Import data from https://www.worldometers.info/ (https://www.worldometers.info/)

In [106]:
```
import pandas as pd
import numpy as np
from bs4 import BeautifulSoup as bs
import matplotlib.pyplot as plt
import plotly.express as px
import seaborn as sns
import requests
```

In [107]:
```
header = {"User-Agent": "Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/50.0.2661.75 Safari/537.36","X-Requested-With": "XMLHttpRequest"}
```

Import world populaion data

In [108]:
```
url="https://www.worldometers.info/world-population/population-by-country/"
```

In [109]:
```
page = requests.get(url, headers=header)
wp=pd.read_html(page.text)[0]
```

In [110]:
```
wp.head()
```

Out[110]:

	#	Country (or dependency)	Population (2020)	Yearly Change	Net Change	Density (P/Km²)	Land Area (Km²)	Migrants (net)	Fert. Rate	Med. Age	Urban Pop %	World Share
0	1	China	1439323776	0.39 %	5540090	153	9388211	-348399.0	1.7	38	61 %	18.47 %
1	2	India	1380004385	0.99 %	13586631	464	2973190	-532687.0	2.2	28	35 %	17.70 %
2	3	United States	331002651	0.59 %	1937734	36	9147420	954806.0	1.8	38	83 %	4.25 %
3	4	Indonesia	273523615	1.07 %	2898047	151	1811570	-98955.0	2.3	30	56 %	3.51 %
4	5	Pakistan	220892340	2.00 %	4327022	287	770880	-233379.0	3.6	23	35 %	2.83 %

Import detailed data for each country

In [111]:
```
url="https://www.worldometers.info/world-population/population-by-country/"
page = requests.get(url, headers=header)
soup=bs(page.content,'html.parser')

links=soup.select("div[class='col-md-12'] div[class='table-responsive'] tbody tr td:nth-child(2) a")[:11]

pop_data=pd.DataFrame()
for link in links:
    country=link.text
    href=link["href"]
    url2="https://www.worldometers.info/"+link["href"]
    page = requests.get(url2, headers=header)
    pop=pd.concat([pd.read_html(page.text)[2],pd.read_html(page.text)[1]],ignore_index=True).sort_values("Year",ascending=False)
    pop=pop.iloc[:,:-1]
    pop["Country"]=country
    pop_data=pd.concat([pop_data,pop],ignore_index=True)
```

In [112]:
```
pop_data.head(5)
```

Out[112]:

	Year	Population	Yearly % Change	Yearly Change	Migrants (net)	Median Age	Fertility Rate	Density (P/Km²)	Urban Pop %	Urban Population	Country's Share of World Pop	World Population	Country
0	2050.0	1.402405e+09	-0.38 %	-5381416.0	NaN	47.6	1.69	149.0	77.9 %	1.091948e+09	14.41 %	9.735034e+09	China
1	2045.0	1.429312e+09	-0.27 %	-3943835.0	-311081.0	47.2	1.69	152.0	76.4 %	1.092037e+09	15.07 %	9.481803e+09	China
2	2040.0	1.449031e+09	-0.17 %	-2410321.0	-311801.0	46.3	1.69	154.0	74.8 %	1.083464e+09	15.75 %	9.198847e+09	China
3	2035.0	1.461083e+09	-0.04 %	-651426.0	-311798.0	45.0	1.69	156.0	72.5 %	1.059619e+09	16.44 %	8.887524e+09	China
4	2030.0	1.464340e+09	0.09 %	1286382.0	-352100.0	42.6	1.69	156.0	69.5 %	1.017847e+09	17.13 %	8.548487e+09	China

Import life expectancy data

In [113]:
```
url="https://www.worldometers.info/demographics/life-expectancy/"
page = requests.get(url, headers=header)
le=pd.read_html(page.text)[0]
```

In [114]:
```
le.head(5)
```

Out[114]:

	#	Country	Life Expectancy (both sexes)	Females Life Expectancy	Males Life Expectancy
0	1	Hong Kong	85.29	88.17	82.38
1	2	Japan	85.03	88.09	81.91
2	3	Macao	84.68	87.62	81.73
3	4	Switzerland	84.25	86.02	82.42
4	5	Singapore	84.07	86.15	82.06

Import GDP data

In [115]:
```
url="https://www.worldometers.info/gdp/gdp-by-country/"
page=requests.get(url, headers=header)
gdp=pd.read_html(page.text)[0]
```

In [116]:
```
gdp.head()
```

Out[116]:

