Answers to Question Set 9

Date: 30/04/2020 Name: D.Saravanan

1. Extract data consisting of India into a pandas dataframe.

Program:

```
import numpy as np
import pandas as pd
from gapminder import gapminder

df = gapminder.copy()
india = df.loc[df['country'] == 'India']
print(india)
```

Output:

```
    country continent  year  lifeExp        pop    gdpPercap
696   India      Asia  1952   37.373   372000000   546.565749
697   India      Asia  1957   40.249   409000000   590.061996
698   India      Asia  1962   43.605   454000000   658.347151
699   India      Asia  1967   47.193   506000000   700.770611
700   India      Asia  1972   50.651   567000000   724.032527
701   India      Asia  1977   54.208   634000000   813.337323
702   India      Asia  1982   56.596   708000000   855.723538
703   India      Asia  1987   58.553   788000000   976.512676
704   India      Asia  1992   60.223   872000000  1164.406809
705   India      Asia  1997   61.765   959000000  1458.817442
706   India      Asia  2002   62.879  1034172547  1746.769454
707   India      Asia  2007   64.698  1110396331  2452.210407
```

2. Convert the extracted data into the format.

Program:

```
import numpy as np
import pandas as pd
from gapminder import gapminder

df = gapminder.copy()
india = df.loc[df['country'] == 'India']
india = india.set_index('year', drop = True)
india.index.name = None
india = india.loc[:, 'lifeExp':'gdpPercap']
india.columns = ['LifeExp', 'Population', 'GDPperCapita']
print(india)
```

Output:

```
      LifeExp  Population  GDPperCapita
1952   37.373   372000000    546.565749
1957   40.249   409000000    590.061996
1962   43.605   454000000    658.347151
1967   47.193   506000000    700.770611
1972   50.651   567000000    724.032527
1977   54.208   634000000    813.337323
1982   56.596   708000000    855.723538
1987   58.553   788000000    976.512676
```

```
1992   60.223   872000000   1164.406809
1997   61.765   959000000   1458.817442
2002   62.879  1034172547   1746.769454
2007   64.698  1110396331   2452.210407
```

3. Compute the growth percentage.

Program:

```
import numpy as np
import pandas as pd
from gapminder import gapminder

df = gapminder.copy()
india = df.loc[df['country'] == 'India']
india = india.set_index('year', drop = True)
india.index.name = None
india = india.loc[:, 'lifeExp':'gdpPercap']
india.columns = ['Life Exp', 'Population', 'GDPperCapita']
india = india.pct_change() * 100
print(india)
```

Output:

```
      Life Exp  Population  GDPperCapita
1952       NaN         NaN           NaN
1957  7.695395    9.946237      7.958100
1962  8.338095   11.002445     11.572539
1967  8.228414   11.453744      6.443935
1972  7.327358   12.055336      3.319477
1977  7.022566   11.816578     12.334362
1982  4.405254   11.671924      5.211394
1987  3.457842   11.299435     14.115439
1992  2.852117   10.659898     19.241341
1997  2.560484    9.977064     25.284173
2002  1.803610    7.838639     19.738728
2007  2.892858    7.370509     40.385464
```

4. Plot a bar plot of the growth percentage.

Program:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
plt.style.use('seaborn-white')
from gapminder import gapminder

df = gapminder.copy()
india = df.loc[df['country'] == 'India']
india = india.set_index('year', drop = True)
india.index.name = None
india = india.loc[:, 'lifeExp':'gdpPercap']
india.columns = ['Life Exp', 'Population', 'GDPperCapita']
india = india.pct_change() * 100

ax = india.plot(figsize=(10, 10), subplots=True, kind="bar", grid=True, legend=False)
ax[0].set(ylabel='Life Expectancy Growth Rate', ylim=[0,10], title="India 1952-2007 Data")
ax[1].set(ylabel='Population Growth Rate', ylim=[0,15], title=" ")
ax[2].set(ylabel='GDP per capita Growth Rate', ylim=[0,50], title=" ")
```

```
ax[2].set_xlabel('Year')
plt.tight_layout()
plt.savefig('grate.png')
plt.show()
```

Output: