In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

In [2]:

```
df=pd.read_csv("ana_data.csv")
df.head()
```

Out[2]:

	country	year	pop	continent	lifeExp	gdpPercap
0	Afghanistan	1952	8425333.0	Asia	28.801	779.445314
1	Afghanistan	1957	9240934.0	Asia	30.332	820.853030
2	Afghanistan	1962	10267083.0	Asia	31.997	853.100710
3	Afghanistan	1967	11537966.0	Asia	34.020	836.197138
4	Afghanistan	1972	13079460.0	Asia	36.088	739.981106

In [3]:

```
df
```

Out[3]:

	country	year	pop	continent	lifeExp	gdpPercap
0	Afghanistan	1952	8425333.0	Asia	28.801	779.445314
1	Afghanistan	1957	9240934.0	Asia	30.332	820.853030
2	Afghanistan	1962	10267083.0	Asia	31.997	853.100710
3	Afghanistan	1967	11537966.0	Asia	34.020	836.197138
4	Afghanistan	1972	13079460.0	Asia	36.088	739.981106
...	...	...	...	...	...	...
1699	Zimbabwe	1987	9216418.0	Africa	62.351	706.157306
1700	Zimbabwe	1992	10704340.0	Africa	60.377	693.420786
1701	Zimbabwe	1997	11404948.0	Africa	46.809	792.449960
1702	Zimbabwe	2002	11926563.0	Africa	39.989	672.038623
1703	Zimbabwe	2007	12311143.0	Africa	43.487	469.709298

1704 rows × 6 columns

In [6]:

```
print(df.shape)
```

```
(1704, 6)
```

In [7]:

```
print(df.columns)
```

```
Index(['country', 'year', 'pop', 'continent', 'lifeExp', 'gdpPercap'], dty
pe='object')
```

In [9]:

```
print(df.dtypes)
```

```
country       object
year           int64
pop          float64
continent     object
lifeExp      float64
gdpPercap    float64
dtype: object
```

In [10]:

```
print(df.info)
```

```
<bound method DataFrame.info of           country  year         pop contin
ent  lifeExp   gdpPercap
0     Afghanistan  1952   8425333.0      Asia   28.801  779.445314
1     Afghanistan  1957   9240934.0      Asia   30.332  820.853030
2     Afghanistan  1962  10267083.0      Asia   31.997  853.100710
3     Afghanistan  1967  11537966.0      Asia   34.020  836.197138
4     Afghanistan  1972  13079460.0      Asia   36.088  739.981106
...           ...   ...         ...       ...      ...         ...
1699     Zimbabwe  1987   9216418.0    Africa   62.351  706.157306
1700     Zimbabwe  1992  10704340.0    Africa   60.377  693.420786
1701     Zimbabwe  1997  11404948.0    Africa   46.809  792.449960
1702     Zimbabwe  2002  11926563.0    Africa   39.989  672.038623
1703     Zimbabwe  2007  12311143.0    Africa   43.487  469.709298

[1704 rows x 6 columns]>
```

In [12]:

```
c=df["country"]
print(c)
```

```
0       Afghanistan
1       Afghanistan
2       Afghanistan
3       Afghanistan
4       Afghanistan
           ...
1699       Zimbabwe
1700       Zimbabwe
1701       Zimbabwe
1702       Zimbabwe
1703       Zimbabwe
Name: country, Length: 1704, dtype: object
```

In [13]:

```
c.head()
```

Out[13]:

```
0    Afghanistan
1    Afghanistan
2    Afghanistan
3    Afghanistan
4    Afghanistan
Name: country, dtype: object
```

In [14]:

```
c.tail()
```

Out[14]:

```
1699    Zimbabwe
1700    Zimbabwe
1701    Zimbabwe
1702    Zimbabwe
1703    Zimbabwe
Name: country, dtype: object
```

In [15]:

```
ss=df[["country","continent","year"]]
ss
```

Out[15]:

	country	continent	year
0	Afghanistan	Asia	1952
1	Afghanistan	Asia	1957
2	Afghanistan	Asia	1962
3	Afghanistan	Asia	1967
4	Afghanistan	Asia	1972
...	...	...	...
1699	Zimbabwe	Africa	1987
1700	Zimbabwe	Africa	1992
1701	Zimbabwe	Africa	1997
1702	Zimbabwe	Africa	2002
1703	Zimbabwe	Africa	2007