	#	Country	GDP (nominal, 2017)	GDP (abbrev.)	GDP growth	Population (2017)	GDP per capita	Share of World GDP
0	1	United States	$19,485,394,000,000	$19.485 trillion	2.27%	325084756	$59,939	24.08%
1	2	China	$12,237,700,479,375	$12.238 trillion	6.90%	1421021791	$8,612	15.12%
2	3	Japan	$4,872,415,104,315	$4.872 trillion	1.71%	127502725	$38,214	6.02%
3	4	Germany	$3,693,204,332,230	$3.693 trillion	2.22%	82658409	$44,680	4.56%
4	5	India	$2,650,725,335,364	$2.651 trillion	6.68%	1338676785	$1,980	3.28%

Import detailed DGP data

In [117]:
```
url="https://www.worldometers.info/gdp/gdp-by-country/"
page = requests.get(url, headers=header)
soup=bs(page.content,'html.parser')

links=soup.select("div[class='container'] div[class='col-md-12'] tbody tr td:nth-child(2) a")[:11]

gdp_data=pd.DataFrame()
for link in links:
    country=link.text
    href=link["href"]
    url2="https://www.worldometers.info/"+link["href"]
    page = requests.get(url2, headers=header)
    df=pd.read_html(page.text)[1]
    df["country"]=country
    gdp_data=pd.concat([gdp_data,df],ignore_index=True)
```

In [118]:
```
gdp_data.head()
```

Out[118]:

	Year	GDP Nominal (Current USD)	GDP Real (Inflation adj.)	GDP change	GDP per capita	Pop. change	Population	country
0	2017	$19,485,394,000,000	$17,348,625,758,200	2.27%	$53,366	0.64 %	325084756	United States
1	2016	$18,707,189,000,000	$16,972,347,070,400	1.49%	$52,543	0.67 %	323015995	United States
2	2015	$18,219,297,000,000	$16,710,458,234,000	2.86%	$52,077	0.69 %	320878310	United States
3	2014	$17,521,747,000,000	$16,242,525,613,600	2.57%	$50,969	0.72 %	318673411	United States
4	2013	$16,784,851,000,000	$15,853,794,839,100	1.68%	$50,107	0.75 %	316400538	United States

Success! All necessary data has been scraped from worldometers.com!

here are the dataframes:

wp - world population without details

pop_data - world population by country and year

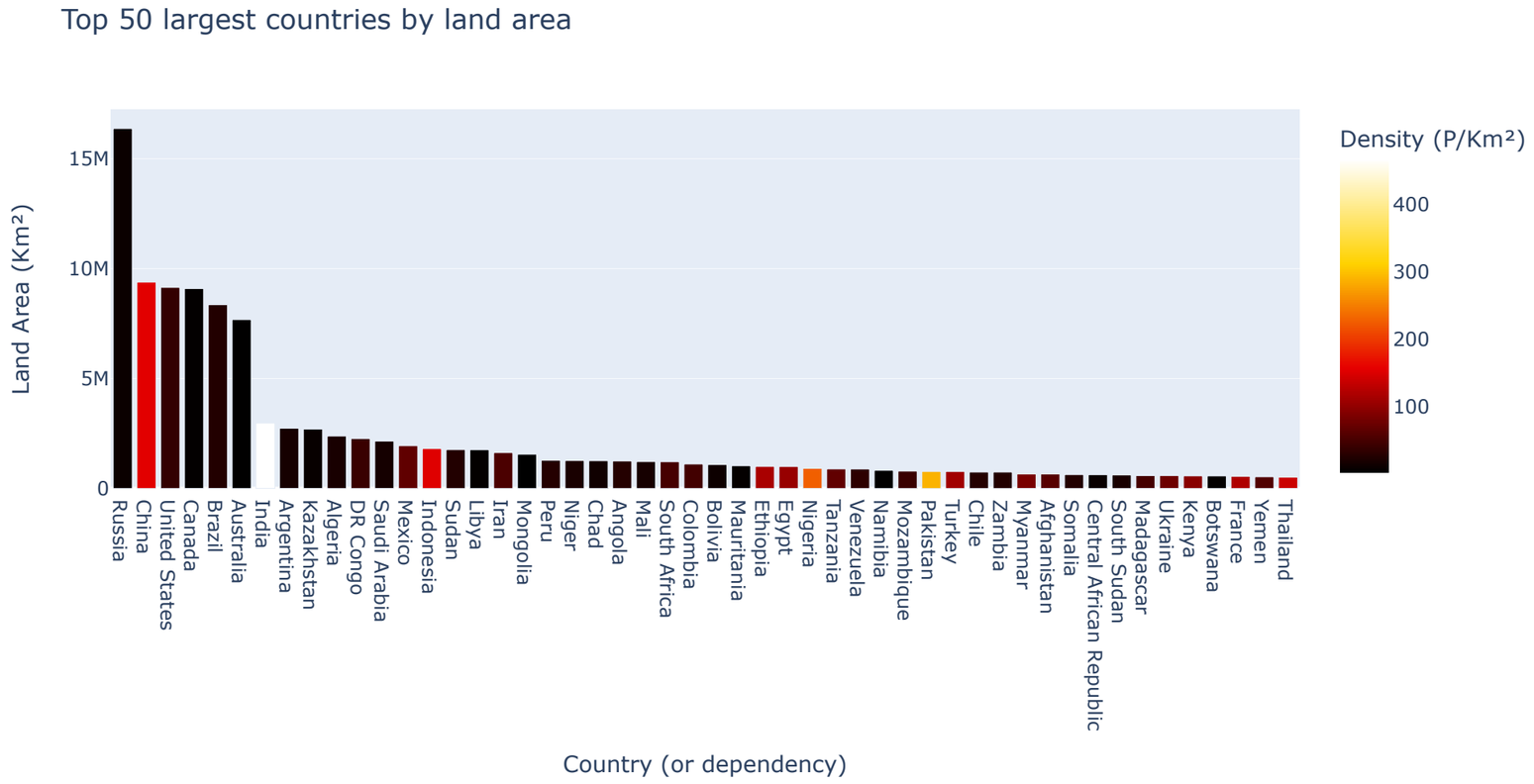
le - life expectancy

gdp - world GDP without details

gdp_data - world GDP by country and year

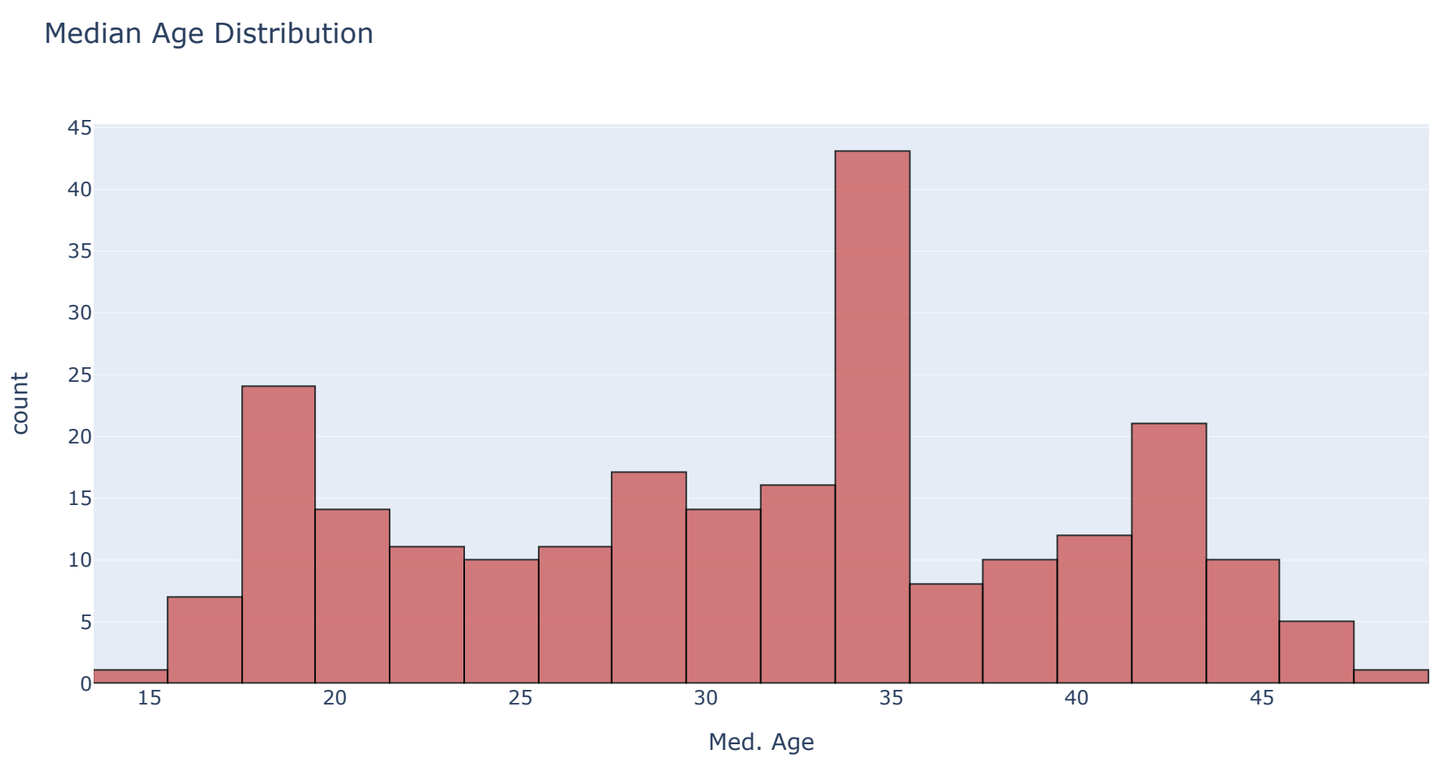
In [119]:
```
wp=wp.rename(columns={"Urban Pop %":"Urban Pop"})
wp=wp.replace(["N.A.",np.NaN],regex=True)
wp["Yearly Change"]=wp["Yearly Change"].str.replace("%","",regex=True).astype(float)
wp["Urban Pop"]=wp["Urban Pop"].str.replace("%","",regex=True)
wp["World Share"]=wp["World Share"].str.replace("%","",regex=True).astype(float)
```

