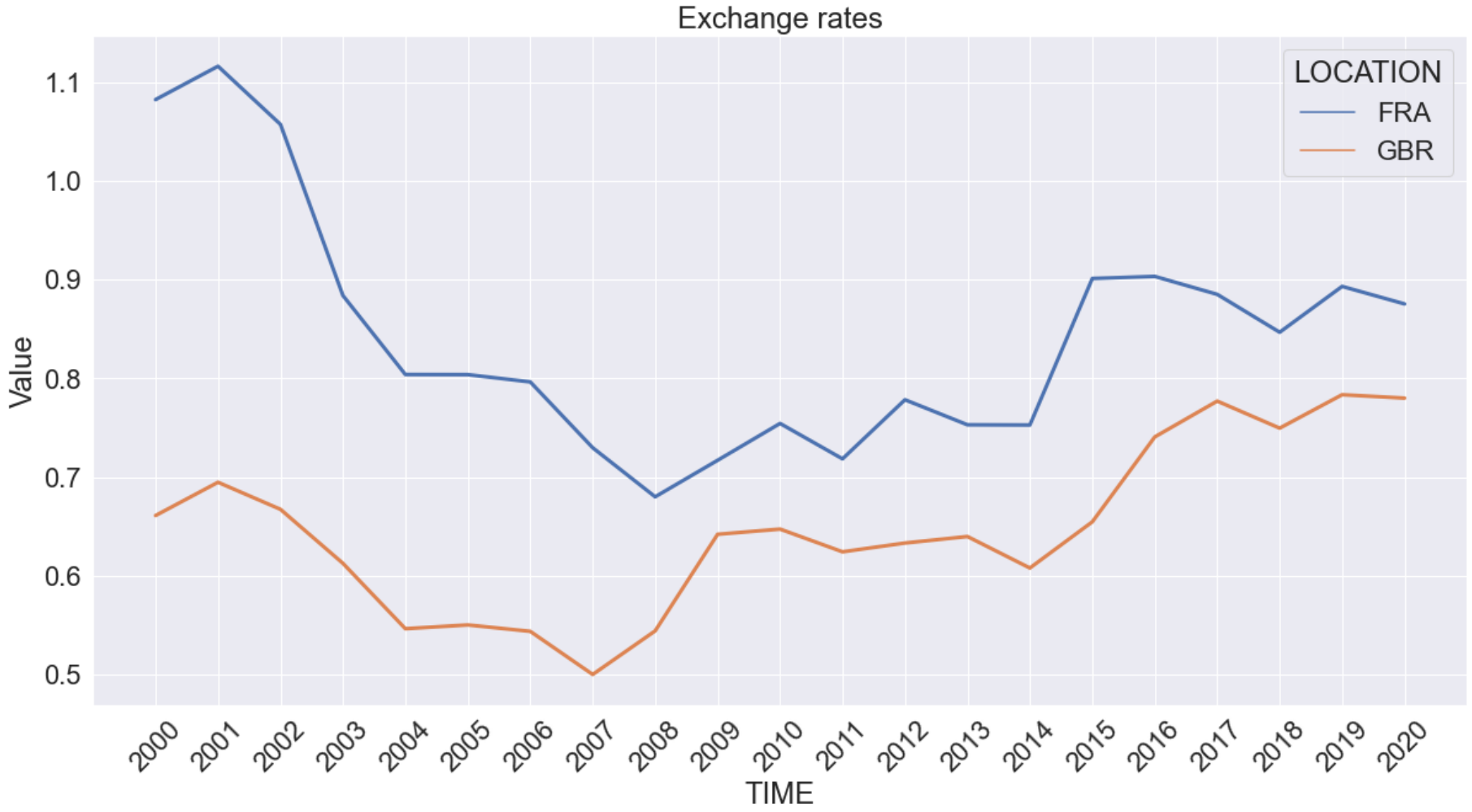
	LOCATION	INDICATOR	SUBJECT	MEASURE	FREQUENCY	TIME	Value	Flag Codes
0	AUS	EXCH	TOT	NATUSD	A	2000	1.724827	NaN
1	AUS	EXCH	TOT	NATUSD	A	2001	1.933443	NaN
2	AUS	EXCH	TOT	NATUSD	A	2002	1.840563	NaN
3	AUS	EXCH	TOT	NATUSD	A	2003	1.541914	NaN
4	AUS	EXCH	TOT	NATUSD	A	2004	1.359752	NaN

In [5]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
sns.lineplot(data=simple_line_graph_ex_rate_df, x=simple_line_graph_ex_rate_df['TIME'],
             y=simple_line_graph_ex_rate_df['Value'],linewidth=3)
plt.title('Exchange rates',fontsize=24)
plt.legend(['AUS'], loc='upper right')
plt.xticks(rotation=45)
plt.show()
```



Multiple line graphs

In [6]:
```
ex_rate_df=ex_rate_df[ex_rate_df['LOCATION'].isin(['FRA','GBR','USD'])]

plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
sns.lineplot(data=ex_rate_df, x=ex_rate_df['TIME'], y=ex_rate_df['Value'],hue=ex_rate_df['LOCATION'],
             linewidth=3)
plt.title('Exchange rates',fontsize=24)
plt.xticks(rotation=45)
plt.show()
```



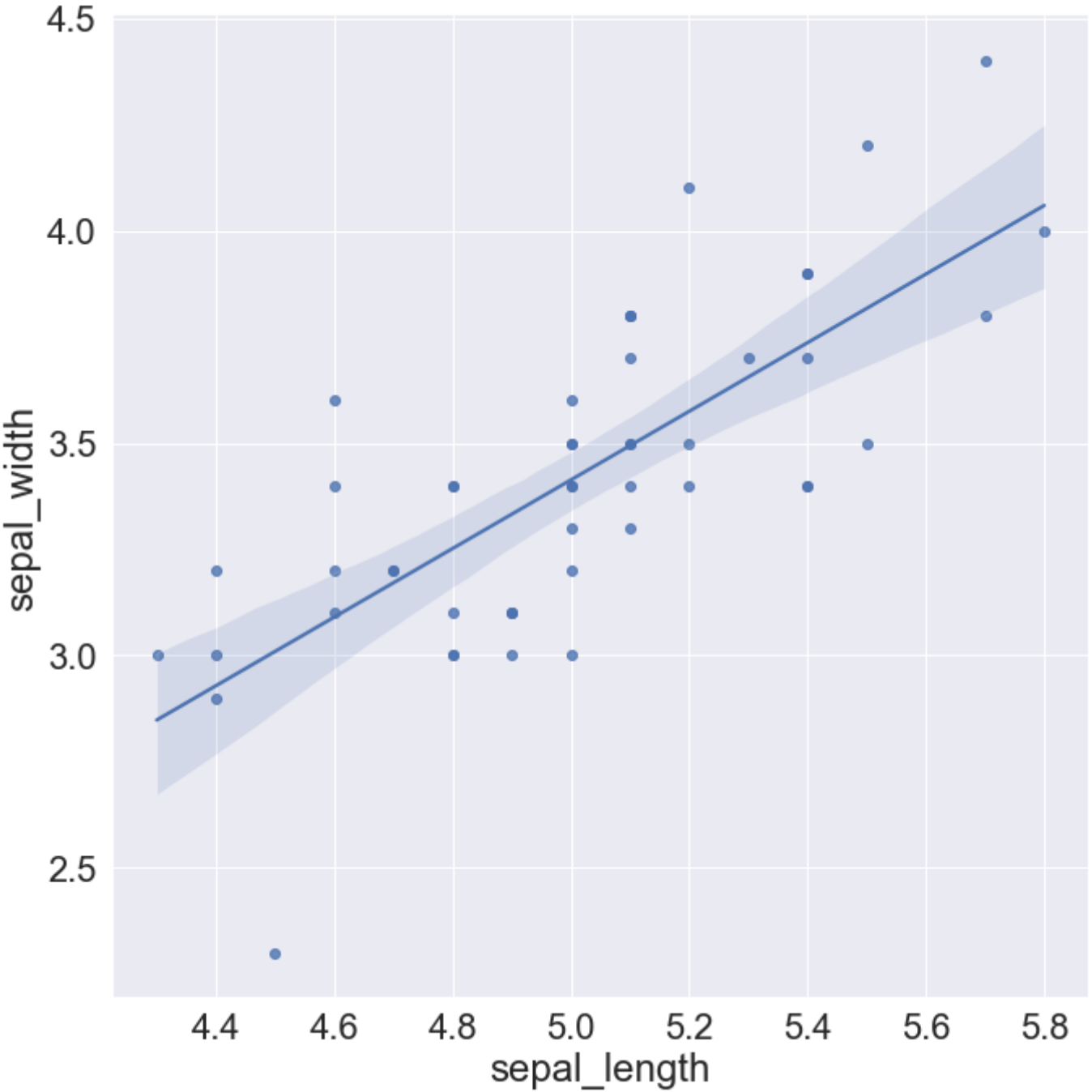
Simple Linear Regression Line

In [7]:
```
iris_df=pd.read_csv('iris.csv')
iris_df.head()
```

Out[7]:

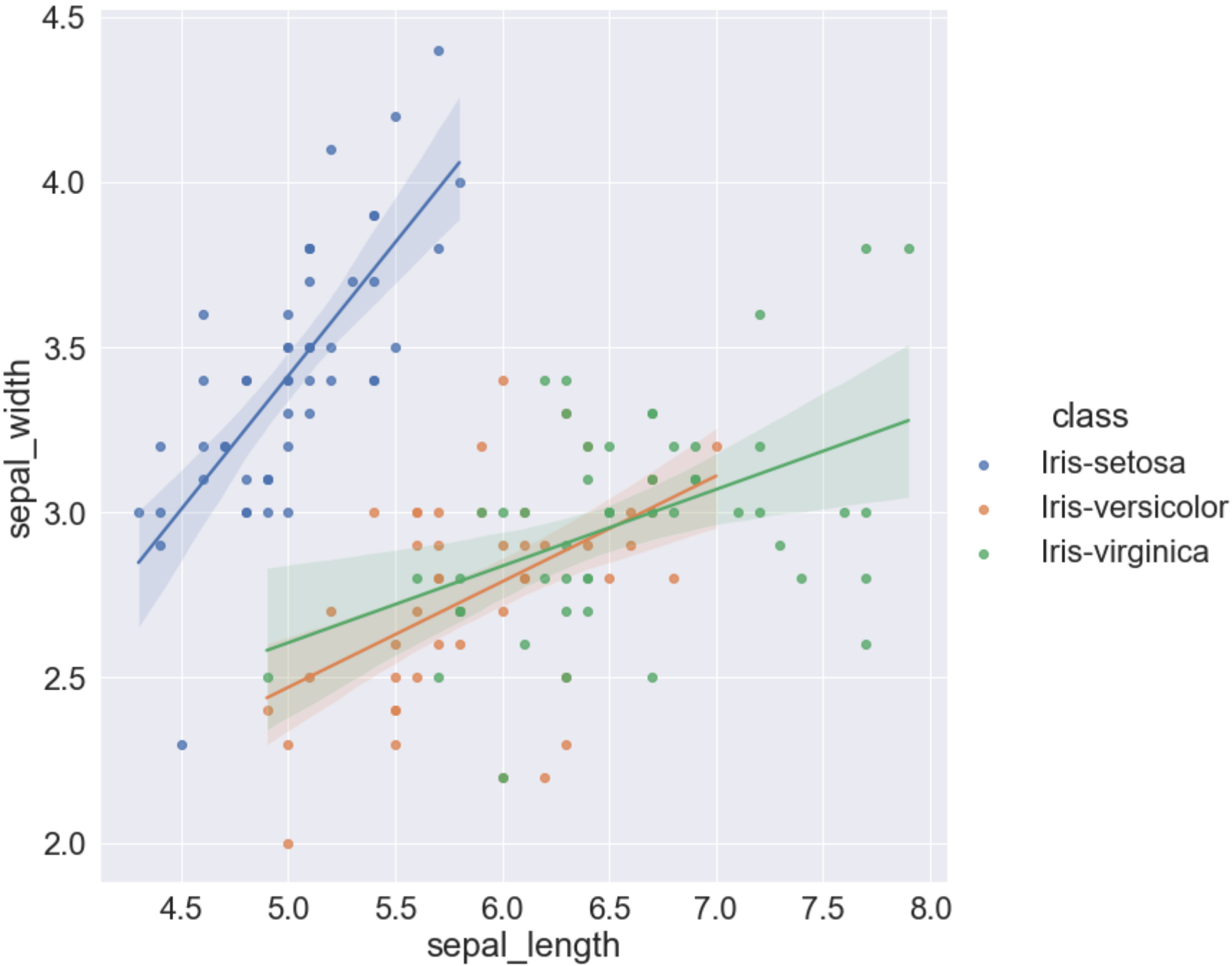
	sepal_length	sepal_width	petal_length	petal_width	class
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

In [8]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)

sns.lmplot(data=iris_df[iris_df['class']=='Iris-setosa'], x="sepal_length", y="sepal_width",height=10)
plt.show()
```


4.5
4.0
3.5
3.0
2.5
sepal_width
4.4
4.6
4.8
5.0
5.2
5.4
5.6
5.8
sepal_length

Multiple Linear Regression

In [9]:
```
sns.lmplot(data=iris_df,x="sepal_length", y="sepal_width", hue="class",height=10)
plt.show()
```


4.5
4.0
3.5
3.0
2.5
2.0
sepal_width
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
sepal_length
class
Iris-setosa
Iris-versicolor
Iris-virginica

