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

In [2]:
```
data = pd.read_csv("C:\\Users\\Mayank\\Downloads\\archive (1).zip")
```

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

Out[3]:

	Year	Country Name	GDP (current US$)	GDP per capita (current US$)	GDP growth (annual %)	Imports of goods and services (% of GDP)	Exports of goods and services (% of GDP)	Total reserves (includes gold, current US$)	Inflation, consumer prices (annual %)	P
0	1960	India	3.702988e+10	82	0.00	6.83	4.46	6.745366e+08	1.78	
1	1961	India	3.923244e+10	85	3.72	5.96	4.30	6.663571e+08	1.70	
2	1962	India	4.216148e+10	90	2.93	6.03	4.17	5.127918e+08	3.63	
3	1963	India	4.842192e+10	101	5.99	5.91	4.28	6.078625e+08	2.95	
4	1964	India	5.648029e+10	116	7.45	5.69	3.73	4.991451e+08	13.36	

In [4]:
```
data.columns
```

Out[4]:
```
Index(['Year', 'Country Name', 'GDP (current US$) ',
       ' GDP per capita (current US$) ', 'GDP growth (annual %)',
       'Imports of goods and services (% of GDP)',
       'Exports of goods and services (% of GDP)',
       ' Total reserves (includes gold, current US$) ',
       'Inflation, consumer prices (annual %)', 'Population, total',
       'Population growth (annual %)',
       'Life expectancy at birth, total (years)'],
      dtype='object')
```

In [5]:
```
data = data.drop("Country Name", axis = 1)
```

In [6]:
```
# The columns name of dataframe is length so we just rename them, "GDP (current US$
new_columns = {"GDP (current US$) " : "GDP", ' GDP per capita (current US$) ' : "G
              "Imports of goods and services (% of GDP)" : "Imports", "Exports of g
              " Total reserves (includes gold, current US$) ": "Total reserves", "
              "Population, total": "Population","Population growth (annual %)": "P
data = data.rename(columns = new_columns)
```

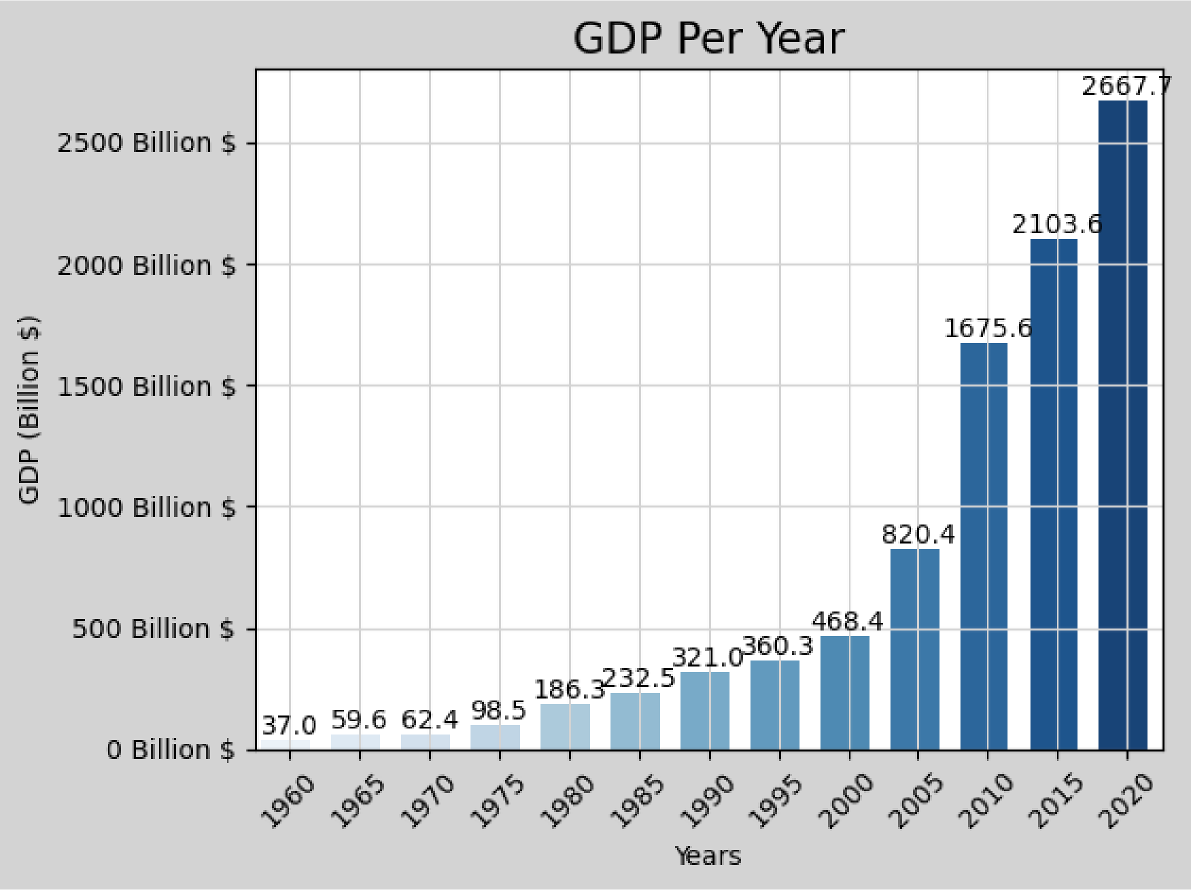
In [7]:
```
# matplotlib has various types of plot's styles. here i used 'seaborn-colorblind'.
plt.style.available
```

Out[7]:

```
['Solarize_Light2',
 '_classic_test_patch',
 '_mpl-gallery',
 '_mpl-gallery-nogrid',
 'bmh',
 'classic',
 'dark_background',
 'fast',
 'fivethirtyeight',
 'ggplot',
 'grayscale',
 'seaborn',
 'seaborn-bright',
 'seaborn-colorblind',
 'seaborn-dark',
 'seaborn-dark-palette',
 'seaborn-darkgrid',
 'seaborn-deep',
 'seaborn-muted',
 'seaborn-notebook',
 'seaborn-paper',
 'seaborn-pastel',
 'seaborn-poster',
 'seaborn-talk',
 'seaborn-ticks',
 'seaborn-white',
 'seaborn-whitegrid',
 'tableau-colorblind10']
```

In [16]:

```python
plt.style.use("seaborn-colorblind")
downsample_data = data[data["Year"] % 5 == 0].copy() # there are 60 rows in the dat
                                                     # so i divide into 12 bars and
downsample_data["GDP"] /= 1e9 # represent the number in billions.
ax = sns.barplot(x=downsample_data["Year"], y=downsample_data["GDP"], palette="Blu
formatter = ticker.StrMethodFormatter("{x:.0f} Billion $")
ax.yaxis.set_major_formatter(formatter)

ax.grid(True, color="lightgray")

bar_width = 0.7
for bar in ax.containers:
    plt.setp(bar, width=bar_width)

# in order to make plot more informative we can iterate in the given set of values
# add text annotations to every index. here ha = 'center' ensure that horizontal a
# alignment should be bottom.

for i, value in enumerate(downsample_data["GDP"]):
    ax.text(i, value + 0.1, f"{value:.1f}", ha="center", va="bottom")

fig = plt.gcf()
fig.set_facecolor('lightgray')

plt.xlabel("Years")
plt.ylabel("GDP (Billion $)")
plt.title("GDP Per Year", fontsize=16)

plt.xticks(rotation=45)

plt.tight_layout()
plt.show()
```