1704 rows × 3 columns

In [16]:

```
ss.head()
```

Out[16]:

	country	continent	year
0	Afghanistan	Asia	1952
1	Afghanistan	Asia	1957
2	Afghanistan	Asia	1962
3	Afghanistan	Asia	1967
4	Afghanistan	Asia	1972

In [19]:

```
ss.tail()
```

Out[19]:

	country	continent	year
1699	Zimbabwe	Africa	1987
1700	Zimbabwe	Africa	1992
1701	Zimbabwe	Africa	1997
1702	Zimbabwe	Africa	2002
1703	Zimbabwe	Africa	2007

In [20]:

```
df.head()
```

Out[20]:

	country	year	pop	continent	lifeExp	gdpPercap
0	Afghanistan	1952	8425333.0	Asia	28.801	779.445314
1	Afghanistan	1957	9240934.0	Asia	30.332	820.853030
2	Afghanistan	1962	10267083.0	Asia	31.997	853.100710
3	Afghanistan	1967	11537966.0	Asia	34.020	836.197138
4	Afghanistan	1972	13079460.0	Asia	36.088	739.981106

In [21]:

```
df.loc[0]
```

Out[21]:

```
country      Afghanistan
year                1952
pop            8425333.0
continent           Asia
lifeExp            28.801
gdpPercap      779.445314
Name: 0, dtype: object
```

In [22]:

```
df.loc[99]
```

Out[22]:

```
country      Bangladesh
year               1967
pop            62821884.0
continent           Asia
lifeExp            43.453
gdpPercap      721.186086
Name: 99, dtype: object
```

In [23]:

```
df.tail(n=1)
```

Out[23]:

	country	year	pop	continent	lifeExp	gdpPercap
1703	Zimbabwe	2007	12311143.0	Africa	43.487	469.709298

In [24]:

```
print(df.loc[[0,99,999]])
```

```
         country  year         pop continent  lifeExp    gdpPercap
0    Afghanistan  1952   8425333.0      Asia   28.801   779.445314
99    Bangladesh  1967  62821884.0      Asia   43.453   721.186086
999     Mongolia  1967   1149500.0      Asia   51.253  1226.041130
```

In [29]:

```
df.loc[[1]]
```

Out[29]:

	country	year	pop	continent	lifeExp	gdpPercap
1	Afghanistan	1957	9240934.0	Asia	30.332	820.85303

In [30]:

```
df.loc[[99]]
```

Out[30]:

	country	year	pop	continent	lifeExp	gdpPercap
99	Bangladesh	1967	62821884.0	Asia	43.453	721.186086

In [32]:

```
df.iloc[[-1]]
```

Out[32]:

	country	year	pop	continent	lifeExp	gdpPercap
1703	Zimbabwe	2007	12311143.0	Africa	43.487	469.709298

In [33]:

```
k=df.loc[:,['year','pop']]
print(k.shape)
print(k.head())
```

```
(1704, 2)
   year         pop
0  1952   8425333.0
1  1957   9240934.0
2  1962  10267083.0
3  1967  11537966.0
4  1972  13079460.0
```

In [34]:

```
m=df.iloc[:,[2,4,-1]]
print(m.shape)
print(m.head())
```

```
(1704, 3)
          pop  lifeExp   gdpPercap
0   8425333.0   28.801  779.445314
1   9240934.0   30.332  820.853030
2  10267083.0   31.997  853.100710
3  11537966.0   34.020  836.197138
4  13079460.0   36.088  739.981106
```

In [81]:

```
r=list(range(5))
r
```

Out[81]:

```
[0, 1, 2, 3, 4]
```

In [82]:

```
g=df.iloc[:,r]
g.head()
```

Out[82]:

	country	year	pop	continent	lifeExp
0	Afghanistan	1952	8425333.0	Asia	28.801
1	Afghanistan	1957	9240934.0	Asia	30.332
2	Afghanistan	1962	10267083.0	Asia	31.997
3	Afghanistan	1967	11537966.0	Asia	34.020
4	Afghanistan	1972	13079460.0	Asia	36.088

In [37]:

```
q=df.loc[42,'country']
q
```

Out[37]:

```
'Angola'
```

In [38]:

```
q=df.iloc[42,0]
q
```

Out[38]:

```
'Angola'
```

In [39]:

```
print(df.iloc[[0,99,999],[0,3,5]])
```

```
         country continent    gdpPercap
0    Afghanistan      Asia   779.445314
99    Bangladesh      Asia   721.186086
999      Mongolia      Asia  1226.041130
```

In [40]:

```
print(df.loc[[0,99,999],['country','lifeExp','gdpPercap']])
```

```
         country  lifeExp    gdpPercap
0    Afghanistan   28.801   779.445314
99    Bangladesh   43.453   721.186086
999      Mongolia   51.253  1226.041130
```

In [41]:

```
print(df.loc[10:13,['country','lifeExp','gdpPercap']])
```

```
       country  lifeExp    gdpPercap
10  Afghanistan   42.129   726.734055
11  Afghanistan   43.828   974.580338
12      Albania   55.230  1601.056136
13      Albania   59.280  1942.284244
```

In [42]:

```
df.head(n=10)
```

Out[42]:

	country	year	pop	continent	lifeExp	gdpPercap
0	Afghanistan	1952	8425333.0	Asia	28.801	779.445314
1	Afghanistan	1957	9240934.0	Asia	30.332	820.853030
2	Afghanistan	1962	10267083.0	Asia	31.997	853.100710
3	Afghanistan	1967	11537966.0	Asia	34.020	836.197138
4	Afghanistan	1972	13079460.0	Asia	36.088	739.981106
5	Afghanistan	1977	14880372.0	Asia	38.438	786.113360
6	Afghanistan	1982	12881816.0	Asia	39.854	978.011439
7	Afghanistan	1987	13867957.0	Asia	40.822	852.395945
8	Afghanistan	1992	16317921.0	Asia	41.674	649.341395
9	Afghanistan	1997	22227415.0	Asia	41.763	635.341351

In [43]:

```
print(df.groupby('year')['lifeExp'].mean())
```

```
year
1952    49.057620
1957    51.507401
1962    53.609249
1967    55.678290
1972    57.647386
1977    59.570157
1982    61.533197
1987    63.212613
1992    64.160338
1997    65.014676
2002    65.694923
2007    67.007423
Name: lifeExp, dtype: float64
```

In [44]:

```
multi=df.groupby(['year','continent'])[['lifeExp','gdpPercap']].mean()
multi
```

Out[44]:

year	continent	lifeExp	gdpPercap
1952	Africa	39.135500	1252.572466
	Americas	53.279840	4079.062552
	Asia	46.314394	5195.484004
	Europe	64.408500	5661.057435
	Oceania	69.255000	10298.085650
1957	Africa	41.266346	1385.236062
	Americas	55.960280	4616.043733
	Asia	49.318544	5787.732940
	Europe	66.703067	6963.012816
	Oceania	70.295000	11598.522455
1962	Africa	43.319442	1598.078825
	Americas	58.398760	4901.541870
	Asia	51.563223	5729.369625
	Europe	68.539233	8365.486814
	Oceania	71.085000	12696.452430
1967	Africa	45.334538	2050.363801
	Americas	60.410920	5668.253496
	Asia	54.663640	5971.173374
	Europe	69.737600	10143.823757
	Oceania	71.310000	14495.021790
1972	Africa	47.450942	2339.615674
	Americas	62.394920	6491.334139
	Asia	57.319269	8187.468699
	Europe	70.775033	12479.575246
	Oceania	71.910000	16417.333380
1977	Africa	49.580423	2585.938508
	Americas	64.391560	7352.007126
	Asia	59.610556	7791.314020
	Europe	71.937767	14283.979110
	Oceania	72.855000	17283.957605
1982	Africa	51.592865	2481.592960
	Americas	66.228840	7506.737088
	Asia	62.617939	7434.135157
	Europe	72.806400	15617.896551
	Oceania	74.290000	18554.709840