Bar Plot

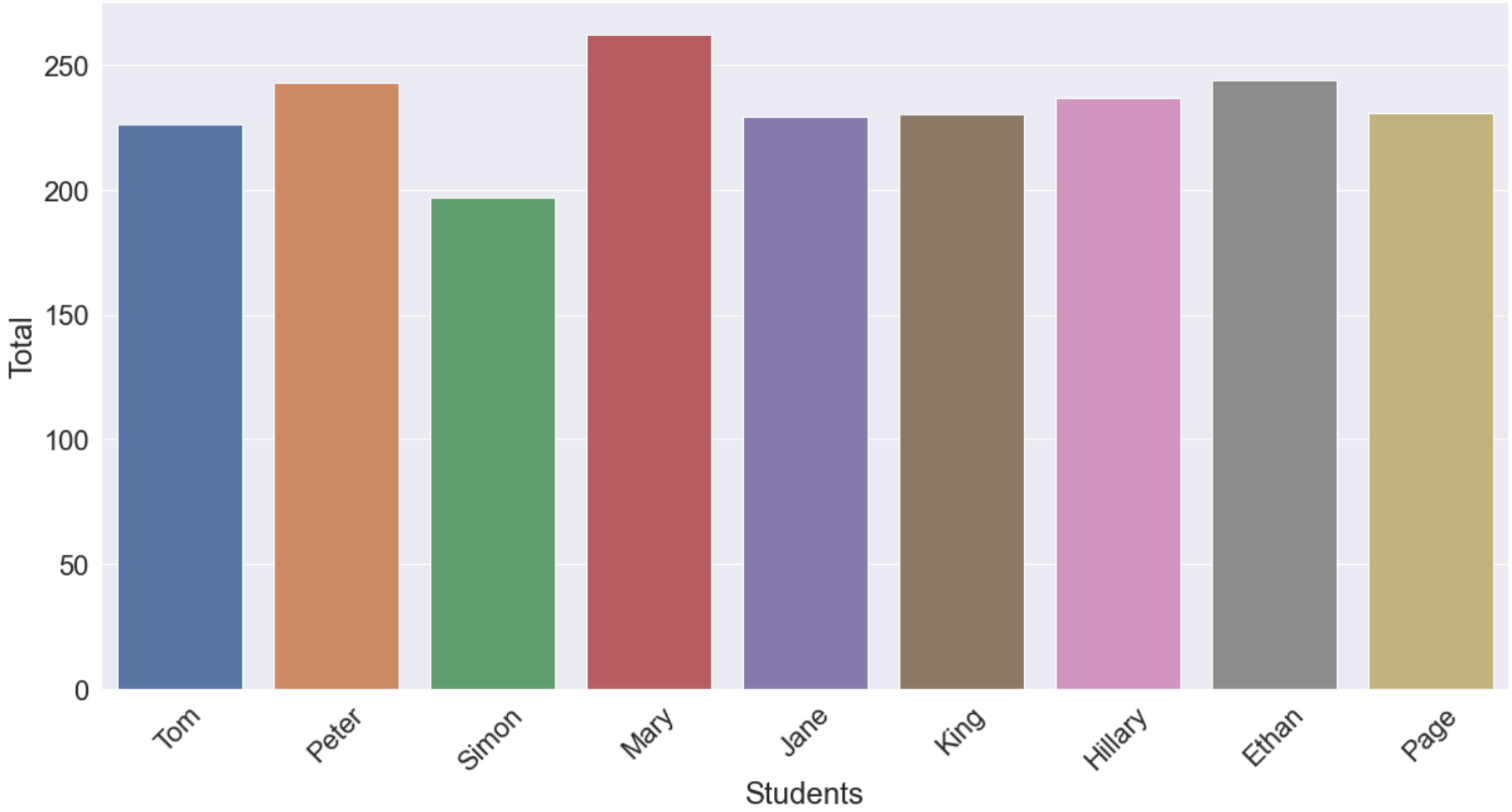
In [10]:
```
score_df = pd.DataFrame(
    {
        "Students": ["Tom", "Peter","Simon", "Mary", "Jane","King","Hillary","Ethan","Page"],
        "Math": [79.00, 67.00,80.00, 84.00, 70.00,60.00,90.00,76.00,75],
        "Physics":[63.00, 98, 60.00, 90,84.00, 77.00,55.00,70,66.00],
        "Computer":[84.00,78.00, 57.00, 88.00, 75.00,93.00,92.00,98.00,90.00],
    },
    index=["Tom", "Peter","Simon", "Mary", "Jane","King","Hillary","Ethan","Page"]
)

score_df['Total']=score_df[['Math','Physics','Computer']].apply(np.sum,axis=1)
score_df
```

Out[10]:

	Students	Math	Physics	Computer	Total
Tom	Tom	79.0	63.0	84.0	226.0
Peter	Peter	67.0	98.0	78.0	243.0
Simon	Simon	80.0	60.0	57.0	197.0
Mary	Mary	84.0	90.0	88.0	262.0
Jane	Jane	70.0	84.0	75.0	229.0
King	King	60.0	77.0	93.0	230.0
Hillary	Hillary	90.0	55.0	92.0	237.0
Ethan	Ethan	76.0	70.0	98.0	244.0
Page	Page	75.0	66.0	90.0	231.0

Simple bar chart

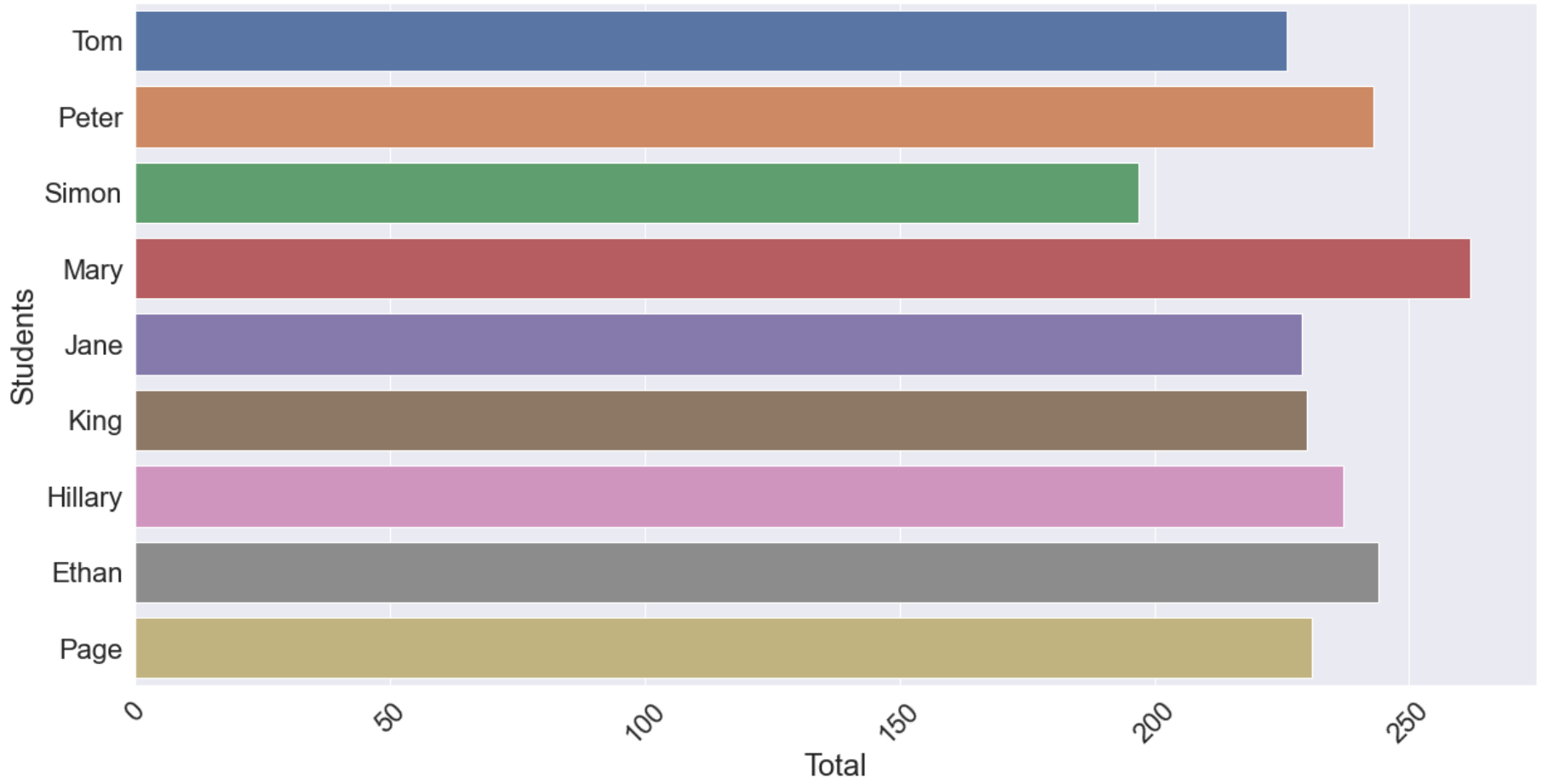
In [11]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
sns.barplot(x=score_df['Students'], y=score_df['Total'])
plt.xticks(rotation=45)
plt.show()
```



Horizontal Bar chart

Simply interchange x and y axes

In [12]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
sns.barplot(y=score_df['Students'], x=score_df['Total'])
plt.xticks(rotation=45)
plt.show()
```



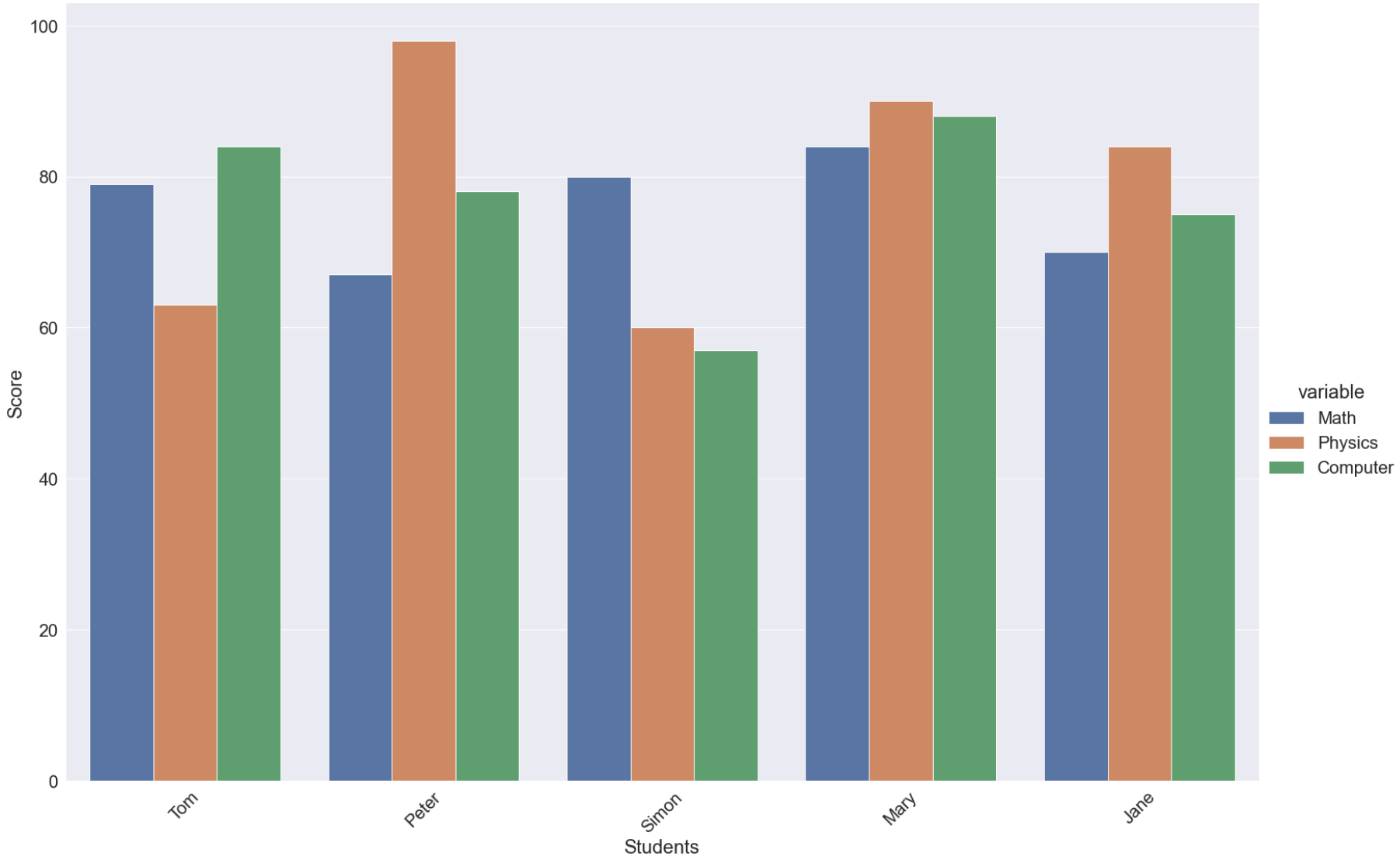
Grouped Bar chart

In [13]:
```
score_melt_df=pd.melt(score_df.reset_index().head(),id_vars=['Students'],value_vars=['Math','Physics','Computer'],
        value_name='Score')
score_melt_df.head()
```

Out[13]:

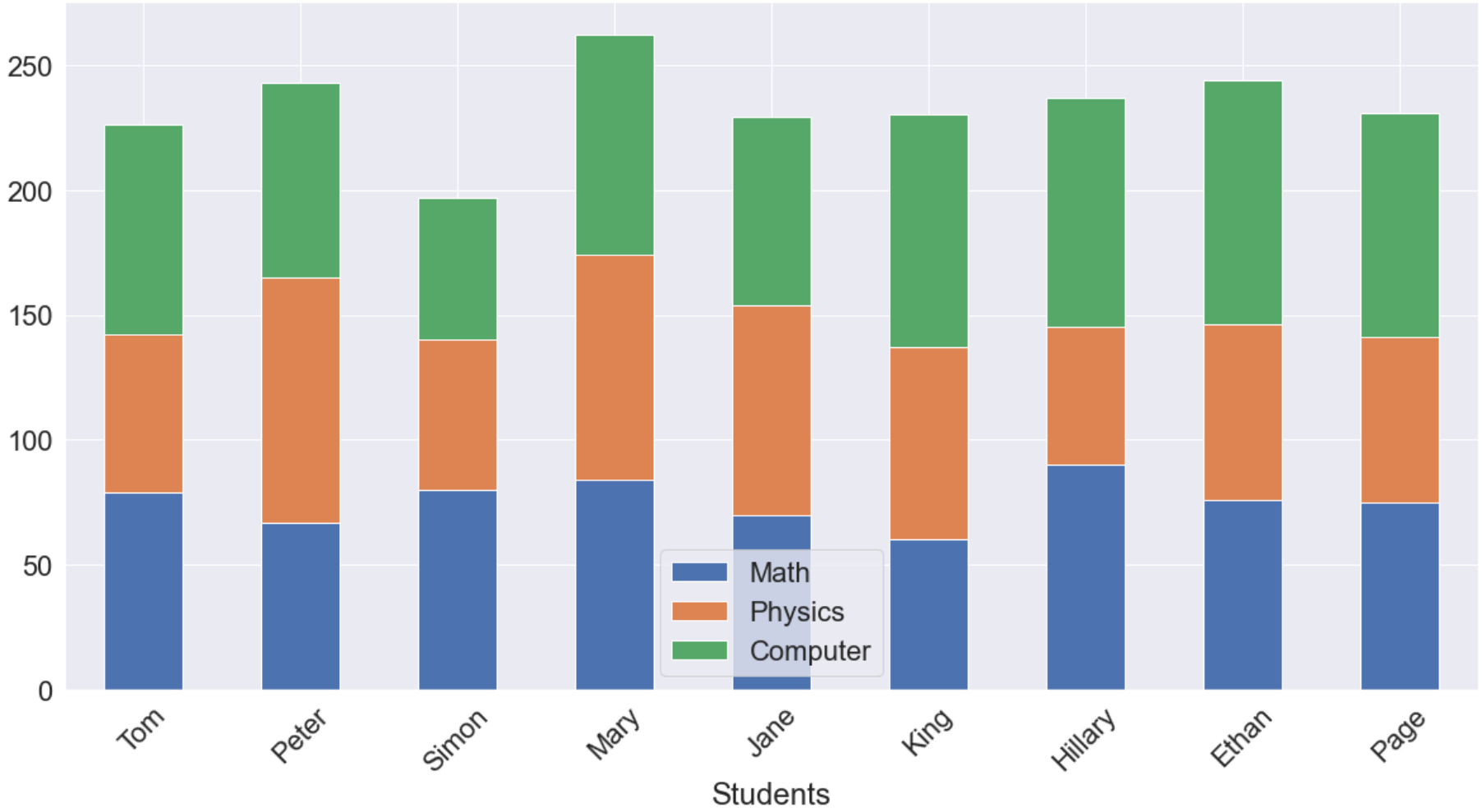
	Students	variable	Score
0	Tom	Math	79.0
1	Peter	Math	67.0
2	Simon	Math	80.0
3	Mary	Math	84.0
4	Jane	Math	70.0

