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In [ ]: 1 # Problem Statement
        2 # We have the min and max temperatures in a city In India for each months of
        3 given below.
        4 #Task:
        5 # 1. fitting it to the periodic function
        6 # 2. plot the fit
        7 #Data
        8 #Max = 39, 41, 43, 47, 49, 51, 45, 38, 37, 29, 27, 25
        9 #Min = 21, 23, 27, 28, 32, 35, 31, 28, 21, 19, 17, 18

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In [1]: 1 import numpy as np
        2
        3 temp_max = np.array([39, 41, 43, 47, 49, 51, 45, 38, 37, 29, 27, 25])
        4 temp_min = np.array([21, 23, 27, 28, 32, 35, 31, 28, 21, 19, 17, 18])
        5
        6 import matplotlib.pyplot as plt
        7 months = np.arange(12)
        8 plt.plot(months, temp_max, 'ro')
        9 plt.plot(months, temp_min, 'bo')
       10 plt.xlabel('Month')
       11 plt.ylabel('Min and max temperature')

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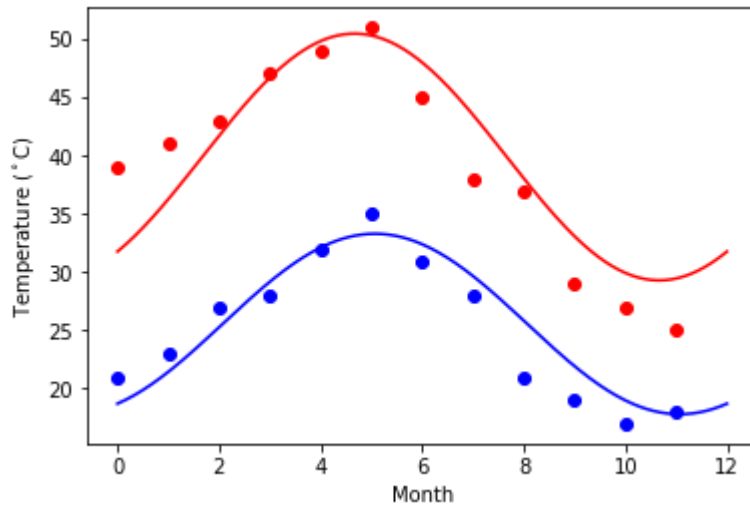
Out[1]: Text(0,0.5,'Min and max temperature')

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In [4]: 1 from scipy import optimize
        2 def yearly_temps(times, avg, ampl, time_offset):
        3     return (avg
        4           + ampl * np.cos((times + time_offset) * 2 * np.pi / times.max()))
        5
        6 res_max, cov_max = optimize.curve_fit(yearly_temps, months,
        7                                     temp_max, [20, 10, 0])
        8 res_min, cov_min = optimize.curve_fit(yearly_temps, months,
        9                                     temp_min, [15, 5, 0])

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In [3]: 1 days = np.linspace(0, 12, num=365)
2
3 plt.figure()
4 plt.plot(months, temp_max, 'ro')
5 plt.plot(days, yearly_temps(days, *res_max), 'r-')
6 plt.plot(months, temp_min, 'bo')
7 plt.plot(days, yearly_temps(days, *res_min), 'b-')
8 plt.xlabel('Month')
9 plt.ylabel('Temperature ( $^{\circ}\text{C}$ )')
10
11 plt.show()
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In [ ]: 1
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