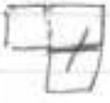
[4] P(n): For any shape composed of n attached unit squares, the the length of its periphery is even.

$\forall n \in \mathbb{N}\ n > 1,\ P(n)$

1. Base Case: $n=1$
   - ☐ has periphery 4, even. ✓

2. Inductive Case:
   1. Case 1: If you add one unit square to another lone unit square (per. len. = 4) you lose 1 len. of per. and gain 3 for a net total 2

   2. Case 2: Add 1 unit sq. to one sq. of an already existing group lose 1 gain 3 net 2



   3. Case 3 Add 1 unit sq. to two sqs of a group - lose 2 gain 2 net 0,

   4. Case 4 Add 1 unit sq. to a group of 5 surrounding sqs, lose 3 gain one net -2

   5. Case 5 Add 1 to a group of 8 surrounding sqs gain 0 lose 4 net -4.

   6. Given a group, size n, assume it is even in periphery.
   7. A group size $(n+1)$ will always have even periphery, regardless of where on the