Overview of NLP

1. In my own words, natural language processing is a field in which we attempt to teach machines (whether through rule based or machine learning techniques) to understand natural language and to generate natural language.
2. Natural language processing is a subfield of artificial intelligence. The field of AI is concerned with intelligent systems capable of learning how to perform tasks (which could range from playing chess to analyzing market trading patterns), and as generating/understanding language is a task that can be given to machines it falls under the umbrella of AI.
3. Natural language understanding is to help a machine understand language. I would see topics related to this being sentiment analysis and any form of classification task (such as classifying a text as an 'argument' or a 'not argument'). It is also necessarily involved in any task involving semantics, where understanding meaning of text is required. Natural language generation is concerned with the generation of text. In my understanding, NLG is more straightforward than NLU simply because NLU must be able to turn all the possible semantic meanings of a given text into a vector representation, whereas NLG is the conversion of that vector representation to a grammatically correct natural language representation, which can be constructed with greater accuracy using rules-based approaches or statistical models.
4. Question answering, sentiment analysis, text classification (many different classification tasks), translation, summarization.
5. The 3 main approaches to NLP are:
    a. Rules-based: Decision trees(?), K-Means(?), expert systems.
    b. Probabilistic/Statistical: Naïve Bayes and logistic regression.
    c. Deep Learning: RNNs, LSTMs, transformers.
6. My interest in NLP originally stemmed from science fiction depictions of intelligent AI. Obviously as my knowledge in the field has developed, I have realized that we are still very far away from arriving at this promise. Regardless, my interest in NLP has always been with the possibility of automatic dialogue generation/question answering, as this implies that the machine is capable of understanding language. I want to further develop my knowledge in NLP for two reasons:
    1. I am currently working with Dr. Ng on an NLP project to develop an argument ranking model, and I believe knowing more about NLP would help me.
    2. I want a career working as a researcher in NLP, whether that be in academia or in industry.