

Problem Statement

Scipy:

We have the min and max temperatures in a city In India for each months of the year. We would like to find a function to describe this and show it graphically, the dataset given below.

Task:

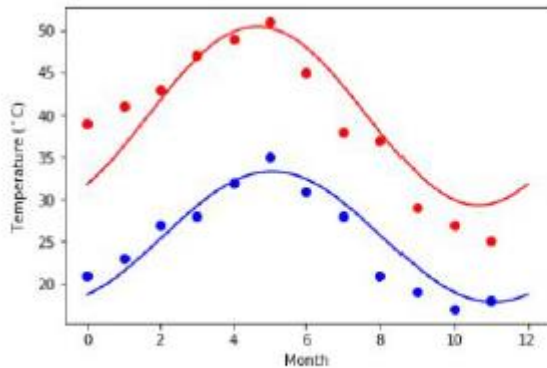
1. fitting it to the periodic function
2. plot the fit

Data

Max = 39, 41, 43, 47, 49, 51, 45, 38, 37, 29, 27, 25

Min = 21, 23, 27, 28, 32, 35, 31, 28, 21, 19, 17, 18

Expected Output:

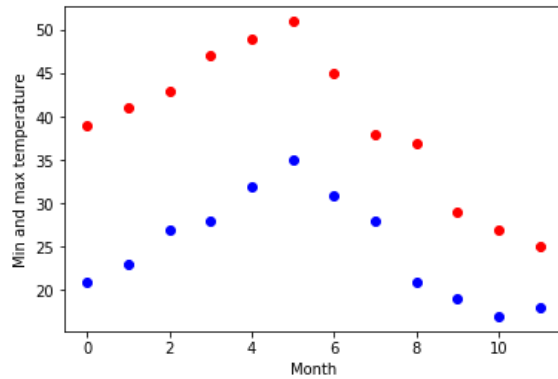


Source Code:

```
import pandas as pd
import numpy as np
import scipy
import sys
import statistics
import matplotlib.pyplot as plt
temp_max = np.array([39, 41, 43, 47, 49, 51, 45, 38, 37, 29, 27, 25])
temp_min = np.array([21, 23, 27, 28, 32, 35, 31, 28, 21, 19, 17, 18])
months = np.arange(12)
plt.plot(months, temp_max, 'ro')
plt.plot(months, temp_min, 'bo')
plt.xlabel('Month')
plt.ylabel('Min and max temperature')
```

Output Screenshot:

```
Text(0,0.5,'Min and max temperature')
```



```
# Fitting it to the periodic Function
```

```
from scipy import optimize
def yearly_temps(times,avg,ampl,time_offset):
    return (avg
            + ampl*np.cos((times + time_offset) * 2 * np.pi/times.max()))
res_max, cov_max = optimize.curve_fit(yearly_temps,months,temp_max,[20,10,0])
res_min, cov_min = optimize.curve_fit(yearly_temps, months,
                                       temp_min, [-40, 20, 0])

print(res_max)
print(res_min)
```

Output Screenshot:

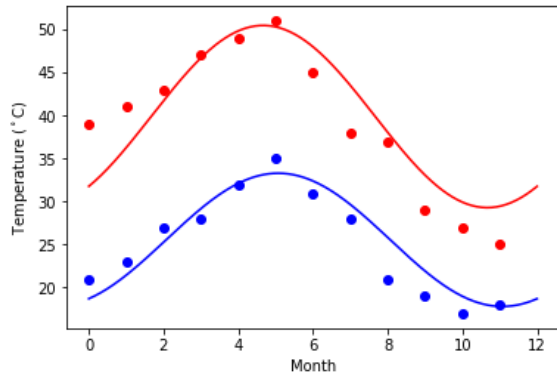
```
[ 39.88861734 -10.59083168  1.33370154]
[25.55626462 -7.74472963  0.93101294]
```

Source Code:

```
# Plot the fit

days = np.linspace(0, 12, num=365)
plt.figure()
plt.plot(months, temp_max, 'ro')
plt.plot(days, yearly_temps(days, *res_max), 'r-')
plt.plot(months, temp_min, 'bo')
plt.plot(days, yearly_temps(days, *res_min), 'b-')
plt.xlabel('Month')
plt.ylabel('Temperature ($^\circ$C)')
plt.show()
```

