a. define NLP in your own words:

NLP is teaching a computer to understand the subtext and meaning behind a language.

b. describe the relationship between AI and NLP:

NLP is a subset of AI that can be used to better Ai or stand alone. For Ai that uses or interacts with human language, NLP is used to help understand the wanted task and automate responses or actions.

c. write a sentence or two comparing and contrasting natural language understanding and natural language generation

Language generation tries to create english text based on a prompt or data set just like chatGPT. Language understanding tries to understand the context and meaning behind a sentence which is that cool part I am really interested in.

d. list some examples of modern NLP applications

Siri and Alexa, voice controlled things, most chatbots are automated using NLP, also spam email filters, and text suggestions.

e. write 3 paragraphs describing each of the 3 main approaches to NLP, and list examples of each approach

Rule based is like a parser in my brain. It’s found in simple filters like when my CS professor filters out emails that don't fit a specific format. Or the spell checking that I'm using right now on Google Docs. This text editor doesn’t understand these words but it does have a set of grammar and syntax rules that it can check my work against. Whenever I break a “rule” then a little red squiggly line appears. Those are when rule based NLP is useful, when the context isn’t needed just the rule set.

Machine Learning (ML) based NLP is based on training and data sets. It uses a bunch of known algorithms to classify data such as classifying an email as spam or not spam. These programs take a lot of training and tweaking to make sure they are accurate at doing the job set out for them, but do a bad job at growing and adjusting to new spam or new patterns emerging that differ from the training data. Decision trees, k-nearest neighbors, and other supervised training techniques may be good initially but can fall off in the long run.

Deep learning based NLP is great but expensive. It uses a lot of background and hidden processing to calculate and learn which words are important and the context behind a sentence.

Context can be helped by representing words as vectors to other words that have similar meaning. An “Attention mechanism” can also be used in Deep Learning to pick out the important characteristics of a sentence so less time is spent on unnecessary words. Deep learning doesn’t use the same kind of formatting for words, it just accepts the raw data. But the big downside is the expensive of massive computing power and the need for large large amounts of data to train the Deep learning program.

f. write a paragraph describing your personal interest in NLP and whether/how you would like to learn more about NLP for personal projects and/or professional application

My personal interest for NLP stems more from the language understanding subsection as opposed to lemmexing, cleaning text format, and other NLP techniques. I hope to one day use natural language understanding in a personal project to analyze song lyrics and better categorize songs. While genre is a good way to categorize music I am a lyrical person, meaning the music I listen to comes from so many different genres but they all share similar lyric or lyrical meaning. If I could create a program to analyze and organize my songs I would be excited to have a real world use for the knowledge gained from this class.