

## Problem 1.2

- (a) ITHINKTHATISHALLNEVERSEEABILLBOARDLOVELYASATREE
- (b) LOVEISNOTLOVEWHICHALTERSWHENITALTERATIONFINDS
- (c) INBAITINGAMOUSETRAPWITHCHEESEALWAYSLEAVEROOMFORTHEMOUSE

## Problem 1.4

## Problem 1.5

For simplicity's sake, I'll be using A, B, C, D as the alphabet.

- (a)  $4! = 4 \cdot 3 \cdot 2 \cdot 1 = 24$  possible substitution ciphers
- (b)
  - (i) For no fixed letters, A can map to B, C, or D, so...  
 $3 \cdot 2 \cdot 1 = 6$  possible substitution ciphers that have no letters fixed
  - (ii) For at least one fixed letter, we have 4 choices for the fixed letter, and then we simply deal with a 3-letter alphabet  
 $4 \cdot 3 \cdot 2 \cdot 1 = 24$  possible substitution ciphers that have at least one letter fixed
  - (iii) For only one fixed letter, we have 4 choices for the fixed letter, and then we simply deal with a 3-letter alphabet without any fixed letters, so...  
 $4 \cdot 2 \cdot 1 = 8$  possible substitution ciphers that have one letter fixed