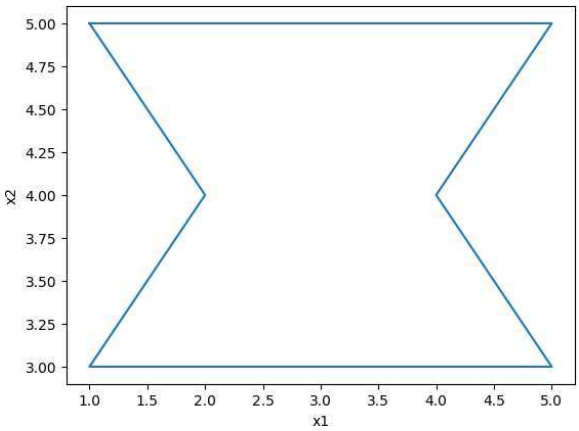
We would like to design a MLP neural network to classify points whether they are inside the shape given below or not. Note that the shape boundary points are (1,5),(5,5),(4,4),(5,3),(1,3),(2,4)

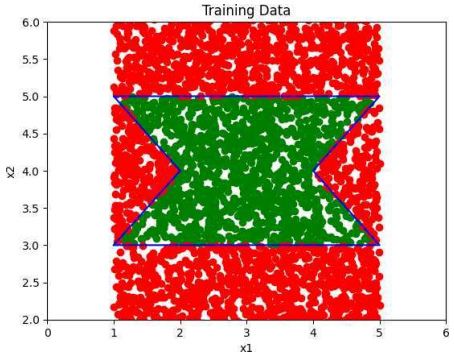


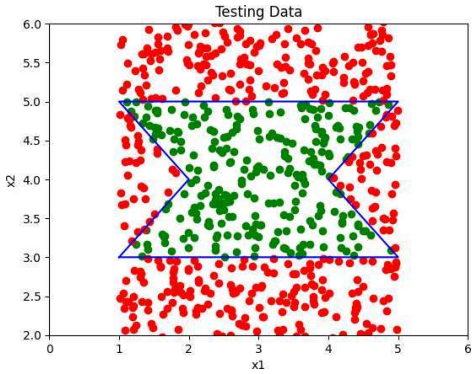
i. Design an MLP to classify points inside the given shape using 7 neurons in the first hidden layer, 2 neurons in the second hidden layer and one neuron in the output layer. Clearly show the used weights and biases. (10 points)

ii. Model your designed MLP in (i) using the derived weights and biases. (5 points)

iii. Generate a training set of 5,000 samples, and a testing set of 1000 samples. The x-axis ranges from 0 to 6 and the y-axis ranges from 1 to 7. Your generated samples should be within this boundary. (10 points)

iv. Test your model in (ii) using the generated training, and testing sets. You should get 100% accuracy. Plot the result of applying the training and testing sets to your model. Plotting the training and testing sets should show figures similar to the ones shown below. (5 points)





v. Build an MLP network with 2 inputs, first hidden layer with 7 neurons using ReLU activation function, second hidden latter with 2 neurons sing ReLU activation function and one output using Sigmoid activation function. Train your network using Adam optimizer with 100 epochs, and binary_crossentropy loss function. Report model parameters, and the training and testing accuracies. Also plot the classification results of the testing samples. You should get a figure similar to the one shown below. (10 points)