Output Screenshot:



Matplotlib:

This assignment is for visualization using matplotlib:

data to use:

[url=https://raw.githubusercontent.com/Geoyi/Cleaning-Titanic-Data/master/titanic_original.csv](https://raw.githubusercontent.com/Geoyi/Cleaning-Titanic-Data/master/titanic_original.csv)

`titanic = pd.read_csv(url)`

Charts to plot:

1. Create a pie chart presenting the male/female proportion
2. Create a scatterplot with the Fare paid and the Age, differ the plot color by gender

Source Code:

```
import pandas as pd
import pylab as plt
import numpy as np
import csv
from urllib.request import urlopen
df = pd.read_csv('https://raw.githubusercontent.com/Geoyi/Cleaning-Titanic-Data/master/titanic_original.csv')
d = pd.DataFrame(df)
df
```

Output Screenshot:

	pclass	survived	name	sex	age	sibsp	parch	ticket	fare	cabin	embarked	boat	body
0	1.0	1.0	Allen, Miss. Elisabeth Walton	female	29.0000	0.0	0.0	24160	211.3375	B5	S	2	NaN
1	1.0	1.0	Allison, Master. Hudson Trevor	male	0.9167	1.0	2.0	113781	151.5500	C22 C26	S	11	NaN
2	1.0	0.0	Allison, Miss. Helen Loraine	female	2.0000	1.0	2.0	113781	151.5500	C22 C26	S	NaN	NaN
3	1.0	0.0	Allison, Mr. Hudson Joshua Creighton	male	30.0000	1.0	2.0	113781	151.5500	C22 C26	S	NaN	135.0
4	1.0	0.0	Allison, Mrs. Hudson J C (Bessie Waldo Daniels)	female	25.0000	1.0	2.0	113781	151.5500	C22 C26	S	NaN	NaN
5	1.0	1.0	Anderson, Mr. Harry	male	48.0000	0.0	0.0	19952	26.5500	E12	S	3	NaN
6	1.0	1.0	Andrews, Miss. Kornelia Theodosia	female	63.0000	1.0	0.0	13502	77.9583	D7	S	10	NaN
7	1.0	0.0	Andrews, Mr. Thomas Jr	male	39.0000	0.0	0.0	112050	0.0000	A36	S	NaN	NaN
8	1.0	1.0	Appleton, Mrs. Edward Dale (Charlotte Lamson)	female	53.0000	2.0	0.0	11769	51.4792	C101	S	D	NaN
9	1.0	0.0	Artagaveytia, Mr. Ramon	male	71.0000	0.0	0.0	PC 17609	49.5042	NaN	C	NaN	22.0

10	1.0	0.0	Astor, Col. John Jacob	male	47.0000	1.0	0.0	PC 17757	227.5250	C62 C64	C	NaN	124.0
11	1.0	1.0	Astor, Mrs. John Jacob (Madeleine Talmadge Force)	female	18.0000	1.0	0.0	PC 17757	227.5250	C62 C64	C	4	NaN
12	1.0	1.0	Aubart, Mme. Leontine Pauline	female	24.0000	0.0	0.0	PC 17477	69.3000	B35	C	9	NaN
13	1.0	1.0	Barber, Miss. Ellen "Nellie"	female	26.0000	0.0	0.0	19877	78.8500	NaN	S	6	NaN
14	1.0	1.0	Barkworth, Mr. Algernon Henry Wilson	male	80.0000	0.0	0.0	27042	30.0000	A23	S	B	NaN
15	1.0	0.0	Baumann, Mr. John D	male	NaN	0.0	0.0	PC 17318	25.9250	NaN	S	NaN	NaN
16	1.0	0.0	Baxter, Mr. Quigg Edmond	male	24.0000	0.0	1.0	PC 17558	247.5208	B58 B60	C	NaN	NaN
17	1.0	1.0	Baxter, Mrs. James (Helene DeLaudeniere Chaput)	female	50.0000	0.0	1.0	PC 17558	247.5208	B58 B60	C	6	NaN
18	1.0	1.0	Bazzani, Miss. Albina	female	32.0000	0.0	0.0	11813	76.2917	D15	C	8	NaN
19	1.0	0.0	Beattie, Mr. Thomson	male	36.0000	0.0	0.0	13050	75.2417	C6	C	A	NaN
20	1.0	1.0	Beckwith, Mr. Richard Leonard	male	37.0000	1.0	1.0	11751	52.5542	D35	S	5	NaN

