Mini Project -3
CS 6957
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1. Ngram model – Implemented the 4-gram model.
   Total number of parameters or the probability conditions: 986440

   (4grams probability conditions + 3grams probability conditions = 831521 + 154919 = 986440)

   Test Perplexity: 17.85244436020036

2.

Models	Test Perplexity	No of parameters
1-layer LSTM	4.9742	371558
2-layer LSTM	4.9082	693158

3. 4-gram model has test perplexity = 17.85 with number of parameters 986440 whereas, for 1-layer LSTM, the number of parameters are 371558 which is around 1/3rd of the parameters used in 4-gram model. Though the parameters are less in the LSTM model, text perplexity value is quite less as compared to the 4gram model. This is because in LSTM model, each character learns the embedding based on context and captures long range dependency. However, in 4-gram, the probability of next character only depends on three previous characters. So, lack of long-range dependency. 2-layer LSTM has around 700K parameters which is again less than 4-gram and its text perplexity is better than both 4-gram model. While using 2-layer LSTM the text perplexity marginally improved as compared to 1-layer LSTM.

4.
   ### 2 Layer LSTM

1. "The little boy was a contract inellectual profession, while he had been taken worhilled their inquiried, bedsider the short gear Of the captories Gallust so-cutton's paths, and lessel will continued to a lace of our Pa"

2. 'Once upon a time in this weary bitters, lastly: Hardcrose of the commevies and pulking over her, The inhabitances; the fire was in sort of the main sterns and presently different, and of eBook a long of unwhattics made '

3. 'With the target insists of suggestious, at least roariously an importance, a notion of permant for that happiness, and lost ask their mileson, "Ay_ then more right," he appeared; Framping sympathe memorsy persons wheth'

4. 'Capitals are big cities. For example, the allow should country astonished, and the second man left the men beautily against the boak with pictures of the flool. Not the warm that he dewedded, That who tried to me in a people; then pouse '

5. 'A cheap alternative together and proclaimed this admiltical increas street perhaps I find when they should take night, and this delicks were permanetials; and often demonstrict, in its story of themself. His servances had '

1 layer LSTM

1. 'The little boy was caught idea through the arm, the length of the threavoet, there was incesping on a light to Snow. One human waying time, whether the going clegridence. He was vanished; soozing the spoke, and be-litt'

2. 'Once upon a time in Elingon. The doors was passed upon a turn:\n.But copies, Occelliner's court, the marridery 1.E.3. If you seem donote: this is of the complying animals them. We meet you bace but Her eyemed from A mide'

3. 'With the target in Paris, where a look. It misterned sense; made at length, as the other not miss and truth, proucheted wound; and I shall not consider to years and relation; to the negement, to the votue till by the d'

4. 'Capitals are big cities. For example, and the good place."\n) he'd drawn almost use to the bignion who deep making, like an any of this straw to the Jafe togetion of the ceasibility and view are in the agreement, substed a half-course of '

5. 'A cheap alternative todic, had a left hang was ever come within a most bally town what I benerated by only consequence that on you are going similar books from it, had not God, whether I must part of the Molor, say the pre'