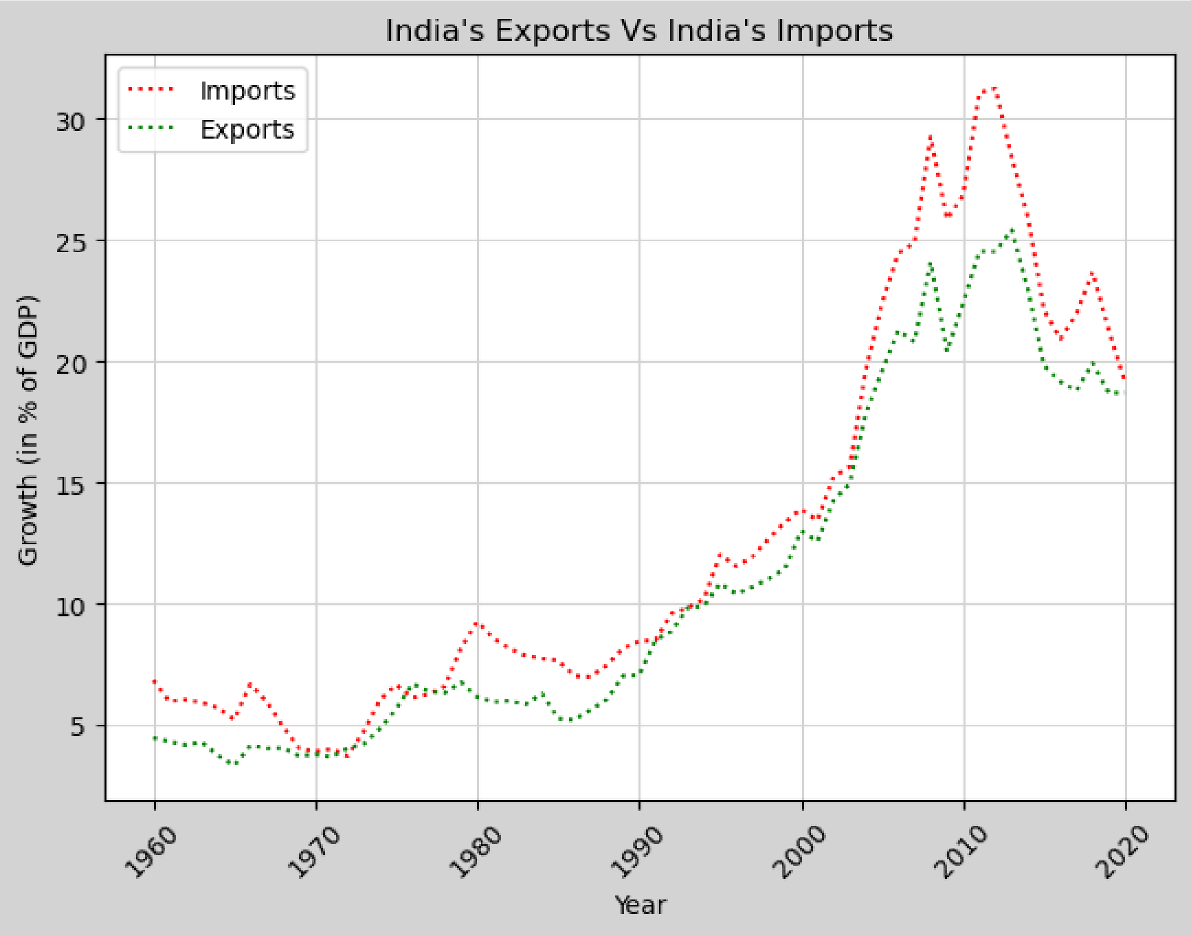


In [9]:
```
data.head()
```

Out[9]:

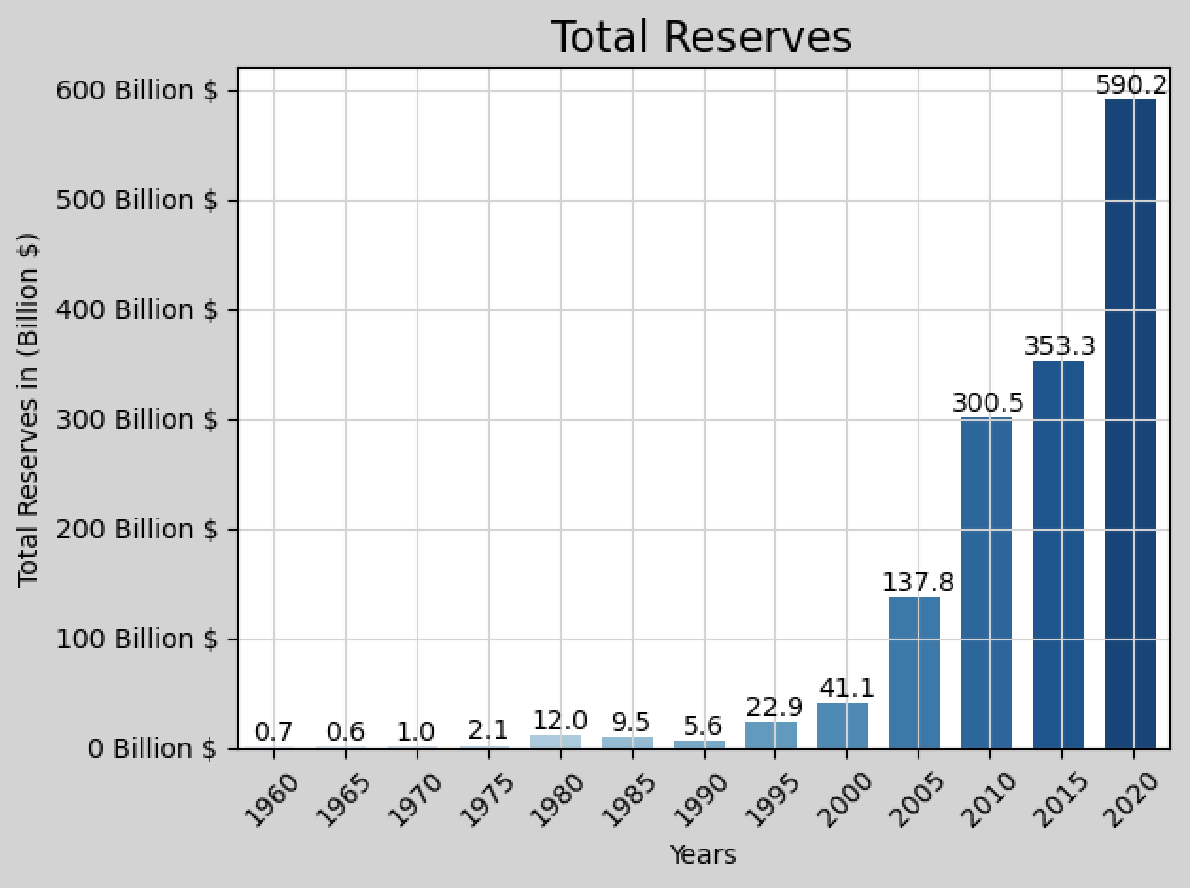
	Year	GDP	GDP per capita	GDP growth	Imports	Exports	Total reserves	Inflation	Population	Po
0	1960	3.702988e+10	82	0.00	6.83	4.46	6.745366e+08	1.78	445954579	
1	1961	3.923244e+10	85	3.72	5.96	4.30	6.663571e+08	1.70	456351876	
2	1962	4.216148e+10	90	2.93	6.03	4.17	5.127918e+08	3.63	467024193	
3	1963	4.842192e+10	101	5.99	5.91	4.28	6.078625e+08	2.95	477933619	
4	1964	5.648029e+10	116	7.45	5.69	3.73	4.991451e+08	13.36	489059309	

In [10]:
```
plt.style.use("seaborn-colorblind")
xaxis = data["Imports"]
yaxis = data["Exports"]
x     = data["Year"]
plt.plot(x,xaxis,color = "Red",linestyle = "dotted",label = "Imports")
plt.plot(x,yaxis,color = "Green",linestyle = "dotted",label = "Exports")
plt.grid(True,color = "lightgray")
fig = plt.gcf()
fig.set_facecolor("lightgray")
plt.xticks(rotation = 45)
plt.tight_layout()
plt.xlabel("Year")
plt.ylabel("Growth (in % of GDP)")
plt.title("India's Exports Vs India's Imports")
plt.legend()
plt.show()
```