21	1.0	1.0	Beckwith, Mrs. Richard Leonard (Sallie Monypeny)	female	47.0000	1.0	1.0	11751	52.5542	D35	S	5	NaN
22	1.0	1.0	Behr, Mr. Karl Howell	male	26.0000	0.0	0.0	111369	30.0000	C148	C	5	NaN
23	1.0	1.0	Bidois, Miss. Rosalie	female	42.0000	0.0	0.0	PC 17757	227.5250	NaN	C	4	NaN
24	1.0	1.0	Bird, Miss. Ellen	female	29.0000	0.0	0.0	PC 17483	221.7792	C97	S	8	NaN
25	1.0	0.0	Birnbaum, Mr. Jakob	male	25.0000	0.0	0.0	13905	26.0000	NaN	C	NaN	148.0
26	1.0	1.0	Bishop, Mr. Dickinson H	male	25.0000	1.0	0.0	11967	91.0792	B49	C	7	NaN
27	1.0	1.0	Bishop, Mrs. Dickinson H (Helen Walton)	female	19.0000	1.0	0.0	11967	91.0792	B49	C	7	NaN
28	1.0	1.0	Bissette, Miss. Amelia	female	35.0000	0.0	0.0	PC 17760	135.6333	C99	S	8	NaN
29	1.0	1.0	Bjornstrom-Steffansson, Mr. Mauritz Hakan	male	28.0000	0.0	0.0	110564	26.5500	C52	S	D	NaN
...
1280	3.0	0.0	Vovk, Mr. Janko	male	22.0000	0.0	0.0	349252	7.8958	NaN	S	NaN	NaN
1281	3.0	0.0	Waelens, Mr. Achille	male	22.0000	0.0	0.0	345767	9.0000	NaN	S	NaN	NaN
1282	3.0	0.0	Ware, Mr. Frederick	male	NaN	0.0	0.0	359309	8.0500	NaN	S	NaN	NaN

1283	3.0	0.0	Warren, Mr. Charles William	male	NaN	0.0	0.0	C.A. 49867	7.5500	NaN	S	NaN	NaN
1284	3.0	0.0	Webber, Mr. James	male	NaN	0.0	0.0	SOTON/OQ 3101316	8.0500	NaN	S	NaN	NaN
1285	3.0	0.0	Wenzel, Mr. Linhart	male	32.5000	0.0	0.0	345775	9.5000	NaN	S	NaN	298.0
1286	3.0	1.0	Whabee, Mrs. George Joseph (Shawneene Abi-Saab)	female	38.0000	0.0	0.0	2688	7.2292	NaN	C	C	NaN
1287	3.0	0.0	Widegren, Mr. Carl/Charles Peter	male	51.0000	0.0	0.0	347064	7.7500	NaN	S	NaN	NaN
1288	3.0	0.0	Wiklund, Mr. Jakob Alfred	male	18.0000	1.0	0.0	3101267	6.4958	NaN	S	NaN	314.0
1289	3.0	0.0	Wiklund, Mr. Karl Johan	male	21.0000	1.0	0.0	3101266	6.4958	NaN	S	NaN	NaN
1290	3.0	1.0	Wilkes, Mrs. James (Ellen Needs)	female	47.0000	1.0	0.0	363272	7.0000	NaN	S	NaN	NaN
1291	3.0	0.0	Willer, Mr. Aaron ("Abi Weller")	male	NaN	0.0	0.0	3410	8.7125	NaN	S	NaN	NaN
1292	3.0	0.0	Wiley, Mr. Edward	male	NaN	0.0	0.0	S.O./P.P. 751	7.5500	NaN	S	NaN	NaN
1293	3.0	0.0	Williams, Mr. Howard Hugh "Harry"	male	NaN	0.0	0.0	A/5 2466	8.0500	NaN	S	NaN	NaN
1294	3.0	0.0	Williams, Mr. Leslie	male	28.5000	0.0	0.0	54636	16.1000	NaN	S	NaN	14.0
1295	3.0	0.0	Windelov, Mr. Einar	male	21.0000	0.0	0.0	SOTON/OQ 3101317	7.2500	NaN	S	NaN	NaN

