Mid-term test
Natural Language processing questions

Choose 7 questions from the list and write detailed answers to them. Submit the document with answers to Google Class.

1. Word representations: basic approaches (BoW, TF-IDF).
2. Word embeddings (word2vec: key ideas, linearity, skip-gram, negative sampling).
3. Seq2seq model. Beam search.
4. Machine translation metrics.
5. Attention and self-attention mechanisms.
6. Transformer: architecture (encoder and decoder) and training tips.
7. Ways of encoding positional information in Transformers: positional encodings with sin/cos (from “Attention is all you need”), trainable encodings (like in BERT), relative positional embeddings, rotary embeddings, ALiBi embeddings.
8. BERT: main ideas (masked language modeling, pre-training on two tasks).
9. GPT: architecture, masking, results on popular benchmarks.
10. Compare WordPiece and BPE tokenizers.
11. Permuted Language Modeling. XLNet and MPNet main ideas.
12. RoBERTa, BART, ELECTRA. Sparse attention (BigBird).
13. Prompt engineering: in-context impersonation, chain-of-thought, knowledge generation, least-to-most prompting.
14. Scaling laws: Kaplan vs. Chinchilla.
15. PEFT: Adapters, LoRA, QLoRA, KronA, Prompt Tuning, P-tuning, Prefix Tuning, IA3.