Problem 6 (due Monday, April 24)

Non-negative integers d_i, $i\in \mathbb Z$, satisfy the following condition: \[d_k=|\{i<k: d_i+i\geq k\}|\] for every integer k. Prove that there is a positive integer n such that \[d_k\in \{n-1,n\}\ \ \text{and}\ \ d_{k+n}=d_k\] for every integer k.

Only one solution was submitted, by Prof. Vladislav Kargin. His solution is different from our original solution. For details see the following link Solution.