		lifeExp	gdpPercap
year	**continent**		
1987	**Africa**	53.344788	2282.668991
	Americas	68.090720	7793.400261
	Asia	64.851182	7608.226508
	Europe	73.642167	17214.310727
	Oceania	75.320000	20448.040160
1992	**Africa**	53.629577	2281.810333
	Americas	69.568360	8044.934406
	Asia	66.537212	8639.690248
	Europe	74.440100	17061.568084
	Oceania	76.945000	20894.045885
1997	**Africa**	53.598269	2378.759555
	Americas	71.150480	8889.300863
	Asia	68.020515	9834.093295
	Europe	75.505167	19076.781802
	Oceania	78.190000	24024.175170
2002	**Africa**	53.325231	2599.385159
	Americas	72.422040	9287.677107
	Asia	69.233879	10174.090397
	Europe	76.700600	21711.732422
	Oceania	79.740000	26938.778040
2007	**Africa**	54.806038	3089.032605
	Americas	73.608120	11003.031625
	Asia	70.728485	12473.026870
	Europe	77.648600	25054.481636
	Oceania	80.719500	29810.188275

In [47]:

```
flat=multi.reset_index()
print(flat.head())
```

```
   year continent    lifeExp     gdpPercap
0  1952    Africa  39.135500   1252.572466
1  1952  Americas  53.279840   4079.062552
2  1952      Asia  46.314394   5195.484004
3  1952    Europe  64.408500   5661.057435
4  1952   Oceania  69.255000  10298.085650
```

In [48]:

```
flat=multi.reset_index()
print(flat.head())
```

```
   year continent    lifeExp     gdpPercap
0  1952    Africa  39.135500   1252.572466
1  1952  Americas  53.279840   4079.062552
2  1952      Asia  46.314394   5195.484004
3  1952    Europe  64.408500   5661.057435
4  1952   Oceania  69.255000  10298.085650
```

In [49]:

```
print(df.groupby('continent')['country'].nunique())
```

```
continent
Africa      52
Americas    25
Asia        33
Europe      30
Oceania      2
Name: country, dtype: int64
```

In [51]:

```
s=df.groupby('year')['lifeExp'].mean()
print(s)
```

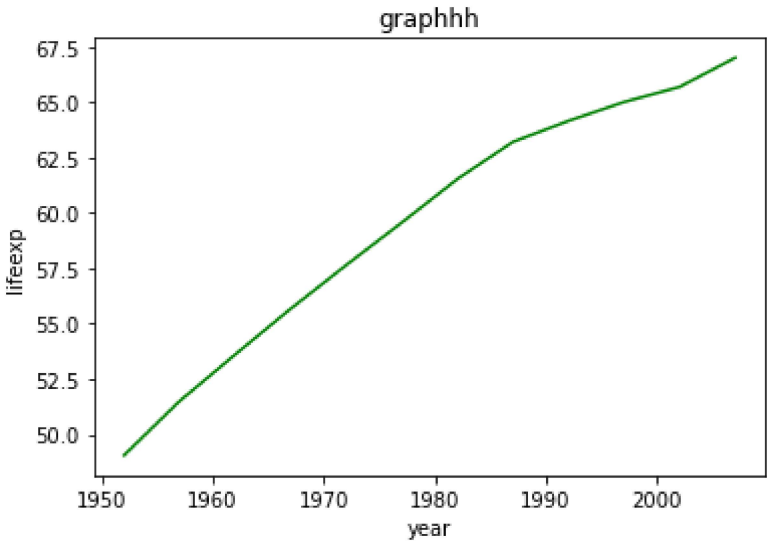
```
year
1952    49.057620
1957    51.507401
1962    53.609249
1967    55.678290
1972    57.647386
1977    59.570157
1982    61.533197
1987    63.212613
1992    64.160338
1997    65.014676
2002    65.694923
2007    67.007423
Name: lifeExp, dtype: float64
```

In [75]:

```
plt.ylabel('lifeexp')
plt.title("graphhh")
s.plot(c="green")
```

Out[75]:

```
<AxesSubplot:title={'center':'graphhh'}, xlabel='year', ylabel='lifeexp'>
```



In [83]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [100]:

In [ ]:

In [ ]:

In [131]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

```
```