In [14]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
sns.catplot(data=score_melt_df, kind="bar", x="Students", y="Score", hue="variable",height=15, aspect=1.5)
plt.xticks(rotation=45)
plt.show()
```



Stacked Bar Chart

In [15]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
score_df[['Students','Math','Physics','Computer']].set_index('Students').plot(kind='bar', stacked=True)
plt.xticks(rotation=45)
plt.show()
```



Scatter Plot

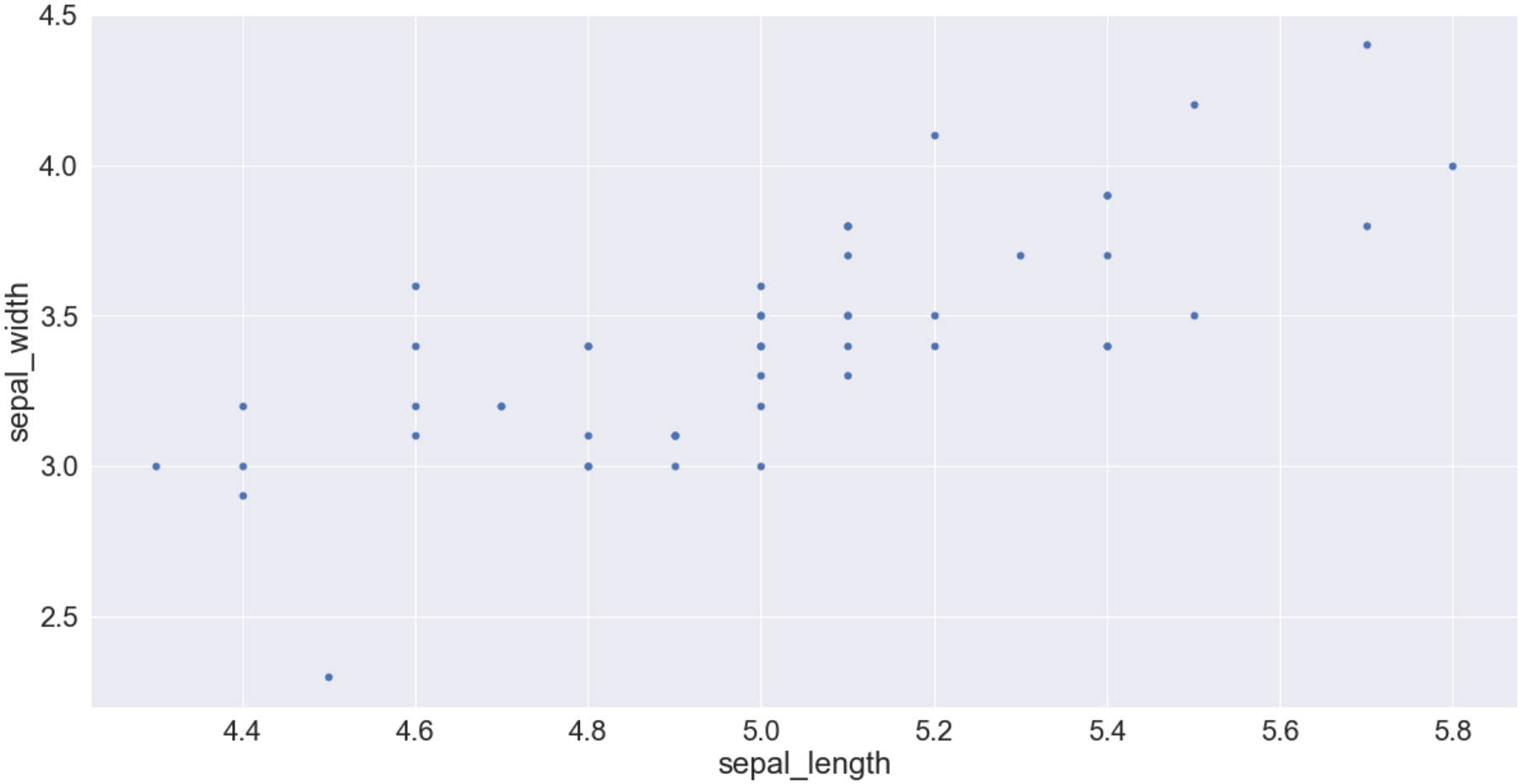
In [16]:
```
iris_df=pd.read_csv('iris.csv')
iris_df.head()
```

Out[16]:

	sepal_length	sepal_width	petal_length	petal_width	class
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

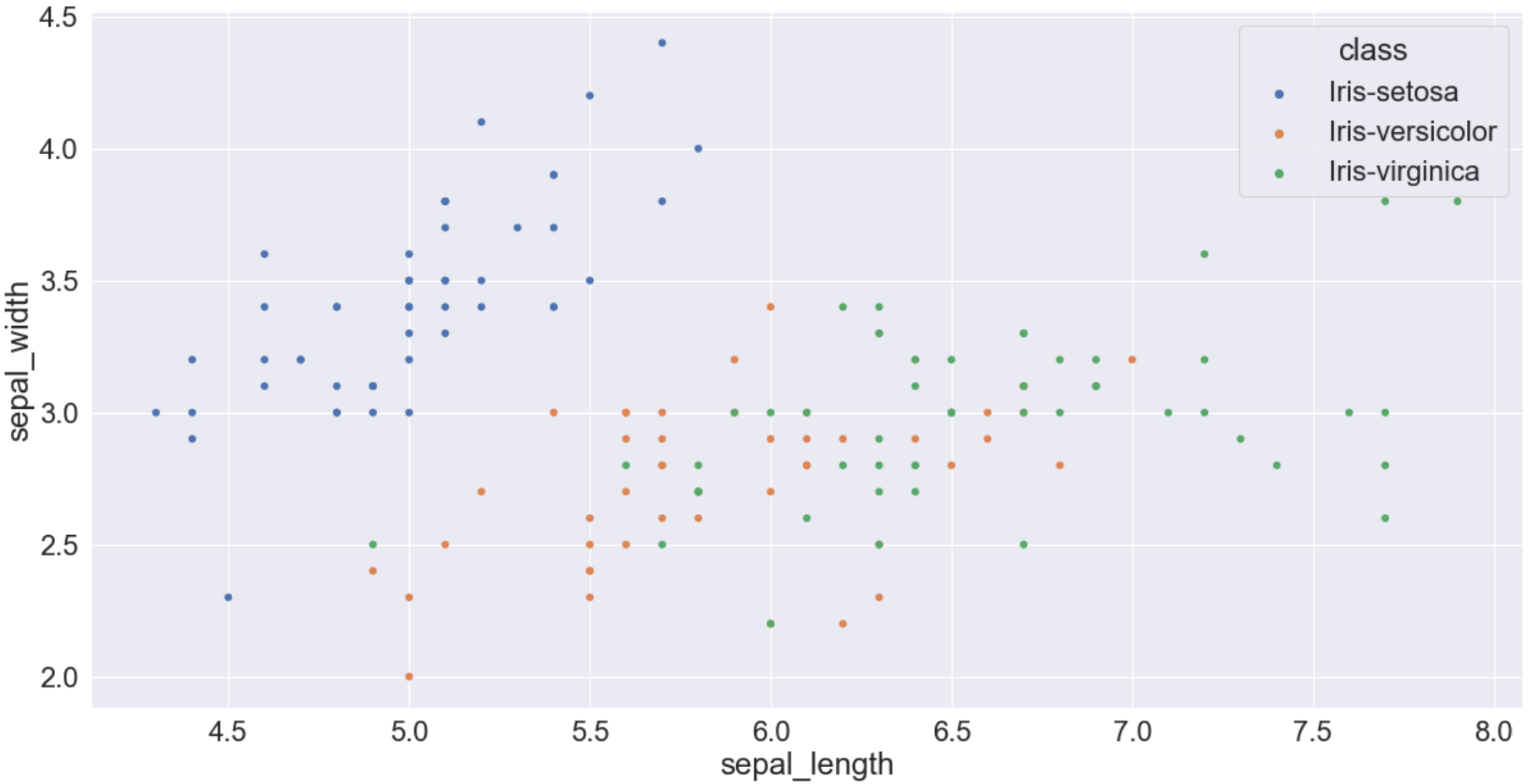
Simple Scatter plot

In [17]:
```
setosa_df=iris_df[iris_df['class']=='Iris-setosa']

plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
sns.scatterplot(x="sepal_length", y="sepal_width", sizes=(1, 8), linewidth=0,data=setosa_df)
plt.show()
```



Multi-class Scatter plot

In [18]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
sns.scatterplot(x="sepal_length", y="sepal_width", sizes=(1, 8), linewidth=0,data=iris_df,hue='class')
plt.show()
```



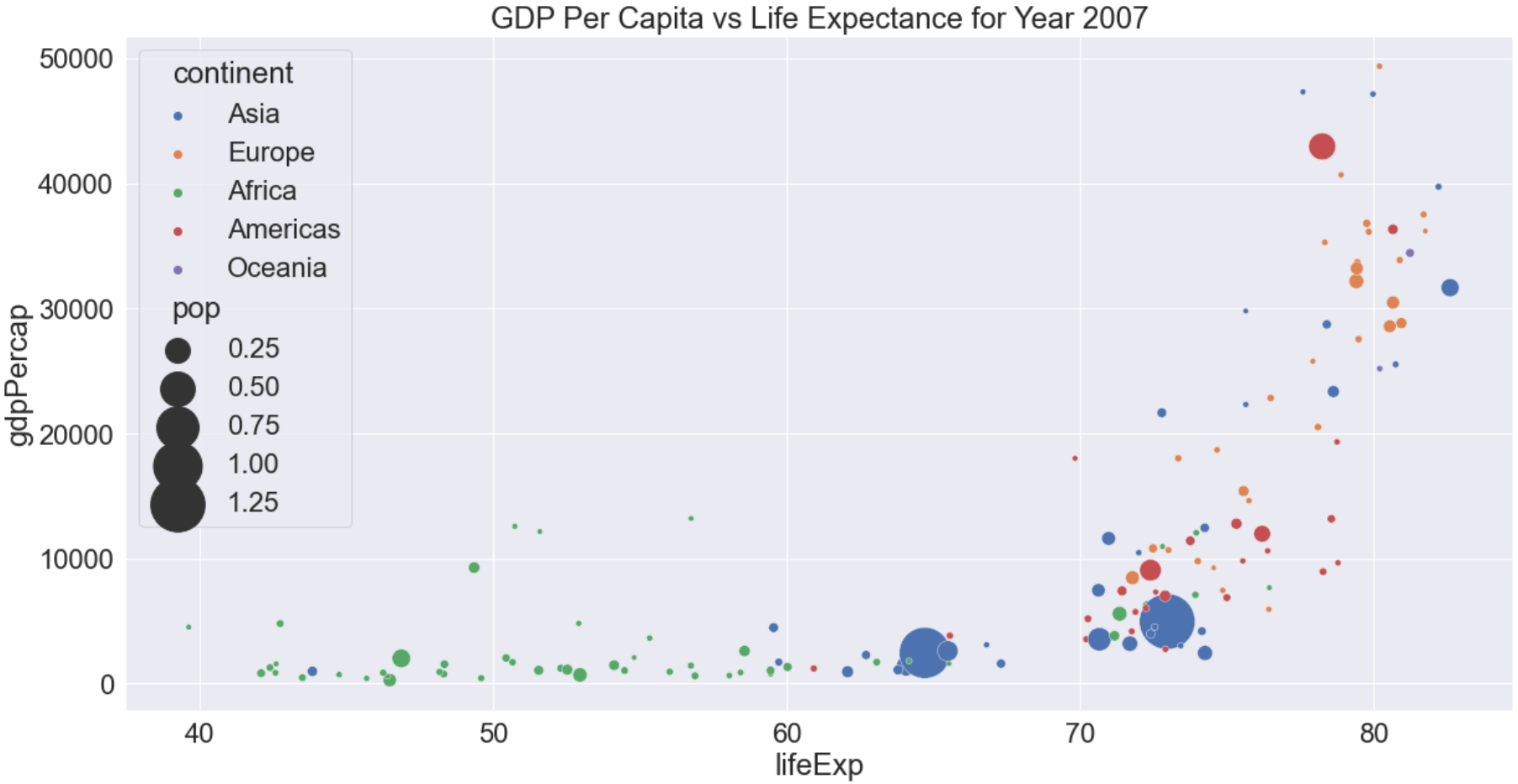
Buble chart

In [19]:
```
gdpPercap_df=pd.read_csv('gdpPercap.csv')
gdpPercap_2007_df=gdpPercap_df.query("year=='2007'")
gdpPercap_2007_df.head()
```

Out[19]:

	country	continent	year	lifeExp	pop	gdpPercap
11	Afghanistan	Asia	2007	43.828	31889923	974.580338
23	Albania	Europe	2007	76.423	3600523	5937.029526
35	Algeria	Africa	2007	72.301	33333216	6223.367465
47	Angola	Africa	2007	42.731	12420476	4797.231267
59	Argentina	Americas	2007	75.320	40301927	12779.379640

In [20]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
sns.scatterplot(data=gdpPercap_2007_df, x="lifeExp", y="gdpPercap", size='pop', hue='continent',
                legend=True, sizes=(20, 2000))
plt.title('GDP Per Capita vs Life Expectance for Year 2007')
plt.show()
```



Pie Chart

In [21]:
```
gdpPercap_df=pd.read_csv('gdpPercap.csv')
gdpPercap_2007_df=gdpPercap_df.query("year=='2007'")
gdpPercap_2007_df.head()
```

Out[21]:

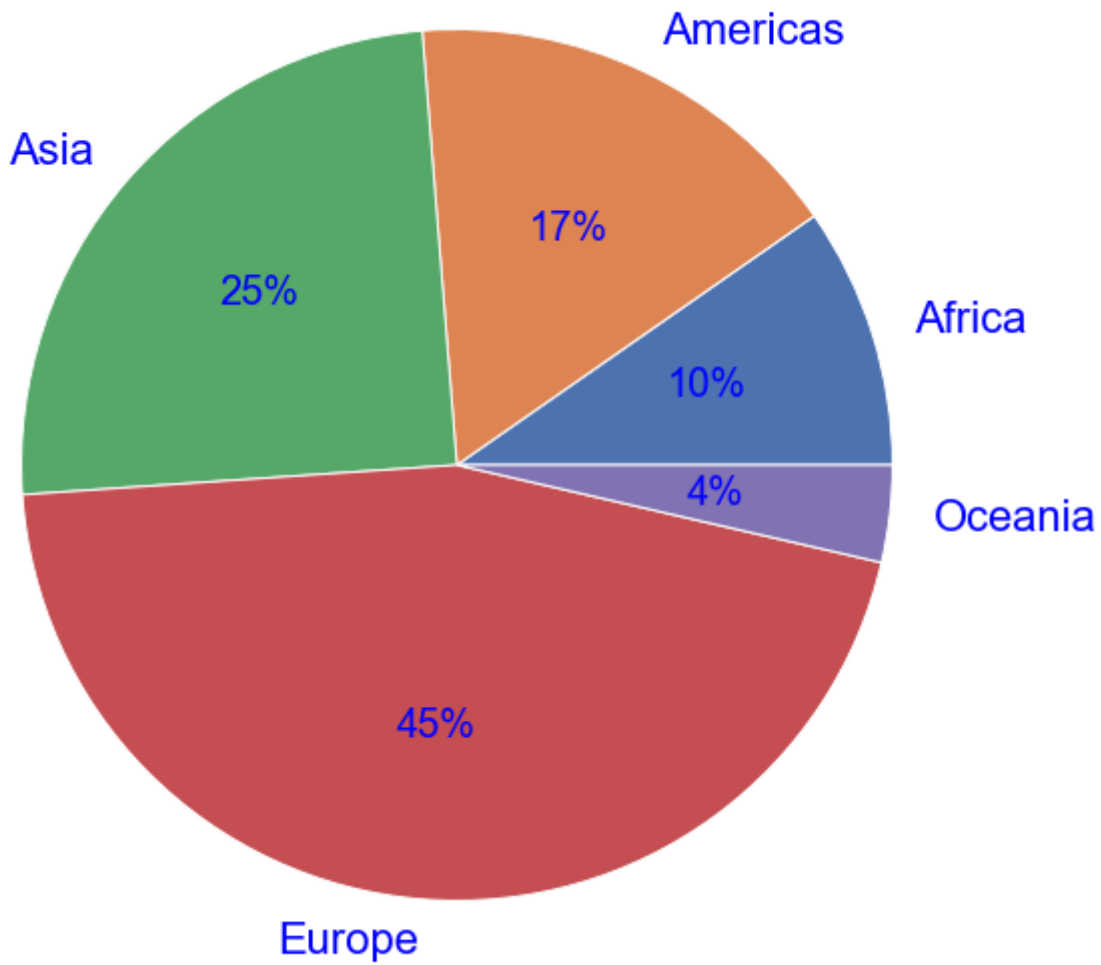
	country	continent	year	lifeExp	pop	gdpPercap
11	Afghanistan	Asia	2007	43.828	31889923	974.580338
23	Albania	Europe	2007	76.423	3600523	5937.029526
35	Algeria	Africa	2007	72.301	33333216	6223.367465
47	Angola	Africa	2007	42.731	12420476	4797.231267
59	Argentina	Americas	2007	75.320	40301927	12779.379640

In [22]:
```
gdpPercap_2007_df=pd.DataFrame(gdpPercap_2007_df.groupby('continent')['gdpPercap'].sum())
gdpPercap_2007_df
```

Out[22]:

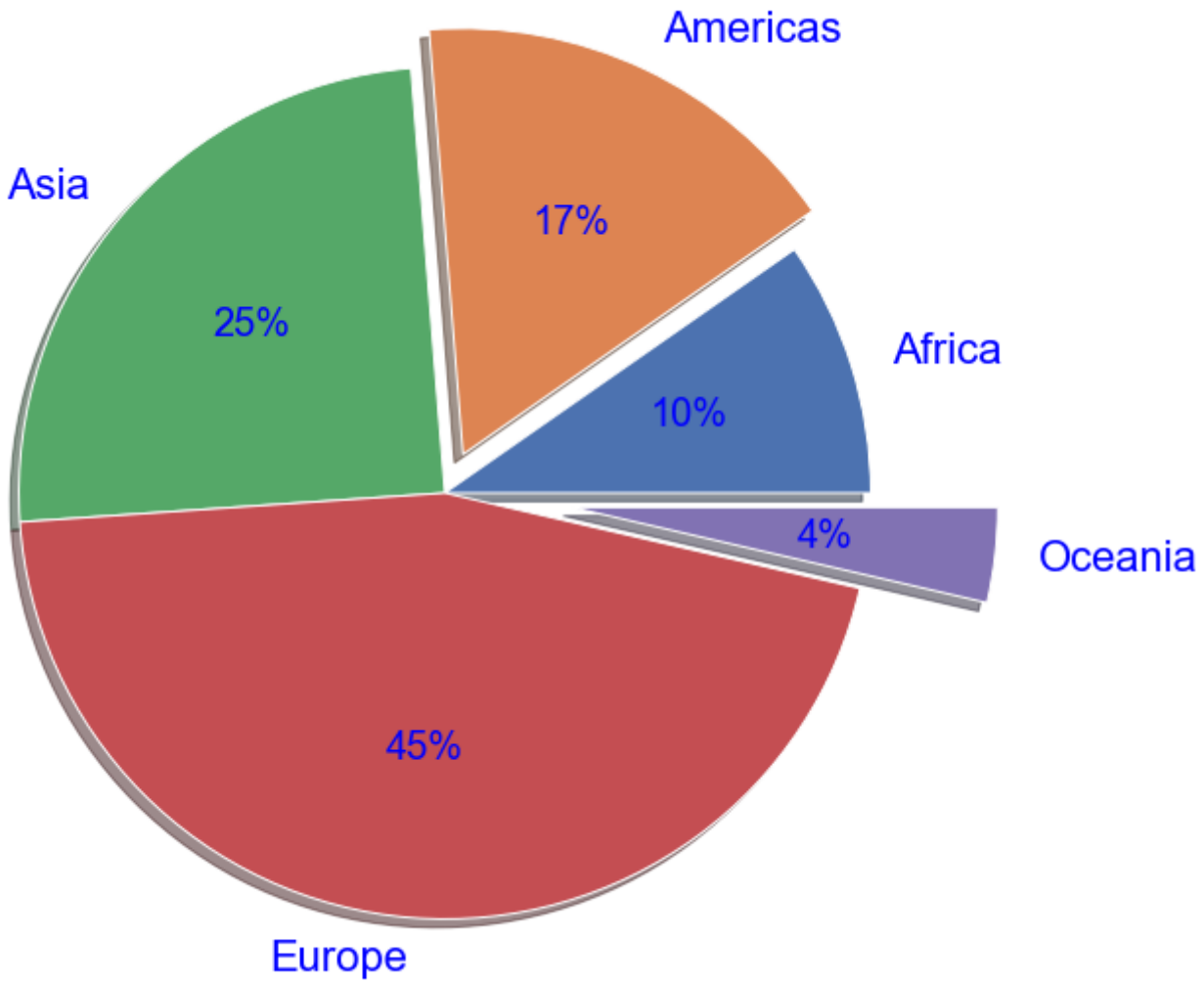
	gdpPercap
continent	
Africa	160629.695446
Americas	275075.790634
Asia	411609.886714
Europe	751634.449078
Oceania	59620.376550

In [23]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20
plt.pie(gdpPercap_2007_df['gdpPercap'], labels =gdpPercap_2007_df.index, autopct='%.0f%%')
plt.show()
```



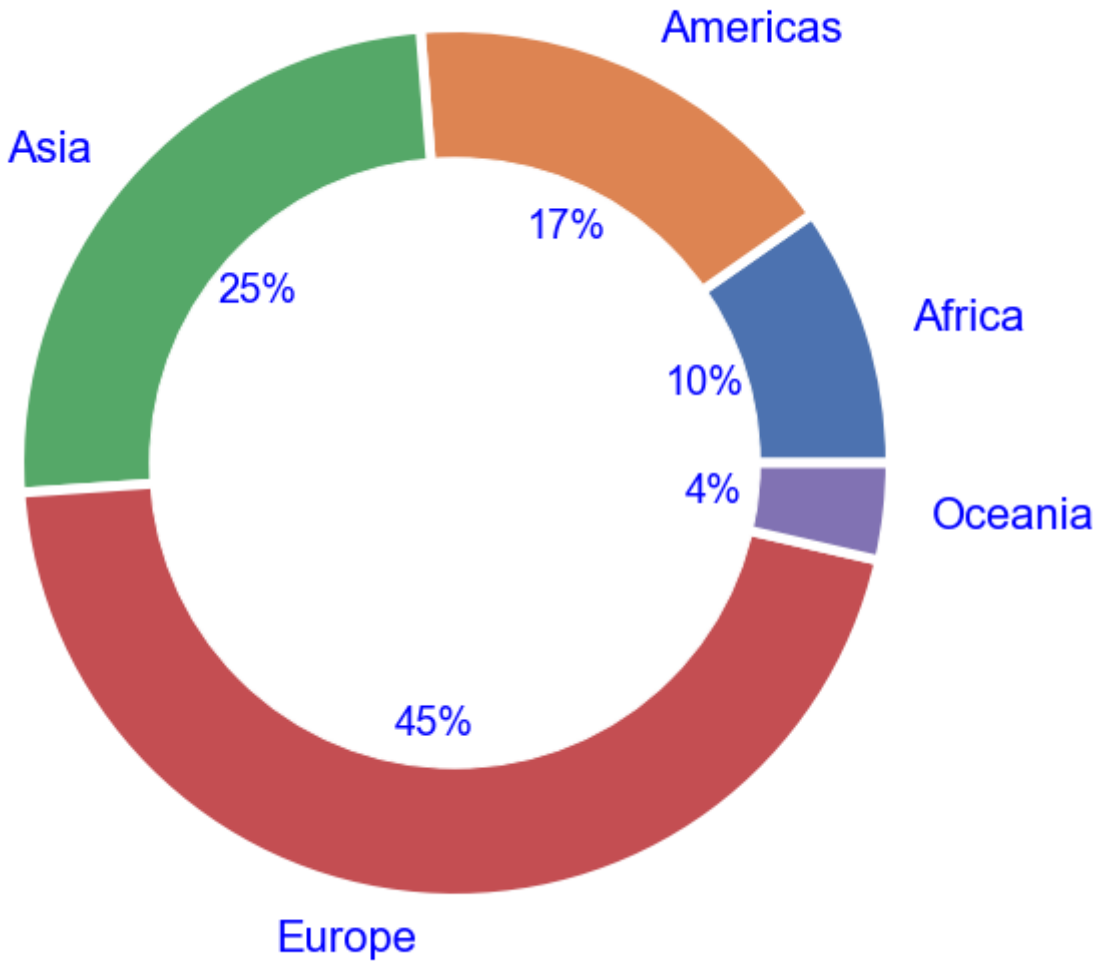
Explode Pie

In [24]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20
plt.pie(gdpPercap_2007_df['gdpPercap'], labels =gdpPercap_2007_df.index, autopct='%.0f%%',
        explode=(0,0.1,0,0,0.3),shadow=True)
plt.show()
```



Donought

In [25]:
```
inner_circle = plt.Circle( (0,0), 0.7, color='white')

plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20
plt.pie(gdpPercap_2007_df['gdpPercap'], labels =gdpPercap_2007_df.index, autopct='%.0f%%',
        wedgeprops = { 'linewidth' : 5, 'edgecolor' : 'white' })
p = plt.gcf()
p.gca().add_artist(inner_circle)
plt.show()
```



Box Plot

In [26]:
```
gdpPercap_df=pd.read_csv('gdpPercap.csv')
gdpPercap_2007_df=gdpPercap_df.query("year=='2007'")
gdpPercap_2007_df.head()
```

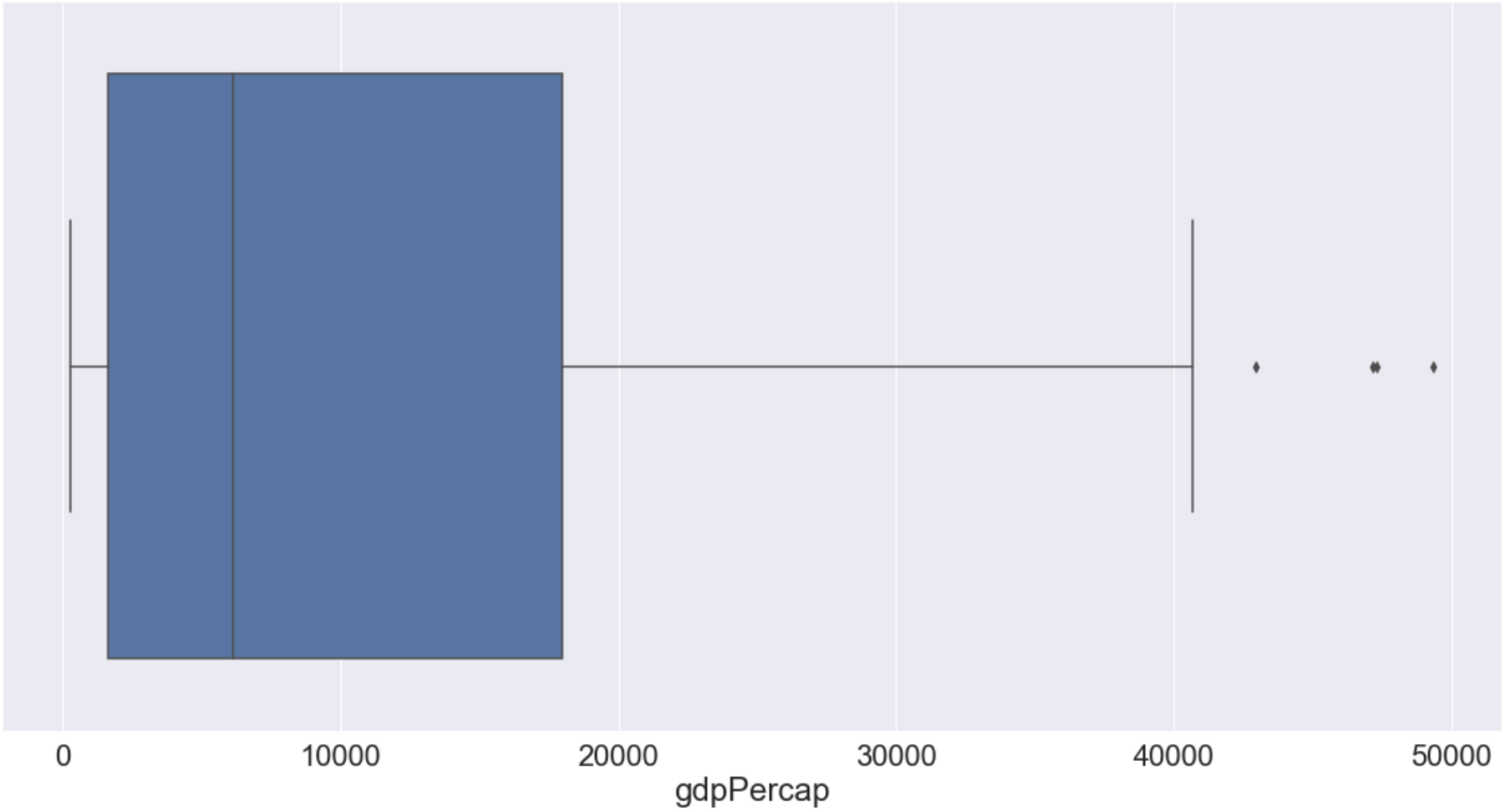
Out[26]:

	country	continent	year	lifeExp	pop	gdpPercap
11	Afghanistan	Asia	2007	43.828	31889923	974.580338
23	Albania	Europe	2007	76.423	3600523	5937.029526
35	Algeria	Africa	2007	72.301	33333216	6223.367465
47	Angola	Africa	2007	42.731	12420476	4797.231267
59	Argentina	Americas	2007	75.320	40301927	12779.379640

