

Minimum Garden Perimeter to Collect Enough Apples

In a garden represented as an infinite 2D grid, there is an apple tree planted at **every** integer coordinate. The apple tree planted at an integer coordinate (i, j) has $|i| + |j|$ apples growing on it.

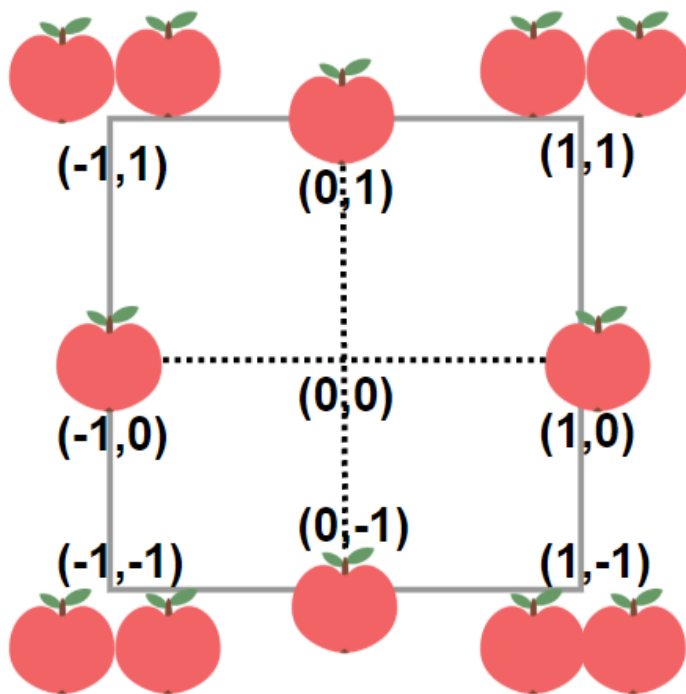
You will buy an axis-aligned **square plot** of land that is centered at $(0, 0)$.

Given an integer `neededApples`, return the **minimum perimeter** of a plot such that **at least** `neededApples` apples are **inside or on** the perimeter of that plot.

The value of $|x|$ is defined as:

- x if $x \geq 0$
- $-x$ if $x < 0$

Example 1:



Input: `neededApples = 1`

Output: 8

Explanation: A square plot of side length 1 does not contain any apples.

However, a square plot of side length 2 has 12 apples inside (as depicted in the image above).

The perimeter is $2 * 4 = 8$.

Example 2:

Input: neededApples = 13

Output: 16

Example 3:

Input: neededApples = 1000000000

Output: 5040

Constraints:

- $1 \leq \text{neededApples} \leq 10^{15}$