# Assignment No-04

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**Title-** Demonstrate the Perceptron learning law with its decision regions.

**Program**:

import numpy as np

import matplotlib.pyplot as plt

from sklearn.datasets import load\_iris

iris = load\_iris()

X = iris.data[:, [0, 2]]

y = iris.target

y = np.where(y == 0, 0, 1)

w = np.zeros(2)

b = 0

lr = 0.1

epochs = 50

def perceptron(x, w, b):

z = np.dot(x, w) + b

return np.where(z >= 0, 1, 0)

for epoch in range(epochs): for i in range(len(X)):

x = X[i] target = y[i]

output = perceptron(x, w, b) error = target - output

w += lr \* error \* x

b += lr \* error

x\_min, x\_max = X[:, 0].min() - 0.5, X[:, 0].max() + 0.5

y\_min, y\_max = X[:, 1].min() - 0.5, X[:, 1].max() + 0.5 xx, yy = np.meshgrid(np.arange(x\_min, x\_max, 0.02),

np.arange(y\_min, y\_max, 0.02))

Z = perceptron(np.c\_[xx.ravel(), yy.ravel()], w, b) Z = Z.reshape(xx.shape)

plt.contourf(xx, yy, Z, cmap=plt.cm.Paired)

plt.scatter(X[:, 0], X[:, 1], c=y, cmap=plt.cm.Paired)

plt.xlabel('Sepal length')

plt.ylabel('Petal length') plt.title('Perceptron decision regions')

plt.show()

# Output:

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