In [17]:

```
plt.style.use("seaborn-colorblind")
downsample_data = data[data["Year"] % 5 == 0].copy()
downsample_data["Total reserves"] /= 1e9
ax = sns.barplot(x=downsample_data["Year"],y=downsample_data["Total reserves"],pal
formatter = ticker.StrMethodFormatter("{x:.0f} Billion $")
ax.yaxis.set_major_formatter(formatter)

ax.grid(True, color="lightgray")

bar_width = 0.7
for bar in ax.containers:
    plt.setp(bar, width=bar_width)

for i, value in enumerate(downsample_data["Total reserves"]):
    ax.text(i, value + 0.1, f"{value:.1f}", ha="center", va="bottom")

fig = plt.gcf()
fig.set_facecolor('lightgray')

plt.xlabel("Years")
plt.ylabel("Total Reserves in (Billion $)")
plt.title("Total Reserves", fontsize=16)

plt.xticks(rotation=45)

plt.tight_layout()
plt.show()
```



In [12]:

```
data.head()
```

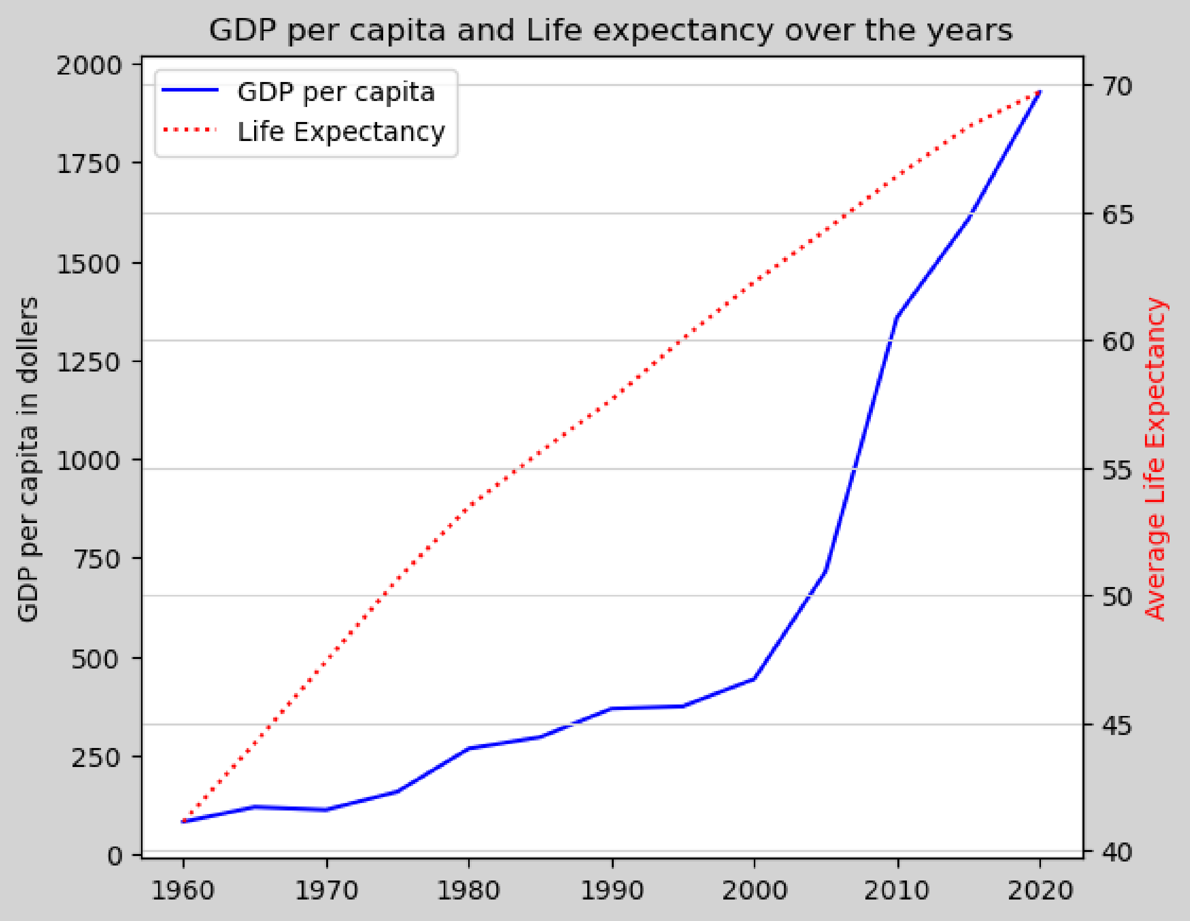
Out[12]:

	Year	GDP	GDP per capita	GDP growth	Imports	Exports	Total reserves	Inflation	Population	Po
0	1960	3.702988e+10	82	0.00	6.83	4.46	6.745366e+08	1.78	445954579	
1	1961	3.923244e+10	85	3.72	5.96	4.30	6.663571e+08	1.70	456351876	
2	1962	4.216148e+10	90	2.93	6.03	4.17	5.127918e+08	3.63	467024193	
3	1963	4.842192e+10	101	5.99	5.91	4.28	6.078625e+08	2.95	477933619	
4	1964	5.648029e+10	116	7.45	5.69	3.73	4.991451e+08	13.36	489059309	

In [13]:

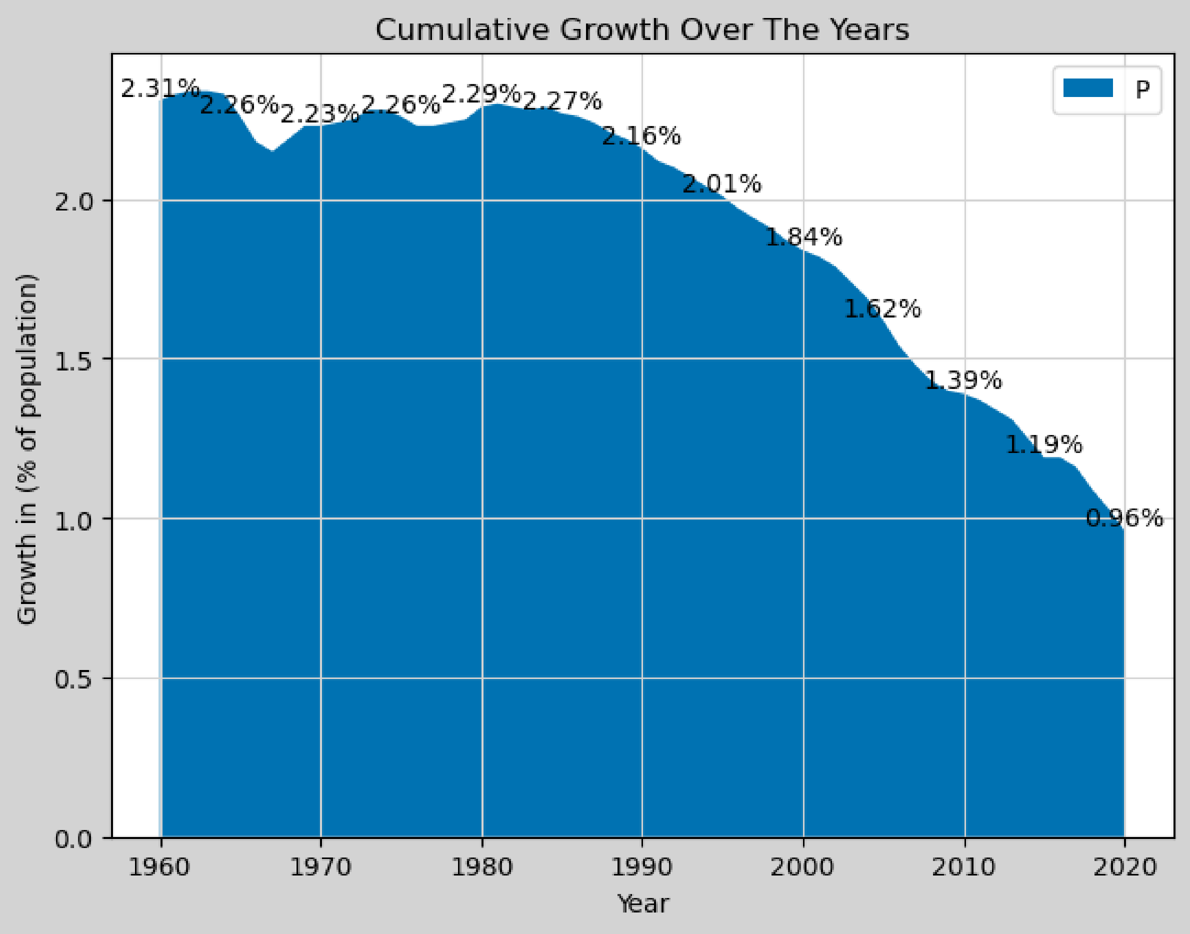
```
plt.style.use("seaborn-colorblind")
downsample_data = data[data["Year"] % 5 == 0]
x = downsample_data["Year"]
y = downsample_data["GDP per capita"]
z = downsample_data[" Life Expectancy"]
fig,ax1 = plt.subplots()
ax1.plot(x,y,color="Blue",linestyle="solid",label="GDP per capita")
ax1.set_ylabel("GDP per capita in dollers")

# we can show to 2 features on y axis correspond to only 1 x-axis in a single plot
# twinx() which allow us to share a x-axis with 2 y-axis.

ax2 = ax1.twinx()
ax2.plot(x,z,color="Red",linestyle="dotted",label="Life Expectancy")
ax2.set_ylabel("Average Life Expectancy")

plt.grid(True,color='lightgray')
fig = plt.gcf()
```

```
fig.set_facecolor("lightgray")
plt.tight_layout()
plt.xticks(rotation=45)
plt.xlabel("Years")
plt.ylabel("Average Life Expectancy",color = "Red")
lines, labels = ax1.get_legend_handles_labels()
lines2, labels2 = ax2.get_legend_handles_labels()
ax2.legend(lines + lines2, labels + labels2)
plt.title("GDP per capita and Life expectancy over the years")
plt.show()
```