Simple Boxplot

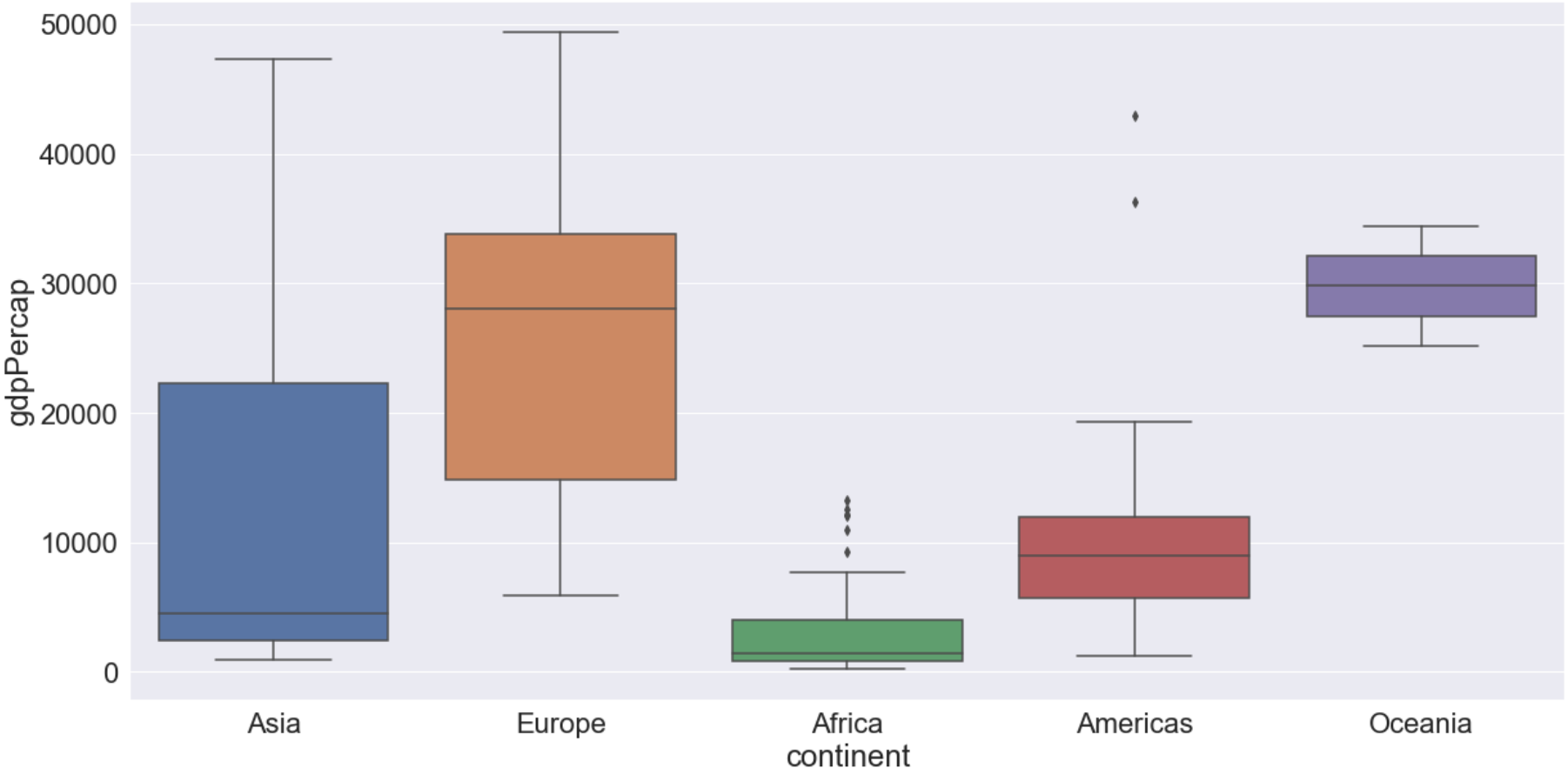
In [27]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20

sns.boxplot(gdpPercap_2007_df['gdpPercap'])
plt.show()
```

```
C:\Users\soongaya\Anaconda3\lib\site-packages\seaborn\_decorators.py:43: FutureWarning: Pass the following variable a
s a keyword arg: x. From version 0.12, the only valid positional argument will be `data`, and passing other arguments
without an explicit keyword will result in an error or misinterpretation.
  FutureWarning
```



Multiple Boxplots

In [28]:
```
sns.boxplot(x='continent', y='gdpPercap', data=gdpPercap_2007_df)
plt.show()
```



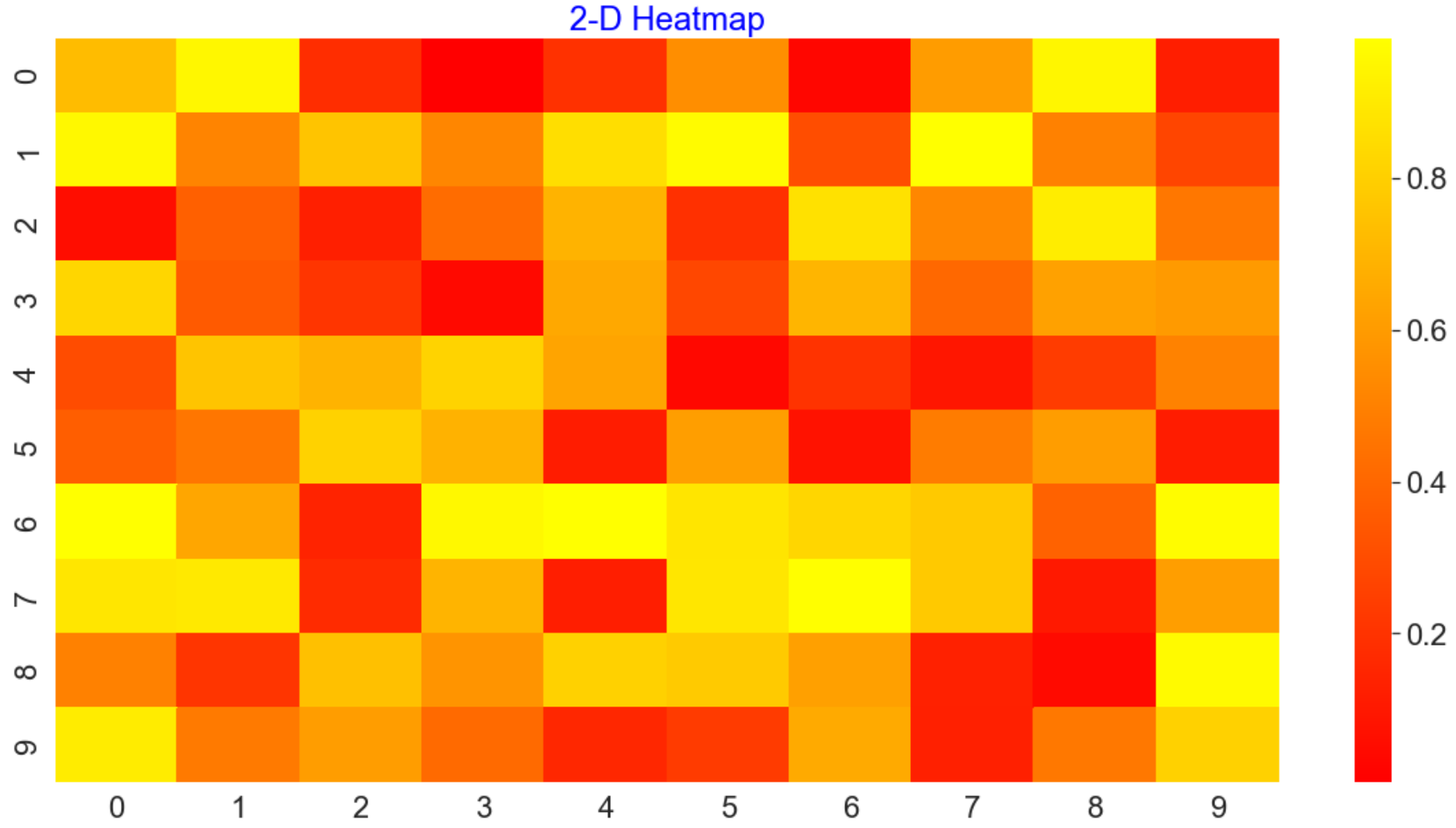
Heatmap

In [29]:
```
gdpPercap_df=pd.read_csv('gdpPercap.csv')
gdpPercap_heatmap_df=gdpPercap_df.pivot('year','country','gdpPercap')
gdpPercap_heatmap_df.iloc[0:,0:12]
```

Out[29]:

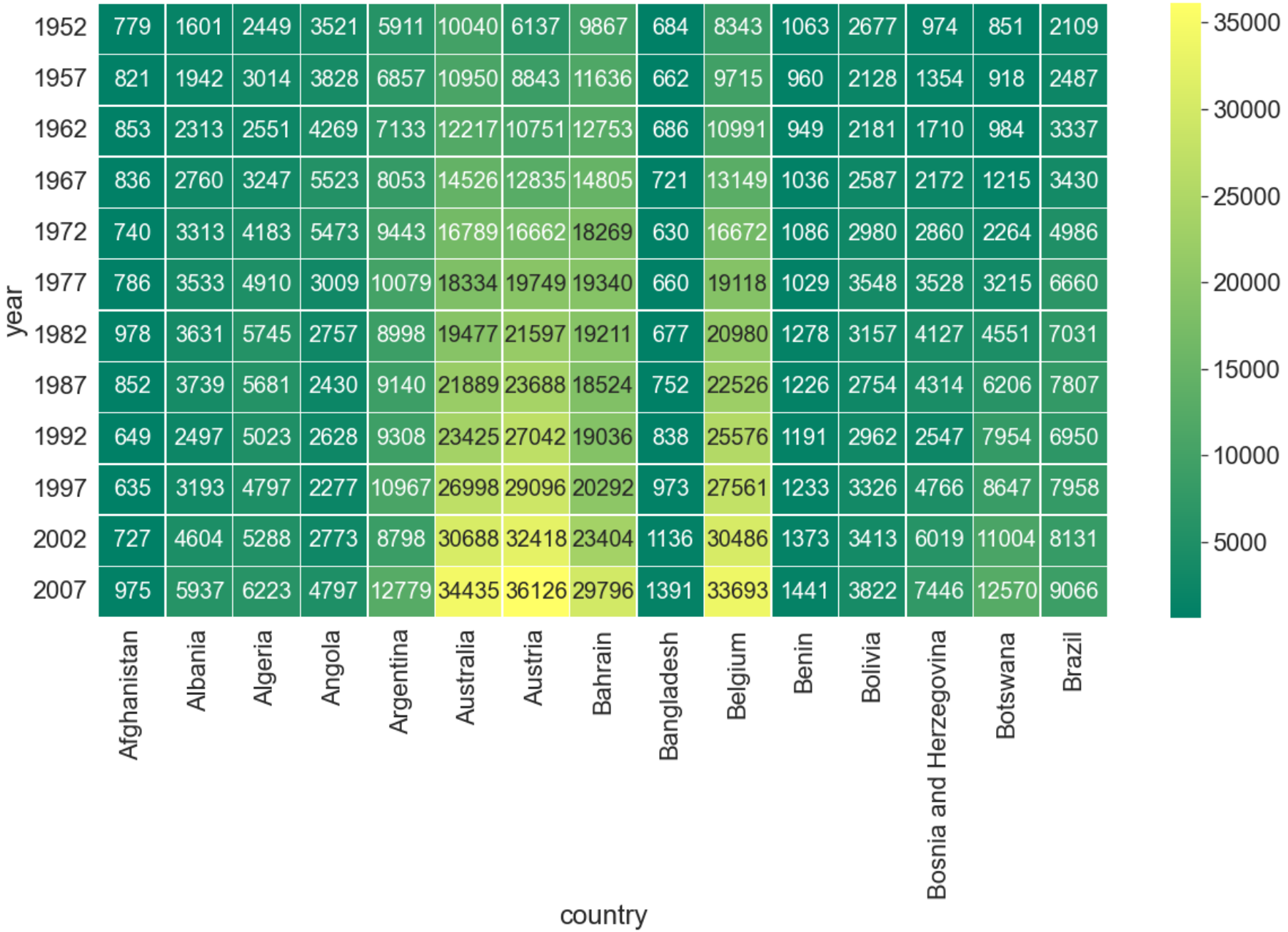
country	Afghanistan	Albania	Algeria	Angola	Argentina	Australia	Austria	Bahrain	Bangladesh	
year										
1952	779.445314	1601.056136	2449.008185	3520.610273	5911.315053	10039.59564	6137.076492	9867.084765	684.244172	8
1957	820.853030	1942.284244	3013.976023	3827.940465	6856.856212	10949.64959	8842.598030	11635.799450	661.637458	9
1962	853.100710	2312.888958	2550.816880	4269.276742	7133.166023	12217.22686	10750.721110	12753.275140	686.341554	1
1967	836.197138	2760.196931	3246.991771	5522.776375	8052.953021	14526.12465	12834.602400	14804.672700	721.186086	1
1972	739.981106	3313.422188	4182.663766	5473.288005	9443.038526	16788.62948	16661.625600	18268.658390	630.233627	1
1977	786.113360	3533.003910	4910.416756	3008.647355	10079.026740	18334.19751	19749.422300	19340.101960	659.877232	1
1982	978.011439	3630.880722	5745.160213	2756.953672	8997.897412	19477.00928	21597.083620	19211.147310	676.981866	2
1987	852.395945	3738.932735	5681.358539	2430.208311	9139.671389	21888.88903	23687.826070	18524.024060	751.979403	2
1992	649.341395	2497.437901	5023.216647	2627.845685	9308.418710	23424.76683	27042.018680	19035.579170	837.810164	2
1997	635.341351	3193.054604	4797.295051	2277.140884	10967.281950	26997.93657	29095.920660	20292.016790	972.770035	2
2002	726.734055	4604.211737	5288.040382	2773.287312	8797.640716	30687.75473	32417.607690	23403.559270	1136.390430	3
2007	974.580338	5937.029526	6223.367465	4797.231267	12779.379640	34435.36744	36126.492700	29796.048340	1391.253792	3

In [30]:
```
heatmap_data = np.random.random(( 10 , 10 ))

plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20
sns.heatmap(heatmap_data,cmap='autumn')
plt.title('2-D Heatmap')
plt.show()
```



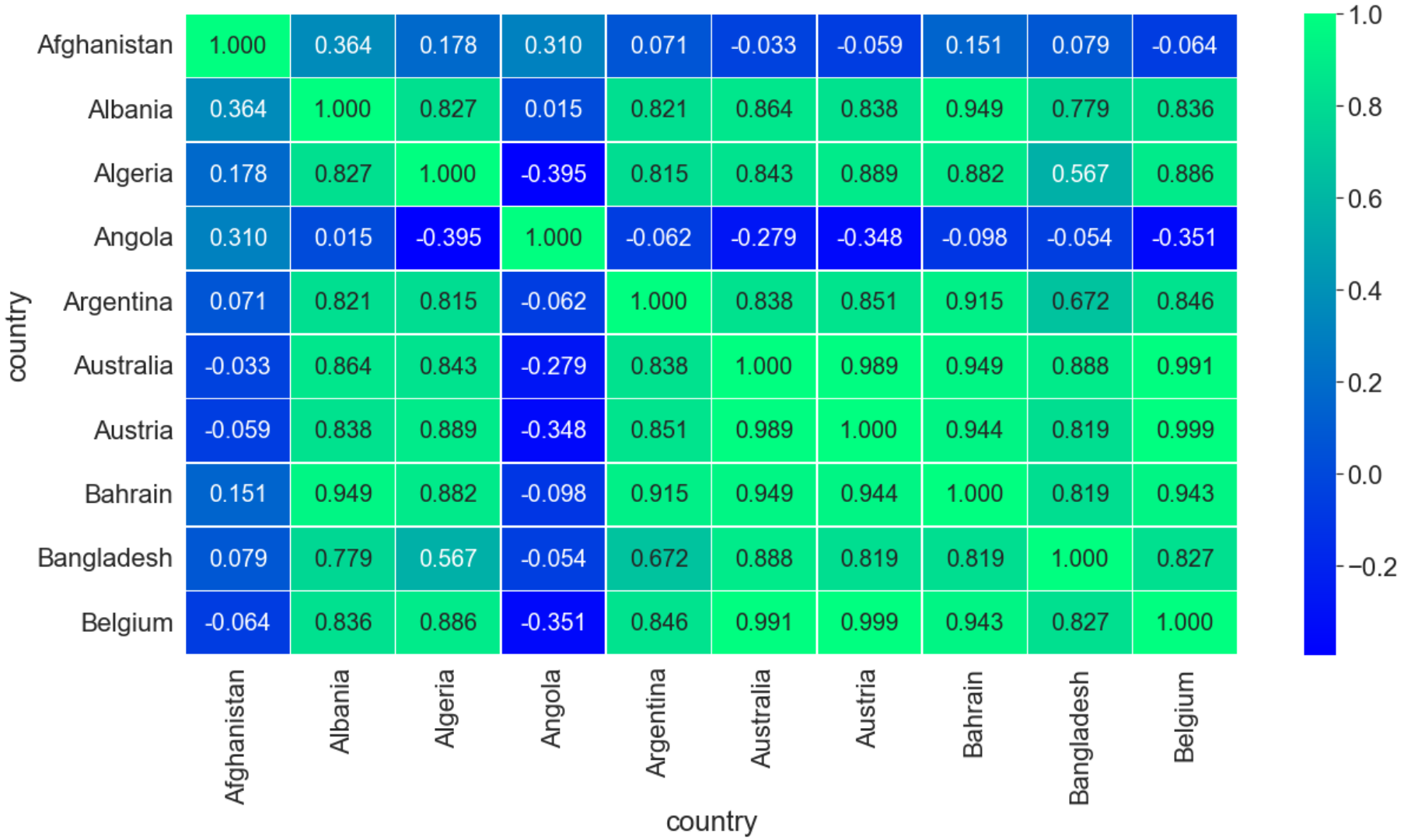
Heatmap with DataFrame

In [31]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20
sns.heatmap(gdpPercap_heatmap_df.iloc[0:,0:15], annot=True, fmt=".0f", linewidths=.5,cmap='summer')
plt.show()
```


year
1952 779 1601 2449 3521 5911 10040 6137 9867 684 8343 1063 2677 974 851 2109
1957 821 1942 3014 3828 6857 10950 8843 11636 662 9715 960 2128 1354 918 2487
1962 853 2313 2551 4269 7133 12217 10751 12753 686 10991 949 2181 1710 984 3337
1967 836 2760 3247 5523 8053 14526 12835 14805 721 13149 1036 2587 2172 1215 3430
1972 740 3313 4183 5473 9443 16789 16662 18269 630 16672 1086 2980 2860 2264 4986
1977 786 3533 4910 3009 10079 18334 19749 19340 660 19118 1029 3548 3528 3215 6660
1982 978 3631 5745 2757 8998 19477 21597 19211 677 20980 1278 3157 4127 4551 7031
1987 852 3739 5681 2430 9140 21889 23688 18524 752 22526 1226 2754 4314 6206 7807
1992 649 2497 5023 2628 9308 23425 27042 19036 838 25576 1191 2962 2547 7954 6950
1997 635 3193 4797 2277 10967 26998 29096 20292 973 27561 1233 3326 4766 8647 7958
2002 727 4604 5288 2773 8798 30688 32418 23404 1136 30486 1373 3413 6019 11004 8131
2007 975 5937 6223 4797 12779 34435 36126 29796 1391 33693 1441 3822 7446 12570 9066
Afghanistan
Albania
Algeria
Angola
Argentina
Australia
Austria
Bahrain
Bangladesh
Belgium
Benin
Bolivia
Bosnia and Herzegovina
Botswana
Brazil
country
35000
30000
25000
20000
15000
10000
5000

Correlation Heatmap

In [32]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20

cmap = sns.diverging_palette(230, 20, as_cmap=True)
sns.heatmap(gdpPercap_heatmap_df.corr().iloc[0:10,0:10], annot=True, fmt=".3f", linewidths=.5,cmap='winter')
plt.show()
```



Grouped Visualizations

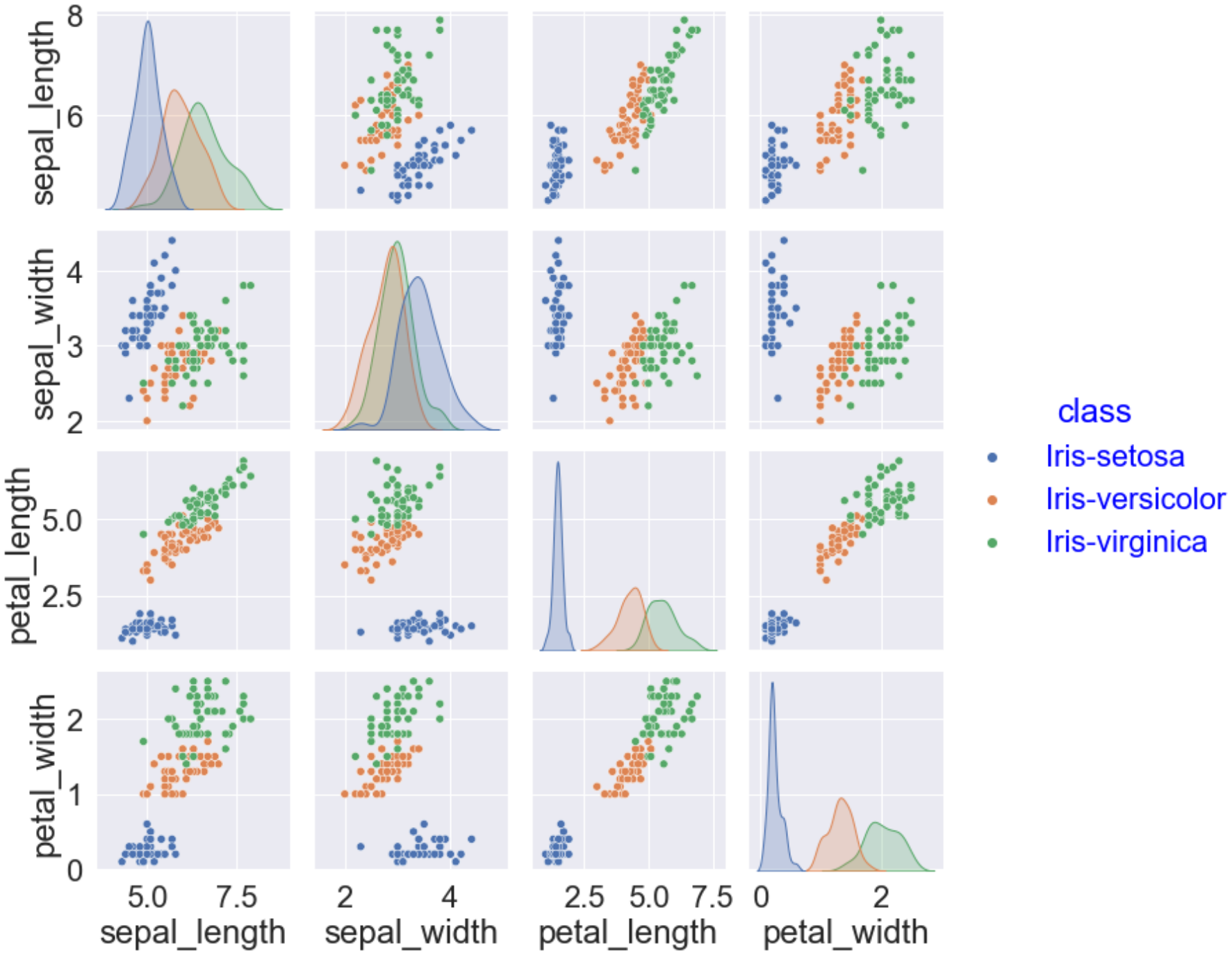
Pairplot

In [33]:
```
iris_df=pd.read_csv('iris.csv')
iris_df.head()
```

Out[33]:

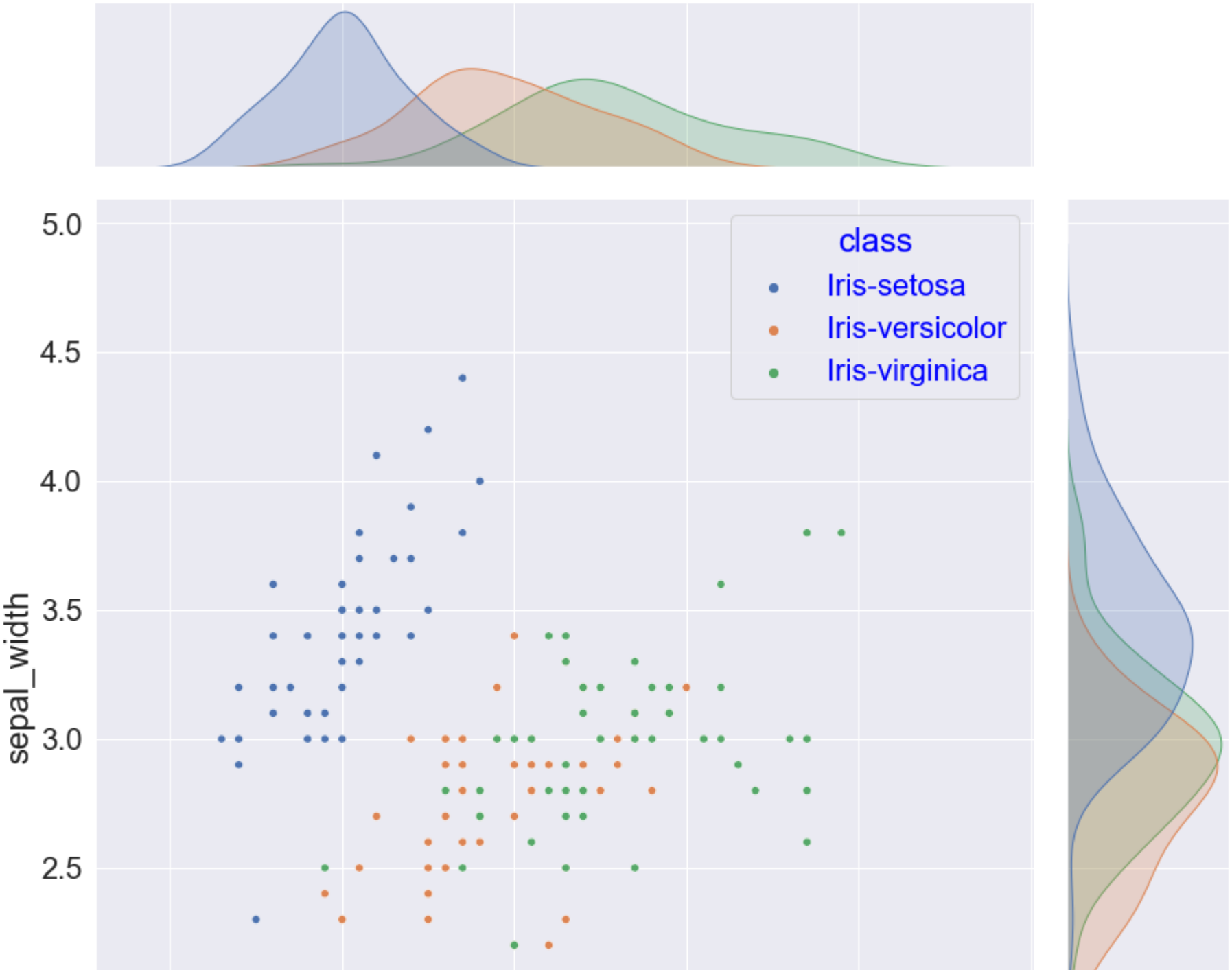
	sepal_length	sepal_width	petal_length	petal_width	class
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

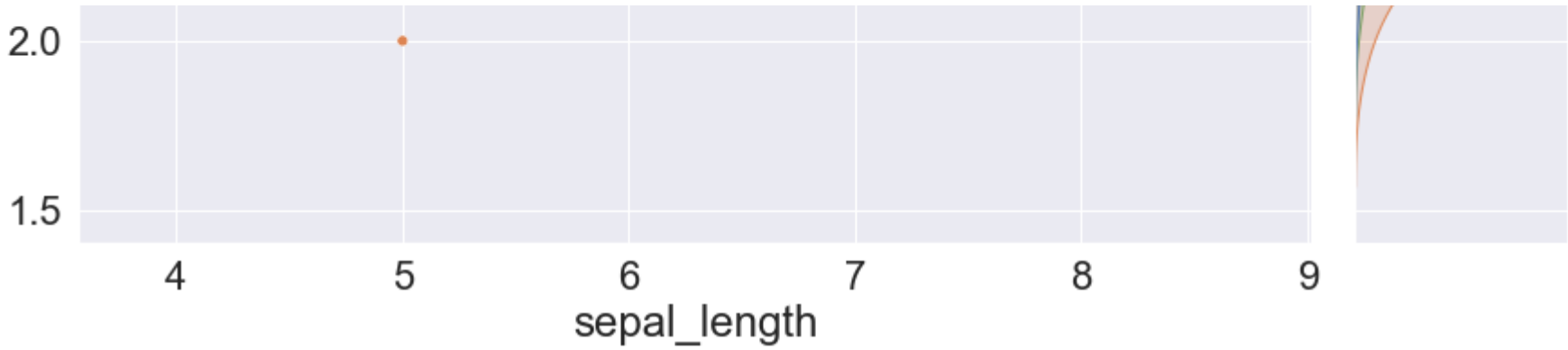
In [34]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20

sns.pairplot(iris_df,hue='class')
plt.show()
```


sepal_length
sepal_width
petal_length
petal_width
8
6
4
3
2
5.0
2.5
2
1
0
5.0
7.5
2
4
2.5
5.0
7.5
0
2
class
Iris-setosa
Iris-versicolor
Iris-virginica

