**Question:**

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:

Matplotlib:

This assignment is for visualization using matplotlib:

data to use:

url=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

**Answer:**   
  
**Part 1: Scipy - Fitting and Plotting Periodic Function**

To fit the temperature data to a periodic function and plot the fit, we can use the curve\_fit function from scipy.optimize to fit a sinusoidal function to the data. Here is how you can do it:

**Python Code**

import numpy as np

import matplotlib.pyplot as plt

from scipy.optimize import curve\_fit

# Data

months = np.arange(12)

max\_temps = np.array([39, 41, 43, 47, 49, 51, 45, 38, 37, 29, 27, 25])

min\_temps = np.array([21, 23, 27, 28, 32, 35, 31, 28, 21, 19, 17, 18])

# Define the periodic function

def yearly\_temps(x, a, b, c, d):

return a \* np.sin(b \* x + c) + d

# Fit the max temperature data

params\_max, \_ = curve\_fit(yearly\_temps, months, max\_temps, [20, 2 \* np.pi / 12, 0, 20])

# Fit the min temperature data

params\_min, \_ = curve\_fit(yearly\_temps, months, min\_temps, [20, 2 \* np.pi / 12, 0, 10])

# Create a smooth curve for plotting

x\_fit = np.linspace(0, 11, 100)

y\_fit\_max = yearly\_temps(x\_fit, \*params\_max)

y\_fit\_min = yearly\_temps(x\_fit, \*params\_min)

# Plotting

plt.figure(figsize=(10, 6))

plt.plot(months, max\_temps, 'ro', label='Max Temperatures')

plt.plot(x\_fit, y\_fit\_max, 'r-', label='Fitted Max Temp Curve')

plt.plot(months, min\_temps, 'bo', label='Min Temperatures')

plt.plot(x\_fit, y\_fit\_min, 'b-', label='Fitted Min Temp Curve')

plt.xlabel('Month')

plt.ylabel('Temperature (°C)')

plt.title('Monthly Temperature Variation')

plt.legend()

plt.show()

**Part 2: Matplotlib - Titanic Data Visualization**

To visualize the Titanic dataset, we'll create a pie chart for the male/female proportion and a scatter plot for Fare vs. Age, colored by gender.

**Python Code**

import pandas as pd

import matplotlib.pyplot as plt

# Load the Titanic dataset

url = 'https://raw.githubusercontent.com/Geoyi/Cleaning-Titanic-Data/master/titanic\_original.csv'

titanic = pd.read\_csv(url)

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

gender\_counts = titanic['sex'].value\_counts()

plt.figure(figsize=(8, 8))

plt.pie(gender\_counts, labels=gender\_counts.index, autopct='%1.1f%%', startangle=140, colors=['lightblue', 'lightcoral'])

plt.title('Male/Female Proportion')

plt.show()

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

plt.figure(figsize=(10, 6))

colors = {'male': 'blue', 'female': 'red'}

plt.scatter(titanic['age'], titanic['fare'], c=titanic['sex'].apply(lambda x: colors[x]), alpha=0.5)

plt.xlabel('Age')

plt.ylabel('Fare')

plt.title('Fare paid vs Age')

plt.legend(['Male', 'Female'])

plt.show()