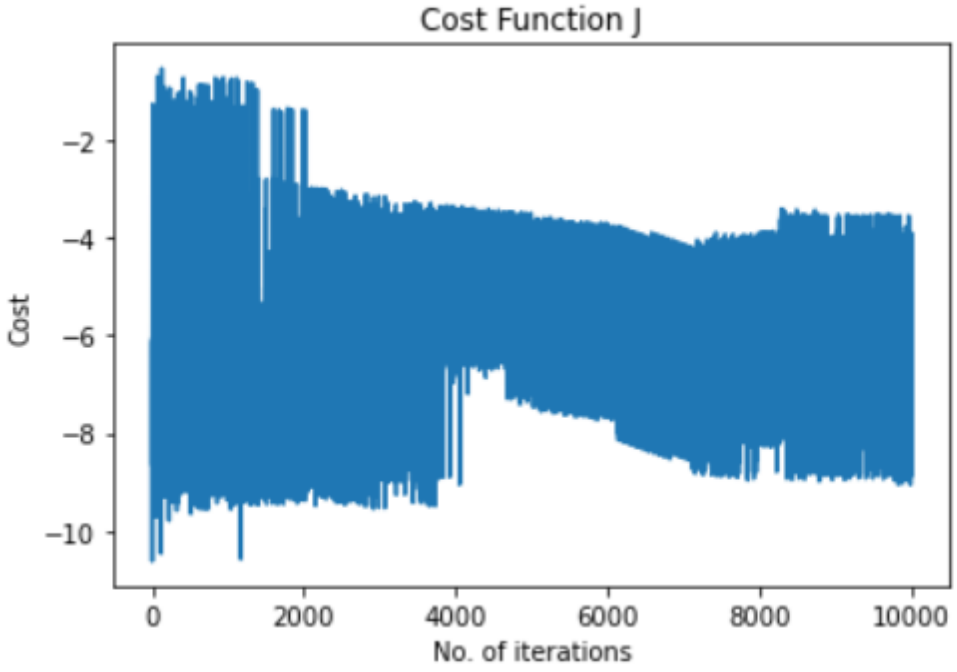
CLL788 Assignment 2

1) Perceptron

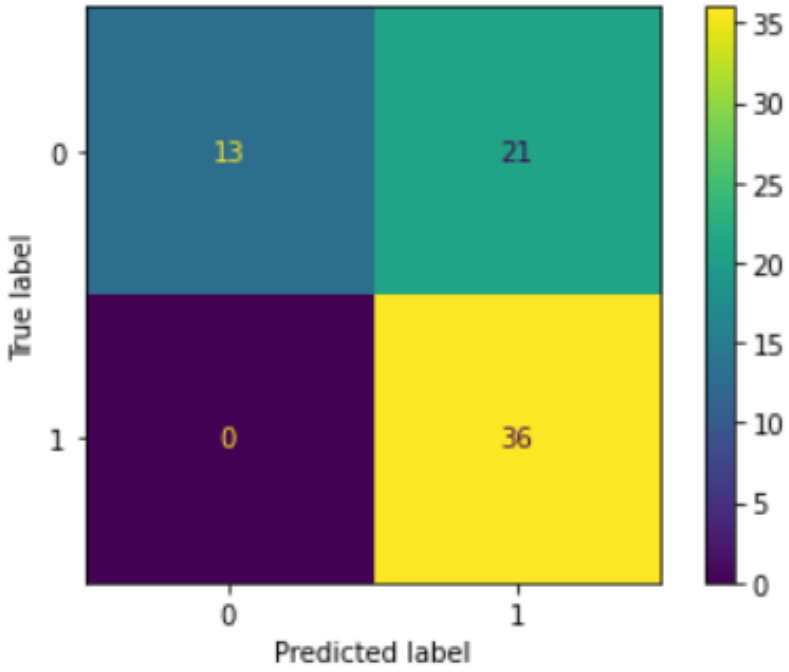
Best Weights**: array ([-5.64162927, 0.17295387, -0.02708792])**

Accuracy on training set: **71.01449275362319 %**

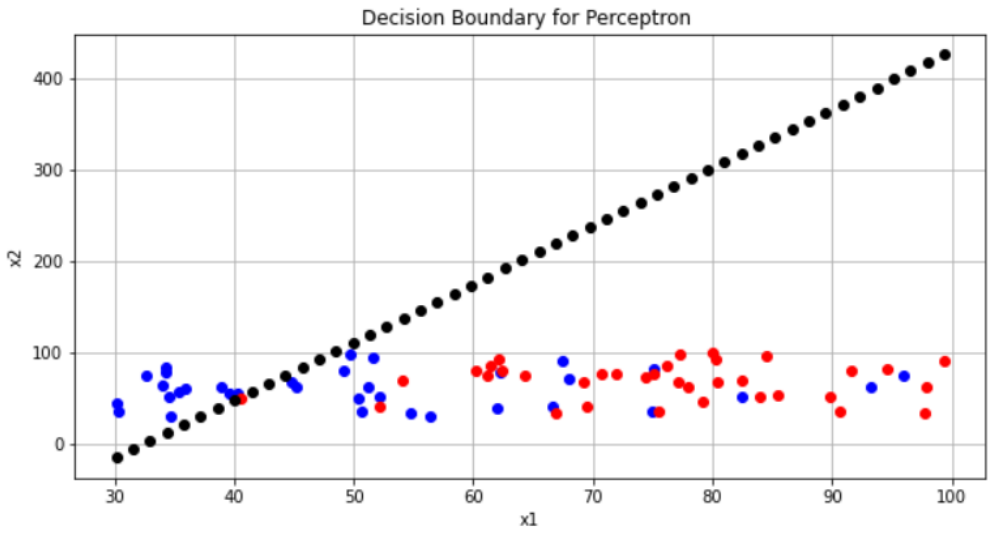
Cost Function with respect to iterations



Confusion Matrix



Decision Boundary



2) A) Multilayer Perceptron

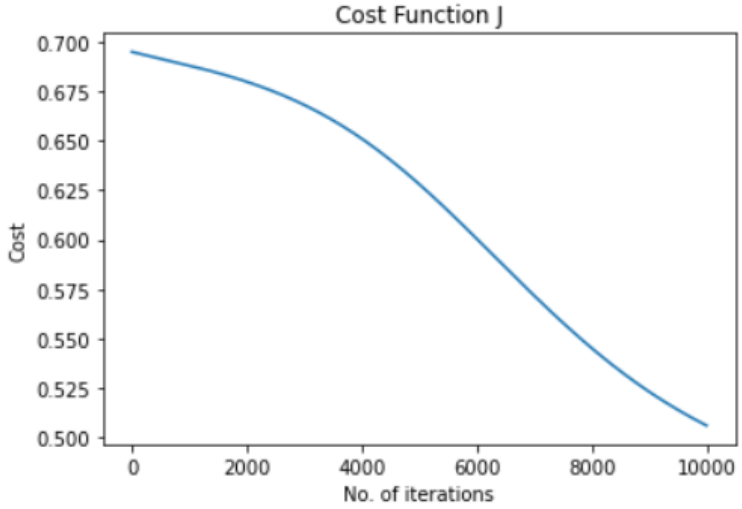
Number of nodes in hidden layer=4

First Activation Function= Tanh

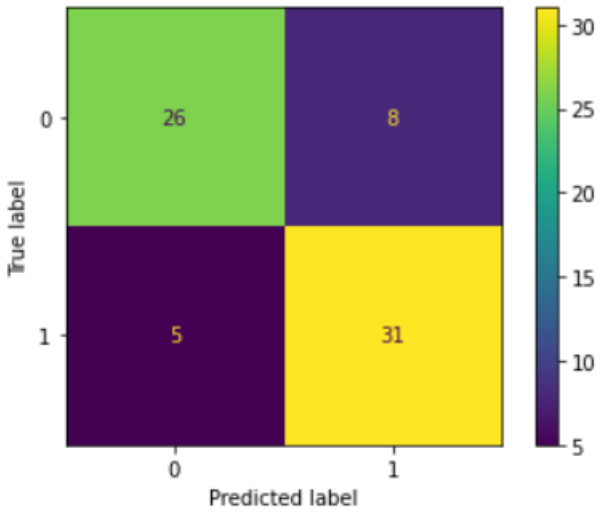
Weights: **{'W1': array ([[0.60687878, 0.03926949],**
[0.6074358, 0.29322187],
[-0.40415882, -0.1332965],
[0.08265366, 0.03226165]]),
'b1': array ([[0.03128171],
[0.03362951],
[-0.01203264],
[-0.0031746]]),
'W2': array ([[0.64799433, 0.73281886, -0.44971269, 0.06277056]]),
'b2': array ([[0.03542853]])}

