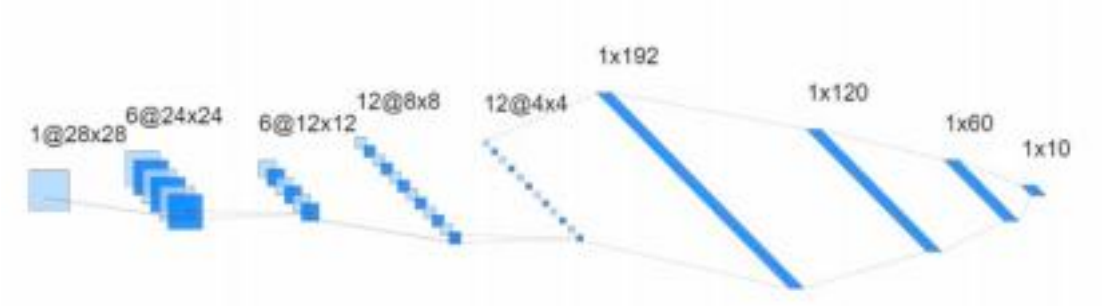
QUIZ (3)

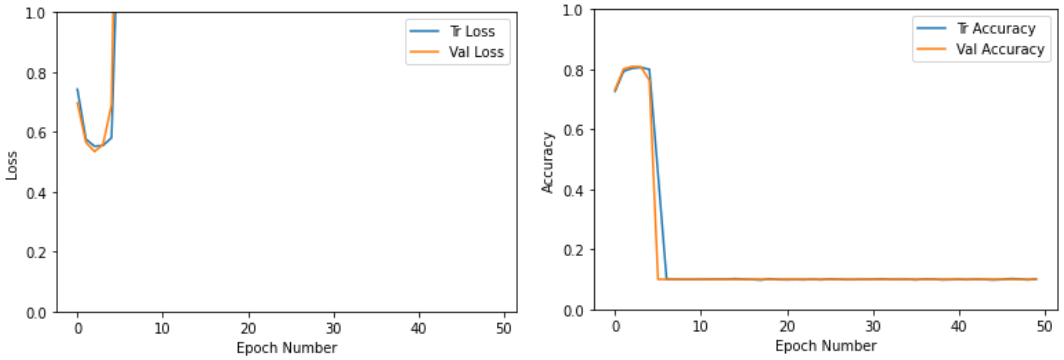
Name: Ahmed Asaad
Matric NO: G1916043

1) For the our model, we use Cross Entropy because it is multi-class classification. It It measures the performance of a classification model whose output is a probability value between 0 and 1.

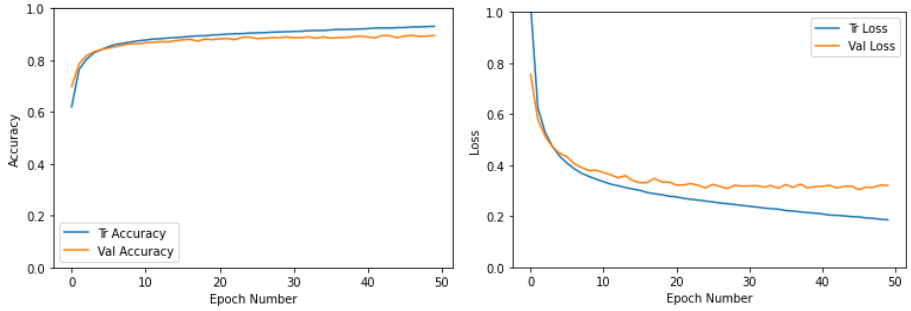
2) Using the following architecture:



I initialize the weights using the *Xavier* initialization, use *ReLU* as the activation functions, a learning rate of 0.1 with *SGD* optimizer and train the neural network for 50 epochs.
The final accuracy for training was (9.8%) and for testing was (10%) despite the accuracy at the beginning was very high (80%) before the dramatic decent in it from the sixth epoch.
The loss for training and testing was behaves differently. At the beginning, the loss was 0.7 and it was followed by the value 0.5 for the next few epochs. Suddenly, the loss increases to the value of 2 starting from the seventh epoch.



3) Keeping the Relu and changing the learning rate with 0.001 , both accuracies for training and test were very high with 93% and 89% respectively. The loss for teaining took decreasing manner starting with 0.2 and with 0.18 at the last epoch. The loss of testing was quite stable with approximately 0.3



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- Changing the function to Tanh, the last epoch accuracy was 77 and 77.9 for training and testing. And losses were 0.65 for both.
- With elu function and sigmoid, the accuracies were very low from the first epoch with 10% only. The loss was high for both training and testing .
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- When I increased the learning rate to 0.5 and 10 , the accuracies were very low from the first epoch with 10% only. The loss was high for both training and testing .

4) Using the dropout(0.3) and (0.1) with learning rate of 0.1 there was no change in the output. Fixing the dropout(0.9) the result was unexpected. Instead of increasing in the accuracies, they went down.