Joint plot

In [49]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20

sns.jointplot(data=iris_df,x='sepal_length',y='sepal_width',hue='class',height=13)
plt.show()
```

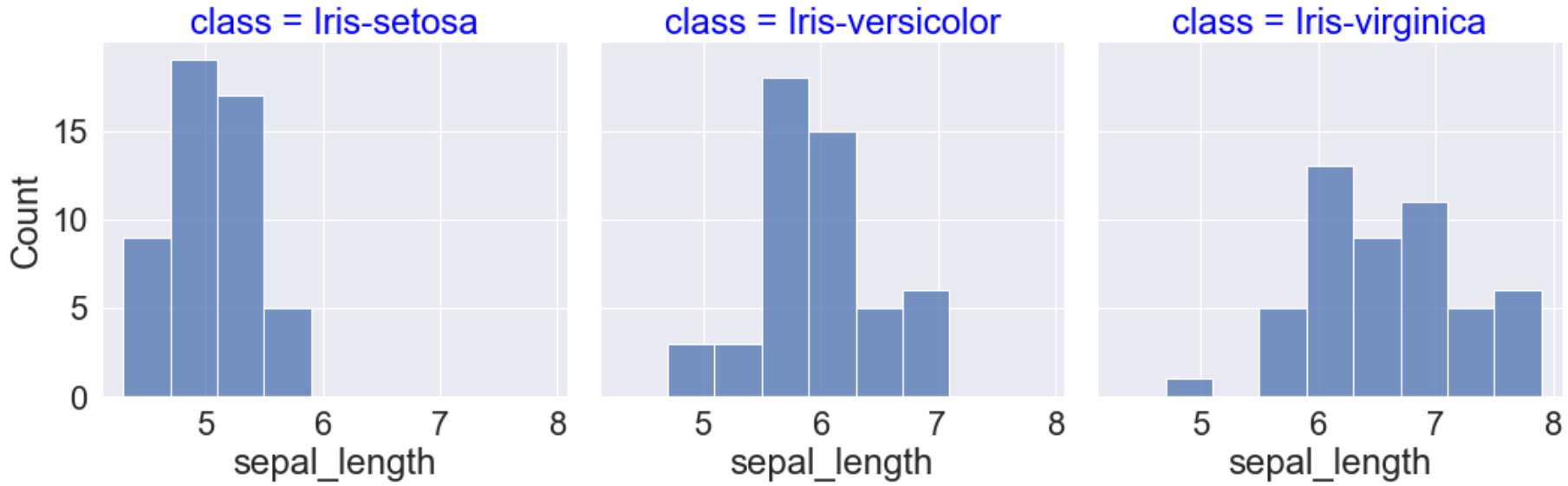

class
Iris-setosa
Iris-versicolor
Iris-virginica
sepal_width
5.0
4.5
4.0
3.5
3.0
2.5



Distplot

In [60]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20

sns.displot(iris_df, x="sepal_length", col="class", height=5, facet_kws=dict(margin_titles=True))
plt.plot()
```

Out[60]: []



Distribtuion Plot

In [35]:
```
iris_df=pd.read_csv('iris.csv')
iris_df.head()
```

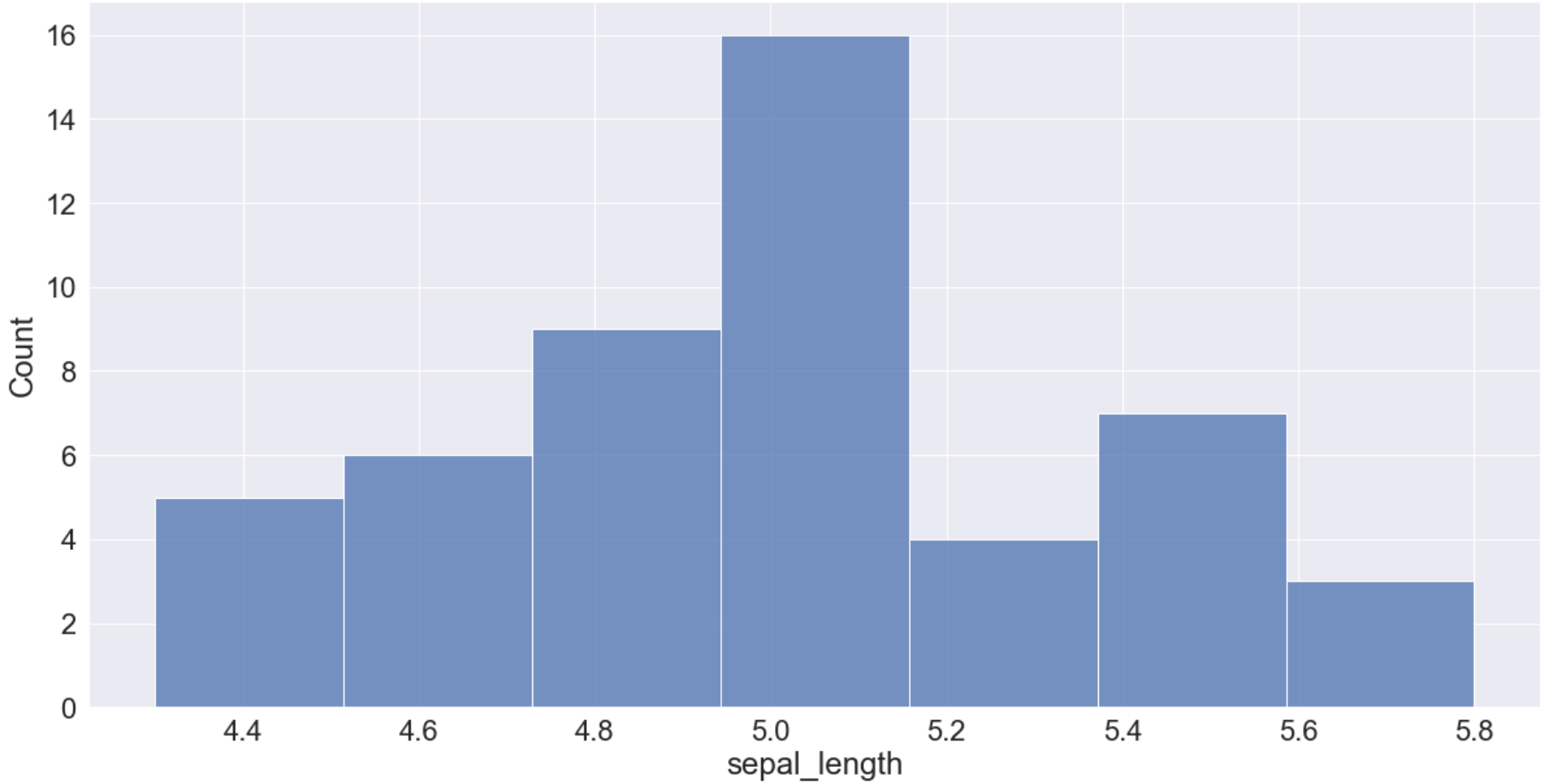
Out[35]:

	sepal_length	sepal_width	petal_length	petal_width	class
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

Histogram

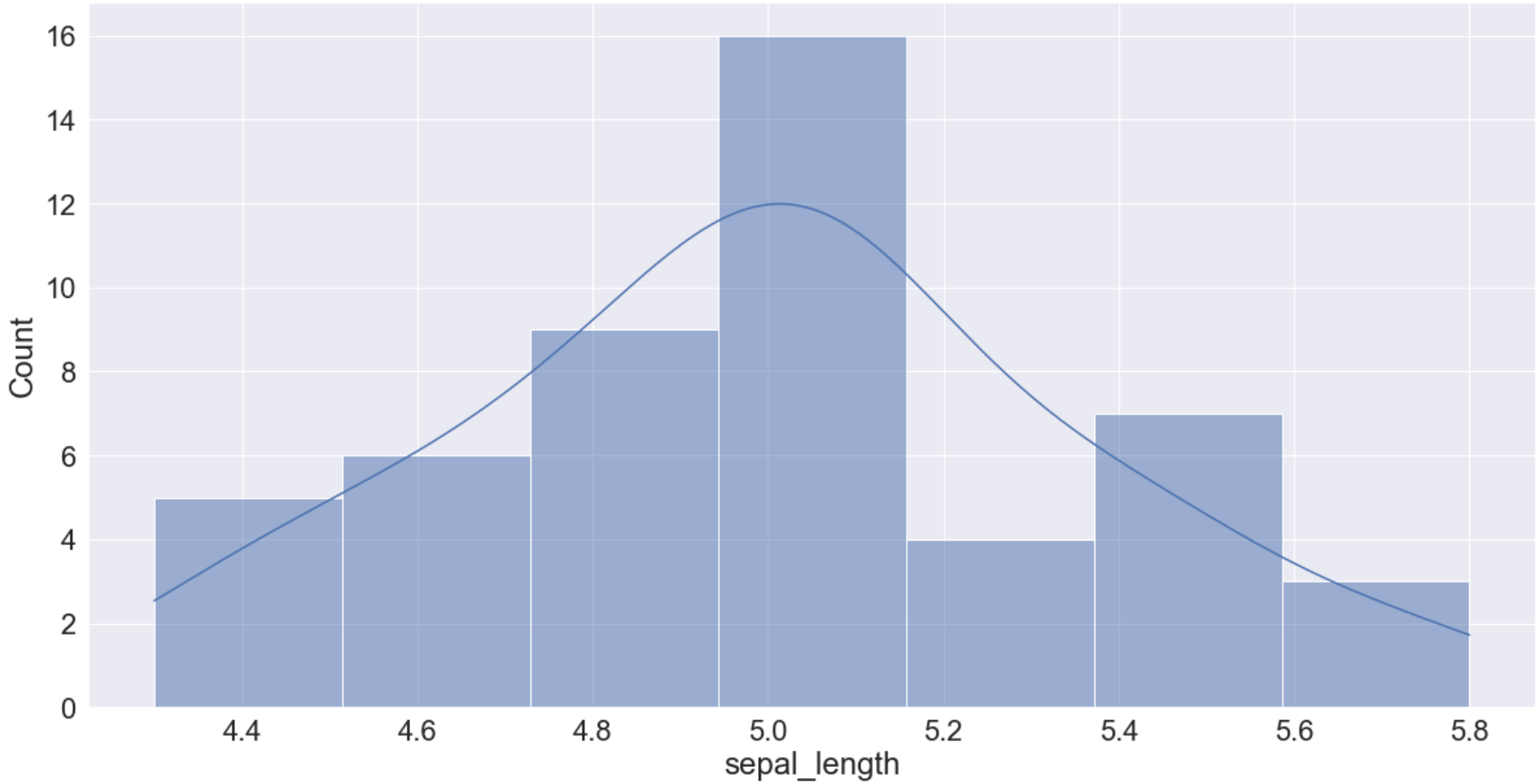
Plotting univariate histogram

In [36]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20

sns.histplot(iris_df[iris_df['class']=='Iris-setosa'], x='sepal_length')
plt.show()
```



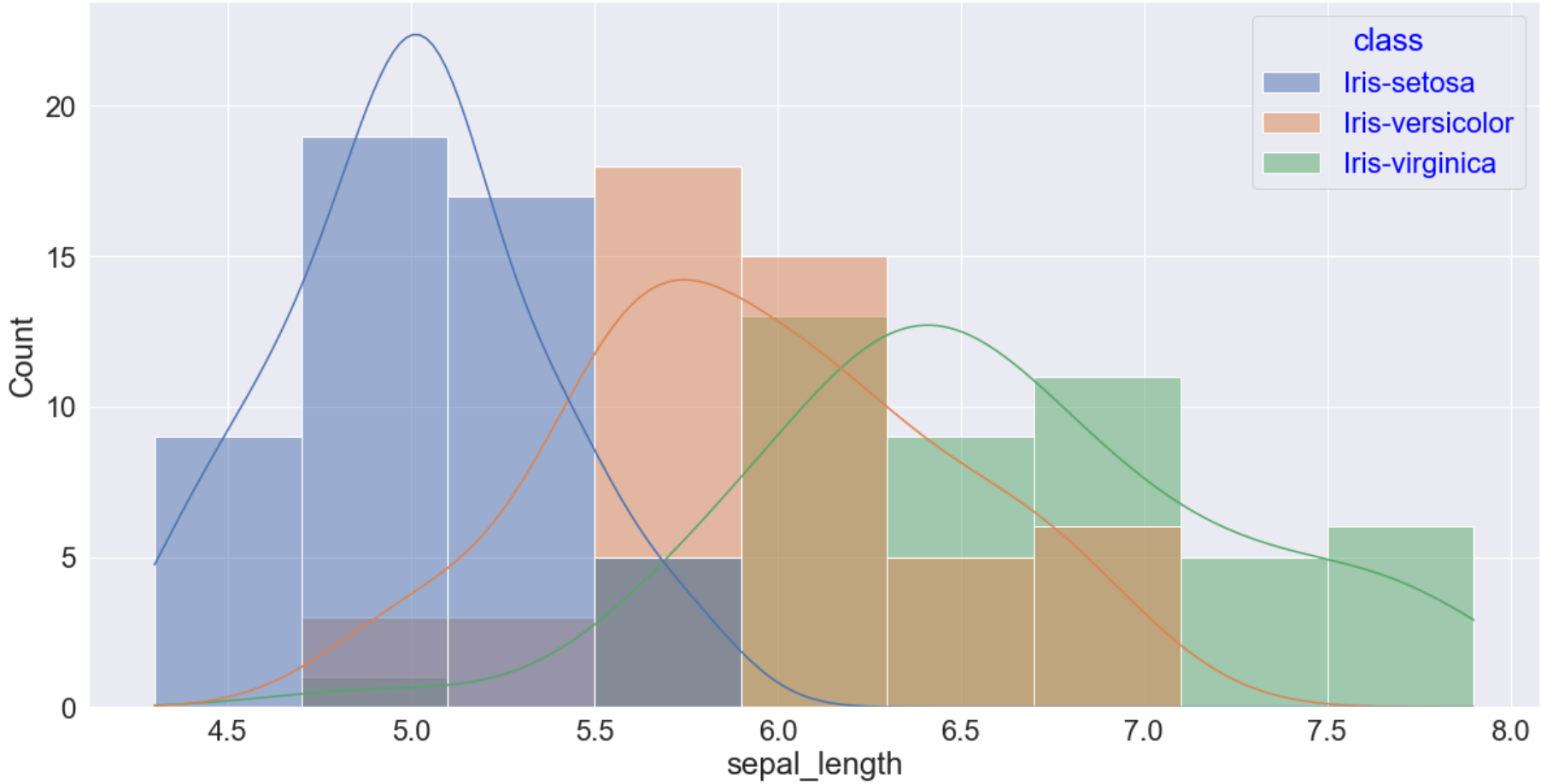
Adding kernel density estimate (kde) to histogram

In [37]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20

sns.histplot(iris_df[iris_df['class']=='Iris-setosa'], x='sepal_length',kde=True)
plt.show()
```