1296	3.0	0.0	Wirz, Mr. Albert	male	27.0000	0.0	0.0	315154	8.6625	NaN	S	NaN	131.0
1297	3.0	0.0	Wiseman, Mr. Phillippe	male	NaN	0.0	0.0	A/4. 34244	7.2500	NaN	S	NaN	NaN
1298	3.0	0.0	Wittevrongel, Mr. Camille	male	36.0000	0.0	0.0	345771	9.5000	NaN	S	NaN	NaN
1299	3.0	0.0	Yasbeck, Mr. Antoni	male	27.0000	1.0	0.0	2659	14.4542	NaN	C	C	NaN
1300	3.0	1.0	Yasbeck, Mrs. Antoni (Selini Alexander)	female	15.0000	1.0	0.0	2659	14.4542	NaN	C	NaN	NaN
1301	3.0	0.0	Yousseff, Mr. Gerious	male	45.5000	0.0	0.0	2628	7.2250	NaN	C	NaN	312.0
1302	3.0	0.0	Yousif, Mr. Wazli	male	NaN	0.0	0.0	2647	7.2250	NaN	C	NaN	NaN
1303	3.0	0.0	Yousseff, Mr. Gerious	male	NaN	0.0	0.0	2627	14.4583	NaN	C	NaN	NaN
1304	3.0	0.0	Zabour, Miss. Hileni	female	14.5000	1.0	0.0	2665	14.4542	NaN	C	NaN	328.0
1305	3.0	0.0	Zabour, Miss. Thamine	female	NaN	1.0	0.0	2665	14.4542	NaN	C	NaN	NaN
1306	3.0	0.0	Zakarian, Mr. Mapriededer	male	26.5000	0.0	0.0	2656	7.2250	NaN	C	NaN	304.0
1307	3.0	0.0	Zakarian, Mr. Ortin	male	27.0000	0.0	0.0	2670	7.2250	NaN	C	NaN	NaN
1308	3.0	0.0	Zimmerman, Mr. Leo	male	29.0000	0.0	0.0	315082	7.8750	NaN	S	NaN	NaN
1309	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

1310 rows × 14 columns



Source Code:

1. Create a pie chart presenting the male/female proportion

```
df['sex'].isnull().value_counts()
male_total_passengers = df[df['sex'] ==
'male'].groupby('pclass')['sex'].count()

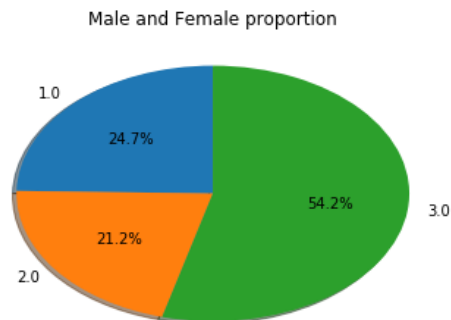
female_total_passengers = df[df['sex'] ==
'female'].groupby('pclass')['sex'].count()

total_passengers = male_total_passengers+female_total_passengers

plt.pie(total_passengers,labels=total_passengers.index.values.tolist(),autopct=
'%1.1f%',shadow=True, startangle=90)
plt.title('Male and Female proportion')
plt.show()
```


Output Screenshot:

```
False    1309
True       1
Name: sex, dtype: int64
```



Source Code:

2. Create a scatterplot with the Fare paid and the Age, differ the plot color by gender

```
df = pd.DataFrame(np.random.randn(1000,4),columns =
['age','fare','male','female'])

df = df.dropna(subset=['sex'])

mapping = {'male' : 'blue', 'female' : 'red'}
plt.scatter(df['age'], df['fare'], alpha=0.5, c=df['sex'].map(mapping))

plt.show()
```

Output Screenshot:

