Neural Network

For Classification task:

Running the code:
- The dataset used is **diabetes.csv** provided with the .ipynb file.
- For running the code upload the dataset in the google colab.

**Defined neural network architectures:**
- There are two different types of neural network architectures defined in the code.
- First contains the 3 layers having 12, 6, and 1 number of nodes and ReLU, ReLu, and Sigmoid as the activation functions for the respective layer.
- The second contains 4 layers having 12, 8, 4, and 1 number of nodes and Relu, Sigmoid as activation functions.
- The MSE is used as a loss function.
- Adam is used for optimization.
- The Plot of Loss and Accuracy for both training and testing is provided with the number of epochs.

Test and Train accuracy:
- For the first architecture, the accuracy on the training is 84%, and test accuracy is 72.7% as shown.
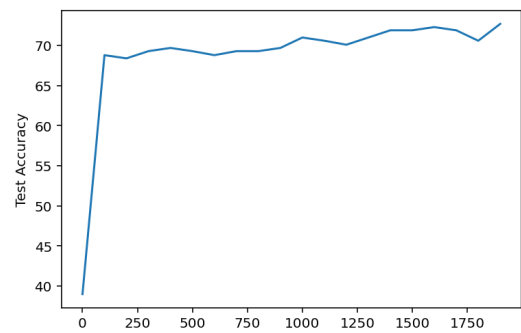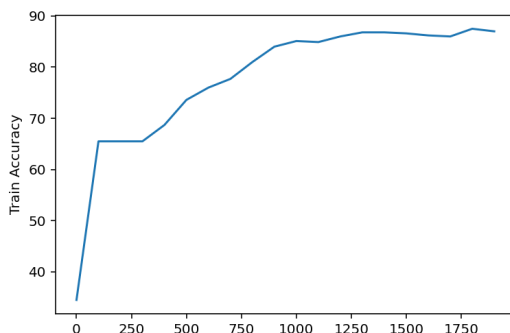
- For Second Architecture the training accuracy is 87%, and test accuracy is more than 71.9% as shown.
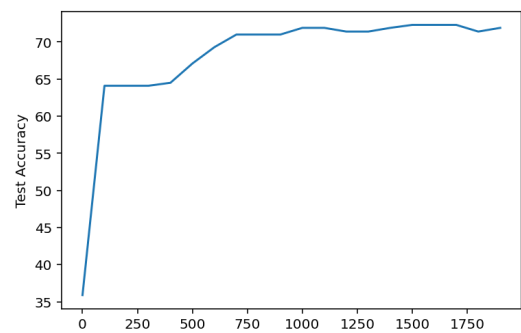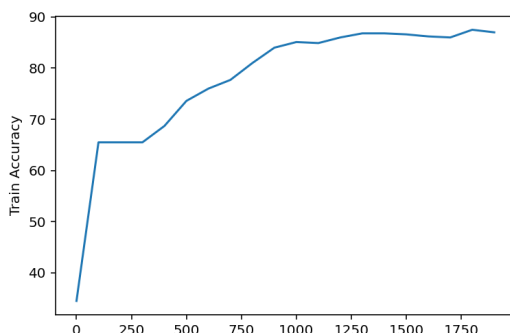
Observations:
- As the number of layers has increased the accuracy is increased.
- For activation functions, ReLu and Sigmoid give better accuracy than other functions.

For Regression Task:

Running the code:
- The dataset used is the **Boston house price prediction dataset** provided in the .ipynb file.
- For running the code just use the Run all cell command there is no need to upload any CSV file.

Defined neural network and parameters:
- The feature used for the regression task is the 5th feature.
- There is only one layer used for the regression task.
- The MSE is used as a loss function.
- SGD is used for optimization.
- The Plot of the prediction on the dataset is provided.
- The plot of loss and number of epochs is also provided.

Observations and results:
- The RMSE error observed over the prediction is 7.27%.
- The plot of prediction is as shown
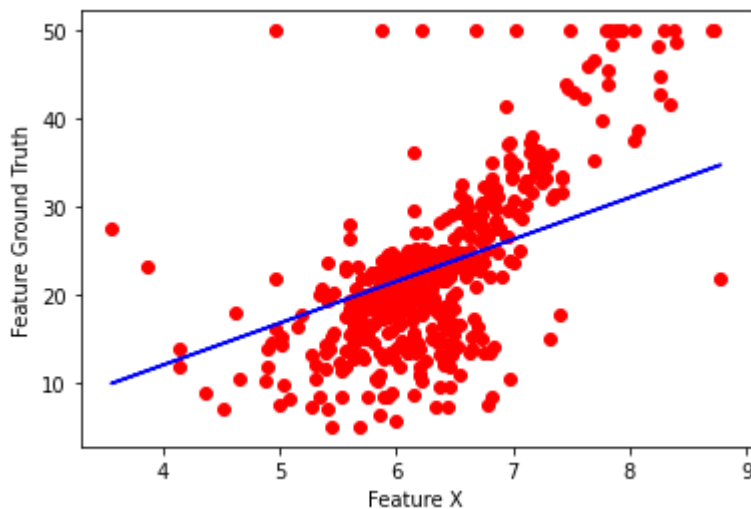
- The Plot of loss with the number of epochs is as shown.
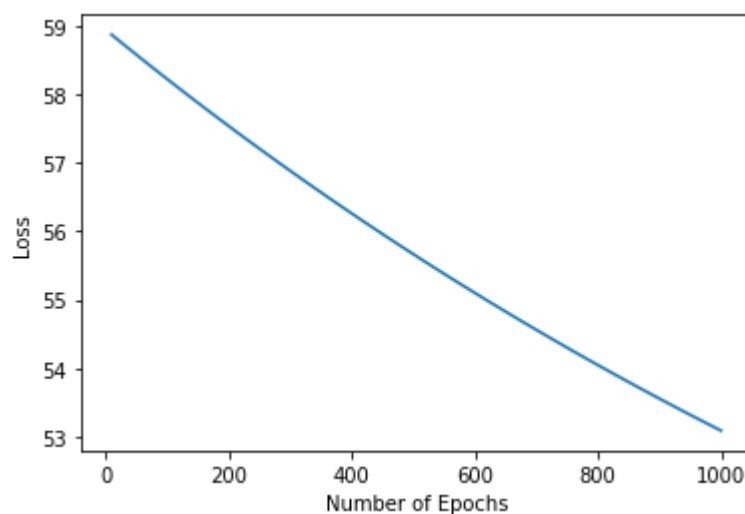
- We can observe as the number of epochs increases the loss is reduced and the prediction accuracy is increased .