Plotting multivariate histogram

In [38]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20

sns.histplot(iris_df, x='sepal_length',kde=True, hue='class')
plt.show()
```

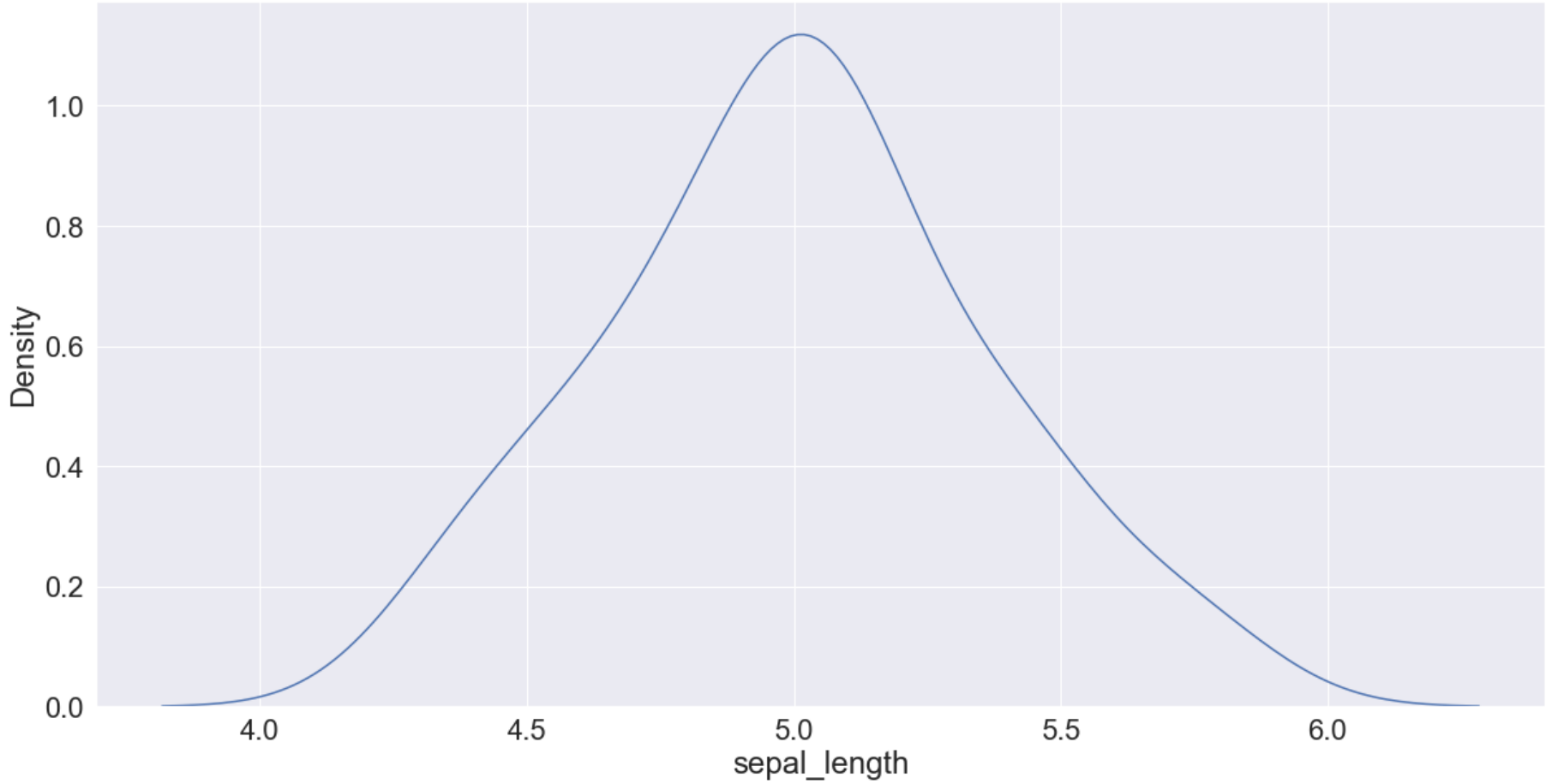


kernel density estimate (KDE) plot

A kernel density estimate (KDE) plot is a method for visualizing the distribution of observations in a dataset, analagous to a histogram. KDE represents the data using a continuous probability density curve in one or more dimensions.

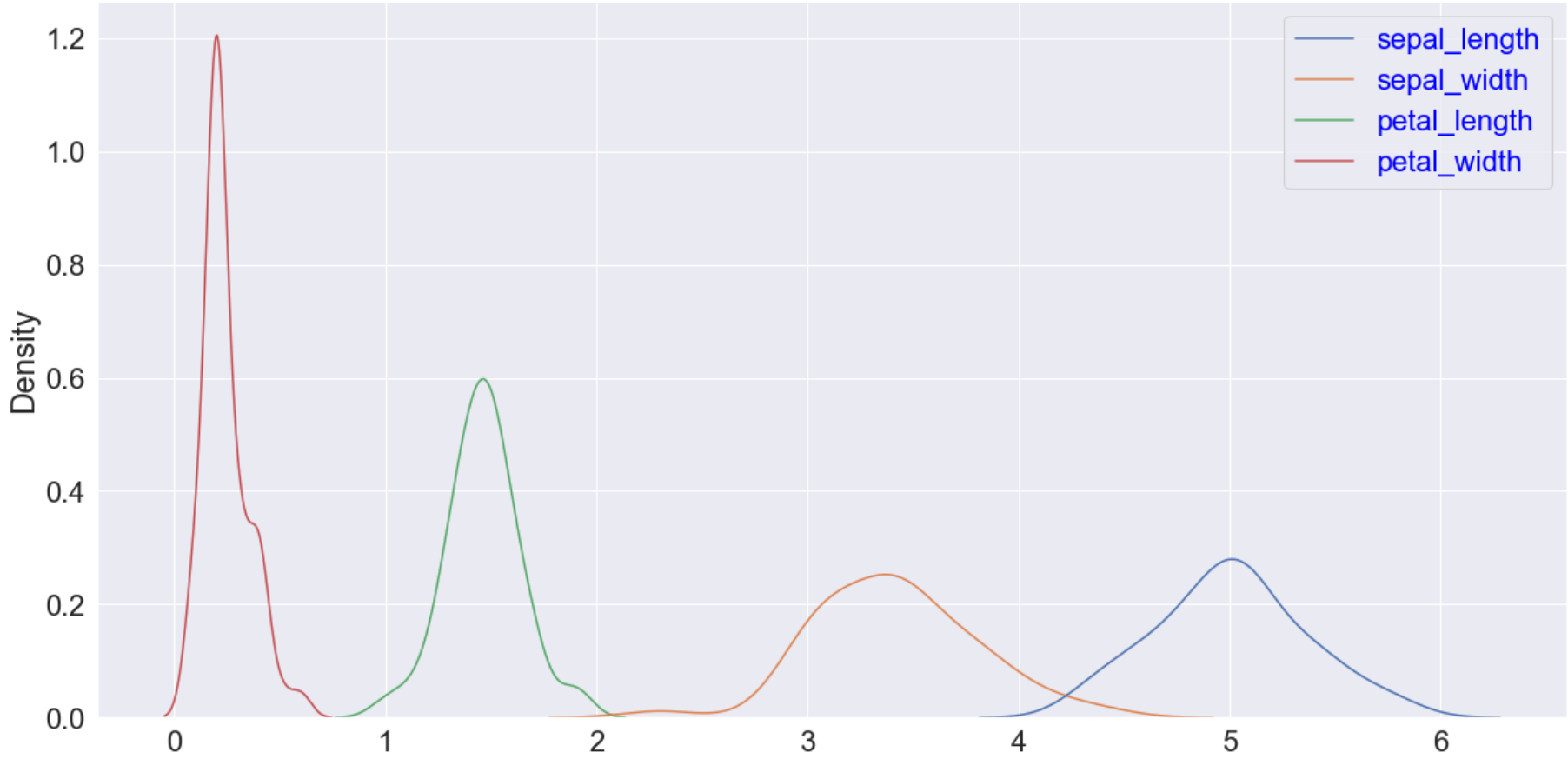
Simple univariate kde distribution

In [39]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20

sns.kdeplot(data=iris_df[iris_df['class']=='Iris-setosa'], x='sepal_length')
plt.show()
```



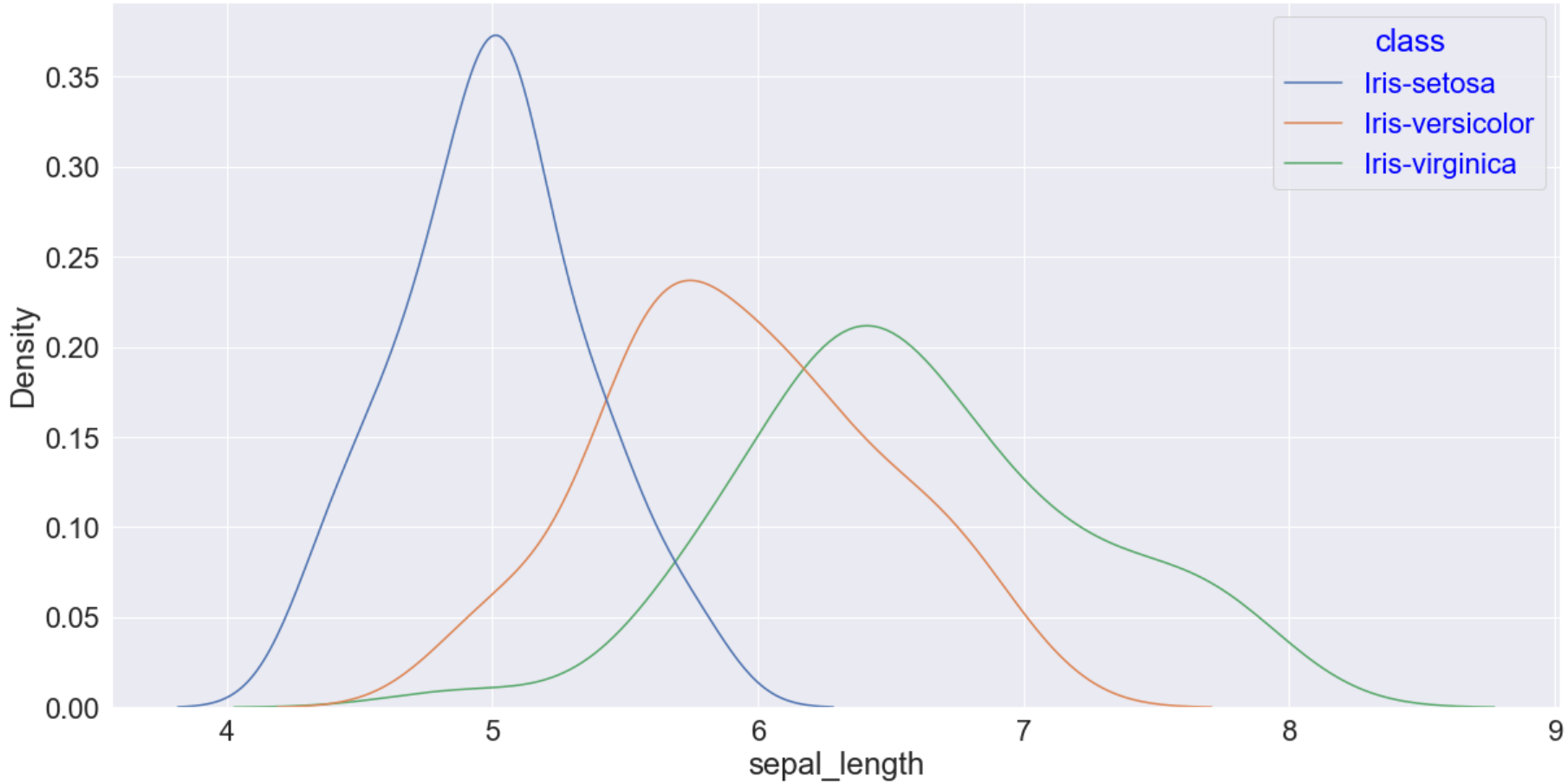
kde plot for all variables

In [40]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20

sns.kdeplot(data=iris_df[iris_df['class']=='Iris-setosa'])
plt.show()
```



kde plot for different species

In [41]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20

sns.kdeplot(data=iris_df, x='sepal_length',hue='class')
plt.show()
```



kde plot with color fill

In [42]:
```
plt.rcParams['axes.labelsize'] = 20
sns.set(font_scale = 2)
plt.rcParams['text.color'] = 'blue'
plt.rcParams['font.size'] = 20

sns.kdeplot(data=iris_df, x="sepal_length", hue="class",
   fill=True, common_norm=False, palette="crest",
   alpha=.5, linewidth=0,)
plt.show()
```