Accuracy on training set: **82.6086956521739 %**

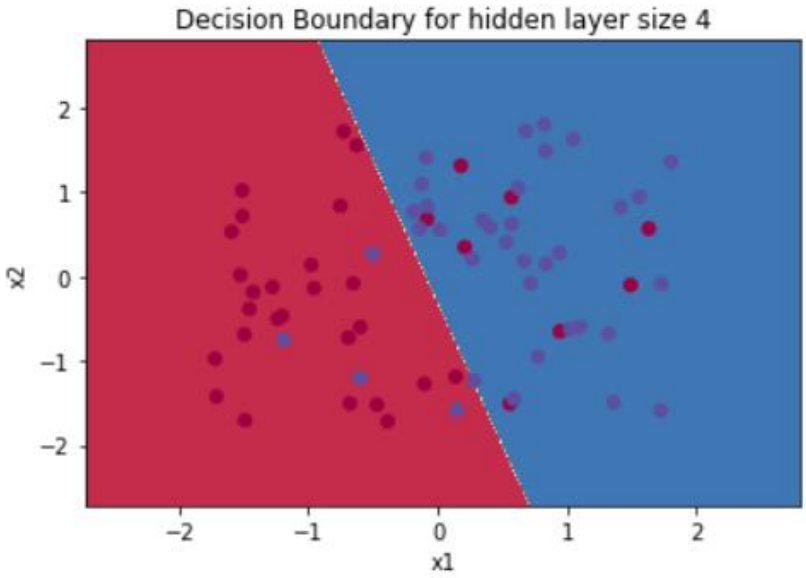
Cost Function with respect to iterations



Confusion Matrix



Decision Boundary



B) <u>Multilayer Perceptron (Sklearn)</u>

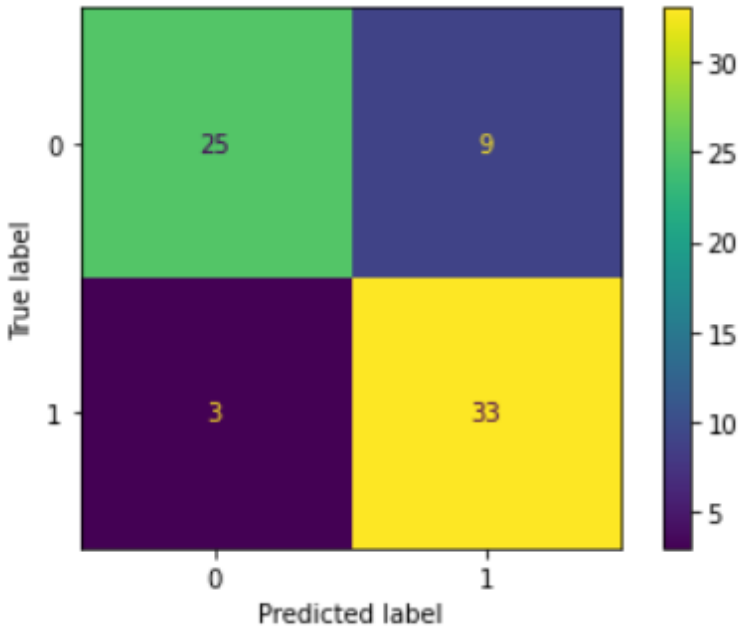
Number of nodes in hidden layer=4

First Activation Function= Tanh

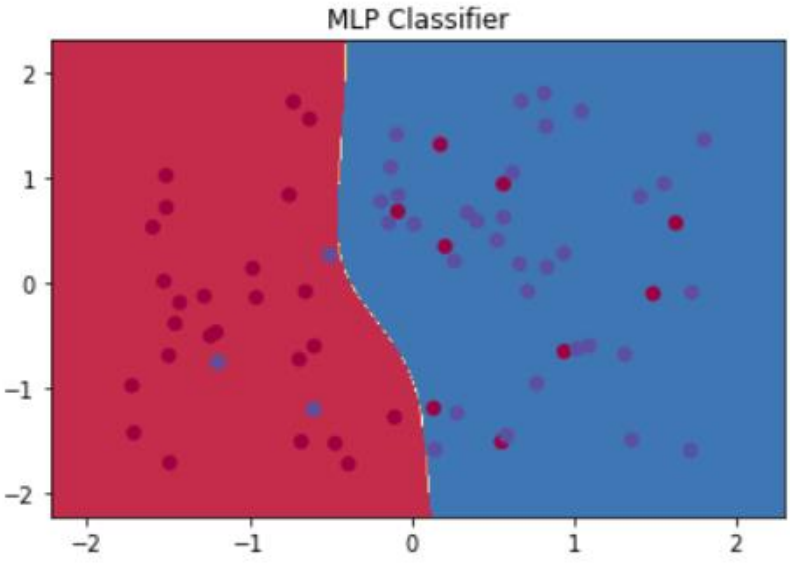
Weights: **[array ([[-0.51549643, 1.06786246, -1.79547785, 0.26240305],**
[-2.0240189, -0.18390299, -0.24005669, -0.48743185]]),
array ([[-1.40216207],
[1.90156296],
[-1.66920773],
[0.62396727]]),
array ([[1.14842685]])]

