1. Given a sentence aligned corpus \{das Haus - the house, das Buch - the book, ein Buch - a book\},
calculate the lexical probabilities of
   \- \( t(\text{the}|\text{das}) \)
   \- \( t(\text{house}|\text{das}) \)
   \- \( t(\text{book}|\text{das}) \)
   \- \( t(\text{a}|\text{das}) \)
after the first iteration of EM.

2. Given the sentence pair \textit{the house} - \textit{la maison}, calculate \( p(a, f|e) \) for all alignments and then perform the factoring-out trick.

3. Provide examples where unigram, bigram, trigram and 4-gram language models would fail to capture a grammatical constraint of the English language.