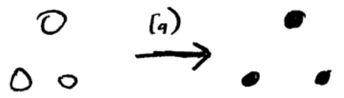
Because $n \equiv 1 \pmod 3$, the last row will begin with A and there will be one more A than the number of B or the number of C, Let $[x]$ denote the number of xs, where $x \in \{A, B, C\}$.

$$[A] = [B] + 1 = [C] + 1 \qquad (1)$$

Each time three lights are flipped, the parity of A's that are on flips, and the parity of B's and the parity of C's. Because all lights start off with the same parity (0 on) and must end with different parities ([A] is different from [B] and [C]), it is impossible to find a sequence of moves to flip them all on when $n \equiv 1 \pmod 3$.

Case 2: $n \equiv 2 \pmod 3$

This is clearly true for the base case, $n = 2$.



Assume it is true for $n = 3k+2$, where $k \in \mathbb{Z}^+$ or $k > 0$.

We wish to show we can do it for $n = 3k+5$.