In [120]:
```
fig=px.bar(wp.sort_values("Land Area (Km²)",ascending=False)[:50],x="Country (or dependency)",y="Land Area (Km²)",barmode="group",
       color="Density (P/Km²)",
       title="Top 50 largest countries by land area",
           color_continuous_scale="hot"
      )
fig.show()
```



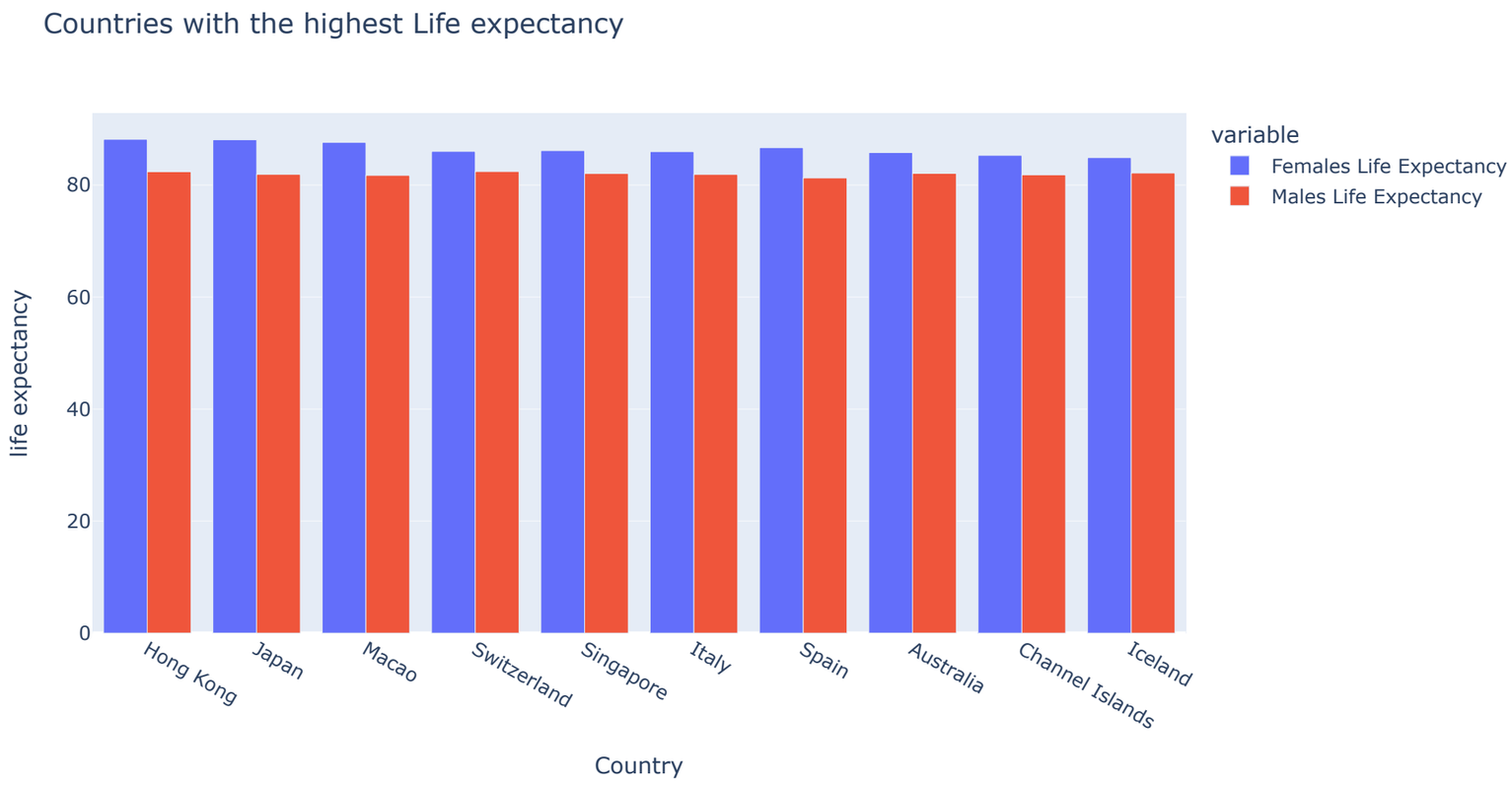
In [121]:
```
Density=[]
for i in wp["Density (P/Km²)"]:
    if i<100:
        Density.append("low")
    elif i>=100 and i<200:
        Density.append("average")
    else:
        Density.append("High")
wp["Density"]=Density
```

