Overview of NLP

a. NLP is a fundamental part of human computer communication. Humans communicate with written and spoken language whereas computers only understand binary.
In my opinion NLP is the bridge that connects these two, it is how computers can understand human language.

b. The relationship between NLP and AI is like a Parent and Child, NLP falls under the umbrella of AI. Artificial Intelligence is a broader term that encompasses different fields such as ML and NLP.

c. Natural Language Understanding and Natural Language Generation are similar in that they are both interactions between a computer and a person. However they are different in that Natural Language Understanding is communication from a human to a computer where the computer understands what the human is speaking or writing. And Natural Language Generation is communication from a computer to a human where the computer generates language in the form of speech or text.

d. IBM Watson
Dall E
Email Classification

e. Rule Based Approach is the oldest and simplest approach to NLP. The accuracy is not the greatest and may lead to inaccurate results. Some examples of this are RegEx and context free grammars. Another obvious inaccurate example is stemming where a word is stored as its stem rather than in its entirety. These focus on pattern matching and parsing.

Statistics is the second approach which uses probabilistic modeling, likelihood maximization, and linear classifiers. Essentially statistical interference was used so machines automatically learned rules. This was primarily on the rise around 1990. An example is part of speech tagging which use hidden Markov models. Another example is cache language models. This approach was more effective and accurate than the rule based approach.

The last and most accurate approach is using Neural Networks for NLP. The shift from statistics to neural networks happened in the 2010s. Although the neural network approach requires large amounts of data, this approach is the most favored one as it has the best results. An example is the use of word embeddings to understand properties of words. Another example is deep learning which is used to bypass the rules the other approaches needed to make decisions.

f. I am a psychology minor and my interests lie in abnormal psychology. A very real problem we discuss in class is the lack of trained professionals who
are qualified to be a psychiatrist. This leads to inflated prices for basic care and people with real issues turn to cheaper alternatives like mobile apps which claim to do the work of a psychiatrist.

As a computer science major, I believe this can be done, but the current state of the technology is detrimental and causes a lot of harm.
This is a personal project which I am very passionate about and is the core reason why I am enrolled in this class.