a. NLP to me is using text data to gain some sort of valuable insight. Like with applied machine learning problems, the objective is to prove the stakeholders with some business value, the only difference is that we now have text data. So, there are specific transformations that can be done on text data so that insights can be extracted.

b. NLP is a part of AI that specifically deals with text data. AI concepts and other components such as deep learning and machine learning can be combined with NLP to extract very meaningful insights.

c. NLU uses syntactic and semantic analysis of text and speech to determine the meaning of a sentence. While NLU focuses on computer reading comprehension, NLG enables computers to write. NLG is the process of producing a human language text response based on some input data.

d. Language translation, chatbots, sentiment analysis

e. Rule-based approaches are the oldest approaches that started in the 1960s. These are still sometimes used today because they have been proven to work very well. These methods involve providing specific rules to text, essentially using arbitrary filters to the text data. This is usually done using regular expressions and context free grammars. These methods tnd to focus of pattern-matching or parsing, can be often though of as "cookie-cutter" methods, and have low precision and high recall meaning that they perform well in some specific cases but bad when generalized. Examples of this involve using regex for pattern matching.

Statistical and probabilistic methods usually involve likelihood maximization and linear classifiers that started in the 1980s. These methods are characterized by using training data in the form o a corpus with markup, feature engineering with common features being word type, surrounding works, capitalized and plural. Also, these models use a training model on paraments and follow up fitting a model on test data, which is typical of most machine learning problems. Lastly, they use inference characterized by finding the most probable words, the next word, best category, etc. An example of this is using naïve bayes classifier.

In the deep learning approach that started in the 2010s, the methods typically use the same foundations as the statistical and probabilistic approach with a few differences. For example, feature engineering is skipped because the neural networks will learn important features, this is the big benefit of using neural networks for NLP. Also, streams of raw parameters like words without engineered features are fed into the neural networks, and the models use a very large training set. Typically, recurrent and convolutional neural networks are used.

f. My personal interest in NLP is in recommender systems. Earlier this year I started working on an anime recommendation engine using data from a website called MyAnimeList, an anime database containing anime data like description, genre, user ratings, user reviews, studio etc. I originally wanted to create a system that used NLP techniques to find similarities in the tone of reviews and descriptions of the anime but my lack of understanding of NLP techniques to accomplish this posed a huge road block for me. I hope to learn techniques in this class to make

a god anime recommendation engine so I don't have to spend hours browsing through MyAnimeList manually looking for an anime to watch.