Computing Translation Probability

- Probabilistic model for phrase-based translation:

$$\mathbf{e}_{\text{best}} = \text{argmax}_{\mathbf{e}} \prod_{i=1}^{I} \phi(\bar{f}_i | \bar{e}_i) \, d(start_i - end_{i-1} - 1) \, p_{\text{LM}}(\mathbf{e})$$

- Score is computed incrementally for each partial hypothesis

- Components

  Phrase translation Picking phrase $\bar{f}_i$ to be translated as a phrase $\bar{e}_i$
   $\rightarrow$ look up score $\phi(\bar{f}_i | \bar{e}_i)$ from phrase translation table
  Reordering Previous phrase ended in end_{i-1}, current phrase starts at $start_i$
   $\rightarrow$ compute $d(start_i - end_{i-1} - 1)$
  Language model For n-gram model, need to keep track of last $n - 1$ words
   $\rightarrow$ compute score $p_{\text{LM}}(w_i | w_{i-(n-1)}, ..., w_{i-1})$ for added words w_i