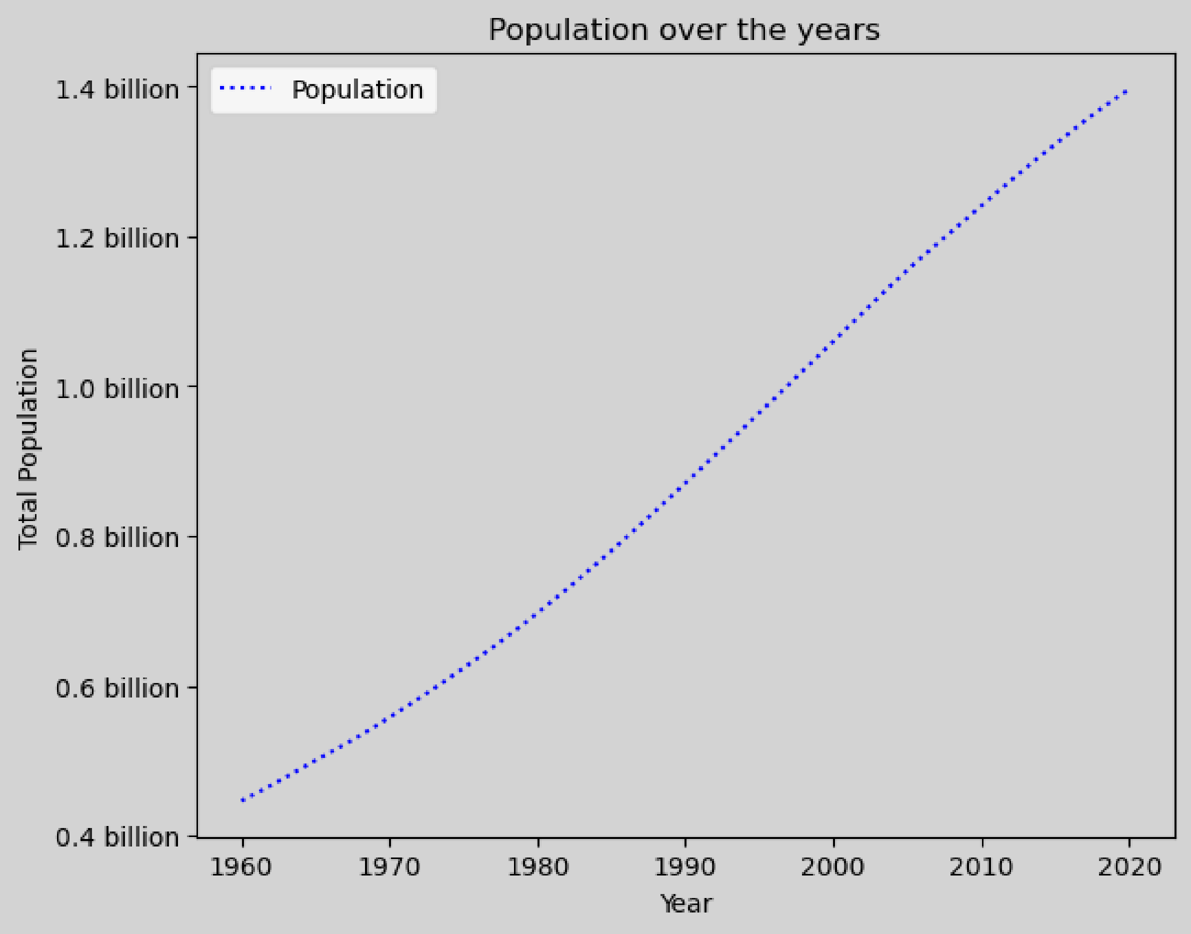
In [14]:

```
plt.style.use("seaborn-colorblind")
plt.stackplot(data["Year"],data["Population growth"],labels = "Population Growth")
plt.grid(True,color='lightgray')
fig = plt.gcf()
fig.set_facecolor("lightgray")
plt.tight_layout()
plt.xlabel("Year")
plt.ylabel("Growth in (% of population)")
plt.title("Cumulative Growth Over The Years")
plt.legend(loc = "upper right")
step = 5
x_labels = data["Year"].tolist()
y_values = data["Population growth"].tolist()

for i in range(0, len(x_labels), step):
    plt.text(x_labels[i], y_values[i], f"{y_values[i]}%", ha="center", va="bottom"

plt.show()
```



In [15]:

```
plt.style.use("seaborn-colorblind")
x = data["Year"]
y = data["Population"]
data["Population"] /= 1e9
plt.plot(x,y,linestyle = "dotted", color = "blue",label="Population")
fig = plt.gca()
fig.set_facecolor("lightgray")
plt.grid(True,color="lightgray")
fig = plt.gcf()
fig.set_facecolor("lightgray")
formatter = ticker.FuncFormatter(lambda x, pos: f"{x:.1f} billion")
plt.gca().yaxis.set_major_formatter(formatter)
plt.tight_layout()
plt.xlabel("Year")
plt.ylabel("Total Population")
plt.title("Population over the years")
plt.legend()
plt.show()
```


Population over the years
Population
Total Population
1.4 billion
1.2 billion
1.0 billion
0.8 billion
0.6 billion
0.4 billion
1960
1970
1980
1990
2000
2010
2020
Year

```
In [ ]:
```