Assignment 0

A) From my personal experience, I always knew that natural language processing is a branch in Artificial Intelligence. As the name suggests, I believe NLP help computers understand the human language to perform a task or process using algorithms.

B) As mentioned above, AI is broader, thus NLP is a part of AI. Artificial Intelligence can be programmed to make certain decisions, preform task, and learn from the results. When you take AI and focus it on human linguistics, you get NLP. NLP allows computers to interpret, understand, and manipulate the human language.

C) Natural language understanding means that each party understood what the other person said, and natural language generation is the formation of spoken responses.

D) Some examples of modern NLP applications include:
    a. Search results
    b. Language translation
    c. Recommender systems based on key words of products/services you have purchased
    d. Automated email reply
    e. Text analytics
    f. Auto correct
    g. Speech recognition
    h. ChatBots

E) Rules-bases Approach – This approach is the oldest in NLP. An example of this involves context-free grammar, which lists production rules for sentences. These production rules could be used either to generate syntactically correct sentences, or to check whether sentences are grammatically correct. The issue with this technique is that the human language is too complex and can't be encapsulated fully in rules. The Eliza chat bot is a great example for this method.

Statistical and probabilistic approaches – An example to illustrate this definition would be counting words and finding the probabilities of words and sequences of words led to useful language models. This model resembles a machine translation system. This strategy became more popular as more data became available. Classic machine learning algorithms like Naïve Based, Decision Trees, and SVM's are used to solve NLP problems. This approach is more sophisticated than a rules-based approach. An example would include a model of translating big sister in English to another language to infer that the meaning is referring to older sister and not large sister.

Deep learning – As more data became available and more processing power increased, creating small neural networks are widely used in NLP applications. This process is to make more and more human sounding interactions possible. An example of this application is speech recognition.

F) I want to learn more of the foundational concepts and techniques in NLP. This is also a great opportunity for me to strengthen my skillsets in python. I learn better implementing projects, so I'd love to learn more about NLP for personal projects. In my previous semesters, I've taken AI and ML and coded assignments in Java without using libraries, which was brutal. So, hopefully learning new libraries will make things much easier.