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First we have created the x and y lists for train, dev and test(only x). Next we create a dictionary of all the words in the dataset. And a label_dict of all the unique tags in the dataset. Next we vectorize the train lists which will be a list of list where each list is a sentence to feed our model. Similarly we make a vectorized list of the labels based on the label_dict. Next we find the class weights of each label.

# TASK 1

In Task 1 we prepare our BiLSTM model with generic embedding layer, use all the custom functions created for training, define loss function, optimizer and scheduler for our model and then train the model for 200 epochs. Simultaneously, also saving model after each epoch.
Hyperparameters:
Embedding dimension = 100
Hidden dimension = 256
Linear Output dimension = 128
Bidirectional = True
Dropout = 0.33
Number of LSTM layers = 1
Batch Size = 4

Loss Function = Cross Entropy with class weights
Optimizer = SGD with Learning Rate = 0.1 and Momentum = 0.9
Epochs = 200

**Q1) What are the precision, recall and F1 score on the dev data.**

```
processed 51578 tokens with 5942 phrases; found: 5609 phrases; correct: 4485.
accuracy:  95.47%; precision:  79.96%; recall:  75.48%; FB1:  77.66
              LOC: precision:  89.07%; recall:  83.40%; FB1:  86.14  1720
             MISC: precision:  82.69%; recall:  77.22%; FB1:  79.87  861
              ORG: precision:  71.93%; recall:  70.32%; FB1:  71.12  1311
              PER: precision:  75.60%; recall:  70.47%; FB1:  72.94  1717
```

# TASK 2

In the task 2 we load our glove_BiLSTM model with glove embedding layer, and use all the custom funtions created for training, define loss function, optimizer and scheduler for our model and then train the model for 50 epochs. Simultaneously, also saving model after each epoch.

Hyperparameters:
Embedding dimension = 100
Hidden dimension = 256
Linear Output dimension = 128
Bidirectional = True
Dropout = 0.33

Number of LSTM layers = 1
Batch Size = 8
Loss Function = Cross Entropy with class weights
Optimizer = SGD with Learning Rate = 0.1 and Momentum = 0.9
Epochs = 50

**Q2) What are the precision, recall and F1 score on the dev data?**

```
processed 51573 tokens with 5941 phrases; found: 5977 phrases; correct: 5355.
accuracy:  98.06%; precision:  89.59%; recall:  90.14%; FB1:  89.86
              LOC: precision:  94.10%; recall:  94.67%; FB1:  94.38  1848
             MISC: precision:  82.37%; recall:  83.08%; FB1:  82.72  930
              ORG: precision:  83.92%; recall:  84.10%; FB1:  84.01  1343
              PER: precision:  92.83%; recall:  93.54%; FB1:  93.19  1856
```