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Homework #3
https://github.com/lesliederas/5106.git

Model	Sequence	Training loss	Validation accuracy	Execution Time
LSTM	10	0.028683647513389587	0.005882352963089943	0.6176514625549316 seconds
LSTM	20	0.03386346399784088	0.005882352963089943	0.7223026752471924 second
LSTM	30	0.24627180099487306	0.023076923191547395	174.35118126869202 seconds
RNN	10	0.24858810901641845	0.005882352963089943	0.35882139205932617 seconds
RNN	20	0.2593832969665527	0.020000000298023225	0.44878554344177246 second
RNN	30	0.2385451078414917	0.023076923191547395	0.5389614105224609 seconds
GRU	10	0.25919246673583984	0.005882352963089943	0.53128981590271 seconds
GRU	20	0.2599127769470215	0.013333334028720856	2.1812620162963867 seconds
GRU	30	0.26486184597015383	0.007692307978868484	1.177968978881836 seconds

1).For the Table above it very well is broken up into the different types of models, sequence length, training loss, validation loss and execution time.For the LSTM model as the sequence length increases so does the training time, also the execution time increases so it take longer for the sequence to execute.For the validation accuracy the values increases as the sequence increased. For the RNN Models as the sequence loss increased the training loss decreased not by much but there was a small decrease.For the RNN Model as the sequence length increases the validation accuracy increases with a substantially big jump from the sequence length of 10 to 20. The execution time increases but that is to be expected the longer the sequence the longer it takes to execute. Last the GRU Model shows as the sequence length increases so does the training loss although it is a small increase, it does still increase. As for the validation accuracy the sequence increases from 10 to 20 the accuracy increases but as the sequence length increases from 20 to 30 the accuracy decreases.Lastly you see the same patterns happen with the execution time that the execution time increase as the sequence length goes from 10 to 20 but then decreases as the sequence length changes from 20 to 30.

Model	Sequence	Training loss	Validation Accuracy	Execution Time
GRU	20	1.7880204	47.26437296873249	546.8918902873993 seconds
GRU	30	1.7794324	47.34010839500971	804.4503381252289 seconds

GRU	50	1.782997	47.293886644939455	1295.1732506752014 seconds
LTSM	20	1.6021386	53.04225036422728	354.9217369556427 seconds
LTSM	30	1.591431	53.40180120409014	553.6715137958527 seconds
LTSM	50	1.587942	53.425173376847525	852.777759552002 seconds

From the table above for the LSTM model the training loss decreases as the sequence increases but the decrease is very gradual showing very little change as the sequence went from 20 to 30 and also a very small change as the sequence went from 30 to 50. As for the validation accuracy and the execution time increased as the sequence length increases which for the execution time it makes sense the longer the sequence the more time it needs to execute.As for the validation accuracy it also had a gradual increase from 20 to 30 and from 30 to 50 in sequence length. From the table above the GRU model the training loss decreases as the sequence length increases. Also shown in the table above the validation accuracy and execution time as the sequence length increases. From the tiny Shakespeare model the training loss fluctuates but not by much and as the sequence length increases the training loss decreases. For the Validation accuracy has the sequence length increase so does the accuracy increases as well along with the execution time increases as the sequence length increases, with the type of model not having much effect.