In [122]:
```
wp["Med. Age"]=wp["Med. Age"].astype(float)

fig=px.histogram(
    wp,"Med. Age",
    title="Median Age Distribution",
    nbins=20,
    #histnorm='probability density',
    color_discrete_sequence=['indianred'],
    opacity=0.8,
    #color="Density"
    #log_y=True
                )
fig.update_traces(marker_line_width=1,marker_line_color="black")
fig.show()
```

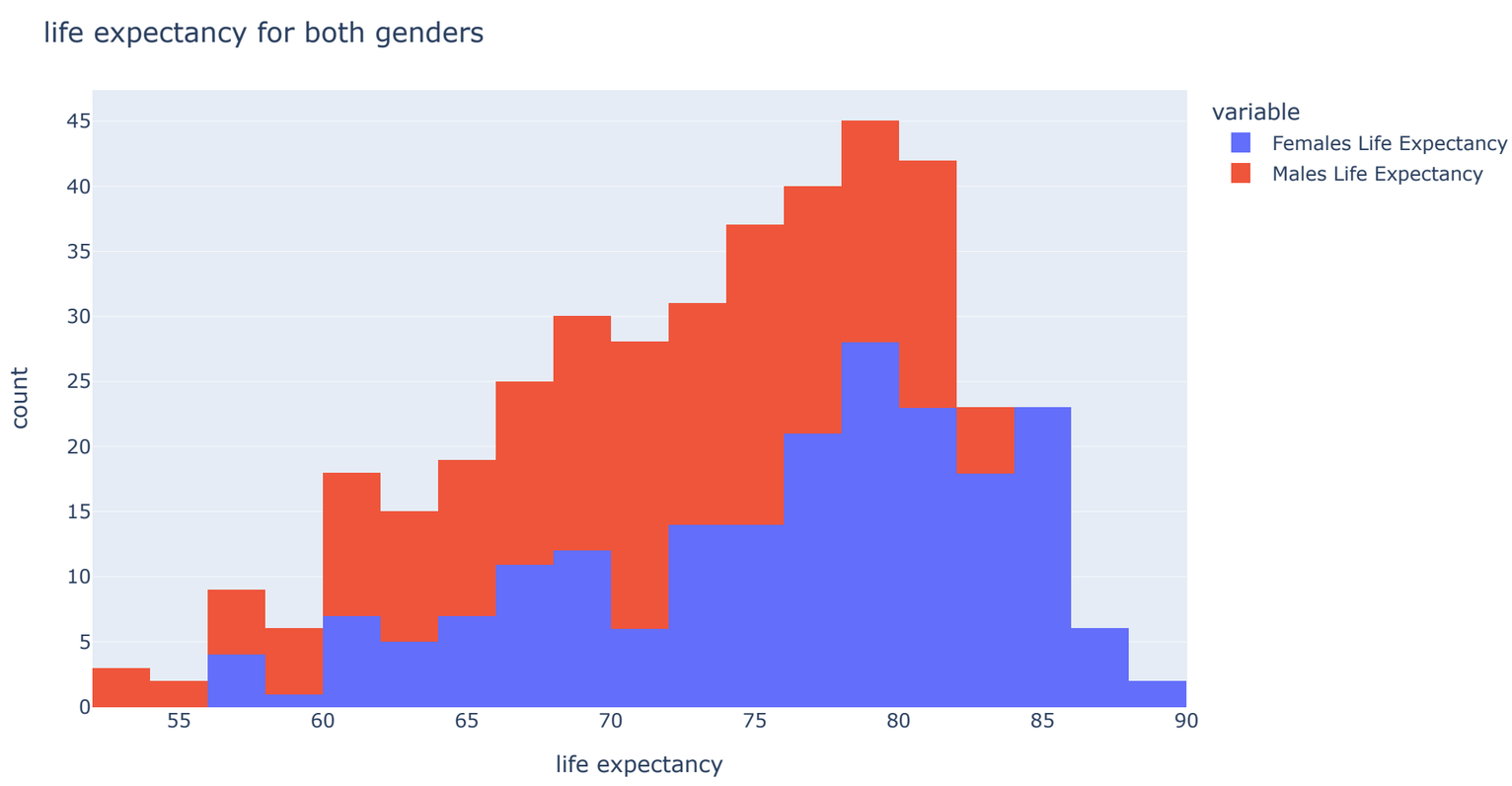


In [123]:
```
countries=pop_data.Country.unique()[:9]
fig,axes=plt.subplots(3,3,figsize=(15,12))
colors=list(plt.get_cmap("hot")(np.linspace(0,0.7,len(countries))))

for country,ax,c in zip(countries,axes.ravel(),colors):
    filtered=pop_data[pop_data.Country==country].sort_values("Year")
    filtered.plot(ax=ax,kind="line",x="Year",y="Population",
                  xlabel="",legend=False,fontsize=8,color=c)
    ax.set_title(country,size=11)
    ax.set_ylabel("Popualation")


    ax2=ax.twinx()
    ax2.plot(filtered["Year"],filtered["Migrants (net)"])
    ax2.set_ylabel("migrants")

plt.subplots_adjust(hspace=0.4,wspace=0.4)

fig.suptitle('Population and migrants change over time for different countries', size=15,fontweight="bold")
plt.show()
```

In [124]:
```
fig=px.bar(le.sort_values("Life Expectancy (both sexes)",ascending=False)[:10],
           x="Country",y=["Females Life Expectancy","Males Life Expectancy"],
          barmode="group",
          title=("Countries with the highest Life expectancy"),
          color_continuous_scale="hot",
          )
fig.update_layout(yaxis_title="life expectancy")
fig.show()
```



In [125]:
```
fig=px.histogram(le,x=["Females Life Expectancy","Males Life Expectancy"],nbins=20)
#fig.update_traces(marker_line_width=1,marker_line_color="black")
fig.update_layout(title="life expectancy for both genders",xaxis_title="life expectancy")

fig.show()
```



