Report of Assignment 1

1. After six epochs using **2 hidden layers with 16 neurons each**, the training accuracy increases continuously, but the validation accuracy decreases, indicating that the model has overfitted. A total of six more trainings were needed before applying the model to the test set in order to achieve the highest **accuracy of 87.47%**.

2. There is a very slight difference in validation and test accuracy when **3 hidden layers** are employed instead of **2 hidden layers** without changing any other hyperparameters. Due to this **saturation in accuracy**, the data set used in developing the model is no longer able to offer any further improvement in accuracy.

3. The number of **hidden layers 2** was kept constant while the number of **neurons** in each layer was increased to **32, 64, 128, 256** without changing any hyperparameters. By adding neurons to the hidden layers, we were able to **improve the validation accuracy**, whereas there was no difference in the **test accuracy**.

4. The validation and test accuracy decrease slightly when **binary-crossentropy is employed** in place of the **MSE loss function**, indicating **binary cross-entropy is superior to the MSE** loss function for our IMDB database. Nevertheless, **4 is the epoch with highest accuracy.**

5. In **comparison to relu, the tanh activation function** slightly decreases both test and validation accuracy.

6. **Dropout**: The dropout does not affect accuracy; however it does help to **reduce the loss function.**

7. A **regularized model shows a marginally higher accuracy** than an initial model, with significantly **less loss with less overfitting** compared to the initial model.