

**Input:** word alignment  $A$  for sentence pair  $(e, f)$

**Output:** set of phrase pairs  $BP$

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1: for  $e_{start} = 1 \dots \text{length}(e)$  do
2:   for  $e_{end} = e_{start} \dots \text{length}(e)$  do
3:     // find the minimally matching foreign phrase
4:      $(f_{start}, f_{end}) = (\text{length}(f), 0)$ 
5:     for all  $(e, f) \in A$  do
6:       if  $e_{start} \leq e \leq e_{end}$  then
7:          $f_{start} = \min(f, f_{start})$ 
8:          $f_{end} = \max(f, f_{end})$ 
9:       end if
10:    end for
11:    add  $\text{extract}(f_{start}, f_{end}, e_{start}, e_{end})$  to set  $BP$ 
12:  end for
13: end for
function  $\text{extract}(f_{start}, f_{end}, e_{start}, e_{end})$ 
1: return  $\{\}$  if  $f_{end} == 0$  // check if at least one alignment point
2: // check if alignment points violate consistency
3: for all  $(e, f) \in A$  do
4:   return  $\{\}$  if  $e < e_{start}$  or  $e > e_{end}$ 
5: end for
6: // add phrase pairs (incl. additional unaligned f)
7:  $E = \{\}$ 
8:  $f_s = f_{start}$ 
9: repeat
10:   $f_e = f_{end}$ 
11:  repeat
12:    add phrase pair  $(e_{start} .. e_{end}, f_s .. f_e)$  to set  $E$ 
13:     $f_e++$ 
14:  until  $f_e$  aligned
15:   $f_s--$ 
16: until  $f_s$  aligned
17: return  $E$ 
```