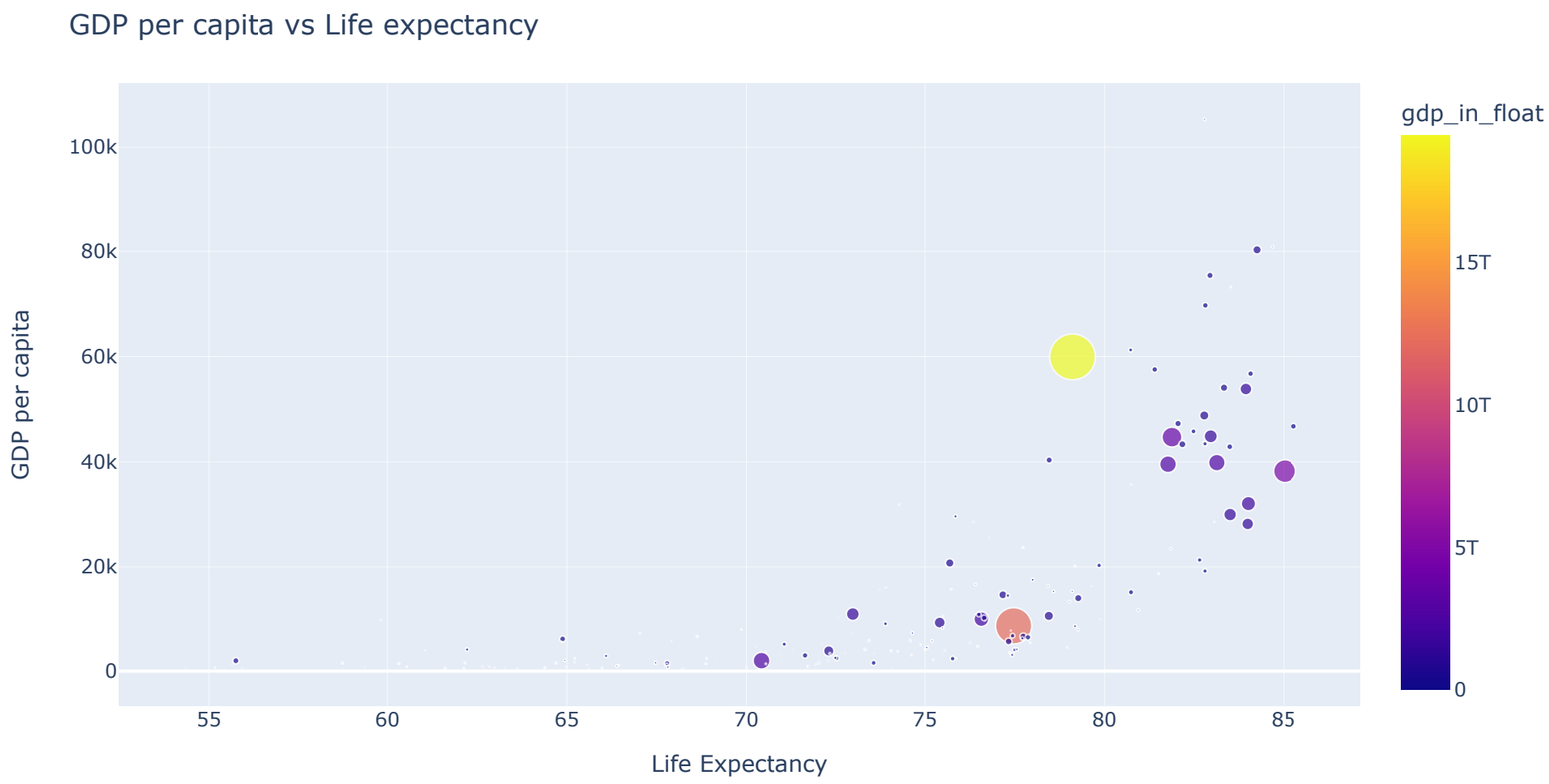
Merge GDP and LE data (on="Country")

In [127]:
```
gdple=gdp.merge(le,on="Country")
```

convert GDP columns to float

In [128]:
```
gdp_in_float=[]
for i in gdple["GDP (abbrev.)"]:
    if i.split("$")[1].split(" ")[1]=="trillion":
        gdp_in_float.append(float(i.split("$")[1].split(" ")[0])*10**12)
    elif i.split("$")[1].split(" ")[1]=="billion":
        gdp_in_float.append(float(i.split("$")[1].split(" ")[0])*10**9)
    elif i.split("$")[1].split(" ")[1]=="million":
        gdp_in_float.append(float(i.split("$")[1].split(" ")[0])*10**6)
    else:
        gdp_in_float.append(None)
gdple["gdp_in_float"]=gdp_in_float


gdple['GDP per capita']=gdple["GDP per capita"].apply(lambda x :float(x.split("$")[1].replace(",","")))
```

In [129]:
```
fig=px.scatter(gdple,x="Life Expectancy (both sexes)",y="GDP per capita",size="gdp_in_float",color="gdp_in_float",hover_name="Country")
fig.update_layout(title="GDP per capita vs Life expectancy",xaxis_title="Life Expectancy")
fig.show()
print("Correlation coefficient between GDP per capita and Life expectancy is ", round(gdple["GDP per capita"].corr(gdple["Life Expectancy (both sexes)"]),2))
```

