**Questions :** In this assignment students have to transform iris data into 3 dimensions

and plot a 3d chart with transformed dimensions and colour each data

point with specific class.

Hint:

import numpy as np

import matplotlib.pyplot as plt

from mpl\_toolkits.mplot3d import Axes3D

from sklearn import decomposition

from sklearn import datasets

**Answers:**

import numpy as np

import matplotlib.pyplot as plt

from mpl\_toolkits.mplot3d import Axes3D

from sklearn import decomposition

from sklearn import datasets

# Load the Iris dataset

iris = datasets.load\_iris()

X = iris.data

y = iris.target

target\_names = iris.target\_names

# Apply PCA to reduce the data to 3 dimensions

pca = decomposition.PCA(n\_components=3)

X\_r = pca.fit\_transform(X)

# Plot the 3D chart

fig = plt.figure()

ax = fig.add\_subplot(111, projection='3d')

# Colors for the three classes

colors = ['navy', 'turquoise', 'darkorange']

# Plotting each class with a specific color

for color, i, target\_name in zip(colors, [0, 1, 2], target\_names):

ax.scatter(X\_r[y == i, 0], X\_r[y == i, 1], X\_r[y == i, 2], color=color, label=target\_name)

# with labels and legend

ax.set\_title("3D PCA of Iris Dataset")

ax.set\_xlabel("Principal Component 1")

ax.set\_ylabel("Principal Component 2")

ax.set\_zlabel("Principal Component 3")

ax.legend()

# Show the plot

plt.show()