Accuracy on training set: **82.85714285714286%**

Confusion Matrix



Decision Boundary

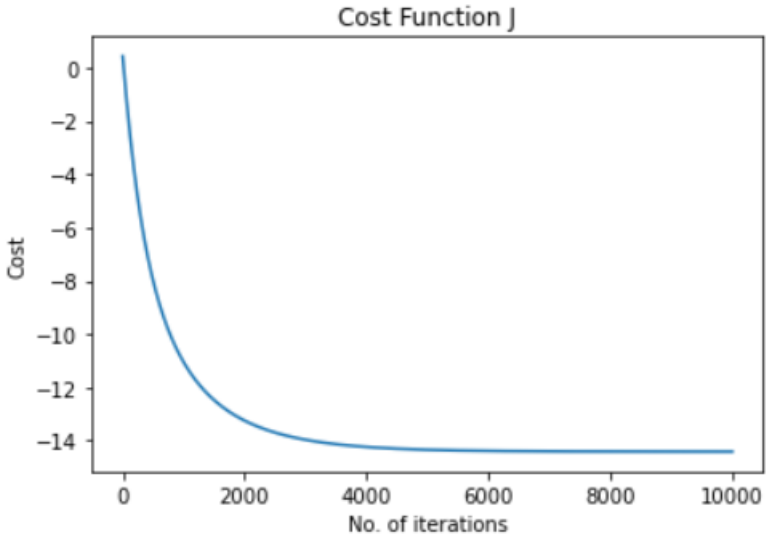


3) <u>Logistic Regression</u>

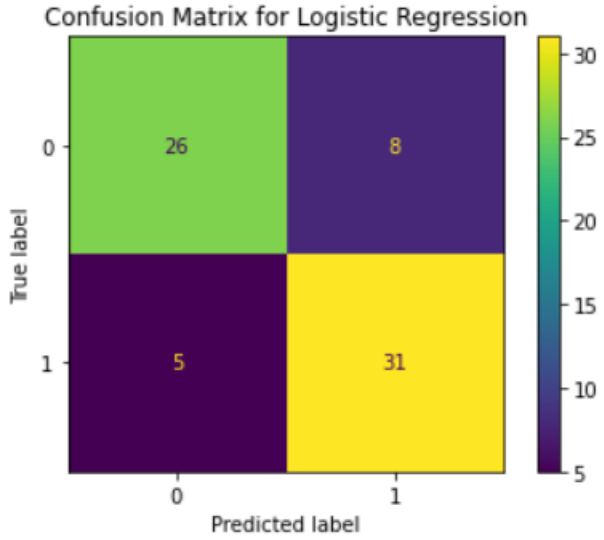
Weights**: [0.05476197 1.65037874 0.31334123]**

Accuracy on training set: **82.6086956521739 %**

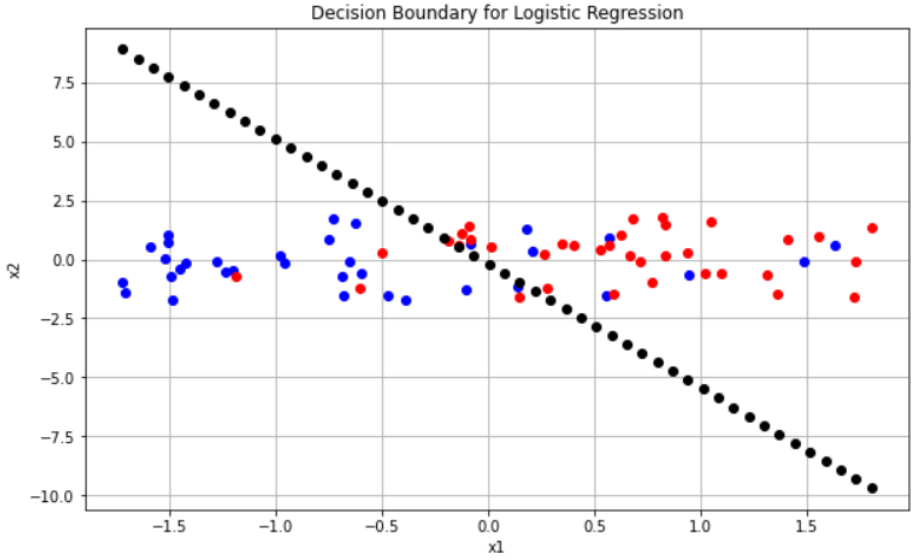
Cost Function with respect to iterations



Confusion Matrix



Decision Boundary



4) Accuracy Comparison:
MLP Classifier(sklearn)> MLP>=Logistic Regression>Perceptron

Model	True Negative	False Positive	False Negative	True Positive
Perceptron	13	21	0	36
MLP	26	8	5	31
MLP (sklearn)	25	9	3	33
Logistic	26	8	5	31