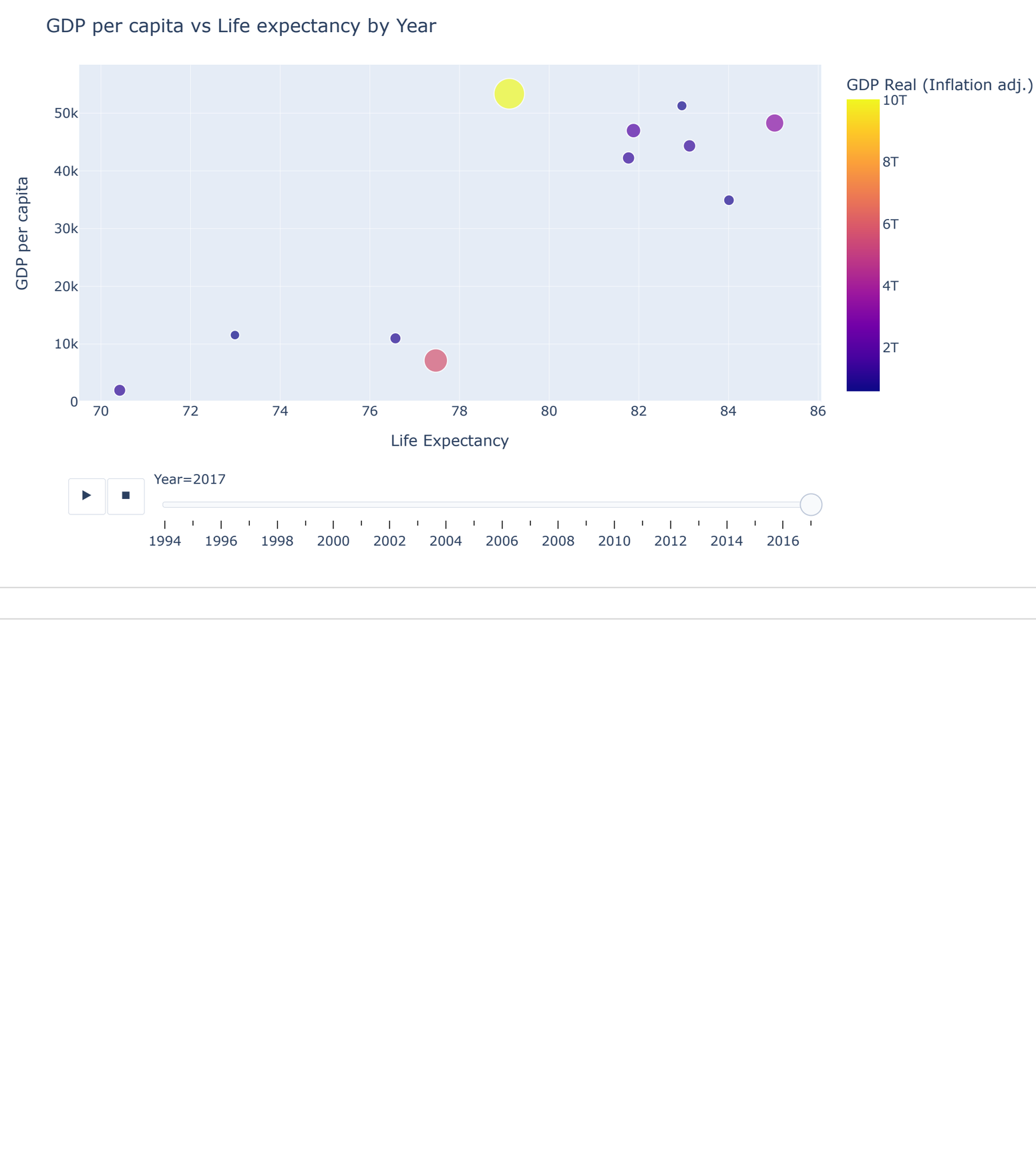



```
Correlation coefficient between GDP per capita and Life expectancy is  0.66
```

Plot interactive scatter plot of life expectancy vs GDP per capita changing year by year

In [130]:
```
gdpdatale=gdp_data.merge(le,left_on="country",right_on="Country")

gdpdatale["GDP per capita"]=gdpdatale["GDP per capita"].apply(lambda x :float(x.split("$")[1].replace(",","")))
gdpdatale["GDP Real (Inflation adj.)"]=gdpdatale["GDP Real (Inflation adj.)"].apply(lambda x :float(x.split("$")[1].replace(",","")))
```

In [131]:
```
fig=px.scatter(gdpdatale.sort_values(["Country","Year"]),x="Life Expectancy (both sexes)",y="GDP per capita",
               size="GDP Real (Inflation adj.)",color="GDP Real (Inflation adj.)",
               hover_name="Country",
               animation_frame="Year",
              range_y=(0,gdpdatale["GDP per capita"].max()+5*10**3))
fig.update_layout(title="GDP per capita vs Life expectancy by Year",xaxis_title="Life Expectancy")
fig.show()
```



In [ ]: